Document No. COLWF-PM-PLN-0018

Construction Soil and Water Quality Management Plan (CSWQMP)

COLLECTOR WIND FARM

Collector Wind Farm
Lerida Road South
Cullerin, NSW 2581
Australia

Vestas Australian Wind Technology Pty Ltd
Level 4, 312 St Kilda Rd
Melbourne
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This is a sub-plan to be used in conjunction with the Construction Environmental Management Plan

Revision	Date	Details	Prepared By	Reviewed By:	Authorised By
2.1	29/09/2017				
3.0	12/12/2018				
3.1	17/12/2018				
4.1	20/02/2019	Updated to address comments from DoPE	CRC (on behalf of Vestas)	David Hewitt Asst Project Manager	Ajay Pancholi Project Manager
4.2	10/04/2019	Additional Comments from CWF	CRC	David Hewitt Asst Project Manager	Ajay Pancholi Project Manager
5	07/05/2019	Updated to address comments from DoPE (16.04.2019)	Alana White CRC	David Hewitt Asst Project Manager	Ajay Pancholi Project Manager
6	20/5/2019	Updated to address Modification 2 approval	Alana White CRC	David Hewitt Asst Project Manager	Ajay Pancholi Project Manager
07	17/08/2019	Alignment with MOD3 conditions.	CRC (on behalf of Vestas)	David Hewitt Asst Project Manager	Ajay Pancholi Project Manager
08	05/09/2019	Revised Figure 7-1 and Table 7-1	CRC	David Hewitt Asst Project Manager	Ajay Pancholi Project Manager

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DEFINITIONS

ASS	Acid Sulfate Soils
CEMP	Construction Environmental Management Plan
CSWQMP	Construction Soil and Water Quality Management Plan
MCoA	Minister's Condition of Approval
DECC	Former Department of Environment and Climate Change (NSW) now NSW Office of Environment and Heritage.
DPI&E	NSW Department of Planning, Industry & Environment
DPI (Fisheries)	NSW Department of Primary Industries (Fishing and Aquaculture)
DPI (Water)	NSW Department of Primary Industries (Water) (Former Office of Water)
EEC	Endangered Ecological Community
EA	Collector Wind Farm Environmental Assessment
EPA	NSW Environment Protection Authority
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act, 1999
EPBC – CoA	Condition of approval by the Federal Minister for the Environment under the EPBC Act
EPL	NSW Environment Protection Licence under the Protection of the Environment Operations Act 1997.
ESCP	Erosion and Sediment Control Plan
SWMS	Safe Work Method Statements
FM Act	NSW Fisheries Management Act 1994
Minister, the	NSW Minister for Planning and Environment
MCoA	NSW Minister for Planning Condition of Approval
PASS	Potential Acid Sulfate Soils
POEO Act	NSW Protection of the Environment Operations Act 1997
TCBP	Temporary Concrete Batch Plant
the project	Collector Wind Farm Project

1 PURPOSE

The purpose of this sub-plan is to describe how impacts associated with soil and water quality management are managed throughout the duration of the project.

Works are to be implemented in accordance with the management measures and strategies contained in this sub-plan.

Chapter 12 and Sections 13.2 of the Collector Wind Farm Environmental Assessment (EA) (June 2012), Chapter 6 of the Second Modification Application (October 2018) and Chapter 6 of the Third Modification Application (July 2019) assessed the project's likely potential water quality and soil impacts. The EA confirmed the likely potential for direct and indirect soil and water quality impacts to occur during the project's construction, including run off and water quality in local watercourses and farm dams associated with Lerida Road South upgrade works. It concluded that providing identified mitigation measures are implemented under the Construction Soil and Water Quality Management Plan (CSWQMP), any residual impacts would not be environmentally significant.

1.1 Project Background

The Collector Wind Farm Project (the Project) is located on the Cullerin Range, 3.5 kilometres north of Collector on the NSW Southern Tablelands. The Project was initially approved on 2 December 2013 under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The project was transitioned to State Significant Development (SSD) on 6 July 2018 and approval was granted for the construction, operation and decommissioning of up to 55 wind turbines and associated infrastructure.

Further background on the project can be found in the Construction Environment Management Plan (CEMP).

2 DOCUMENT SCOPE

This sub-plan applies to all aspects of soil and water quality management for the project.

This sub-plan complies with and supplements the guidelines and/ or procedure developed by the Client/ key stakeholder for the management of soil and water quality.

The target audiences for this sub-plan are Project Managers, Site Supervisors, Environmental Advisors, Contracting staff and any other relevant stakeholders.

The sub-plan forms part of the construction environmental management plan (CEMP). It describes applicable and relevant:

- Minister's Conditions of Approval (MCoA) issued by the NSW Minister of Planning and Environment
- Mitigation and management commitments contained in the following assessment and planning documentation:
    - Collector Wind Farm Environmental Assessment, prepared for RATCH Australia Corporation Limited (APP Corporation, June 2012) (the EA).
    - Revised Statement of Commitments (APP Corporation, March 2013)
    - Collector Wind Farm Preferred Project and Submissions Report (APP Corporation, March 2013)
    - Collector Wind Farm Modification Report (NGH Environmental, September 2015)
    - Collector Wind Farm Submissions Report (NGH Environmental, December 2015).
    - Revised Statement of Commitments (22 July 2016)
    - Second Modification Application (NGH Environmental, October 2018)

- Collector Wind Farm Submissions Report (NGH Environmental, March 2019)
- Collector Windfarm Third Modification Application Report dated July 2019

This plan has been prepared in accordance with the;

- Managing Urban Stormwater – Soils and Construction Volumes 1 and 2, 4th Edition (Landcom, 2004)
- Australian and New Zealand Environment Conservation Council (ANZECC) Guidelines
- Guidelines for Controlled Activities on Waterfront Land (May 2018)

A Consultation Log is provided in Annex C detailing communications with Agencies relevant to the preparation of this plan.

3 CEMP SUB-PLAN STRUCTURE

A series of environmental sub-plans, as referenced in the project's Construction Environmental Management Plan (CEMP), aim to identify environmental risks and opportunities, and provide mitigation controls to manage those risks with an emphasis on the critical risks and controls.

As with the CEMP, the plans reference any documents (including but not limited to, procedures, work instructions, and forms), client specific requirements, and project specific documents required to execute the project.

Updates to sub-plans are subject to the document review and approval process detailed in the CEMP.

4 STANDARDS AND LEGISLATION

Soil and water management protection is governed and provisioned by associated legislation, regulation and guidelines as well as the committed mitigation measures and relevant State conditions of approval.

4.1 Guidelines and Standards

Table 5-1 lists the non-statutory guidelines and standards that provide for soil and water quality management.

Table 4-1 Guidelines and standards

Saline soil management
Roads and Salinity (Department of Infrastructure, Planning and Natural Resources, 2003)
Introduction to Urban Salinity (Department of Natural Resources (DNR), 2006)
Building in a Saline Environment (DNR, 2006)
Salinity Management Guidelines (Blacktown City Council and Landcom, 2008)
Water quality management
Australian and New Zealand Guidelines for Fresh and Marine Water Quality: Volume 1 – The Guidelines (ANZECC, 2000)
Australian Drinking Water Guidelines (Natural Resource Management Ministerial Council (NRMMC), 2011)
Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (NSW Environment Protection Authority, 2004).
Floodplain management
Floodplain Risk Management Guideline: Practical Consideration of Climate Change (Department of

Environment and Climate Change (DECC), 2007)
Contaminated land and groundwater management
Guidelines for Assessment and Management of Contaminated Groundwater (Department of Environment and Conservation (DEC), 2007)
Watercourse crossings
Controlled Activities Guidelines for Laying Pipes and Cables in Watercourses (NSW Office of Water, 2012)
Controlled Activities Guidelines for instream works on waterfront land (NSW Office of Water, 2012)
Controlled Activities Guidelines for outlet structures on waterfront land (NSW Office of Water, 2012)
Controlled Activities Guidelines for riparian corridors on waterfront land (NSW Office of Water, 2012)
Controlled Activities Guidelines for Watercourse Crossings on waterfront land (NSW Office of Water, 2012)
Policy and Guidelines for Fish Friendly Waterway Crossings (NSW Fisheries, February 2004)
Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings. NSW Fisheries, Cronulla, 16 pp (Fairfull, S. and Witheridge, G. (2003))
Erosion and sediment control (including stormwater, stockpile and spill management)
The Blue Book: Managing Urban Stormwater: Soils and Construction, V 1 and V2 (Landcom, 2004)
Bunding and Spill Management: Insert to the Environmental Protection Manual for Authorised Officers (Technical Section) (NSW Department of Environment and Conservation (DEC), 1997)
Australian Standard: AS1940 - 2004, The Storage and Handling of Flammable and Combustible Liquids
Guidelines for the Control of Earthworks and Sedimentation in Roadworks (NSW Department of Main roads 1984)
Environmental Best Management Practice Guideline for Concreting Contractors (DEC, 2004)
Waste Classification Guidelines
Waste Classification Guidelines Part 1: Classifying waste (NSW EPA, 2014)
Waste Classification Guidelines Part 2: Immobilisation of waste (NSW EPA, 2014)
Waste Classification Guidelines Part 4: Acid sulfate soils (NSW EPA, 2014)

4.2 Minister's Conditions of Approval

The MCoA relevant to this CSWQMP are listed Table 5-2. A cross reference is also included to indicate where the condition is addressed in this CSWQMP or other project management documents.

Table 4-2 Minister's Conditions of Approval relevant to the CSWQMP

CoA	Condition requirements	Associated management procedure
A0	In addition to meeting the specific environmental performance criteria established under this approval, the Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or decommissioning of the project.	Section 8
A9	With the approval of the Secretary, the Proponent may submit any strategy, plan or program required by this approval on a progressive basis.	Section 11

CoA	Condition requirements	Associated management procedure
	To ensure the strategies, plans or programs under the conditions of this approval are updated on a regular basis, the Proponent may at any time submit revised strategies, plans or programs to the Secretary for approval. With the agreement of the Secretary, the Proponent may prepare any revised strategy, plan or program without undertaking consultation with all the parties referred to under the relevant condition of this approval. Notes: • While any strategy, plan or program may be submitted on a progressive basis, the Proponent must ensure that all development being carried out on site is covered by suitable strategies, plans or programs at all times. If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future critical stages, and the trigger for updating the strategy, plan or program.	
Water Quality and Hydrology		
B8	Except as may be provided by an EPL, the Project shall be constructed and operated to comply with section 120 of the *Protection of the Environment Operations Act 1997,* which prohibits the pollution of waters.	CSWQMP Section 6 and 8
Soil, water quality and hydrology – Construction Soil and Water Management		
D17	Soil and water management measures consistent with *Managing Urban Stormwater - Soils and Construction Vols 1 and 2, 4th Edition* (Landcom, 2004) or its latest version shall be employed during the construction of the Project to minimise soil erosion and the discharge of sediment and other pollutants to land and/or waters.	Section 6 and 8
D18	Where available, and of appropriate chemical and biological quality, stormwater, recycled water or other water sources shall be used in preference to potable water for construction activities, including concrete mixing and dust control.	Section 8
D19	Construction activities within 40 metres of any watercourses, shall be consistent with the *Controlled Activity Guidelines* (NSW Office of Water, 2012) including, but not limited to, 'In-stream works', 'Outlet Structures', 'Riparian Corridors', 'Vegetation Management Plans', and 'Watercourse Crossings', or any guidelines which supersede these documents.	Section 8
Construction Environmental Management Plan		
D24 (e)	details of how environmental performance would be managed and monitored to meet acceptable outcomes, including what actions will be taken to address identified potential adverse environmental impacts (including any impacts arising from the staging of the construction of the Project). In particular, the following environmental performance issues shall be addressed in the Plan:	CSWQMP Section 6 to 11
iv.	soil and water quality and spoil management	
vii.	soil contamination	

Construction soil and water management plan		
D 25(d)	**Construction Soil and Water Quality Management Plan** to manage surface and groundwater impacts during construction of the Project. The Plan shall be developed in consultation with DPI-Water and include, but not necessarily be limited to:	CSWQMP
i.	Details of construction activities and their locations, which have the potential to impact on water courses, storage facilities, storm water flows, and groundwater	Section 6 Section 8
ii.	Surface water and ground water impact assessment criteria consistent with Australian and New Zealand Environment Conservation Council (ANZECC) guidelines	Section 8
iii.	Management measures to be used to minimise surface and groundwater impacts, including details of how spoil and fill material required by the project will be sourced, handled, stockpiled reused and managed; erosion and sediment control measures: and the consideration of flood events	Section 8
iv.	Management measures for contaminated material and a contingency plan to be implemented in the case of unanticipated discovery of contaminated material during construction	Section 6 and 8 *Annex A – Unexpected find contingency plan*
v.	A description of how the effectiveness of these actions and measures would be monitored during the proposed works, clearly indicating how often this monitoring would be undertaken, the locations were monitoring would take place, how the results of the monitoring would be recorded and reported, and, if any exceedance of the criteria is detected how any non-compliance can be rectified	Section 8 to 11
vi.	Mechanisms for the monitoring, review and amendment of this Plan	Section 9 to 11
Rehabilitation and revegetation		
E5	The Proponent shall implement a revegetation and rehabilitation program for all areas of the Project footprint which are disturbed during the construction of the Project and which are not required for the ongoing operation of the Project, including temporary construction facility sites and sections of construction access roads. The Proponent shall ensure that all revegetation measures are implemented progressively where possible and in all cases within six months of the cessation of construction activities at the relevant area. Unless otherwise agreed to by the Secretary, the Proponent shall monitor and maintain the health of all revegetated areas until such time that the plantings have been verified by an independent and suitably qualified expert (whose appointment has been agreed to by the Secretary) as being well established, in good health and self-sustaining.	Section 8

5 PROJECT ENVIRONMENT

The project site is located in the Upper Lachlan Shire (Figure 5-1) and is covered by the Southern Tablelands Bush Fire Risk Management Plan. The Approved Project Layout is provided in Figure 5-2 which shows the 55 turbine layout and associated infrastructure.

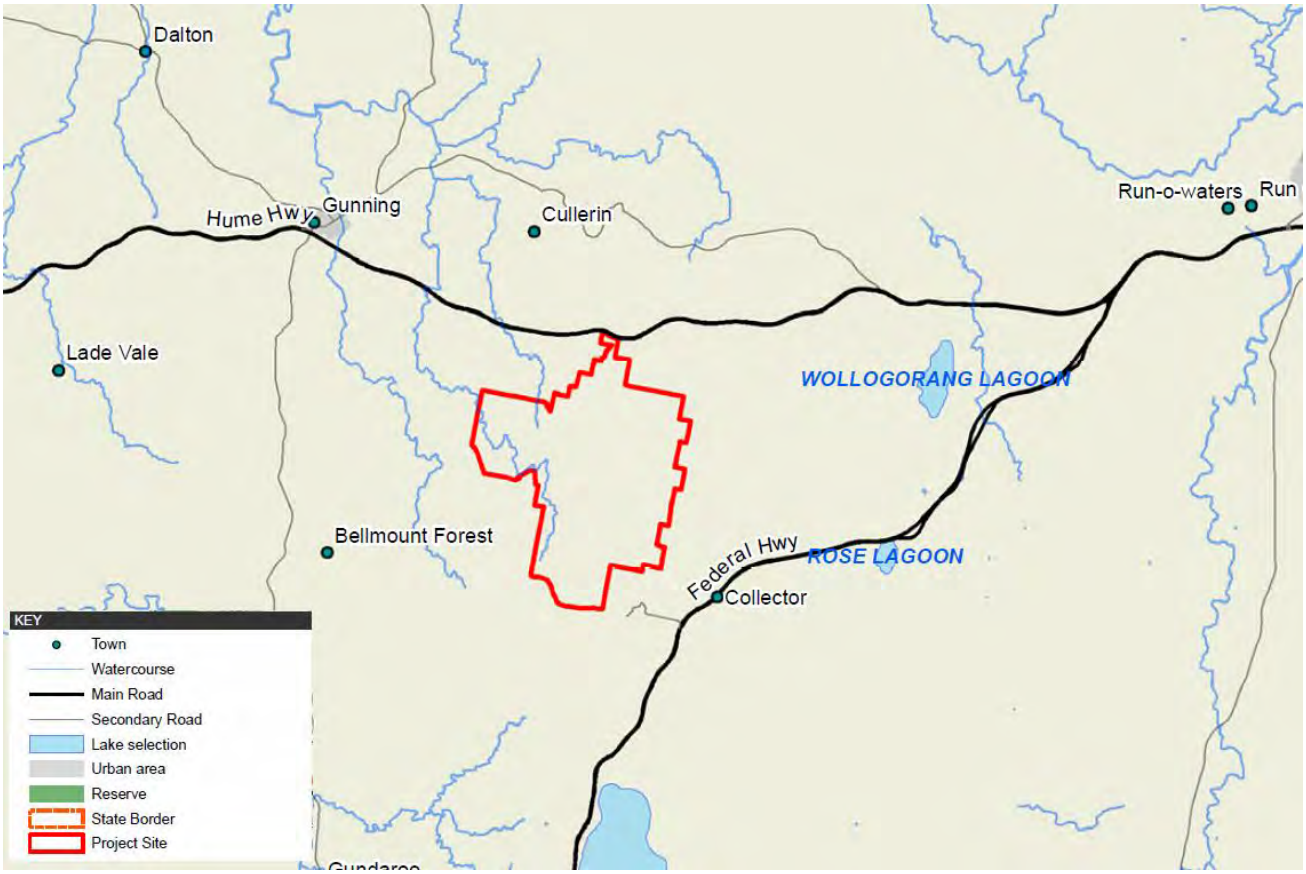


Figure 5-1 Regional Project Locality Figure

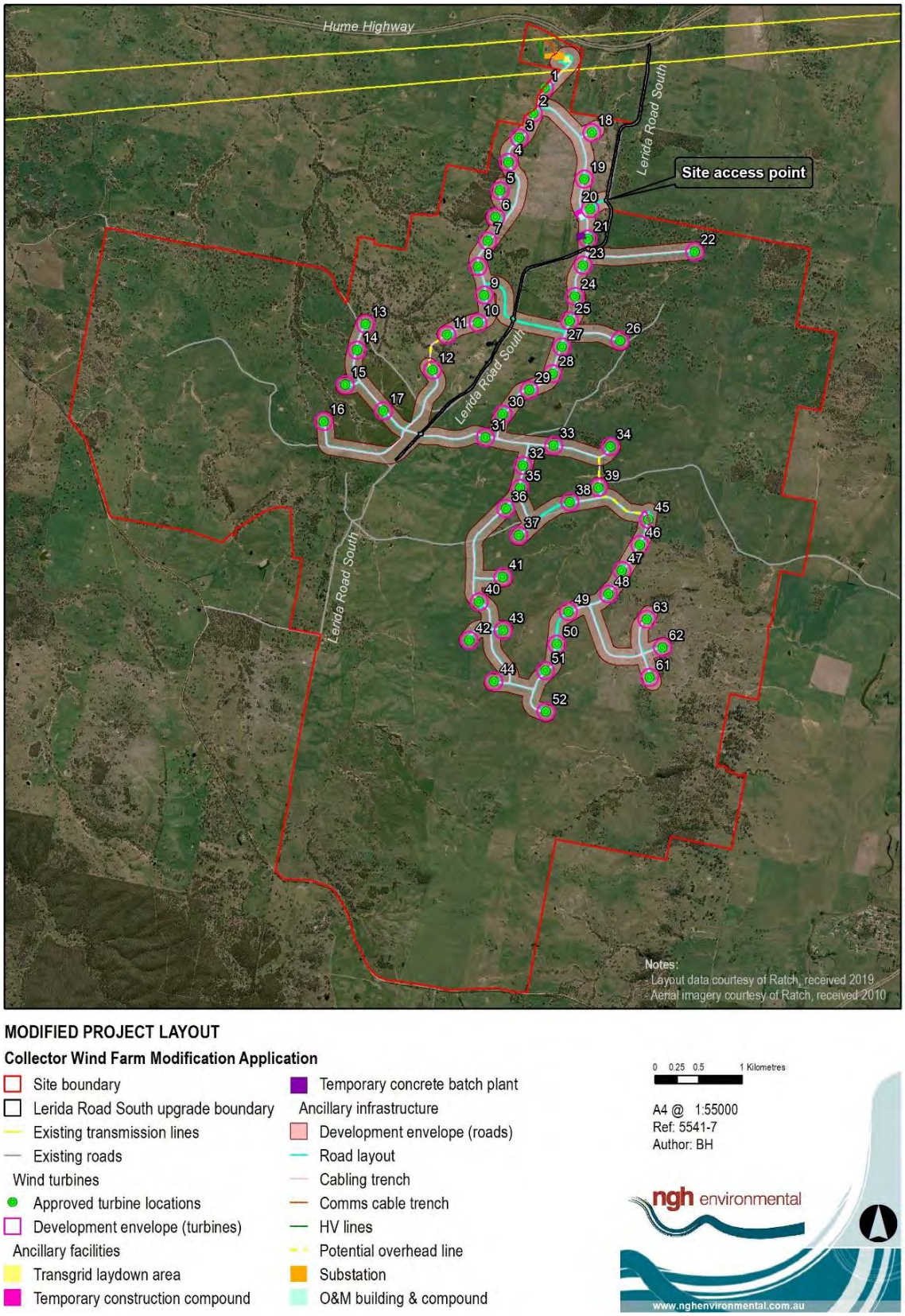


Figure 5-2 Approved Project Layout

The soil and water environment within the work footprint and its environs is described below. This information is a summary of chapter 12 (water quality), section 13.1(climate) and section 13.2 (soils) of the EA.

5.1 Climate

The average annual rainfall from the nearest Bureau of Meteorology monitoring site (Goulburn – station number 070037, elevation 702m) is 665.6mm,

Table 5-1 Mean Monthly Rainfall (Goulburn)

Month	Mean Monthly Rainfall (mm)
January	64.8
February	60.6
March	55.6
April	48.1
May	55.5
June	56.3
July	47.8
August	49.1
September	50.0
October	62.5
November	56.1
December	62.9

5.2 Soils and Landforms

Upper Lachlan Shire Council's Annual Report (2008-2009) has identified soil erosion, salinity and acid soils as the main sources of land degradation in the Shire. The majority of gully erosion is classified as moderate to severe. Salinity is a problem that continues to grow within the Shire predominantly around the lower part in the vicinity of Gunning, Dalton and Collector. Many soils in high rainfall areas are naturally acidic, the level of acidity in agricultural areas may be partially due to the application of nitrogenous fertilizers, removal of produce, and build-up of soil organic matter (Upjohn et al. 2005).

The Shire has a particularly complex geology. The project site is situated across a north-south ridgeline of uplifted metasediments and volcanics within the eastern Lachlan Fold Belt. Another steep metasedimentary ridge occurs to the north-west of the site. The eastern edge of the Lake George fault features metasedimentary geology, with shallow, stony loams on steep slopes. West of the fault scarp slope is an undulating granitic plain with deeper, more fertile soils, sometimes with rounded boulders on the surface and in the soil profile. There are also discrete areas which contain Tertiary deposits of gravels, sand, clay, claystone and sandstone (Biosis Research 2004; Brunker and Offenberg 1968).

Slopes range from 0-10% on ridge crests and undulating plains and valleys, to over 20% on range side slopes. Soils within the project site are generally highly eroded.

Salinity in the landscape is predominantly a function of vegetation clearing, particularly tree clearing, which increases leakage to the groundwater system, contributing to watertable rise that could bring salt to the root zone and surface. As salts accumulate near the surface, they can cause poor plant health and dominance of salt-tolerant species. According to the Upper Lachlan Shire Council 2009/2010 Annual Report (ULSC, 2010), salinity is a problem that continues to grow within the shire predominantly around the lower part of the shire

around Gunning, Dalton and Collector. There is limited monitoring by ULSC of salinity and therefore the impacts of development and natural pressures such as the prolonged drought cannot be fully determined (ULSC, 2009). However, ULSC has implemented a number of projects to address catchment water quality in general and salinity in particular. For example, the Council promotes the use of rainwater tanks to reduce reliance on groundwater to supply potable water demand.

5.2.1 Potential Impacting Construction Activities

Construction of turbine footings and crane pads would be located on the crests of the undulating landform. Access roads would be constructed over all areas of the landscape; crests, side slopes and foothills. The majority of civil construction works would be located on soils documented as having high to extreme erosion potential. Therefore, the management and control of potential erosion, associated landform stability and sediment mobilisation impacts is required during the construction phase.

Access tracks would be built (or upgraded) to an indicative average width of 8m - 10m in some cases to accommodate large loads during the construction stage. Additional identified construction activities with the potential to impact on soil and landform aspects include:

- Increased hardstand areas (including the construction compound, operations and maintenance facility and the temporary concrete batch plant) - changes to surface water flow paths resulting in change to landform.
- Groundworks – increased erosion potential.
- Vegetation clearance – potential soil salinity increases, although highly unlikely.

The construction due to the upgrade of Lerida Road South will induce the potential for increased water runoff and impact on local water quality in local water courses and farm dams.

Table 5-2- Hazardous Materials to be Site

Hazardous Material	UN Number
Form Release agent	NA
polyurethane sealant	NA
Evaporation Retardant	NA
Epoxy past	NA
Diesel Fuel	3082
Unleaded Fuel	1203
Various Coolants	3104
Lubricant Grease	NA
Break and Clutch Fluid	NA
Solvent Cement	1133
Spray Paint	1950
Gas Cylinder	1075
Lubricating Spray	1950
Pure Epoxy Injective	NA
Enamel thinners	1268
Pine Disinfectant	NA

5.3 Contamination

No specific areas of contamination were identified within the EA.

5.3.1 Potential Contamination from Construction Activities

The land use history within the project site, comprising a mixture of farming (grazing), has some potential to contaminate land through activities such as sheep and cattle dips, pesticide/herbicide application and diesel refuelling.

The project has the potential to impact the environment in relation to contamination through:

- disturbance of unidentified contaminated land leading to adverse environmental impacts;
- contaminated or hazardous waste not being correctly disposed of;
- Increased waste (concrete slurry) and hazardous chemicals onsite with the construction and functioning of a Temporary Concrete Batch Plant;
- increasing waste amounts from improper practices e.g. poor fill management;
- release of contaminant into surrounding and/or underlying soils, surface waters and/or groundwater;
- movement of contaminated sediments into waterways.
- soil contamination through localised hydrocarbon or chemical spill – occurring during:
    - site planning activities – i.e. surveying and pegging
    - establishment activities – i.e. clearing and compaction, transportation of plant, equipment and substances, ancillary areas establishment
    - general construction activities utilising equipment and machinery – i.e. excavations, turbine erection, transportation of materials.
- The construction due to the upgrade of Lerida Road South will induce the potential for increased water runoff and impact on local water quality in local water courses and farm dams.

6 WATER QUALITY

6.1 Surface water

The project site sits on the drainage divide between the Lerida Creek and Frankfield Creek catchments to the west, which are within the Upper Lachlan River catchment, and the Collector Creek catchment to the east. The majority of the project site is drained by intermittent (non-perennial) streams, including:

- Sandy Creek, to the north-west which drains north to Frankfield Creek;
- Cullerin Creek, Norfolk Creek and Mutmutbilly Creek to the north and north-east, which all drain north toward the upper reaches of Lachlan River;
- Boheara Creek, Boyds Creek and Stony Creek to the south-east, which all drain east and south to Collector Creek.

The most significant drainage features in the project site are Lerida Creek and Frankfield Creek which are both mapped as perennial watercourses.

There are numerous farm dams on the project site, with water sourced for domestic uses and stock watering.

No significant waterways would need to be crossed in construction. The majority of the drainage lines in the vicinity of the development footprint are first order streams. (Under the Strahler stream classification system, a first order stream is any watercourse that does not have any other watercourse flowing into it.) Under the *Water Management Act 2000* there are provisions to protect surface water environments through the establishment of core riparian zones (CRZ), within which there are development restrictions. The prescribed width for a CRZ varies with stream order, with a first order watercourse requiring a CRZ of 10m width.

There are no significant aquatic environments or fish habitats in the vicinity of the development footprint. While the wind turbine sites are situated away from drainage features on ridge lines, the access track and cable routes will cross intermittent streams. These watercourses do not provide habitat for aquatic species of conservation significance.

6.1.1 Potential Surface Water Impacts from Construction Activities

Construction activities with potential to impact on water quality and surface water environments include:

- establishment and ongoing usage of stockpiles – location and exposure to erosion and runoff increasing sedimentation
- exposed / disturbed ground (with vegetation cleared) – location, duration of exposure to erosion and runoff increasing sedimentation
- hardstand (including office compound) and access track construction – increasing surface water runoff areas
- access track installation – leading to modifications to flow paths
- cable trench installation near waterways – temporary flow path modifications and sedimentation of waterway
- vegetation clearance - resulting in increased salinity
- accidental oil / fuel / chemical spills – leading to a reduction in water quality from suspended sediment and other pollutants.

Most of the proposed infrastructure will be sited on elevated locations along the Cullerin Range which are sufficiently offset from drainage lines. However, some sections of access tracks and cable trenches will require crossing of ephemeral drainage lines. Crossings and cable trenching could affect riparian and aquatic habitats during construction due to disturbance and the potential for increased erosion.

The proposed access road alignments generally follow site contours to avoid steep grades, thereby minimising the need to build crossings over drainage lines. However, cabling would need to be aligned along the shortest path and may need to cross drainage lines where required. This is to minimise cable length and associated transmission losses. It is possible to carry out cable trenching across drainage points during dry periods to minimise the risk of silting into receiving watercourses.

The office compound, operations and maintenance facility and TCBP, will be situated outside of water courses, constructed so they are not affected by the 1 in 20 ARI and have sediment controls that meet the Blue Book specifications for the soil type and area of disturbance.

In general, the soils adjacent to Lerida Road South have been heavily disturbed during historical road construction and maintenance operations. There are shallow table drains either side of the road discharging to irregularly spaced mitre drains. The proposed works have the potential to alter drainage patterns through changes to Lerida Road South road formation and sealing. Several small culverts are likely to be replaced or extended as a result of the road widening works and some table drains will need to be reconstructed. There is potential for the exacerbation of gully erosion west of Lerida Road South. This will be minimised by appropriate culvert and outlet design.

The potential risk of erosion of water ways will be mitigated through the implementation of controls, such as rock checks and silt fencing. Rock beaching shall be installed at entrance and exits of culverts with energy dissipation rocks placed where required. All environmental controls will be implemented where specified through design, instructed by independent environmental consultant or internal environmental representative.

6.2 Groundwater

According to the *Upper Lachlan Shire Council 2009/2010 Annual Report* (ULSC, 2010) and the *Australian Capital Region State of the Environment Report* (ACT Commissioner for Sustainability and Environment, 2009), groundwater in the Upper Lachlan Shire is of moderate to good quality, with areas of high salinity around Dalton and Collector; however there has been a steadily decreasing water table since 1991. This trend is likely to be due to the low natural rainfall and increased groundwater extraction.

As the Collector area does not have a town water supply, residents source their water via either surface or groundwater extraction, for both domestic and agricultural purposes (L. Moloney, Upper Lachlan Shire Council, pers. comm. 18 January 2011).

Based on data sourced from the NSW Natural Resource Atlas, there are five registered groundwater bores located within 1km of the site. For two of these groundwater bores no data for the standing water level or depth to the water bearing zone was available. In the remaining three groundwater bores, the standing water level ranges from 5.5 to 12m below ground level (bgl) while the top of the water bearing zone was encountered at depths of between 27 and 33 m. The large difference between the groundwater depth and standing water levels suggests a confined groundwater table.

6.2.1 Potential Groundwater Impacts from Construction Activities

Potential impacts on groundwater from the construction phase relate to the installation of wind turbine footings, particularly where rock anchor foundations are utilised. Rock-anchor foundations can involve drilling to depths up to 20m bgl with the potential to intercept the groundwater table. These are not expected to be used on this project.

The alternative gravity foundations, which are expected to be utilised at the majority, if not all, of wind turbine sites, would involve excavations to a maximum of 3m bgl. Similarly, cable routes will generally follow higher ground, with trench depths up to a maximum of 2m bgl. Hence it is highly unlikely that groundwater tables would be intercepted, given the apparent depths to the water bearing zone in the vicinity of the site detailed above.

Interception of the groundwater table during rock-anchor foundation installation may involve potential localised impacts to groundwater quality from foundation materials (e.g. concrete grout) however this is unlikely given as the quantities of material involved are relatively small at each turbine location and confined to the individual drill hole, impacts are likely to be insignificant.

Another risk to water quality (groundwater and surface water) is contamination from leaks and spills of oil and fuel from construction plant during construction and transformer oil from the substation transformers during operation and maintenance. This will be managed by ensuring the machinery is maintained and operated as per the OEM's.

Annexure D includes the groundwater assessment undertaken for the project. It identifies the proposed activities will have no impact on the groundwater and provides guidance on measures should interception occur.

7 WATER USE

7.1 Potable

Water required at the compound for potable water will be delivered to site by a licenced and registered provider. This will be arranged as required.

7.2 Construction

Non potable water will be required as part of the construction process for dust control, concrete batching and road construction through the need to meet aggregate moisture content specifications. Ideally, the water content of the aggregate will be sufficient for design specifications when delivered. However, if this is not the case, water will be added to ensure levels are achieved. Dust suppression activities will occur throughout the site by using water carts. The number of water carts will be dependent on the area under disturbance and the weather conditions of the day. Where required, additional water carts will be added to construction activities to control dust to achieve the outcomes detailed in the associated management plans.

Water sources available to the project include:

- Surface water (dam extraction)
- Surface water (in stream extraction)
- Groundwater (bore)
- Offsite sources (Council provision)

The construction activities span 15 km in length, with multiple internal access roads, summing an estimated 36 km including the Lerida Road South upgrade. This is a sizeable area across which dust management will be undertaken. It also infers a potential for considerable distances between potential on site water sources and sites where application will be required

To mitigate these considerations, the project site has been separated into water use zones. These zones mirror the construction program groups which are used to determine construction sequencing. Each water use zone has proposed sources of water that will be used for the associated construction activities. By separating the water use into these zones, water cart efficiency will be increased which will in turn improve dust management on site. This will also spread the drawn down of water across the site, improving water availability and decreasing the potential for each source being depleted.

These zones are detailed in Figure 3 below.

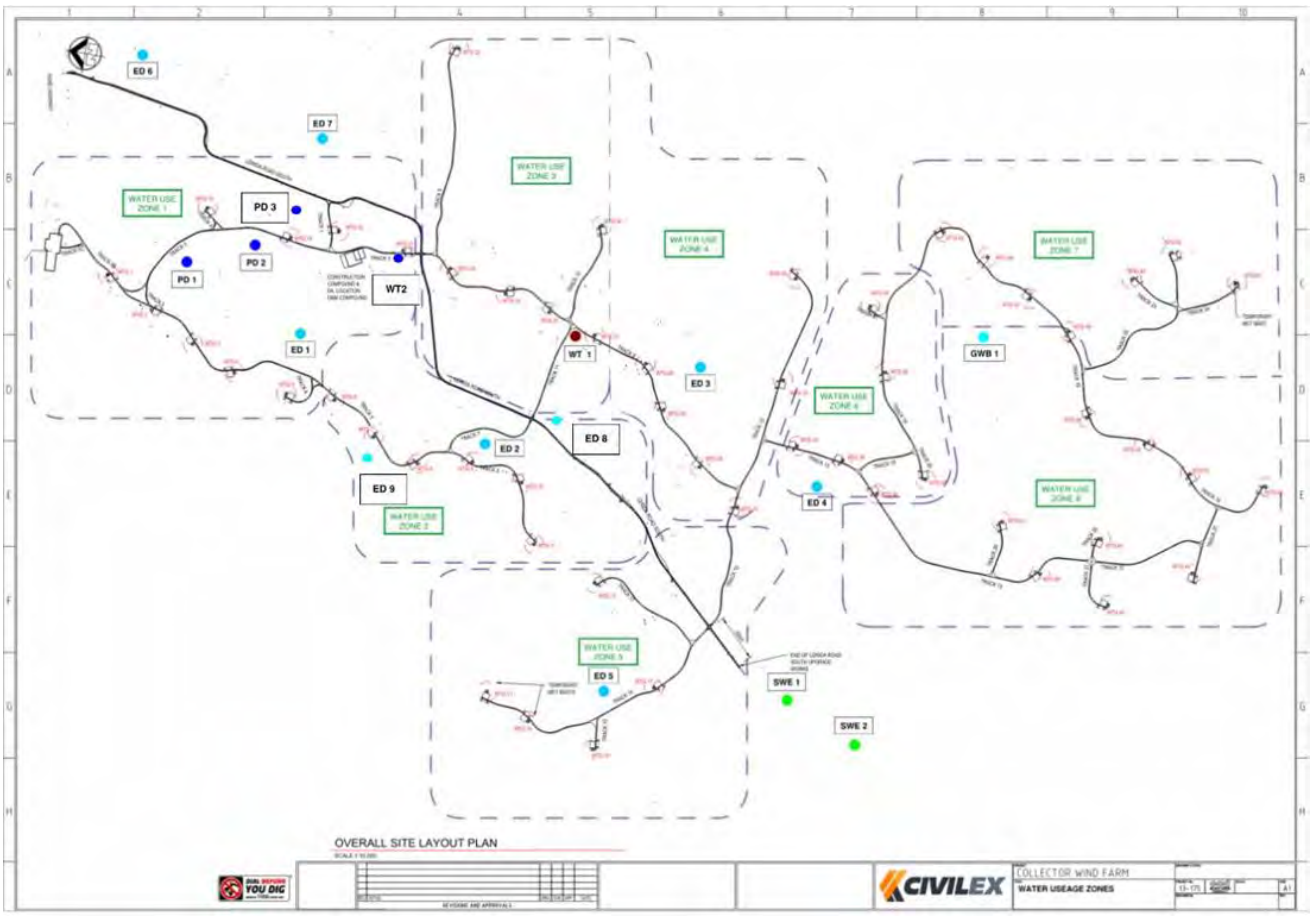


Figure 7-1 Water use zones and water sources

The project team are currently working through the process to confirm the water usage proposed in Figure 3. The progress of this work is detailed in Table 4.

Table 7-1 Water sources, type and progress to approval

Source	Water Use Zone	Use	Approval requirement	Progress
Existing Dams				
ED1	1	Construction	Landholder	Approved
ED2	2 - 3	Construction	Landholder	Approved
ED3	4	Construction	Landholder	Approved
ED4	6-8	Construction	Landholder	In progress
ED5	5	Construction	Landholder	In progress
ED6	1-4	Reserve	Landholder	Approved
ED7	1-4	Reserve	Landholder	Approved
ED8	2-4	Construction	Landholder	Approved
ED9	2-4	Construction	Landholder	Approved
Proposed dams				
PD1	1-3	Construction	Landholder	Approved & Constructed
PD2	1-3	Construction	Landholder	Approved & Constructed
PD3	1-3	Reserve	Landholder	Approved & Constructed
Creek extraction				
SWE1	5-8	Reserve	ULSC Landholder	Not initiated Not initiated
SWE2	5-8	Reserve	ULSC Landholder	Not initiated Not initiated
Groundwater bores				
GWB1	5-8	Construction	Water Access Licence Landholder	Not initiated In progress
Water storage				
WT1 – 80, 000L Water Tank	1-4	Emergency reserve	None required	
WT2 – 20,000L Water Tank	Temporary Concrete Batch Plant	Construction (batch plant operations)	None required	

In order to ensure the project will have access to water throughout the construction process, reserve water sources have been identified (see Table 4 and Figure 3). The continuous monitoring of water levels across the site will trigger when these reserves may be required.

Should the approvals for water use be rejected by the landholders or government agencies, the project has made provisions to source the water required for the project needs off site from Council sources. This is unlikely to be required but is the contingency if needed.

8 MITIGATION AND CONTROL

The following table outlines the management measures and mitigation strategies that are undertaken as far as practicable during the pre-construction, construction, and post-construction phases of the project to mitigate the potential impacts associated with soil and water management.

Table 5 Management Measures and Mitigation Strategies

Management Measures & Mitigation Strategies	Responsibility	Source of Requirement
Pre-Construction Phase		
General		
Training will be provided to all project personnel, including relevant sub-contractors on sound erosion and sediment control practices and the requirements from this plan through inductions, toolboxes and targeted training.	Principal Contractor / Sub-contractors	CEMP Good practice
Erosion and Sediment Control Plans (ESCPs) will be prepared and implemented in advance of construction, including earthworks and stockpiling. ESCPs and will be updated as required.	Principal Contractor / Sub-contractors	MCoA D17 Blue Book MCoA D25(d)(iii) SoC 11.01
Detailed design will identify the exact location of construction activities and ancillary facilities (such as concrete batching plants) which have the potential to impact on water courses, storage facilities, stormwater, and groundwater. This plan will be updated as required to reflect any changes to identified potential impacts and required mitigation measures.	Principal Contractor / Sub-contractors	MCoA D25(d)(i)
Spoil and fill management		
The foundation design will consider the volume of excavated spoil that would be generated and opportunities for reuse of the spoil in the construction of other site infrastructure.	Principal Contractor / Sub-contractors	MCoA D25(d)(iii)
Soils and Landform		
Detailed geotechnical investigations would be undertaken to assess ground conditions and determine the most suitable foundation design for the turbine site.	Principal Contractor / Sub-contractors	EA mitigation measure SoC 12.01
During detailed design the access tracks and routes to be confined to already disturbed areas where possible.	Principal Contractor / Sub-contractors	EA mitigation measure SoC 12.01
Surface water		

Management Measures & Mitigation Strategies	Responsibility	Source of Requirement
The construction of hardstands and sealed roads may cause alterations to drainage patterns due to reduction in infiltration resulting in localised increased runoff. During detailed design the appropriate drainage structures and erosion controls are to be incorporated in hardstands, access roads and tracks to manage run-off and reduce the risk of erosion.	Principal Contractor / Sub-contractors	EA mitigation measure MCoA D25(d)(iii) SoC 11.01 SoC 11.02 SoC 11.03
Outlet structures are to be designed in accordance with the DPI-Water to minimise construction and operation impacts on watercourse and riparian corridors. Considerations include, but are not limited to: ▪ any stormwater outlets should aim to be 'natural', yet provide a stable transition from a constructed drainage system to a natural flow regime; and ▪ all ancillary drainage infrastructure, e.g. sediment traps, should be located outside the riparian corridor. ▪ Using appropriate sediment and erosion controls to ensure material harm is not caused downstream of the construction site	Principal Contractor / Sub-contractors	EA mitigation measure
Flooding events		
Detailed design will consider the potential for flooding impacts (from different scale flood events) and the required mitigation measures during construction and operation phases. Primarily, all ancillary buildings will be located outside of the 1:20 ARI flood event footprint. Should a flood event occur, the sites emergency management plan will be enacted to ensure the safety of personnel. Asset and equipment protection through relocation to higher ground will be undertaken across the site wherever possible where safe access and exit is possible. All sources of pollutants will be prioritised for relocation should the interaction with flood waters be a potential.	Principal Contractor / Sub-contractors	MCoA D25(d)(iii)
Groundwater		
A groundwater assessment will be undertaken prior to the commencement of construction for DPI-Water endorsement. Once completed, recommendations from the consultant will be taken on board by the project team and managed within the construction activities as far as reasonably practicable with the aim to mitigate any potential groundwater impacts.	Principal Contractor / Sub-contractors See Annexure D	EA mitigation measure SoC 11.05
Construction Phase		

Management Measures & Mitigation Strategies	Responsibility	Source of Requirement
General		
Except as may be provided by an EPL, the Project shall be constructed and operated to comply with section 120 of the POEO Act, which prohibits the pollution of waters.	Principal Contractor / Sub-contractors	MCoA B8
Appropriate drainage structures and erosion controls will be incorporated in handstands, access roads and tracks to manage run off and reduce the risk of erosion and scour from concentrated flows	Proponent, designers and contractors	
ESCPs will be prepared and implemented in advance of construction in high risk locations, including earthworks with high erosion potential and steep grades, works near waterways and stockpiling. ESCPs will be updated as required.	Principal Contractor / Sub-contractors	Managing Urban Stormwater: Soils and Construction Volume 1 and Volume 2D
Where available, stormwater, recycled water or other water sources shall be used in preference to potable water for construction activities, including concrete mixing and dust control. An example of this would be to recycle water from any dewatering activities onsite that are of appropriate chemical and biological quality.	Principal Contractor / Sub-contractors	MCoA D18
Exposed areas will be progressively rehabilitated. Methods will include permanent revegetation, or temporary protection. Erosion and sedimentation protection will remain in place until approval of site supervisor or independent environmental consultant.	Principal Contractor / Sub-contractors	MCoA E5
Active work areas will be stabilised at the end of each day's work and/or just prior to inclement weather, by means such as grading or smooth drum rolling to create a smooth surface.	Principal Contractor / Sub-contractors	Good Practice
Stockpiles and ancillary facilities will be located to minimise erosion. Sediment and erosion controls will be put in place as per the recommendations by the ESCP.	Principal Contractor / Sub-contractors	Good Practice
Physical controls to address the potential risks associated with the use and storage of chemicals on site will include: ▪ Use of Australian Standard compliant bunded storage facilities for chemicals and fuels. ▪ Use of appropriately bunded areas for refuelling and washdown.	Principal Contractor / Sub-contractors	Good Practice SoC 11.04

Management Measures & Mitigation Strategies	Responsibility	Source of Requirement
▪ Availability of effective spill kits at all construction sites and equipment service vehicles.		
At ancillary facilities, management of runoff and spills will include: ▪ Restricting vehicle movements to designated pathways where feasible. ▪ Paving areas that will be exposed for extended periods, such as car parks and main access roads, where reasonable and feasible. ▪ Diverting clean water runoff around disturbed sites where required. ▪ Locating chemical or other hazardous material storage areas at least 50 metres from waterways	Principal Contractor / Sub-contractors	Good Practice
Water will be used during construction for a number of purposes, including, but not limited to: ▪ Concrete batching. ▪ Dust control. ▪ Washing of plant and equipment. ▪ Drinking water. ▪ Amenities. ▪ Landscaping and re-vegetation. Prior to and during construction, water needs will be identified, and water sources assessed to determine the most appropriate water source(s). When determining the most appropriate water source(s), the use of non-potable water sources will be considered in preference to potable water where appropriate.	Principal Contractor / Sub-contractors	Good Practice MCoA D18
Rehabilitation and revegetation measures will be undertaken as per the Rehabilitation and Revegetation Management Plan. This plan identifies the need for a completion criterion to be met prior as well as management and monitoring for the best and most successful outcomes to be achieved. The site compound will be a temporary facility, however, the land owner has requested this area is left insitu post project completion. The sediments and batters will be stabilised post the deconstruction of the facilities if required. The road batters and disturbance corridors resulting from construction will be rehabilitated and be required to meet a performance criterion.	Principal Contractor / Sub-contractors	Schedule B Condition E5

Management Measures & Mitigation Strategies	Responsibility	Source of Requirement
Any impact on the receiving environment resulting from a pollution event will be required to meet a rehabilitation criterion that demonstrates no further or ongoing damage is apparent in the area. Unless otherwise stipulated, rehabilitation and revegetation initiatives will be monitored every 6 months until completion criteria is met. These areas should meet the criteria within no later than 24 months of the rehabilitation activities commencing.		
Waste water from batching operations: ▪ Wastewater will be captured in a fully sealed cavity that will be separate to the first flush system. ▪ Reuse of concrete water will be followed wherever possible to meet the client specifications for the concrete batch footings Excess wastewater will be transferred off site and disposed of as per the regulatory requirements.	Principal Contractor / Sub-contractors	n/a
Soils and Landform		
Soil compaction resulting from access and laying of materials will be remediated after construction activities through light ripping and topdressing of topsoil.	Principal Contractor / Sub-contractors	EA mitigation measure SoC 12.01 MCoA D25(d)iii
Topsoil will be stockpiled separately and inspected for noxious weed seedlings at six monthly intervals. The control of the weed seedlings will be managed as per the weed management plan.	Principal Contractor / Sub-contractors	Good Practice
Surface water		
Except for drainage line crossings of access tracks and cable trenches, ground disturbance activities, including road construction and track upgrades and the excavation of footings for turbines, crane pads, control buildings and substation, as well as soil stockpiling would be located away from natural drainage features where possible.	Principal Contractor / Sub-contractors	EA mitigation measure
The storage of oils, fuels and other hazardous chemicals will be appropriately bunded and located away from watercourses. Storage will be in accordance with regulatory requirements.	Principal Contractor / Sub-contractors	EA mitigation measure SoC 11.02 SoC 11.04
Spill kits to be provided at oil and fuel storages and on service vehicles	Principal Contractor / Sub-contractors	EA mitigation measure SoC 11.02

Management Measures & Mitigation Strategies	Responsibility	Source of Requirement
Any spoil stockpiles from foundation excavation and access road construction will be located away from drainage lines, natural watercourses, road surfaces and trees. Stockpiles will be protected against erosion and sedimentation.	Principal Contractor / Sub-contractors	EA mitigation measure SoC 11.04
Construction activities within 40 metres of any watercourses, shall be consistent with the *Controlled Activity Guidelines* (NSW Office of Water, 2012) including, but not limited to, 'In-stream works', 'Outlet Structures', 'Riparian Corridors', 'Vegetation Management Plans', and 'Watercourse Crossings', or any guidelines which supersede these documents. There are no water courses within the development area.	Principal Contractor / Sub-contractors	MCoA D19
Sediment basins will be managed to ensure sufficient storage capacity is available in the event of wet weather as per the requirements of the Blue Book. Where practicable, water from sediment basins will be reused within the Project.	Principal Contractor / Sub-contractors	MCoA D25(d)(ii) MCoA D18
Water quality and sedimentation control devices will be regularly inspected and maintained to ensure functionality.	Principal Contractor / Sub-contractors	EA mitigation measure
All trenching works within drainage lines will be rehabilitated as soon as practicable. Trenching across water ways will take into consideration the timing of works and will aim to complete such task throughout dryer months. After the completion of the trench & back fill across the water way, suitable erosion controls will be implemented. Erosion controls will be dependent on the site conditions and could vary from rock beaching, jute mat or seeding.	Principal Contractor / Sub-contractors	SoC 11.04
Hardstand material, rumble grids or similar will be provided at exit points from construction areas onto public roads to minimise the tracking of soil and particulates onto public roads.	Principal Contractor / Sub-contractors	Good practice
Vehicle movements from site will be managed during wet weather if the tracking of mud may become an issue.	Principal Contractor / Sub-contractors	Good practice
Stockpiles		
Where reasonable and feasible, stockpiles will: ▪ Not require removal of areas of native vegetation. ▪ Be located outside of known areas of weed infestation.	Principal Contractor / Sub-contractors	MCoA D25(d)(iii)

Management Measures & Mitigation Strategies	Responsibility	Source of Requirement
▪ Be located such that waterways and drainage lines are not directly or indirectly impacted. ▪ Limited in height to less than 2.5m and batter the sides to 2:1 or flatter. ▪ Covered or seeded with sterile seed. ▪ Located at least 10m away from the top of the bank of first-class water supplies		
Stockpiles will be regularly assessed for noxious weed infestation.	Principal Contractor / Sub-contractors	MCoA D25(d)(iii)
Where required, all construction stockpiles will comply with the requirements of the *Protection of the Environment Operations Act 1997* and NSW *Waste Avoidance and Resource Recovery Strategy 2007* for any waste activities that involve the generation, storage and/or disposal of waste and also consider the NSW Resource Recovery Exemptions as applying the storage of stockpiled material	Principal Contractor / Sub-contractors	MCoA D25(d)(iii)
Spoil and fill management		
The waste hierarchy of avoid, reduce, reuse and recycle will be employed throughout the project as reasonably practicable. Examples that may be employed on site include: ▪ beneficial reuse will occur on site where feasible ▪ topsoil will be stockpiled for later reuse in site rehabilitation, where possible.	Principal Contractor / Sub-contractors	MCoA D25(d)(iii)
Where possible, fill to be used for construction will be stockpiled in the location it is required to prevent double handling.	Principal Contractor / Sub-contractors	MCoA D25(d)(iii)
Subsoil would be separated from topsoil for reinstatement purposes.	Principal Contractor / Sub-contractors	MCoA D25(d)(iii)
Suppliers of material imported to site such as gravel and bedding sand will provide weed free declarations	Principal Contractor / Sub-contractors	Good Practice
Material sent offsite will be classified in accordance with regulations and the OEH's *Waste Classification Guidelines: Part 1 Classifying Wastes* (DECC 2009a).	Principal Contractor / Sub-contractors	MCoA D25(d)(iii)
Contamination		
To minimise potential for activities contaminating land and water:	Principal Contractor / Sub-contractors	MCoA D25(d)(iv) MCoA D24 (e) vii

Management Measures & Mitigation Strategies	Responsibility	Source of Requirement
▪ Determine the quantity and size of spill kits required to ensure all works take place within the vicinity of a suitably sized spill kit; and ensure that all vehicles plant and machinery used onsite have spill kits. ▪ Ensure contents of spill kits will be appropriate for the type of activity and any chemicals with the potential to spill. ▪ Hazardous material, waste and sewage to be managed in accordance with regulatory requirements. ▪ Ensure all plant and machinery are serviced regularly. ▪ Any on-site refuelling must occur in an area greater than 50m from the nearest drainage line and ensure correct practices are implemented. ▪ All washdowns to be conducted in a designated wash-down area, or on top of geofabric material, which is then removed upon completion of works and disposed of accordingly. ▪ All waste material and debris from work activities is to be removed from site daily ▪ All personnel will inform their site supervisor of any spills and other incidents involving hazardous materials immediately, regardless of size.		
If unanticipated contaminated materials are found on the site, the unexpected finds contingency plan contained in ***Annex B*** should be followed	Principal Contractor / Sub-contractors	MCoA D25(d)(iv)
Groundwater		
In the instance that below-ground infrastructure intercepts the groundwater table, a suitable protective casing (for example a plastic pipe sleeve) will be considered for use when passing through the ground water zone.	Principal Contractor / Sub-contractors	EA mitigation measure MCoA D25(d)iii
Spill kits will be provided at or near the location of oil and fuel storage to contain potential spills and leaks.	Principal Contractor / Sub-contractors	EA mitigation measure SoC 11.02
Concrete and cement-carrying vehicles will only be washed out in designated wash-out facilities. These facilities will be centrally located for each turbine and 100m away from water courses or water bodies. The wash-out bay will never be filled to more than 90% of its capacity before being cleaned out. It will have an impervious bund that will not capture any run off from a catchment (will be a turkey nest). To minimise the amount of washout water, excess material will be scraped off the equipment prior to hosing and the use of a high pressure,	Principal Contractor / Sub-contractors	EA mitigation measure

Management Measures & Mitigation Strategies	Responsibility	Source of Requirement
low volume spray nozzle will be used. High volume rain events will trigger washout facilities to be covered should a risk of spill over be a medium or higher potential.		
Any on-site refuelling must occur in an area greater than 50m from the nearest drainage line and ensure correct practices are implemented.	Principal Contractor / Sub-contractors	EA mitigation measure
All hazardous materials, waste and sewage will be stored, managed and transported in accordance with relevant OEH and WorkCover guidelines and regulations.	Principal Contractor / Sub-contractors	EA mitigation measure
Wastewater produced from temporary on-site toilets during construction will be disposed off-site.	Principal Contractor / Sub-contractors	EA mitigation measure

8.1 Erosion and Sediment Control

The Erosion and Sediment Control Plans will include but not be limited to:

- A drawing that clearly shows the site layout including:
  - North point and plan scale.
  - Approximate grades and directions of falls.
    (Contours 0.5m for gradients <15%, 1m for gradients 15-30% and 2m slopes >30%).
  - Site boundaries, adjoining roads and sensitive surroundings.
  - Construction access points.
  - Site office, car park and location of stockpiles.
  - Proposed construction activities and limits of disturbance.
  - Approximate location of trees and other vegetation designated “No Go Zones”.
  - Existing and proposed drainage patterns and discharge points.
  - Clean water diversion of upslope runoff around the disturbed areas.
  - Location and details of proposed erosion and sediment control measures.
  - Location of stockpile areas, including topsoil storage, protection and reuse methodology.
  - Creek crossings and mitigation controls.

- Commentary describing:
  - Timing of works,
  - Nature and extent of earthworks (cut and fill),
  - Site rehabilitation proposals including schedules,
  - Frequency and nature of maintenance regimes.

8.2 Watercourse crossings

There are multiple crossings (see Figure 4 below) of low order (1 and 2) stream throughout the infrastructure footprint. These crossing will be designed to allow for a 1 in 50 rainfall events. Each will be designed as per the requirements under the Blue Book.

Figure 8-1 Watercourse crossings

8.3 Responsibility

The responsibility of ensuring environmental controls are implemented in accordance with the ESCP and maintained throughout the construction lies on all management however the people below will be accountable for ensuring there is no breaches within the plan and any breaches are recorded and reported.

Table 8-1 Responsibilities for Environmental Control implementation

Environmental Aspects	Responsible Personal
Pre-construction ESCP sign off	Site Supervisor
Adequacy of controls during construction	Site Supervisor
Reporting of environmental incidents	Environmental officer Site Supervisor
Reporting Environmental performance of the works	Environmental officer or Environmental consultant.

9 MONITORING AND INSPECTION

In addition to the requirements outlined in the CEMP, the following table outlines the monitoring and reporting to be undertaken during the pre-construction, construction, and post-construction phases of the project relating to soil and water management.

Table 9-1 Monitoring and Reporting Requirements

Monitoring & Reporting Requirements	Responsibility	Source of Requirement
Construction Phase		
Monitoring		
Rainfall forecasts and onsite weather stations will be monitored daily and the site managed to avoid erosion and sedimentation, and to minimise the impact of heavy rainfall and flood events.	Principal Contractor / Sub-contractors	MCoA D25(d)v
Erosion and sediment controls will be inspected: ▪ At least weekly (with maintenance and/or modifications made as necessary). ▪ Inspections and/or maintenance during wet-weather maybe increased where necessary. ▪ Prior to and immediately after a significant rain event (>15mm).	Principal Contractor / Sub-contractors	MCoA D25(d)v SoC 11.01
Inspections of compound and ancillary facilities erosion and sediment control measures, concrete wash out facilities, storage of materials, stockpiles, etc: ▪ Informal inspections are to occur daily and prior to and immediately after a significant rain event. ▪ Formal weekly environmental inspections are to occur.	Principal Contractor / Sub-contractors	MCoA D25(d)v
Regular inspections will be undertaken to assess environmental compliance against regulatory requirements in accordance with the CEMP.	Principal Contractor / Sub-contractors	MCoA D25(d)v
Compliance, non-conformances and incidents will be managed in accordance with the procedures outlined in the CEMP	Principal Contractor / Sub-contractors	MCoA D25(d)v

Monitoring & Reporting Requirements	Responsibility	Source of Requirement
Water quality monitoring will be undertaken should an overspill from a sediment dam occur daily whilst the overspill is occurring. The monitoring will follow the ANZECC guidelines for the Murrimbidgee and Lake George area. Turbidity will be measured with a trigger of 25 NTU. Oil and grease will also be monitoring visually. pH will also be measured with an exceedance of NTU or presence of oil and grease will prompt a notification to the DPIE and an investigation into material harm to meet the requirements of the EPL. The HSEQ team will undertake the investigation, calling on external experts where required. Sediment dams will be able to accommodate the rainfall requirements as per the Blue Book determined in the ESCP. An event greater than this will still be monitored, however, is not considered an exceedance. The project team will still communicate the event to the DPIE and EPA. Continuous improvement protocols will be put in place to ensure the minimisation of the event reoccurring. As the project is in the upper catchment area, upstream monitoring will be unachievable during rain events.	Principal Contractor / Sub-contractors	MCoA D25(d)v
Reporting		
All water sampling will be recorded on a Water Quality Monitoring Record Form.	Principal Contractor / Sub-contractors	MCoA D25(d)v
All results of an erosion and sediment control inspection will be recorded***.***	Principal Contractor / Sub-contractors	MCoA D25(d)v
Actions arising from the inspections will be recorded and each action will be allocated and monitored for completion. .	Principal Contractor / Sub-contractors	MCoA D25(d)v
Further reporting will be in line with the CEMP.	Principal Contractor / Sub-contractors	MCoA D25(d)v

10 INCIDENT REPORTING

Should an incident occur as defined by the development consent the Department of Planning will be notified within 24 hours of the proponent becoming aware of the event. An assessment for the potential of material harm to the receiving environment to have occurred will be undertaken. If there is any potential, the EPA will be notified within 24 hours. An investigation will be undertaken for all incidents to determine if, and to what extent, material harm has occurred and the root causes to inform corrective actions and continuous improvement actions. Results from the investigations will be provided to the government stakeholders as required.

Compliance reporting will be undertaken as per the requirements in the consent and licence approvals. All incidents within the reporting period will be detailed within the reports.

11 REVIEW AND IMPROVEMENT

11.1 Continuous Improvement

Continuous improvement of the CSWQMP will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement. The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance
- Determine the cause or causes of non-conformances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies
- Verify the effectiveness of the corrective and preventative actions
- Document any changes in procedures resulting from process improvement

11.2 CSWQMP Update and Amendment

MCoA C6A requires that within 3 months of the submission of:

- an incident report under condition C8 (listed below);
- an audit under condition C7 (listed below); or
- any modification to the conditions of this consent (unless the conditions require otherwise),

The Applicant shall review and, if necessary, revise the strategies, plans, and programs required under this consent to the satisfaction of the Secretary.

Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted to the Secretary for approval.

The MCoA notes that the purpose of this condition is to ensure that the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.

12 REFERENCED DOCUMENTS

Collector Wind Farm Construction Environmental Management Plan (CEMP)

Collector Wind Farm Environmental Assessment, prepared for RATCH Australia Corporation Limited (APP Corporation, June 2012) (the EA).

Controlled Activities Guidelines (NSW Office of Water, 2012)

Collector Wind Farm Preferred Project and Submissions Report (APP Corporation, March 2013)

Collector Wind Farm Modification Report (NGH Environmental, September 2015)

Collector Wind Farm Submissions Report (NGH Environmental, December 2015)

Second Modification Application (NGH Environmental, October 2018)

Managing Urban Stormwater - Soils and Construction Vols 1 and 2, 4th Edition (Landcom, 2004)

Managing Urban Stormwater Soils and Construction Volumes 2A and 2D Main Road Construction (DECC 2008)

Minister's Conditions of Approval (MCoA) issued by the NSW Minister of Planning and Environment

Policy and Guidelines for Fish Friendly Waterway Crossings (NSW Fisheries, February 2004)

Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (Fairfull and Witheridge, 2003)

Revised Statement of Commitments (APP Corporation, March 2013)

Waste Classification Guidelines Part 4: Acid Sulfate Soils (DECC 2008)

Third Modification Application (NGH Environmental, July 2019)

13 REFERENCES

Biosis Research 2004, *Draft Report – Collector Wind Farm: Preliminary Cultural and Heritage Assessment*. A Report for Stanwell Corporation Limited.

Brunker and Offenberg 1968, *Goulburn 1:250 000 Geological Sheet SI/55-12*, 1st edition, Geological Survey of New South Wales, Sydney.

Bureau of Meteorology (BoM) 2011, *Climate Statistics Goulburn*, viewed 21 January 2011 at <http://www.bom.gov.au/climate/averages/tables/cw_070037.shtml>.

Upper Lachlan Shire Council (ULSC) 2009a. *Regional State of the Environment Report 2004-2009: Upper Lachlan*. September 2009.

Upper Lachlan Shire Council (ULSC) 2010, *Annual Report 2009/2010*

Upjohn, B., Fenton, G. and Conyers, M. (2005) *Soil Acidity and Liming Agfact AC.19 3rd Edition,* prepared for the NSW Department of Primary Industries

ACT Commissioner for Sustainability and Environment 2009, *Australian Capital Region State of the Environment Report*.

ANNEX A – UNEXPECTED FIND CONTINGENCY PLAN

Procedure

During works at the site, potentially contaminated soil materials that have not been encountered previously during the investigation could become apparent.

Examples of Unexpected Finds are as follows:

- Soil or fill that differs from previously identified materials onsite;
- Asbestos or suspected asbestos containing materials;
- Man-made fibrous material;
- Materials with obvious unnatural odours or man-made inclusions throughout; and
- Materials exhibiting staining or unusual colouring.

Standards

Relevant standards will depend on the substance identified but may include:

- NSW Work Health and Safety Act, 2011;
- NSW Work Health and Safety Regulation 2011;
- SafeWork Australia 2011 *Code of Practice: How to Safely Remove Asbestos*
- SafeWork Australia, 2011 Code of Practice how to Manage and Control Asbestos in the Workplace
- NEPC, 2013 *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)*.
- NSW EPA, 1995 *Contaminated Sites: Sampling Design Guidelines.*
- NSW EPA, 2006 *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd edition)*.
- NSW EPA, 2007 *Guidelines for the Assessment and Management of Groundwater Contamination*
- NSW EPA, 2009, *Contaminated Sites: Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 2009*.
- NSW EPA, 2011 *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*.
- NSW EPA, 2009 *Waste Classification Guidelines Part 1: Classifying Waste*.

Control and Management

The following control and management actions are required:

- Works in this area of the site are to cease temporarily and this area of the site be secured.
- Site Supervisor, Project Manager and Environmental Manager to be notified with details of the material description (see above characteristics) and suspected extent.
- Where asbestos materials are suspected, Class A (friable asbestos) or Class B (bonded asbestos) licensed contractor will be required to coordinate the works and specify appropriate environmental control measures in accordance with existing legislation and guidance. This may require the following:
    - Establish workplace and site boundary air monitoring;
    - Use of appropriate PPE;
    - Use of closed vehicle cabs with air conditioning running;
    - Use of lined and covered vehicles;
    - Identification of clearly defined trafficking routes from work area;

- Temporary stockpiling in an appropriately controlled manner to prevent liberation of fibres;
- Appropriate waste classification;
- Notification of the intention to transport waste; and
- Disposal at a suitably licensed facility and provision of relevant materials tracking and disposal dockets.
- Clearance certificates (must be produced for friable and bonded).

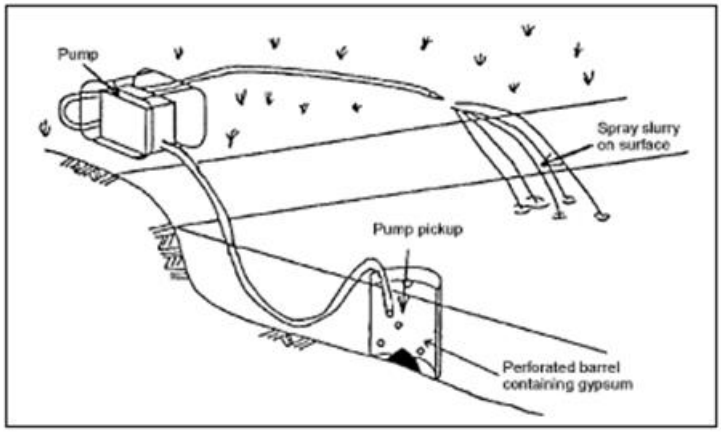
- Where chemical contamination is suspected, the Site Supervisor should liaise with the Environmental Manager to coordinate the works and specify appropriate environmental control measures in accordance with existing legislation and guidance. This is likely to be similar to that outlined for asbestos above.
- Once the unexpected find has been safely relocated and contained within a secure temporary storage area, the environmental consultant will be required to conduct laboratory analysis to ensure that materials are appropriately classified for suitably licensed waste disposal.
- Incident notification, recording and reporting are to be conducted in accordance with Section 12 of the CEMP.

ANNEX B – FLOCCULATION PROCEDURE

Sediment basins and traps are effective at trapping larger soil particles which rapidly settle. Smaller particles and any dispersive clays require longer periods to settle out. As such a flocculation of larger structures is likely to be required. In the initial stages dosing at the specified rate will be trialled for its effectiveness and required application.

1. Flocculation shall occur where there is a 3-4 day weather forecast of no rain;
2. Flocculent can be applied by either manually dosing by broadcasting using shovels or the preferable option is to use the perforated drum and pump spray method see Annex C 1 below;
3. Dosage rate for gypsum = 40kg/100m3 of stored water (this dosage rate may need to be increased up to 45-50kg/100m3 depending on its effectiveness;
4. Dosage rate for Alum is to be 8mg/L of stored water (NB: Ensure that overdosing does not occur and always monitor the pH of the water to ensure it is within the acceptable limits).
5. Gypsum/Alum is to be applied by mixing the required dosage above and spraying it across the surface if the water contained within the sediment basin;
6. Caution should be taken to prevent the disturbance of sediments while applying the Gypsum/ Alum;
7. Allow a minimum of 2 -3 days settling time (as necessary), or until such time the TSS is less than 50mg/L.

Annex B 1 - Flocculation spray method (Source: Landcom, 2004)



ANNEX C – CONSULTATION LOG

Consultations relevant to the development of this Soil and Water Quality Management Plan.

Plan	Version	Agency	Date	Details
Soil & Water Quality MP (SWQMP)	2.2	DPI	4/10/2018	SSQMP submitted to DPI for comments via email
	2.2	DPI	12/11/2018	Email and phone follow up to DPI for comments on SSQMP
	2.2	DPI	16/11/2018	DPI comments on SSQMP received
	3.1	DoPE	21/12/2018	Submitted to DoPE for approval
	3.1	DoPE	30/01/2019	DoPE comments received in relation to SWQMP
	4.1	DPI	8/05/2019	DPI Fisheries email: CoA B9 is not applicable to CWF

ANNEX D – GROUNDWATER ASSESSMENT

Document No. COLWF-PM-PLN-0019

Groundwater Assessment

COLLECTOR WIND FARM

Collector Wind Farm
Lerida Road South
Cullerin, NSW 2581
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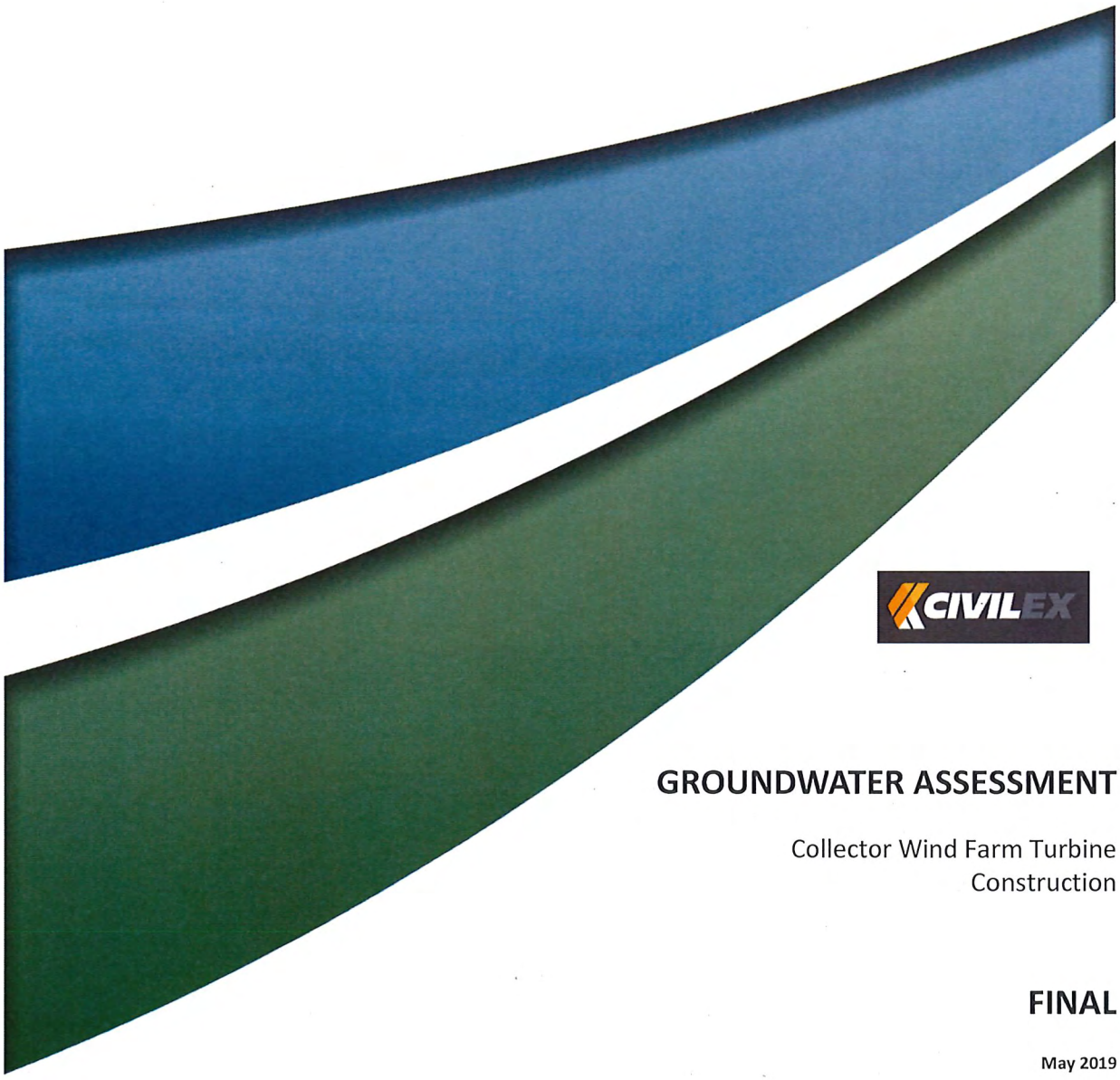

CIVILEX

GROUNDWATER ASSESSMENT

Collector Wind Farm Turbine Construction

FINAL

May 2019

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FINAL

Prepared by
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on behalf of
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1.0 Introduction

1.1 Scope

This Groundwater Assessment has been prepared on behalf of Civilex to assess the potential impacts on the regional groundwater source associated with the construction of the Collector Wind Farm turbines (the Project) and identify appropriate mitigation measures to minimise the risk of potential groundwater impacts.

1.2 Project Description

The Project is an approved development for the construction, operation and decommissioning of up to 55 wind turbines in the NSW southern tablelands. The Project was initially approved (MP10_0156) on 2 December 2013 under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* although it was subsequently transitioned to a State Significant Development on 6 July 2018 (Vestas, 2019). Modification 1 (MP10_0156) which involved an amendment to the site layout (including roads, electrical cabling and project facilities for construction and operation) was approved on 22 July 2016 and a consolidated project consent was issued by the Department of Planning and Environment (DPE). A second modification to MP10_056, Modification 2, which involves minor changes to the location and development footprint for the substation and grid connection infrastructure and incorporation of the Lerida Road upgrade works, is presently in the approvals stage.

The Project site is located approximately 35 km south-west of Goulburn and 3.5 km north-east of Collector (refer to **Figure 1.1**). It is situated along the Cullerin Range at elevations between 700 and 900 metres Australian Height Datum (mAHD) and within the Upper Lachlan Shire Council Local Government Area (LGA).

The development envelope for the Project covers an area of 800 hectares (ha). Disturbed areas planned for the construction phase, including those for the purpose of turbine construction, cable trench easements, construction access tracks, construction compound and crane pads, will cover an area of approximately 45 ha (APP, 2012).

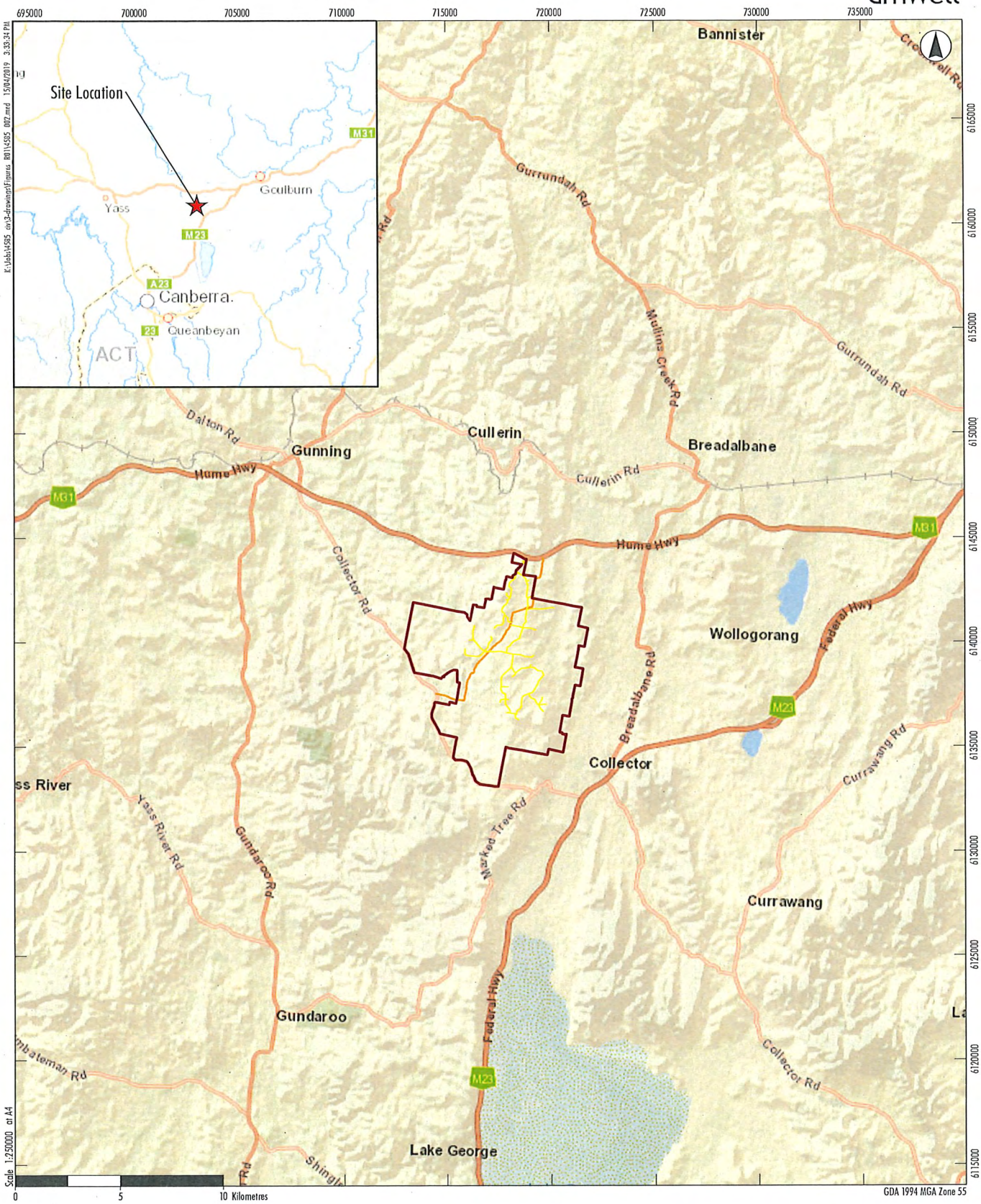

FIGURE 1.1

Site Locality & Project Boundary

Image Source: ESRI Basemaps Data source: NSW LPI (2019)

2.0 Groundwater Assessment

2.1 Existing Groundwater Environment

Groundwater licensing in this catchment is governed by the *Water Management Act 2000* under the Water Sharing Plan (WSP) for the NSW Murray-Darling Basin Fractured Rock Groundwater Sources. Groundwater at the Project site is within the Lachlan Fold Belt Murray-Darling Basin (MDB) Groundwater Source (Australian Groundwater Source, Bureau of Meteorology). Locally, the groundwater source is used by residents of the nearby town of Collector and surrounding areas for domestic and agricultural purposes (Vestas, 2019).

A selection of groundwater bores considered representative of all bores in the vicinity of the project are shown in **Figure 2.1**. Logs for these bores (refer to **Table 2.1** and **Figure 2.1**) show depths to the groundwater source water bearing zone ranging from 16 to 45 metres below ground level (mbgl), with the three bores having the water bearing zone nearest to the surface being:

- 16 mbgl for bore GW705004 located 0.4 km south-west of the Project site
- 21 mbgl for bore GW700954 located 1.4 km south-east of the Project site near Collector
- 27 mbgl for GW704089 located 1.0 km north of the Project site.

The measured standing water levels for these three bores are 2.5 mbgl for GW705004, 9 mbgl for GW700954 and 11 mbgl for GW704089 are indicative of a confined aquifer. There is also GW703978 with a standing water level at 6 mbgl but the depth to the water bearing zone is not recorded in the bore records. The relatively shallow standing water levels are representative of the confined groundwater aquifer water pressure rather than the depth to the groundwater table. As a result, groundwater would not be encountered at the standing water level without penetrating the much deeper water bearing zone.

The Environmental Assessment (APP, 2012) gave a depth range for the water bearing zone of approximately 27 to 33 mbgl, and this is consistent with bores GW702970 and GW 703248. **Table 2.1** provides greater detail on the groundwater resource in the vicinity of the project.

Table 2.1 Groundwater Bore Logs (Source: WaterNSW Real-time Data Portal)

Bore ID	Bore Depth (mbgl)	Water Bearing Zone (mbgl)	Standing Water Level (mbgl)	Yield (L/s)	Latitude (°)	Longitude (°)
GW700954	30	21	9	0.38	-34.914	149.4272
GW702790	70	28	5.5	0.20	-34.911	149.3608
GW703248	41	33	12.0	1.50	-34.878	149.3519
GW703555	42	*	*	0.33	-34.847	149.3294
GW703978	56	*	6.0	0.70	-34.836	149.3344
GW704089	66	27	11.0	0.60	-34.820	149.4042
GW704344	86	*	14.0	1.00	-34.880	149.3433
GW704923	84	45	14.0	0.14	-34.844	149.3489
GW705004	78	16	2.5	0.49	-34.879	149.3478

NOTE * not recorded on bore logs sourced from WaterNSW Real-time Data Portal

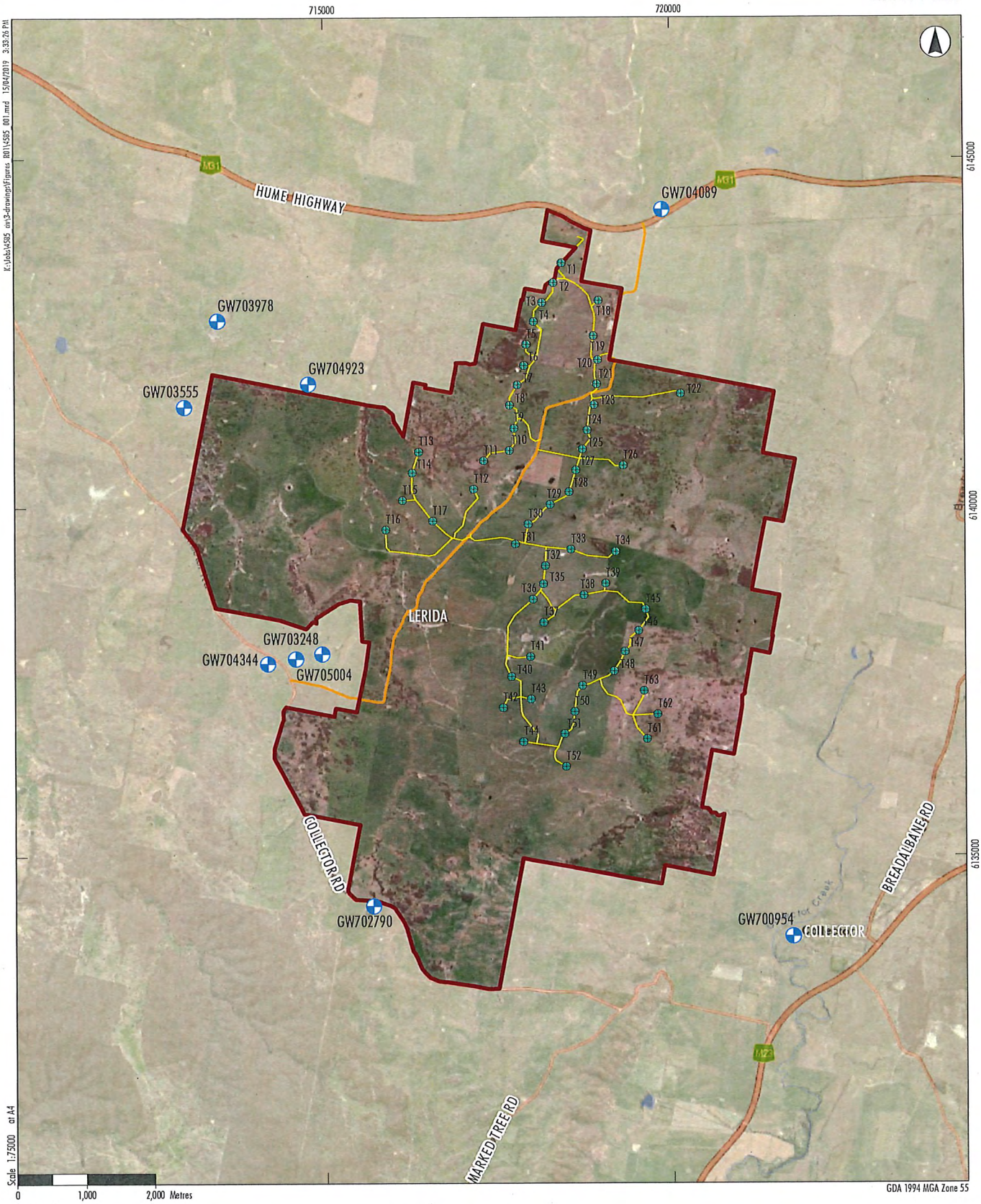

FIGURE 2.1

Groundwater Bore Locations

Image Source: ESRI Basemaps Data source: NSW LPI (2019)

3.0 Impact Assessment and Mitigation

3.1 Potential Groundwater Impacts

A review of the project background information has identified the following potential groundwater impacts.

- Interception and draw down/depressurisation

  If excavations were to extend deeper than the confirmed 5 mbgl and intercept the water bearing zone (refer to depths in **Table 2.1**), this could lead to, depressurisation of the confined aquifer.

- Water quality impacts from spills

If a hydrocarbon or chemical spill was to occur, contamination of the local groundwater source could occur. The degree of contamination would depend on the type and volume of hydrocarbon or chemical spilt and the location of the spill with respect to possible aquifer entry.

3.2 Impact Assessment

The Environmental Assessment (APP, 2012) indicated the construction of individual wind turbines could incorporate either gravity foundations or rock anchor foundations. Rock anchor foundations would require drilling to depths of approximately 20 mbgl with the potential to intercept the groundwater table. However, Civilex has confirmed construction of all wind turbines will occur with gravity foundations rather than rock anchor foundations. Foundation excavations will be limited to 3 mbgl. The construction of the roads and substation requiring the removal of material will be no more than 5 mbgl.

Bore GW705004 indicates the shallowest depth to groundwater in the area of 16 mbgl. This bore is approximately 0.4 km from the project boundary. As the maximum excavation depths required for the foundation construction will be significantly above the expected groundwater source water bearing zone in the immediate area surrounding the Project (refer to **Table 2.1**), interception of the groundwater table is not expected.

Further to this, the significant distance between the groundwater source water bearing zone and the planned maximum excavation depth not only precludes the possibility of aquifer depressurisation but provides a substantial barrier to groundwater contamination in the event of a hydrocarbon or chemical spill.

Provided the maximum excavation depth of 5 mbgl is adhered to, and appropriate hydrocarbon or chemical spill response procedures are implemented (refer to **Section 3.3**), no impact to the local groundwater source is expected.

3.3 Groundwater Mitigation Measures

Should an unexpected situation occur and construction requirements were to change (e.g. the requirement to use rock anchor foundations or excavations substantially greater than 5 mbgl) which could result in the interception of the groundwater table within the aquifer, an assessment of potential groundwater impacts will be undertaken in accordance with the NSW Aquifer Interference Policy (AIP) (NSW Government, 2012).

Should construction activities require interception of the groundwater table, baseline groundwater water quality monitoring will be undertaken as part of a revised groundwater assessment. The monitoring will be

undertaken to allow comparison of groundwater water quality with the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Environment and Conservation Council (ANZECC), 2000) and to set appropriate trigger values to identify any potential water quality impacts associated with the Project on the groundwater water source.

3.4 Trigger Action Response Plans

While interception of the groundwater table is not expected, a Trigger Action Response Plan (TARP) relating to unforeseen groundwater inflows to the Project construction site has been prepared to ensure Civilex personnel respond appropriately to unexpected water inflows at excavations (refer to **Table 3.1**). A TARP has also been prepared to ensure Civilex personnel respond appropriately in the event of a hydrocarbon/chemical spill (refer to **Table 3.2**).

Table 3.1 Unforeseen Groundwater Inflow TARP

Observation	Strategy for Mitigation	Monitoring	Monitoring Action	Response
Groundwater seepage inflow to an excavation is observed	• Excavations are not to be greater than 5 mbgl. (*NOTE:* Groundwater bore logs (refer **Table 2.1**) indicate the minimum depth to the water bearing zone within the aquifer is between 16 mbgl west of the site (GW705004) and 27 m bgl north of the site (GW704089)).	• Ongoing visual monitoring of the excavation for water seepage inflows.	• Continue visual monitoring. • Estimate the inflow rate (e.g. by measuring time to fill a given depth in the excavation or time to discharge water from the excavation with a pump of known flow rate)	Investigate potential contributing factors: • Climatic conditions, e.g. is the inflow a result of seepage through excavation faces from recent rainfall • Engage a groundwater specialist to undertake a preliminary investigation if required. If groundwater inflow is confirmed, immediately notify DPE and Department of Industry (DoI) Water and: • Undertake a groundwater assessment in accordance with the NSW AIP • Identify appropriate controls and mitigation measures. • Obtain the required licences and approvals with sufficient shares in the water source (the Lachlan Fold Belt water source within the Murray Darling Basin Fractured Rock Groundwater Sources) to account for the groundwater inflow.

Table 3.2 Hydrocarbon/Chemical Spill TARP

Observation	Strategy for Mitigation	Monitoring	Monitoring Action	Response
Hydrocarbon or chemical spill in or into excavation	• Controlled use and handling of hydrocarbons chemicals within 20 m of excavations • Refuelling and maintenance of equipment, mobile plant and vehicles at least 20 m from excavations. • Spill kits to be located close to work areas with hydrocarbon storage and transfer to ensure they can be accessed promptly in the event of a spill.	• Daily inspections of equipment, mobile plant and vehicles used within and around the excavation area for oil or fuel leaks • Visual monitoring for spills in excavation and surrounding area during construction phase	• Continue daily checks and visual monitoring. • Undertake a broader inspection to determine whether spill is more widespread (i.e. tracked across site by mobile plant with oil/fuel leak)	• Contain the spill using absorbent materials or soil bunds as required • Remove contaminated soil/rock from area as soon as possible to prevent seepage into deeper layers • Notify construction site supervisor and HSEQ of the spill • If it is believed the spill has the potential to contaminate the groundwater source notify DPE and DoI Water of the incident as detailed in **Section 4.0**. • Dispose of contaminated soil/rock via an appropriately licensed waste management facility.

NOTE – No groundwater impacts are expected as a result of the Project construction

4.0 Incident Reporting

Where an incident relating to groundwater management has occurred, Civilex will follow reporting as detailed in the conditions of the consent as follows:

Condition of Consent

C8 - The Proponent shall notify the Secretary within 24 hours of becoming aware of any incident caused or contributed to by the Project with actual or potential significant off-site impacts on people or the biophysical environment. The Proponent shall provide full written details of the incident to the Secretary within seven days of the date on which the incident occurred.

C9 - The Proponent shall meet the requirements of the Secretary to address the cause(s) or impacts of any incident, as they relate to this Approval, reported in accordance with condition C8 of this Approval, within such period as the Secretary may require.

5.0 Conclusion

Due to the significant distance between maximum excavation depth and nearest groundwater levels in the vicinity of the project, no groundwater impacts are expected as a result of the Project construction. Mitigation measures and TARPs are in place for the unlikely event that unforeseen groundwater inflows occur and other incidents that could impact on groundwater quality, such as chemical or hydrocarbon spills.

6.0 References

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