Preliminary Construction Environmental Management Plan

Theodore Wind Farm

PREPARED FOR

Theodore Energy Developments Pty Ltd

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Preliminary Construction Environmental Management Plan

Theodore Wind Farm

0661076

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
BESS	Battery Energy Storage System
CEMP	Construction Environmental Management Plan
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DTMR	Department of Transport and Main Roads
EP Act	*Environmental Protection Act 1994*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ERM	Environmental Resources Management Australia Pty Ltd
ESCP	Erosion and Sediment Control Plan
FDI	Fire Danger Indicator
Ha	Hectares
HSE	Health, Safety and Environment Advisor
Km	Kilometre
NC Act	*Nature Conservation Act 1992*
PO	Performance Outcome
The Proponent	Theodore Energy Development Pty Ltd, a wholly owned subsidiary of RWE Renewables Europe & Australia
The Project	Theodore Wind Farm
SDAP	State Development Assessment Provision
SDS	Safety Data Sheet
SMP	Stormwater Management Plan
State Code 23	State Code 23: Wind farm development
SWMS	Safe Work Method Statement
VM Act	*Vegetation Management Act 1999*
VMP	Vegetation Management Plan
WTG	Wind Turbine Generator
WONS	Weeds of National Significance

1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (**ERM**) has been engaged by Theodore Energy Development Pty Ltd (**TED**) / (**the Proponent**) to prepare a Preliminary Construction Environmental Management Plan (**CEMP**) for the proposed Theodore Wind Farm located approximately 22 km east of the township of Theodore, Queensland (herein referred to as the Project).

The CEMP has been prepared for the area considered for the Project (herein referred to as the Project Area).

The Project consists of up to 170 WTG and ancillary infrastructure including, but not limited to, access tracks, substations, overhead and underground electrical cabling, hardstands, and an operation and maintenance compound. In order to facilitate connection to the electricity grid, TED is working with Powerlink to determine the optimal connection point to the existing network. The Project is being developed across 9 land parcels, 8 freehold lots and 1 lands lease lot (currently being converted to freehold), on alluvial plains with non-remnant grasslands predominantly used for agricultural grazing.

The Proponent has identified the proposed design and layout, and as such, potential impacts as a result of the Project have been identified. Baseline management measures are required to avoid or minimise these impacts to the greatest extent possible through the construction process.

1.1 PURPOSE

The purpose of this CEMP is to provide an overview of key infrastructure required for the Project, outline the potential impacts from the Project, and to provide baseline management and mitigation measures for these potential impacts.

This Preliminary CEMP has been prepared to support the Development Application (**DA**) for the Project in accordance with the Queensland State Development Assessment Provisions (**SDAP**) State Code 23: Wind farm development (**State Code 23**). The purpose of this preliminary CEMP is to demonstrate compliance with the performance outcomes (**POs**) relating to construction management of SDAP State Code 23.

In accordance with PO16 of State Code 23 this Preliminary CEMP addresses potential project impacts to environmental values, water quality objectives and amenity. A separate Traffic Impact Assessment has been prepared to address the Projects potential impacts to the local transport networks and infrastructure during construction.

It is anticipated that this Preliminary CEMP will provide the management and mitigation measures to support construction, as well as roles and responsibilities for key parties, with a Final CEMP to be prepared prior to commencement of construction. baseline foundation for the detail CEMP that is to be prepared once the Project has undergone the detailed design phase. Additional information may also be required by the Department of Climate Change, Energy, the Environment and Water (**DCCEEW**) to support the *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**) assessment process.

1.2 SUITABLY QUALIFIED PERSON

Management measures noted in this preliminary CEMP have been subject to technical review by Dr David Dique, a 30-year experienced ecologist. Additionally, David led all field survey design which identifies the species of interest for the Project Area and informed required avoidance and mitigation strategies.

2. CONSTRUCTION ENVIRONMENTAL MANAGEMENT FRAMEWORK

2.1 ROLES AND RESPONSIBILITIES

The Project construction team is divided into numerous roles, including:

- The Proponent;
- The Principal Contractor;
- All other personnel (including contractors).

The responsibilities of each of the above listed roles are outlined in **Table 2-1**.

TABLE 2-1 ROLES AND RESPONSIBILITIES

Roles	Responsibilities
Proponent	• Responsible for obtaining primary State and Federal approvals for the Project, with secondary consents a shared responsibility between the Proponent and Principal Contractor; and • Responsible for reviewing all plans prepared for the Project.
Principal Contractor	• Preparation of site-specific management plans including CEMP and Health and Safety documentation; • Preparing, reviewing and implementing this CEMP and communicating the CEMP requirements to all Project personnel; • Engage qualified and experienced staff and provide management support to ensure all activities relating to environmental performance are undertaken by trained and competent personnel; and • Report to administrating authorities where required. • Ensure all environmental requirements are implemented in accordance with the project approvals, client requirements, the specification, the contract requirements and legislative obligations; • Establish and maintain a list of current contact names and telephone numbers for all personnel relevant to environmental matters; • Ensure that all personnel are inducted in their roles and responsibilities; • Escalating environmental incidents to the Principal Contractor where required; • Responsible for ensuring all required training and competencies are up-to-date as required; • Undertake and record corrective actions, release incidents and non-compliance; and- • Support the continued review and update of the environmental management framework to address risks relevant to each construction phase or activity.
All personnel	• Follow the requirements of the CEMP and the Principal Contractor • Undertake pre-start meetings and Tool Box Talks; • Undertake the appropriate training and inductions prior to commencement of construction works; • Report any site-specific environmental issues (i.e., dust generation, spillages, excessive noise and vibration etc.) to the appropriate representative as communicated in the site induction; and • Comply with all relevant environmental laws associated with the delivery of the Project.

2.2 PROJECT HEALTH AND SAFETY RECORDS

The Principal Contractor will appoint a suitably qualified and experienced management team who will be responsible for the site, including legal and environmental responsibilities, site health and safety, ensure adherence to the CEMP, approved method statements and the DA and other consents. Contractors and subcontractors will be required to adhere to this CEMP.

All construction management documents are subject to ongoing review and continual improvement. This includes times of change to scheduled activities or to legislative or licensing requirements. Only the relevant Principal Contractor, or delegate, has the authority to change any of the environmental management documentation.

All construction management documentation will be in accordance with Theodore Energy Development Pty Ltd Health and Safety Policy.

2.3 ASSOCIATED ENVIRONMENTAL MANAGEMENT PLAN COMMITMENTS

In association with this CEMP, the Project commits to preparing the following environmental management plans to support the construction of the Project:

- Vegetation and Fauna Management Plan;
- Bird and Bat Management Plan;
- Bushfire Management Plan;
- Stormwater Management Plan;
- Erosion and Sediment Control Management Plan;
- Construction Traffic Management Plan;
- Post-Construction Rehabilitation Management Plan;
- Safety and Emergency Management Plan;
- Complete Investigation and Response Plan;
- Cultural Heritage Management Plan;
- Biosecurity Management Plan.

2.4 CEMP UPDATES, APPROVAL AND DISTRIBUTION

The Principal Contractor appointed prior to the commencement of construction work will coordinate the preparation, review, and distribution, as appropriate, of construction management documents. During the construction and commissioning phases of the Project, CEMPs and site generated documentation will be held at either the site office, online or other appropriate locations as required.

The Principal Contractor will implement a document control procedure to control the flow and revisions of documents within and between stakeholders and sub-contractors. The procedure will also ensure that documentation is:

- Developed, reviewed prior to issue e.g. checklist/compliance forms, Safe Work Management Systems, Journey Hazard Assessments, and site access procedures;
- Issued for use;
- Controlled and stored for the legally required timeframe;
- Removed from use when superseded or obsolete; and
- Archived.

A register and distribution list will identify the current revision of documents or data.

2.5 COMMUNICATION

The suitably qualified management team appointed by the Principal Contractor are to be the main point of contact for any environmental issues that may arise during the construction phase of the project. Onsite personnel will report any environmental issues as they arise to the relevant manager as advised during the site induction, who are then to take further action where required.

All personnel onsite are required to undertake a site-specific site induction prior to commencement of works.

2.6 STAFF TRAINING AND AWARENESS

All workers including subcontractors will receive induction to ensure that they are aware of their responsibilities relating to safety. Designated emergency response trained staff members will be trained according to their level of responsibility:

- First Aiders – Emergency First Aid response; and
- Fire Wardens – Warden Training.

3. PROJECT DESCRIPTION

3.1 PROJECT AREA LOCATION

The Project involves the construction and operation of a large-scale wind farm, approximately 22 kilometres (**km**) east of the township of Theodore, Queensland within the Banana Shire Council Local Government Area. The Project Area is within the Rural Zone of the Banana Shire Council, with the predominant land use being cattle grazing.

The Project Area is 46,830 hectares (**ha**) in size. The Project Area consists of nine properties owned by three individuals. The total development footprint is anticipated to be 1,932.2 ha, which accounts for approximately 4.1% of the Project Area.

3.2 SENSITIVE LAND USES

Sensitive Land Uses is defined in Schedule 24 of the Planning Regulation 2017 and means any of the following land uses:

1. Caretakers' accommodation
2. Child care centre
3. Community care centre
4. Community residence
5. Detention facility
6. Dual occupancy
7. Dwelling house
8. Dwelling unit
9. Educational establishment
10. Health care services
11. Hospital
12. Hotel
13. Multiple dwelling
14. Non-resident workforce accommodation
15. Relocatable home park
16. Residential care facility
17. Resort complex
18. Retirement facility
19. Rooming accommodation
20. Rural workers' accommodation
21. Short-term accommodation
22. Tourist park

Construction activities have the potential to impact the amenity sensitive land uses through increased traffic, noise, dust, visual impact and environmental degradation. **Table 3-1** outlines the sensitive land uses identified within the locality of the Project as shown on **Figure 1-1.** Impacts to these land uses are heightened within 3km of construction activities, which is limited to sensitive land uses on host lots for this Project.

TABLE 3-1 SENSITIVE LAND USES WITHIN LOCALITY

ID	Lot Description	Status	Distance to nearest WTG (approx.)
H01	Lot 2 on SP131475	Associated Non-host Lot	15,789 m
H02	Lot 1 on RP617748	Host Lot	8,154 m
H03	Lot 8 on DW2	Host Lot	5,326 m
H04	Lot 17 on DW49	Host Lot	2,678 m
H05	Lot 11 on DY446	Host Lot	1,534 m
H06	Lot 18 on DW550	Host Lot	2,025 m
H07	Lot 18 on DW550	Host Lot	2,904 m
H08	Lot 20 on SP100500	Host Lot	2,020 m
H09	Lot 20 on SP100500	Host Lot	5,743 m
N1	Lot 4 on DW559	Non-host Lot	6,463 m
N2	Lot 4 on DW559	Non-host Lot	6,447 m
N3	Lot 4 on DW559	Non-host Lot	6,391m
N4	Lot 22 on DW526	Non-host Lot	3,521 m
N5	Lot 10 on DW40	Non-host Lot	8,298 m
N6	Lot 15 on SP257659	Non-host Lot	5,093 m
N7	Lot 16 on DW388	Non-host Lot	3,493 m
N8	Lot 16 on DW388	Non-host Lot	3,513 m
N9	Lot 16 on DW388	Non-host Lot	3,535 m
N10	Lot 16 on DW388	Non-host Lot	3,524 m
N11	Lot 20 on DW2	Non-host Lot	4,355 m
N12	Lot 9 on DW19	Non-host Lot	4,470 m
N13	Lot 9 on DW19	Non-host Lot	5,385 m
N14	Lot 9 on DW19	Non-host Lot	5,309 m
N15	Lot 13 on DW2	Non-host Lot	5,704 m
N16	Lot 9 on DW198	Non-host Lot	4,355 m
N17	Lot 3 on RP617750	Non-host Lot	6,455 m
N18	Lot 26 on SP179635	Non-host Lot	13,932 m

3.3 PROJECT OVERVIEW

The Theodore Wind Farm is proposed to include up to 170 WTG project, consisting of:

- Up to 170 WTGs;
- WTG foundations and hardstand areas;
- Temporary infrastructure such as concrete batching plants, laydown areas, temporary construction offices, welfare facilities and parking;
- On-site accommodation;
- Access tracks including public road and water crossings;
- Electrical reticulation including underground cabling and overhead lines;
- Switching stations and substations;
- Battery Energy Storage Systems (**BESS**);
- Temporary and Permanent meteorological masts; and
- Permanent operations and maintenance facilities, with a variety of associated site facilities and storage laydowns around the proposed site.

The infrastructure design has been based on refining the infrastructure design through an iterative process including environmental, wind resource, constructability, landowner, traditional owner, and transmission network considerations. The design refinement process focused on the avoidance and minimisation of impacts to important ecological values (vegetation and mapped habitat for listed threatened species), identified from the desktop and field investigations conducted from October 2022 to September 2023, and the coordination of these aspects with engineering design and wind resource restrictions.

The proposed development is proposed to be connected to the grid network via the Banana Range Wind Farm Connection Project 275kV transmission line, approx. 50 km north of the Project Area, with the transmission line to be under separate ownership and subject to separate approvals.

It should be noted that existing land management practices will be largely unaffected by the proposed development as the host properties are able to continue to use for agricultural activities throughout the life of the Project.

3.3.1 WIND TURBINE GENERATORS

The final selection of turbine numbers, locations and dimensions will be determined as part of the detailed design. However, the Project Area has been designed to accommodate the following maximum turbine dimensions (**Table 3-2**) so that potential impacts of environmental values can be properly considered.

TABLE 3-2 KEY GENERATION AND TURBINE SPECIFICATIONS

Feature	Statistic
Estimated Project generation capacity	1152 MW *
Turbine electrical output	Up to 8.0 MW
Number of Turbines	Up to 170
Hub height**	UP to 185 m
Tip height**	Up to 270 m
Rotor diameter**	Up to 175 m

**The actual output of the wind farm will depend on the size and type of turbine chosen during the detailed design phase. Regardless of the size of the wind farm generation capacity, the proposed development will still need to comply with the Queensland Wind Farm State Code and supporting Planning Guidelines, particularly in relation to acoustic amenity and setback criteria.*
***The specifications contained within the table are based on current, projected turbine size. Whilst they are an estimated maximum, changes in technology and constructability may result in larger turbines being installed*

3.3.2 TURBINE FOUNDATIONS AND HARDSTAND FOUNDATIONS

Each WTG foundation will consist of a mass concrete footing or rock anchor foundation where suitable. WTG foundations may vary in size depending on the selected WTGs, imposed loadings, ground conditions, construction methodology and the drainage design. The detailed design of the foundations will be undertaken prior to construction of the proposed development and will be dependent on the final selection of WTG model to be installed at the Project Area.

The final design will also consider the geotechnical conditions identified through detailed site investigations. The ground surrounding the WTG will be finished, so it is tidy and usable for shared agricultural purposes. This may include mounding.

At each WTG site, a hardstand area may be established for the laydown of key WTG equipment including the crane boom laydown and assembly area, nacelle, tower sections, blades, and other WTG components. The hardstand is the area used for the assembly, construction, and erection of the WTG. Each WTG foundation and hardstand area will be up to approximately 2.67 ha in size. Where suitable just in time delivery and tower cranes might be utilised which may result in a smaller hardstand area. The smaller hardstand area is dependent on geotechnical studies, detailed engineering design including construction methodology review.

3.3.3 TEMPORARY INFRASTRUCTURE

The preliminary layout includes 12 construction laydown areas, totalling at 102 ha in size. Temporary construction laydown areas are proposed for the storage of WTG components when initially delivered to site as well as other construction items. Alongside the laydown areas, 5 locations for concrete batching plants are proposed, with approximately 2 concrete batching plants to be operations, with the potential to move around the Project Area. The concrete batching plants are to be established on the site for production of concrete for the WTGs foundations and other infrastructure footings, these are proposed to be approximately 2 ha in size.

3.3.4 ACCESS AND UNDERGROUND CABLING AND OVERHEAD TRANSMISSION LINES

Up to 223 km of access roads will be required for the proposed development within the Project Area. Access tracks between the existing State-controlled road network and the wind farm components will be established and or upgraded to allow access to the site for construction and operational traffic. Considerations in the establishment of these routes will include load requirements, turning radii, topography of the land, soils, watercourse crossings, vegetation clearing and potential colocation of wind farm infrastructure. The onsite access road layout will be designed to utilise existing tracks where appropriate and usage does not significantly impact on planned agricultural usage.

The proposed access/infrastructure corridors are as narrow as reasonably practical given the design maturity. This width is necessary to accommodate the access road, elements of the electrical collection system between the WTGs and where co-located, parts of the transmission system. Proposed access/infrastructure corridors will be further refined in the detailed design phase prior to construction.

The road formation will generally not exceed 12 m in width (table drain – table drain), with regular widening to accommodate passing bays. The area of the corridors outside the road formation may be cleared for the installation of reticulation/overhead lines. Access corridors will be their widest during the construction phase, and areas outside the final road formation will undergo progressive restoration of grass species post construction activities.

3.3.5 CONNECTION SYSTEM, SUBSTATION AND GRID CONNECTION

A cable system (33kV) will be installed to transfer the power from each WTG to a collection substation. Currently 4 substations are proposed. The collection system will be installed in a mix of underground cables, and above-ground cables supported by poles.

The substations will include equipment necessary to collect the power flow from each WTG, increase the voltage and dispatch to the electricity grid. Hardware would include switches, breakers, transformers, meters, synchronous condensers (as needed), Battery Energy Storage Systems (BESS), the earthing grid, and other electrical equipment. The nominal size of the substations is approximately 1.5 ha each with potential for an adjacent switching station/BESS of up to 16 ha each to ensure space for appropriate ability to isolate areas of the wind farm from the transmission system and ensure system stability as well as provision suitable BESS. A BESS for the storage of produced electricity may be installed at the substations/switching stations. The BESS would be designed to provide storage for export, system strength, and firming support.

The voltage will be “stepped up” at the substations (up to 275kV) and transmitted to the transmission grid.

The planning approval for the export transmission line is outside the scope of this report and will be subject to a separate application submitted by a different proponent.

3.3.6 PERMANENT METEOROLGICAL MASTS

Three metrological monitoring (met) masts have been erected within the Project Area, for data collection purposes for Project feasibility.

Approximately 4 met masts are to be installed to monitor wind conditions for the operation of the wind farm. Installed meteorological masts will be up to 200 m in height. The exact location of these masts is indicated in **Appendix A**. The marking, lighting, and notification requirements accordance with regulatory requirements and conditions of approval.

3.3.7 CENTRAL OPERATIONAL AND MAINTENANCE FACILITY

The preliminary layout includes 2 operations and maintenance facilities, which are approximately 8.5 ha in total size. The operational infrastructure for the proposed development will include management offices, workshops, storage, equipment laydown, and warehousing facilities.

3.4 CONSTRUCTION SPECIFICATIONS

3.4.1 CONSTRUCTION EQUIPMENT AND MACHINERY

It is anticipated that the construction work (subject to geotechnical conditions) may include the following:

- Cut and fill earthworks (including excavating, hammering, ripping, crushing, material haulage, blasting, compacting, moisture conditioning, testing etc.);
- Erection of turbines (including component delivery, cranage, fitting of ancillary items);
- Cabling works (including trenching and laying of cables by various methods);
- Substation construction;
- Vegetation clearing (utilising appropriate methods);
- Construction of site compounds, camps and facilities; and
- Delivery of various Project components.

It is anticipated that an on-site borrow pit will be utilised to source much of the required construction material, where possible.

3.4.2 CONSTRUCTION NOISE MANAGEMENT

Noise emissions from construction plant(s) can be reduced by fitting exhaust mufflers, using reversing alarms that emit a broadband noise (e.g. white noise) rather than a beep, maintaining plant in good working order and following industry standard construction methodologies.

Noise will be generated by mobile plant such as excavators, bulldozers, mobile cranes and the movement of heavy vehicles.

3.4.3 CONSTRUCTION HOURS AND TIMEFRAME

Approximately 300-500 staff will be employed during the peak construction period, and will include locally sourced staff, contractors and manufacturers, however, this is dependent on qualifications, suitability, local procurement policies and commercial terms.

The general construction hours of the Project will be refined prior to the commencement of construction, however, is likely to be:

- Monday to Sunday: 7:00am to 7:00pm.
- Public holidays: As required.

It is expected that a roster system is adopted and that construction activities will continue seven days per week. Core hours on site will be 7.00am to 7.00pm but on occasion, work outside of these times will be required. This would include for example, concrete pouring of foundations, Turbine installation to take advantage of low winds, and where not to continue would create safety issues, any emergency or works which would impact normal work so needs to be performed out of hours

Outside of emergencies, night works would be minimised.

3.4.4 TEMPORARY SITE ILLUMINATION

As a general rule, construction activities will be planned to be undertaken during daylight hours and scheduled to maximise the use of the longer summer days. However, there will be occasions where temporary site illumination will be required to ensure work can be undertaken in a safe environment.

Temporary site lighting and the use of lights on construction plant will be required on occasions where work will continue outside daylight hours or where adverse weather conditions impact on the available natural light. Lighting may also be required if work is required within a building or structure. Temporary lighting shall be provided to allow the construction activities to be carried out safely and will only be used during the site working hours.

When providing temporary lighting or using lights on construction plant the potential for light pollution or nuisance will be considered, although there are no residential receptors within close proximity to working areas.

The placing of temporary lighting will also consider species which may be disturbed by unnatural light such as bats.

Site lighting outside of working hours will be designed to the minimum required level to ensure safety and security to prevent potential impacts on neighbours. Exterior out of hour's site lighting shall be limited to floodlights mounted on temporary welfare cabins to provide sufficient lighting levels to ensure that site workers are able to access the cabins and circulatory spaces safety. Additionally, PIR activated floodlights may be utilised on site and located at strategic locations, for example, to facilitate safe access at gates, highlight safety controls near excavations or deter unauthorised access in the vicinity of plant and material storage.

3.4.5 WATER SUPPLY

The provision of water is essential for the construction of the proposed development. The construction activities likely to require water are:

- Bulk earthworks and material conditioning;
- Concrete batching;
- Dust suppression; and
- Drinking water for personnel and water for ablution facilities.

Water demand will vary over time, depending on the stages of the work and required water quality standards for each activity. Potable water fit for human consumption will be required at the site offices, while both medium (suitable for use in the concrete batching) and low-quality raw water (for earthworks and dust suppression) may be used for construction purposes. Water will be tested from various supply options and allocated to the most appropriate use.

A water sourcing strategy will be developed so that water used during the construction phase does not cause issues to adjacent landowners or other stakeholders. Where possible, potable water will be obtained from the local government water reticulation network or otherwise trucked to the site.

Lower quality water (for earthworks and dust suppression) is likely to be locally sourced from:

- Groundwater – to include artesian and sub-artesian.
- Rainwater – to be sourced from dams or collection ranks.
- Offsite – to be sourced offsite and trucked in.

Construction water supply options will be determined during the detailed design of the proposed development and confirmed with DoR prior to construction. Appropriate permits and approvals will be sourced to ensure compliance where required.

4. CONSTRUCTION RISK IDENTIFICATION AND MANAGEMENT MEASURES

4.1 SUMMARY OF RELEVANT IMPACTS

The Project has the potential to impact numerous ecological values, particularly during the clearing and construction phases, these include:

- Impacts to flora and fauna through habitat clearing and direct mortality;
- Introduction of weed and pest species;
- Impacts to traffic and access in the area;
- Impacts to stormwater and waterways through worsening of stormwater management, spills, leakage, seepages and impacts to aquatic ecology;
- Impacts to air quality from dust and exhaust emissions, fugitive dust emissions from construction activities and indirect impacts to adjacent habitat areas as a result of noise and dust;
- Noise and vibration impacts to sensitive receptors;
- Risk of bushfire;
- An increase in erosion and sediment runoff; and
- Potential disturbance to cultural heritage sites / items / values (if located onsite).

The above potential impacts have been considered, and impact-specific objectives and management measures have been applied for each. The management of each of these impacts is discussed in further detail in the following subsections, with specific management measures listed.

It is noted that construction activities in general may also pose the risk of light pollution, disturbance of contaminated land and exposure. Based on site assessments completed to date it is considered unlikely these factors will impact the Project Area. This is based on the Project Area location, proposed operating hours being Monday to Sunday from 7:00AM to 7:00PM and land not being listed on any contaminated land or environmental management registers. Should additional impacts be identified as part of detailed project design, the CEMP will be amended as required.

4.2 FLORA AND FAUNA

The construction of wind turbines within the Project Area has potential to impact MNES and MSES flora and fauna through the following:

- Habitat clearance for permanent and temporary construction facilities (e.g. wind turbines and associated infrastructure, transmission lines, compound sites, stockpile sites, access tracks). The consequences of this impact may include:
  - Direct loss of native flora and fauna habitat;
  - Injury and mortality to fauna during clearing of fauna habitat;
  - Fragmentation of connectivity areas;
  - Introduction and spread of priority weeds and pathogens that impact fauna;
  - Disturbance to fallen timber, dead wood and bush rock; and
  - Indirect impacts identified include risks for soil and water contamination, creation of barriers to fauna movement, or the generation of excessive dust, light or noise.

A Vegetation and Fauna Management Plan has been development for the Project, and preliminary management measures outlined in **Table 4-1** below.

TABLE 4-1 FLORA AND FAUNA MANAGEMENT MEASURES

Flora and Fauna Objectives

- Compliance with legal requirements including permits, licences, approval conditions and Federal (e.g., EPBC Act) and State Acts (e.g., *Nature Conservation Act 1992*, VM Act*, Environmental Protection Act 1994*).
- Ensure the Project avoids causing unlawful environmental harm;
- Ensure harm to flora and fauna is minimised to the greatest extent practicable, particularly including direct fauna mortality; and
- Ensure all staff are made aware of potential impacts and management measures regarding flora and fauna within the Project Area.

Potential Impact	Action	Responsibility	Project Phase
Direct Fauna mortality	Include daily toolbox talks for site specific bird, bat and fauna information during clearing and construction.	Principal Contractor	Clearing and construction
	Speed limits are to be signed and enforced on all site access tracks.	All personnel	Clearing, construction and operation
	Implementation of the Queensland Fauna Stock Management Plan	Principal Contractor	Clearing and construction
	Provide site specific information on relevant threatened species.	Principal Contractor	Clearing, construction and operation
	BACI surveys conducted at impact and control areas during construction to determine bird and bat composition, abundance and density at control and development areas. This includes BUS and use of bat survey techniques (as required in the Projects Bird and Bat Management Plan).	Principal Contractor	Construction
	Fauna exclusion devices (i.e., fencing) must be implemented where practical around areas of potential risk to fauna, to discourage fauna from entering. Temporary fencing will assist in keeping animals out of the Project Area and will guide them away from unsafe environments to remaining habitats.	Principal Contractor	Construction
	A qualified fauna spotter catcher will inspect the areas to be cleared immediately prior to clearing activities occurring. Where fauna are detected the spotter catcher will assess and implement the most appropriate method to avoid or minimise impacts on that fauna as a result of clearing.	Principal Contractor	Clearing and Construction
	Where trenching and excavations are created which may entrap fauna, suitable escape measures are put in place, and excavation are checked for fauna before backfilling.	Principal Contractor	Clearing and construction

Flora and Fauna Objectives			
Habitat Clearing	All clearing shall be within clearly marked boundaries and in accordance with the Development Permit.	Principal Contractor	Clearing and construction
	Any adjacent vegetation to the impact area shall be clearly marked off to avoid unnecessary clearing/vegetation damage.	Principal Contractor	Clearing and Construction
	A Vegetation and Fauna Management Plan (**VFMP**) has been prepared and must be followed during construction to ensure that clearing is undertaken in accordance with legislative standards and requirements.	All personnel	Clearing and Construction
	Avoid the removal of large hollow-bearing trees or dead trees wherever possible. If hollow bearing trees require removal, they must be inspected by a fauna spotter catcher to determine if threatened fauna are present. If present, the species must be safely removed prior to tree felling.	Principal Contractor / Fauna Spotter Catcher	Clearing and Construction
	All threatened fauna and flora, including threatened fauna habitat (i.e., hollows, fallen logs, cracking soils etc) and weed species must be recorded in a detailed register during pre-clearing surveys. Environmental representative is to manage all records of threatened species and upload data to a public mapping register (e.g., ALA or Wildlife Online databases).	All personnel	Clearing and Construction
	A high and low risk Species Management Plan will be required and prepared for the Project, abiding by the Koala regulations within Category C vegetation.	Principal Contractor	Construction
	Infrastructure shall be located preferentially to avoid or minimise edge effects or dissecting tracts of native vegetation.	Principal Contractor / Proponent	Design and Construction
	Where disturbance to threatened species habitat has to occur, individuals and surrounding micro-habitat features (e.g., hollows, nests, logs etc.) will be translocated to suitable areas (if possible).	Principal Contractor / Fauna Spotter Catcher	Clearing and Construction
	Where required, breeding habitat clearing activities will be undertaken in accordance with a Species Management Program approved under the *Nature Conservation Act 1992*.	All personnel	Clearing and Construction
	Toolbox meetings will include information for all personnel on site specific flora information when updates are relevant.	Principal Contractor	Construction
	Natural rehabilitation of access tracks will occur once construction has been completed in accordance with the Post-Construction Rehabilitation Management Plan	Principal Contractor	Construction and Rehabilitation

Flora and Fauna Objectives			
Impact to vegetation under the VM Act	All personnel are to be made aware of potential impacts to vegetation management as a result of the Project, through onsite inductions and training prior to commencement of construction works.	All personnel	Construction
	All clearing boundaries will be clearly marked and complied with in accordance with the Development Permit.	All personnel	Construction
	A Vegetation and Fauna Management Plan (**VFMP**) has been prepared and must be followed during construction to ensure that clearing is undertaken in accordance with legislative standards and requirements.	All personnel	Clearing and Construction
	Turbines will be located in areas previously disturbed and/or less vegetated to avoid and minimise the clearing extent of mature habitat trees.	Principal Contractor / Proponent	Design and Construction
	Any adjacent vegetation to the Project Area shall be clearly marked off to avoid unnecessary clearing/vegetation damage.	Principal Contractor	Clearing and Construction
	Activities will be planned so that movement of vehicles, plant, machinery and equipment avoids moving between properties as required.	Principal Contractor	Clearing and construction
	Construction activities must not interfere or block natural drainage areas including disturbing channel contours without site appropriate engineering mitigations.	All personnel	Construction
	Access roads, easements and yards will be kept weed free where practicable.	Principal Contractor	Construction
	Only registered herbicides will be used by licenced weed sprayer.	Principal Contractor	Clearing and Construction

4.3 WEED AND PEST MANAGEMENT

The introduction of weed and pest species to the Project Area may be harmful to native and threatened species, and as such, relevant objectives and management measures (particularly regarding the clearing and construction phases of the Project) are outlined in **Table 4-2**.

TABLE 4-2 WEED AND PEST MANAGEMENT MEASURES

Weed and Pest Objectives
• Compliance with legal requirements including permits, licences, approval conditions and Federal (e.g., EPBC Act) and State Acts (e.g., NC Act, VM Act, EP Act and *Biosecurity Act 2014*); • Ensure the introduction of invasive weed and pest species during Project construction is minimised to the greatest extent practicable; • Ensure the Project avoids causing unlawful environmental harm; and • Ensure all staff are made aware of potential impacts and management measures regarding flora and fauna within the Project Area. Ensure harm to flora and fauna is minimised to the greatest extent practicable, particularly including direct fauna mortality; and • Ensure all staff are made aware of potential impacts and management measures regarding flora and fauna within the Project Area.

Potential Impact	Action	Responsibility	Project Phase
Introduction of Weed and Pests	All onsite personnel will be made aware of the locations and consequences of biosecurity threats within the Project Area.	Principal Contractor	Construction
	A Biosecurity Management Plan will be developed and implemented for the Project and will include management measures regarding vehicle wash down procedures, weed certification and obligations to restrict vehicle movements to access tracks.	Principal Contractor	Clearing and Construction
	Access to a landholder's property to be in line with protocols outlined in the site induction.	All personnel	Clearing and Construction
	Weeds Of National Significance (**WONS**) and Restrictive Invasive species will be identified and monitored in the impact area. Appropriate weed monitoring will occur to ensure new weed species are identified and recorded.	Principal Contractor	Construction
	Onsite waste disposal strategies (particularly for food wastes) to be employed that will not encourage the presence of pest fauna.	All personnel	Construction
	Monitoring and weed inspections particularly in response to reported outbreaks or complaints from adjacent property owners	Principal Contractor	Construction

4.4 TRAFFIC AND ACCESS

As a result of the clearing and construction phases of the Project, there will likely be an increase of traffic on the surrounding road network, and may occasionally result in detours, delays and decreased road condition. A Preliminary Traffic Impact Assessment has been created to assist with the Development Application approval process. The proposed development will not impede on the Stock Route Network on Crowsdale Camboon Road. Given the nature of the proposal, it is able to co-exist with agricultural activities with minimal impact on the stock route. Additionally, a Construction Traffic Management Plan will be implemented to support the proposed development during the construction phase.

4.5 STORMWATER MANAGEMENT, WATERWAYS, EROSION AND SEDIMENT CONTROL

The construction of the proposed development has the potential to impact stormwater through:

- Adverse impacts on downstream water quality due to:
- The potential increase in suspended solids, nutrients and metal concentrations; and
    - The potential introduction of chemical and fuel contaminants used during construction and maintenance.
- Adverse impacts to aquatic ecology as a result of the construction and implementation of waterway crossings, including:
    - Disturbance to riparian and aquatic vegetation;
    - Changes to the natural flow patterns of waterways;
- Disturbance to fish passages, sediment transport as a results of waterway crossings; and
    - The potential increase in sediment and nutrient loads due to altered roadside drainage arrangements.

A Stormwater Management Plan (SMP) and Erosion and Sediment Control Plan (ESCP) will be prepared prior to commencement of construction activities. The SMP aims to manage potential stormwater quality and quantities, and the ESCP will aim to support the reduction and management of erosion and sedimentation as a result of Project activities.

Mitigation and control measures proposes as part of the SMP include the following:

- Where appropriate, progressive stabilisation of exposed areas by the Principal Contractor to reduce erosion and sediment run-off.
- Construction activities are to be staged and confined to the necessary construction areas.
- Transport of any loads that are subject to loss through wind or spillage shall be covered or sealed to prevent entry of pollutants to stormwater system.
- Regular inspection and maintenance of sediment fences, sediment basins and other erosion control measures by the Principal Contractor. Following rainfall events sufficient to produce runoff, inspection of erosion control measures and removal of collected material should be undertaken. Replacement of any damaged equipment should be performed immediately.
- Adequate inspection and maintenance of controls in high erosion risk areas by the Principal contractor to ensure that the controls in these areas are operating effectively to manage the elevated risk of erosion that is present.

Additionally, a riverine protection permit is generally required prior to the excavation, placement of fill material, or removal of watercourse vegetation under the Water Act 2000. This will be sought during the preliminary stages for stormwater and erosion control if required.

Where works during construction are found to intersect or disturb fish passages, this work must be completed in accordance with the accepted development requirements for operational work that is constructing or raising waterway barrier works per the *Fisheries Act 1994.*

4.6 AIR QUALITY AND DUST

Air quality and dust as a result of the Project have the potential to be harmful to the environment, through the release of exhaust emissions, fugitive dust emissions and indirect impacts to adjacent habitat areas as a result of dust. Preliminary management measures regarding these air quality and dust impacts have been developed and are described in **Table 4-3**.

TABLE 4-3 AIR QUALITY AND DUST MANAGEMENT MEASURES

Air Quality and Dust Objectives

- Compliance with legal requirements including permits, licences, approval conditions and Federal (e.g., EPBC Act) and State Acts (e.g., NC Act, VM Act, EP Act);
- Ensure exhaust emissions and fugitive dust emissions are minimised to the greatest extent practicable;
- Ensure the Project avoids causing unlawful environmental harm.

Potential Impact	Action	Responsibility	Project Phase
Fugitive dust emissions from construction activities	Access track dust generation to be managed through water or application of dust reducing product, especially during prolonged dry periods.	All personnel	Clearing and Construction
	Install washing or shaking facilities to prevent mud from construction operations being transported onto adjacent public roads to be utilised as required.	Principal Contractor	Clearing and Construction
	Regular cleaning of Project Area entrances where necessary.	All personnel	Clearing and Construction
Indirect impacts to adjacent habitat areas as a result of noise, blasting and dust	Staff and contractors will be made aware through general site induction and training of the potential to generate dust emissions and mitigation and management measures that should be implemented. The risk of dust generation is to be monitored on a daily basis and appropriate mitigation measures enacted accordingly.	All personnel	Clearing and Construction
	Vehicles, plant and machinery will comply with site-specific speed limits to minimise dust generation.	All personnel	Clearing and Construction

4.7 NOISE AND VIBRATION

The Project is proposed in a remote location with minimal amenity impacts to surrounding properties, however there remains the potential to impact nearby sensitive receptors through noise and vibration during the clearing and construction phase of the Project. A Noise Impact Assessment has been completed to support construction, identifying that the proposed development does not adversely impact on sensitive land uses and has been designed to satisfy State Code 23 and Planning Scheme provisions which seek to ensure no unreasonable acoustic amenity impacts are experienced by existing or approved sensitive land uses.

Preliminary management measures have been prepared to minimise the impacts of noise and vibration to sensitive receptors to the greatest extent practicable and are presented in **Table 4-4**.

TABLE 4-4 NOISE AND VIBRATION MANAGEMENT MEASURES

Noise and Vibration Objectives

- Compliance with legal requirements including permits, licenses, approval conditions and Federal (e.g., EPBC Act) and State Acts (e.g., NC Act, VM Act, EP Act).
- Compliance with Queensland Wind Farm State Code and Planning Guideline; and
- Ensure the Project avoids causing unlawful environmental harm.

Potential Impact	Action	Responsibility	Project Phase
Impacts on sensitive receptors	Maintain construction equipment in good working order.	All personnel	Construction
	Maintain a noise and vibration complaints procedure and register.	Principal Contractor	Construction
	Noise generation will be minimised through dropping materials utilising methods such as minimising drop height, dropping onto existing piles, dropping in bunded areas and other similar approaches.	Principal Contractor	Clearing and Construction
	Where available, plant will be fitted with exhaust silencers and/or mufflers and will have covers closed when in use	Principal Contractor	Construction
	Working hours may be reduced around residential properties and noise emissions will be considered during the selection of plant	Principal Contractor	Construction
	Toolbox talks will be used to reiterate the importance of minimising noise on site	Principal Contractor	Construction

4.8 WASTE

Without the appropriate management measures, the Project has the potential to produce waste, and as such, the preliminary management measures in **Table 4-5** have been developed to ensure waste generation is minimised to the greatest extent practicable.

A waste management hierarchy will be implemented in accordance with the Waste Reduction and Recycling Act 2011, consisting of the following:

1. Elimination;
2. Reduction;
3. Re-use of materials;
4. Recycling; and
5. Disposal.

TABLE 4-5 WASTE MANAGEMENT MEASURES

Waste Objectives

- Compliance with legal requirements including permits, licenses, approval conditions and Federal (e.g., EPBC Act) and State Acts (e.g., NC Act, VM Act, EP Act).
- Ensure waste generation is minimised to the greatest extent practicable;
- Ensure the Project avoids causing unlawful environmental harm.

Potential Impact	Action	Responsibility	Project Phase
Waste generation	Implement site waste management plan.	Principal Contractor	Clearing and Construction
	Use a hierarchical approach to waste management, from the most preferable (reduce, reuse or recycle wastes) to the least preferable (disposal), and prioritise waste management strategies to avoid waste generation.	All personnel	Clearing and Construction
	Where waste cannot be avoided, waste materials will be segregated by type where appropriate for the waste management methods available for collection and removal (for processing or disposal) by licensed contractors.	Principal Contractor	Clearing and Construction

4.9 BUSHFIRE

Without the appropriate management measures, the clearing and construction activities required for the Project may have the potential to cause environmental harm through an increase in frequency and intensity of bushfires. As such, preliminary management measures regarding bushfires have been prepared and are outlined in **Table 4-6**.

TABLE 4-6 BUSHFIRE MANAGEMENT MEASURES

Bushfire Objectives

- Compliance with legal requirements including permits, licenses, approval conditions and Federal (e.g., EPBC Act) and State Acts (e.g., NC Act, VM Act, EP Act).
- Ensure there is no increase in bushfire risks as a result of the Project; and
- Ensure the Project avoids causing unlawful environmental harm.

Potential Impact	Action	Responsibility	Project Phase
Increase in frequency and/or severity of bushfires	Prepare a Bushfire Management Plan in consultation with Rural Fire Services.	Principal Contractor	Clearing and Construction
	Fire extinguishers must be readily available onsite, in site offices and all construction vehicles. These fire extinguishers are to be appropriately maintained in accordance with Australian Standard AS 1851 – Maintenance of Fire Protection Systems and Equipment.	All personnel	Clearing and Construction
	The Fire Danger Index (FDI) must be monitored daily.	Principal Contractor	Clearing and Construction
	Fire warnings shall be monitored and if considered dangerous, construction shall halt.	All personnel	Construction
	Ensure buildings meet relevant fire safety building codes suitable for where they are situated.	Principal Contractor	Design and Construction
	An Emergency Response Plan shall be prepared prior to clearing and construction.	Principal Contractor	Construction
	If fires occur as a result of the Project, fires must be investigated for the cause and procedures must be updated to prevent further incidents.	Principal Contractor	Construction

5. STANDARD MANAGEMENT PRACTICES

5.1 SPILL MANAGEMENT

The construction phase of the Project may incur spills at times. As part of the induction and training period of all onsite personnel, personnel will be made aware of the correct spill response and management procedures that are to be implemented onsite.

In the instance that chemicals are required to be carried or stored onsite, these will be stored appropriately for the material or chemical type. Safety Data Sheets (**SDS**) must be kept, and where required, a risk assessment is to be entered into a chemical register and appropriate spill kit to be available on site.

5.2 REFUELLING ACTIVITIES

The construction phase of the Project will require a refuelling facility to effectively refuel all onsite vehicles, plant and equipment utilised during Project construction. As such, the Project refuelling activities will occur away from fauna habitat on go lines wherever practicable. Where refuelling is to occur in-situ near to habitat, appropriate spill management materials are to be available on hand.

Due to the operational requirements, it will also be necessary for refuelling to occur where the plant is kept or in the field with drip trays available and to be used when refuelling.

5.3 EMERGENCY MEASURES

In order to effectively minimise the risks and impacts of incidents during the construction period, the following equipment will be readily available in several locations within the Project Area:

- Fire Precaution and Fighting equipment including fire blankets, fire extinguishers (e.g., water, foam, CO2, powder, water mist and wet chemical) to be provided in each vehicle;
- Spill response kits (e.g., absorbent pads and compound, personal protective equipment and bags for storage of used materials) to be provided in each vehicle; and
- First Aid medical equipment including defibrillator and snake bite kits.

In the event of an emergency all personnel on site must comply with the direction given by Rural Fire Service Queensland, and other relevant emergency services. Environmental harm[1] as defined under the *Environmental Protection Act 1994* are to be immediately reported to the Queensland environmental regulator through the 'Pollution Hotline' on 1300 130 372 (option 2).

The development of emergency procedures will be specific to the site and prepared by the Principal Contractor once engaged and prior to mobilising to site.

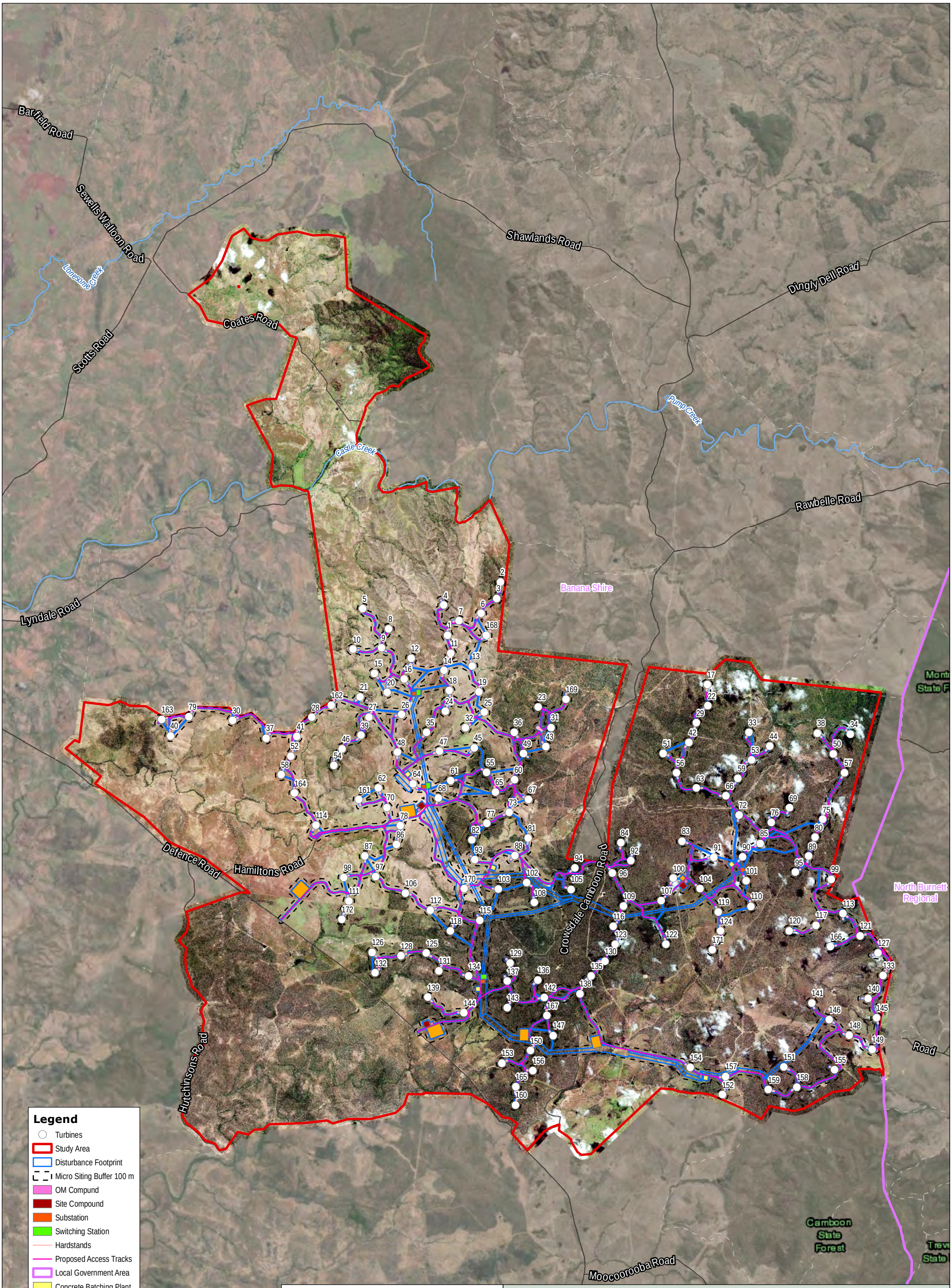
[1] *Environmental harm is any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value, and includes environmental nuisance.*

Project staff and other workers will be made aware of the current requirements of the specific responses through a combination of:

- Site employee record forms;
- Prestart meetings;
- Toolbox talks;
- Posters; and
- Site evacuation or emergency response drills.

The effectiveness of emergency procedures will be tested periodically in accordance with emergency guidelines, amendments to emergency procedures will be made as required. Training will be provided to employees where they have been allocated emergency response responsibilities. First Aiders for the Project will be maintained with First Aid Kits located in suitable areas.

APPENDIX A PROJECT LAYOUT PLAN



Coordinate System:
GDA2020 MGA Zone 56

Date: 09/08/2024
Created By: SP
Drawing Size: A3

0 1 2 3km

1:125,000

Appendix A – Project Layout Plan

Theodore Wind Farm

Theodore Energy Developments Pty

ERM

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ERM HAS OVER 160 OFFICES ACROSS THE FOLLOWING COUNTRIES AND TERRITORIES WORLDWIDE

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Belgium
Brazil
Canada
China
Colombia
France
Germany
Ghana
Guyana
Hong Kong
India
Indonesia
Ireland
Italy
Japan
Kazakhstan
Kenya
Malaysia
Mexico
Mozambique
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