ATTACHMENT 4 LANDSCAPE MEMO

PRELIMINARY LANDSCAPE AND VISUAL IMPACT APPRAISAL MEMO

High Sea Wind

1 PURPOSE

This memorandum identifies preliminary landscape and visual impact considerations associated with the project. Relevant planning policies and planning controls have been identified together with an overview of technical parameters.

This desktop based preliminary appraisal has been prepared by RPS to accompany environmental referrals. It does not constitute a full assessment of landscape and visual impacts from the project.

Due to the significant distance offshore of the proposed wind turbines (i.e., from approximately 76 kilometres), and visual acuity limitations of human vision, seascape character has not been appraised at this preliminary stage.

2 ONSHORE INVESTIGATION AREA

The onshore transmission infrastructure will be contained within an easement of around 100 metres wide. An area of investigation is under consideration for the underground cable route to connect the project to the VicGrid onshore connection hub. The areas of investigation are shown in Figure 3-1. The area of investigation surrounds the Darriman H29 Bushland Reserve, which is excluded from consideration. The coastline comprises part of Ninety Mile Beach and is designated as wildlife reserve or coastal reserve land. This includes the Jack Smith Lake Wildlife Reserve and McLoughlins Beach – Seaspray Coastal Reserve. Beyond the referral area, large areas of marine and coastal park are located to the south-west, including Corner Inlet and Wilsons Promontory, and north-east, the Ninety Mile Beach Marine National Park.

3 PLANNING CONTEXT

The onshore components of the project are subject to planning policies, controls and provisions of the Wellington Planning Scheme. The Planning Policy Framework (PPF) provides the key policy influences for Wellington Shire Council at state, regional and local levels.

Planning policy and controls provide a high-level basis to assess landscape character and visual impact sensitivity along with the preservation and enhancement of landscape values and visual amenity. Clause 12 specifically relates to Environmental and Landscape Values and provides applicable policy considerations in relation to river corridors, lakes, waterways and wetlands together with coastal and rural landscapes. Other PPF clauses would be appraised as part of a full landscape and visual impact assessment (LVIA) for the Project, where required for approvals under the *Planning and Environment Act 1987* (Vic).

Planning controls applicable to the onshore investigation area are summarised as follows in Sections 3.1 and 3.2.

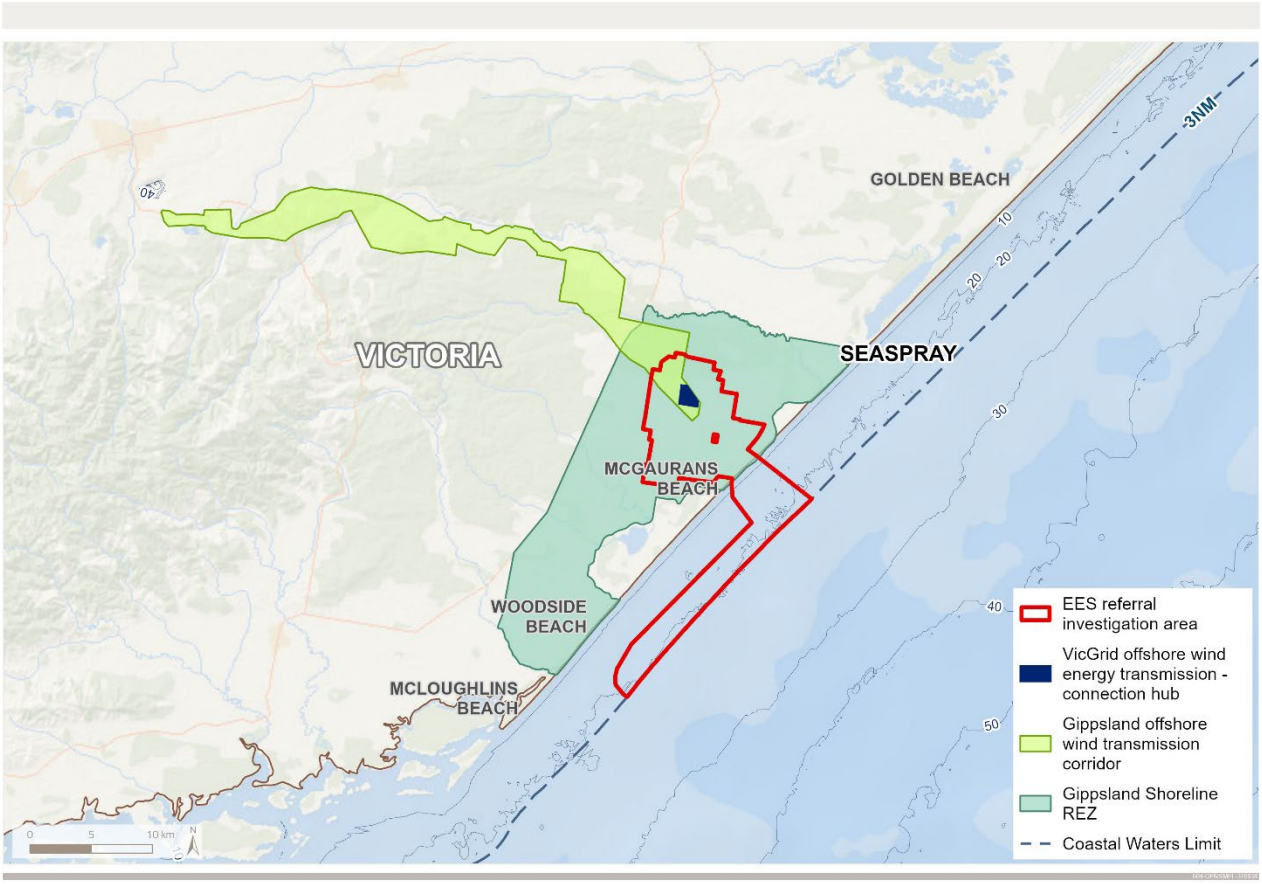


Figure 3-1 Areas of investigation

3.1 Zoning

Land within the investigation area comprises the following zones:

- **Farming Zone Schedule 1**: this is the predominant zone in the investigation area.
- **Public Conservation and Resource Zone (PCRZ)**: the PCRZ seeks to protect and manage land with significant environmental or resource values and recognise areas for public recreation and open space including along the coastline and Ninety Mile Beach Marine National Park.
- **Public Use Zone (Service and Utility) (PUZ1)**: applicable to a small area adjacent to the coastline, it is our understanding that this is Gippsland Water's saline water outfall pipeline.
- **Transport Zone (TRZ3)**: applicable to significant municipal road(s).

3.2 Overlays

Land within the area of investigation comprises the following overlays:

- **Environmental Significance Overlay - Schedule 1 (ESO1)**: relates to coastal and Gippsland Lakes environs in Wellington. ESO1 seeks to protect highly sensitive coastal and estuarine environments. A key objective of the ESO1 is to protect and enhance the visual amenity and landscape of the coastal area.
- **Environmental Significance Overlay - Schedule 2 (ESO2)**: relates to wetlands. The primary objective is to protect and enhance the ecological, habitat, aesthetic, scientific, floristic, faunal, cultural, educational, and recreation values of wetlands through the control of development.

- **Floodway Overlay (FO)**: applies to waterways, major flood paths, drainage depressions and high hazard areas which have the greatest risk and frequency of being affected by flooding.
- **Specific Controls Overlay – Schedule 2 (SCO2)**: applies specifically to the Basslink project with specific reference to the Basslink Land Use and Development Controls (2002). Basslink is an electricity interconnector comprising a 370 kilometer HVDC cable linking Victoria and Tasmania. It facilitates a 500MW bi-directional flow of electricity.

Upon finalisation of the land transmission corridor, specific planning permit requirements under the Wellington Planning Scheme will be confirmed.

4 PRELIMINARY OFFSHORE VISUAL APPRAISAL

This preliminary assessment represents an initial screening of impacts based on the widely adopted landscape and visual impact assessment in the *Guidelines for Landscape & Visual Impact Assessment (2013) (GLVIA3)* prepared by *The Landscape Institute* and the *Institute of Environmental Management & Assessment*, UK.

Typically, the definition of a study area for a landscape and visual impact assessment would include the site area along with a broader landscape and visual catchment in the surrounding area. The study area essentially represents the physical locations where a development may be visible. Given the relatively narrow subterranean onshore transmission corridor for the project, the study area for preliminary purposes is the onshore area of investigation determined by a zone of theoretical influence (ZTVI).

A ZTVI (refer Section 4.2.4) is typically used to define the area from which the development could be visible without reference to existing buildings, structures and vegetation that may partially or fully screen views. A ZTVI plan is prepared using Geographical Information Systems (GIS) software and elevation data within a Digital Terrain Model (DTM). A ZTVI will indicate at a high level the areas within the investigation area that may be visually affected by the development; the extent of which is determined by subsequent desktop and on-site appraisal.

The use of photomontages is a standard visualisation technique used to illustrate as constructed and/or potential changes to a view and therefore visual amenity. Similarly, changes to baseline landscape character can also be depicted via the production of photomontages. At this preliminary stage, photomontages have not been prepared.

4.1 Landscape

Landscape is generally considered to be the relationship between people and place. It can be simply defined as all the visible features of an area of land. Landscape impacts relate to the general capacity of the physical landscape (refer baseline conditions) to absorb or accommodate changes of the nature and scale presented.

Landscape sensitivity is often referred to as the extent to which a landscape can accept a change of a particular type and scale without an unacceptable adverse impact on its character. In general, the greater the extent of prior modifications, the lesser its sensitivity to change. Landscape value is a key element in determining significance of impacts and the need for any mitigation measures or treatments.

4.2 Visual parameters and considerations

Visual impacts relate to the effects of change from a development on the views available to people and their visual amenity. Visual amenity is generally considered to be the degree of pleasantness with the content and character of views. A change or loss in visual amenity occurs due to changes to an existing landscape either via the removal of elements or the addition of elements.

A visual impact assessment for designated viewpoints provides a largely qualitative appraisal of the specific receptors with a focus on sensitive receptors such as residential dwellings and public open space. The purpose for which a viewer uses a place or space also forms part of the assessment.

Potential visual impacts are generally influenced by the following:

- The visibility of either the development and/or works
- The distance of the viewer

- The landscape and viewer sensitivity
- The number of viewers.

Designated viewpoints have not been identified at this preliminary referral stage, noting that the onshore transmission infrastructure will be primarily located underground.

4.2.1 Visual Conditions

GLVIA3 (para. 8.15) and NatureScot, previously Scottish Natural Heritage (SNH), guidance (NatureScot, 2017) refer to the use of Met Office visibility data to assess typical visibility conditions within an area.

Although there are limitations to how this data can be applied to judgements about windfarm visibility, the visibility data provides some understanding and evidence basis for evaluating the actual visibility of the turbines against the horizon/background.

The Met Office defines the different ranges of visibility, stating “visibility measures the distance at which an object can be clearly seen”. The Met Office defines a visibility index as follows:

- Very poor visibility – Less than 1 kilometres;
- Poor visibility – 1 – 4 kilometres;
- Moderate visibility – 4 – 10 kilometres;
- Good visibility – 10 – 20 kilometres;
- Very good visibility – 20 – 40 kilometres; and
- Excellent visibility – Greater than 40 kilometres.

The common/average prevailing weather conditions of any given site differs drastically even across relatively small distances, a thorough understanding of said conditions needs to be assessed to determine the mean visibility distance.

4.2.2 Field of view

The Horizontal Field of View (‘HFoV’) represents a central cone of vision or field of view with a horizontal angle of 50 degrees is close to what the human eye perceives in any view, with our binocular vision limited to approximately 120° (Panero J, 1979)

The systematic consideration of visual impact should be undertaken having regard to the visual parameters and limitations from *Human Dimension and Interior Space* (Panero J, 1979), as illustrated in Figure 4-1 and Figure 4-2.

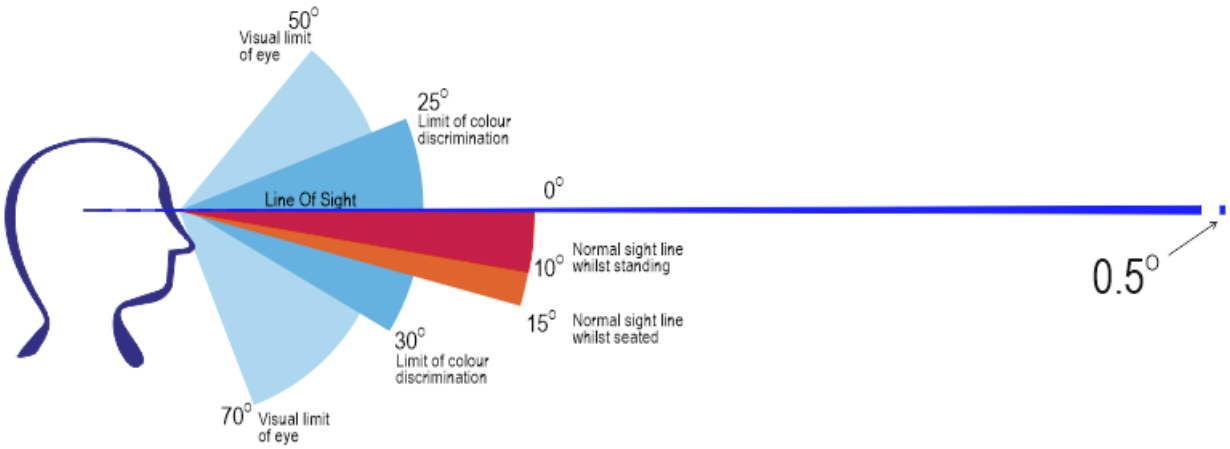


Figure 4-1 Vertical Visual Parameters (Panero J, 1979)

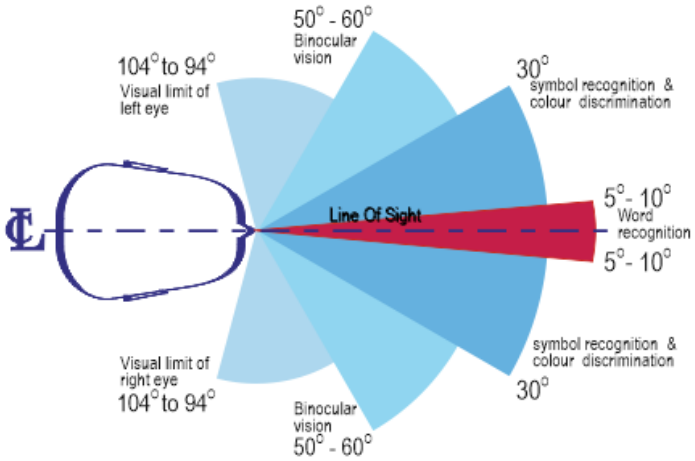


Figure 4-2 Horizontal Visual Parameters (Panero J, 1979)

Human Dimension and Interior Space source book (1979) breaks this down even further and specifies that word recognition is limited to 10° either side of the central line of sight, symbol recognition is limited to between 5° and 30° and colour discrimination is limited to between 30° and 60°.

Beyond the 120° limit of binocular vision to between 180° and 208° is monocular vision, which 'causes objects to appear unclear and diffused' (Panero J, 1979). While a full 180° range may lack clarity and depth of colour beyond 120°, the principle of movement mentioned in the *Guidance on the Assessment of the Impact of Offshore Wind Farms* (DTI, 2005) notes that *our eye tends to stop at points in the view that contain unusual objects, high contrasts, or movement, particularly…along the horizon.* At significant distances, '*visibility modifiers, such as atmospheric interference, would have a more significant effect'* (White, 2019) on visual acuity than the earth's curvature.

Conventional practice in Victoria assumes that any object which occupies less than 5% of the human eye's vertical field of view (equivalent to 1 degree) is unlikely to result in an unacceptably high visual impact, due to the relatively small proportion of the total field of view it would occupy.

Due to the siting High Sea Wind from approximately 76 kilometres from the coastline, seaward visual limit would be negligible beyond approximately 65 kilometres applying a formula of on average 2.9 metres of vertical loss per kilometre for an observer at sea level (as presented in Table 4-1). This is based the *Guidance on the Assessment of the Impact of Offshore Wind Farms* report (DTI, 2005) and the Visual Representation of Wind Farms: Guidance (NatureScot, 2017)

Table 4-1 Vertical distance correction - (NatureScot, 2017) (DTI, 2005)

Distance	Vertical correction for Earth curvature and atmospheric refraction*	
	Turbine Height	Turbine Component
5 km	343m	• Tower, Nacelle and rotor blades clearly visibile, as well as any ephemeral water craft
10 km	339m	• Tower, Nacelle and rotor blades clearly visibile
15 km	330m	• Tower and rotor blades
20 km	329m	• Tower and rotor blades
25 km	305m	• Assuming Very Good visibility • Tower and rotor blades (breaking the horizon)
30 km	285m	• Assuming Very Good visibility • Tower and rotor blades (breaking the horizon)
35 km	265m	• Assuming Excellent visibility • Tower and rotor blades (breaking the horizon)
40 km	240m	• Assuming Excellent visibility

Distance	Vertical correction for Earth curvature and atmospheric refraction*	
	Turbine Height	Turbine Component
		• Tower and rotor blades (breaking the horizon)
45 km	212m	• Assuming Excellent visibility and perfect constrasting conditions • Tower and rotor blades (breaking the horizon)
50 km	180m	• Assuming Excellent visibility and perfect constrasting conditions • Nacelle, Top of tower and rotor blades
55 km	135m	• Assuming Excellent visibility and perfect constrasting conditions • Most of rotor blades (movement along the horizon)
60 km	97m	• Assuming Excellent visibility and perfect constrasting conditions • Half of rotor blades (movement along the horizon)
65km	38m	• Beyond the visual acuity of the eye in any conditions
65+km	0m	• Non-visible

Based on a 345m Hub Height and 310m rotor diameter and a 1.7m height observer standing on the beach (sea level). Note that the formula for calculating vertical correction also takes into account a variable light refraction coefficient

Due to the significant distance offshore of the proposed wind turbines (from approximately 76 kilometres), and visual acuity limitations, impacts on seascape character are not deemed significant and have not been appraised at this preliminary stage.

4.2.3 Other visibility conditions and influences

A SLVIA assesses a study area which is defined based on a 'worst case scenario' approach where the proposed study area is the bounded extent of visually influenced onshore land. Due to the ephemeral nature of any landscape and the constant shifting of variable factors, a bounded, onshore area of visual impact is seldom the sum total of potentially affected land. The factors that can influence this shifting degree of visual impact are:

- Constant factors:
  - Curvature of the earth (at sea level curvature of the earth becomes a significant factor at or beyond a distance of approximately 30 kilometres);
  - Object characteristics (including colour, contrast, texture, form and size);
  - Human visual acuity;
  - Viewer elevation (extends the visibility distance); and
  - Distance of the viewed object.
- Variable factors:
  - Refraction;
  - Atmospheric or aerial perspective;
  - Weather and atmospheric conditions (air clarity; the background cloud cover; haze can reduce contrast even at distances within the range of visibility; summer days have the lowest visibility and winter nights have the highest);
  - Direction of the sun in relation to the turbines; and
  - Degree of available screening.

Visibility distance is (in this case) the most influential factor determining the visibility of a turbine, however other influential factors such as the degree, direction and elevation of sunlight, the background cloud cover, and haze which can alter contrast even at distances within the range of visibility. These factors do not operate independently, and contrast cannot be therefore assessed by the analysis of visibility distance alone. Objects located at sea are influenced by a range of visibility factors; A unique feature of a seascape is its variability. The most important variables in determining the character of the sea are wind, light, tidal movements and the clarity or otherwise of the atmosphere.

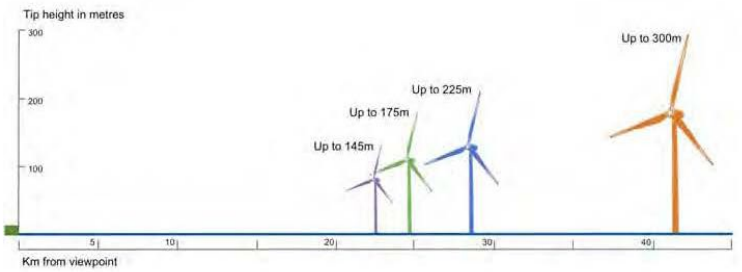
4.2.4 Zone of Theoretical Influence

To better understand (at a high level) the potential impacts from the project infrastructure on onshore viewsheds, a ZTVI (Figure 4-3) has been generated. The ZTVI was generated in May 2026 based a set of key overarching data points pertaining to the project infrastructure outlined in Table 4-2.

One of the key purposes of the ZTVI is to define the SLVIA study area which directly corresponds to the upper limits of visual acuity. NatureScot, previously Scottish Natural Heritage, guidance suggests a 45 kilometre study area for wind turbines over 150 metres in height (blade tip height) (NatureScot, 2017). White et al (2019) subsequently developed a set a ratio of 1:133 between turbine height and distance from a viewpoint to notionally affect a low magnitude of impact (not taking into consideration any other factors such as cumulative impact and height of the receiver above low astronomical tide), as illustrated in Graph 1 and Graph 2.

Based on this accepted methodology for defining a study area, the proposed design specification for the project turbines (350 metre blade tip height) would dictate a study area offset from the boundary of the site by at least 45.5 kilometres. Further desktop investigation of potentially sensitive onshore receptors may extend this offset to capture onshore viewsheds and surrounding onshore influences on said viewpoint's sensitivity.

Graph 1 Distances at which average low magnitude of visual effect occurs for different heights of turbine (White, et al, 2019)



Graph 2 Distances at which average medium magnitude of visual effect occurs for different heights of turbine (White et al, 2019)

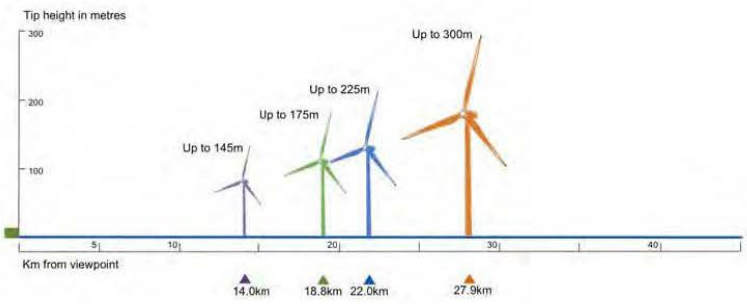


Table 4-2 Configuration for generation of ZTVI

Item	Configuration
Base Topographical Data	• DataVic 3 second/85m resolution elevation contours
Eye height	• 1.8m from ground level as determined by the DEM
Receptor height	• 345m blade tip height • 190m hub height
Maximum radius of assessment from each base point	• 200km/200,000m

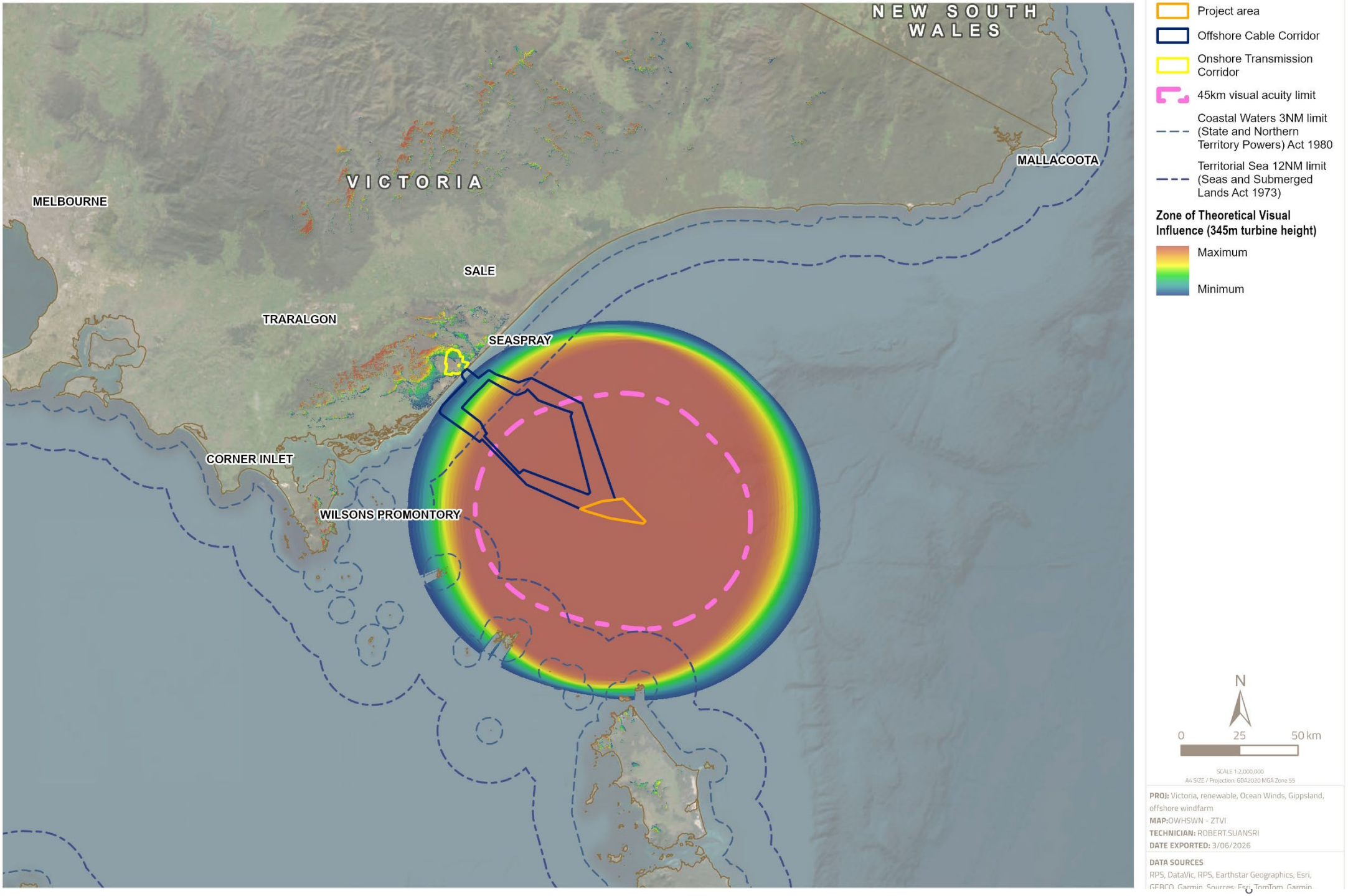


Figure 4-3 Preliminary ZTVI

4.2.4.1 ZTVI Limitations

Limitations applicable to the development of the ZTVI included:

- Elevation data used was the best available open source;
- Turbine height was projected from the site boundary as the actual turbine layout is unknown;
- The analysis was based on a modelled Digital Elevation Model (DEM) and therefore does not consider surface obstructions such
- as vegetation, buildings, and other barriers; and
- A 85 metre DEM resolution was used for analysis due to the large area under assessment.

5 PRELIMINARY ONSHORE VISUAL APPRAISAL

Proposed onshore works would likely result in insignificant landscape and visual impacts. Overall, the magnitude, form, and colour composition of these works, given the largely subterranean nature of the infrastructure, is anticipated to be minimal. In effect, a low contrast element for viewers in the prevailing coastal and rural landscape.

The sensitivity of visual receivers generally should take account of the nature of the use, occupation or activity of people experiencing the view at particular locations and the extent to which their attention or interest is focussed on views within and surrounding the project works.

Since the onshore transmission is proposed to be underground, the most significant landscape and visual impacts would likely be temporary in nature and confined to the construction phase of the onshore infrastructure. The adopted construction would determine the overall scale of the temporary impacts. This includes the onshore construction footprint and activities such as site preparation works, construction of project elements and ancillary facilities. Additional vehicle movements in the construction area would also temporarily affect landscape character, with increased traffic and the presence of heavy vehicles and machinery.

5.1 Ninety Mile Beach

Landscape sensitivity is generally greater where there is a more natural, undisturbed setting. Consistent with other offshore wind projects in Gippsland, it is expected that the most sensitive onshore environment would be the coastal landscape, including primary and secondary dunes. It is a linear landscape with a combination of sandy beaches, low dunes, peninsulas, and wetlands is set against the wild seas of Bass Strait. It is visually of State significance, and planning controls in the Wellington Planning Scheme (particularly ESO1) are structured to protect and manage land with significant environmental or resource values including along the coastline and Ninety Mile Beach Marine National Park.

Construction methodology will be the primary mitigation treatment in the Ninety Mile Beach environs. Utilising trenchless construction would largely avoid direct landscape and visual impacts on this significant coastal landscape.

5.2 Agricultural land

Views of the project construction works may be possible from agricultural land. The visual effects will however be temporary and their extent dependent on the distance from sensitive receivers (e.g., dwellings). Individual landowners in the area of investigation may be potentially impacted by temporary construction works, albeit that viewshed considerations including topography and vegetation coverage may help to mitigate or moderate visual impacts.

The sensitivity of visual impacts is generally deemed to be less for those employed or carrying out work in rural areas compared to potential views from residential dwellings. Other sensitive receivers have not been identified in the area of investigation.

5.3 Dwellings

Dwellings are deemed to be sensitive receptors for impact assessment purposes. At this preliminary stage, the exact number and distribution of dwellings in the area of investigation are unknown but likely to be minimal based on aerial imagery.

The potential visual impact for dwelling occupants would depend on the extent of the setback and nature of construction work for the onshore component of the project. Visual impacts would be more significant at locations where residential or other sensitive receivers have an unscreened view of the project site. Since the onshore transmission is proposed to be underground, permanent visual impacts are not anticipated.

5.4 Road users

The rural based area of investigation contains predominantly local roads and private property access. Anticipated visibility and duration of impacted views for road users during the construction phase of the Project would be limited and temporary. Transient visual impacts in this context are likely to be relatively minor with limited viewership and sensitivity.

6 SUMMARY

This memorandum identifies preliminary landscape and visual impact considerations associated with the project. Relevant planning policies and planning controls have been identified together with an overview of key technical parameters for an assessment.

Due to the largely subterranean nature of the onshore infrastructure and works, the most significant landscape and visual impacts would likely be temporary in nature and confined to the construction phase. The adopted construction methodology would be the key determinant in the location, duration and scale of the temporary impacts.

The offshore turbines are to be sited in Commonwealth waters approximately from 76 kilometers from the coastline. Due to the significant distance offshore, human visual acuity limitations, and the effects of the earth’s curvature, project impacts on seascape character in Bass Strait are unlikely to be significant and as a consequence, have not been addressed at this preliminary stage.

7 REFERENCES

DTI Guidance on the Assessment of the Impact of Offshore Wind Farm: Seascape and Visual Impact Report [Report]. - UK : Department of Trade and Industry, 2005.

NatureScot Visual Representation of Wind Farms: Guidance [Report]. - [s.l.] : NatureScot, 2017.

Panero J Zelnik M Human Dimension and Interior Space: A source book of design reference standards [Report]. - New York : Watson-Guptill Publications, 1979.

White S, Michaels, S, King, H Seascape and visual sensitivity to offshore wind farms in Wales: Strategic assessment and guidance. Stage 1 - Ready reconer of visual effects related to turbine size [Report]. - Bangor : Natural Resources Wales, 2019.