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Neoen Australia Pty Ltd
29-Mar-2019

Proposed Kentbruck Green Power Hub

Preliminary Hydrology Assessment

Attachment 4

29-Mar-2019
Prepared for – Neoen Australia Pty Ltd – ABN: 57 160 905 706

Proposed Kentbruck Green Power Hub

Preliminary Hydrology Assessment

Client: Neoen Australia Pty Ltd

ABN: 57 160 905 706

Prepared by

AECOM Australia Pty Ltd
Level 10, Tower Two, 727 Collins Street, Melbourne VIC 3008, Australia
T +61 3 9653 1234 F +61 3 9654 7117 www.aecom.com
ABN 20 093 846 925

29-Mar-2019

Job No.: 60591699

Table of Contents

1.0 Introduction

1.1 Background

Neoen Australia Pty Ltd is proposing the development of the Kentbruck Green Power Hub project, around 330 kilometres west of Melbourne between Portland and Nelson, Victoria. The project would comprise:

- A wind farm, consisting of up to 157 wind turbines and associated infrastructure
- Battery storage facility, comprising a lithium-ion battery with up to 500MW / 1,000 MW hours of storage
- A connection to the electricity grid via an overhead and/or underground transmission line connection.

This report has been prepared to support the preparation of project referrals for the project in accordance with the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and Victorian *Environment Effects Act 1978* and assist Neoen in the further development of the design of the Green Power Hub.

1.2 Scope of Work

This Preliminary Hydrology Assessment covers the following topics:

- Regional hydrology
- Receiving water environment
- Groundwater and geological conditions
- Local hydrology
- Water supply
- Design considerations relating to hydrology, surface water and groundwater
- Construction mitigation measures relating to hydrology, surface water and groundwater.

1.3 Site Context

The proposed Kentbruck Green Power Hub site is approximately 7,500 hectares in size. The project is located approximately 30 kilometres north-west of Portland and five kilometres east of Nelson, in south-west Victoria. The project site is within Glenelg Shire and is primarily within an area that has been substantially modified for commercial forestry use (radiata pine). Small sections of agricultural land for grazing also exist within the project site boundary. Portland – Nelson Road bisects the project site in a generally east – west direction. The project site is bound by forestry to the north, highly-modified land used for grazing purposes to the east and west, Discovery Bay Coastal Park to the south and the Glenelg River National Park and Cobboboonee National Park to the east and north – east. The closest township is Kentbruck located at the south eastern end of the site. A figure showing the proposed project site location is provided in **Appendix A.**

The project is in the early stage of development. Indicative key attributes of the project comprise a wind energy facility consisting of up to 157 turbines and associated infrastructure, including:

- Internal site access tracks and upgrades to existing access points from the public road network
- Hardstand and lay down areas
- Underground electricity cabling
- Overhead power lines (up to 275 kV)
- Electricity collector stations
- Overhead and/or underground electricity cabling and a terminal substation to provide connection to the 500kV transmission line
- Permanent meteorological monitoring masts (met masts)
- An operations and maintenance building

- Temporary infrastructure including construction compounds, concrete batching plants, car parking, site buildings and amenities.

Turbine details will be developed following a tendering process which will take place once planning approvals have been granted. For the purposes of the referrals the following dimensions are to be used for the wind turbines:

- Tip height up to 270 metres above ground level
- Rotor diameter up to 190 metres
- Lower blade sweep height of 45 metres or higher.

Turbine foundations will consist of concrete gravity or rock anchor foundations (subject to geotechnical assessment). Foundations will be about four metres deep with a diameter of up to about 25 metres.

The project will also consist of either an underground or overhead transmission line to connect the project to the electricity grid. Two routes are currently under consideration and are shown in **Appendix A**. Both route options are addressed within the project referrals as they are subject to ongoing design development and discussions with project stakeholders.

2.0 Regional Hydrology

2.1 Catchment Overview

Data available on the Glenelg Hopkins Catchment Management Authority (GHCMA, 2019) website indicates that there are some creeks located at the east side of proposed wind farm site, including Johnstone Creek and some unnamed creeks. The biggest watercourse within the Glenelg Hopkins Catchment is the Glenelg River which is located north of the proposed wind farm site (GHCMA, 2019).

The proposed underground transmission line route crosses Surrey River and Mt Kincaid Creek. The proposed overhead transmission line route crosses Wattle Hill Creek. Either option would require approval from GHCMA before undertaking works.

The proposed wind farm site and the proposed transmission line routes are located within the Glenelg Basin and Portland Coast Basin catchment regions, as shown in **Figure 1**.

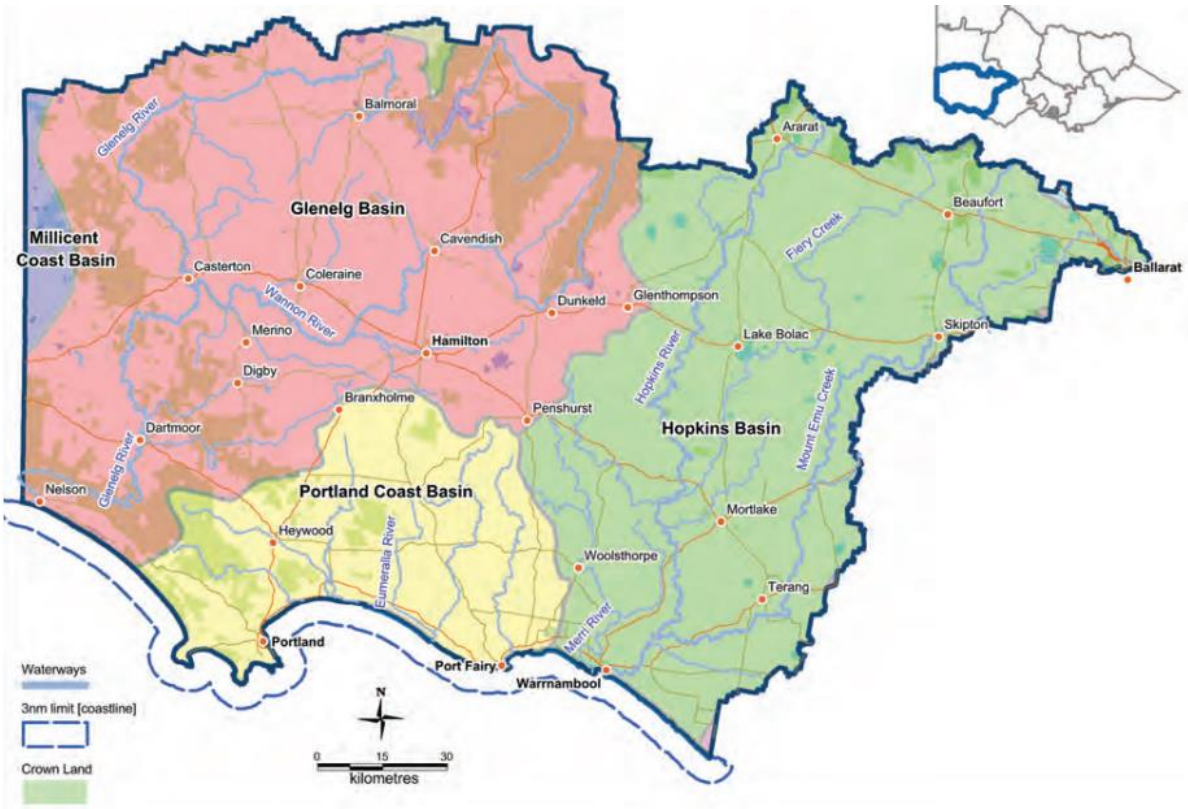

Figure 1 – Map of the key river basins in the Glenelg Hopkins region (GHCMA, 2019)

The Glenelg River is the largest river in south-west of Victoria, located between Dartmoor and the coast and is classified as a heritage River under Heritage River Act 1992. Significant tributaries of the Glenelg River include the Wannon, Chetwynd, Stokes, Crawford and Wando Rivers. Within the Portland Coast Basin, there are the Moyne, Eumeralla/Shaw , Darlots Creek/Fitzroy River, and Surrey River systems. These rivers are relatively short, and all drain the immediate inland areas to the Southern Ocean at a variety of points (GHCMA, 2019).

Within the Glenelg Hopkins Catchment Management Authority (GHCMA) region, approximately 81% of the of the region has been developed for agricultural use and about 2% of the catchment area comprises of pine forest, whereas 16% are native forests and less than 1% is used for urban and industrial development. Out of the 81%, the main agricultural use is denominated by dryland pasture (Agriculture Victoria, 2019).

As shown in **Figure 2** most of the area covered by the proposed wind farm has been modified substantially for commercial forestry use (Radiata Pine). The proposed underground transmission line runs through the Cobboboonee National Park, Cobboboonee State Forest and dryland pastures whereas the proposed overhead transmission line is runs mainly through dryland pastures.

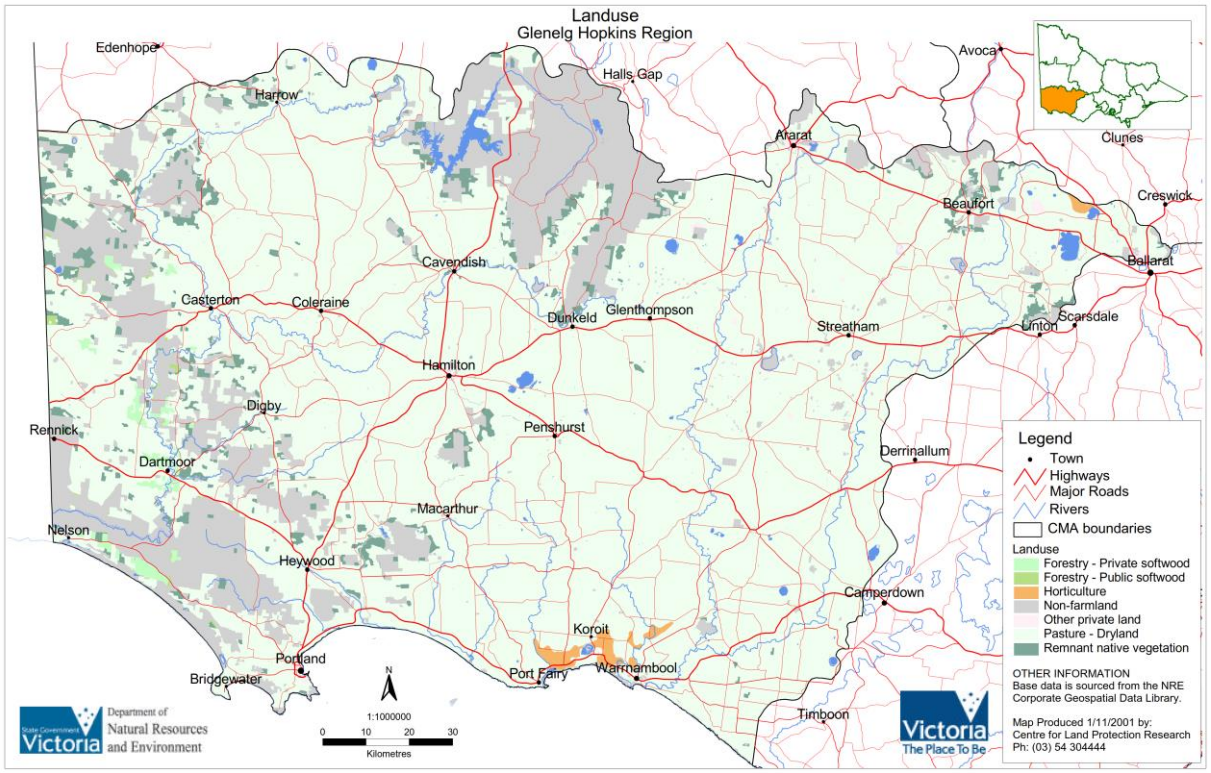

Figure 2 - Land use in the Glenelg Hopkins Region (Agriculture Victoria, 2019)

2.2 Rainfall

The climate of the Glenelg Hopkins region is generally warm and dry during the summer months, and cool and wet during the winter months. Data available on Water Watch Victoria shows that the average annual rainfall in the region ranges from approximately 400 millimetres per year in Harrow and Balmoral, to 600 millimetres per year in the Hamilton and to more than 900 millimetres per year near the Portland area, as shown in **Figure 3** (Water Watch Victoria, 2019).

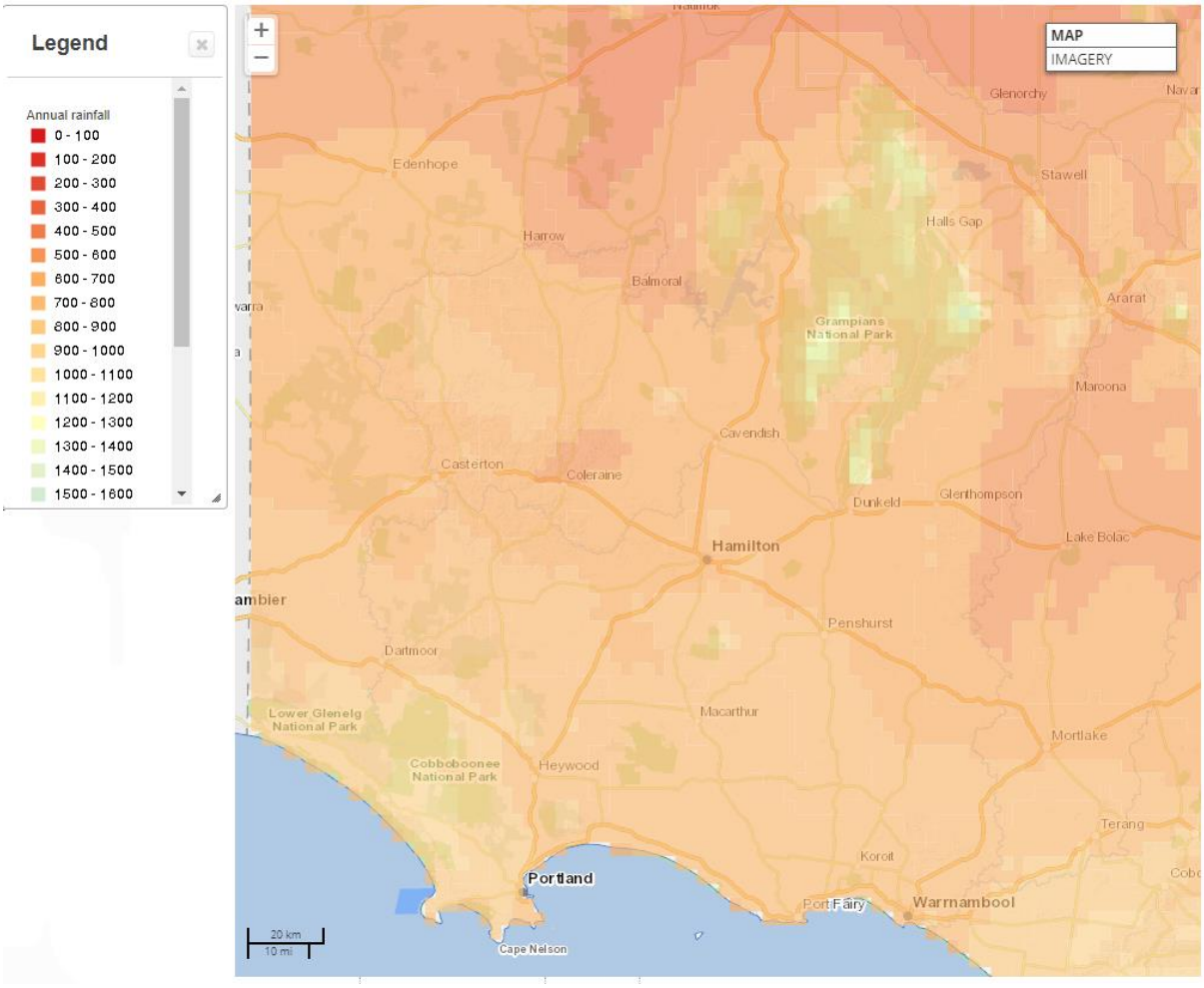

Figure 3 – Rainfall Intensity Data for Glenelg Hopkins catchment region (Water Watch Victoria, 2019)

2.3 Existing Flood Risk

Referring to flood information available via Water Watch Victoria the proposed project site is not located within a 1% Annual Exceedance Probability (AEP) flood extent (Department of Environment, Land, Water & Planning, 2018). Based on available data there is no indication that the proposed wind farm site is subject to flooding. The proposed underground transmission option crosses the 1% AEP flood extent for the Surrey River, nearby Heathmere, as shown in **Appendix D1**.

There are flood risks upstream of Glenelg River, Wannon River, Portland, Fitzroy River, Condah Drain, Darlot Creek, Heywood and Port Fairy. Available existing 1% AEP flood extents for the region are as shown in **Appendix B**.

2.4 Receiving Water Environment

Referring to data available on the Glenelg Hopkins Catchment Management Authority (GHCMA) website and the topography of the region, rainfall on Glenelg Basin ultimately discharges to Discovery Bay via Glenelg River (GHCMA, 2019).

Rainfall on Portland Coast Basin ultimately discharge to both Discovery Bay and Portland Bay via Fitzroy River and Eumeralla River. (Water Watch Victoria, 2019)

2.5 Glenelg Estuary and Discovery Bay Ramsar Site

A Ramsar site is a wetland site designated to be of international importance under the Ramsar Convention, an intergovernmental treaty established in 1971 by UNESCO.

The proposed wind farm site is located next to the Glenelg Estuary and Discovery Bay Ramsar Site. The Ramsar site is located next to the Victorian-South Australian Border, approximately 430 kilometres west of Melbourne and the closest township to the Ramsar site is Nelson. The Ramsar site covers about 22,289 hectares and it covers the western part of Lower Glenelg National Park from the South Australian border to Nelson – Winnap Road, most of the Discovery Bay Coastal Park and the Nelson Streamside Reserve. Both the National Park and Discovery Bay Coastal Park are managed by Parks Victoria in partnership with the local stakeholders. Where the proposed wind farm and the proposed transmission line routes are located, neither of them is located within the Ramsar Site (Department of Environment, Land, Water and Planning, 2019).

Further to the above, in accordance to the Article 3.2 of the Ramsar Convention, Australian Government is required to monitor and report to the Ramsar Convention Secretariat if the ecological character of any Australian wetland has changed, is changing or is likely to change since the time of listing, due to technological developments, pollution or other human interference. Though, changes in ecological character may be positive (improvements) or adverse (degradation), however, notifications to the Ramsar Convention Secretariat are only required for adverse changes. (Australian Government Department of Environment and Energy, 2019).

The Glenelg Estuary and Discovery Bay Ramsar Site Management Plan states that there is currently a knowledge gap in the understanding the hydrology of the Ramsar site (Department of Environment, Land, Water and Planning, 2019). There is currently no local drainage information available for the plantation or agricultural land adjacent to the Ramsar site. Appendix C shows that the topography of the plantation and agricultural land within the proposed site generally falls towards the Glenelg Estuary and Discovery Bay Ramsar site, and ultimately to Discovery Bay. This indicates that any rainfall that falls on the proposed site may flow overland, or underground, towards the Glenelg Estuary and Discovery Bay Ramsar site and eventually to Discovery Bay.

3.0 Local Hydrology

The proposed Kentbruck wind farm site is in a local catchment that is highly modified. The proposed site consists predominantly of land used for commercial forestry. The most western and most eastern ends of the proposed site consist of agricultural land used for grazing. A relatively small pocket of Public Park and Recreation Zone crosses the proposed site to the south of where Skyline road meets Portland-Nelson Road. The Glenelg Estuary and Discovery Bay Ramsar site borders the proposed site along the southern boundary and on the north western boundary.

3.1 Kentbruck Plantation

The land of the Kentbruck Plantation located within the proposed wind farm site is highly modified. The plantation is traversed by access roads to allow for harvesting of radiata pine. The northern border of the proposed wind farm, which cuts through the Kentbruck Plantation site, generally follows a local ridgeline that connects a local highpoint near Wade Junction to the mountain range that runs north-south, beginning at Mount Richmond, through the Lower Glenelg and Cobboboonee National Parks.

As shown in **Appendix C**, the topography of the plantation within the proposed site falls towards the Glenelg Estuary and Discovery Bay Ramsar site and ultimately to Discovery Bay. Currently there is no local drainage or surface water information available for the plantation. Four farm dams are assumed to exist on the southern side of the plantation area, based on information available from Geoscience Australia (Geoscience Australia, 2019), as shown in **Appendix D2**. The operational status or design of these dams is not known.

3.2 Agricultural Land

On the western end of the proposed site an area of agricultural land exists to the south of Portland-Nelson Road. This agricultural area is split by a wedge of, and ultimately bordered by the Glenelg Estuary and Discovery Bay Ramsar site to the south. The topography of this area grades down towards the Ramsar site, and ultimately to Discovery Bay.

Currently there is no local drainage or surface water information available for this area of agricultural land with the exception of farm dams (Geoscience Australia, 2019) as shown in **Appendix D2**. The operational status or design of these dams is not known.

On the eastern end of the proposed site an area of agricultural land exists between Portland-Nelson Road and Lower Glenelg National Park. This area of agricultural land has several areas that are indicated to be land subject to inundation based on information available from Geoscience Australia (Geoscience Australia, 2019), as shown in **Appendix A**. There are also several farm dams in this area based on information available from Geoscience Australia (Geoscience Australia, 2019), as shown in **Appendix D2**. The operational status or design of these dams is not known.

This is area of the proposed site sits on a plateau of Mount Richmond. Parts of this area drain to the north, south, east and west depending in location within the proposed site. Currently there is no local drainage or surface water information available for this area of agricultural land.

3.3 Rainfall

Data available on Water Watch Victoria (Water Watch Victoria, 2019) shows the average annual rainfall in the area ranges from approximately 600 millimetres per year near Budj Bim National Park to more than 900 millimetres per year in the Cobboboonee Forest west of Heywood, as shown in **Figure 4** (Water Watch Victoria, 2019).

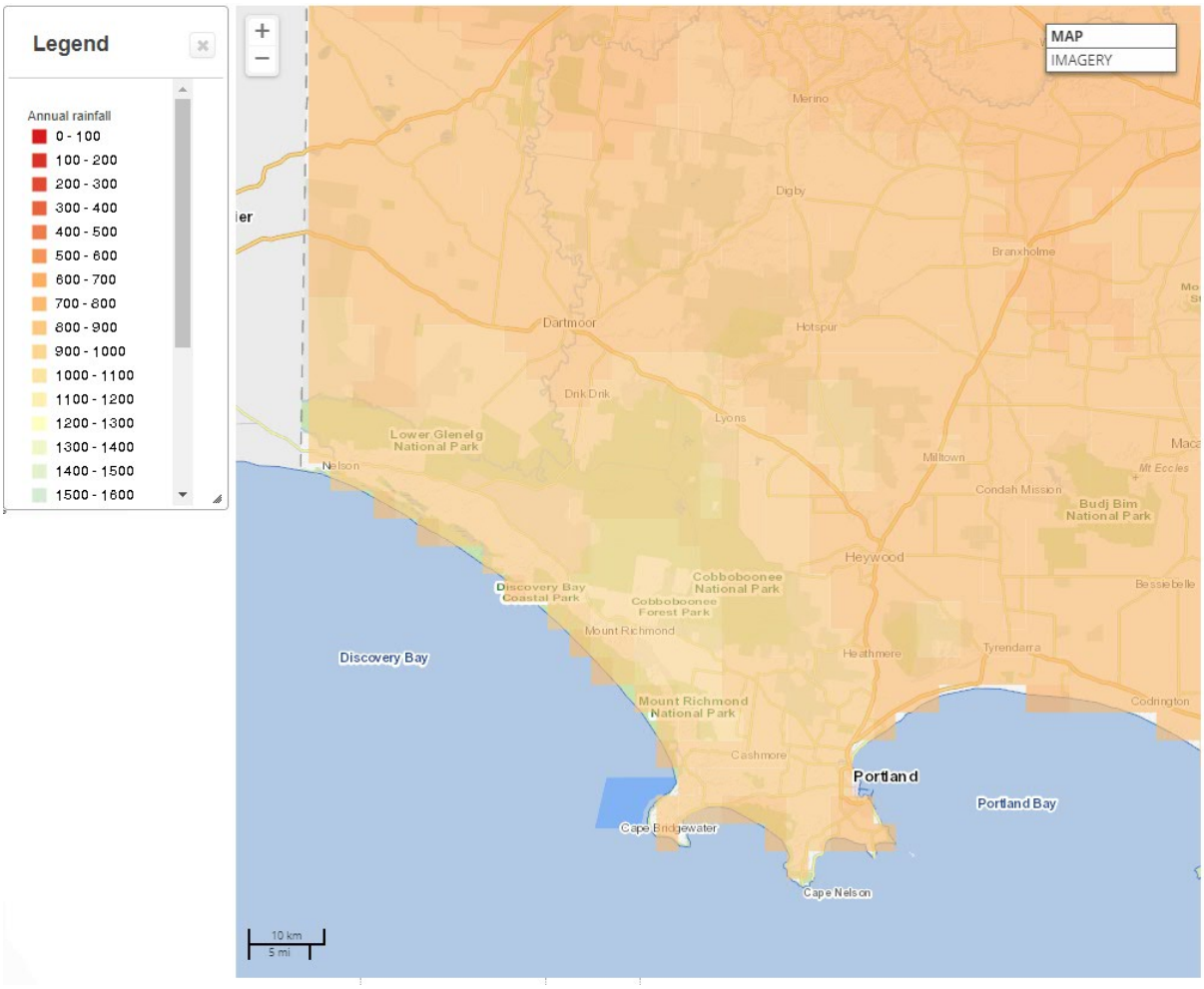

Figure 4 – Rainfall Intensity Data for the local region (Water Watch Victoria, 2019)

3.4 Existing Flood Risk

Flood information available indicates that the proposed project site is not located within a 1% AEP flood extent (Department of Environment, Land, Water & Planning, 2018). Available existing 1% AEP flood extents for the region are shown in **Appendix B**.

Appendix B shows:

- The proposed project site is not located within a 1% AEP flood extent
- The proposed underground transmission option crosses under the 1% AEP flood extent for the Surrey River

4.0 Groundwater and Geological Conditions

The project site is located within the Glenelg groundwater catchment, which forms part of the Otway Basin in Western Victoria. The basin is substantially thick (greater than 1,000 m) and spatially, extends from onshore to offshore beneath the Bass Strait. A generalised stratigraphy as described in a groundwater resource report for the area was obtained from the Department of Environment, Land, Water and Planning (DELWP), is provided below:

Stratigraphy	Depth Below Surface (m)	Groundwater Salinity (mg/L)	Groundwater Management Unit (GMU)
Quaternary Aquifer – sand, gravels, clay, silts	0 – 7	501 – 1000	Glenelg Water Supply Protection Area
Upper Mid-Tertiary Aquifer – limestone, sand, gravel, clay, minor coal	7 – 256	501-1000	
Upper Mid Tertiary Aquitard – clay, silt marl, minor sand	256 – 259	Unknown	
Lower Mid Tertiary Aquitard – clay, silt, siltstone, marl, minor sand	259 – 289	Unknown	
Lower Tertiary Aquifer – sand, gravel, clay, silt, minor coal	289 – 1380	501 -1000	
Cretaceous and Permian Sediments – sandstone, mudstone, siltstone, sand and minor coal	1380 – 3074	Unknown	
Mesozoic and Paleozoic Bedrock	3074 - 3274	1001-3500	

As shown in **Appendix E**, Surface geology in the region consists of a Quaternary deposition associated with coastal dunes, beach sands, swamp deposits and some near shore marine deposits. At the site, the geology comprises predominantly Pleistocene aeolian dune deposits, with some Holocene coastal and inland dunes with minor swamp deposits; and extrusive basalts, scoria and ash to the southeast of the site.

The surface geology is host to the water table aquifer (Quaternary Aquifer) as described in the table above. Depth to water below the ground surface across the site was predominantly less than 10 metres below ground level, with minor variations due to changes in topography. Water level data from the SOBs 65058, 101246 and 101241 (bores shown in **Appendix G**) indicated that water levels in these bores were generally constant between and were not affected by seasonal changes by greater than one metre.

Salinity measured by total dissolved solids information was downloaded from the Spatial Datamart maintained by DELWP. As shown in **Appendix F,** the results indicate the water table salinity of the unconfined aquifer to be between 500 and 1,000 mg/L. This classifies the water quality as Segment A1 – A2 of the SEPP Waters (Groundwater) guidelines and that water quality is good in the area.

A search for registered groundwater users located in the map extent of **Appendix F** was undertaken on 21 March 2018 using the Water Measurement Information System (WMIS) maintained by DELWP. A total of 330 registered groundwater bores were located within the map extent of the site. Domestic, stock or irrigation bores comprised 258 bores, with two of the bores classified as commercial use, 13 as state observation bores maintained by DELWP and 57 classified as miscellaneous, non-groundwater or unknown purposes.

Of those, a total of 20 bores were located within the Inclusion Zone extent of the site, with ten bores classified for domestic, stock or irrigation, three state observation bores (SOBs) and seven bores classified as miscellaneous or unknown use. Registered bore depths, as shown in **Appendix F** suggests that most registered bores in the area are utilising the shallow aquifer system (Quaternary Aquifer / Upper Mid-Tertiary Aquifer).

5.0 Water Supply

Within the Glenelg Hopkins catchment region, there are three main agencies that work collaboratively to manage the water resources. They are Southern Rural Water, Wannon Water and Glenelg Hopkins Catchment Management Authority (GHCMA). Each of them has different role and each offers their customers different services.

Southern Rural Water

- Assesses license applications for the construction of new farm dams and bores
- Manages and monitors new and existing groundwater and surface water licenses
- Assesses and manages temporary and permanent water transfers.

Wannon Water

- Manages the collection and storage of water
- Filtration and/or disinfection and delivery of water
- The collection and treatment of wastewater.

Glenelg Hopkins CMA

- Implements the regional catchment strategies
- Monitors and reports on the health of the catchment
- Promotes community awareness of catchment issues
- Provides advice and recommendations to the government.

Referring to the data available from Wannon Water, most of the water supplies for the region are sourced from Rocklands Reservoir, Tullich Borefield, Konongwootong Reservoir and Dilwyn Aquifer. (Wannon Water, 2019)

5.1 Water Supply for Construction

Based on the publically available data available there are not any readily available water sources nearby the proposed site. Below are a options which can be considered. Necessary permits would need to be obtained from relevant authority:

- To locate and pump from the nearest river or creek
- To locate and pump from the nearest bore
- To locate and tap from the nearest water main.

Given the scale of the project site and depending on the approach, it is likely approvals are required from all three authorities for the water supply required for the construction.

6.0 Design Consideration

The design of the proposed Green Power Hub should consider the following for hydrology and surface water:

- Access roads: existing access roads within the plantation should be used wherever possible and any new access roads to wind turbines and Green Power Hub infrastructure should avoid existing local overland flow paths where possible. If new access roads are proposed to cross existing overland flow paths this will need to be considered and mitigation measures implemented to maintain existing surface water conditions.
- Hardstand areas: new hardstand areas proposed to support new wind turbines and Green Power Hub infrastructure should be place outside of existing overland flow paths. If hardstand

areas are of a considerable size the additional surface water runoff from these areas may need to be managed appropriately through mitigation measures.

- Critical infrastructure: critical infrastructure for the Green Power Hub should be built above the AEP flood level, with freeboard, as required by the relevant planning authority. Critical infrastructure should be placed outside of any local overland flow paths where possible.
- Turbine foundations: designing of turbine foundations, and any foundations for Green Power Hub infrastructure, should consider the depth to ground water.
- Presence of Acid Sulphate soils: design of any infrastructure should consider the presence of Acid Sulphate soils. If Acid Sulphate soils are disturbed and exposed to air oxidation can occur producing Sulphuric Acid. This acid can acidify waterways, wetlands and estuaries and cause harm or kill the local flora and fauna. It can also impact concrete and steel, slowly destroying infrastructure.

7.0 Mitigation Measures

7.1 During Construction

7.1.1 Flood Risk

The proposed project should consider the following where applicable:

- Design temporary access roads on grade to allow surface water flows across the site and retain existing flow paths
- Reinstate the drainage system if it is impacted during construction
- Ensure upstream and downstream boundaries are suitably graded with the construction site surfaces/platform level
- To construct temporary on-site storage and conveyance structures where necessary to control the runoff from construction sites
- As the proposed windfarm site is located next to a Ramsar site and within the commercial forestry of Radiata Pine, there may be a requirement to construct a temporary sediment basin to control the quality of surface water runoff. This basin will need to be maintained during construction
- Regular inspections and clean up the relevant supporting infrastructure after major storms.

7.1.2 Water Quality

For the proposed Green Power Hub, the construction activities from groundwork to construction of the wind turbine, it may present a risk to surface water contamination if not effectively managed. To manage this risk, the following measures should be considered where applicable,

- Ensure construction activities are effectively managed by best practice pollution prevention strategies in accordance with EPA publications *480 Environmental Guidelines for Major Construction Sites and 275, Construction Techniques for Sediment Pollution Control*
- Minimise the extent of disturbed areas and reinstate as soon as possible
- Obtain the necessary works on waterways permit from the Glenelg Hopkins Catchment Management Authority (GHCMA) and other relevant authority
- Minimise works in waterways, only work in waterways when dry and reinstate ground quickly following completion
- Employ sediment control fences downstream of work areas
- Construct sediment basins to collect silty runoff and allow sediment to settle out prior to discharging (consider the use of flocculants where appropriate) and to ensure that sediment is removed and disposed accordingly if the design capacity is reduced by the sediment build up.

7.2 Permanent Works

7.2.1 Flood Risk

While the proposed wind farm will not greatly alter the overall land use of the existing area, and will not have a significant impact on the catchment characteristics i.e. imperviousness, to reduce the risk of flooding as a result if the works the design should consider the following where applicable:

- Critical infrastructure be built above the AEP flood level, with freeboard, as required by the relevant planning authority Design of access roads on grade to retain existing flow paths
- The designing of culverts for waterway crossings should limit afflux and not increase water levels on neighbouring properties, subject to the requirements of the relevant approval authority
- To have on-site storage and conveyance structures if/as required (e.g. ditches to manage runoff from access roads, rainwater harvesting on the control room)
- If the proposed drainage is connecting to any existing assets (e.g. irrigation storage ponds and channels), regular assessments are required for their integrity and ongoing safety and to upgrade them if necessary
- Regular inspections and clean up the relevant supporting infrastructure after major storms.

7.2.2 Water Quality

It is anticipated that the proposed wind farm will result in a reduced risk of surface water contamination once the site has been re-established after the construction phase. However, to manage this risk, the project should consider and include the following where applicable:

- Maintain all pollution control measures until the site is fully re-vegetated
- Road drainage infrastructure such as table drains should be designed to minimise velocities and prevent scour
- Regular inspections and clean up the relevant supporting infrastructure after major storms.

8.0 References

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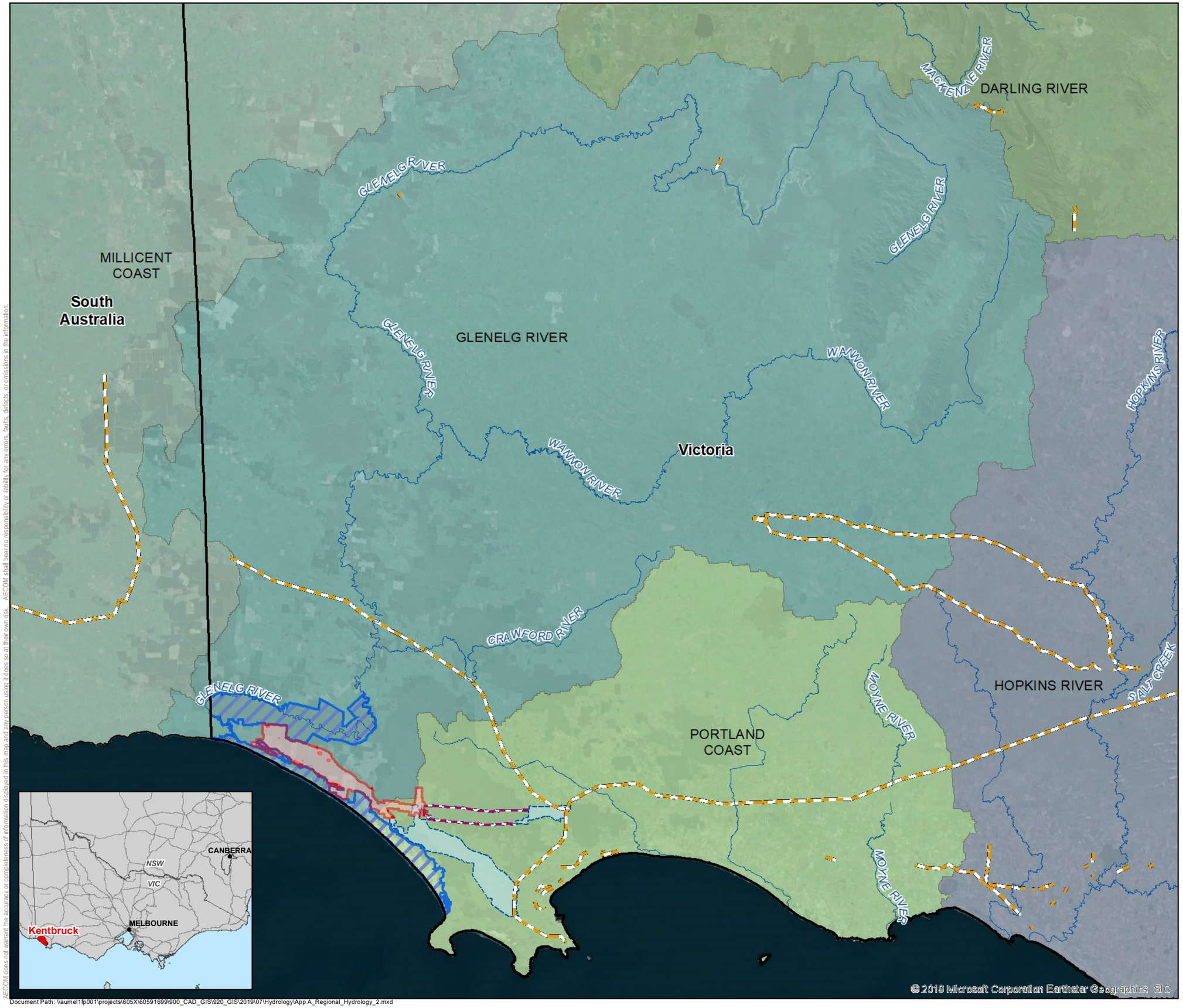
9.0 Appendix



NEOEN Boundless Energy

AECOM

DATUM GDA94 VICGRID94

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Kilometers

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Legend

- Indicative Wind Farm Site Boundary
- Work Exclusion Area
- Overhead Line Development Envelope
- RAMSAR Gleneg Estuary and DIscovery Bay
- Underground Line Option
- Existing 500 kV transmission line

Basin

- DARLING RIVER
- GLENELG RIVER
- HOPKINS RIVER
- MILLICENT COAST
- OTWAY COAST
- PORTLAND COAST

Data Sources:
1. Locality, Railway, Drainage Line, Streets, Features © StreetPro 2014
2. State Controlled Roads © (VICMAP) 2018
3. Essential Habitat © (VICMAP) 2018
4. Conservation Areas © (VICMAP) 2018
5. Protected Area © (VICMAP) 2018
6. Regional Ecosystems v8 © (VICMAP) 2018
7. Protected Plants Flore Survey Trigger © (VICMAP) 2018
8. Waterway Barrier Works© (VICMAP) 2018

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Preliminary Hydrology Assessment
Kentbruck Green Power Hub

REGIONAL HYDROLOGY

PROJECT #:	60578607
CREATED BY:	JB
LAST MODIFIED:	brierej: 17/07/2019
VERSION:	1

Appendix A

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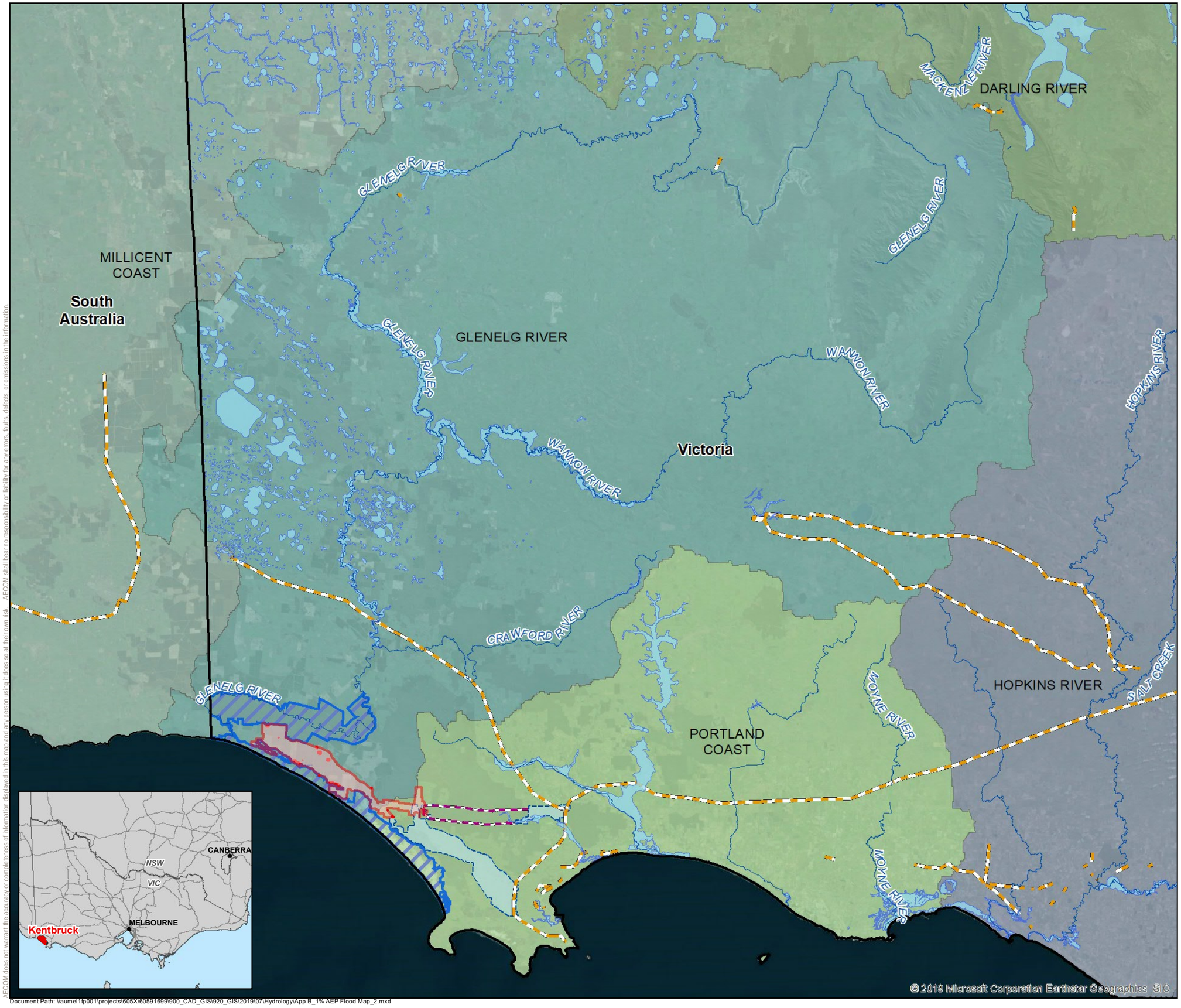

NEOEN Boundless Energy

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DATUM GDA94 VICGRID94

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Kilometers

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Legend

- Indicative Wind Farm Site Boundary
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- HOPKINS RIVER
- MILLICENT COAST
- OTWAY COAST
- PORTLAND COAST

1% AEP Flood Map

- 1% AEP Flood Map

Data Sources:
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Preliminary Hydrology Assessment
Kentbruck Green Power Hub

1% AEP FLOOD MAP

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CREATED BY:	JB
LAST MODIFIED:	brierej: 17/07/2019
VERSION:	1

Appendix B

A3 size

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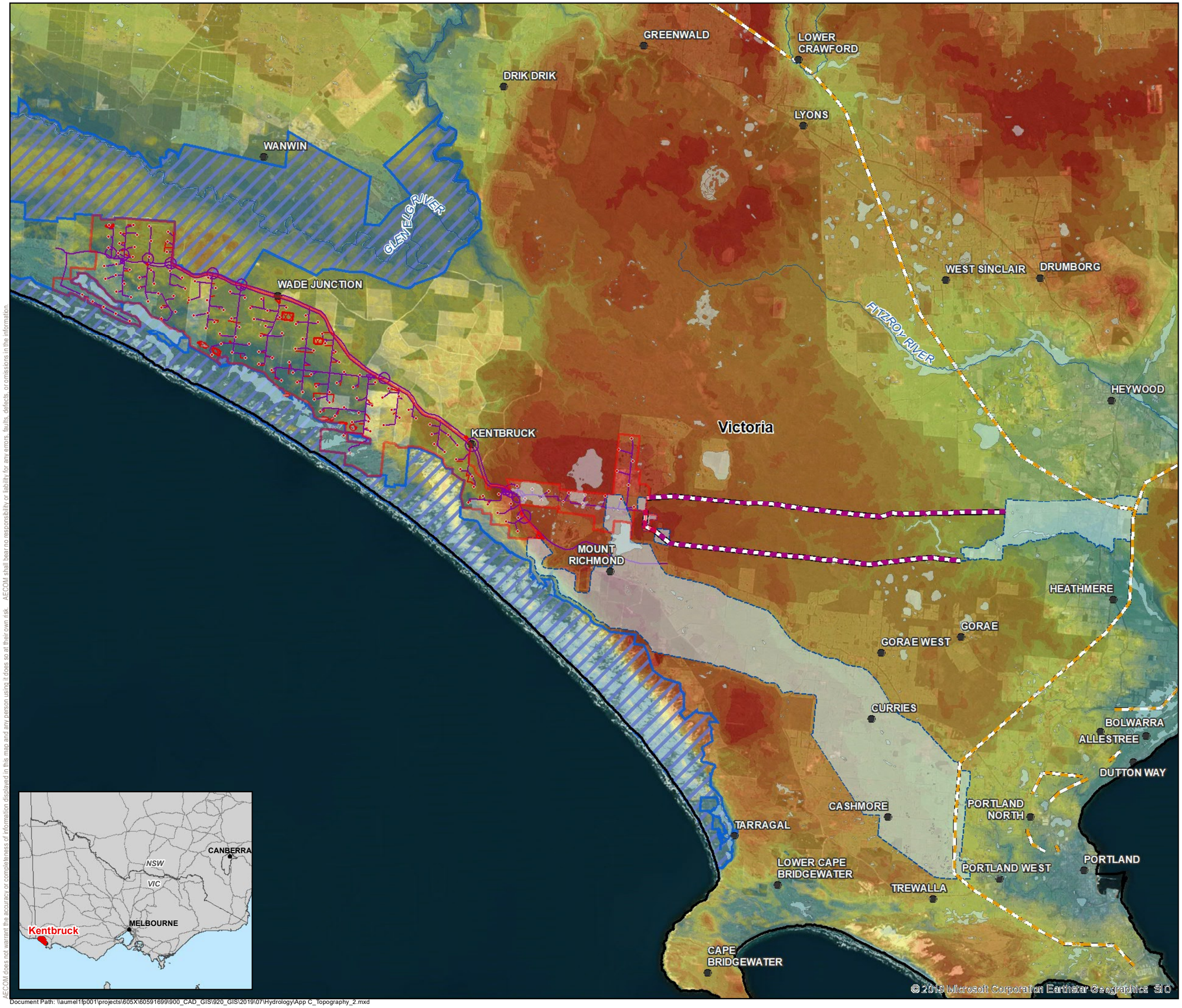

NEOEN BOUNDLESS ENERGY

AECOM

DATUM GDA94 VICGRID94

0 3.5 7

Kilometers

1:175,000 (when printed at A3)

Legend

- Indicative Wind Farm Site Boundary
- Work Exclusion Area
- Overhead Line Development Envelope
- RAMSAR Gleneg Estuary and DIscovery Bay
- Access Roads
- Wind Tower Access
- Wind Turbines
- Underground Line Option
- Existing 500 kV transmission line

DTM 20m

- 0 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 50
- 50 - 60
- 60 - 80
- 80 - 100
- 100 - 120
- 120 - 140
- 140 - 160

Data Sources:
1. Locality, Railway, Drainage Line, Streets, Features © StreetPro 2014
2. State Controlled Roads © (VICMAP) 2018
3. Essential Habitat © (VICMAP) 2018
4. Conservation Areas © (VICMAP) 2018
5. Protected Area © (VICMAP) 2018
6. Regional Ecosystems v8 © (VICMAP) 2018
7. Protected Plants Flore Survey Trigger © (VICMAP) 2018
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Kentbruck Green Power Hub

TOPOGRAPHY

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CREATED BY:	JB
LAST MODIFIED:	brierej: 17/07/2019
VERSION:	1

Appendix C

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NEOEN BOUNDLESS ENERGY

AECOM

DATUM GDA94 VICGRID94

0 3.5 7

Kilometers

1:175,000 (when printed at A3)

Legend

- Indicative Wind Farm Site Boundary
- Work Exclusion Area
- Overhead Line Development Envelope
- RAMSAR Gleneg Estuary and DIscovery Bay
- Bore
- Farm Dam Location
- Spring
- Access Roads
- Wind Tower Access
- Wind Turbines
- Underground Line Option
- Existing 500 kV transmission line

Basin

- GLENELG RIVER
- PORTLAND COAST

1% AEP Flood Map

- 1% AEP Flood

Preliminary Hydrology Assessment
Kentbruck Green Power Hub

HYDRO POINTS LOCATION

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Appendix D1

A3 size

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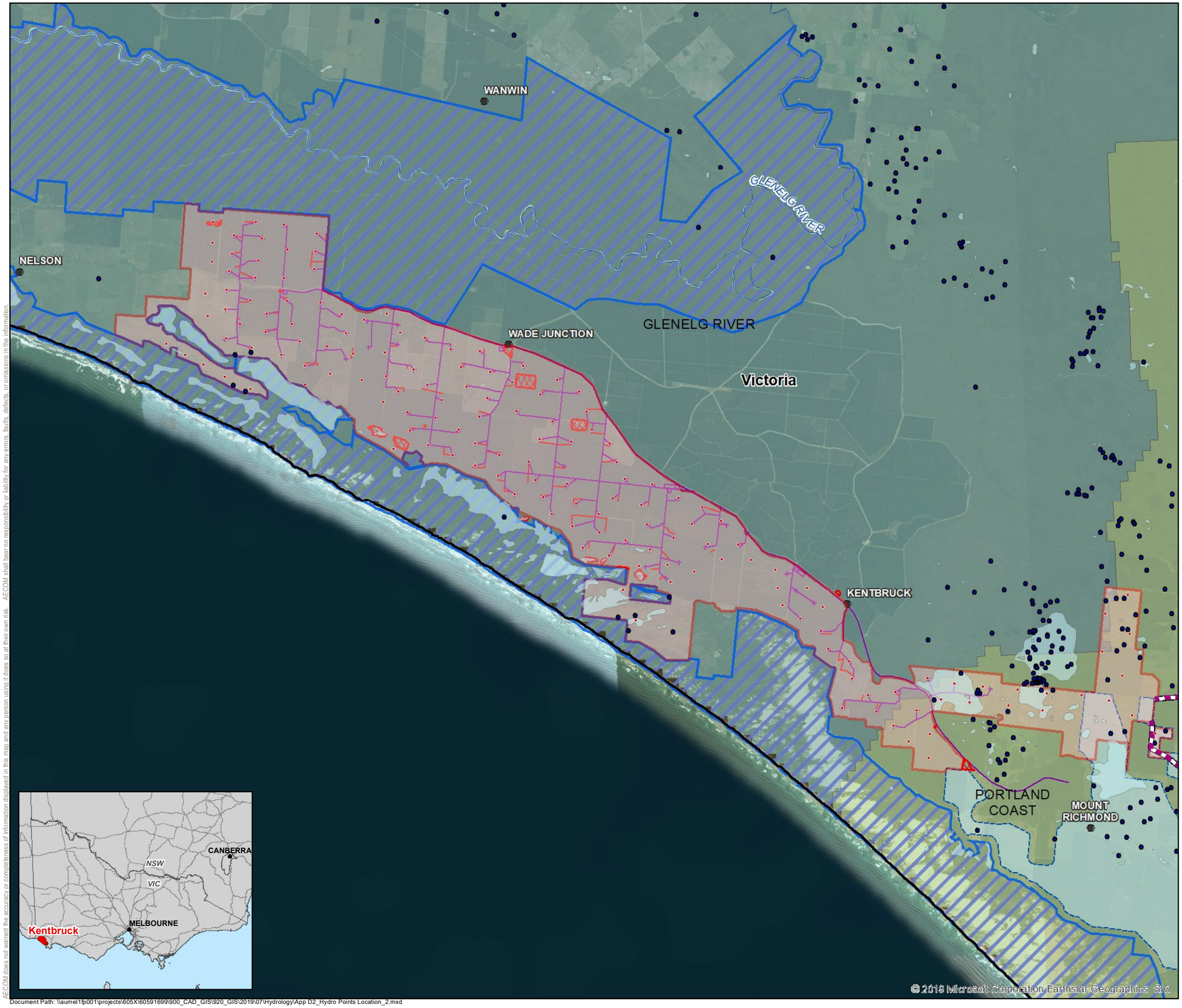

NEOEN BOUNDLESS ENERGY

AECOM

DATUM GDA94 VICGRID94

0 2 4

Kilometers

1:100,000 (when printed at A3)

Legend

- Indicative Wind Farm Site Boundary
- Work Exclusion Area
- Overhead Line Development Envelope
- RAMSAR Gleneg Estuary and DIscovery Bay
- Farm Dam Location
- Wind Tower Access
- Access Roads
- Wind Turbines
- Underground Line Option

Basin

- GLENELG RIVER
- PORTLAND COAST

Data Sources:
1. Locality, Railway, Drainage Line, Streets, Features © StreetPro 2014
2. State Controlled Roads © (VICMAP) 2018
3. Essential Habitat © (VICMAP) 2018
4. Conservation Areas © (VICMAP) 2018
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HYDRO POINTS LOCATION (ZOOMED IN)

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Appendix D2

A3 size

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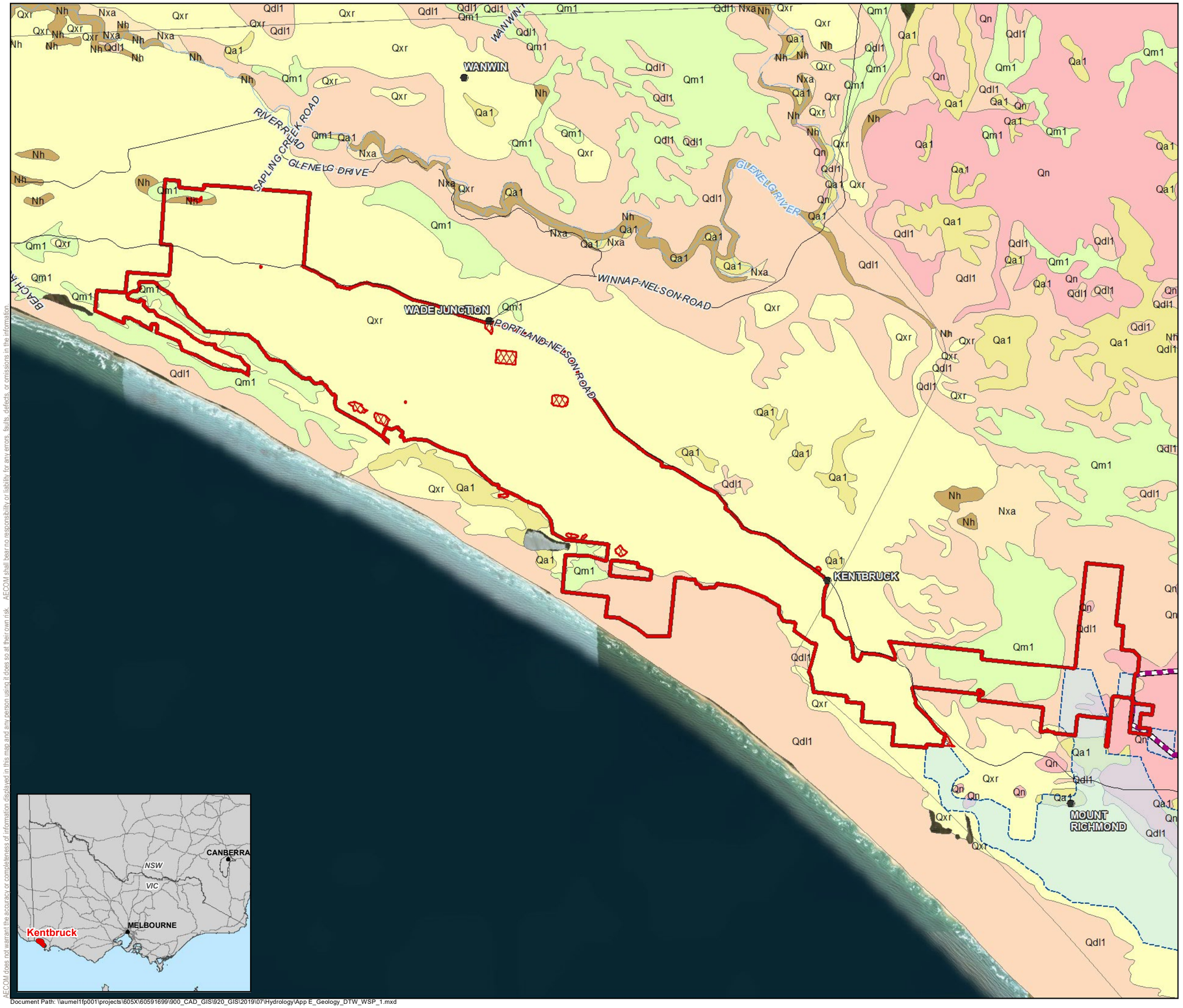

NEOEN BOUNDLESS ENERGY

AECOM

DATUM GDA94 VICGRID94

0 2 4

Kilometers

1:100,000 (when printed at A3)

Legend

- Indicative Wind Farm Site Boundary
- Work Exclusion Area
- Overhead Line Development Envelope
- Town
- Underground Line Option
- Roads
- Watercourses

Geology

- Nh: Neogene (Miocene): Marine calcarenite,marl, silt
- Nxa: Quaternary (Pleistocene) Coastal: sandy limestone, calcarenite, shell beds, marl
- Qa1: Quaternary (Holocene) Fluvial: alluvium, gravel, sand, silt
- Qdl1: Quaternary (Holocene), Aeolian: coastal and inland dunes: dune sand, some swamp deposits
- Qm1: Quaternary (Holocene), Aeolian and littoral: coastal and inland dunes: dune sand, some swamp deposits, beach sand
- Qn: Quaternary (Holocene), Extrusive: tholeiitic to alkaline basalts, minor scoria and ash
- Qxr: Quaternary (Pleistocene), Aeolian, dune deposits: calcarenite

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GEOLOGY

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Appendix E

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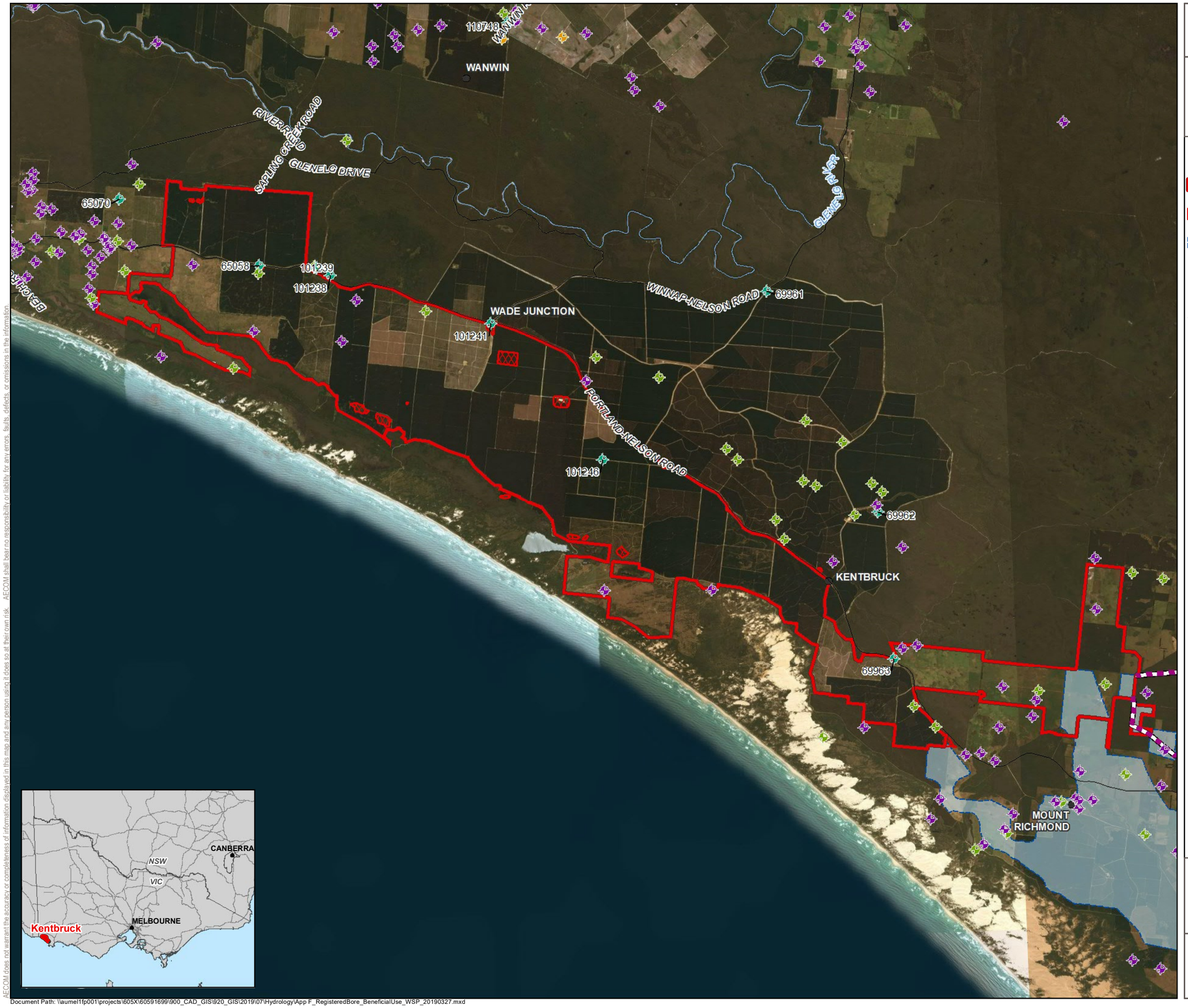

NEOEN BOUNDLESS ENERGY

AECOM

DATUM GDA94 VICGRID94

0 2 4

Kilometers

1:100,000 (when printed at A3)

Legend

- Indicative Wind Farm Site Boundary
- Work Exclusion Area
- Overhead Line Development Envelope
- Town
- Underground Line Option
- Roads
- Watercourses

Bore Use

- DOMESTIC, STOCK, IRRIGATION
- STATE OBSERVATION NETWORK
- MISCELLANEOUS, UNKNOWN
- NON GROUNDWATER

Data Sources:
1. Locality, Railway, Drainage Line, Streets, Features © StreetPro 2014
2. State Controlled Roads © (VICMAP) 2018
3. Essential Habitat © (VICMAP) 2018
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REGISTERED GROUNDWATER BORE USERS AND BENEFICIAL USES

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VERSION:	1

Appendix F

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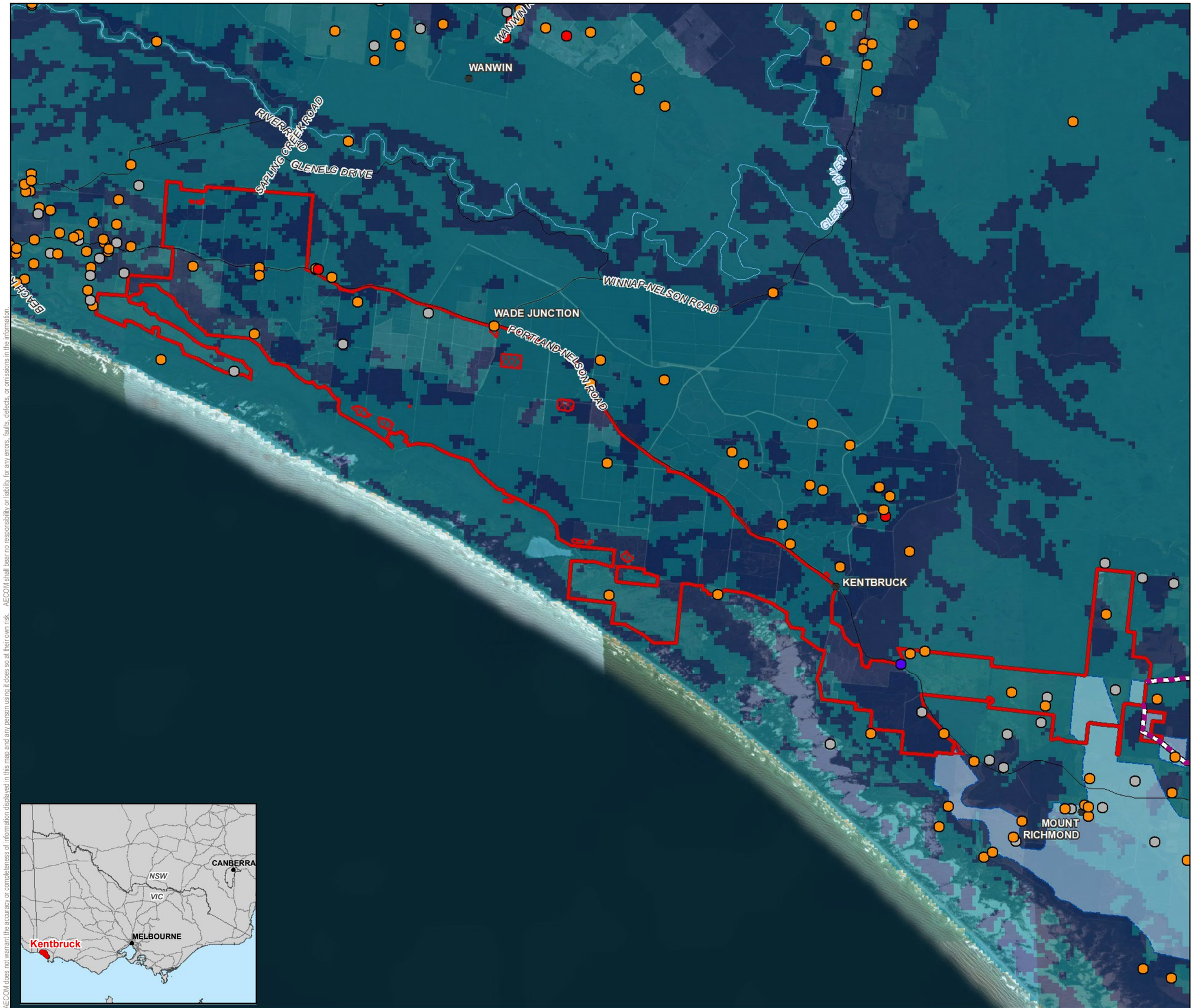

NEOEN BOUNDLESS ENERGY

AECOM

DATUM GDA94 VICGRID94

0 2 4

Kilometers

1:100,000 (when printed at A3)

Legend

- Inclusion Zones
- Work Exclusion Area
- Overhead Line Development Envelope
- Town
- Underground Line Option
- Roads
- Watercourses

Bore Depth (m)

- 0 - 10
- 11 - 150
- 291 - 1350
- 1351 - 3000

Depth to Groundwater (m bgs)

- 0 - 9.99
- > 10

Data Sources:
1. Locality, Railway, Drainage Line, Streets, Features © StreetPro 2014
2. State Controlled Roads © (VICMAP) 2018
3. Essential Habitat © (VICMAP) 2018
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DEPTH TO GROUNDWATER

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Appendix G

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