



Mount Emerald Wind Farm

Construction Environmental Management Plan



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1.0 Introduction

This Construction Environmental Management Plan (CEMP) has been prepared for Vestas Australian Wind Technology Pty Ltd (Vestas) and applies to construction activities to be carried out on the Mount Emerald Wind Farm (MEWF), in response to the Decision Notice Conditions as issued by the Queensland Minister for Infrastructure, Local Government and Planning, dated 18 December 2015. This CEMP and the associated sub plans will be subject to approval by MEWF, Department of Innovation, Local Government and Planning (DILGP) and the Department of the Environment and Energy (DEE).

1.1 Purpose

This CEMP details the environmental management and mitigation measures, which will be implemented during the construction phase of the MEWF. The primary objective of CEMP is to reduce any associated adverse environmental impacts and satisfy regulatory requirements. This CEMP provides a framework for actions, responsibilities and protocols associated with environmental management with which Vestas and their Contractors are required to adhere.

The mitigation and management measures detailed in this CEMP (and the associated sub-plans and Standard Operating Procedures) are required as a minimum to meet the requirements of Vestas Environmental Management System (including the Environmental Policy), and the MEWF Conditions of Approval. Accordingly, this CEMP should be read in conjunction with the project specific sub-plans, including:

- Environmental Management Plan
- EMP Training and Induction Plan
- Threatened Plants Management Plan
- Northern Quoll (Species) Management Plan
- Habitat Clearing and Management Plan
- Weed Management Plan
- Pest Management Plan
- Rehabilitation Plan
- Erosion, Sediment and Stormwater Management Plan
- Hydrocarbon and Hazardous Substance Plan
- Bushfire Management and Emergency Evacuation Plan
- Cultural Heritage Management Plan
- Emergency Response Plan
- Construction Transport Plan
- Construction Noise and Vibration Management Plan
- Construction Dust Management Plan
- Construction Waste Management Plan

1.3 Objectives

The broad objectives of this CEMP are to provide planning and management systems to:

- Facilitate achievement of environmental standards.
- Ensure prevention and mitigation of environmental harm, which may occur from the construction of the Project.
- Facilitate appropriate and timely responses to equipment failure, emergencies or other unusual conditions that may cause environmental harm.
- Facilitate documentation, communication and implementation of contingency plans.
- Ensure that all personnel responsible for the construction of the Project are aware of their environmental responsibilities.
- Ensure that environmental monitoring and review occurs to manage environmental components of the construction and to ensure continual improvement in this CEMP.
- Ensure that relevant information is retained and is communicated throughout the organisation.
- Ensure communication with the Department of Environment and Heritage Protection (DEHP), and Department of the Environment and Energy (DEE) or other authority as required by legislation.

1.4 Location

The project area comprises both Lot 7 SP235224, Easements A, C & E in Lots 1, 2 & 3 on SP231871 and part of Lot 905. The coordinates detailed in Table 1 below delineate the boundary of the MEWF, which covers an area of 2422 ha.

Table 1 Boundary Coordinates for the MEWF project.

Latitude Degrees	Minutes	Seconds	Longitude Degrees	Minutes	Seconds
17	9	8.67	145	21	55.7
17	9	11.95	145	21	53.02
17	9	13.24	145	21	48.25
17	9	12.63	145	21	42.47
17	9	16.96	145	21	22.82
17	9	15.07	145	21	17.6
17	9	37.15	145	21	20.56
17	10	0.4	145	21	29.71
17	10	20.3	145	21	42.5
17	11	4.35	145	22	27.19
17	11	43.83	145	23	40.34
17	11	53.94	145	24	17.47
17	11	44.78	145	24	33.37
17	10	3.86	145	24	44.1
17	9	16.56	145	24	2.93
17	9	2.88	145	24	12.61
17	9	2.63	145	24	8.02
17	8	58.92	145	23	59.4
17	8	52.97	145	23	51.89
17	8	45.33	145	23	48.94
17	8	37.89	145	23	43.89
17	8	29.17	145	23	26.45
17	8	24.21	145	23	24.07
17	8	34.9	145	22	59.96
17	8	22.91	145	22	44.15
17	8	7.47	145	22	48.71
17	7	59.65	145	22	49.11
17	8	3.18	145	22	47.91

Latitude Degrees	Minutes	Seconds	Longitude Degrees	Minutes	Seconds
17	8	7.31	145	22	47.7
17	8	23.27	145	22	42.99
17	8	36.03	145	22	59.83
17	8	25.51	145	23	23.58
17	8	29.88	145	23	25.67
17	8	38.64	145	23	43.18
17	8	45.77	145	23	48.03
17	8	53.55	145	23	51.03
17	8	59.76	145	23	58.86
17	9	3.6	145	24	7.78
17	9	3.76	145	24	10.76
17	9	14.07	145	24	3.46
17	8	48.58	145	23	23.05
17	8	40.73	145	22	42.89
17	8	49.38	145	22	32.2
17	8	30.86	145	22	15.15
17	8	27.35	145	21	43.6
17	8	37.54	145	21	38.92
17	8	38.73	145	21	40.98
17	8	45.45	145	21	46.05
17	8	49.65	145	21	46.33

1.5 Regulatory Requirements

1.5.1 Requirements for CEMP

Conditions relevant to the preparation and implementation of the CEMP are detailed in Condition 13 of the Ministerial Decision Notice and are identified in **Table 2**. This is provided with the Statement of Commitments in **Appendix A**.

Table 2 Conditions imposed by Ministerial Delegation on the MEWF Project

Condition	Timing	Where requirements are addressed
<p>13 (a) Submit to the chief executive administering SPA an Environmental Management Plan (EMP) prepared by a suitably qualified person(s). The EMP must:</p> <ul style="list-style-type: none"> i. be generally in accordance with the Preliminary Environmental Management Plan prepared by RPS and dated November 2013 and the draft <i>Statement of Commitments</i> contained within Appendix A of the RPS Development Application Material Change of Use Report dated March 2012; ii. be based on the revised Turbine Location and Development Footprint Plan submitted in accordance with Condition 2 of this approval; iii. include the following components as further detailed in Attachment 1 <ul style="list-style-type: none"> ▪ a construction and work site operational management plan (also known as a CEMP): <p>Identification of fuels, other hazardous material and all other potential contaminants stored or used on site during the construction phase of the wind farm and appropriate storage, construction, and operational methods to control any identified contamination risks;</p>	<p>(a) Prior to seeking approval for any site, operational building work</p>	<p>This CEMP</p> <p>Appendix B EMP - Hydrocarbon and Hazardous Substance Plan</p>

Condition	Timing	Where requirements are addressed
Procedures for managing noises emissions from construction related activities;		Appendix C
Procedures to suppress dust emissions from construction related activities		Appendix D
Procedures for managing potential spills and leaks and pollution incidents including incorporation of appropriate pollution control		Appendix B EMP Hydrocarbon and Hazardous Substance Plan
Appropriate sanitary facilities to be provided for construction and maintenance staff.		Section 2.4.5
A timetable for the construction of turbine bases, access tracks and power cabling during warmer months to minimise impacts on ephemeral wetlands, local fauna and sediment mobilisation;		Section 2.5
Measures to minimise waste generation on site and maximise opportunities for recycling and reuse;		Appendix E
Measures for dust mitigation, control and monitoring dust gauges;		Appendix D
Procedures to ensure that construction vehicles and equipment use designated tracks and works areas to avoid impacts on native vegetation;		Appendix B EMP Sub plan Habitat Clearing and Management Plan
Procedures for covering trenches and hoes at night and		
Procedures for covering trenches and hoes at night and filling trenches as soon as practical after excavation to protect native fauna;		Appendix B EMP Sub plan Habitat Clearing and Management Plan
The removal of works, building and staffing areas on completion of the construction phase of the project.		Appendix B EMP

1.6 Summary of Relevant Legislation Requirements

The legislation and standards listed in **Table 3** below have been used to guide preparation of this CEMP and will form the basis for ongoing decision-making and complaint resolution in respect of the CEMP.

Table 3 Environmental legislation, policies and standards relevant to the Project

Element	Legislative and Other Requirements
Construction—General	<i>Environmental Protection Act 1994 (Qld)</i> <i>Environmental Protection Regulation 2008 (Qld)</i> <i>Workplace Health and Safety Act 1995 (Qld)</i> <i>Workplace Health and Safety Regulation 1997 (Qld)</i>
Noise and Vibration	<i>Environmental Protection (Noise) Policy 2008 (Qld)</i> <i>Workplace Health and Safety Act 1995 (Qld)</i> AS 1055.1 & .2: Acoustics—Description and measurement of environmental noise AS 2436: Guide to noise control on construction, maintenance and demolition sites

Element	Legislative and Other Requirements
Air Quality	<i>Environmental Protection (Air) Policy 2008 (Qld)</i> National Health and Medical Research Council Guidelines 1985(Cwth) Draft National Environmental Protection Measures and Impact Statement for Ambient Air Quality 1997(Cwth)
Water Quality	<i>Environmental Protection (Water) Policy 1997 (Qld)</i> Australian Water Quality Guidelines for Fresh and Marine Waters, ANZECC 2002 <i>Water Act 2000 (Qld)</i>
Erosion and Sedimentation Control	Soil Erosion and Sediment Control, Engineering Guidelines for Queensland Construction Sites—IEAust (Qld) 1996
Contaminated Land	<i>Environmental Protection Act 1994 (Qld)</i>
Storage and Handling of Dangerous Goods	<i>Environmental Protection Act 1994 (Qld)</i> <i>Environmental Protection Regulation 2008 (Qld)</i> <i>Workplace Health and Safety Act 1995 (Qld)</i> AS1940 – The Storage and Handling of Flammable and Combustible Liquids
Transport of Dangerous Goods	Australian Code for Transport of Dangerous Goods by Road and Rail
Waste Management	<i>Environmental Protection (Waste Management) Policy 2000 (Qld)</i> <i>Environmental Protection (Waste Management) Regulation 2000 (Qld)</i>
Flora and Fauna	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwth)</i> <i>Nature Conservation Act 1992 (Qld)</i> <i>Nature Conservation Regulation 1994 (Qld)</i> <i>Vegetation Management Act 1999 (Qld)</i> <i>Environmental Protection Act (Qld)</i> <i>Biosecurity Act 2014</i>
Cultural Heritage	<i>Native Title Act 1993 (Cwth)</i> <i>Native Title (Queensland) Act 1993</i> <i>Queensland Heritage Act 1992</i> <i>Queensland Heritage Regulation 2003</i> <i>Aboriginal Cultural Heritage Act 2003 (Qld)</i>
Land Use	<i>Integrated Planning Act 1997(Qld)</i> <i>Biosecurity Act 2014</i>

2.0 Construction Details

2.1 Site Description and Location

Lot 7 is a large rural allotment, situated (at its closest point) approximately 3.5 km south-west of Walkamin, off Springmount Road at Arriga on the Atherton Tablelands. Topographically, the site is situated at the northern most end of the Herberton Range (part of the Great Dividing Range) with the north-western section of the site being dominated by Walsh's Bluff.

The site is characterised by rugged terrain with elevations of between 540m up to 1089m ASL (above sea level). The town centre of Mareeba is situated approximately 20 km to the north of the site, with the town of Atherton approximately 11.5 km south-east of the site.

Other features of the site include a series of ephemeral drainage lines, including the headwaters of Granite Creek. Powerlink's Chalumbin-Woree 275 kV transmission line easement traverses the site and broadly bisects it (Figure 1). This easement also provides a number of existing access points and tracks.

Virtually the entire site (and all of Lot 7), with the exception of cleared land along the existing access tracks and below the power line is covered by remnant vegetation as defined under Queensland's *Vegetation Management Act 1999* (VMA). Applicable under the VMA is the presence of two bioregions: the Wet Tropics and the Einasleigh Uplands, where the former is mapped at a scale of 1:50 000 and the latter at 1:100 000. Remnant vegetation across the site has a conservation status under the VMA of *Least Concern* and *Of Concern*. The *Of Concern* communities are only found in the Wet Tropics bioregion section. The entire Einasleigh Uplands section is shown on mapping to have a conservation status of *Least Concern*.

Lot 905 is a large parcel of land, and contains both open channel and underground infrastructure associated with the Mareeba-Dimbulah irrigation channel managed by SunWater. Only a section of Lot 905 is included within the project area, being that part (in strata) proposed to be opened as road, referred to in the road opening offer by DERM dated 9 December, 2011 (DERM ref: 2011/006477).

The relevant section of Lot 905 included within the application is generally bounded by the bank of Granite Creek on the eastern side and the edge of the existing concrete open channel to the west. This section contains a siphon beneath the surface of the land and is primarily utilised as an access between Kippen Drive and Springmount Road, used by a number of properties located off Kippen Drive. The site contains a constructed gravel access road with associated table drains and concrete culverts, as well as private tracks. Vegetation adjacent to this unsealed road is primarily regrowth and weeds are common. It is proposed to realign the access across Lot 905, in association with the proposed upgrade to the Springmount Road intersection and new site access from Kippen Drive.

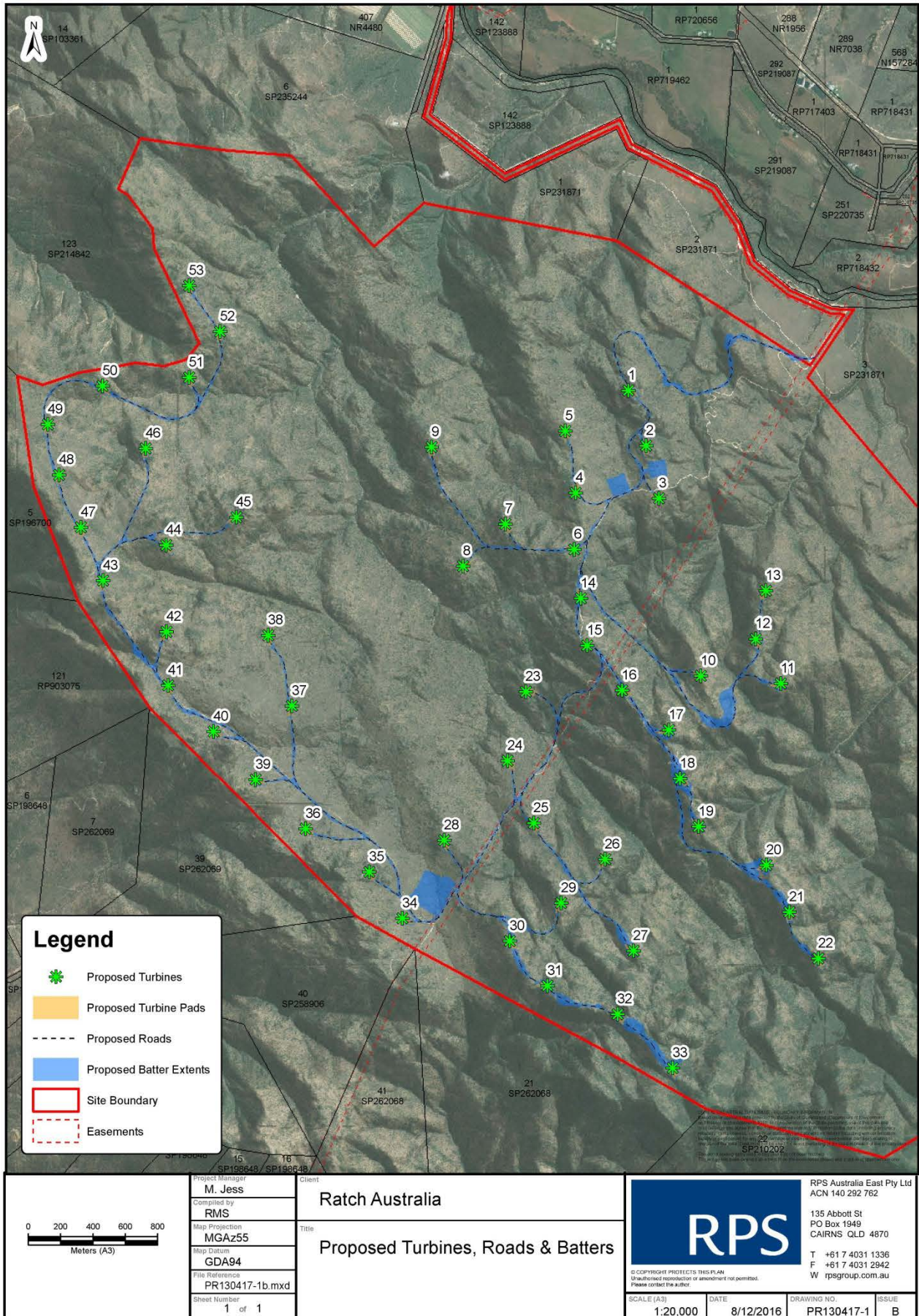


Figure 1 Project Site Location

2.2 Project Description

The MEWF is approved to build a wind farm up to 63 wind turbines and associated infrastructure, on an elevated site approximately 20 km SSW of Mareeba on the Atherton Tablelands in north Queensland (**Figure 1**). The approximate size of the wind turbines proposed will be; towers 80-90m high, with 50-60m blades, for a capacity of 3-3.5 MW.

The site where the wind turbines, interconnecting tracks and associated infrastructure are to be established is on land formally described as Lot 7 on SP235224, which encompasses an area of 2,422ha. This land forms the terminus of the Herberton Range and is contiguous with Mount Emerald (proper) at its southern boundary. Virtually the entire wind farm project area is covered by remnant and relatively undisturbed vegetation, where the only land modification is associated with the existing 275 kV transmission line infrastructure and its series of access tracks. Kippen Drive at the base of the site is severely degraded in most zones adjacent to the unsealed road, and weeds are conspicuous.

The wind farm site has been selected on the basis that it represents an excellent wind resource because of its elevated position and series of high ridges. The elevation range of the site is between 540m up to 1089m above sea level (ASL). The highest ridges south of the existing 275 kV transmission line hold the most significant value in terms of flora and represent an important tract of land with functional connectivity to other regional nodes of high biodiversity importance. Although land to the north of the transmission line (includes the landmark of Walsh Bluff) possesses lower floristic diversity, it is recognised for its habitat value for the endangered Northern Quoll (which is also expected to occur south of the transmission line).

The wind farm project estimates to deliver up to 650,000 megawatt hours of renewable energy, which is predicted to meet the annual needs of approximately 75,000 north Queensland homes over a 20 year period.

The wind farm will be connected to the existing Chalumbin –Woree 275 kV transmission line via a substation, which is to be located within the site. The 275 kV transmission line infrastructure that traverses the site was established in 1998 and represents a pre-existing disturbance footprint which the proposed wind farm will take advantage of in order to minimise the area of new impacts to the environment.

From a constructability perspective, the northern sector of the site has more undulating landforms and fewer dissected ridges with precipitous drop offs. There also appears to be a higher proportion of former landscape disturbance in the northern sector and across the east-facing slopes on the Walkamin side.

2.3 Construction Details

Access to the site will be via Kennedy Highway, onto Hansen Drive and entering the site at a realigned Springmount Road - Kippen Drive intersection. Kippen Drive is currently unsealed. The construction of a series of access and interconnecting tracks within the site are required and will take advantage of existing transmission line infrastructure tracks wherever possible. The new tracks are required to be constructed to an initial cleared width of approximately 10m. Widths will be wider in some areas to account for batters needed to facilitate road construction. The interconnecting tracks will form the routes for the inter-turbine underground cabling, which is expected to be buried in trenches at approximately 1m deep.

Each turbine construction pad is expected to occupy approximately an area of 35m (long) x 40m (wide) and a turbine base construction pad. The substation and associated compound will occupy an area of 200m x 200m and will be located close to the existing 275 kV transmission line which crosses the site.

Under the Development Approval, wind turbines may be "micro-sited" - a technique which involves selecting a position in the landscape where the least environmental, constructability and other impacts are considered and weighed up. As part of this procedure, comprehensive ground surveys will be undertaken of each site to ensure impacts to conservation significant species and other sensitive environmental values are minimised or avoided.

A wind farm operations building will be constructed adjacent to the substation, which will house monitoring and communications equipment. Other associated internal infrastructure will include car parking areas, construction compound and machinery area. Depending on the outcomes of relevant approvals, a batching plant may be temporarily constructed within the site. However, it is expected this will be located off site in an existing quarry near Springmount Raceway.

The MEWF project has been broadly categorised into four phases: pre-construction, construction, operation, maintenance, and decommissioning. Rehabilitation and impact mitigation will be actively practiced throughout these stages (**Appendix B** EMP Sub-plans G, H, I, K).

2.4 Project Components

The project components are provided in **Table 4** below. These terms will be used in relation to project elements throughout this document.

Table 4 Project Components

Component	Definition
Access Roads	Roads connecting public roads to the site and the site roads
Assembly Area	Areas on site where rotor blades are attached to the hubs prior to the installation of the complete rotor to the nacelle. The area is only relevant for the rotor assembly installation method.
Development envelope	The area of the project site in which the wind farm infrastructure (turbines, hardstands, access roads, electrical cables and substation) could potentially be sited.
Development footprint	The final locations of the wind farm infrastructure. This includes the infrastructure footprint - the area occupied by turbines, access tracks, substation etc. during the operational phase - and other areas that will be affected by construction (for example, cable trench easements, construction phase access track width, construction compound, crane pads) which can be rehabilitated post-construction.
Project site	The land within the cadastral boundaries of all properties involved with the MEWF, comprising an area of 2,422 ha.
Nacelle	The housing for the generating components of the wind turbine. This includes the generator, gear box, drive train and brake assembly.
Turbine Footing	The stable horizontal platform for the towers sections and elements to be mounted. Foundations will be of either a gravity or rock-anchor type, depending on the geotechnical conditions at each wind turbine site.
Crane Hard Stand	An improved / stabilized area with a prepared surface where plant and cranes can operate, vehicles can be parked and material can be stored.
Construction Area	The part of the installation area located at each Wind Turbine Generator WTG foundation position which is required for assembling the cranes and area for operating cranes, containers for lifting equipment, generator unit, working area with tools and containers etc.
Compound for substation and control building	The base area for the site management and technicians. The area consists of restroom facilities, parking, site offices, tools and spare parts containers

2.4.2 Preparatory Works for Commencement of Construction

Works to upgrade the site entry points will be undertaken in conjunction with site establishment and site earthworks and include site access realigned Springmount Road/Kippen Drive intersection, across a new road within Lot 905, along Kippen Drive and then across Easements A & C to Lot 7.



Figure 2 Kippen Rd and Springmount Drive Layout Plan

2.4.3 Site Establishment and Installation of Construction Facilities

The construction and operation of the MEWF will require the installation of a number of temporary and permanent facilities, such as:

- Administration, maintenance and storage building for operations, substations;
- Temporary buildings for construction;
- Turbine construction pads;
- Site access roads;
- Laydown and holding areas for equipment and components during construction;
- Car parking.

2.4.4 Operations and Maintenance Building

An operations and maintenance building will be constructed adjacent to the substation compound. This building will house the wind farm operational infrastructure, including the monitoring and communications equipment. Maintenance facilities will include a store, work area and staff amenities, supported with rainwater tanks and a septic system. Car parking for operations and maintenance staff will also be provided adjacent to the substation compound (**Figure 2**).

2.4.5 Sanitary Facilities

The project will require the following sanitary facilities:

- Maintenance facility:
- 1 x Cleaner's Store
- 1 x Toilet/Shower Suite
- 2 x Toilet Suite Waste plumbed through floor.
- Construction facility - 5000L septic tank underground, 2 x toilet block facilities, 22500L potable water tank for cleansing, cleaning storage facilities, appropriate storage facilities for all rubbish types.
- Construction facilities will be maintained by BOP contractor for duration of project.
- Maintenance facility
- 1 x Cleaner's Store
- 1 x Toilet/Shower Suite
- 2 x Toilet Suite Waste plumbed through floor;
- Construction Facility 5000L septic tank underground, 2 x toilet block facilities, 22500L potable water tank for cleansing, cleaning storage facilities, appropriate storage facilities for all rubbish types

2.4.6 Site Access Tracks

Access to the individual turbine sites will be provided by a series of access tracks, which will be used for both construction and operation activities (**Figure 1**). These roads will comprise a formed roadway approximately 5m in width with additional clearance of approximately 1m each side for shoulders and drainage. An estimated disturbance width of 10m has been applied to all site roads, to allow for the formed road and associated drains and batters. Roads will be designed to accept terrain and as such, it is thought reasonable to assume an overall 10m clearance width for all internal roads. The required road gradient for transport and cranes (as per wind turbine supplier specifications) is 11 to 15% without the use of a push/pulling unit. For

circumstances where gradients do exceed this requirement, push/pulling (towing type) units will be used. A number of defined watercourses are present across the site, and the proposed layout is sympathetic to the environmental sensitivity of these features and seeks to minimise the number of waterway crossings by utilising existing crossings where practical. It is important to note that all waterways contained within the site are seasonal and generally flow only during the wet season. During the dry season, minor pools may persist in the Granite Creek tributary in the northern extent of the site, depending on the duration and intensity of the wet season. There are approximately 6km of existing tracks traversing the site, providing access to the Powerlink 275kV transmission line. These tracks will be used wherever possible to link with the additional turbine access tracks and therefore minimise the area of disturbance.

In designing the access tracks, particular attention has been given to the management of stormwater drainage to minimise erosion and sediment transport. Excavated topsoil will be stockpiled during the construction of the access tracks and later used in the rehabilitation of the site. The stockpiles will be stabilised to prevent dust generation and loss of material. At the conclusion of the construction phase, any tracks not required for subsequent operation and maintenance of the wind farm will be restored and revegetated according to the Rehabilitation Plan (**Appendix B Sub-plan K**).

The design of tracks has also been guided by the threatened species sub-plans (**Appendix B**), where the design has been modified to avoid and minimise potential impacts to threatened fauna and flora species (e.g. denning locations of Northern Quolls).

2.4.7 Wind Turbines

2.4.7.1 Hardstands

At each Wind Turbine Generator (WTG) site, a number of permanent and temporary hardstand areas will be required, including:

- Foundations,
- Crane operations during the erection of the towers and wind turbine components; and
- Scheduled maintenance activities during the wind farm operational and decommissioning phases.

The hardstand configuration at each WTG site will be based on either the triangular and rectangular hardstand methods, which will be determined by the topography and terrain. Triangular hardstands occupy an area of approximately 1000m² and rectangular hardstands occupy an area of approximately 1200m². Permanent hardstand will require full vegetation clearing and include the Foundation Pad, Main Crane and the Assist Crane. Temporary hardstand areas will include the main crane boom supports and blade trestle hardstands. Within the temporary hardstand areas, it may be possible to only clear trees and taller shrubs, thereby allowing the retention of the ground layer, which will promote natural revegetation.

2.4.7.2 Foundations

Each wind turbine tower will be erected on a concrete and steel foundation. Foundations will be of either a gravity or rock-anchor type, depending on the geotechnical conditions at each wind turbine site.

Gravity foundations are essentially reinforced concrete slabs, which support the wind turbine tower by gravitational mass. This type of foundation is a standard type for wind turbines and requires approximately 450 cubic metres (m³) of material to be excavated to a depth of approximately 2.5m. The foundation is constructed from concrete with reinforcing steel.

Rock anchor foundations utilise a series of tensioned steel cables (or tendons) installed into competent rock to a depth of approximately 20m below ground. Each cable is secured to a concrete slab at the surface and

tensioned prior to erection of the tower. Rock anchor footings require excavation of approximately 100m³ of material.

A combination of both these foundation types may be required, depending on the specific geology at each wind turbine site; however it is expected from preliminary investigations and field assessments that the majority of foundations will comprise the rock anchor type. Geotechnical investigations have indicated that little blasting will be required as the substrate is sufficiently weathered to be removed using ripping and non-explosive rock splitting.

Topsoil from the footing excavation will be stockpiled separately adjacent to the excavation. It will be used for backfilling over the constructed footing with any excess topsoil being evenly spread around the disturbed turbine site. Excavated material will also be used to prepare a level hard stand area for the lay down of the component turbine parts and for the large cranes required for erection of the turbine.

2.4.8 Construction and Installation

2.4.8.1 Wind Turbines

Wind turbines are manufactured in separate components and sections and will be assembled on the site according to the following broad stages:

- Turbines will be constructed from a hardstand area located at the base of each turbine location.
- Each unit will be installed in a sequential process following the formation of the footing and hardstand areas.
- The installation process will generally take up to one week for each turbine depending on weather conditions.
- Turbine erection commences with the initial tower section bolted to a stub section embedded within the concrete footing. Subsequent sections are raised by crane and bolted to the section below. The nacelle is then lifted to the top of the tower and secured, followed by fixing the rotor and the individual blades.
- Once the turbine is constructed, it is subjected to a detailed checking process as part of its commissioning before it can commence unrestricted operation.

2.4.9 Electrical Infrastructure

The electrical infrastructure at the wind farm will convey electricity generated by the WTGs to the electricity transmission grid. The electrical infrastructure is comprised of the following:

- WTG transformers at each wind turbine site located within the turbine tower;
- A wind farm substation with two 130 MVA transformers, switch gear and circuit breakers;
- Approximately 40km of 33kV underground electrical and control cabling to connect each wind turbine to the substation;
- An overhead transmission connection to the existing 275kV transmission line; and
- An operations building containing control and communications equipment.

2.4.9.1 Wind Turbine Generator Transformers

The WTG would produce electricity at approximately 0.7kV. This output will be transferred via cable to a transformer located within the nacelle. This transformer would step-up the voltage from 0.7kV to 33kV to allow transmission via the underground cable system to the wind farm substation.

2.4.9.2 Windfarm Substation

The wind farm substation will be situated in close proximity to the existing power line which traverses the central portion of the project site from east to west. This would limit the length of the overhead transmission line required to connect to the grid. The substation will be sited in a compound of approximately 200m x 200m.

The connections between the incoming 33kV cabling, the wind farm transformer and the 275kV transmission line would involve various components including busbars, circuit breakers and isolators. The design specifications will be prepared to meet the requirements of the transmission network owner, Powerlink.

Electrical infrastructure within the substation compound will be founded on concrete slabs with gravel surrounds. The compound itself would be enclosed to restrict unauthorised access. The transformers will be placed on concrete pads with protective bunding to contain any leak or spill of transformer oil.

2.4.9.3 Underground Cables

Underground 33kV electrical cables will connect each wind turbine to the wind farm substation. Placement of the cables underground will minimise the visual impact of overhead lines. The proposed underground cable routes would generally follow the access tracks and would be included within the already disturbed roadway.

Underground cables will be buried in trenches generally about one metre in depth to give a minimum cover of 0.75m. The width of the trenches for individual cables will be approximately 0.5m to 0.75m, where power cables and control cables will be installed in the same trench. The time that trenches are open will be minimised and they will be backfilled and compacted using sand, which will be placed immediately above the cables and excavated material above the sand.

Control cables would connect each wind turbine to a computerised operation system in the wind farm control room, allowing turbines to be monitored and managed at all times. Individual turbines can be automatically controlled for start-up and shut-down. In addition, wind speed and direction will be monitored allowing individual turbines to be adjusted to suit the prevailing wind conditions to maximise energy production.

Any surplus natural soil and rock material will be distributed over the surrounding area to blend in with the natural landform and will be revegetated. Excess concrete and other construction materials will be removed from the site. In situations where trenches will need to cross constructed drainage channels, the crossings will either involve under-boring of the channel (horizontal drilling) or stringing conductors above the channels with due consideration given to safety standards and the normal maintenance activities for drainage channels.

2.4.9.4 Overhead Line

As the proposed substation site is located adjacent to the existing Powerlink 275 kV transmission line, the length of some connecting transmission lines will be minimised between the wind farm substation and the connection point along the transmission line.

2.4.10 **Permanent Monitoring Masts**

Two temporary wind monitoring masts are currently installed on the project site; an 80 m tower is situated at approximately 925m ASL to the south-east of the site at -17.175741°S 145.392811°E; and a 50m tower in the north-west of the site at -17.166665°S 145.360292°E (867m ASL). These monitoring masts have recorded wind data which has been utilised for the MEWF development and planning. Additionally, two mobile sonic wind recorders have been utilised across the site.

Up to four permanent wind monitoring masts will be installed within the development footprint to monitor the performance of the wind turbines against the manufacturer’s power-generation guarantees. Each monitoring mast, comprising a lattice structure supported by steel guy cables, will be fitted with equipment such as anemometers, wind vanes, temperature sensors, etc., to measure climatic conditions in the vicinity of the wind turbines. The location and number (max. of 4) of wind monitoring masts is yet to be finalised.

While the monitoring masts provide for the long-term collection of wind data, the key need for the masts is part of performance testing to ensure the wind turbines installed on-site operate in accordance with specifications in respect of noise and power output. The location of monitoring masts in relation to the wind turbines is required to meet a number of obligations to ensure acceptability of test results (*International Standard IEC61400-12*). The final location of masts will be determined in conjunction with the owner and supplier of wind turbines.

2.4.11 Decommissioning of Temporary Facilities

Temporary construction facilities that are not required for operational activities of the wind farm will be removed on completion of construction activities and the areas rehabilitated in accordance with the Rehabilitation Plan (**Appendix B Sub- plan K**).

2.5 Construction Phase Timing

The MEWF Stage 1 construction works will extend over a period of up to 2 years. A breakdown of the construction phases is provided in **Table 5** below.

Table 5 Phases of Project Implementation

TIME	2017												2018											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Local Road Upgrades		✓	✓																					
Site Mobilisation	✓	✓	✓	✓	✓	✓																		
Roads Construction				✓	✓	✓	✓	✓	✓	✓	✓													
Prepare Hardstands & Foundations				✓	✓	✓	✓	✓	✓	✓	✓													
Install Cabling					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓								
Sub Station Construction			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓									
O&M Building Construction							✓	✓	✓	✓	✓													
Deliver Turbine Components									✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Erect Towers, Nacelles and Rotors									✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
De-mobilise Site																				✓	✓	✓		

3.0 Environmental Management System

This section provides an outline of the elements that have been adopted in this CEMP. Environmental management during construction is to be governed by this CEMP and its associated sub-plans.

3.1 Environmental Policy

Below is a summary of the Vestas Environmental Policy of which all staff and contractors are expected to abide by while working on the project site.

'Vestas deliver best-in-class wind energy solutions and set the pace in our industry to the benefit of our Customers and our planet. Vestas operate a certified integrated management system to manage risk and drive continuous improvement of business performance through innovation, benchmarking, and learning from experience.

Vestas satisfy applicable legal and voluntary requirements and ensure transparency in our Quality, Environmental, Health and Safety performance through disclosure of the annual external statement available at Vestas.com.

Vestas will live up to our policy by:

Health and Safety:

- Preventing injury and work related illness through management commitment.
- Demonstrating Safety First by considering health and safety in developing, planning, and execution of our operations, products and services.
- Meeting or exceeding Health and Safety standards by engaging employees, contractors, suppliers, and other stakeholders.
- Ensuring Safety is a prerequisite of doing business at and with Vestas.

Quality:

- Adherence to processes, specifications and procedures in order to achieve Customer Satisfaction.
- Preventing defects through proactive quality assurance and fact-based continuous improvements.
- Reducing risk and associated cost of poor quality by focusing on quality across the value chain.
- Ensuring a life cycle approach to our products and services by focusing on levelized Cost of Energy.

Environment:

- Demonstrating commitment to preventing pollution and protecting the environment in everything we do.
- Demonstrating environmental vigilance by having a life cycle approach in developing, planning, and execution of our operations, products, and services.
- Meeting or exceeding our environmental standards by engaging employees, contractors, suppliers and other stakeholders.' (Vestas.com 2016).

3.2 Application

This CEMP applies to all personnel (staff and contractors) and activities associated with the construction of the Project. The Project Manager, Vestas Australian Wind Technology, is responsible for implementation of the CEMP.

The Project Manager shall ensure that all persons employed or sub-contracted to construct the Project are trained in environmental responsibilities as determined by this CEMP and as legislated by the *Environmental Protection Act 1994*. Environmental duties of all personnel include the following:

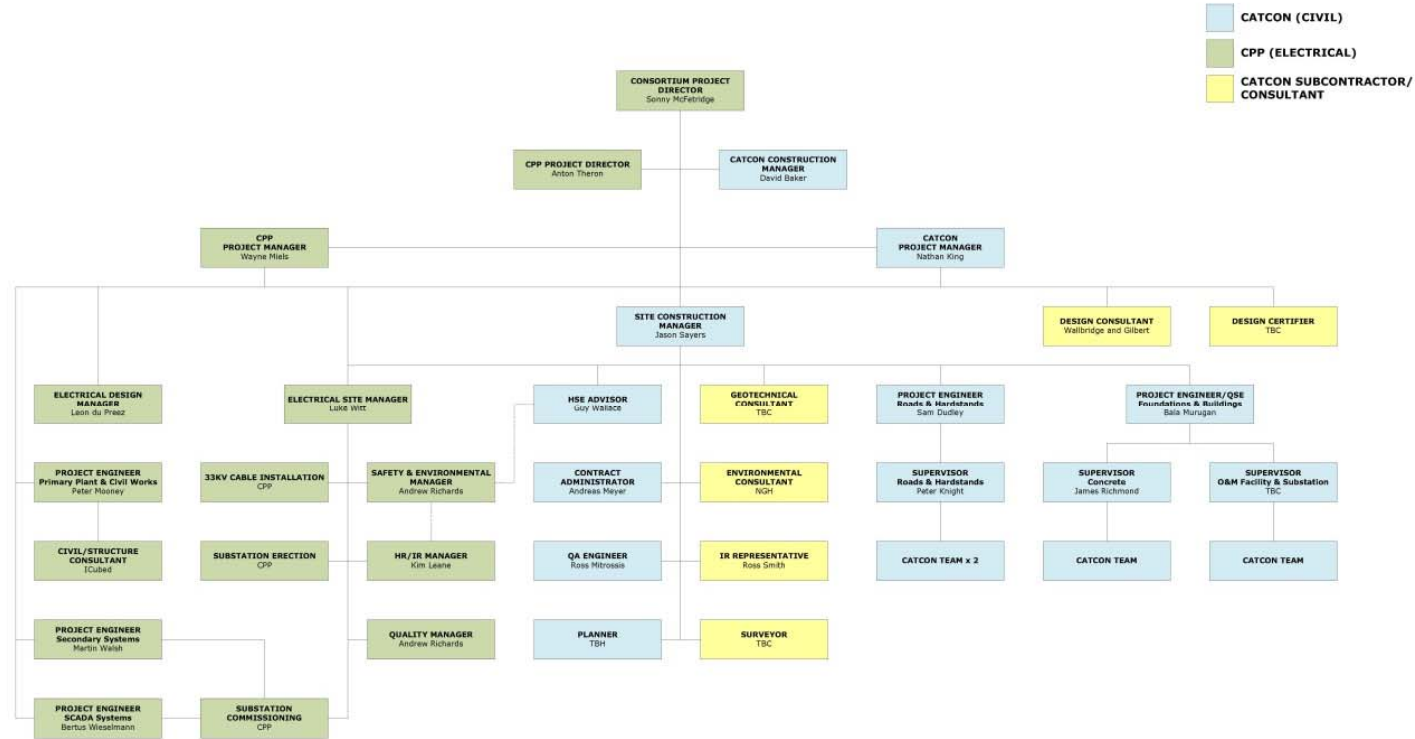
- General Environmental Duty – whereby a person in the performance of their duties shall not do so in a manner which will cause, or is likely to cause, environmental harm unless the person takes all reasonable and practical measures to prevent or minimise the harm.
- Duty to Notify Environmental Harm – whereby if a person in the performance of their duties becomes aware that serious or material environmental harm is caused or threatened, then the person must immediately contact the Principal Contractor who in turn must immediately notify the relevant authorities.

4.0 Roles and Responsibilities

4.1 Project Organisation Structure

A Project Organisation Chart outlining responsibilities for the construction management consortium is presented in **Figure 3** below. **Figure 4** further describes Vestas project management and site management on the project indicating the relationship with MEWF.

MT EMERALD WIND FARM
BOP CONSORTIUM ORGANISATIONAL CHART



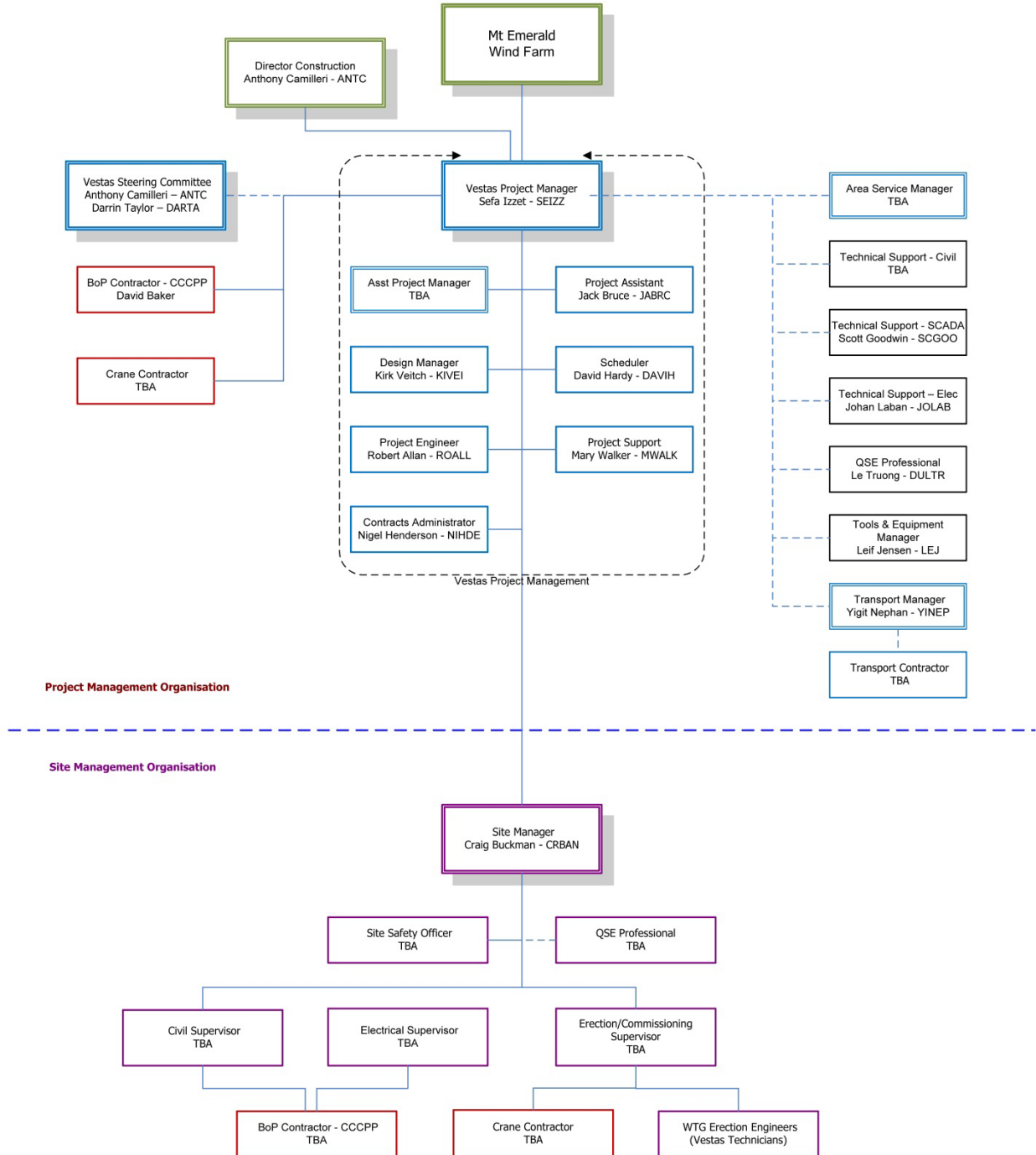
Rev Date: 15/11/16 Approved by: General Manager
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Figure 3 Consortium Flowchart

Mt Emerald Wind Farm Organisation Chart

Vestas

Date: 15/11/16
Revision: 01



Doc No : SP-44593-M-0005_01 Vestas Org Chart

Figure 4 MEWF Project Organisation Flowchart

4.2 MEWF Project Manager

The roles and responsibilities of the MEWF Project Manager are to:

- Oversee compliance with the CEMP covering the construction of the project.
- Integration of outcomes of the Approvals processes into final designs, operational plans and contractual documentation, including facilitating any pre-construction environmental programs, regular review of operational performance reports, and facilitation of external environmental compliance audits.
- Continually review environmental performance of the Construction (Site) Manager against all Approval/CEMP commitments, conditions and audit outcomes and drive any necessary operational changes as required to maintain regulatory compliance.
- Commission any external environmental expertise, particularly in relation to ecological research and monitoring programs and incorporation of outputs into a range of environmental programs identified in the CEMP, in consultation with regulatory agencies as required.

4.3 Vestas Project Manager

The roles and responsibilities of the Vestas Project Manager are to:

- Ensure compliance with development permit conditions and for implementation of this CEMP.
- Instruct project personnel on how to comply with Vestas Environmental Policy, EMS and procedures.
- Notify the relevant agencies of any proposed changes to this CEMP and its implementation, reporting or monitoring, and any breach of development permit conditions and proposed corrective action.
- Inform as soon as practical the relevant agencies of any non-compliance with the construction of the Project.
- Appoint an Environment Officer (EO) to manage the day-to-day environmental management of the construction of the Project, to oversee the implementation of the CEMP and to provide environmental management advice as the need arises.
- Notify the EO of any inquiries received from stakeholders and the nature and timing of any measures that are required in response to such an inquiry.
- Appoint consultants to assist in overseeing works and monitoring compliance with conditions of relevant permits as required.
- Ensure an appropriate staff induction process is implemented ensuring that employees and sub-contractors are aware of and comply with this CEMP, relevant to their respective activities.
- Ensuring periodic monitoring, inspections and audits are undertaken when required by suitably trained Personnel ensuring any issues / non-conformance/ incidents are addressed appropriately.
- Initiate remedial measures when environmental deficiencies are observed, or in response to environmental complaints.
- Restrict construction activities affected by any environmental deficiencies until remedial action has been undertaken.
- Maintain environmental performance records (such as incidents and non-conformances).

4.4 Construction (Site) Manager

The roles and responsibilities of the Construction (Site) Manager are to:

- Direct work in a manner that complies with all relevant environmental procedures, adheres to all legislative requirements and ensures the requirements of this CEMP are implemented.

- Ensure the site is compliant with provisions in this CEMP and with any relevant approvals on a day to day basis including 'stop task' and 'stop work' authority. They will also be responsible for initiating and managing external system audits.
- Managing subcontractors and construction activities on a daily basis to ensure appropriate environmental controls are implemented and maintained.
- Ensuring all staff are inducted into the site and attend daily toolbox sessions.
- Ensuring site personnel are trained and provided with the relevant safety and environmental protection equipment.
- Ensuring all site personnel are provided with, utilise and are appropriately trained in the requirements of Personal Protective Equipment (PPE) and environmental management equipment such as spill kits.
- Undertake daily site inspections and maintain records of environmental actions when required ensuring inquiries or complaints are referred immediately to the Project Manager attending onsite meetings at the request of the Project Manager.
- Immediately address any non-conformance or incident.

4.5 Environmental Officer

The roles and responsibilities of the Environmental Officers (EO) are to:

- Issue written Corrective Action Reports to the Vestas Project Manager within 24 hours of the identification of a need for corrective actions to be taken, maintain records of any complaints received and responses, advise the Vestas Project Manager of complaints and responses, investigate and (where appropriate) implement control measures.
- Review and advise the Vestas Project Manager of any proposed alterations to the CEMP that may be required in response to issues that arise during the conduct of works.
- Report on CEMP implementation and performance.
- Follow directions of the Vestas Project Manager or a nominated representative, with respect to environmental performance.
- Implementation of environmental programs such as species management plans, the Complaints Register and for setting up compliance audits and monitoring programs. Construction compliance auditing will be conducted against the requirements of this CEMP, EMP, Construction Safe Work Method Statements, License and Permit Conditions.
- Provide the Construction (Site) Manager with specifications for and certifications of specific works.
- Prepare plans and specifications that comply with relevant conditions of development permit and the requirements of this CEMP.
- Develop specifications and plans that adequately address environmental issues.

4.6 Community Liaison Officer

The roles and responsibilities of the Community Liaison Officer are to:

- Liaise with the construction management team to ensure timely and effective engagement with the local community on construction activities.
- Communicate through website, newsletters, and advertising.
- Collect information on complaints and provide information to Environmental Officer to investigate.

4.7 All Personnel

The roles and responsibilities of all personnel are to:

- Comply with all legal and contractual requirements, including Project Conditions of Approval and conditions of the Construction Contract.
- Undertake work in accordance with contract specifications, which are to include the requirements of the CEMP.
- Comply with management supervisory directions.
- Participate in induction and training as directed; and
- Report, and if necessary respond to, any environmental incidents to their supervisor for timely reporting to RACL.

5.0 Reporting and Auditing

The Vestas Project Manager is responsible for monitoring and auditing the environmental performance of all persons/organisations involved in their respective stage of the Project.

5.1 Reporting

During construction, there will be a continuous review of the project area, where individuals and work crews will be required to demonstrate the pertinent requirements of the CEMP are being adhered to.

Daily Inspection Checklists (**Appendix F**) will be filled out by supervisors to ensure controls are in place and these are to be reviewed by the Construction (Site) Manager.

Monthly Monitoring Environmental Inspections will be undertaken across the work site by the Environmental Officer and signed off by the Construction (Site) Manager. The Auditing Schedule is provided in **Table 6**.

Table 6 Environmental Auditing Schedule

Timing	Internal/External	Objective of Audit
Daily	Internal	<ul style="list-style-type: none"> Site Supervisory personnel will inspect the site and sub-contractor activities.
Fortnightly	Internal	<ul style="list-style-type: none"> Environment Officer will conduct an inspection of the site on a fortnightly basis, completing the Environment Inspection Checklist.
Monthly	Internal	<ul style="list-style-type: none"> Environmental Officer to conduct formal inspection of site on monthly basis. Report provided by Environmental Officer to MEWF and Vestas Project Manager on compliance with CEMP.
Three monthly	Internal	<ul style="list-style-type: none"> Vestas Project Manager to inspect the site.
6 monthly	Internal	<ul style="list-style-type: none"> Review management targets, environmental objectives. Response to external audit accepted and achieved performance targets.
6 monthly	External	<ul style="list-style-type: none"> Assess compliance with the CEMP and relevant approvals, licences and permits. Assess management controls and any non-conformance activities.

5.2 Auditing

MEWF commissioned external audits will include as a minimum, two annual construction audits (the first within two months of commencement) and two annual operation phase audits for the first three years, reverting to an annual audit thereafter assuming high levels of compliance (**Figure 5**). Frequency of auditing will be revised following receipt of approval conditions. Biannual Internal audits will be conducted. Where regulatory authorities determine that compliance levels are unacceptable, auditing and reporting schedules may be reviewed.

5.3 Incident Reporting and Non-conformance

Incident reporting will be implemented to record any safety or environmental non-conformances, incidents or complaints. These shall be recorded on an Incident Report Form (**Appendix D**) and forwarded to the Construction (Site) Manager for reporting within the MEWF system and for a process of continuous improvement to be implemented.

The notification of emergencies or incidents will include the following information:

- The area where incident occurred;

- The details of incident (suspected cause, was there environmental harm etc.);
- The location of the emergency or incident;
- Time of release/spill;
- Recommended future actions;
- Construction Site Manager.

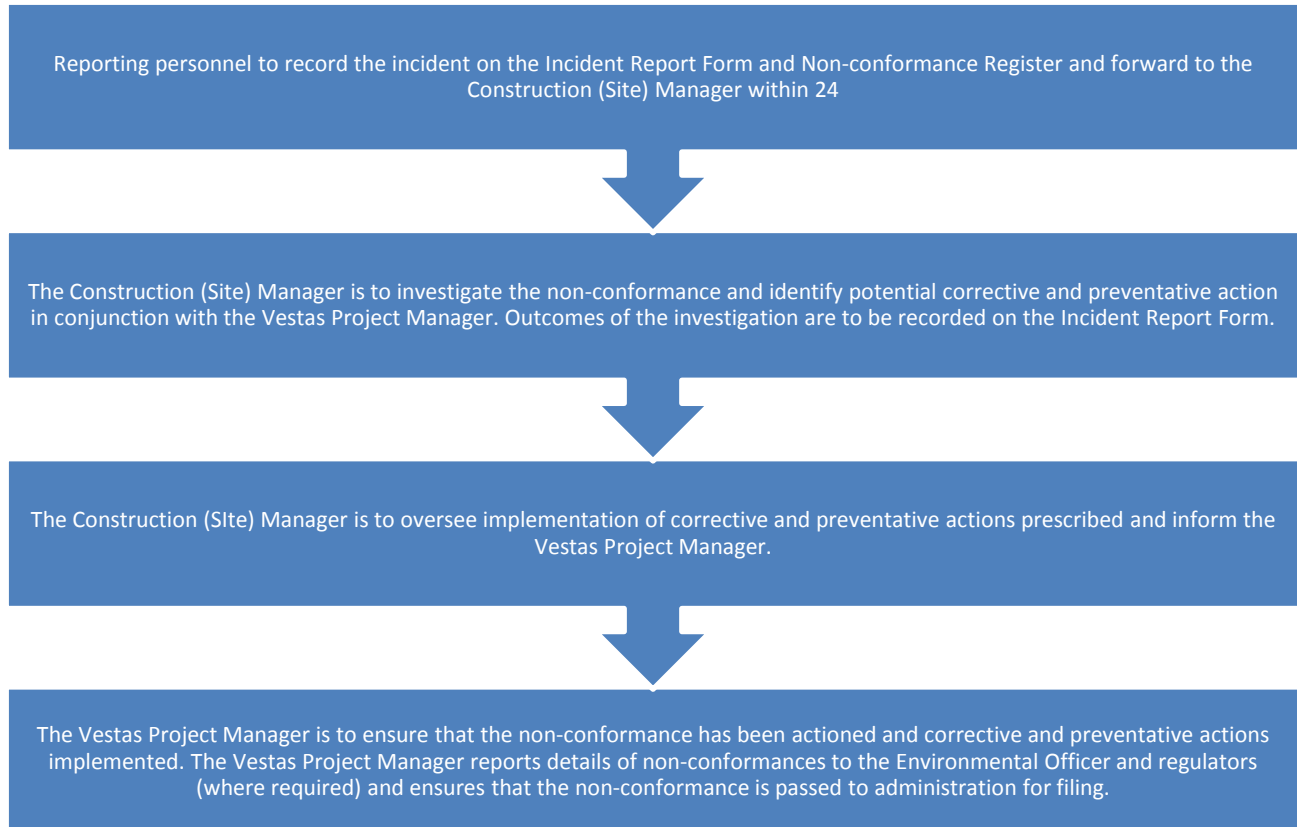


Figure 5 Environmental Emergency and Non-Conformance Procedure

5.3.1 Compliance and External Reporting Procedure

Section 320 of the *Environment Protection Act* requires any person who becomes aware of an event that may or has caused environmental harm, reports the event / incident to their employer. Details of the nature and circumstances of the event must be provided.

The Construction (Site) Manager will ensure the appropriate external agencies (DEE and DEHP) are notified within the appropriate timeframe.

A written report will be provided to the administering authority within 14 days following the initial notification of an emergency or incident or receipt of monitoring results.

The report will include:

- Results and interpretation of samples taken at the time of the incident and analysed;
- Outcomes of actions taken at the time of the incident to prevent or minimise environmental harm; and
- Proposed actions to prevent a recurrence of the emergency or incident.

All such incidents shall be investigated in a timely manner and any necessary steps implemented to minimise likelihood of recurrence. If required, the CEMP shall be reviewed and updated in accordance with **Section 5.5.3**.

5.4 Complaints Procedure

5.4.1 Community complaints

The complaints and dispute resolution procedure outlined below will be implemented at the MEWF. This procedure will enable stakeholders to raise grievances or disputes with MEWF PL and will provide a framework for addressing and resolving issues in an appropriate and timely manner.

5.4.1.1 Complaints mechanisms

A range of mechanisms are available to facilitate the lodgment of complaints, including:

- A 24 hour community call line (1800 702 597);
- A project email address: info@mteemeraldwindfarm.com.au;
- A project mailing address: PO Box 1058, North Sydney NSW 2060;
- Website feedback form;
- Contacting community relations personnel directly; and
- Incident/Complaints Form (part of RATCH-Australia Information Management System)

The complaints mechanisms will be advertised on the MEWF website, factsheets and other relevant community publications.

5.4.1.2 Complaints protocol

- (1) Complaints received should be recorded using the designated Community Complaints Record Sheet (**Appendix H**) or alternatively, via the Incident/Complaints Form under RATCH-Australia's internal systems. These documents will then be incorporated into the Complaints Management Register.
- (2) Any complaint that may not be resolved immediately must be referred to the MEWF Community Liaison via the MEWF project email or telephone number.
- (3) The Community Liaison will contact the complainant within 48 hours to acknowledge receipt of the complaint and to explain that either an update or resolution will be provided within seven working days.
- (4) The Community Liaison will liaise with the relevant MEWF PL representative and/or external project consultant to investigate the complaint.
- (5) The target should be to develop an update or resolution for communication to the complainant within seven working days.
- (6) Where complaints are unable to be adequately resolved through this process, and if the MEWF board believe it is necessary, these complaints will be referred to an external mediation body.
- (7) At the completion of any follow-up activities and resolution the Community Complaints Record Sheet is to be finalised and the Complaints Management Register updated accordingly.
- (8) MEWF PL's community relations team will prepare a monthly communications report during the construction phase and quarterly during the operation phase. Each report will include a summary and analysis of all complaints during the reporting period. The effectiveness of dispute resolution will also be described in the reports. Feedback received via complaints will be incorporated into organisational practice.

5.5 Document Control

All relevant personnel involved in the environmental management process will be expected to maintain a document control system for recording environmental management activities (i.e. incidents, complaints and monitoring activities). The distribution list of registered copies is outlined in **Section 5.5.1**. The distribution list will be maintained by the Vestas Project Manager and all copies will be issued electronically with a hard copy kept on file. It is the Vestas Project Manager's responsibility to ensure personnel are aware of the location of the most recent version of this document.

5.5.1 Distribution List of Registered Copies

Any and all hardcopies of the CEMP will be labelled with their distribution and document issue number in the footer and on the front cover. The CEMP will be provided to personnel listed in **Table 7**.

Table 7 Distribution List

Distribution Number	Personnel Issued To
1	Vestas Project Manager
2	Construction (Site) Manager
3	MEWF Project Manager
4	Environment Officer
Electronic Copy	Latest Version maintained by Vestas

5.5.2 Environmental Record Management

Environmental records will be maintained by the Construction (Site) Manager. Records will be maintained in accordance with **Table 8**. All records must be stored both electronically and as a hard copy for audit purposes.

Table 8 Environmental Record Locations

Document	Storage Location	Period of Retention (minimum)
Daily Site diary/checklists	Project Drive	3 Years
Weekly site inspection checklists	Project Drive	7 Years
Internal and external audit reports	Project Drive	7 Years
Incident / non-conformance reports	Project Drive	7 Years
Environmental training records	Project Drive	7 Years
Complaint and enquiry records	Project Drive	7 Years

5.5.3 Review and Update

The CEMP is a live document and will be regularly reviewed and revised to reflect the plan of construction and ensure that the document addresses environmental issues, changes in legislation, policies, guidelines and work practices.

At a minimum, the CEMP will be reviewed on an annual basis; notwithstanding, the CEMP will be updated in the response to the following:

- Changes to the MEWF operating procedures;
- Changes to the conditions of the MEWF Approval Conditions, permits, licences or sub-plans;
- Consequence of a corrective action; and

- Feedback from regulatory agencies.

Any revisions to the CEMP will be approved by the Vestas Project Manager and the updated CEMP will be provided to the MEWF Project Manager and stakeholders according to **Section 5.5.1**. In addition, all construction staff will be informed of any important changes to the CEMP during toolbox sessions prior to the start of the working day. A hard copy will be available on site at all times where it can be viewed upon request.

A register of review and updates to the CEMP will be maintained for audit purposes by the Vestas Project Manager.

6.0 Environmental Training and Induction

The success of the CEMP depends on all those responsible for its implementation being conversant with its contents and performance measurements. Vestas, MEWF and its contractors will be responsible for ensuring project personnel have sufficient knowledge and awareness to identify potential environmental issues, and that they are trained to take appropriate corrective action.

It is essential that all personnel are familiar with the reporting procedures of the CEMP.

6.1 Induction

All employees and sub-contractors will complete an induction prior to commencing work on the Project. The induction will include safety, access and a review of environmental requirements, which will be documented in an *EMP Induction Plan (Appendix B)*. All Project personnel from supervisory to managerial level will have an additional detailed training session on the use and implementation of the CEMP and relevant sub plans. It is the responsibility of the Construction (Site) Manager to ensure records of training are maintained.

All visitors' and delivery drivers which enter the site must undergo a visitor induction or delivery driver induction, which may be tailored to reflect the reduced risk to safety and the environment. Sub-contractors are responsible for the actions of their visitors'. All visitors to site must be accompanied by a fully inducted representative at all times. The induction of all staff is the Construction (Site) Manager's (or delegate's) responsibility.

The induction will address a range of issues including, but not limited to:

- The MEWF EMP;
- Conditions of the Project Approval;
- Legal and regulatory requirements including duty of care and potential consequences of infringements;
- Identification of threatened species and their habitat, duty of care;
- Identification of sensitive areas and vegetation clearing activities and procedures;
- Emergency plans and evacuation procedures for bushfires;
- Designation locations and procedures for washdown of vehicles, maintenance etc.
- Incident management training;
- Identification and management of non-conformances;
- Identifying, understanding site procedure's for accessing high risk work areas;
- Communication; and
- Other site-specific information (e.g. potential presence of Unexploded Ordnance outside clearance areas).

6.2 Toolbox Meetings

The Construction (Site) Manager will ensure that supervisors hold at least one weekly toolbox talk with staff and crews to discuss issues associated with the scheduled work.

This will include highlighting and discussing relevant environmental and safety issues as required. The sessions will include discussion of strategies to be implemented as identified in Job Hazard Analysis (JHA) of current work activities.

6.3 Job Hazard Meetings

A Job Safety Environment Analysis (JSEA) is a simple tool used in helping personnel identify, analyse and manage the hazards that exist in the work they undertake. It formalises the process of hazard identification and risk management that most people follow when working. The JSEA requires personnel to examine the task they are about to undertake and:

- Break the job down into separate and defined steps;
- For each step identify the potential hazards (including potential environmental or cultural heritage hazards) that could occur; and
- For each potential hazard list the method to be followed to prevent the hazard causing an injury, loss, damage or environmental incident.

Weekly job hazard meetings will be held in conjunction with the Toolbox meetings.

6.4 Management of Sub-contractors

All sub-contractors will be required to comply with this CEMP at all times and will have the same environmental management responsibilities as the Contractor. The Vestas Project Manager is directly responsible for ensuring that sub-contractors implement the appropriate environmental management requirements during construction. The Vestas Project Manager will ensure that the requirements of this CEMP are included in any commercial agreements or subcontracts with subcontractors.

Sub-contractors undertaking works that are beyond the scope of this CEMP are required to submit a Standard Operating Procedure to the Construction (Site) Manager (or delegate) for approval prior to commencing works.

7.0 Risk Management

7.1 Risk Assessment

A multi-criteria analysis has been used in this assessment in accordance with the Australian Standard AS/NZ 4360 Risk Management, where the likely hood of an activity is assessed against the severity (consequence) of the action. Through identification of the environmental risks and assessment of the proposed mitigation measures against these risks, we can ascertain the value of the mitigation measures and strategies outlined in the CEMP.

7.2 Risk Assessment Process

The risk matrix (**Table 9**) provides a risk rating from the combination of likelihood of occurrence and consequence, should construction impacts occur. Potential impacts with a risk rating of 1 to 3 are considered to present a negligible to moderate environmental risk, whereas a risk rating of 4 to 6 is considered to present a moderate to very high environmental risk.

Table 9 Risk Matrix

		CONSEQUENCE					
		Insignificant	Minor	Moderate	Major	Disaster	Catastrophic
LIKELIHOOD	Almost Certain	4	4	5	5	6	6
	Likely	3	4	4	5	5	6
	Probable	2	3	4	4	5	5
	Possible	2	2	3	4	4	5
	Unlikely	1	2	2	3	4	4
	Improbable	1	1	2	2	3	4

7.2.2 Risk Management Assessment Procedure

The risk analysis matrix will be reviewed and incorporated into field based risk assessments in the form of a *Risk Management Assessment Procedure*. The risk analysis matrix will be maintained by the Vestas Project Manager throughout construction of the project and will be reviewed annually or as required, based on the occurrence of new hazards or the change in activities.

A number of potential ecological impacts have been identified and assessed, the majority of which are assessed as low to moderate risk following implementation of proposed mitigation measures. The impacts which remain significant (i.e. Risk Level 4 or greater) after all appropriate measures are applied, are detailed in the following sections

7.2.3 Risk Analysis Matrix

A high level risk analysis matrix is presented in **Table 10** with potential impacts indicated for the defined construction process. Standalone sub-plans have been developed to address the above key environmental risks in consultation with stakeholders and form part of this CEMP.

- Other identified issues and associated risks that require an appropriate level of management include:
- Air quality and dust management;
- Pollution control; and

- Waste minimization.

These issues are appropriately addressed in the attached EMP (**Appendix B**).

7.2.4 Flora

Loss of Montane Heath habitat above 900m in the Wet Tropics Bioregion

To reduce the impact from turbines to the montane heath habitat in the wet tropics bioregion, MEWF reduced the number of turbines in this area. Offsets are proposed for residual impacts on the montane heath above 900m. The use of below sub plans will minimize any impacts on montane heath habitat from construction activities:

- Threatened Plants Management Plan;
- Pest Management Plan;
- Weed Management Plan; and
- Rehabilitation Plan.

7.2.5 Fauna

Northern Quoll high quality denning habitat loss

Potential impacts to high quality denning habitat (Northern Quolls) remain a moderate risk due to the lack of suitable data collection to date.

Other moderate risk impacts include habitat degradation and direct species mortality to Northern Quolls from construction activities.

- Implementation of the following sub-plans will minimize potential impacts to the Northern Quoll:
- Bushfire Management and Emergency Evacuation Plan;
- Northern Quoll Outcomes Strategy;
- Northern Quoll (Species) Management Plan;
- Habitat Clearing and Management Plan;
- Weed Management Plan; and
- Pest Management Plan.

Table 10 Project Risk Analysis Matrix

Environmental issue	Project Phase	Source or nature of Risk	L	C	R	Mitigation Measure
Landscape and Visual Impact	C	Works area lighting	3	2	2	Environmental Management Plan EMP Training and Induction Plan
Noise and Vibration	C/D	Construction noise and vibration	4	2	3	Environmental Management Plan Construction Noise and Vibration Management Plan
	C/O/D	Increased vehicle movements	5	2	4	Environmental Management Plan EMP Training and Induction Plan
Traffic and Transport	C/D	Increase in traffic volume	3	2	2	Traffic and Transport Management Plan
	C/D	Damage to local road service	3	3	3	Traffic and Transport Management Plan EMP Training and Induction Plan
Air quality	C	Dust nuisance	3	3	3	Environmental Management Plan Construction Dust Management Plan EMP Training and Induction Plan
Downstream Water Quality	C	Increase erosion and land instability leading to poor downstream water quality	4	4	4	Erosion, Sediment and Stormwater Management Plan EMP Training and Induction Plan
	C	Modification to drainage patterns	3	2	2	Erosion, Sediment and Stormwater Management Plan EMP Training and Induction Plan
Waste Minimisation	C/O/D	Release of hazardous waste due to improper handling and/or disposal	3	4	4	Construction Waste Management Plan Hydrocarbon and Hazardous Substance Plan Environmental Management Plan EMP Training and Induction Plan
		Litter and refuse waste	5	2	4	Construction Waste Management Plan Environmental Management Plan EMP Training and Induction Plan
Hydrology	C/O/D	Potential spills into waterways and aquifers	2	4	3	Hydrocarbon and Hazardous Substance Plan EMP Training and Induction Plan
		Increased runoff concentrating flows	3	3	3	Erosion, Sediment and Stormwater Management Plan Environmental Management Plan EMP Training and Induction Plan

Environmental issue	Project Phase	Source or nature of Risk	L	C	R	Mitigation Measure
		Destruction of riparian vegetation	3	3	3	Threatened Plant Management Plan Erosion, Sediment and Stormwater Management Plan Environmental Management Plan EMP Training and Induction Plan
Fire	C	Environmental damage from ignition from construction activities	3	4	4	Hydrocarbon and Hazardous Substance Plan Bushfire Management and Emergency Evacuation Plan
	C/O	Damage to adjoining properties from bushfire resulting from construction or operation of windfarm	3	4	4	Hydrocarbon and Hazardous Substance Plan Bushfire Management and Emergency Evacuation Plan EMP Training and Induction Plan
Unexploded ordnance	C	Blast and fragmentation effects	3	5	4	Emergency Management Plan CEMP EMP Training and Induction Plan
Flora	C	Clearing of conservation significant plants	5	3	4	Threatened Plants Management Plan Habitat Clearing and Management Plan Weed Management Plan Bushfire Management and Emergency Evacuation Plan EMP Training and Induction Plan
	C/D	Loss of montane heath habitat	6	3	5	Threatened Plants Management Plan Habitat Clearing and Management Plan EMP Training and Induction Plan
	C/O/D	Increased bush fire intensity and degradation of habitat from invasive grass weed spread	3	4	4	Weed Management Plan Bushfire Management and Emergency Evacuation Plan EMP Training and Induction Plan
	C/O	General habitat fragmentation	3	4	4	Threatened Plants Management Plan Rehabilitation Plan Environmental Management Plan EMP Training and Induction Plan Pest Management Plan

Environmental issue	Project Phase	Source or nature of Risk	L	C	R	Mitigation Measure
Northern Quoll	P/C	High Quality Denning Habitat loss	4	4	4	Northern Quoll Outcomes Strategy Northern Quoll (Species) Management Plan Habitat Clearing and Management Plan Pest Management Plan Weed Management Plan EMP Training and Induction Plan
	P/C/O	Habitat degradation		4	4	Northern Quoll (Species) Management Plan Habitat Clearing and Management Plan Bushfire Management and Emergency Evacuation Plan EMP Training and Induction Plan Weed Management Plan Pest Management Plan
	P/C	Construction mortality	3	5	4	Northern Quoll (Species) Management Plan Habitat Clearing and Management Plan Northern Quoll Outcomes Strategy EMP Training and Induction Plan
Bare-rumped Sheathtail Bat	P/C	Loss of roosting habitat	3	4	4	Northern Quoll (Species) Management Plan Habitat Clearing and Management Plan EMP Training and Induction Plan
General Fauna	C	Mortality of individuals	3	3	3	Habitat Clearing and Management Plan EMP Training and Induction Plan
	C/O/D	Habitat and Behavioural Disturbance	5	2	4	Environmental Management Plan EMP Training and Induction Plan Threatened Plants Management Plan Northern Quoll (Species) Management Plan Habitat Clearing and Management Plan Weed Management Plan Pest Management Plan Bushfire Management and Emergency Evacuation Plan Northern Quoll Outcomes Strategy

Environmental issue	Project Phase	Source or nature of Risk	L	C	R	Mitigation Measure
	C	Fragmentation of populations	3	2	2	Threatened Plants Management Plan Bushfire Management and Emergency Evacuation Plan EMP Training and Induction Plan
Cultural Heritage	C	Damage or disturbance to areas/items of cultural heritage	3	3	3	Cultural Heritage Management Plan EMP Training and Induction Plan
	C	Uncover items of significance	2	3	2	Cultural Heritage Management Plan EMP Training and Induction Plan
Social and Economic Matters	P/C/O/D	Visual Amenity Impacts on neighbouring properties	4	3	4	Environmental Management Plan EMP Training and Induction Plan

*L= likelihood; C= consequence R= risk

8.0 Emergency Response Plan

This section provides an overview of the Emergency Response Plan, which is provided in **Appendix C**. The purpose of this Emergency Response Plan (ERP) is to describe how Vestas propose to identify potential emergency situations, respond to and manage the emergency to ensure the risks of personal, environmental and property damage are minimised.

The ERP is for the use of all Vestas employees and subcontractors during the life of the project. The ERP details the management of emergency evacuations, fire safety, incidents involving hazardous substances and reporting, investigation and recording procedure for injuries and incidents.

8.1 Emergency Response Structure

The Construction (Site) Manager, Site Safety Officer and the nominated Emergency Control Coordinator (ECC) for the project are required to form an Emergency Management Committee (EMC) in accordance with AS3475: 2010.

Table 11 Emergency Management Committee Requirements

Emergency Control Coordinator (ECC)	Requirements
Formation date of the EMC	TBA <Insert date>
Meeting schedule	Every 3 months
Emergency Scenario Assessment(s)	Emergency scenarios are included in the Emergency Response Plan
Copies of the Emergency Response Plan locations	2 Controlled copies onsite in safety folders Office Administration and First Aid Room.
Emergency Response Plan Review Schedule	3 monthly or as project phases dictate
Members of the Emergency Management Committee	<Name>, <Name> & <Name> (or as revised as the project dictates)
Emergency Response Plan testing Schedule	On commencement and every 4 months
Health and Safety Training Matrix	Owned by Technical Safety Training Centre

The EMC will be responsible for assessing risk of all potential emergency situations, including specialised rescue for site. This will include first aid requirements risk assessment, and assessment of the suitability, location and accessibility of paths of travel, location of emergency equipment and signage. Incidents identified as having the potential to cause emergency situations will be documented within the ERP. Where an incident requires coordination with external authorities or bodies, the ERP shall include emergency contact numbers and periodic liaison timeframes during heightened risk periods (e.g. bushfire periods and total fire ban days).

The ERP contains processes to ensure emergency equipment, exit signs, paths of travel and alarm systems are provided, inspected, tested and maintained at the required frequencies. This will be performed by a competent person (e.g. familiar with the Building code of Australia, level 3 first aider, trained in fire-fighting etc.) consistent with the project audit/review schedule using the relevant assessment documentation ASP-PACIFIC-WI-0150.1a Emergency Equipment RA - Part 1 (First Aid) and ASP-PACIFIC-WI-0150.1b Emergency Equipment RA - Part 2 (Fire Protection Fire Fighting) and ASP-PACIFIC-FM-0150.2 Emergency Response Equipment Maintenance Register.

Specific arrangements shall be included in the plan for situations needing specialised rescue for site personnel, such as excavation collapse or rescue from heights. It also covers public interface incidents, such as a major road accident adjacent to the worksite, or in traffic control zones.

The ERP shall be used to identify and nominate the individuals who will be the Project's Emergency Control Organisation (as per AS3745). Specific roles and responsibilities include ECC, EMC Members, First Aiders and First Responders (e.g. those trained in special equipment that may be required, including fire extinguishers, height rescue/EWP/harnesses, gas detectors, earthmoving machinery, etc.)

8.1.2 ERP Audit

Vestas will review the adequacy of the ERP, in particular the risk assessments, equipment location and suitability every three (3) months or after an event, to ensure it adequately addresses site activity and conditions.

Emergency rehearsals and coordination protocols shall be conducted on minimal six (6) monthly interval or when significant changes occur to the workplace, planned work activities, project related hazards or workforce. Emergency rehearsals shall be scheduled based on the works program and relevant emergency risks on the project. The EMC will be responsible for developing and maintaining a schedule of rehearsals to ensure this occurs within the prescribed timeframes.

Post rehearsal simulation or activation of the ERP, the EMC will meet and review the plans and assess response for overall effectiveness. Where improvements are identified, a record of the discussions will be made and a review of the related assessments and plan triggered.

8.1.3 Competency and Training

Competency and training requirements will be defined and will be managed in accordance with the Project's Learning and Development Matrix HSE Training program. As a minimum, all members of the EMC will have completed a specific Chief Warden training course with a Registered Training Authority and specific training will be provided for all dedicated emergency personnel. Amendments to emergency plans will be detailed in training programs for dedicated personnel and will be briefed to all workers at toolbox and management meetings.

The site ERP connects into the APC Crisis Management Plan and process. A similar coordination protocol will also be setup with the Customer's crisis management process (where applicable) and/or other businesses in the vicinity of the project where coordination of emergency response may be necessary. Further details of these plans can be found in **Appendix C**.

9.0 Management Sub Plans

9.1 Construction Transport Plan

A detailed Construction Transport Plan was developed by Jacobs Group Pty Ltd, collates all of the existing reports and documentation relating to the impacts of the project on the surrounding road network, and includes requirements for site access (**Appendix J**).

The report also provides details on the following:

- Transport related Conditions of Approval.
- Traffic generated by construction of the wind farm.
- Mitigation and management measures.
- Consultation undertaken with local and regional government authorities.

9.2 Construction Noise and Vibration Management Plan

The Noise and Vibration Management Plan (**Appendix C**) outlines procedures to minimise and control potential noise and vibration impacts on the environment and local community, associated with the construction phase of the MEWF. Construction noise and vibration is expected to occur primarily from earthworks, blasting, building activities and movement of materials.

9.3 Construction Dust Management Plan

The Construction Dust Management Plan (**Appendix D**) outlines procedures to minimise air quality pollution associated with dust emission and the potential impacts on the environment and surrounding community. Air pollution and dust have the potential to impact on the amenity of the surrounding area and the health of the local community, environment and construction workers.

9.4 Construction Waste Management Plan

The Construction Waste Management Plan (**Appendix E**) is necessary to appropriately manage the range of wastes, which will be created during the construction and operational phases. The plan outlines the methods that are required to manage these wastes while minimising the production of waste materials and maximising reuse and recycling in accordance with the waste hierarchy.

9.5 Environmental Management Plan

The MEWF EMP considers all stages of the MEWF development. A total of eight sub-plans have been developed to comprise part of the EMP and should be read in conjunction with associated sections of the construction, operations and decommissioning phases of the MEWF project. Each sub-plan has been developed in response to the Decision Notice Conditions dated 18 December 2015 (**Appendix A**). These plans are:

- Environmental Management Plan
- EMP Training and Induction Plan
- Threatened Plants Management Plan
- Northern Quoll (Species) Management Plan
- Habitat Clearing and Management Plan

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- Weed Management Plan
 - Pest Management Plan
 - Rehabilitation Plan
 - Erosion, Sediment and Stormwater Management Plan
 - Hydrocarbon and Hazardous Substance Plan
 - Bushfire Management and Emergency Evacuation Plan
 - Cultural Heritage Management Plan

Additional documents associated with this plan and referenced throughout the document have been conditioned under the Federal Department of the Environment Ministers Approval Notice (26 November 2015), and includes the Northern Quoll Outcomes Strategy (Burnett, 2016).

10.0 References

Burnett, S (2016) *Mount Emerald Wind Farm Northern Quoll Outcomes Report* for RATCH Australia Pty Ltd, Brisbane.

RAC (2016) *Mount Emerald Wind Farm Community Engagement Strategy*, Brisbane.

Standards Australia (2007), *Risk Management Guidelines - Companion to AS/NZS 4360: 2004*, HB 436:2004/Amdt 1:2005, Standards Australia, Sydney.

Standards Australia (2009), *Risk management – Principles and guidelines*, AS/NZS ISO 31000-2009, Standards Australia, Sydney.

11.0 Glossary

Term	Description / Definition
Batching plant	Operational area where concrete and other aggregated materials are prepared.
CHMP	Cultural Heritage Management Plan
Compound for substation and control building	The base area for the site management and technicians. The area consists of restroom facilities, parking, site offices, tools and spare parts containers
Consequence	Outcome or impacts of an event. There can be more than one consequence from one event. Consequences can range from positive to negative. Consequences can be expressed qualitatively or quantitatively. Consequences are considered in relation to the achievement of objectives (<i>AS/NZS ISO 3100:2009 Risk management - Principles and guidelines</i>).
Conservation significance	Species or community listed as endangered, vulnerable, rare, near threatened or migratory under either the EPBC Act or the NC Act
Construction Area	The part of the Installation Area located at each WTG foundation position which is required for assembling the cranes and area for operating cranes, containers for lifting equipment, generator unit, working area with tools and containers etc.
Crane Hard Stand	An improved / stabilized area with a prepared surface where plant and cranes can operate, vehicles can be parked and material can be stored.
Cultural heritage	The legacy of physical artefacts and intangible attributes of a group or society that are inherited from past generations, maintained in the present and bestowed for the benefit of future generations.
Culverts	Reinforced structures (usually concrete) to provide sealed access over watercourses.
DEHP	Department of Environment and Heritage Protection (Queensland)
Development envelope	The area of the project site in which the wind farm infrastructure (turbines, hardstands, access roads, electrical cables and substation) could potentially be sited, comprising an area of approximately 57 ha.
Development footprint	The final locations of the wind farm infrastructure. This includes the infrastructure footprint - the area occupied by turbines, access tracks, substation etc. during the operational phase - and other areas that will be affected by construction (for example, cable trench easements, construction phase access track width, construction compound, crane pads) which can be rehabilitated post-construction.
DNRM	Department of Natural Resources and Mines (Queensland)
DEE	Department of Energy and Environment (Federal)
Ecologically sustainable development	The environmental component of sustainable development. It can be achieved partially through the use of the 'precautionary principle', namely that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
Ecology	The scientific study of the distribution and abundance of life and the interactions between organisms and their environment. The environment of an organism includes physical properties, which can be described as the sum of local abiotic factors such as insolation (sunlight), climate, and geology and biotic factors, which are other organisms that share its habitat.
Economic Impact Assessment	Assessment of the measured effect on the economy of a region of an impacting agent.
EIS	Environmental Impact Assessment -An environmental impact assessment is an assessment of the possible impacts that a proposed project may have on the environment, consisting of the environmental, social and economic aspects.
EMP	Environmental Management Plan
Environmental Impacts	Impacts that could be caused to the environment when a development project is constructed; in operation or when decommissioned.
EP Act	Environmental Protection Act 1994
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)

Term	Description / Definition
ESCP	Erosion and Sediment Control Plan
ESD	Ecologically Sustainable Development
Fauna	Animal life
Flora	Plant life
Geotechnical	Technologies and sciences relating to geology.
Gravity Foundations	A standard type of reinforced concrete slab which support the wind turbine tower by gravitational mass. Excavation is required to a depth of approximately 2.5 m.
Landscape	Natural and manmade features of the urban, rural or natural environment, such as vegetation, topography and land use elements.
MEWF	Mount Emerald Wind Farm
MNES	Matters of National Environmental Significance, as defined under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth).
Montane heath	A rare plant community hosting numerous important species and restricted to exposed ridges above 900 m ASL.
MSC	Mareeba Shire Council
MW	Megawatts
Nacelle	The housing for the generating components of the wind turbine. This includes the generator, gear box, drive train and brake assembly.
NC Act	<i>Nature Conservation Act 1992</i> (Queensland)
NC Plan	Nature Conservation (Protected Plants) Conservation Plan 2006
NTA	<i>Native Title Act 1993</i>
RACL	RATCH Australia Corporation Limited
RCA	Radio Communications Act 1992
Remnant vegetation	Vegetation which is mapped by the Queensland Department of Environment and Resource Management as being within a remnant endangered regional ecosystem, a remnant of concern regional ecosystem, or a remnant not of concern regional ecosystem map. Vegetation remaining after an area has been cleared or modified.
Revegetation	The practice of direct-seeding or planting tubestock into the ground as part of the landscape rehabilitation process.
Riparian	Any land which adjoins or directly influences or is influenced by a body of water.
Sensitivity	The relative susceptibility to adverse impacts to environments.
Turbine Footing	The stable horizontal platform for the towers sections and elements to be mounted. Foundations will be of either a gravity or rock-anchor type, depending on the geotechnical conditions at each wind turbine site.
VMA	<i>Vegetation Management Act 1999</i> (Queensland)
vpd	Vehicles per day
Weeds	Plant species that invade native ecosystems and can adversely affect the survival of indigenous flora and fauna. . A species not native to Australia. Sometimes referred to as naturalised species.
WTG	Wind Turbine Generator(s) - A wind turbine is a device that converts kinetic energy from the wind into electrical power.