

KAIMAI WIND FARM

Assessment of Environmental Effects

Executive Summary

This report forms an assessment of environmental effects pursuant to the Fourth Schedule of the Resource Management Act, 1991 (RMA). It is presented in support of an application by Kaimai Wind Farm Ltd for resource consents to enable a proposed wind farm project located along the north-western extents of the Kaimai Ranges in the Waikato Region of New Zealand's North Island. The assessment has been informed by numerous technical assessments undertaken by experts in their respective fields, commensurate with the significance of this wind farm scheme, and in respect of both the construction and operational phases of the Project.

Kaimai Wind Farm Ltd requests that the applications be publicly notified.

The Project revolves around the establishment of 24 large scale wind turbines up to 207m high, designed through an iterative process over several years across a Site comprising 771 and 604 Rotokohu Road and 6356 State Highway 26 – with a combined site area of 1304 hectares. Ancillary structures and works are also required, including of a new 110kV sub-station with two new lattice transmission towers, two internal 33kV overhead lines, 18.9km of internal roading network, 24 turbine platforms, 3 component laydown areas, replacement of 8 existing culverts along the existing farm access track, and an underground cable network between the turbines. A comprehensive mitigation package is also proposed, including ecological, visual, cultural, traffic and landscape measures. These will be refined through the consent process, and in response to ongoing consultation with all stakeholders, building on the extensive consultation undertaken to date that has informed the overall proposal.

The Project requires land use consents for discretionary activities and a non-complying activity from the Hauraki District Council under its District Plan for one discrete aspect. In chief, renewable energy generation activities are a Discretionary Activity in the rural zone under rule 7.4.5.5(D1). Other associated activities for which consent is needed include ancillary electrical structures, earthworks, and minor traffic matters. The discrete non-complying activity aspect is a technical infringement associated with works in the High Voltage Transmission Corridor – and an activity that would likely always be required for a renewable energy generation project. This component is sought on an un-bundled basis, and with the primary elements (being the development and operation of the wind farm itself) sought as a discretionary activity. Resource consents are also required in tandem from the Waikato Regional Council under its Regional Plan, again as discretionary activities, and specific to proposed upgrades to existing in-stream culverts, earthworks, and associated discharges to land and water.

The assessment of environmental effects concludes that on balance, and in light of the findings, conclusions and recommendations from the various technical assessments, the Kaimai Wind Farm has been designed, and can be constructed and operated in a manner that will appropriately avoid, remedy or mitigate adverse effects on the environment. Overall, the Site is considered to be an appropriate location for a wind farm, particularly given the immediate proximity to the National Grid and the accessibility of a strong wind resource, the rural zoning and pastoral land use, available noise buffer separation distances from residential dwellings, and a lack of designated ecological or landscape values within the Site.

That being said, it is recognised that the potential adverse effects from the Project cannot be avoided, remedied or mitigated in their entirety. The adverse impacts on landscape character and values and visual amenity in this area have the potential to be high, as do effects on the cultural landscape valued by tangata whenua. In this regard, the Kaimai Wind Farm has evolved through an iterative design process – seeking to address often conflicting values, and the proposal now represents an appropriate and balanced outcome in terms of effects on visibility and the surrounding landscape and character, particularly when assessed in the context of the national direction provided by the NPS-REG.

The statutory assessment of the Project is founded on the discretionary activity status under both the HDP and WRP. The assessment addresses matters that the consent authority must have regard to when considering an application for a resource consent, including: the *National Policy Statement for Renewable Energy Generation, 2011* (NPS-REG), *Waikato Regional Policy Statement, Waikato Regional Plan, Waikato Regional Energy Strategy, Hauraki District Plan*, and the *Zero Carbon Bill*. Overall, the Project is generally consistent with, and not contrary to, the objectives and associated policies throughout these relevant national, regional and district planning documents. Moreover, numerous objectives and policies throughout the relevant documents recognise the need to develop renewable electricity generation infrastructure, including at significant scale and the need for such infrastructure to be located where the resource exists. There is also clear policy recognition that the development of renewable electricity generation activities responds to technical, functional and locational constraints that must be considered in determining the appropriateness of a site for development.

Overall, the assessment presented through this report and its attachments establishes that the proposed Kaimai Wind Farm achieves an appropriate balance in terms of its location and site design, and the actual and potential adverse effects from the Project can be appropriately mitigated or offset. Finally, the Project addresses the growing need for renewable energy generation and is in synergy with the statutory framework of relevance to this consent application.

In that regard, and as to the promotion of the sustainable management purpose of RMA, the NPS-REG is of paramount importance to recognising renewable energy as a matter of national significance in its own right, and is the only national planning instrument of direct relevance to the Project, giving national direction as to how the Part 2 principles should be applied in assessing it.

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B	Technical Reports
C	Miscellaneous Drawings
D	Civil Drawings
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Document Control

<i>Client</i>	Kaimai Wind Farm Limited
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<i>Reviewed/approved by</i>	Jack Turner (Director)

Abbreviations and Definitions

Report reference	Definition and meaning in the context of this report
Constructor	Refers to a to-be appointed lead contractor for the construction works
CVA	Cultural Values Assessment
dB	Decibel
DoC	Department of Conservation
HDC	Hauraki District Council
HDP	Hauraki District Plan, 26 September 2014
HFSP	Hazardous Facilities Screening Procedure
Hub	That component of a wind turbine which connects the rotor blades to the main shaft and ultimately to the rest of the drive train.
Kaimai Wind Farm	Refers to the Project itself
kV	Kilovolts, a measure of the electric potential difference or electromotive force, commonly known as voltage.
KWF	Refers to Kaimai Wind Farm Limited as the applicant for the project.
L _{A90}	The noise level exceeded for 90% of the measurement period, A-weighted and calculated by Statistical Analysis.
L _{Aeq}	A-weighted, equivalent sound level. A widely used noise parameter describing a sound level with the same Energy content as the varying acoustic signal measured.
MW	Megawatt, a unit of power
Nacelle	A cover housing that houses all of the generating components in a wind turbine, including the generator, gearbox, drive train, and brake assembly.
National Grid	The nationwide system of electric power transmission in New Zealand.
NPS-REG	National Policy Statement for Renewable Energy Generation, 2011

Report reference	Definition and meaning in the context of this report
NZ	New Zealand
NZAA	New Zealand Archaeological Association
ONF	Outstanding Natural Feature, as defined through the Hauraki District Plan
ONFL	Outstanding Natural Features and Landscapes (ONFL) of regional significance, as defined through the Regional Policy Statement
ONL	Outstanding Natural Landscape, as defined through the Hauraki District Plan
Project	Refers to the Kaimai Wind Farm Project in its entirety
Rotor blades	The propeller-like blades mounted to the hub of a wind turbine that capture the wind resource.
RMA	Resource Management Act, 1991
RPS	Regional Policy Statement, and specifically the Operative Waikato Regional Policy Statement (20 May 2016)
Site	The Project area as described in Section 2 of this report
SNA	Significant Natural Area, as defined through the Hauraki District Plan
TIA	Transportation Impact Assessment
Tower	The <i>tower</i> of a wind turbine carries the nacelle and the rotor.
Transpower	The State-Owned Enterprise that owns and operates the National Grid – or high voltage transmission network – that carries electricity around the country
Ventus	Ventus Energy (NZ) Limited, parent company of KWF (Kaimai Wind Farm Ltd)
WRC	Waikato Regional Council
WRP	Waikato Regional Plan, April 2012

Limitations

This report has been prepared for the sole benefit of our client, Kaimai Wind Farm Limited, and must not be relied on or used out of context by any other person or organisation without the express permission of Tektus Consultants Limited.

1 Introduction

This report forms an assessment of environmental effects pursuant to the Fourth Schedule of the Resource Management Act 1991. It is presented in support of an application by Kaimai Wind Farm Limited for resource consents to enable a proposed wind farm project located along the north-western extents of the Kaimai Ranges in the Waikato Region of New Zealand's North Island.

1.1 Electricity Market Context

A strong, robust and resilient electricity generation and supply system is essential to sustain social and economic wellbeing. Central government has signalled a net zero carbon emissions policy alongside existing climate change obligations, while both the previous and current governments have also put in place strong drivers for the deployment of electric vehicles. The demand for new housing in the upper north island – particularly Hamilton, Bay of Plenty and Auckland is increasing the residential electricity demand. In contrast, the upper North Island has seen significant reduction in the amount of electricity generation with the removal of a combined 1000 megawatts (MW) of thermal plant – namely Otahuhu, Southdown and half of the Huntly coal plant – representing a reduction of approximately 10% of the total New Zealand grid connected generation capacity. With these and other contributing factors in mind, a sustained effort is needed to implement renewable energy projects in New Zealand (NZ) at scale.

The realistic and available renewable energy technologies, at scale for NZ, are geothermal, solar and wind. Each has their benefits however it is clear that wind energy has the largest potential for deployment throughout NZ as the resource is distributed (unlike geothermal) and the scalability is very good (unlike solar). Both the NZ Government and Transpower acknowledge the importance of promoting wind energy into the NZ generation fleet.

Whilst there are some large wind farm projects already consented in NZ, most of the capacity is not viable due to poor site economics, long distances to the grid network, turbines that are too small and now not available in the market, and with potential for several existing wind farm consents to lapse. There are very few viable sites currently consented and none in the upper North Island. Having generation close to the demand centres, increases efficiency and increases supply security.

1.2 The Application in Essence

Kaimai Wind Farm Ltd (KWF) seeks all necessary resource consents from the Hauraki District Council and Waikato Regional Council for the construction, operation and maintenance of twenty-four (24) large wind turbines (including all associated, and ancillary activities such as sub-station, access roads and overhead line structures) at a site located along the northern end of the Kaimai Ranges. This report and its attachments support applications by KWF for resource consents from the Hauraki District Council and Waikato Regional Council for this, the Kaimai Wind Farm Project. **KWF requests that the applications be publicly notified.**

The Assessment of Environmental Effects (AEE) Report has been prepared to satisfy the requirements of Section 88 of the Resource Management Act 1991 (RMA) and includes: a detailed description of the proposal; an overview of all relevant resource consent requirements; an overview of the receiving environment; an assessment of environmental effects pursuant to the Fourth Schedule of the RMA; and assessments pursuant to Section 104 of the Act. A table outlining compliance with the Fourth Schedule requirements is included as Attachment A6.

The Kaimai Wind Farm Project is a significant undertaking that has progressed through several iterations over more than a decade since investigations for the site commenced in 2005. The Project has advanced through pre-feasibility and feasibility phases now to preliminary design stage, as appropriate for resource consent purposes. The Technical Reports and plans appended to this AEE Report are sufficient to enable an assessment of the effects of the Project by the consent authorities. Assuming resource consents are granted, the Project would then move to a detailed design phase with more specific plans, particularly in relation to the engineering and geotechnical matters, needing to be approved by the consent authorities under consent conditions likely imposed.

The application expressly seeks resource consents for any and all variations or amendments to the plans and information described and appended to this AEE Report, to the extent necessary to enable implementation of the resource consents, assuming granted, upon progression of the Project through the detailed design phase. This is provided any such variations or amendments do not create materially different or additional effects than those assessed, described or illustrated in this AEE and the Technical Reports and plans included within Attachments B to E.

1.3 The Applicant

Kaimai Wind Farm Ltd is a wholly owned subsidiary of Ventus Energy (NZ) Ltd which is in turn owned by Glenn Starr. Mr Starr also owns Ventus Energy Ltd, a company incorporated in the Republic of Ireland which has developed two wind farms in the west of Ireland at 6MW and 24MW. Ventus Energy (NZ) Ltd (Ventus) holds consents for an 11-turbine project on the west coast of the North Island, south of Kawhia Harbour named Taumatotara. Ventus is also active in the development of electric urban buses for the NZ market in collaboration with Times Electric Group (a subsidiary of China Rail and Rolling Stock Company) – a Chinese state-owned manufacturer of electric power trains. One bus is currently operating in Auckland, one in Wellington and ten double deck buses are currently under construction for the Greater Wellington Council contracts. For the Kaimai Wind Farm project, Ventus can be considered as a Green Field developer of an Independent Power Producer (IPP) project. Ventus has no affiliation with the incumbent NZ generation companies, and is not an approved electricity operator under the Electricity Act 1992, nor as such a network utility operator pursuant to s166 of the RMA.

1.4 Application Details

<i>Applicant</i>	Kaimai Wind Farm Limited (KWF)
<i>Contact email address</i>	info@kaimaiwind.nz
<i>Project website</i>	www.kaimaiwind.nz
<i>Site address</i>	604 and 771 Rotokohu Road, Tirohia 3673; and 6356 State Highway 26, Tirohia 3673
<i>Address for service</i>	Tektus Consultants Limited, Attention: Jack Turner PO Box 80212 Green Bay, Auckland 0643
<i>Legal description</i>	Refer to Section 2.2 of this AEE
<i>District Boundary</i>	Hauraki District Council (HDC)
<i>Regional Boundary</i>	Waikato Regional Council (WRC)
<i>District Plan</i>	Hauraki District Plan (HDP), 26 September 2014
<i>Regional Plan</i>	Waikato Regional Plan (WRP), April 2012
<i>Zoning</i>	Rural (HDP Maps 29, 32 and N4)
<i>Overlays (HDP)</i>	Area of Significance to Māori (Rauwharangi Tapu – Urupā (310) and (319)) Heritage Item (Category C) High Voltage Transmission Line (near to turbine 24) Unformed Legal Road Significant Natural Areas (SNAs)
<i>Overlays (WRP)</i>	Areas defined as High Erosion Risk
<i>Planning Features (adjacent to the site)</i>	HDP: Outstanding Natural Landscape (to north and east of Site), corresponding with the Conservation Indigenous Forest Zone HDP: Outstanding Natural Feature (ONF5) (Mt Karangahake to the north of Site) Regional Policy Statement (RPS): Outstanding Natural Feature and Landscape (ONFL 8), Kaimai Range
<i>Hazards</i>	None identified

2 Site Description

2.1 The Site

The wind farm is proposed within an overall site area of 1304 hectares, located at 771 and 604 Rotokohu Road and at 6356 State Highway 26 – The Site. The Site is modified farmland and comprises the western slopes of the northern end of the Kaimai Ranges, located approximately 5km south of Paeroa and approximately 8km north of Te Aroha. Details of the Site as described in this and subsequent sections of the AEE Report (along with the location of the 24 Turbines) are set out on Figure 1 and Figure 2 below.

Most of the Site is under pasture cover and is managed by grazing stock. There are two dwellings on the Site and other built elements include farm sheds, overhead utility lines, fences and farm tracks. These elements will be retained on the Site. The neighbouring properties in the immediate vicinity are largely rural in nature and include residential dwellings, ancillary farm buildings and general agricultural activities. In addition, the Tirohia quarry is adjacent to the north-western boundary of the Site and a piggery to the south.

The geology of the area is volcanic and the hills are fairly steep and rugged in character. The Kaimai Range at this location rises from a low level of 10m to 500m above sea level at the highest part of the Site. The northern Kaimai Ranges have high levels of visibility from the Hauraki Plains located to the west and the Waihi Basin located to the east. The Site abuts the Kaimai Mamaku Conservation Park, an area of regenerating indigenous broadleaved forest and there is also a large patch of indigenous bush along the southern site boundary on the western slopes. Part of the Kaimai Range is an Outstanding Natural Landscape area (as identified through the HDP and RPS) and the adjacent indigenous vegetative cover provides a habitat for indigenous wildlife.

A major high-tension (110kV) power line on pylons crosses the main Range over the southern corner of the site – this power line forms part of Transpower’s National Grid. The main part of the site on the secondary (and lower elevation) ridge, includes fragments of indigenous bush that are degrading due to agricultural grazing of the understory.

Local Iwi regard the Kaimai Ranges and the adjacent Coromandel Ranges as an important cultural landscape. Important peaks with cultural significance in the area include Karangahake and Mt Te Aroha.

The site is dissected by various stream tributaries including the Waitoki, Romaru, Raeotepapa, Owhakatina which drain to the Waihou River and the Kuaotiti River.

The general area provides various tourism and recreational activities including gliding, trail walking, pig hunting and cycling.

The Site is described in further detail through the technical reports included in Attachment B.



Figure 1. Site Location Map

2.2 Land Ownership

The Site for the proposed wind farm occupies land held by three (3) separate landowners, including the site access. The land areas and site-specific addresses are:

Denize Brothers Ltd	595 Ha [771 Rotokohu Road, Tirohia 3673]
Rotokohu Farms Ltd	594 Ha [604 Rotokohu Road, Tirohia 3673]
M Jackson	115 Ha [6356 State Highway 26, Tirohia 3673]
Total	1304 Ha

Table 1: Legal Description and landowner details for the project site.

Owner	Title
Denize Brothers Limited	77898
Denize Brothers Limited	SA23A/877
Denize Brothers Limited	SA327/297
Denize Brothers Limited	SA333/255
Denize Brothers Limited	SA343/179
Denize Brothers Limited	SA445/233
Denize Brothers Limited	SA445/289
Denize Brothers Limited	SA4B/481
Denize Brothers Limited	SA674/161
Denize Brothers Limited	SA674/162
Denize Brothers Limited	SA683/68
Maureen Jayne Jackson	355146
Rotokohu Farms (2014) Limited	SA1729/44
Rotokohu Farms (2014) Limited	SA1749/2
Rotokohu Farms (2014) Limited	SA18A/1341
Rotokohu Farms (2014) Limited	23A/876
Rotokohu Farms (2014) Limited	SA2A/587
Rotokohu Farms (2014) Limited	SA319/172
Rotokohu Farms (2014) Limited	SA339/161
Rotokohu Farms (2014) Limited	SA351/188
Rotokohu Farms (2014) Limited	SA370/146
Rotokohu Farms (2014) Limited	SA683/179
Rotokohu Farms (2014) Limited	SA684/149

Copies of the certificates of title are included in Attachment A.

3 The Activity

3.1 Site Selection

Ventus Energy (NZ) Ltd (Ventus – owner of Kaimai Wind Farm Ltd) have had an active program of investigating and developing wind farm generation opportunities throughout the upper North Island. Ventus has used both traditional site assessment methods and modelling techniques to identify potential wind farms sites. The investigation of the wind resource at several sites throughout New Zealand has formed the basis for Ventus' consideration in determining general and specific areas that may be viable for the development of utility scale wind farms. This analysis has identified the Kaimai Range area as being the most suitable site in the region for wind farm development.

As part of the selection process for a potential site several technical matters relative to different sites are evaluated. While every potential location for a wind farm has its individual nuances, it is generally accepted that a site which has the collective following attributes will be a suitable candidate for wind generation at a commercial scale:

- Availability of a good wind resource (typically an average annual wind speed greater than 7.5 m/s, ideally associated with low turbulence);
- Availability of land suitable for the construction of turbines;
- Close proximity to locations of high energy demand;
- Suitable distance from large population centres;
- Practical access for transporting equipment and materials to the site;
- Ability to connect to the national grid; and
- Avoidance of sensitive environmental areas.

Kaimai Wind Farm Ltd has considered each of these matters in detail when selecting the Kaimai site as a feasible development project. The main determinant for locating a wind farm in the upper North Island is the distance of a site with viable wind resource to the Transpower network.

TRANSPOWER TRANSMISSION NETWORK : NORTH ISLAND

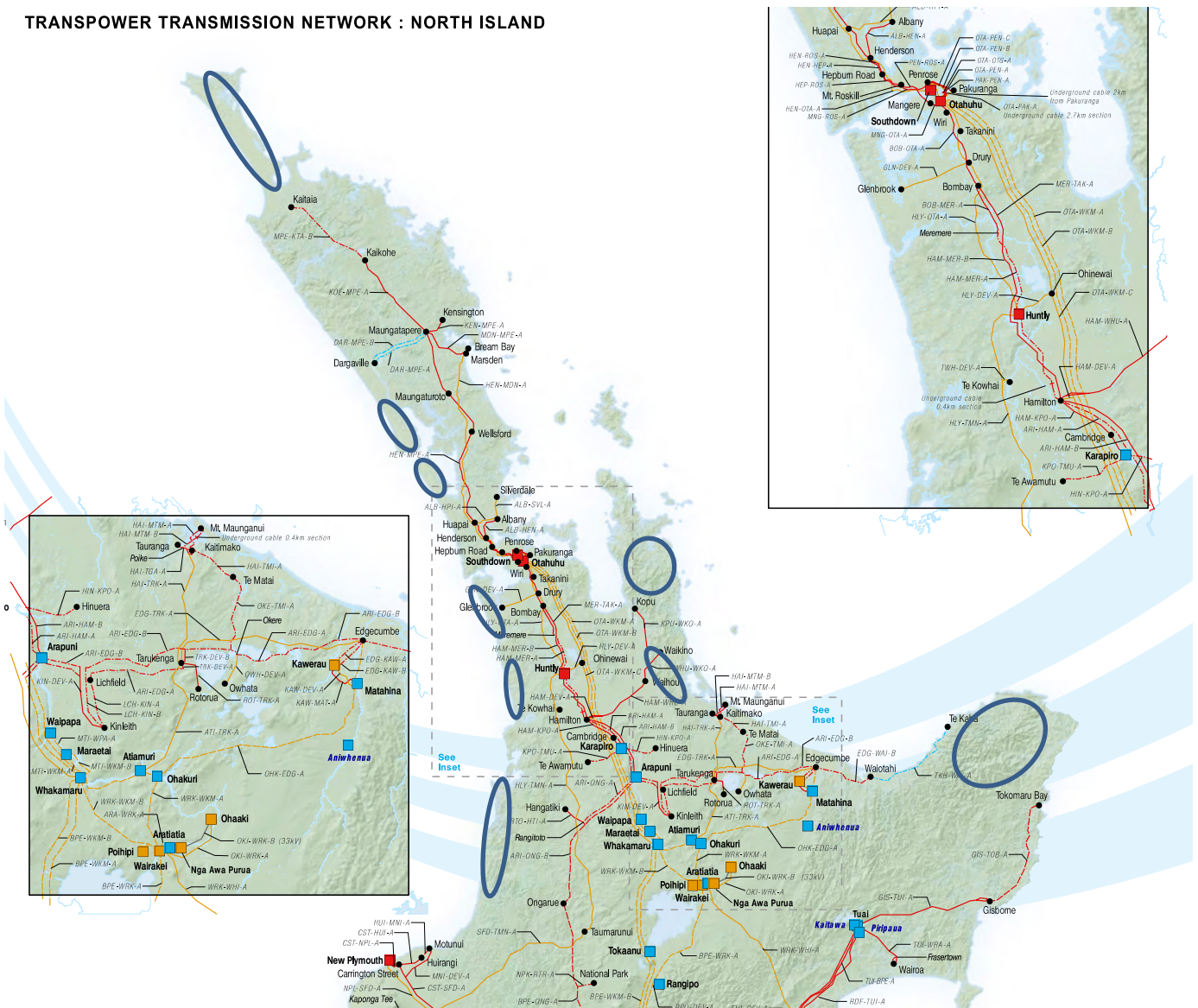


Figure 3. Map showing viable wind resource areas in the upper North Island and National Grid

The locations of viable wind resource are shown by the purple oval shapes, and the Transpower National Grid network is shown by orange and red lines. It is apparent that most good wind resource areas are in coastal environments a long distance from the Transpower network. As a result, to develop any project at scale in the upper North Island requires a supporting grid corridor. This forms three major constraints to successful development:

1. Consenting a transmission corridor
2. Obtaining the legal right to occupy the land
3. The overall grid connection costs typically render even a large-scale wind energy project financially unviable.

The Kaimai Wind Farm Site is unique in the Upper North island as it is the **only viable site** co-incident with a Transpower connection point. The Site has a significant development advantage in this respect, with the Transpower 110kV Line passing directly along the southern boundary.

3.2 Wind Turbines

The wind farm will involve the construction and operation of 24 large wind turbines. Each turbine consists of a supporting tower, nacelle (housing all the generating componentry), hub (connecting the blades to the generating drive train) and rotor blades (the propeller-like blades which capture the wind resource).

Wind turbine economics improve with scale, and wind turbine designs continue to increase in size over time with technology and material advances. The latest round of designs sees turbines routinely delivered at diameters greater than 140m. For context, the largest diameter turbines in NZ are currently 101m, installed as part of the Te Uku wind farm project in Raglan. A major advantage of this increase in scale is that the delivered cost of electricity reduces. The delivered cost is now about half of what it was 8 years ago.

The proposed Kaimai Wind Farm will introduce seven (turbine numbers 18 – 24) 180m high turbines to the main Kaimai Range ridgeline, and seventeen 207m high turbines at the lower elevation ridgeline. The overall height of each turbine is measured to the vertical blade tip, and represents a combination of the tower height, hub diameter and blade length.

It is essential to the project feasibility to allow some flexibility in the turbine configuration as most manufacturers offer variations on hub height and rotor diameter in order to tailor a specific design to a specific site context. Therefore, for the purposes of the consideration of environmental effects, three scenarios for the upper and lower ridges were developed upon which the technical reports were developed, summarised as follows:

- a. Upper Ridge (18-24), three scenarios:
 - i. 112m Hub Height, 136m rotor diameter, 180m tip height
 - ii. 107m Hub Height, 146m rotor diameter, 180m tip height
 - iii. 98m Hub Height, 146m rotor diameter, 171m tip height
- b. Lower Ridge (1-17), three scenarios:
 - i. 132m Hub Height, 150m rotor diameter, 207m tip height
 - ii. 128m Hub Height, 160m rotor diameter, 207m tip height
 - iii. 110m Hub Height, 160m rotor diameter, 190m tip height

Scenario a (ii) and b (ii) presents the overall largest impact and ‘worst case’ in terms of environmental effects, and have been assessed in the Landscape Report (Attachment B12) and in this AEE Report accordingly.

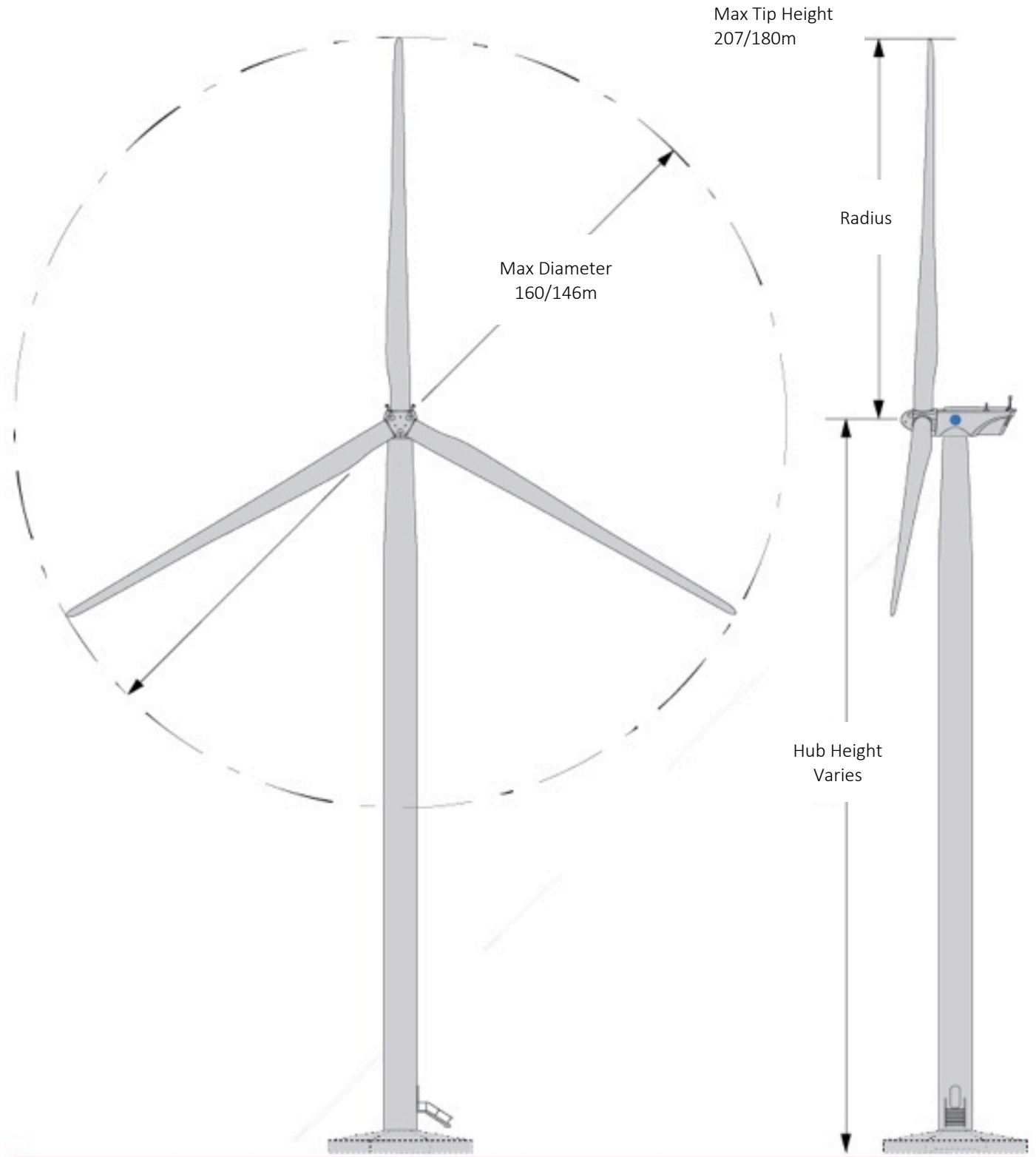


Figure 4. Wind Turbine Schematic

The nacelles of modern wind turbines can differ due to the mechanical arrangement within the nacelle (Figure 5). Some options are shown below:

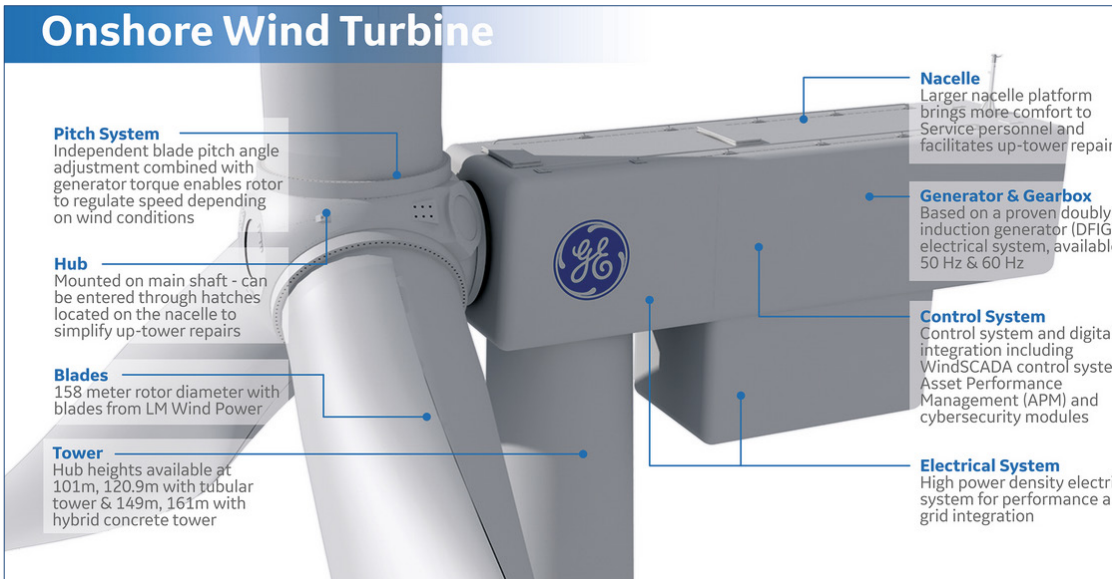


Figure 5. Nacelle Arrangements from General Electric, Siemens-Gamesa and Vestas

3.3 Ancillary Structures and Works

The following ancillary structures and works are required to facilitate the construction, operation and ongoing maintenance of the wind farm:

- Construction of a new 110kV sub-station including two new lattice transmission towers
- Construction of two internal 33kV overhead lines including double pole termination structures
- 18.9km of internal roading network
- Twenty-four (24) turbine platforms including crane pad and (in most cases) turbine component laydown / storage areas
- Three turbine component laydown and construction equipment storage areas
- Replacement of eight existing culverts along the existing farm access track
- Underground cable network to collect the electrical output from each turbine
- Earthworks
- Quarry areas
- Vegetation clearance

3.3.1 Sub-Station and Lattice Transmission Towers

A new sub-station is proposed to be constructed on site that will facilitate connection into the existing 110kV network. In tandem, two new lattice transmission towers will be required to enable this connection to the National Grid, situated adjacent to the sub-station platform area. The sub-station is to be owned by KWF, however the detailed design will be approved by Transpower. Transpower have completed a preliminary report on the connection and proposed three concept options (including identification of the need for two new lattice transmission towers). KWF is now engaged with Transpower on the next design phase.

3.3.2 33kV Overhead Lines

The topography of the site is characterised by three distinct ridgeline areas which has led to the wind farm layout forming three clusters of turbines:

- Turbines 1 to 14,
- 15 to 17, and
- 18 to 24

Rather than install underground cable between these three clusters, it is more efficient to install overhead lines to connect the first two clusters into the proposed sub-station. The overhead lines will be operated at 33kV which forms the normal sub-transmission voltage used in the Hauraki District, e.g. the Paeroa and Mikkelsen Road (Te Aroha) sub-stations.

Typical termination structures for a 33kV overhead line is given in Figure 6 below:

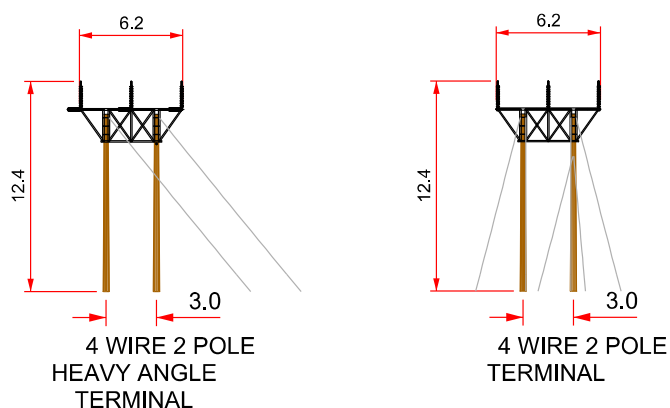


Figure 6. Typical termination structures for a 33kV overhead line with dimensions shown in metres

3.3.3 Road Network

The road network mostly follows existing farm access tracks (except for the access road from Rawhiti Road) and ridgelines where the greatest wind resources exists. A full preliminary civil engineering drawing package is in Attachment D1, which outlines an overall combined road length of 18.9km (including 900m of access road leading into the site). The road is typically 6m wide on straight sections and wider on corners. The surface water drainage is to be managed by cross-fall gradients, roadside collection channels and culverts. Some typical cross sections are copied in Figure 7.

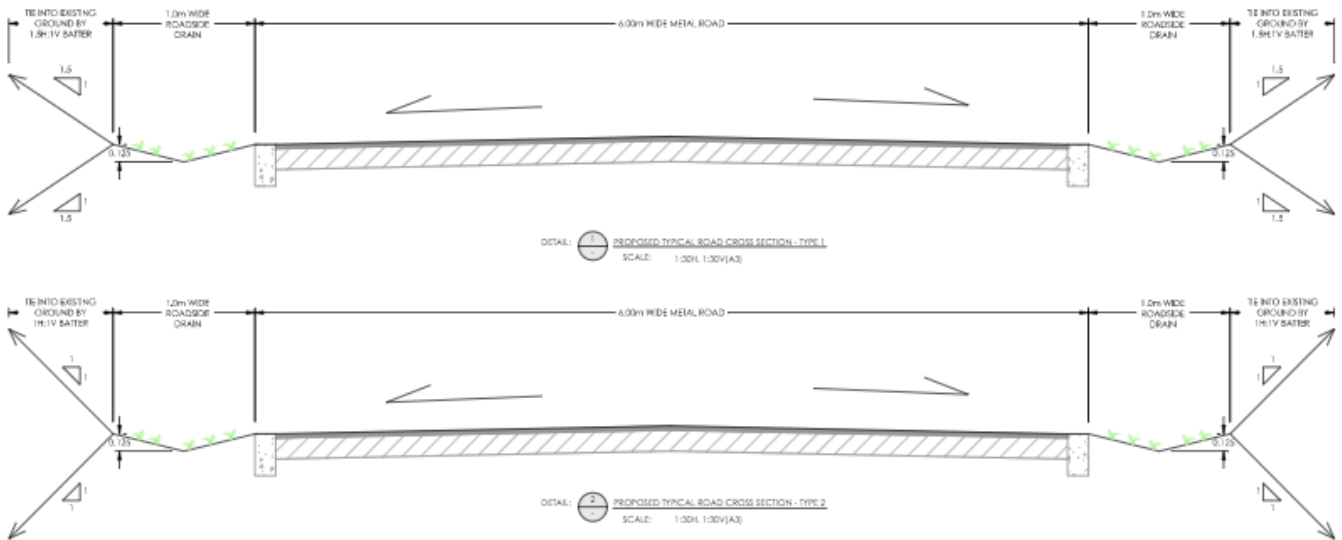


Figure 7. Typical road cross sections, Type 1 (top) and Type 2 (bottom)

3.3.4 Turbine Platforms

Key elements of each wind turbine platform include the turbine foundation area, crane pad for construction and maintenance, and component laydown / storage area. As a conservative approach the preliminary civil design has allowed for a 26 x 26m octagonal gravity type foundation. This foundation size is evidenced overseas where these larger turbines are now being installed.

The crane pad is developed from the requirements of the mobile crane required to lift the nacelles to a hub height of 132m.

The laydown / storage areas (where possible) are sized to allow the laydown of three blades (Figure 8).

In some cases, the laydown area has been omitted from the preliminary platform design due to more challenging topography at some sites (Figure 9). In such cases, the turbine components can be picked up by the crane directly from the transporter. This construction method is more expensive but is a practical solution.

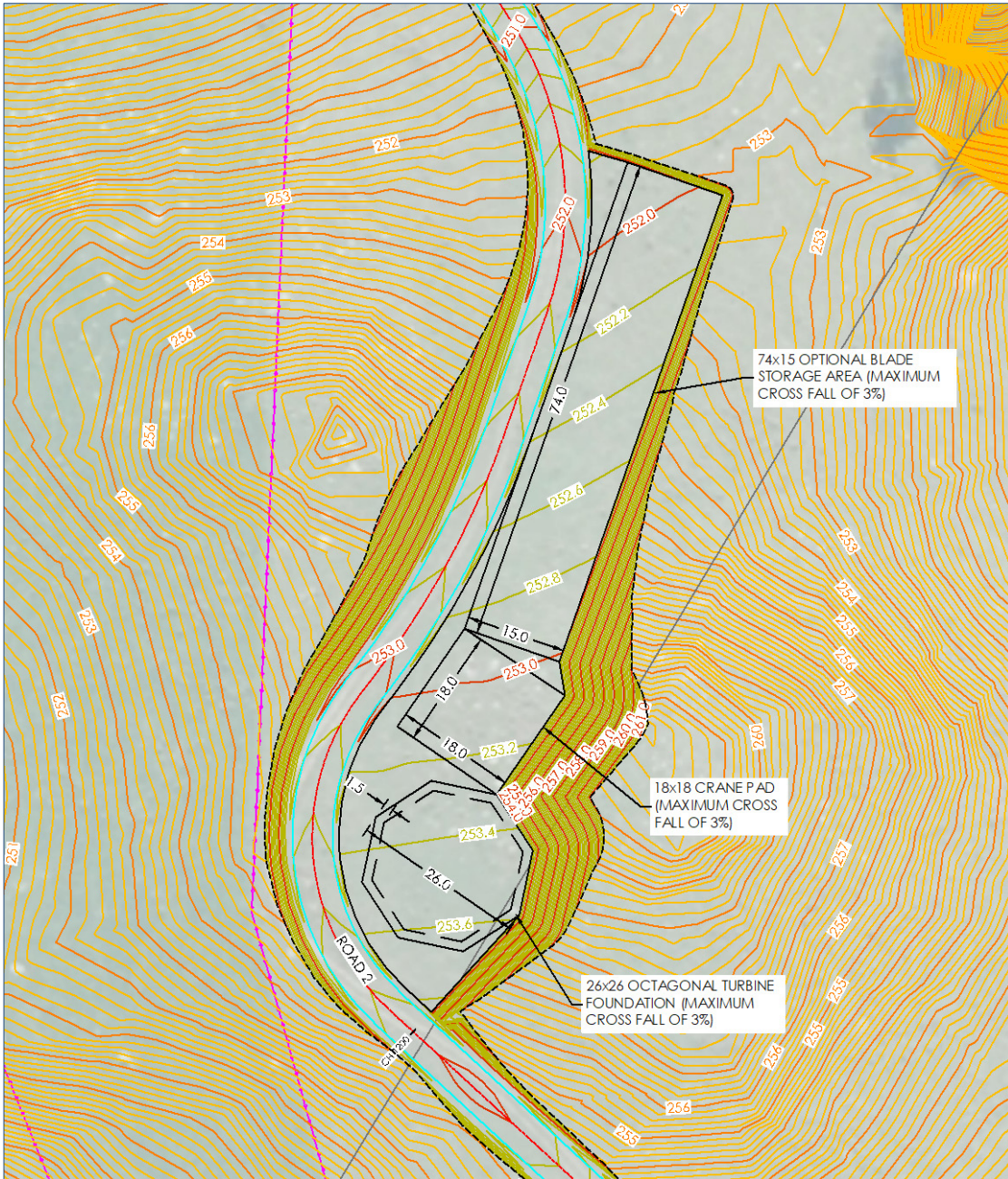


Figure 8. Typical turbine platform arrangement

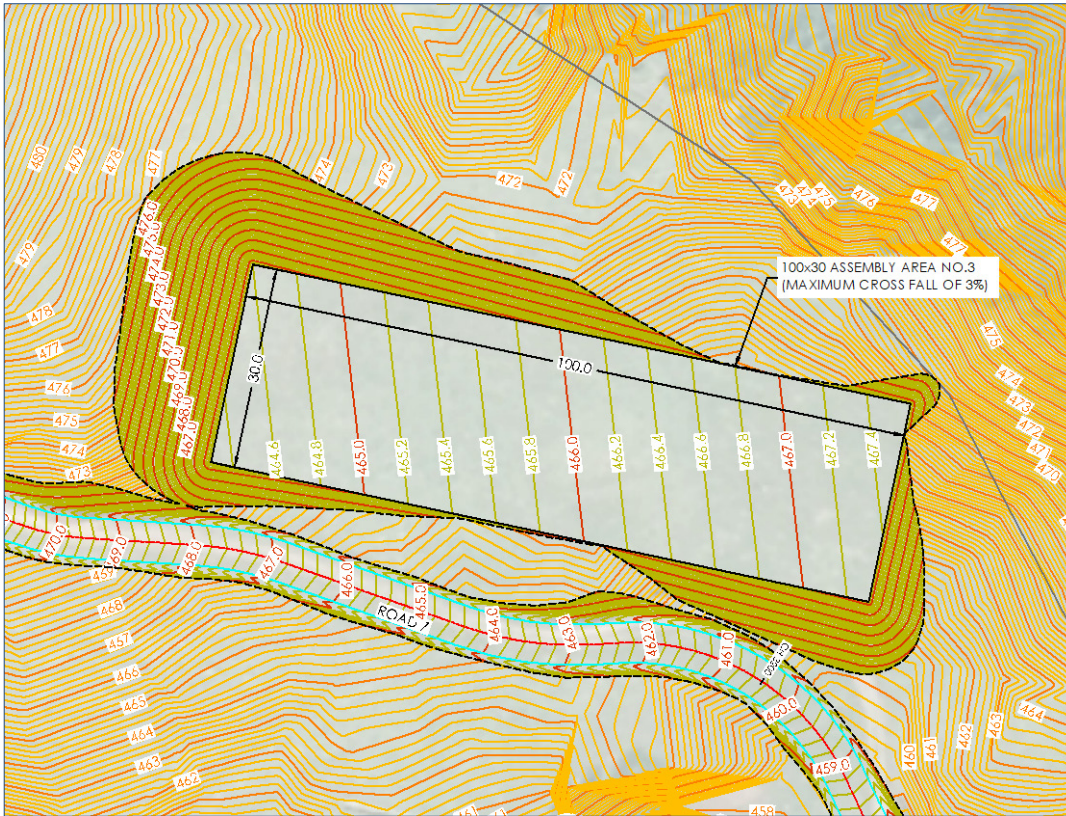


Figure 10. Component Assembly and Laydown Area – typical



Figure 11. Bunded fuel storage

3.3.6 Culvert Replacement

Several culverts along the existing access road and farm tracks are proposed to be upgraded. The purpose of these upgrades is to allow the passage of a higher rainfall event and to provide better strength. All of the upgrade works will involve existing culverts along the 'Proposed Road 1' alignment. Of these, only culverts located at Proposed Road 1 Chainage 100 and Chainage 780 are within the existing Romaru Stream. All other culvert work will not be within a stream bed, including any culverts beyond Proposed Road 1.

3.3.7 Underground Cable Network

An underground 33kV collection network will be installed by specialist pipe laying machinery (Figure 12).



Figure 12. Cable laying Te Uku Wind Farm

3.3.8 Earthworks

The overall extent of earthworks required to facilitate the project is estimated at 460,000m² in area, with a total cut volume of 900,000m³. Of this total cut volume, 113,500m³ will be placed as engineered fill along the road alignment, and the balance of 786,500m³ will be placed on site in specific suitable cleanfill disposal areas. These predicted area and volume estimates include a 20% contingency to account for potential increases during the detailed assessment and design phase because of refinements in the platform and road alignment designs.

3.3.9 Vegetation Clearance

Most of the Site is covered in pasture, however there are pockets of indigenous forest and an identified Significant Natural Area (HDP reference T13UP206). The Project footprint has been designed to avoid impacts on areas of native vegetation, particularly the SNA. However, the necessary separation distances between turbines has resulted in Turbine 13 being located on an isolated area of undesignated and degrading indigenous forest within the Site. This area is described by Ecology New Zealand Ltd as a *contiguous podocarp-broadleaf treeland*, and the proposed area of clearance is estimated at approximately 1,700m² out of the 1.15ha bush fragment.

3.5 Generation Output

The Project Rationale report by Energy3 (refer to Attachment B14) provides the following explanation in regard to the specifications of wind turbines relative to the overall generation output of the Kaimai Wind Farm.

Installing the largest rotor possible on any wind farm site has a significant impact and benefit to the overall project generation output. Every potential wind turbine location is therefore considered against the various manufacturer's available turbines and power curves; however the structural loading must stay within the design parameters of the proposed wind turbine model.

The upper ridge turbines with a proposed hub height of 112m would be sited within an area with an estimated wind speed of 9.5 m/s with low turbulence. It is therefore possible to install a Class II machine on this main ridgeline.

A power production chart relative to mean annual wind speed for the Vestas 4.2-136m model is show below on Figure 14. Using a linear extrapolation it can be deduced that the energy output estimate is 20.5 GWhr/year/turbine. This is an excellent annual production figure for such a turbine, and consequently, it is estimated that the 7 turbines on the upper ridgeline will produce approximately 144 GWhr/year.

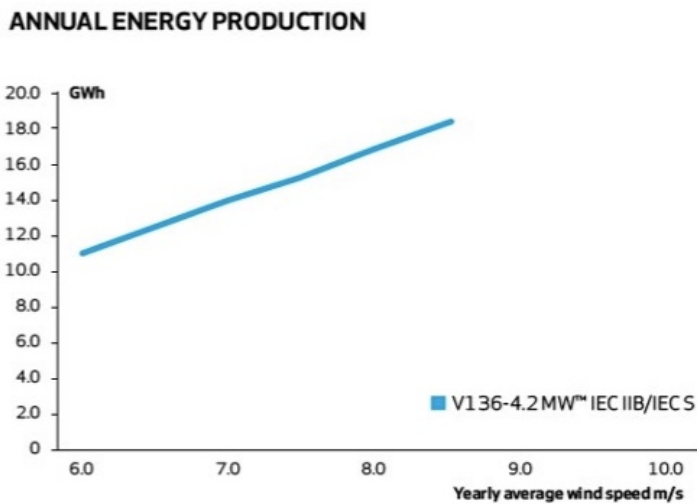


Figure 14. V136 Annual Energy Yield Relative to Mean Annual Wind Speed

The Vestas 4.2 – 150m is an appropriate machine to install on the lower ridgelines (turbine 1 to 17) where the average wind speed is 7.5m/s at the proposed hub height of 132m. This wind speed is at the upper end of the type classification of that turbine model, and will furnish an output of approximately 16 GWhr/year – see Figure 15 below. Applying the average yield across 17 turbines, generation will be in the order of 272 GWhr/year.

Gross output for the total wind farm is therefore estimated at 416 GWhr/year. Average gross output per turbines is factored at the level of 17.3 GWhr/year. This level of output/turbine pushes the project into financial viability.

Within that, the positive yield impact of the upper ridgeline turbines is essential to the overall economic viability of the project.

ANNUAL ENERGY PRODUCTION

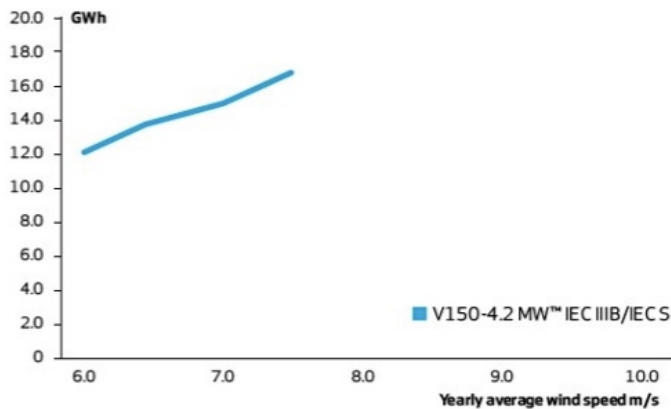


Figure 15. V150 Annual Energy Yield Relative to Mean Annual Wind Speed

3.6 Need for the Project

An Electricity Market Report (Attachment B8) has been prepared by ERS that outlines the drivers for more renewable energy in NZ and the upper North Island, in particular to meet growing demand. It concludes:

Summary of Benefits

The Kaimai Wind farm will provide benefits to:

- The New Zealand Wholesale Electricity Market by aiding competition,
- It will support national security of supply challenges by bringing new supply to the market,
- While helping with local transmission thermal and voltage issues, and
- Reducing overall losses in the transmission system by providing electricity close to local demand in a high demand growth area.

New Zealand Wholesale Electricity Market

The New Zealand electricity market is based on a model of economically constrained dispatch to ensure that the least cost providers of electricity are always dispatched to meet demand. This is a highly competitive market and new supply will aid that competition as it brings another seller to the market which puts downward pressure on price.

There are also benefits to the financial contracts market, where buyers and sellers reach agreement of financial contracts to set a fixed price for electricity in the future. Once again new supply into this market will be a benefit to buyers of contracts as there is more choice of sellers.

Kaimai Wind farm

With an installed capacity of circa 100MW to put downward pressures on the wholesale price in real time and an expected annual production level of circa 400GWh which ERS expects would be mostly sold forward into the contracts market the Kaimai Wind farm will aid competition in the New Zealand Wholesale Electricity Markets. This will result in lower overall electricity prices for consumers in New Zealand.

Security of Supply Balance

There are both National and Local benefits from a security of supply perspective to having the Kaimai Wind farm consented and built.

National Security of Supply

There has been a decline in the supply and demand balance between 2010 and 2016 both from an installed capacity and an annual output or energy perspective. There has been more thermal plant retired than new plant built between 2010 and 2016.

Financial contract of sufficient value to keep the remaining two Huntly coal units in the market until 2022 where executed against this backdrop of changing supply and demand risk.

System Operators Reports

The System Operator's short term (Hydro Risk Curves) and medium to long term (security of supply assessment) security of supply reports show declining supply and demand balances and the need to build modest level of new generation from 2020, while more significant investments are needed from 2023.

The Security of Supply Assessment report "base case scenario" shows a need for 1,174MW of new capacity and new annual energy volumes of 8,877GWh by 2026. Wind is expected to provide 21% of new capacity and 32% of the annual energy capability based on this scenario.

While there are parties with generation investments on their books there are no actual committed projects. New Zealand needs new generation assets to be built to meet the expected growth in electrical demand.

EDGS Scenarios

Based on the outcomes of the Ministry of Business, Innovation, and Employment (MBIE), Electricity Demand and Generation Scenarios (EDGS).

Wind generation is expected to play an important role in meeting the challenge of new supply at least cost and will make up circa 43% of all new installed capacity and provide circa 46% of all new generation output in 2040 based on the average across the EDGS scenarios.

Issue	Total	Wind Contribution
New Installed Capacity 2040	3,680MW	1,583 or 43%
Difference in annual output 2016 to 2040	11,063GWh	5,100 or 46%

Another way of looking at these numbers is over the 24 years between 2016 and 2040 New Zealand would need to install 154MW of new capacity each year that can produce 460GWh per year.

Local Security of Supply

Both Transpower and Powerco in their respective transmission planning documents have noted that there is a forecast thermal constraint and present voltage issues associated with the 110KV Valley Spur circuit. Also, Powerco reports strong demand growth both historically and forecasted in their AMP in the areas that are feed from the Valley Spur circuit.

Kaimai Wind Farm

The injection of Kaimai Wind farms generation into the middle of the valley Spur circuit will add another option for management of these thermal constraint and voltage issues.

Peak output of the Kaimai Wind farm would be able to cover over 60% of the expected future demand peaks. While the annual output of 400GWh from the Kaimai Wind farm would have provided 55% of the total demand on the Valley Spur circuit in 2016. This injection of generation close to the local load will also reduce national transmission losses.

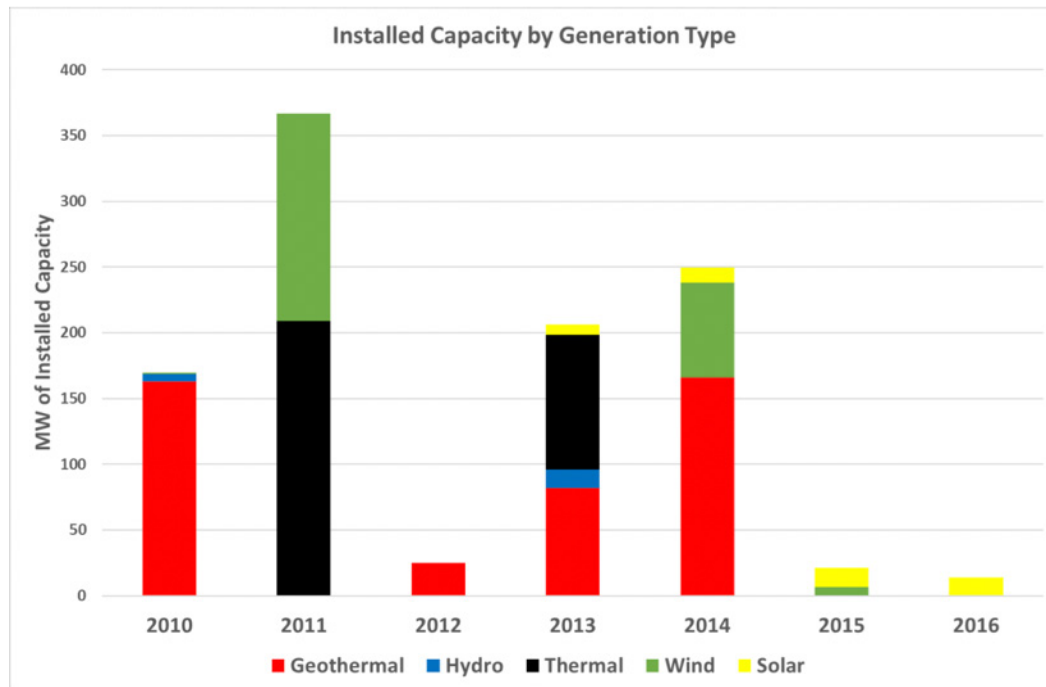


Figure 16. Installed Capacity by Generation Type

3.7 Mitigation

By way of an overview, Kaimai Wind Farm Ltd (KWF) proposes the following broad mitigation programme to address residual adverse environmental effects of the 24-turbine project:

- Local ecology (notably bush birds and bats): KWF will provide funds to support local restoration and rehabilitation projects. The KWF preference is for these funds to go towards supporting bat habitats or populations.
- Migration Birds: KWF will offer to contribute to conservation management at the Miranda Shore Bird centre. The aim is to maintain or enhance that habitat and/or breeding success of water birds.
- Landscape and Visual – Local Residences Views: Vegetation and visual buffering in the intervening landscape is being explored to assist in screening the turbines from some closer residences. KWF is open to providing practicable planting on site for local residents.
- Landscape and Visual – Night Sky: KWF commits to using an active aviation light management system that activates only when approaching aircraft are detected in order to mitigate the effects of the turbine aviation lighting on the naturalness of the night sky.
- Tangata Whenua (Cultural) – Measures to remedy or offset effects of the Project on the cultural landscape as valued by hapū with mana whenua standing, as may include, for example, funding of a local carving and story boards recognising the unique history of tangata whenua in this environment. The location and content of this shall be decided in consultation with the local Iwi and the Hauraki District Council
- Tangata Whenua (Economic) – Further to those measures outlined above in respect of cultural values, KWF proposes an annual scholarship to support tertiary-level study in resource management, industrial design or engineering.

- Residences – A fund for supporting local social connectivity.
- Shadow flicker – Vegetation and visual buffering in the intervening landscape is being explored to assist in screening the turbines from some closer residences. KWF is open to providing practicable planting on site for local residents.
- Traffic – Heavy transporters will be limited to the Rawhiti Road entrance.
- Tourism – Funding to support local tourism initiatives such as Hauraki Rail Trail, Karangahake trails, ecology tours etc
- Soarers (Gliders and Hang Gliders): Turbines 16 and 17 are to be shut down on up to ten (10) days per year that coincide with glider competitions and low wind speed conditions. A communication protocol shall be put in place to co-ordinate the wind farm operation with the soaring community.
- No less than three months prior to the commencement of any works for, or associated with, the proposed Kaimai Wind Farm Project, a draft Ecological Management Plan (EMP) shall be submitted to the District and Regional Council following (where required) consultation with DoC.

The details of the proposed mitigation will be addressed in specific consent conditions to be developed during the course of the public notification, submissions and hearing process, with input from the relevant experts, consent authorities, relevant stakeholders, and submitters.

3.8 Lapse Period and Duration

Whilst there is a clear demand for wind energy projects in the near term with all the drivers present as outlined in Sections 1.1 and 3.6, there are a range of factors that may influence or delay implementation of the Project. These include:

- Sudden economic downturn
- Bank liquidity crisis
- Disruptive technologies that reduce network demand (e.g. peer-to-peer trading)
- Availability of turbine components and ancillary equipment from overseas,
- Foreign exchange rates,
- Timing of the construction of other development projects

In accordance with section 125 of the RMA, a twelve-year lapse period is therefore sought for all resource consents to provide sufficient flexibility to time the construction and commissioning of the wind farm within a range of economic conditions. In tandem, KWF request a twenty-year duration pursuant to section 123 of the RMA for the regional consents sought from Waikato Regional Council, providing implementation flexibility beyond the requested lapse period.

4 Consultation

Section 36A of the RMA states that an applicant does not have a duty to consult any person on their resource consent application. However, clause 6(1)(f) of the Fourth Schedule to the RMA also states that an application should identify individuals or groups affected by the proposed activity and detail any efforts undertaken to engage, understand and respond to the concerns of any those individuals or groups.

This section provides an overview of the consultation that has been undertaken by KWF with land owners, iwi, key stakeholders and the wider community since it secured land access to the project site and commenced investigations into securing resource consents for the Kaimai Wind Farm and associated transmission line.

A summary of consultation carried out is contained in Attachment A.

4.1 Iwi Consultation

KWF initiated contact with Hauraki iwi, via the Hauraki Māori Trust Board, in 2005 to advise them of the proposal to develop a wind farm and seek their advice on Iwi which should be consulted. The Board identified that the following five Hauraki Iwi should be consulted, the first three being the most likely to have potential sites of cultural value near the project –

- Ngāti Tara Tokanui
- Ngāti Tamaterā
- Ngāti Hako
- Ngāti Maru
- Ngāti Rāhiri Tumutumu

Consultation with Iwi commenced in 2005 with a letter advising that a wind monitoring mast would be erected on the proposed site. In mid-2017 engagement matured with frequent contacts with all five Iwi, and in-depth conversations (both online and hui) with Ngāti Tara Tokanui, Ngāti Tamaterā and Ngāti Hako, in particular. The intent of all communications was to ensure that local hapū were aware of the proposal, had an opportunity to ask questions and/or express concerns and understood the opportunity to present a Cultural Values Assessment (CVA).

A hui was held at Ngahutoitoi Marae (Ngāti Tara Tokanui) on 21 January 2018 at the request of the iwi to provide an overview of the proposal and kōrero with hapū.

At the time of this application, Ngāti Hako has undertaken a CVA (Summary of Key Issues), as addressed further below, and Ngāti Tamaterā have indicated that they are considering a CVA.

4.2 Community and Agency Engagement

KWF's community engagement plan identified a broad range of regulatory/statutory, conservation and environmental organisations and the local community. The following community engagement has been undertaken to date:

Regulatory/Statutory bodies

Consultation with Hauraki District Council commenced in 2005 regarding a wind farm project on the Site. The site layout evolved through the design process and wind monitoring masts were consented with HDC and subsequently installed. Contact has been maintained with HDC over the past 13 years. Since late 2016, as the proposed Site design resolved, KWF continued with regular updates via email and meetings – to the date of application.

Waikato Regional Council was provided with an overview of the proposal in 2017 with subsequent meetings, commencing in September 2017. Also, Ventus actively participated in the public consultation process on the ONFL designation in the proposed RPS since 2010.

Contact with the neighbouring Matamata-Piako District Council commenced in June 2012 on a 32 turbine layout. Following the focus on pursuing a project only in the HDC territory in 2017, the discussions with MPDC focussed on the transport plan for cartage of the turbines from the Port of Tauranga. Also, Ventus made submissions on the MPDC Transportation and Utilities Plan Changes (PC43 and PC44) in 2014.

Government

The relevant Minister of Conservation, Energy and Resources (both before and after the 2017 General Election) were provided with an overview of the proposal, as were local Members of Parliament.

Conservation/environment

The Department of Conservation's Bay of Plenty Regional Office was first advised of a wind farm proposal in June 2005. Subsequent meetings and discussions were held over the years on environmental monitoring design including a site visit by field staff in 2009 – especially for avian fauna. The final layout design was advised to DoC in early 2017. Over subsequent months the Department was provided with regular updates. A copy of a report prepared by Kessels Ecology was provided with a request for feedback on possible mitigation of issues to promote the ecology of the location and region.

Landowners

KWF has maintained close contact with the three owners of the land on which the proposed wind farm will be established. This began in 2005 and has continued with inclusion in all community engagements and personal contact.

Transpower

Transpower was first approached in 2009, at which time they issued a high-level review report on the connection options, confirming several viable connection options. Transpower then reviewed that report in 2017 and KWF has now made a formal application to Transpower for connection approval. The review report can be viewed in Attachment A7.

Business community

KWF presented to the Paeroa business community's Business-After-5 Network in August 2017 and June 2018 providing local business people with an overview of the proposal, and an avenue for contact.

Recreational and commercial aeronautical use

Several conversations were initiated with the Piako Soaring Club, NZ Hang Gliding and Paragliding Club along with commercial and recreational flyers to understand their use of the area and potential concerns. As a result, KWF agreed to reduce the number of turbines from 26 to 24 to accommodate flight paths and to consider shutting down specific turbines during gliding competitions.

Peet Aviation also conducted a comprehensive aviation report which concluded that the proposed wind farm will not represent a physical obstacle to glider operations over the proposed site. Likewise, turbulence and wind shear will not be an issue when wind speeds in the area are approximately 16 knots, which is the norm. Glider operations over the proposed site may, however, be affected when wind speeds are more than 20 knots – although this would account for potentially 15% of the time and needs to be considered against the fact that glider activity would remain viable and subject to pilots conducting flights in a safe and secure manner at an appropriate altitude.

Recreational walking and cycle use

Online discussion and meetings were held with NZ Walking Access Commission and the Hauraki Rail Trail in February and April 2018 (respectively) to update them on the proposal and gain insight to the linkages which could be developed – between the wind farm and the cycle and walking trails – which would promote tourism to the area.

Community

Engagement with the Paeroa, Waikino, Tirohia and northern Te Aroha communities commenced in December 2016 with a regular written community updates (delivered via email and NZ Post) and personal visits. These are detailed as follows:

Public Information Days

- 17 March 2017: The first public information day was held on 17 March 2017 at the Tirohia Hall attended by around 60 residents. The purpose of the gathering was to provide residents with an overview of the proposal, including but not limited to the project rationale, location and turbine size. In addition to the more technical project elements, KWF provided an overview of the more detailed analysis which would be undertaken and the channels which residents could avail themselves of to learn more about the proposal. Several subject matter experts were on hand at the meeting to address issues such as noise, visual impacts and to answer questions. Refer: Consultation Record Attachment A3;
- 6 and 7 September 2017: Two further Public Information Days were held at the offices of Positive Paeroa. The events were informal, drop-in opportunities allowing the public to call at times which suited, to speak with a range of subject-matter experts and to view a range of easy to understand posters addressing issues such as noise, visual, impacts on property values etc. An invitation to the events was delivered, by NZ Post, to around 760 residents within a 2km radius of the proposed site, and to the 5 iwi groups referred to above. The days were also promoted in local print and broadcast media.
- 13 November 2017. An information sharing evening was organised to provide residents of Rotokohu and Thorp Roads with an opportunity to learn more about the proposal and to raise concerns they had around the proposal. Residents were subsequently emailed an overview of all questions, answers and possible mitigations raised during the evening.

Community Update Newsletter

Community Update Newsletters were mailed to around 400 RD 3 Paeroa and RD 2 Te Aroha residents in February, April, June and December 2017 with an online update in April 2018. Email copies were also sent to every organisation, Iwi, media or individual who contacted the company directly or via the website.

Kaimai Wind website

The Kaimai Wind website (www.kaimaiwind.nz) was developed at the start of 2017 providing the wider public with easy access to the latest news about the proposal, a detailed Q&A and an ability to raise issues or concerns. All individuals who contacted the company via this means were contacted personally.

Ongoing consultation

KWF will, throughout the consenting process, continue to engage with all stakeholders.

5 Resource Consent Application Context

The Site is located within the Hauraki District and Waikato Region, and the Project is hence subject to two primary resource consent planning frameworks at district and regional levels; namely the Hauraki District Plan and the Waikato Regional Plan. Both plans include a system of policies and methods to manage development and the natural and physical resources within their respective district and region.

5.1 Hauraki District Plan

The District Plan is the primary document for the management of the effects of land use and development within the Hauraki District, and the current version of the Hauraki District Plan (HDP) became operative on 26 September 2014. The HDP provides land use rules for managing development based on a zoning framework, with different activities being provided for as permitted or requiring resource consent, depending on the scale and specific zone.

The Site is zoned as *Rural* under the HDP, as shown on Map 29. The HDP Maps also identify the following features within the Site:

- Rauwharangi Tapu (Urupa) (310)
- Significant Natural Area (T13UP206)
- Heritage Item Category C (216)

There are no other natural character values identified through the HDP inside the Site boundary.

There are however parts of the Kaimai Ranges adjacent to the Site that are identified as having important natural character values and that are protected by HDP zone provisions. These are located north and east of the subject site. In particular, the Kaimai Range and Kaimai Mamaku Conservation Park is identified as an ONL (HDP Map N4), in tandem with Conservation (Indigenous Forest) and Significant Natural Area overlays (Map 29). Within that area, Mt Karangahake to the north is identified as an Outstanding Natural Feature (HDP Map 29 – ONF5). The HDP maps also identify other Significant Natural Areas to the west and north of the site, located adjacent to the Tirohia Quarry (T13UP87) and around the western fringes of the Kaimai Range and Kaimai Mamaku Conservation Park (north of the site). While not directly relating to the HDP rule framework for the proposal (with the Project footprint avoiding direct impacts on these adjacent areas), the identified natural character values attributed to adjacent areas provide context for the assessment of environmental effects of the Project.

Tirohia Quarry located to the west of the Site is buffered by a defined 'Quarry Reverse Sensitivity Area' within the HDP framework (Map 29), which serves to protect the quarrying activities from any future sensitive development in the adjacent areas (such as further residential activities). The Kaimai Wind Farm Project incorporates several turbines (1, 2 and 3) and a portion of Proposed Road 2 that encroach on the Quarry Reverse Sensitivity Area buffer. However, the Project does not pose a reverse sensitivity issue relative to adverse effects arising from the quarry.

The site has known archaeological and wāhi tapu sites registered with the New Zealand Archaeological Association (NZAA) and under the HDP maps. The archaeological site T13/923 relates to gold prospecting. The identified Wāhi Tapu site (Rauwharangi Tapu – HAU 310) is located centrally within the Site, with Heritage Item Category C (216) toward the northern boundary. The proposed turbines and road layout have been designed to avoid these registered archaeological and heritage sites.

A High Voltage Transmission Line Corridor is identified on the HDP maps towards the south of the development area (Map 32). There will be works undertaken within this location to enable connection to the electricity transmission network. This Corridor is

subject to a designation held by Transpower which enables operation and maintenance of the National Grid. This designation framework does not apply to Kaimai Wind Farm Ltd and specific land use consents for the associated works in this area are sought concurrently.

5.2 Waikato Regional Plan

The Waikato Regional Plan (WRP) contains policies and methods to manage the natural and physical resources of the Waikato region, and at a regional level under the RMA. It contains modules covering Matters of Significance to Maori, Water, River and Lake Beds, Land and Soil, Air, and Geothermal Resources. The WRP also gives effect to and implements the Regional Policy Statement (RPS).

The WRP maps include classifications for freshwater streams, and within the Site, streams are generally classified as the general 'Surface Water Class'. The exception is a short reach of a headwater stream located in the south-eastern extremity of the Site which is classified as Natural State Class (refer to Figure 17) and is identified as being a stock exclusion area ('Priority 1'). No works will be undertaken within this stream.

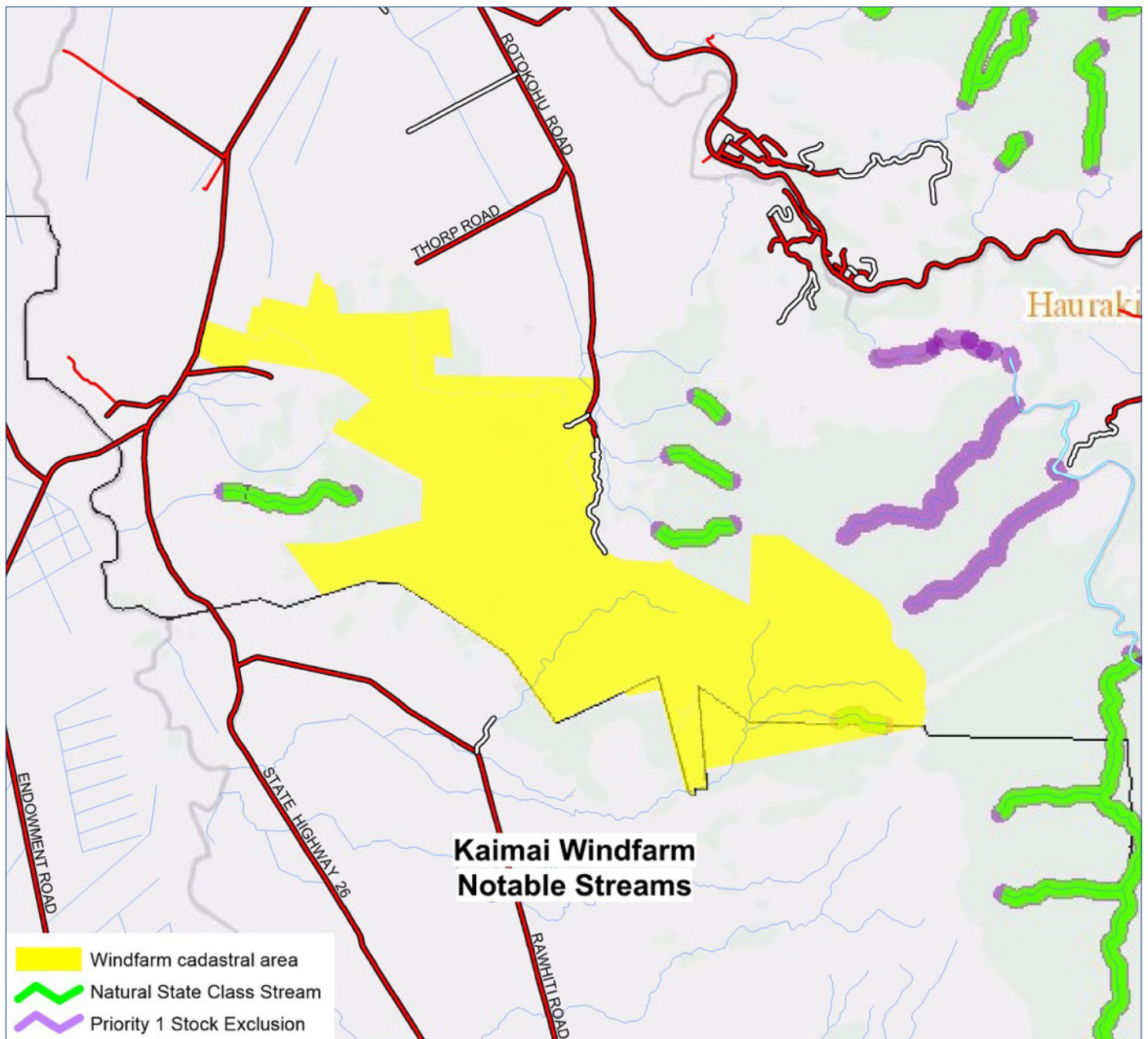


Figure 17. Notable Streams defined in Waikato Regional Plan

6 Reasons for Consent

6.1 Hauraki District Plan Rules

The HDP includes a framework of rules to control development in the District, providing for different land use activities as either permitted or requiring resource consent, and splits these against four main sections – zones, conservation and heritage, specific and District-wide matters, and performances standards. The following rules have been identified as relevant to the Project.

6.1.1 Section 5 – Rural Zone

Most of the Hauraki District is subject to the Rural Zone provisions (outlined through Section 5.1 of the Plan), and the HDP recognises that the rural land resource is one of the most valued of the natural and physical resources in the District. There are ‘significant natural areas’ (e.g. stands of indigenous vegetation), ‘outstanding natural features and landscapes’ and ‘district amenity landscapes’ within the rural area, with values that require protection from adverse effects of some activities. The protection provisions for ‘indigenous biodiversity of significance’ in the Rural Zone are supplemented by other general provisions relating to less significant indigenous biodiversity.

The zone provisions include a range of permitted through to non-complying activities. Overall, and as discussed in Section 6.1.3 below, the Proposal is a renewable electricity generation activity that is a discretionary activity in the Rural Zone as a result of rule 7.4.5.5(4)(D1). This is how the HDP provides for electricity generation in the Rural Zone, and the default non-complying activity rule for activities not otherwise provided for in the Rural Zone is not triggered. This is as explained through Section 2.1.2(5)(a):

2.1.2(5)(a) The zones include a section headed “Activity Status” which specifies the type of activities that are provided for as either permitted, controlled, restricted discretionary, discretionary, non complying, or prohibited. Activities that are specific to that zone are listed there, with activities that need to be provided for throughout the District referenced to other sections of the text (eg Section 6.0 – Conservation and Heritage).

In respect of the proposed small-scale quarry areas within the Site, Policy 7.8.3(b)(i) (“excavations and placement of fill”) states that:

...any excavations and fills are managed through land subdivision consent procedures. There is no need for any further management of these activities. Excavations and fills in the Rural Zone are often undertaken as part of legitimate land use activities and Council does not consider there is any need for management other than where volumes of material are being transported from one property to another and the excavations have become, in effect, a mine.

In light of this, the proposed small-scale quarry areas within the site can be managed as part of the overall land-use consent being sought. There is no intention to transport any aggregate won or extracted on Site to properties beyond the Kaimai Wind Farm Site. In our view, the “mining” provisions of the rural zone are not intended to apply to circumstances such as this.

Rule	Control	Comment
5.1(P14) Tracks, Driveways, Outside of the Outstanding Natural Landscape Area (Refer To Activity Specific Standard 5.1.6(4))	5.1.6(4) Land Subject to Inundation as Identified on the Planning Maps (a) No more than 5% of the area within the site that is subject to inundation as identified on the planning maps shall be covered by buildings and/or covered in an impermeable surface or vegetation (other than grass or similar), or otherwise made unavailable to inundation (eg by bunding or solid fencing), or be subject to exploration, excavation and filling.	All works are outside of an Outstanding Natural Landscape Area, and the Site is not identified as being subject to inundation according to the Planning Maps. THE PROJECT COMPLIES WITH THIS RULE.
5.1.4.4(D18) Discretionary Activities	Any permitted or controlled activity that does not meet the zone development standards in rule 5.1.5 for a restricted discretionary activity.	The Project will infringe various Rural Zone development standards outlined in 5.1.5 – including maximum height (11-15m) and daylight control (45degree plane from 2m elevation at boundary). The standards can be used as a guide when assessing applications for Discretionary Activities. CONSENT IS REQUIRED AS A DISCRETIONARY ACTIVITY.

5.1.7 Assessment Criteria for Discretionary Activities	When assessing any application for a Discretionary Activity, Council shall have regard to the relevant development standards, activity specific standards, environmental results and assessment criteria for Permitted, Controlled and Restricted Discretionary Activities in Rules 5.1.4 to 5.1.6, and the relevant General and Activity Specific assessment criteria below, and any other matters it considers appropriate.	The criteria presented through 5.1.7, and specifically 5.1.7.1 and 5.1.7.8 provide relevant assessment criteria for the AEE – presented through section 8.
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6.1.2 Section 6 – Conservation and Heritage

6.1 Historic Heritage

The HDP recognises the importance of retaining significant aspects of the District’s heritage, as it is a matter of national importance under the RMA, and for the benefit of both present and future generations. Buildings, objects, and places of historical, cultural, architectural, scientific or other interest are valuable natural and physical resources (both in terms of landscape and visual appeal and as a record of human development) and contribute to the amenity values, environmental quality, social and cultural well-being of the community. Section 6.1 of the HDP includes provisions that relate to the management of heritage values.

There are no rules applying in the HDP with particular respect to archaeological sites, instead deferring to the Heritage New Zealand Pouhere Taonga Act 2014 and Heritage New Zealand for the management of such activities.

There are no protection or conservation rules applying in the District Plan with respect to any Category C Heritage Items, except that the Council requires a photographic record to be provided prior to the demolition or removal of any listed buildings or structures. Heritage Item Category C (216) is located within the Site, but the Project avoids and does not directly impact this item.

No Rules within Section 6.1 of the HDP are relevant to the Project.

6.2 Indigenous Biodiversity and Significant Natural Areas

This section of the Plan identifies areas of significant indigenous vegetation and habitats of indigenous fauna (Significant Natural Areas (SNAs)) held in both public and private ownership, and presents a framework of Rules to protect the values of SNAs.

Significant Natural Area ‘T13UP206’ is the only SNA located within the Site, and all works are designed to avoid direct impacts on this area.

Site Ref	Map No.	Ecosystem	Protection	Protection type	Significance	Approx. Area (Hectares)
T13UP206	29	Terrestrial	Unprotected	DOC	National	1.13

The iterative design of the Kaimai Wind Farm has accounted for the values of SNAs and specifically avoided direct impacts on SNAs within and adjacent to the Site. In this case, none of the rules within Section 6.2 of the HDP are applicable to the Project.

6.3 Protection of Outstanding Natural Features and Landscapes and District Amenity Landscapes

Section 6.3 of the HDP addresses ‘outstanding’ and ‘amenity’ landscapes, as identified and assessed by LA4 Landscape Architects (September 2006). The Plan explains that the assessment process subdivided the District’s landscape into landscape units based on consistency of landscape character in terms of land uses, vegetation cover, topography and presence of water bodies or relationship with nearby bodies of water. Each landscape unit was assessed against several recognised landscape assessment criteria to provide an overall sensitivity rating. Those landscapes and landscape features with ‘extreme’ or ‘high’ sensitivity have been identified as “Outstanding”. Landscape units with a ‘significant’ sensitivity have been identified as “District Amenity Landscapes”. These landscapes and landscape features are identified on the Planning Maps.

There are no Outstanding Natural Features, Outstanding Natural Landscapes or District Amenity Landscapes on the Project Site. As such, none of the rules within Section 6.3 are relevant to the Proposal.

An Outstanding Natural Landscape abuts the site on the north and eastern boundaries, and the Outstanding Natural Feature of Mt Karangahake (ONF5) is located within this Landscape area. The values of these landscape features and the effects of the Project on them are addressed through Section 7 of the AEE, and relevant policies addressed in Section 8.

Item No.	Map No.	Feature	Feature Type	Approx. Location
ONF5	29	Mt Karangahake	Visual	DOC Reserve, Karangahake Gorge

6.4 Recognition and Protection of Significant Trees

There are no Significant Trees identified through the HDP within the Site, and the provisions of Section 6.4 are hence not relevant in this case. Further, the RMA does not offer any blanket protection of trees in rural areas; instead relying on specific District Plan provisions. In Hauraki, the HDP enables blanket or grouped protection of vegetation through the identification of Significant Natural Areas and the supporting provisions of Section 6.2. As outlined above, the Project does not encroach any Significant Natural Areas.

6.1.3 Section 7 – Specific and District Wide Matters

The HDP notes that the rules in sections 7 and 8 are to be used as guides in the processing of discretionary activities.

Sections 7.1 (Overview), 7.2 (Water Supply Catchments) and 7.3 (Riparian Margins & Esplanades) do not offer any Rule provisions that affect or are relevant to the Site or Project. Relevant objectives and policies are addressed through Section 8 of the AEE.

7.4 Provision for Energy Generation Activities

Section 7.4 of the HDP contains provision for network utilities and energy generation. 7.4.1(7) acknowledges “the use and development of renewable energy and innovative energy technology can be in a number of different forms (eg. Wind, hydro, marine, solar, biomass, co-generation) and can enable a significant portion of electricity to be supplied to the region’s communities in a sustainable manner, and can assist with the nationwide security of supply, a reduction in dependence on the national grid and a reduction in greenhouse gas emissions. In accordance with Sections 7(ba) and (j) of the RMA, and having regard to the ~~Proposed~~ National Policy Statement for Renewable Electricity Generation, the New Zealand Energy Strategy and the Waikato Regional Energy Strategy, the Council wishes to provide opportunities to increase electricity generation through the development and use of renewable energy resources over non-renewable resources, and innovative energy technologies.” The following provisions in Section 7.4 relate to this overarching enabling position.

Further, ‘renewable electricity generation activities’ are defined through the Plan to include electricity conveyance to the national grid. The overhead and underground electricity lines associated with the Project are therefore covered within Rule 7.4.5.5(4)(D1) outlined below, no other ‘utility’ rules need be relied on, except for the substation.

7.4.5.4 Provision for All Other Network Utilities Either in Roads or Zones

The following applications are sought for ancillary structures or works that are involved with the development of the Project.

Rule	Control	Comment
7.4.5.4 – All other network utilities in roads or zones	(P1) Any network utility whether located above or below ground in the Rural (excluding outstanding natural landscape are and district amenity landscape area), golden cross mineral and industrial zones, unless otherwise specified as Restricted Discretionary or Discretionary Activities. (D3) Any transformer, line, work or ancillary equipment or fittings for the distribution or transmission of electricity at a voltage exceeding 66k above or below ground. (D4) Any new electricity substation or extension to existing electricity substation in the rural zone.	The 110kV substation and additional lattice transmission towers are not a permitted activity as these are specified as a Discretionary Activity under 7.4.5.4 (D3) and (D4). CONSENT IS REQUIRED AS A DISCRETIONARY ACTIVITY.

7.4.5.5 Provision for Energy Generation Activities

This is the primary rule within the HDP in respect of the Project.

Rule	Control	Comment
7.4.5.5 – Energy Generation Activities	<p>(P1) Local co-generation or emergency power generation facilities/plants/schemes where these activities are ancillary to any permitted or approved activity in the rural zone, subject to compliance with the zone development standards for permitted activities of the relevant zone.</p> <p>(P2) Electricity generation facilities/plants/schemes for on-site domestic use, subject to compliance with the zone development standards for permitted activities of the relevant zone.</p> <p>(D1) Renewable electricity generation activities not otherwise provided for as a permitted activity in the rural zone.</p>	<p>The permitted activity provisions are not relevant to this Proposal as it does not involve ancillary local co-generation or emergency power facilities, nor is it an on-site domestic use facility. Also, there are no controlled activities under this rule, and the restricted discretionary rule (RD1) does not apply.</p> <p>Rule 7.4.5.5(4) (D1) states that renewable energy generation activities which are not a permitted activity in the rural zone are a Discretionary Activity. This is the core rule within the HDP of relevance to the Project and establishes it as a Discretionary Activity, and notes it shall be assessed against the relevant criteria in Section 7.4.8.</p> <p>CONSENT IS REQUIRED AS A DISCRETIONARY ACTIVITY.</p>

7.6 Signs

The HDP includes controls for the location, number, size, type and nature of signs, relative to both the safety and aesthetic aspects of signs located on private property and on road reserves.

Rule	Control	Comment
Signs 7.6	<p>(1) In All Zones asset identification markers (such as the asset number of a power pole, transformer or bridge) and hazard identification signs, for network utilities.</p> <p>(2) In All Zones except Conservation (Wetland), Conservation (Indigenous Forest), Reserve (Active) and Reserve (Passive):</p> <p>(a) Official and Regulatory Signs erected by or approved by the Road Controlling Authority.</p> <p>(b) Neighbourhood watch signs</p> <p>(c) Community Welcome to Town and District Signs</p> <p>(d) Temporary signs for Auctions/Sale of Land; Signs on Construction Sites</p> <p>(d) Name boards for schools, maraes, community facilities etc.</p> <p>(3)(b) Signs for Rural Zone...</p> <p>(i)-(ii) produce signs</p> <p>(iii) One sign, on the subject site, not exceeding 1.5m² in area, bearing the occupier's and/or property's name.</p>	<p>At this stage, the Project does not incorporate fixed details for signage associated with the wind farm. It is anticipated that there will be signage for some components of the Project, as outlined as follows:</p> <p>1) any asset identification markers and hazard identification signs required for network utilities would comply with this rule.</p> <p>(2) (a) Signage for transportation aspects of the site will likely be required, and it is anticipated that these would need to be approved by the Road Controlling Authority. Any such signage would therefore be in accordance with this rule.</p> <p>(b)-(d) N/A</p> <p>(3) In terms of signage within the Rural zone, should any signage be associated with the site, it would be within the 1.5m² standard. If, at a future date, KWF sought to install larger signage, this aspect could be appropriately considered at a later date as a standalone consent.</p> <p>THE PROJECT COMPLIES WITH THIS RULE.</p>

7.7 Hazardous Substances and Contaminated Land

The HDP recognises that the handling, transport, storage, use and disposal of hazardous substances can pose a risk to the environment and to human health and safety if not appropriately managed. Further, the use and development of land containing contaminated soils can lead to environmental effects if the contaminants are not identified and the land is not remediated to make it environmentally sound and safe for human use. Section 7.7 of the HDP contains rules relating to these hazards, and defers to the National Environmental Standard (NES) for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011 in respect of adverse effects of contaminants in soil on human health.

HDC adopted the “Hazardous Facilities Screening Procedure” (HFSP) for use in assessing hazardous activities or facilities to assess the hazard posed by various substances and the risk they present.

Rule	Control	Comment								
7.7.6(1)(a) Permitted Activity	Any hazardous facility with an Effects Ratio that equals or falls below the Effects Ratio specified for the zone in which it proposes to locate, as indicated in the HFSP Consent Status Matrix in Rule 7.7.12(5) below.	At this stage, it is anticipated that the HFSP ratio for the Site and Project would be less than or equal to 0.25 – partly in light of the separation distances from the works areas to site boundaries and likely small quantities of hazardous substances on site at any one time. THE PROJECT COMPLIES WITH THIS RULE.								
7.7.12 – Hazardous Facilities Screening Procedure (HFSP) Consent Status Matrix	(1) The HFSP [NZS standard] Consent Status Matrix in Rule 7.7.12(5) below shall be used to determine the consent status of a hazardous facility in the zone where it is to be located. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Zone</th> <th colspan="2">Consent Status</th> </tr> <tr> <th>Permitted</th> <th>Restricted Discretionary</th> </tr> </thead> <tbody> <tr> <td>Rural</td> <td>≤ 0.25</td> <td>> 0.25</td> </tr> </tbody> </table>	Zone	Consent Status		Permitted	Restricted Discretionary	Rural	≤ 0.25	> 0.25	Consent will be sought for the storage of hazardous substances in excess of the 0.25 HFSP ratio if needed, prior to construction.
Zone	Consent Status									
	Permitted	Restricted Discretionary								
Rural	≤ 0.25	> 0.25								

7.8 Excavation and Placement of Fill (Earthworks)

Land disturbance activities form a fundamental part of the Project. Section 7.8 of the HDP contains rules pertaining to earthworks, and an assessment of these rules is as follows. The proposed earthworks are “included within the meaning of earthworks” under the HDP, and of note, there is currently no land-use consent for these works (exemption ‘a’), and the internal road will have gradients that exceed 1:8 in some areas (exemption ‘f’). For completeness, these definitions are included as follows:

Earthworks Means excavation and/or placement of cleanfill to change the contour or level of a site or part of a site. The following shall not be included within the meaning of earthworks:

- (a) Earthworks that have been specifically approved as part of a subdivision or land use consent.
- ...
- (f) Road, driveway and access construction with a gradient ≤ 1:8.
- (i) Mining and Mining Operations (see definitions for these activities): where the total quantities of material extracted (minerals, overburden and waste rock) exceed those specified in 7.8.5.1(2) P3, 7.8.5.1(3) P5, 7.8.5.1(4) P7 and 7.8.5.1(5) P9.

With the above definition in mind, it is noted that if the proposed accessway were able to comply with the maximum gradient of 1:8 (12.5%), the associated earthworks may be exempt from the rule provisions in Section 7.8 of the HDP.

Rule	Control	Comment
Earthworks – 7.8.5.1 (P3) – Rural Zone Discretionary activity rule 7.8.5.4 (D1)	(P3) Excavation and movement of up to 4000m ³ of minerals and/or cleanfill (not otherwise provided for in P1 to P2 above) for end use on the holding of source in any 12-month period where council is informed of the fill action before more than 500m ³ is proposed to be relocated. Details are to be provided to the Council where the fill action exceeds 500m ³ and/or the depth of fill exceeds 0.5 metres at any point within one month following the placement of fill.	The Project will not comply with this permitted activity rule as the earthworks exceed 4000m ³ within the Rural Zone. There are a no Controlled Activities under this rule, and the earthworks are not specified as a Restricted Discretionary Activity in Rule 8.2A.1.3(3)(b). (D1) The Discretionary Activity Rule applies to works that are not within the conservation (wetland) and flood ponding zone – as is the case with the Kaimai Wind Farm. The earthworks are hence considered a Discretionary Activity under Rule 7.8.5.4 and are subject to relevant criteria in Rule 7.8.6. CONSENT IS REQUIRED AS A DISCRETIONARY ACTIVITY.

7.9 Transport Network

For clarity, the rules listed under Section 7.9 in relation to the Transport Network are not relevant to this proposal as the access to the wind turbines does not meet the definition of “road” given that the access will be privately owned and will not be under the control of the road controlling authority.

7.10 Financial Contributions

The HDP includes provision for Financial Contributions to be imposed as conditions of consent, so that the costs of mitigating the off-site effects associated with subdivision and development do not fall inequitably upon the entire community. The Contributions are intended to impose a fair share of the cost of mitigating the adverse effects resulting from development on the environment, particularly network infrastructure, on the developer.

In this case, none of the Rule provisions in Section 7.10 are relevant to the Proposal (i.e. not involving sewerage, water supply, stormwater and land drainage, (public) roads, or waivers to financial contributions).

6.1.4 Section 8 – District Wide Performance Standards for Development and Subdivision

Section 8.1 of the HDP outlines the background to Section 8, and explains that the performance standards, environmental results and assessment criteria in this Section were developed to promote the objectives and policies of this District Plan and the purpose of the RMA, namely the avoidance, remedying or mitigation of adverse effects of activities on the environment, natural and physical resources and amenity values.

8.2 Design and Location of Buildings

This Section provides a range of provisions relating to the design and locations of buildings and structures relative to various factors.

8.2.1 Setback from Public Drains, Lakes, Rivers, Streams, Floodways, Spillways and Flood Protection Works.

The Project Site has streams that traverse the property, and the existing farm track already includes several culverts across a number of watercourses. The proposed access will follow the same alignment as the farm tracks and will utilise these same culverts, albeit with upgrades to several existing culverts to accommodate the improved road alignment.

Rule	Control	Comment
Standards 8.2.1.3	<p>(1) Rural and Reserve (Passive) (a) No building is permitted within a floodway or spillway. Non-compliance with this standard is a Non Complying Activity. (b) No building is permitted within 100 metres of a spillway. 1 No building is permitted within 12 metres of the boundary of a Flood Protection Works.</p> <p>(2) All Zones (a) No building is permitted within 20 metres of the margin of a river or stream identified for a future esplanade reserve or strip.</p>	<p>The project complies with this rule, as no buildings will be located within floodways, 100m of a spillway, or 12 metres of any flood protection works. The project does not involve any building within 20 metres of the margins of a river or stream identified for a future esplanade reserve or strip.</p> <p>THE PROJECT COMPLIES WITH THIS RULE.</p>

8.2.2 Flood Levels

This Section is not relevant to the proposal.

8.2.3 Erosion Protection Setback Lines (Whiritoa Beach)

This Section is not relevant to the proposal.

8.2.4 Sewage Plant Buffer Areas

This Section is not relevant to the proposal.

8.2.5 Glare and Lighting

Section 8.2.5 contains provisions relating to glare and lighting in the District. It is acknowledged that some building materials create glare which has the potential to be a detraction for adjoining areas. A wind farm contains components that have potential to result in glare effects. An assessment of the relevant provisions are as follows:

Rule	Control	Comment
8.2.5.3(1) Glare	In all zones, buildings are to be constructed and finished to ensure reflection (glare) from the building surfaces does not reflect into adjoining properties, or into the vision of motorists on a street or road.	The Project components (turbines and sub-station) are all to be painted in a non-reflective coating. The Landscape Report (Attachment B12) provides further details of this. THE PROJECT COMPLIES WITH THIS RULE.
8.2.5.3(2) Lighting	In all zones, artificial lighting shall be installed, designed, shaded and arranged in order that the level of lighting measured horizontally or vertically at any point on or directly above the boundary of any adjacent site or road is no greater than 8.0 lux.	The wind turbines will include lighting for the purposes of aviation navigational safety. These will comply with the standard (being less than 8.0 lux at the boundary). Any lighting required for the new Sub-Station will be designed to comply with the HDC rule. THE PROJECT COMPLIES WITH THIS RULE.

8.2A Buildings, Structures, Subdivision and Earthworks within a High Voltage Transmission Corridor

Earthworks will need to be undertaken within the High Voltage Transmission Corridor to enable the construction of the proposed sub-station and new lattice transmission towers, as depicted on the Hauraki District Plan maps.

Rule	Control	Comment
8.2A.1.3(1) All Zones – Buildings/ Structures within 12 metres of centreline of High Voltage Transmission Lines	(e) Any buildings, or structures not otherwise provided for in (a),(b), (c) or (d) above, are a Non Complying Activity.	The proposed lattice transmission towers (termination structures) within the grid corridor (and potentially the substation, subject to detailed design and positioning) are not otherwise provided for in parts (a)-(d) – in part because these will not be done by a Network Utility Operator. These must be considered as a non-complying activity under part (e). CONSENT IS REQUIRED AS A NON-COMPLYING ACTIVITY.
8.2A.1.3 (2) All Zones – Buildings/ Structures between 12 metres and 32 metres from centreline of HV Transmission Lines	(a) All new buildings, structures or additions to existing buildings or structures are a Permitted Activity provided they comply with the New Zealand Electrical Code of Practice (NZECP) 34:2001. (b) Any new buildings, structures or additions to existing buildings or structures that do not comply with NZECP34:2001 are a Non Complying Activity	All structures placed within 32 metres of the High Voltage Transmission Line will comply with the New Zealand Electrical Code of Practice (NZECP) 34:2001. THE PROJECT COMPLIES WITH THIS RULE.
8.2A.1.3 (3) All Zones – Earthworks within the High Voltage Transmission Line Corridor (32 metres either side of the centreline of the High Voltage Transmission Line)	(a) No earthworks shall occur within the High Voltage Transmission Line Corridor (as identified on the Planning Maps) that: (i) are at a depth greater than 300mm within 2.2 metres of a transmission pole support structure or stay wire; and (ii) are at a depth greater than 750mm between 2.2 metres and 5 metres of a transmission pole support structure or stay wire; or (iii) are at a depth greater than 300mm within 6 metres of the outer visible edge of a transmission tower support structure or stay wire; and (iv) are at a depth greater than 3 metres between 6 metres and 12 metres of the outer visible edge of a transmission tower support structure or stay wire; or (v) create an unstable batter; or (vi) result in a reduction of the clearance distance underneath the conductors required by NZECP34:2001. <i>Exemptions:</i> (1) Rules 8.2A.1.3(3)(a)(i) – (iv) shall not apply to earthworks undertaken by network utility operators; (b) Any activity not complying with any one or more of Rules 8.2A.1.3 (3)(a)(i) – (vi) is a Restricted Discretionary Activity.	Earthworks within the High Voltage Transmission Line Corridor (32 metres either side of the centreline of the High Voltage Transmission Line) will not trigger parts (a)(i)-(iv) due to the separation distance from existing support structures or stay wires, and will be done to ensure stable batters. However, the clearance distances underneath the conductors may vary depending on the specific and final design of the earthworks in this area – particularly for the substation platform. Accordingly, the Project seeks consent pursuant to 8.2A.1.3 (3)(b) as a restricted discretionary activity. CONSENT IS REQUIRED AS A RESTRICTED DISCRETIONARY ACTIVITY.

8.3 Amenity Matters

This section contains rules pertaining to amenity matters and seeks to ensure a reasonable level of amenity is maintained for the surrounding environment. It is considered that noise and vibration are relevant considerations for both the construction and continued operation of the Project.

8.3.1(1) Noise

The following table presents an overview against the permitted noise standards.

Rule	Control	Comment																
Noise 8.3.1.3(1)(a)-(b)	(1)(a) <i>Between Sites within Zones</i>	8.3.1.3(1)(a)-(b) Turbine Operation: A specialist acoustic report by Dr Chiles (Attachment B10) has been prepared for the project and concludes that the predicted sound arising from the operation of the wind farm turbines will comply with this standard. THE PROJECT COMPLIES WITH THIS RULE.																
	<table border="1"> <thead> <tr> <th>Zone</th> <th>Standard</th> <th>L_{Aeq} (15min)</th> <th>L_{Afmax}</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Rural</td> <td rowspan="2">All activities in the Rural...Zone shall be conducted to ensure that the following noise levels shall not be exceeded within the notional boundary of any residential property within that zone.</td> <td>55</td> <td>75</td> </tr> <tr> <td>70</td> <td>85</td> </tr> <tr> <td>On all days 7.00am – 10.00pm</td> <td>50dB</td> <td>NA</td> </tr> <tr> <td>On all nights 10.00pm – 7.00am</td> <td>40dB</td> <td>65dB</td> </tr> </tbody> </table>		Zone	Standard	L _{Aeq} (15min)	L _{Afmax}	Rural	All activities in the Rural...Zone shall be conducted to ensure that the following noise levels shall not be exceeded within the notional boundary of any residential property within that zone.	55	75	70	85	On all days 7.00am – 10.00pm	50dB	NA	On all nights 10.00pm – 7.00am	40dB	65dB
	Zone		Standard	L _{Aeq} (15min)	L _{Afmax}													
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			On all days 7.00am – 10.00pm	50dB	NA													
	On all nights 10.00pm – 7.00am		40dB	65dB														
	(1)(b) <i>Between Zones</i>																	
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	Zone		Standard	L _{Aeq} (15min)	L _{Afmax}													
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		70	85															
	On all days 7.00am – 10.00pm	50dB	NA															
On all nights 10.00pm – 7.00am	40dB	65dB																

8.3.1(2) Vibration

The Plan defers to Standard 8.3.2.

8.3.1(3) Construction Noise

Rule	Control	Comment																																																										
Construction Noise 8.3.1(3)	<p>Construction noise emanating from a site shall meet the maximum noise standards set out in the tables below, and shall be managed, measured and assessed in accordance with NZ Standard 6803:1999 – Acoustics Construction Noise.</p> <p>Typical noise standards in the Rural Zone:</p> <table border="1"> <thead> <tr> <th rowspan="2">Time of week</th> <th colspan="2" rowspan="2">Time Period</th> <th colspan="2">Typical Duration (dB)</th> </tr> <tr> <th>L_{Aeq}</th> <th>L_{Amax}</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Weekdays</td> <td>0630</td> <td>0730</td> <td>60</td> <td>75</td> </tr> <tr> <td>0730</td> <td>1800</td> <td>75</td> <td>90</td> </tr> <tr> <td>1800</td> <td>2000</td> <td>70</td> <td>85</td> </tr> <tr> <td>2000</td> <td>0630</td> <td>45</td> <td>75</td> </tr> <tr> <td rowspan="4">Saturdays</td> <td>0630</td> <td>0730</td> <td>45</td> <td>75</td> </tr> <tr> <td>0730</td> <td>1800</td> <td>70</td> <td>90</td> </tr> <tr> <td>1800</td> <td>2000</td> <td>45</td> <td>75</td> </tr> <tr> <td>2000</td> <td>0630</td> <td>45</td> <td>75</td> </tr> <tr> <td rowspan="4">Sundays and Public Holidays</td> <td>0630</td> <td>0730</td> <td>45</td> <td>75</td> </tr> <tr> <td>0730</td> <td>1800</td> <td>55</td> <td>80</td> </tr> <tr> <td>1800</td> <td>2000</td> <td>45</td> <td>75</td> </tr> <tr> <td>2000</td> <td>0630</td> <td>45</td> <td>75</td> </tr> </tbody> </table>	Time of week	Time Period		Typical Duration (dB)		L _{Aeq}	L _{Amax}	Weekdays	0630	0730	60	75	0730	1800	75	90	1800	2000	70	85	2000	0630	45	75	Saturdays	0630	0730	45	75	0730	1800	70	90	1800	2000	45	75	2000	0630	45	75	Sundays and Public Holidays	0630	0730	45	75	0730	1800	55	80	1800	2000	45	75	2000	0630	45	75	<p>Construction: Dr Chiles has assessed that the wind farm construction should comply with this standard (Attachment B10), and proposed conditions of consent would require this .</p> <p>THE PROJECT COMPLIES WITH THIS RULE.</p>
Time of week	Time Period				Typical Duration (dB)																																																							
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8.3.2 Vibration in the Ground

The following table presents an overview against the permitted vibration standards.

Rule	Control	Comment
8.3.2.3 Vibration	<p>(1) Continuous Vibration – the 99 percentile ground vibration levels (V_{max}) resulting from any land use activity (Activity) shall not exceed the background vibration level (Background) by more than 0.5mm/second.</p> <p>(4) Vibration from Heavy Vehicles on Public Roads Within the Residential Zone only, the 99 percentile ground vibration levels (V_{max}) resulting from heavy vehicles (V_{activity}) shall not exceed the background vibration level (V_{background}) by more than 0.5 mm/sec, when measured at the front yard boundary within any residential lot.</p>	<p>Construction and Operation: Dr Chiles has addressed vibration matters through his report and indicates that the wind farm construction and operation can comply with this standard (Attachment B10).</p> <p>THE PROJECT COMPLIES WITH THIS RULE.</p>

8.4 Vehicle Parking, Loading and Access

Rule	Control	Comment
<p>8.4.1.3 Number and Location of Parking Spaces</p> <p>8.4.2.3 Number and Location of Loading/Drop Off Spaces</p> <p>8.4.3.3 Vehicle Access and Crossing</p> <p>8.4.4.3 Design of Parking, Drop Off and Loading Spaces, Access and Turning Areas</p> <p>8.4.6.2 Formation, Screening and Landscaping of Parking and Loading and Manoeuvring Areas</p> <p>8.4.6.3 Traffic Sight Lines</p> <p>8.4.7.3 Corner Splays</p>	<p>Various controls are listed in detail in the HDC plan on vehicle parking, loading, subdivisions, vehicle crossings, splays etc.</p> <p>Overall, advice from HDC has been that if a Transportation Impact Assessment (TIA) is required (under Rule 8.4.1.3(7)), any activities that are otherwise Permitted, Controlled or Restricted Discretionary, lose that status and have to be assessed as a Discretionary Activity.</p>	<p>No new lots are being created, and no public roads or new roads are proposed. There is no directly applicable rule for the proposed activity.</p> <p>Three assembly areas and 24 turbine sites are to be established on Site for temporary storage of components and vehicles. All up there are potentially numerous parking sites provided however Kaimai Wind Farm has no intention to occupy them all simultaneously or on a permanent basis.</p>

Rule	Control	Comment
8.4.8.3 Internal Access 8.4.9.3 Street and Road Design Standards		A TIA has, however, been prepared for the Project, and this assesses the associated activities against the requirements of these Rules (Attachment B20). Compliance is generally achieved for the relevant standards, but the Project does not comply in relation to the entranceway sight distance and separation distance (8.4.3.3) and as the internal accessway is longer than 1000m (8.4.8.3 / 8.4.9.3). CONSENT IS REQUIRED AS A DISCRETIONARY ACTIVITY.

8.5 Infrastructure and Services

Within this Section of the HDP, only 8.5.5 is of specific relevant to the Project.

8.5.5 Drains

The development will require hardstand areas to be constructed for the access and turbine platforms. As such, drains will need to be constructed to enable stormwater passage. The following is an assessment of the relevant rule in this regard.

Rule	Control	Comment
8.5.5.3 Drains	(1) For land within the rural area covered by a Council Drainage District, every new allotment created by subdivision shall be provided with a land drainage outlet to a Council drain at the boundary of the allotment.	The proposal does not require any subdivision of land. Accordingly, this standard is not relevant. THE PROJECT COMPLIES WITH THIS RULE.
	(2) In the rural area, all required drains shall be designed and constructed in accordance with the requirements of the “Drain design” diagram HDC400 set out in the HDC Engineering Manual.	Drains are designed in accordance with the engineering manual. THE PROJECT COMPLIES WITH THIS RULE.
	(3) Easements shall be created which cover the drain and shall be of a minimum width of 8 metres from the top edge of the open drain along one side to allow for access of maintenance equipment and deposition of spoil removed from the drain.	No easements are understood to be required in this case, noting that the proposal is within private land. THE PROJECT COMPLIES WITH THIS RULE.

6.2 Summary of Reasons for Consent under the Hauraki District Plan

Land use consent is sought under the HDP pursuant to the following rules. Overall, the primary elements of the Project are considered as a **Discretionary Activity** under the HDP. However, the required termination structures and substation near to and within the High Voltage Transmission Line Corridor require consent as a **Non-Complying Activity** under Rule 8.2A.1.3(1)(e). This appears to be a gap in the HDP for these discrete aspects of the proposal in circumstances where they are not being established by a Network Utility Operator. However, agreement from Transpower is being sought to progress or oversee these aspects of the Project, whereby discretionary activity status would be achieved for the works in proximity of the High Voltage Transmission Line Corridor, and permitted for buildings/earthworks within 12m of a Transmission line. In line with case law, there is no overlap between the effects associated with the substation and the termination structures whereby the consideration of the effects of these structures would affect the scope or outcome of the assessment of the broader wind farm proposal. On that basis, it would not be appropriate to “bundle” the activity status associated with these two discrete aspects of the proposal so as to render what is otherwise a discretionary activity provided for under the District Plan non complying as a whole.

Rule	Control	Comment
5.1.4.4(D18) Discretionary Activities	Any permitted or controlled activity that does not meet the zone development standards in rule 5.1.5 for a restricted discretionary activity.	The Project will infringe various Rural Zone development standards outlined in 5.1.5 – including maximum height and daylight control. CONSENT IS REQUIRED AS A DISCRETIONARY ACTIVITY.

<i>Specific & District Wide</i> 7.4.5.4 – All other network utilities in roads or zones	(D3) Any transformer, line, work or ancillary equipment or fittings for the distribution or transmission of electricity at a voltage exceeding 66kV above or below ground. (D4) Any new electricity substation or extension to existing electricity substation in a rural zone.	The ancillary structures >66kV associated with the wind farm are not a permitted activity as they are specified as Discretionary under 7.4.5.4 (D3)/(D4). CONSENT IS REQUIRED AS A DISCRETIONARY ACTIVITY.
<i>Specific & District Wide</i> 7.4.5.5 – Energy Generation Activities	(D1) Renewable electricity generation activities not otherwise provided for as a permitted activity in the rural zone.	Renewable energy generation activities are a Discretionary Activity in the rural zone – assessed against the relevant criteria in Section 7.4.8. CONSENT IS REQUIRED AS A DISCRETIONARY ACTIVITY.
<i>Specific & District Wide</i> 7.8.5.4(D1) – Earthworks (Rural Zone)	(D1) The Project will not comply with this permitted activity rule as the earthworks exceed 4000m ³ within the Rural Zone.	The earthworks are a Discretionary Activity under Rule 7.8.5.4(D1) and are subject to relevant criteria in Rule 7.8.6. CONSENT IS REQUIRED AS A DISCRETIONARY ACTIVITY.
8.2A.1.3(1) All Zones – Buildings/ Structures within 12 metres of centreline of High Voltage Transmission Lines	(e) Any buildings, or structures not otherwise provided for in (a),(b), (c) or (d) above, are a Non Complying Activity.	The proposed lattice transmission towers/termination structures within the grid corridor (and potentially the substation, subject to detailed design and positioning) are considered as a non-complying activity under Rule 8.2A.1.3(1)(e). CONSENT IS REQUIRED AS A NON-COMPLYING ACTIVITY.
8.2A.1.3 (3) All Zones – Earthworks within the High Voltage Transmission Line Corridor (32 metres either side of the centreline of the High Voltage Transmission Line)	(b) Any activity not complying with any one or more of Rules 8.2A.1.3 (3)(a)(i) – (vi) is a Restricted Discretionary Activity.	Earthworks within the High Voltage Transmission Line Corridor (32 metres either side of the centreline of the High Voltage Transmission Line) may alter the clearance distances underneath the conductors, subject to detailed design of the earthworks in this area – particularly for the substation platform. Such works are a restricted discretionary activity under 8.2A.1.3 (3)(b). CONSENT IS REQUIRED AS A RESTRICTED DISCRETIONARY ACTIVITY.
<i>Performance Standards – Traffic</i> 8.4.3.3 – Vehicle Access and Crossing 8.4.8.3/8.4.9.3 – Internal Access	A Transportation Impact Assessment is required (under Rule 8.4.1.3(7)) and overall must be assessed as a Discretionary Activity.	Compliance is generally achieved for the relevant standards, but the Project does not comply in relation to Vehicle Access and Crossings (minor infringement of sight distances to the west), and for the length of the Internal Access. CONSENT IS REQUIRED AS A DISCRETIONARY ACTIVITY.

6.3 Waikato Regional Plan Rules

The WRP contains modules (or Chapters) covering Matters of Significance to Maori, Water, River and Lake Beds, Land and Soil, Air, and Geothermal Resources, and includes a framework of rules within these modules to control development in the Region, providing for different activities as either permitted or requiring resource consent. The following rules have been identified as relevant to the Project, albeit that not all directly apply.

6.3.1 Chapter 2 – Matters of Significance to Maori

This Chapter identifies the broad tribal groups in the Region, and gives an introduction for why the module is included in the Plan in the context of the associated RMA framework. The module does not include rules for resource consent, and instead largely relies on a policy framework. This framework is addressed in Section 8 of the AEE.

6.3.2 Chapter 3 – Water Module

This Chapter was developed in recognition of the Waikato Region’s distinctive character which is largely derived from the scenic and aesthetic impressions of its lakes, rivers and wetlands. The module includes a framework of provisions to address and protect this character and its associated values, and includes rules addressing the taking, use, and associated discharge of fresh water.

Rules of relevance to the Project are identified as follows.

3.1-3.2 Implementation Measures – Water Management...

Chapters 3.1 and 3.2 outline overarching water management frameworks, including the establishment of Water Management Classes. These parts of the Plan do not include specific rules.

3.3 Implementation Methods – Water Takes

This part of the Water Module incorporates a framework of rules to control water takes throughout the Region, including the Waihou River catchment. At this stage, the Project does not seek specific consent for any water takes beyond those allowed for through the permitted activity provisions of this Chapter. Should the construction phase of the Project require on-site water takes, once a Constructor has been nominated and a construction methodology resolved, further consents will be sought for water takes if and where necessary.

3.4 Implementation Methods – Efficient Use of Water

This Chapter presents a framework for the efficient use of water, and in particular, water takes. As the Project does not seek consent for water takes at this time, and no existing consents to take water are impacted by the Project, the rule provisions of this Chapter are not relevant at this point.

3.5 Implementation Methods – Discharges

Chapter 3.5 includes rules pertaining to the management of different forms of discharges to water. Only part 3.5.11 relating to stormwater discharges is considered relevant to the Project at this point.

3.5.11 Implementation Methods – Stormwater Discharges

Rule	Control	Comment
3.5.11.4 – Permitted Activity Rule – Discharge of Stormwater to Water	(a) The discharge shall not originate from a catchment that includes any high-risk facility, contaminated land, operating quarry or mineral extraction site unless there is an interceptor system* in place. (b) Any erosion occurring as a result of the discharge shall be remedied as soon as practicable. (c) The catchment shall not exceed one hectare for discharges that originate from urban areas. (d) There shall be no adverse increase in water levels downstream of the discharge point which causes flooding on neighbouring properties, as a result of the discharge. (e) The discharge shall comply with the suspended solids standards in Section 3.2.4.6. (f) The discharge shall not contain any material which will cause the production of conspicuous oil or grease films, scums or foams, or floatable suspended materials at any point downstream that is a distance greater than three times the width of the stream at the point of discharge. (g) The discharge shall not contain concentrations of hazardous substances that may cause significant adverse effects on aquatic life or the suitability of the water for human consumption after treatment. (h) There shall be no discharge to any Significant Geothermal Feature.	The site is not a high-risk facility or any other of the listed activity types. The catchment is located within a rural area. Any discharge will meet the criteria listed in b); d)-g) in terms of quantity and quality of discharge and (c) is not relevant. In terms of matter e) and meeting the suspended solids standards in Section 3.2.4.6, the stormwater discharge will be managed effectively and can comply with the following standards: a) The activity or discharge shall not increase the concentration of suspended solids in the receiving water by more than 10 percent; and either b) The suspended solids concentration of the discharge shall not exceed 100 grams per cubic metre. These matters are addressed through the report by CES in Attachment B18. THE PROJECT COMPLIES WITH THIS RULE.

<p>3.5.11.5 – Permitted Activity Rule – Discharge of Stormwater to Land</p>	<p>(a) The discharge shall not originate from a catchment that includes any high-risk facility or contaminated land unless there is an interceptor system in place.</p> <p>(b) The discharge shall be below a rate that would cause flooding outside the design discharge soakage area, except in rain events equivalent to the 10% Annual Exceedance Probability design storm or greater. Any exceedance shall go into designated overland flow paths.</p> <p>(c) There shall not be any overland flow resulting in a discharge to surface water, except in rain events equivalent to the 10% Annual Exceedance Probability design storm or greater; then there shall be no adverse surface water effects as a result of the discharge.</p> <p>(d) Any erosion occurring as a result of the discharge shall be remedied as soon as practicable.</p> <p>The discharge shall not contain concentrations of hazardous substances that may cause significant adverse effects on aquatic life or the suitability of the water for human consumption after treatment.</p>	<p>The site does is not a high-risk facility or contaminated land, and the discharges will comply with the criteria listed in (b), (c) and (d). In terms of matter e), the discharges will not contain concentrations of hazardous substances that may cause significant adverse effects on aquatic life or the suitability of the water for human consumption after treatment.</p> <p>These matters are addressed through the report by CES in Attachment B18.</p> <p>THE PROJECT COMPLIES WITH THIS RULE.</p>
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6.3.3 Chapter 4 – River and Lake Bed Module

This module of the WRP addresses river and lake bed management issues and is divided into three chapters. Chapter 4.1 provides a general overview of river and lake bed management issues, and Chapters 4.2 and 4.3 then address these through various measures, including a framework of Rules. Section 4.4 relates to Lake Taupo and is not relevant. There are numerous Rule provisions within Chapters 4.2 and 4.3, and those of relevance to the Project and the associated activities are addressed as follows.

4.2.9 Culverts

Rule	Control	Comment
<p>4.2.9.3 – Controlled Activity Rule – Culverts for Catchment Areas Not Exceeding 500 Hectares (but more than 100 Hectares)</p>	<p>Any activity unable to comply with Rules 4.2.9.1 or 4.2.9.2 or unless controlled by Rule 4.2.5.1, the following activities:</p> <ol style="list-style-type: none"> 1. The use, erection, reconstruction, placement, alteration or extension of a culvert, and associated bed disturbance, in or on the bed of a river or lake for a catchment area exceeding 100 hectares but not exceeding 500 hectares upstream of the culvert, and 2. The subsequent diversion and discharge of water through the culvert, and 3. Any discharge of sediment associated with construction activities; and 4. The associated deposition of construction materials. 	<p>The proposed upgraded culverts along Proposed Road 1 (Ch100 and Ch780) pass water from an upstream catchment of between 100 and 500 Hectares, and the upgrade works are considered as a Controlled Activity under Rule 4.2.9.3, subject to compliance with the standards and terms of that rule – (a) through (j). Compliance with these standards and terms is addressed by the specialist report in Attachment B18.</p> <p>CONSENT IS REQUIRED AS A CONTROLLED ACTIVITY.</p>

4.3 River and Lake Bed Disturbances

The only direct interaction of the Project with rivers and/or lakes is via the two proposed culvert upgrades, outlined above. The provisions of Rule 4.2.9.3 include the temporary disturbance of the stream/river bed, and hence the subsequent ‘disturbance’ provisions through Chapter 4.3 are not relevant to the Project.

6.3.4 Chapter 5 – Land and Soil Module

This module of the WRP addresses land and soil management issues and is divided into three chapters – 5.1 Accelerated Erosion, 5.2 Discharges Onto or Into Land, and 5.3 Contaminated Land. 5.3 is not considered to be relevant to the Project due to the lack of any identified soil contamination on Site, however both 5.1 and 5.2 include Rules that are relevant. Those of relevance to the Project and its associated activities are addressed as follows.

5.1 Accelerated Erosion

This Chapter presents rules that seek to control land management practices to address Erosion Prone Areas. These areas are subject to the definition of High Risk Erosion Area, included as follows:

High risk erosion area: Means any part of any activity (where the activity is not otherwise permitted):

1. where the pre-existing slope of the land exceeds 25 degrees; or
2. on coastal frontal dunes on the East Coast; or
3. on coastal sand country on the West Coast (Mokau to Karioitahi) where loose sands are at the ground surface or within 10 centimetres of the surface; or
4. within 50 metres landward of the coastal marine area of an estuary, except in the landward margin of an authorised stopbank; or
5. adjacent to water bodies (including ephemeral watercourses draining catchments greater than 100 hectares, but excluding any other ephemeral rivers or streams), where:
 1. the land slope is between 0 degrees to 15 degrees – within 10 metres from any lake, wetland or the bed of a river or lake, or
 2. the land slope is greater than 15 degrees – within that distance from the wetland, the bed of a river or lake, or from mean high water springs to the first point at which the slope reduces to 15 degrees or less, or 100 metres (whichever is the lesser, outside the minimum distance described in i)).

In this case, the Site includes pre-existing slopes that exceed 25 degrees, and portions of Proposed Road 1 and the upgrade works associated with that road are adjacent to water bodies with potential land slopes of greater than 15 degrees. Accordingly, the Site is a ‘high risk erosion area’ under the WRP provisions.

5.1.4 Implementation Methods – Accelerated Erosion

Rule	Control	Comment
5.1.4.15 – Discretionary Activity Rule – Soil Disturbance, Roading, Tracking, Vegetation Clearance, Riparian Vegetation Clearance in High Risk Erosion Areas	Except as restricted by Rule 5.1.4.16 the following activities, occurring in any continuous 12 month period and located in a high risk erosion area: 1. Roading and tracking activities exceeding 2,000 metres in length 2. Soil disturbance activities exceeding 1,000 cubic metres in volume (solid measure) 3. Soil disturbance activities exceeding two hectares in area 4. Soil disturbance activities resulting in a cut slope batter exceeding three metres in vertical height over a cumulative distance exceeding 120 metres in length...	The proposal does not meet the permitted or controlled activity provisions under previous Rules as the roading exceeds 2000m length, earthworks area exceeds 2 hectares, and the volume of earthworks exceeds 1000m ³ . Consent is required as a Discretionary Activity under Rule 5.1.4.15. CONSENT IS REQUIRED AS A DISCRETIONARY ACTIVITY.

5.2 Discharges Onto or Into Land

This Chapter presents rules that seek to control land management practices to address discharge of contaminants onto or into land. Rules of relevance to the Project are addressed as follows.

5.2.5 Implementation Methods – Cleanfilling and Overburden Disposal

Rule	Control	Comment
5.2.5.6 – Discretionary Activity Rule – Cleanfill Disposal in High Risk Locations	The discharge of cleanfill onto or into land and any subsequent discharge of contaminants into water or air in a manner that does not comply with Rules 5.2.5.4 and 5.2.5.5 is a discretionary activity (requiring resource consent).	The proposal does not comply with earlier Rules given the high-risk erosion area and the overburden exceeding a volume of 5000m ³ over a three-year period. CONSENT IS REQUIRED AS A DISCRETIONARY ACTIVITY.

5.2.9 Implementation Methods – Dust Suppression

Rule	Control	Comment
5.2.9.1 – Dust Suppression	<p>The discharge of contaminants (excluding waste oil*) onto or into land for the purpose of dust suppression is a permitted activity subject to the following conditions:</p> <ul style="list-style-type: none"> a) If the dust suppressant is a hazardous substance or if the water or dust suppressant contains hazardous substances it shall be licensed for use as a dust suppressant under the provisions of the Hazardous Substances and New Organisms Act (1996). b) The contaminants shall not be applied at a rate or in weather conditions that result in ponding or surface run-off of contaminants into surface water. c) Any discharge to air arising from the activity shall comply with the conditions and standards and terms in Section 6.1.8 except where the matters addressed in Section 6.1.8 are already addressed by conditions on resource consents for the site. 	<p>No hazardous substances will be used for dust suppression. Having viewed the matters set out in Section 6.1.8, it is considered that any discharge of dust as a result of construction activities on the site will be able to meet the requirements as stipulated below, as any suppressants will be applied at a rate and in weather conditions that will not lead to surface run-off and subsequent discharge to water. Similarly, any dust arising from construction activities will be controlled to an extent that will not be obnoxious to the surrounding environment. Overall, the Project will comply with the following:</p> <ul style="list-style-type: none"> a) There shall be no discharge of contaminants beyond the boundary of the subject property* that has adverse effects on human health, or the health of flora and fauna. b) The discharge shall not result in odour that is objectionable to the extent that it causes an adverse effect at or beyond the boundary of the subject property. c) There shall be no discharge of particulate matter that is objectionable to the extent that it causes an adverse effect at or beyond the boundary of the subject property. d) The discharge shall not significantly impair visibility beyond the boundary of the subject property. e) The discharge shall not cause accelerated corrosion or accelerated deterioration to structures beyond the boundary of the subject property. <p>THE PROJECT COMPLIES WITH THIS RULE.</p>

6.3.5 Chapter 6 – Air Module

The WRP addresses several issues relating to air quality – outlined through this module. Chapter 6.1 provides the management framework for considering adverse effects on local and ambient air quality, from the discharge of contaminants; while the issue of agrichemical spray drift is addressed in Chapter 6.2. Overall, the Project does not pose risks to air quality (beyond construction phase dust, as addressed through Chapter 5.2.9) and this module is not relevant.

6.3.6 Chapter 7 – Geothermal Module

The Geothermal Module of this Plan identifies and discusses resource management issues that specifically concern geothermal water and sets out objectives and policies applying to geothermal water and the effects of the take, use, and discharge of geothermal energy and fluid on other resources, including fresh water. Overall, the Project does not interact with geothermal matters and this module is not relevant.

6.4 Summary of Reasons for Consent in the Waikato Regional Plan

Resource consents are sought under the WRP pursuant to the following rules. Overall, the project is considered as a **Discretionary Activity** under the WRP.

Rule	Control	Comment
<i>River & Lake Bed Module</i> 4.2.9.3 – Controlled Activity Rule – Culverts for Catchment Areas Not Exceeding 500 Hectares (but more than 100 Ha)	4.2.9.3(1) The use, erection, reconstruction, placement, alteration or extension of a culvert, and associated bed disturbance, in or on the bed of a river or lake for a catchment area exceeding 100 hectares but not exceeding 500 hectares upstream of the culvert...	The proposed upgraded culverts along Proposed Road 1 (Ch100 and Ch780) are a Controlled Activity under Rule 4.2.9.3. CONSENT IS REQUIRED AS A CONTROLLED ACTIVITY.
<i>Land & Soil Module</i> 5.1.4.15 – Discretionary Activity Rule – Soil Disturbance, Roading, Tracking, Vegetation Clearance, Riparian Vegetation Clearance in High Risk Erosion Areas	5.1.4.15 <i>The following activities</i> occurring in any continuous 12 month period and located in a high risk erosion area: 1. Roading & tracking exceeding 2,000m 2. Soil disturbance activities exceeding 1,000m ³ 3. Soil disturbance activities exceeding 2Ha 4. Soil disturbance activities resulting in a cut slope batter exceeding three metres in vertical height over a cumulative distance exceeding 120 metres in length...	The Proposed earthworks includes roading which exceeds 2000m length, the area exceeds 2 hectares, and the volume of earthworks exceeds 1000m ³ . Consent is required as a Discretionary Activity under Rule 5.1.4.15. CONSENT IS REQUIRED AS A DISCRETIONARY ACTIVITY.
<i>Land & Soil Module</i> 5.2.5.6 – Discretionary Activity Rule – Cleanfill Disposal in High Risk Locations	The discharge of cleanfill onto or into land and any subsequent discharge of contaminants into water or air in a manner...[in high risk locations] is a discretionary activity.	The proposal does not comply with earlier Rules given the high-risk erosion area and the overburden exceeding a volume of 5000m ³ over a three-year period. CONSENT IS REQUIRED AS A DISCRETIONARY ACTIVITY.

6.5 Overall Activity Status

The proposal requires resource consent under both the Hauraki District Plan and Waikato Regional Plan as a Discretionary Activity, apart from the discrete substation and termination structures, which are (technically) a non complying activity under the HDP.

For the avoidance of doubt, to the extent that there are any other rules of the Hauraki District Plan or Waikato Regional Plan infringed by the Project (as described in this AEE Report and Attachments) resource consent is sought to depart from those rules accordingly.

7 Assessment of Environmental Effects

The following section of the report addresses the actual or potential effects on the environment arising from the proposed wind farm, considering the relevant objectives and policies of the relevant planning instruments as well as the purpose and principles of the Resource Management Act.

7.1 Receiving Environment

The receiving environment is comprised of the following:

- The existing environment and associated effects from lawfully established activities; and
- Effects from any consents on the subject site (not impacted by the proposal) that are likely to be implemented; and
- The existing environment (beyond the subject site) as modified by any resource consents granted and likely to be implemented; and
- The environment as likely to be modified by activities permitted in the plan.

The Site is described in Section 2. The proposed development is located on land that is zoned Rural. The Rural Zone generally envisages an open space character, with buildings mainly limited to dwellings and other ancillary-type buildings directly associated with rural production activities.

The applicant is not aware of any resource consents held for development on neighbouring land of relevance to the proposal. In terms of the “*environment as likely to be modified by activities permitted in the plan*”, the rural zoning does allow for activities to be established on the surrounding land as permitted activities. These include the following:

- One dwelling on each certificate of title containing up to 40 hectares of land (excluding dwellings and additions and accessory buildings and additions in the outstanding natural landscape area, district amenity landscape area or Piako flood ponding area);
- Two dwellings on each certificate of title containing 40 or more hectares of land (excluding dwellings and additions thereto and accessory buildings and additions thereto in the outstanding natural landscape area, district amenity landscape area, or Piako flood ponding area);
- One dwelling on each certificate of title containing up to 40 hectares of land in the district amenity landscape area;
- Two dwellings on each certificate of title containing 40 or more hectares of land in the district amenity landscape area; and
- Buildings that are accessory to farming activities.

The Rural Zone also allows for farming and forestry activities to be undertaken, as well as farm stays and home occupations.

7.2 Permitted Baseline

There are no granted but unimplemented consents in relation to the Site, except for existing resource consents pertaining to the wind monitoring masts. These however have no bearing on the permitted baseline for the Project.

Any activity not covered under permitted activity status automatically triggers the requirement for a resource consent under the Hauraki District Plan. ‘Stand alone’ wind farms are not permitted under the HDP. Under the Waikato Regional Plan, consents are required for streamworks and earthworks-associated activities. In particular, the earthworks required to establish the wind farm are significantly higher than the permitted activity thresholds. Therefore, the permitted baseline associated with both the district plan and regional plan does not provide any useful comparison for the purpose of disregarding effects.

Accordingly, a permitted baseline has not been applied for this assessment.

7.3 Surrounding Character, Landscape and Visual Effects

The proposed Kaimai Wind Farm will have effects on the character and landscape values of the Site and its surrounds, including areas with Outstanding Natural Landscape values. An assessment of the actual and potential effects of the wind farm on the landscape, visual amenity and character of the surrounding environment has been undertaken by Mike Moore, a Registered landscape architect with the New Zealand Institute of Landscape Architects. Mr Moore's assessment is included in Attachment B12, and it references Project photomontages completed by Energy3 (refer to Attachment E). The conclusions reached by Mr. Moore are quoted as follows:

The proposed Kaimai Wind Farm site is modified farmland but has visual sensitivity due to its prominent position on the Kaimai Range and the proximity of the higher part of the site to the Kaimai Mamaku Conservation Area, an area recognized as an Outstanding Natural Landscape.

The proposed wind farm has an area of 1304ha covering three properties, and will have 24 turbines. Because of their distinctive form and at around 200m tall, the turbines will be prominent. Most of the turbines will be located on a lower secondary ridge but a group of seven will be on the main Kaimai Range ridge. Their specific locations will generally be in response to the landform pattern of spurs and ridgelines. Substantial earthworks will be required for access roads and platform creation but generally these will not have major long term visual effects due to the avoidance of steep, visually prominent slopes and the proposed revegetation of batter slopes.

The effects of the proposal on landscape character and values will be adverse / high as far as the upper group of 7 turbines are concerned, and adverse / moderate for the main lower group of turbines, with the variation relating to the differing character and sensitivity of the contexts. The upper group impacts the main ridgeline and is visible within a highly natural context from the Waihi Basin area whilst the lower group is lower and in an area where a working rural landscape character is more strongly expressed.

In terms of effects on the visual amenity of the various affected viewing audiences, the proposed wind farm will be visible over a wide area and the nature and significance of effects varies with viewing distance and the degree of visual dominance, as well as the character of the context as seen from the specific viewpoints. Assessments for the various areas range from adverse / high to adverse / very low. The viewers likely to be most sensitive to the visual change that the proposal will bring are close-by residents. In general, effects from areas within approximately 2km of the nearest turbine are assessed as at least adverse / moderate due to the dominance of the turbines within this distance. Visual effects are also more significant when seen from the eastern side of the range due to the highly natural landscape context. From other viewpoints, at distances from which the turbines will not be seen as dominant, the wind farm will be well integrated in what is a modified, working rural landscape. It will add a significant new feature but in other respects existing landscape elements, patterns and processes will remain largely unchanged.

In terms of the relevant assessment matters in the HDP and its fit with the relevant objectives and policies in the HDP and WRPS, the proposed wind farm is generally consistent with those matters protecting rural character and associated amenity values, but there are adverse effects on the values of the adjacent ONFL and the visual amenity values of neighbours.

In summary, Mr Moore concludes that Project will cause 'adverse / high' effects on the landscape character and values as a result of the upper group of 7 turbines, and 'adverse / moderate' for the main lower group of turbines. Mr Moore explains that the variation in effects relates to the differing character and sensitivity of the contexts for the two groups. As to visual amenity effects of the various affected viewing audiences, the assessments range from 'adverse / high' to 'adverse / very low' levels of effect. Mr Moore determines that the visual amenity effects are likely to be most pronounced on close-by residents, while viewpoints to the east of the Ranges will also be more significantly impacted due to the highly natural landscape context associated with the ONFL.

Mr Moore's assessment was also subject to a peer review undertaken by Mr Boyden Evans, Partner and Landscape Architect at Boffa Miskell Ltd. This review was undertaken to add further support to the work done and conclusions drawn by Mr Moore. Mr Evans' summary of his peer review is included in Attachment B13.

While Mr Moore's report has concluded that there would be up to 'adverse / high' effects on landscape character and values and visual amenity in this area, it is not possible for a wind farm to avoid adverse visual effects, given the necessary scale and positioning

of turbines along ridges to efficiently and economically utilise the available wind resource. Wind farms are also not foreign elements in the rural landscape and they require the space and scale provided by rural settings.

Wind farm design is largely dictated by operational requirements, including the location and number of turbines required for a viable scheme (as discussed in Sections 3.4-3.5 of this report). With the Kaimai Wind Farm, several design iterations have been undertaken with the intent on mitigating adverse effects on the landscape, where possible. This has included removing two turbines (with nine turbines originally planned along the upper ridgeline) and reducing the height of the seven turbines on the upper ridge to a maximum tip height of 180m. On this basis, the Kaimai Wind Farm in its Proposed format is considered to represent an appropriate and balanced outcome in terms of effects on landscape values, character and visibility.

7.4 Noise and Vibration Effects

Wind farms have the potential to generate adverse noise effects on surrounding land users, caused by the movement of turbine blades through the air and the associated gearing and other machinery within the turbine nacelle. An acoustic assessment has been undertaken by Dr Stephen Chiles of Chiles Ltd to determine the predicted noise levels from the wind farm, in particular to address the ongoing noise levels expected from the operation of the wind farm relative to the nearest residences. Dr Chiles has also assessed the potential noise effects associated with the construction of the Project. Conclusions from the assessment by Dr Chiles are included below (refer to Attachment B10 for the full assessment report):

Chiles Ltd has assessed sound from the proposed Kaimai Wind Farm near Tirohia. The Hauraki District Plan does not include noise rules that can be applied to a wind farm. Therefore, the assessment has been based on the New Zealand wind farm noise standard NZS 6808. This standard is referenced in the Matamata Piako District Plan.

The existing environment has been found to be typical of a rural area. A survey during March 2017 showed elevated background sound levels due to cicadas, but analysis of audio recordings to remove the influence of cicadas indicates that sound levels are likely to reduce to more common rural levels at other times of year.

A computer model has been used to predict sound levels for the maximum sound power of indicative wind turbines. The wind farm sound levels are predicted to comply with a 40 dB LA90 noise limit.

On the basis that predicted sound levels comply with NZS 6808, which recommends limits to protect health and reasonable amenity, the noise effects of the Kaimai Wind Farm are considered to be acceptable in this environment. Vibration from wind farms has been shown to be below thresholds for levels that can be felt by people or cause damage to buildings.

The wind farm construction would cause temporary noise effects, but due to the separation of most activities from neighbouring houses levels should comply with the limits in the New Zealand construction noise standard. If consent is granted, it is recommended that conditions should be imposed to ensure noise effects remain in accordance with this assessment.

The noise and vibration assessment of the Project undertaken by Chiles Ltd has been completed in accordance with current best practice, and specifically the requirements of the *New Zealand Standard on Acoustics – Wind Farm Noise (NZS 6808: 2010)*. The assessment concludes that all requirements of *NZS 6808: 2010* will be met by the Project, i.e. the wind farm sound levels are predicted to comply with a 40 dB LA90 noise limit. On this basis, Dr Chiles concludes that the noise effects of the Kaimai Wind Farm are considered to be acceptable in this environment. Further, KWF proposes to implement the conditions of consent recommended by Chiles Ltd to ensure noise effects remain in accordance with that assessment.

7.5 Ecological Effects

The proposed Kaimai Wind Farm has the potential to cause adverse effects on the ecological values of vegetation and fauna on and around the Site. An assessment of the potential ecological effects associated with the construction and operation of the Project has been undertaken by Kessels Ecology Ltd, which is summarised through its 'Ecological Effects Assessment' report dated March 2018 following extensive investigations undertaken from 2009 to 2017. The assessment identifies and addresses both direct and indirect potential impacts on ecological values from the Project, and proposes recommendations for avoidance, remediation and mitigation measures to address these impacts. This report is included in Attachment B6, and is referred to it as the 'Kessels EEA' report.

Supplementary ecological investigations were commissioned by KWF to ensure a comprehensive ecological assessment of the Project, and these have been undertaken by Ecology New Zealand Limited (ENZL). The additional investigations and findings are summarised through the ENZL 'Supplementary Ecology Report,' dated 14 June 2018, and this is included in Attachment B7. This is referred to as the 'ENZL SER'.

7.5.1 Effects on indigenous vegetation

The Site contains areas of indigenous forest and scrubland, most of which is avoided by the wind farm design. The HDP-identified SNA is specifically avoided. However, Turbine 13 is located on a fragment area of indigenous vegetation, requiring vegetation clearance for its construction and operation. No further indigenous vegetation will be removed for the construction of infrastructure and roading upgrades to the wind farm.

The Kessels EEA identifies that the vegetation clearance required for Turbine 13 equates to 1657m² of secondary broadleaved forest and 70m² of secondary broadleaved treeland. It concludes that this fragment is heavily modified by grazing and is not ecologically significant. The effect of this vegetation clearance is further addressed through the ENZL SER. ENZL note that the '*relevant Hauraki District Plan map (Map 29) shows that the treeland fragment has not been identified as a Significant Natural Area; thus, significant and protected regional biodiversity values will not be affected. No kauri were identified within the Turbine 13 site during the assessment.*'

On balance, the ecological assessments conclude that non-significant effects are expected from the proposed clearance of vegetation for Turbine 13.

7.5.2 Effects on bats

Both the Kessels EEA and ENZL SER address potential effects on bats, and in particular, local long-tailed bat populations. Preliminary bat surveys were undertaken by Kessels during 4 – 17 January 2013 and 22 September – 27 October 2015, confirming the presence of long-tailed bats within the Site. ENZL were subsequently commissioned to carry out supplementary native bat monitoring across the Site and surrounding areas. The supplementary monitoring by ENZL was undertaken to provide a robust assessment of bat distribution and activity across the wider Project area, including areas on and off-Site. The findings of the supplementary bat investigations support and improve impact assessments for this protected native species. Key findings from the ENZL SER are included as follows, building on the investigations and outcomes from the Kessels EEA:

Section 3.6 Discussion and Summary of Findings

Long-tailed bat threat status was described in the Kessels EEA report as Nationally Vulnerable. Genetic research has recently led to the reclassification of long-tailed bats as a single species (previously broken into North and South Island taxa)⁷. The threat status of this species has also been updated and it is now classified as a Threatened – Nationally Critical species. The threat level was increased due to concerns regarding impacts from vespid wasps, significant habitat loss, and continuing declines being reported within populations without predator control.

It has been confirmed that long-tailed bats occur across the western extents of the Kaimai Mamaku Forest, both within and outside of the Project boundaries. These bats were detected commuting across the ridgeline edge of this forest and down through lower altitude areas to the west of the Project site. The landscape in the lower altitude western areas provide habitat comprised of a mosaic of farmland, plantation forest and pockets of remnant forest. These results indicate that long-tailed bats are utilising wide areas across the local landscape. With the exception of four sites where high bat activity levels were recorded, activity levels across the Project site and wider landscape were moderate or low.

Foraging areas not previously noted were identified during ENZLs March/April 2018 surveys. The most notable of which occurred immediately south of the Project boundary (ABM 03) and the second within the northern extent of the Project site (ABM 16). These areas did not overlap with any identified rotor impact zones associated with the proposed turbine positions, however ABM 16 was found in relatively close proximity.

No short-tailed bats were detected during ENZLs survey efforts. This supports prior findings undertaken by Kessels ecology. The closest records of this species lie approximately 70km north of the Projects boundary.

Though no indicative roosting habitat was identified during survey efforts, it is expected that the most abundant and higher quality roosting areas for long-tailed bat lie within the Kaimai Mamaku Forest area.

The above findings expand the knowledge of long-tailed bat distribution and activity patterns across the local landscape. The Kessels EEA concluded that the proposed wind farm poses a potential turbine strike risk for the local bat population (noting that turbine blades may not actually need to make contact with a bat to cause injury or mortality – bats may be killed by barotrauma). That finding is consistent with international studies that have shown that wind farms can cause substantial numbers of bat mortalities. However, a comprehensive multi-year bat strike monitoring programme at the Te Uku Wind Farm (a wind farm of similar scale and within a similar habitat matrix to this Project) provides a strong indication that the actual impact of wind farms on long-tailed bats is not significant. Given that there is some uncertainty regarding the impact of the proposed wind farm on bats, the targeted pest control recommended as bat mitigation in the Kessels EEA is considered appropriate.

In summary, the Kessels EEA and ENZL SER confirm the presence of long-tailed bats in and around the Project area. Both assessments indicate some risk to this species from the operation of the wind farm; however recent local knowledge gained from the Te Uku Wind Farm in Raglan indicates that the actual impact of wind farms on long-tailed bats is not significant. Accordingly, the proposed mitigation measures in the form of targeted pest control to address the residual risk to long-tailed bats, as proposed through the Kessels EEA and endorsed in the ENZL SER, is considered appropriate relative to the scale of potential adverse effects.

7.5.3 Effects on avifauna

The potential effects on avifauna (birds) from the Project have been investigated and assessed through the Kessels EEA, with supplementary commentary provided through the ENZL SER, particularly in respect of appropriate mitigation measures. The primary risk is the potential for bird strike and mortality from collisions with the turbines. The main groupings of birds identified and assessed through the Kessels EEA are summarised as follows:

- *Internal Migratory Shorebirds*. In particular, South Island pied oystercatcher (SIPO) have been detected flying over the site but in low numbers.
- *Northern Hemisphere Migrants*. The Kessels EEA notes that migration and local flight pathways may cross the site, but bioacoustic surveys have not detected any calls of migratory species to date.
- *Resident Birds*. Studies on this Site suggest key resident birds, such as harrier, tui and kereru, are likely to be present in low numbers.
- *Local Migrants*. The Kessels EEA identifies the potential for dispersal and/or localised migration, particularly by karearea (New Zealand falcon) and North Island kākā.

The Kessels EEA provides the following summary of findings from the research and assessments:

The potential adverse effects of turbine blade strike is likely to result in injury or mortality of some resident and migrating bird species, as well as long-tailed bats.

Tui, New Zealand falcon, kaka and kereru do fly at turbine blade height, and can perform aerial breeding displays at heights of over 30-50 m. However, collision risk analysis and carcass search studies under operating wind farms at other New Zealand sites have indicated that actual strike is rarely detected and where it occurs is in low numbers which the local population is able to sustain. Fencing, habitat restoration and animal pest control are recommended to an extent sufficient to increase the breeding success of these species to a level which will at least match the predicted effect.

Local flight movements of internal migrant New Zealand shorebirds, wetland and resident shorebirds/seabirds, and movements of international migrants to their staging areas between the Firth of Thames and the Bay of Plenty indicate that some of these birds will likely pass over the Kaimai Range on a regular basis. Bioacoustic surveys confirmed that South Island pied oystercatcher are at risk because they have been heard crossing the site on several occasions. Other migratory birds are likely to be using flight pathways across the Kaimai Range, even though they have not been detected. Therefore, these species may also be at risk of collision with turbine blades.

However, previous studies of these species in New Zealand suggest that strike mortality will be low and able to be mitigated through the implementation of appropriate offset, compensation and monitoring/adaptive management measures during the operational lifespan of the wind farm. For example, to compensate for these potential turbine strike losses supporting initiatives which increase the breeding success of each of these species to a level that effectively replaces this number of breeding adults of each species would be an appropriate offset mitigation measure.

In the context of vegetation removal associated with the establishment of Turbine 13 and the potential for direct impacts on birds and this habitat, the ENZL SER presents the following summary assessment:

The clearance of native vegetation will directly remove some habitat for native birds. Due to their highly mobile nature, it is likely that direct impacts on adult forest birds on-site will be largely avoided as they are expected to disperse to other habitat during vegetation clearance. Potential impacts on nesting adult native birds, and both their eggs and unfledged chicks should be avoided/minimised by only clearing vegetation outside of the peak of the breeding season for native forest bird species (October to February inclusive). If vegetation clearance during the peak of the bird breeding season is unavoidable, then those areas should be checked by a suitably qualified ecologist for nesting birds immediately prior to vegetation removal and, if any active nests (i.e. one or more viable eggs or live chicks are present) are detected, vegetation clearance in the immediate vicinity of the nest (e.g., within a 10m radius) should be delayed until a suitably qualified ecologist confirms that any nests present are no longer active.

Overall, the Kessels EEA concludes that the potential impacts on the identified bird species presents a 'low adverse effect likely with suitable mitigation and monitoring provisions.' The proposed mitigation and monitoring in respect of potential effects on avifauna, as outlined in Section 3.7 of this AEE, and as reinforced through the findings of the supplementary ENZL SER, will further ensure the predicted outcome of 'non-significant effects' in this regard (see wording in ENZL SER).

7.5.4 Effects on herpetofauna and terrestrial invertebrates

Most of the vegetation within the Site and Project envelope is comprised of pasture and no significant indigenous vegetation will be directly affected by the development. This reduces the scope for adverse ecological effects on herpetofauna (lizards) and indigenous terrestrial invertebrates. There is potential for habitat disturbance through the clearance and/or trimming of non-ecologically significant vegetation (comprising of both exotic and indigenous species), primarily associated with the establishment of Turbine 13.

The Kessels EEA concludes that adverse effects on lizards and terrestrial invertebrates are likely to be relatively minor, provided best practice measures are implemented during construction and operation phases, as is proposed. This is in-line with the supplementary findings from the ENZL SER, which summarises:

Actual and potential habitats for several native lizard species are present across the site as described above in section 2.3. Vegetation removal and earthworks therefore pose a direct risk of impacts on protected native lizards including the species confirmed to be present and those potentially on site but not detected to date. This is highlighted by the presence of lizards within vegetation proposed for clearance within the Turbine 13 bush fragment pocket and within the works footprint for the construction of vehicle access to Turbines 11, 12 and 13. Both areas containing relict populations of copper skink. Without mitigation, it is likely that the proposed vegetation clearance and earthworks will adversely affect native lizards (e.g., by causing injury, death or displacement). It is therefore recommended that prior to any vegetation clearance and earthworks, an appropriately qualified and DOC-approved herpetologist/ecologist should implement appropriate lizard management prior to and during vegetation removal and earthworks. A Project-specific Wildlife Act permit will be required by the Department of Conservation to salvage and relocate native lizards.

Overall, the proposed best practice measures for the construction and operation phases of the wind farm, including appropriate lizard management (with DoC approval as required), will ensure that potential adverse effects on herpetofauna (lizards) and indigenous terrestrial invertebrates can be appropriately mitigated.

7.5.5 Effects on aquatic habitats

The Project will include erosion and sediment controls for the duration of the construction phase to mitigate adverse effects associated with soil erosion and discharges of sediment. The Kessels EEA addresses this issue in light of the proposed best practice mitigation measures outlined through the siltation report by CES (refer to Attachment B17). The Kessels EEA summarises as follows:

While the turbines themselves are on the ridge lines, there is the potential for sediment runoff to adversely affect ecologically sensitive stream habitats and possibly concentrate contamination, depending on method utilised for construction of access roading and associated infrastructure.

There is an increased potential for sediment or concrete runoff to streams as a result of exposed excavation associated with turbine construction and road construction activities.

The potential adverse effects associated with sediment runoff from exposed excavations may cause significant and prolonged sediment discharges if not adequately controlled. Effects can be avoided by adoption of appropriate sediment control measures. During construction, care will be needed to prevent sediment and concrete from discharging into the streams. Sediment control measures include, but are not restricted to, controlling run off, the prevention of slumping of batters, cuts and side casting, maintain slope stability and a contingency measure for heavy rainfall events.

It would also be prudent to immediately stabilise exposed earth areas and construct sediment ponds and geotextile silt traps at suitable drainage points and key erosion points.

In addition to earthworks, the supplementary ecological assessment (ENZL SER) identifies risks to aquatic habitats associated with the proposed culvert upgrades, specifically the two in-stream culverts along the access road. In this regard, the ENZL SER concludes:

Overall, the culvert upgrades have the potential to increase the ecological value of the site by improving fish passage throughout the site ensuring that previously restricted habitat become accessible. This improvement could be coupled with fencing and riparian restoration of stream headwaters to ensure that there will be a significant benefit to the freshwater environment within the site.

In summary, the potential adverse effects on aquatic habitats associated with the Project, in particular the earthworks and culvert upgrades, can be appropriately mitigated through the implementation of the proposed best practice measures throughout the duration of construction works.

7.5.6 Effects on environmental weeds and disease spread

The Kessels EEA identifies the introduction of new weeds and the spread of existing weed species as one of the most critical aspects of this Project in terms of potential ecological impacts. The report also highlights the risk of disease spread during the construction phase, particularly myrtle rust and kauri dieback. It goes on to conclude:

Provided due care and initial weed control is carried out as and when required, it is expected that the pasture or indigenous scrubland species will quickly gain a foot-hold and dominate vegetative cover along access road batters and cuts.

...procedures and measures to prevent the introduction and or spread of kauri dieback and myrtle rust into the area should be developed and implemented. For instance, it is recommended that all equipment brought to site, both during construction and operation, is washed to remove soil prior to entry into the area and all contractors clean their equipment with the appropriate chemicals to kill the spores before undertaking work on the site to avoid any spread of the spores.

These findings are reinforced by the ENZL SER which states:

...it is recommended that all equipment brought to site, both during construction and operation, is washed to remove soil prior to entry into the area and all contractors clean their equipment with the appropriate chemicals to kill the spores before undertaking work on the site to avoid any spread of the spores. Advice shall be sought

from the Ministry of Primary Industries in regards to Myrtle Rust due to on-going changes in this diseases management.

The proposed Ecological Management Plan will incorporate a framework for weed and disease management, and overall, the potential adverse effects in this regard can be appropriately mitigated.

7.5.7 Summary of residual ecological effects

The supplementary ecological assessment undertaken by Ecology New Zealand Ltd (ENZL SER) presents a clear summary of the potential residual ecological effects associated with the Project – refer to Section 5.7 in Attachment B07. Table 3 from this assessment is included in full below:

ENZL SER – Table 3: Summary of residual adverse ecological effects after recommended management has been implemented

Key Ecological Values	Risk Assessment	Predicted significance of residual adverse effects following implementation of avoidance, mitigation and compensation measures
Vegetation	Localised vegetation clearance to occur for the establishment of a single Turbine footprint	Non-significant effects expected
Long-tailed bats	Localised vegetation clearance and potential collision risks may impact bats but monitoring at operational wind farms indicates little or no impact on bats.	Non-significant effects expected but with uncertainty. Monitoring and adaptive management to be applied accordingly.
Internal Migratory Avifauna (Waders)	Flight paths may cross the site. South Island Pied oystercatcher have been detected flying over the site but in low numbers	Non-significant effects expected but with uncertainty. Monitoring and adaptive management to be applied accordingly.
Northern Hemisphere Avifauna Migrants	Migration pathway(s) may cross the site. Bioacoustic surveys will be carried out during migration periods to reduce uncertainty.	Non-significant effects expected but with some uncertainty. Monitoring and possibly adaptive management/compensation to be applied accordingly.
Resident Avifauna	Resident native birds (e.g., tui, harrier and kereru, are likely to be present in low numbers. Monitoring at operational wind farm sites indicate very low actual strike rates.	Non-significant effects expected
Local Avifauna Migrants	Collision may occur during dispersal or localised migration by NZ falcons and North Island kaka, but likely to be rare event	Non-significant effects expected but with uncertainty. Monitoring and adaptive management to be applied accordingly.
Herpetofauna	Localised in areas of vegetation rank grass clearance	Non-significant effects expected
Terrestrial Invertebrates	Low – Negligible localised impacts expected for individuals/local populations.	Non-significant effects expected
Freshwater Quality (including aquatic invertebrates)	Sediment and erosion from construction pose risks to entering the sites waterways.	Non-significant effects expected
Freshwater Quality (including aquatic invertebrates)	Sediment and erosion from construction pose risks to entering the sites waterways.	Non-significant effects expected
Native Fish	Localised impacts at eight culvert sites across the site.	Non-significant effects expected
Environmental Weeds	Potential spread and introduction of weeds during the construction and operations phase.	Non-significant effects expected
Disease Spread	Potential spread and introduction of disease during the construction and operations phase.	Non-significant effects expected

The ENZL SER generally concludes that ‘non-significant’ residual adverse ecological effects can be expected from the Project. It does however highlight some areas of uncertainty, specifically in respect of long-tailed bats, and local, internal and northern hemisphere migratory avifauna. The proposed monitoring and adaptive management programmes will be implemented to address this uncertainty. Overall, on balance, the potential adverse effects on ecological values are not significant and can be appropriately mitigated, or offset.

7.6 Shadow Flicker Effects

‘Shadow Flicker’ refers to the shadow that a wind turbine casts over structures and observers when the sun is positioned behind the turbine rotor. An analysis of the potential shadow flicker effects has been undertaken by Energy3 Services Ltd (included as Attachment B16), and the report presents an assessment of the potential occurrence of shadow flicker on 39 dwellings near the wind farm. The report and its conclusions are summarised as follows:

The Wind Farm design software package “WindFarm” has been used to calculate shadow flicker in this analysis. However, the analysis method employed tends to be conservative and typically results in over-estimation of the actual number of hours of shadow flicker experienced at a dwelling. So as to calculate shadow flicker on a “worst case” scenario, no attempt has been made to quantify the likely reduction in shadow flicker duration due to turbine orientation, intervening structures or terrain. However probable exposure has been calculated from long term cloud cover data.

Kaimai Wind Farm Limited has supplied a layout for the wind farm consisting of 24 turbines, and surveyed locations of 39 dwellings in the vicinity of the wind farm. The dwellings range from a minimum distance of approximately 1 km, extending to a maximum distance of approximately 8.6 km from the turbine locations.

In New Zealand there are no specific guidelines as to how to assess shadow flicker generated by wind turbines. However, international guidelines state that the practical extent to which shadow flicker should be assessed is to a distance of 265 times the distance of the blade chord (the widest part of the turbine blade), or approximately 1.1 km. The assessment has identified that 13 dwellings fall within this distance from the wind farm. The dwellings within 2 km have been assessed for the total number of hours per year that these dwellings could be potentially exposed to shadow flicker. This calculated figure has been compared to the international guidelines for acceptable levels of exposure.

The 21 dwellings within a 2-kilometre radius were represented as an omnidirectional “greenhouse” receptor in the calculation, such that receptors consist of a 1 m x 1 m window, with the window centre being 2 m above ground level, on each wall of the house.

The generally accepted international exposure levels are deemed as 30 hours in total per year on a modelled basis, 10 hours per year actually experienced, or no more than 30 minutes per day.

The number of occupied residences registering more than 30 hours per year was 15, ranging from 30.1 hours to 92.6 hours.

Calculations were assessed a conservative basis, assuming all houses had an un-obscured window directly orientated towards the wind farm.

Energy3 have also outlined mitigation measures that could be explored in the event that shadow flicker is a nuisance on nearby residences. These include:

- Planting vegetation or tree lines that will obscure the line of sight to the turbines causing flicker; and
- Installation of window blinds or awnings on affected dwellings.

As outlined in Section 3.7, KWF is open to providing practicable planting on site for local residents in response to adverse effects from shadow flicker. Overall and on balance, the potential adverse effects from shadow flicker can be appropriately mitigated.

7.7 Tourism and Recreation Effects

Wind farms have the potential to adversely affect recreational and tourism activity by way of precluding public access in locations used by recreationalists, or by impacting the amenity value of the recreation and tourism experience. In this locality, the turbines are to be located within private land; however, the location is adjacent to various recreational and tourism activity sites that have the potential to be affected by the wind farm. An assessment of the actual and potential effects of the development on tourism and recreation values has been undertaken by TRC Tourism Ltd (Attachment B19), and its conclusions are included as follows:

Overall, recreation and tourism effects from the construction of the Kaimai Wind Farm will be minimal provided construction traffic impacts are addressed.

The effects of the *operation* of the wind farm on recreational and tourism activities will also be minimal. Ventus Energy Limited has proactively engaged with the local community and recreational groups during the design and construction phase. To date this has resulted in a reduction in the number of turbines to allow gliding activities to continue, and discussions have occurred about adjustments to operations to allow for enhanced use of the area during gliding competitions. This consultation process is underway and ongoing.

The potential impacts on the recreational settings in Kaimai Mamaku Forest Park are mitigated by the limited visibility of the turbines from most areas because of vegetation, and because they will only be visible from the park in the context of the open rural views to the west.

The establishment of new walking and cycling routes across the site would add to the range of recreational options for people using both the Kaimai Mamaku Forest Park and the Hauraki Rail Trail, thus enhancing these two significant recreational experiences.

More significantly there is an opportunity to make a positive contribution to local tourism through a series of initiatives designed to inform the local community and visitors to the region about the wind farm and its function. The creation of a new wind farm tour experience would add a significant new visitor experience that would positively contribute to the local tourism economy.

Overall, TRC Tourism Ltd have concluded in their assessment that potential social, recreation and tourism effects arising from the construction of the wind farm will be minimal and can be appropriately managed. In terms of the operational effects, the wind farm will be noticed, but will not restrict public access or prevent enjoyment of the nearby recreational and tourism facilities. On this basis, the Kaimai Wind Farm will reasonably integrate within the surrounding recreational and tourism activities with minimal adverse impacts.

7.8 Geotechnical Effects

A geotechnical assessment has been undertaken by KGA Geotechnical Ltd (KGA) relative to the specific ground conditions at the Site, and to assess the potential for geotechnical constraints and inform the preliminary design of the Kaimai Wind Farm. The full geotechnical report is included in Attachment B9, and a summary of its main conclusions and recommendations is included as follows:

The geotechnical investigation undertaken indicates no significant geotechnical issues that will prevent the formation of the proposed windfarm. However there are geotechnical considerations that must be taken into account as part of the detailed design stage. The key conclusions and considerations for a wind farm development at the site are summarised below:

- The site is underlain by stiff to very stiff surface soils. The depth to rock across the site is variable, ranging from within approximately 3m of ground surface within the central portion of the site and to greater than 7m depth in the southern portion of the site. Further subsurface investigation, including machine drilling, will be required at proposed turbine sites as part of detailed design to confirm the ground conditions for each turbine base.
- Some turbine sites are located on narrow hilltops or on sloping ground and excavation is required to form a level platform for the turbine base. Rock may be encountered within the excavation depth.
- No fill should be placed below the turbine bases.
- Some turbine platforms are likely to be located on a combination of rock and soil which can create a strength difference in the bearing soils. Where this occurs, we recommend either excavation so that the entire turbine base is founded on rock, or alternatively, the turbine base should be pile supported, with piles taken to found into the underlying rock.
- Some turbines are located near to steep slopes. As part of detailed design, slope stability will need to be considered. This may include the piling of the turbine base slab or providing retaining structures.
- Further subsurface investigation and design will be required at select location along the roadway and at each proposed quarry locations.

KGA provides recommendations for detailed earthworks, turbine foundation and building design/construction, access design/construction, and drainage considerations, but ultimately concludes no significant geotechnical issues would prevent the safe formation of the Project on the Site. The various recommendations would be implemented at the detailed design phase.

7.9 Site Access and Transport Effects

7.9.1 Land transportation of turbine equipment

A report has been prepared by Tranzcarr Heavy Haulage Limited outlining the expected land transportation options and routes for transporting the turbine equipment to the Project Site (Attachment B11). The purpose of that report was to assess the effects on the current and future efficiency, operation, safety and development of state highway, local road networks and railway infrastructure. The report focuses on two aspects of the transportation: the oversize loads being blade sections which are up to 78m in length, and the heaviest loads – being the nacelles, generator or the blades (up to 90 tonnes in weight). The report states:

- *Turbine equipment will be shipped to the Mount Maunganui Port, where they will initially be stored prior to transportation. The estimated transport movements are as follows:*

Equipment type	Number	Loads
Tower Section	4 per Turbine	96 loads
Blade Sections	3 per Turbine	72 loads
Nacelle Units	1 per Turbine	24 loads
Hub	1 per Turbine	24 loads
Shipping Containers	2 per Turbine	48 loads
Ancillary equipment		24 loads

- *Blade sections will be transported from the port via State Highway 29. Options need to be considered in some areas as roundabouts, street furniture, signs are located in positions that prevent navigation and therefore will require civil works to enable access.*
- *Haulage of the heavy equipment (nacelle and generator) will follow a different path from the Port due to the weight and height restrictions on the overhead bridge on Takitimu Drive, but will ultimately follow a route along State Highway 29.*
- *A number of approvals and permits are required for the transportation aspects of this proposal. This includes New Zealand Transport Agency (“NZTA”) (noting that NZTA have given approval for a generic 80 tonne heavy vehicle following the suggested route), local roading authorities, Kiwi Rail and utility operators for overhead lines.*

On balance, the Tranzcarr report provides some certainty that transportation of the turbine equipment to the site is feasible, albeit with the necessary approvals from the transport authorities and potential modifications along the route.

7.9.2 Access, safety and transportation effects

The main access to the wind farm for turbine components is on Rawhiti Road, which is located within the Matamata-Piako District Council (“MPDC”) boundary. A minor access for trade vehicles and concrete trucks is via Rotokohu Road. The establishment of the wind farm on the site will increase the trips associated on the local transportation network. A traffic assessment has been prepared by Gray Matter Limited (Attachment 20), which considers the potential safety and efficiency effects on the transport network associated with the construction and establishment of the wind farm. For avoidance of doubt, this assessment is supplementary to the report undertaken by Tranzcarr which focuses on the oversize load and weight considerations, and necessary permits. The conclusions of the Integrated Transport Assessment (ITA) are as follows (in *italics*):

9.1. Potential Effects

The proposal is likely to generate approximately 121veh/day with peaks up to around double (250vpd), for a short duration of 18 months while the wind farm is developed. The potential adverse transportation effects include crashes at the site access and at the SH26 intersection. The potential effects can be mitigated by:

- Localised widening at the site access and the Rawhiti Road/SH26 northern intersection in accordance with NZTA Diagram E.
- Construction Management Plan including:
 - Communications strategy.
 - Temporary traffic management during construction.

- Construction traffic using the SH26 north intersection unless restricted by the weight limit on the one-lane bridge.

9.2. Conclusion

Operational traffic will be negligible. The traffic flows are well within the capacity of the road network to accommodate them. It would be desirable to minimise the effects on people by using the northern access to Rawhiti Road. The construction effects will be temporary. The benefits from localised widening will continue. With appropriate mitigation, including conditions requiring localised widening at the vehicle access and widening at the Rawhiti Road/SH26 (north) intersection, the adverse construction effects of the proposal relating to traffic can be managed to be less than minor and the operational effects will be negligible.

Having regard to the above and the recommended mitigation measures proposed by Gray Matter, it is considered that access to the wind farm for construction and operation can be adequately and safely achieved and any increased traffic generation because of the Project can be adequately accommodated within the existing traffic network. Overall, any adverse traffic effects can be appropriately mitigated.

7.10 Discharges to Land and Water

The Project will cause discharges to land and water during the construction and operational phases, associated with potential discharges of sediment-laden water during the earthworks operations and discharges of stormwater from the road and turbine platforms once operational. The potential effects from these discharges are assessed as follows.

7.10.1 Sediment from earthworks

The earthworks required to enable the construction of the wind farm, primarily related to the access and turbine platforms, are extensive in scale. The potential effects associated with such earthworks relate to various matters including soil erosion and sediment, land stability, archaeological and cultural heritage values, visual and aesthetic values, noise levels, and traffic. In the context of discharges to land and water, the potential for soil erosion and discharges of sediment-laden water during the earthworks has been assessed by Civil Engineering Services (refer to Attachment B17). This siltation report outlines various construction methodologies and erosion and sediment controls to be adopted in order to minimise sediment runoff from the Site. This includes measures such as minimising disturbance areas, and progressively stabilising areas on completion of works. The report outlines the proposed use of erosion and sediment controls which are as follows:

- Sediment ponds;
- Water cut offs;
- Topsoil bunding;
- Rock check dams;
- Silt fences;
- Decant ponds (with fixed or floating decant devices) with rock lined outlet protection.

The road formation and construction will traverse ridgelines and involve cut batters, with excess materials being carted to flatter areas of the Site. Sediment control devices, including silt fences, decanting earth bunds and sediment retention ponds have been identified as being required at key locations for the road construction. Excavations at the turbine locations are required for the establishment of appropriate foundations to support the turbines. It is expected that each turbine site will require the construction of a sediment retention pond (in various formats) to enable suspended sediment to settle in the pond prior to discharge, thereby minimising any sediment migration to receiving environments.

Overall, the report confirms that erosion and sediment controls can be effectively employed for the construction phase of developing the wind farm, and this will ensure that any sediment related runoff to receiving environments will be minimised. Through conditions of consent, a finalised construction/erosion and sediment control plan would be submitted to Council for review and approval prior to any works being undertaken. This would ensure that the appointed contractor would be able to provide input into the final design and construction programme.

On this basis, potential effects resulting from earthworks and associated discharges to land and water can be appropriately managed and adverse effects on the downstream receiving environments minimised.

7.10.2 Stormwater from roads

Discharges to land and water from stormwater originating from the modified road network within the Site have the potential to cause adverse effects on the downstream receiving environments. The management of stormwater from the road alignment and cross-road culverts has been subject to assessment by Civil Engineering Services (refer to Attachment B18). This assessment concludes that *'the existing culverts and concreted overflow spillways serve the farm access and potentially the wind farm quite adequately barring the need to improve the geometric aspects of the road.'* The proposed culvert improvement measures will be implemented as per the CES Report, and stormwater from the proposed road will be managed in accordance with best practice. Overall, the potential effects of discharges to land and water associated with stormwater from the road alignment will be appropriately managed and mitigated.

7.11 Archaeological and Heritage Effects

The project Site is recorded with NZAA as containing one archaeological site, being T13/923 relating to gold prospecting which is recorded as an archaeological Sensitive Area (A) on historic maps. Under the HDP maps, two wāhi tapu sites are registered within the project envelope (HAU 310 and HAU 319). The project has the potential to disturb, modify and destroy these archaeological and heritage sites, particularly during the construction phase of the project. An archaeological assessment has been undertaken by Andrew Hoffman to assess the potential and actual effects of the wind farm on these archaeological and heritage values (Attachment B1).

Mr Hoffman's assessment concludes the following in respect of potential effects on archaeological and heritage values:

Turbine construction

The construction foot print for each proposed turbine is approximately 0.5 – 1 acre. Earthworks will involve formation of a flat platform of that size, and will require substantial cut work in most instances.

Road construction

Road alignment and construction has been defined as PR ROADS 1 to 12. The road alignments are annotated and detailed in Appendix B. The majority of instances will involve upgrade earthworks along existing farm tracks, particularly widening and grading to allow for the large transporters to navigate the area. In a few instances, including PR ROAD 4, new short sections of road will be constructed to reach turbine locations.

No likely effects to T13/923.

Construction of turbines 18, 19 and 20 will not effect Adits 1 or 2.

An existing benched farm track will be upgraded to formation requirements for PR ROAD 7. Adit 1 entrance is located 20 m uphill from the proposed top of batter for PR ROAD 7, and the lowest part of the mullock heap is 2.5 m from the top of batter. Batter cutting earthworks will not modify Adit 1 or its mullock heap. Road upgrade works will not impact Adit 2.

Sensitive Area A:

Construction of PR ROAD 4 avoids Sensitive Area A and will not be modified by it. Appendix B, drawing 200-3, Revision A, shows several potential clean fill site along PR ROAD 4. The northern most of these is at the southern margin of Sensitive Area A. The project manager has been notified of this by email and has confirmed this particular proposed site will be removed from the plan and no dump used at this position (pers.com Glenn Star, 13 June 2018). There are no envisaged effects on Sensitive Area A (see Figure 7).

Rauwharangi tapu – wāhi tapu – HAU310:

This property is between 200 - 400 m from the closest proposed turbine location (10) and any road construction work. The proposed works will have no physical effect on this property.

Pukehange No.1 – wāhi tapu - HAU 319:

The eastern boundary of this property is 850 m from the nearest construction activity. There are no envisaged physical effects to this property.

Turbine 3 – Possible wāhi tapu – burial:

This turbine location is 80 m west of the knoll centre identified by R. Thorpe as the location of a possible wāhi tapu /burial place. The turbine pad footprint does not fall within the area of this knoll and will not modify it.

Overall, the archaeological report concludes that it is unlikely that the works will destroy, damage or modify the whole or part of any archaeological or heritage site. A condition should be included to the effect that if unknown sites are discovered, work at that site will stop and the relevant iwi and other authorities notified.

7.12 Cultural Effects

The responses to consultation with Hauraki iwi to date have been limited. However, Ngāti Hako provided a summary Cultural Values Assessment in April 2018. This highlighted that the Kaimai Mamaku range is an area of high spiritual and cultural significance to Hako, and identified the following key issues for Ngāti Hako with the Project:

- Ngāti Hako place high value on the cultural landscape of Hako and Hauraki. The wind turbines will affect the cultural landscape of Hako. The aesthetic value will be impeded and may have detrimental effects on the cultural values associated with the peaks and mountain ranges.
- There are potential effects on the tohu and kaitiaki located and associated with the Kaimai Mamaku mountain ranges. Tangata whenua rely on tohu (indicators) for weather, tangata (people) and whenua (land). These tohu have been a significant part of our culture and traditions since time immemorial.
- For Ngāti Hako, te uira (lightning) ua (rain), and kohu (mist) are important tohu used to caution and notify iwi of impending news. The proposal will have potential effects on the weather patterns and our ability to read these tohu.

KWF intend to progress further consultation with iwi through the publicly notified consent process to enable a fully informed decision to be made on these and other cultural issues of importance to iwi.

7.13 Aviation Effects

The wind farm has the potential to obstruct and pose risks to various aviation activities that take place in the area given that the turbines will reach a maximum height of 207m. These include hang-gliding and paragliding, as well as glider aircraft from the Matamata Soaring Centre. An assessment of the potential and actual effects of the proposal on aviation activities has been undertaken by Peet Aviation (refer to Attachment B2). The conclusions reached, and recommendations made by Peet Aviation are included as follows:

Conclusion

The ridgeline on the Jackson property will not be able to be used as a launch site for hang-glider and paragliders with the location of the turbines.

With respect to glider aircraft activity, it is my opinion that the KWF will not represent a physical obstacle to glider operations over the proposed site. Likewise, turbulence and wind shear will not be an issue when wind speeds in the area are approximately 16 knots, which is the norm. Glider operations over the proposed site may, however, be affected when wind speeds are more than 20 knots –although this would account for potentially 15% of the time, and needs to be considered against the fact that glider activity would remain viable and subject to pilots conducting flights in a safe and secure manner at an appropriate altitude.

Risk Mitigation measures:

The wind farm is likely to have suitable lighting to comply with the requirements of CAANZ Rule Part 77.21(d) and appendix B and marked on aeronautical charts, this would be a CAANZ decision.

Hang-gliding and paragliding activities remain viable from launch sites away from KWF, however, they will need to be operated in a safe manner over the KWF site, with respect to height and this is the responsibility of the pilot.

Shut down turbines 16 and 17 on ten days per year, during glider competitions under the auspices of the Matamata Soaring Centre and with wind conditions 12 knots or less (<6m/s).

Finally, I do not consider that there is any need to consider moving the location or the alignment of the proposed site or provide for a reduced project envelope.

Overall, considering the assessment by Peet Aviation, the effects from the Project on aviation activities can be appropriately managed and mitigated by the measures outlined above.

7.14 Radio Interference Effects

The turbine towers, including the blades, have the potential to both obstruct and reflect radio signals. These effects can potentially degrade radio reception by both reducing the strength of the wanted signal and also by resulting in reflected signals that can cause interference. Lambda Communications have undertaken an assessment to determine the effects that the construction of the wind farm might have on existing radio communications services in the area – refer to Attachment B15. The summary conclusions from this report are included as follows:

Within the vicinity of the Kaimai Wind Farm, the single largest radio communications site is on the top of Mt Te Aroha at an elevation of 940 metres. This places the radio transmitters on Mt Te Aroha at a considerably greater elevation than the turbines for the wind farm. It is this height differential that would greatly minimise the effect of the windfarm on radio communications services emanating from Mt Te Aroha. This remains the case for the latest turbine size and height definitions as revised in May 2018.

In the case of cellular services, the cellular base stations in the area of the wind farm are at an equivalent or lower elevation to the windfarm, but are situated close to main population centres and major highways and as such aren't generally obstructed by the windfarm. For State Highway 26 between Paeroa and Te Aroha which runs alongside the windfarm, the cellular providers have overlapping coverage from cell sites to the north and south, which will minimise any effects from the presence of the windfarm.

Given the windfarms location on the Kaimai Ranges separating the Waikato from the Bay of Plenty, there are a significant number of fixed point-to-point radio services in the area. However due to the wind farms relative position in relation to Mt Te Aroha, the major repeater site for fixed services, almost all fixed service don't cross the over the windfarm and will therefore be unaffected. The exception to this is for three links, that go between Mt Te Aroha and remotes site near Paeroa and Kopu. In the case of the Kopu link, the link is long enough that the elevation of the radio path passes well over the top of the windfarm and so will be unaffected. For one of the two Paeroa links an initial desktop analysis would indicate that the radio path for these two links will also pass between the wind turbine locations. It would still be advisable to confirm this analysis through a physical line of sight check at the time of construction. The other Paeroa link has since been decommissioned and is therefore no longer an issue.

Mt Te Aroha is also the main terrestrial television translator for the Waikato and northern Bay of Plenty. While the wind turbines might have a limited shadowing effect in a northerly direction from the windfarm, the significant height differential between the windfarm and Mt Te Aroha means this shadowing effect will be restricted to the immediate area below the hills where the windfarm is situated. The shadowing effect is unlikely to extend to the closest township to the north of the wind farm, being Paeroa where television reception should be largely unaffected. The relatively close proximity of Paeroa to Te Aroha means the area already has good coverage and diffraction of the television signals around the turbines should also help to mitigate the shadowing affect.

On balance the affect of the proposed wind farm on radio communications services in the area will be minimal and in most cases there will be no impact at all. It should also be recognised that some level of noise or interference is present in all terrestrial communication links due to the dynamic nature of the environment through which radio signals are propagated. As part of any good radio design, these factors should always be allow for to ensure a service meets an acceptable level of reliability. In almost all cases, the establishment of the wind farm should not significantly change the radio environment to such an extent that existing radio services can't accommodate the change. Only those services that are directly obstructed by the wind turbines might experience any noticeable affects and from the analysis completed as part of this report, there are few if not any links that are obstructed in this way.

Overall, Lambda Communications conclude that on balance, the effect of the Project on radio communications services be minimal and in most cases, there will be no impact at all.

7.15 Wholesale Electricity Market and Security of Supply

Electricity Risk Solutions Ltd (ERS) have provided an evaluation of the proposed Kaimai Wind Farm development to assess the project in terms of the economic and physical benefits to the New Zealand Wholesale Electricity Market and how it would help meet both Local and National Security of Supply requirements. This assessment has been included in Attachment B8, and the conclusions are set out at Section 3.6 above. The ERS report provides the following concluding comments in respect of National Security of Supply:

Both the short-term Hydro risk curves and the medium to longer term security of supply assessment show a need for investment in new generation capacity and energy production capability.

For the security of supply assessment there is a strong need for new levels of energy capability or MWhs of production from 2023 onwards when all the present high and medium likelihood of proceeding generation will be needed in an extended dry year situation.

The North Island Capacity measure will need new installed capacity by 2023 with projects from both the high and medium likelihood of proceeding projects being required to meet the target from there until the end of the report period, 2026.

In the context of the Kaimai Wind farm it is well placed to help with both measures. Its energy produce of 400GWh annually will contribute to that needed to meet the Winter Energy Margins and the installed capacity of 100MW will contribute to the Winter Capacity Margin in the North Island.

7.16 Positive Effects

The proposed wind farm has the potential to generate numerous positive and economic benefits for local and regional communities. This includes the following:

Generation Benefits – Renewable Electricity

- The use of renewable energy resources, effectively assisting in meeting the required targets under the NPS-REG legislation.
- With an installed capacity of circa 100MW, this will put downward pressures on the wholesale electricity price in real time. An expected annual production level of circa 400GWh will be available to be sold forward into the contracts market. Therefore, the Kaimai Wind farm will aid competition in the New Zealand Wholesale Electricity Markets having the ability to result in lower overall electricity prices for consumers in New Zealand.
- There are both National and Local benefits from a security of supply perspective to having the Kaimai Wind farm consented and built. From a National supply perspective, there has been a decline in the supply and demand balance between 2010 and 2016, with more thermal plant retired than new plant built over that period. Kaimai Wind Farm will reduce national security of supply risk. At a local level, it has been noted that there is a forecast thermal constraint and present voltage issues associated with the 110KV Valley Spur circuit. There is also strong demand growth (historic and forecasted) in areas fed by the Valley Spur circuit. Accordingly, another option will be added for the management of the thermal constraint and voltage issues. Kaimai Wind Farm will be able to cover off 60% of expected future demand peaks.

NZ economy benefits

- The expected Full Time Equivalent (FTE) jobs for wind farms are reported by BERL in a report commissioned by the Wind Energy Association. The phases are as follows:
 - Planning/Design/Project Management: 0.81FTE/MW – 81 FTE - estimated 18 months
 - Construction: 1.79FTE/MW – 179 FTE – estimated 18 months
 - Operation: 0.15 FTE/MW – 15 FTE - estimated 30 years
 - The expected capex of the project is \$180M, made up of Turbines, transport and balance of plant at \$126M, \$12.6M and \$41.4M respectively. The balance of plant will be sourced locally.

7.17 Summary Effects Assessment

The Kaimai Wind Farm is a significant project – at a local, regional and national scale. This assessment of environmental effects has been informed by numerous technical assessments undertaken by experts in their respective fields, commensurate with the significance of this wind farm Project, and in respect of both the construction and operational phases of the Project.

On balance, and in light of the findings, conclusions and recommendations from the various technical assessments, the Kaimai Wind Farm has been designed, and can be constructed and operated in a manner that will appropriately avoid, remedy or mitigate adverse effects on the environment. Overall, the Site is an appropriate location for a wind farm. This is particularly so given the immediate proximity to the National Grid and the accessibility of a strong wind resource, the rural zoning and pastoral land use, available noise buffer separation distances from residential dwellings, and a lack of designated ecological or landscape values within the Site.

That being said, the potential adverse effects from the Kaimai Wind Farm cannot be avoided, remedied or mitigated in their entirety. The adverse impacts on landscape character and values and visual amenity in this area have the potential to be high as do effects on the cultural landscape valued by tangata whenua. In this regard, the Project has evolved through an iterative design process – seeking to address often conflicting values, and the proposal now represents an appropriate and balanced outcome in terms of effects on visibility and the surrounding landscape and character.

The mitigation measures outlined in Section 3.7 of this AEE have been identified through the numerous expert technical assessments (which also propose a range of additional specific mitigation measures). KWF proposes to implement these as recommended in order to avoid, remedy mitigate or offset adverse effects from the Project. KWF further intend that these measures will be refined through the consent process to specific conditions of consent.

8 Statutory Assessment

Section 104(1) of the RMA outlines the matters that a consent authority must have particular regard to when considering any resource consent application, as follows:

- (a) any actual and potential effects on the environment of allowing the activity; and*
- (ab) any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity; and*
- (b) any relevant provisions of –*
 - i) a national environmental standard;*
 - (ii) other regulations;*
 - (iii) a national policy statement;*
 - (iv) a New Zealand coastal policy statement;*
 - (v) a regional policy statement or proposed regional policy statement; and*
 - (vi) a plan or proposed plan; and*
- (c) any other matter the consent authority considers relevant and reasonably necessary to determine the application.*

Consideration of the matters listed above is subject to Part 2 of the RMA, which sets out its purpose and principles. Case law has determined that the Part 2 provisions are 'not operative' and that by giving effect to the provisions of, in particular, the objectives and policies of the higher order planning instruments (which "flesh out" or give substance to the Part 2 provisions in the local circumstances) the Part 2 provisions are necessarily addressed. Nevertheless, as this case law is evolving, and the Fourth Schedule requires it, a brief assessment of the Project against Part 2 of the RMA follows assessment against the relevant National and Regional Policy statement and in turn Regional and District Plan objectives and policies. The actual and potential effects of the Project as assessed in the previous section of this AEE are also addressed alongside the relevant district plan criteria.

8.1 Actual and potential effects on the environment of allowing the activity

Section 7 of this report presents an assessment of actual and potential effects on the environment of allowing the Kaimai Wind Farm Project. Overall, the assessment concludes that the Project has been designed, and can be constructed and operated in a manner that will appropriately avoid, remedy, mitigate or offset adverse effects on the environment, and will have a range of significant positive effects.

8.2 Measures proposed for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment

Measures proposed by KWF for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects are outlined in Section 3.7 of this report. Again, the details of the proposed measures will be addressed in specific consent conditions to be developed during the course of the public notification, submissions and hearing process, with input from the relevant experts, consent authorities, stakeholders and submitters.

8.3 National Policy Statement for Renewable Electricity Generation 2011 (NPS-REG)

The Objective of the NPS-REG is: *To recognise the national significance of renewable electricity generation activities by providing for the development and continued operation of new and existing renewable electricity generation activities, such that the proportion of New Zealand's electricity generated from renewable energy sources increases to a level that meets or exceeds the Government's national target for renewable energy generation. (the strategic target is 90% of New Zealand's electricity generated from renewable sources by 2025).*

The NPS-REG recognises that development which increases renewable energy generation capacity can have environmental effects that span local, regional and national scales, often with adverse effects manifesting locally and positive effects manifesting nationally. The NPS acknowledges that the benefits of this type of development can compete with matters of national importance (Section 6 of the RMA) as well as matters to which particular regard must be had under Section 7.

It records that the natural resources from which electricity is generated can coincide with areas of significant natural character, significant amenity values, historic heritage, outstanding natural features and landscapes, significant indigenous vegetation and significant habitats of indigenous fauna. The NPS-REG seeks to increase national consistency in addressing the competing values associated with the development of renewable energy resources by providing greater certainty to decision makers in terms of guiding the assessment process of such applications.

This NPS is of paramount importance to recognising renewable energy as a matter of national significance in its own right, and is the only national planning instrument of direct relevance to the Project, giving national direction as to how the Part 2 principles should be applied in assessing it.

Policy A requires decision makers to recognise and provide for the national significance of renewable energy generation activities, including their national, regional and local benefits in terms of maintaining or increasing security of supply, at local, regional and national level, by diversifying the type and/or location of electricity generation. Having regard to the assessment in the ERS report (Attachment B8) the Project clearly gives effect to this policy direction.

Policy B c) requires that particular regard must be had to the fact that meeting or exceeding the Government's national target for renewable energy generation will require the significant development of renewable electricity generation activities. Policy C1 acknowledges the practical implications of achieving an increase in the proportion of electricity generated from renewable sources. Clause (a) of Policy C1 recognises that there is a need to locate the activity where the renewable energy resource is available. As referred to in Section 3.5, the higher elevation sites (Turbines 18-24) will produce 28% more electricity. While also being in the most visually sensitive location, these Turbine sites are critical to ensuring the wind farm as a whole can meet the essential site selection criterion for commercial scale electricity generation.

In this case, as outlined in the Electricity Market report in Attachment B8, the Site also has a significant development advantage that the 110kV line passes through the project site at its southern end, meaning no additional transmission lines external to the site will need to be built. This is recognised in Clause (c) of Policy C1.

With respect to Policy C2 decision makers, when considering such applications, shall have regard to offsetting measures or environmental compensation in instances where any residual environmental effects of renewable electricity generation activities cannot be avoided, remedied or mitigated. While considerable effort has been made to avoid, remedy, and mitigate the effects associated with this wind farm, there are residual adverse effects which are unavoidable.

In light of the above, the project should be recognised in terms of its national significance as a renewable energy generation development providing both local and regional benefits in terms of security and diversity of supply, as well for its contribution towards meeting the 90% target for renewable energy by 2025 at a national level, which is strongly signalled from central government and is embedded in the NPS-REG.

The NPS REG is enabling, where the primary provisions do not focus on avoiding adverse effects on the environment per se, instead providing the framework for nationally significant infrastructure. The development of the Kaimai Wind Farm would give effect to the objectives and policies of the NPS-REG.

8.4 Waikato Regional Policy Statement

The Waikato Regional Policy Statement (WRPS) is structured around issues of regional significance, which notably includes provision for energy demand. The following assessment has been undertaken against the parts of the WRPS that are relevant to this proposal.

8.4.1 Providing for energy demand

Highlighted in Part A of this Policy Statement are six recognised significant resource management issues, including Issue 1.3, which provides for energy demand. There is a clear signal that renewable energy sources should be provided for, recognising the

importance of achieving the strategic government targets that have been set within the NPS-REG for renewable energy. The following matters set out in Part A highlight the important considerations for renewable energy applications:

- a. *how the increasing demand for energy is to be met;*
- b. *potential for conflicts between activities to meet energy demand and other land or water uses including natural values;*
- c. *the need to locate renewable energy generation infrastructure where the resource exists;*
- d. *the need to maintain the efficiency of, and production from, existing renewable electricity generation activities;*
- e. *the need for the continued existence, and operation of the Waikato Hydroscheme as significant national infrastructure, and*
- f. *security of supply.*

Electricity Risk Solutions Ltd (ERS) have provided an evaluation of the proposed Kaimai Wind Farm and have determined how it would help meet both Local and National Security of Supply requirements, and provide insight to matters outlined in Clauses (a) to (f) above. The report concludes that the Project would provide benefits to security of supply at both a local and national level. At a national level, New Zealand needs new generation assets to be built to meet the expected growth in electrical demand. KWF is committed to consenting and building this project, and therefore reducing national security of supply risk. At a local level, the project will help with local transmission issues which have been identified as having thermal constraint and voltage issues. In terms of demand, the report suggests that if new generation was required to meet the post 2014 growth of 0.4% annually, then the industry would need to install each year 178.5GWh, and a shortfall between retired thermal and new build generation annual production of 1,082 GWh. ERS draws the conclusion that the electrical supply and balance in 2017 is worse than it was in 2010. The Kaimai Wind Farm with its expected maximum output of 100MW and annual output of 400GWh will contribute to supplying future electricity demands.

Clause (c) above clearly acknowledges a need to locate renewable energy generation infrastructure where the resource exists (as with the NPS-REG), and Clause (b) recognises that there will be potential for conflicts between energy generation development and other land uses. As previously stated, the wind farm design is largely dictated by operational requirements which control the location, number and scale of the turbines required. The conclusions of the “project rationale” document (Attachment B14) state that the recorded parameters from extensive monitoring of the site have indicated an excellent wind regime for viable wind farms. With respect to Clause (b), it would not be possible for a wind farm to avoid all adverse effects, given the scale, significant size and positioning of the structures. In this particular case, it is acknowledged that there will be moderate to high effects associated with the landscape character and visibility of the turbines, when viewed from certain viewing audiences. Careful consideration has been applied to the design of the development to minimise adverse effects on the surrounding environment and neighbouring residents as far as possible. Several iterations of the design have been undertaken, and turbines have been removed from the proposal where it was considered that the effects were unreasonable. Additionally, the upper ridge turbines have been reduced in height to reduce the visibility of these turbines.

The following Objectives from Section 3.5 of the WRPS are directly relevant.

- Objective 3.2 *“recognises and provides for the role of sustainable resource use and its development and its benefits in enabling people and communities to provide for their economic, social and cultural wellbeing, includingc) the availability of energy resources for electricity generation and for electricity generation activity to locate where the energy resource exists...”*
- Objective 3.5 seeks that *“energy use is managed, and electricity generation and transmission is operated, maintained, developed and upgraded, in a way that:*
 - a. *increases efficiency;*
 - b. *recognises any increasing demand for energy;*
 - c. *seeks opportunities to minimise demand for energy;*
 - d. *recognises and provides for the national significance of **electricity transmission and renewable electricity generation activities**;*
 - e. *recognises and provides for the national, regional and local benefits of electricity transmission and renewable electricity generation;*
 - f. *reduces reliance on fossil fuels over time;*
 - g. *addresses adverse effects on natural and physical resources;*
 - h. *recognises the technical and operational constraints of the electricity transmission network and electricity generation activities; and*

- i. *recognises the contribution of existing and future electricity transmission and electricity generation activities to regional and national energy needs and security of supply*

As stated above, the Kaimai Wind Farm with its expected maximum output of 100MW and annual output of 400GWh will contribute to meeting existing and future electricity demand, and will provide benefits to security of supply at both a local and national level in accordance with Clause (i) (while recognising the increases in demand as set out in Clause (b)).

Clause (d) and (e) recognise and provide for renewable electricity generation as a matter of national significance. Emphasis is also again placed on the national, regional and local benefits of such development. There is also recognition of the need to “*address adverse effects on natural and physical resources*” (Clause (g)). The assessment of effects undertaken in the Sections above has confirmed that the majority of adverse effects associated with the development and operation of the wind farm can and will be appropriately managed to ensure that adverse effects are acceptable on the surrounding environment and generally, minor. The main issue arising from the specialist assessments is the anticipated outcomes for landscape character and visual effects, with the expected changes reported as being moderate to high for certain viewing audiences. Ecological effects on migratory and certain forest bird species also need to be addressed. Given the scale, significant size and positioning of the structures on ridges in order to best utilise the wind resource, it is not unexpected for a wind farm to alter the existing landscape to this extent, and generate such effects. While the turbine structures will not ‘dominate’ the natural environment, they will detract from natural landscape character values from some viewpoints.

Overall on this issue, the WRPS gives a strong directive to provide for renewable electricity generation, and recognises that a wind farm proposal will contain elements that cannot be avoided, remedied or mitigated.

Policy 6.6.1 similarly “*provides for renewable energy by having particular regard to:*

- (i) *the increasing requirement for electricity generation from renewable sources such as geothermal, fresh water, wind, solar, biomass and marine and the need to maintain generation from existing renewable electricity generation; and*
- (ii) *the need for electricity generation to locate where energy sources exist, and transmission infrastructure to connect these generation sites to the national grid or local distribution network;*
- (iii) *the logistical or technical practicalities associated with developing, upgrading, operating or maintaining renewable electricity generation, or electricity transmission activities;*
- (iv) *any residual environmental effects or renewable electricity generation activity which cannot be avoided, remedied or mitigated can be offset or compensated to benefit the affected community or the region, and*
- (v) *the benefits of renewable generation activities including maintaining or increasing security of electricity supply.”*

The assessment above applies equally to this Policy, as did the assessment on the equivalent provisions of the NPS-REG.

Policy 6.6.1(f) provides for infrastructure in a manner that:

- (i) *recognises that infrastructure development can adversely affect people and communities;*

Policy 6.6.1(f) provides for infrastructure, while recognising that development can adversely affect people and communities. KWF have carefully considered the design of the wind farm to minimise adverse effects on neighbouring residential properties and the wider community. As previously outlined, this has included removing turbines from the overall project that were likely to result in unreasonable adverse effects, and reducing the scale of the upper ridge turbines which have a high sensitivity as a result of the adjacent ONL and the elevated ridgeline. It is considered that the current design represents an appropriate response for a sustainable wind farm, while respecting the amenity of surrounding residents and the wider environment.

Policy 6.6.1(g) states that development shall be designed in a manner that “*considers how existing and planned renewable electricity generation activities and existing and planned urban development will be managed in relation to one another.*”

The Electricity Market Report (Appendix B8) concludes that the Kaimai Wind Farm will in-part meet the supply gap from retired thermal electricity supply, in a part of the North Island that is experiencing rapid growth in urban deployment (refer section 1.1 above). With its expected maximum output of 100MW and annual output of 400GWh, the Kaimai Wind Farm will contribute to meeting future electricity demands, and to meeting the government set targets for renewable energy generation. The Kaimai Wind Farm will also address local transmission issues by adding another management option to the Valley Spur Circuit, which has been identified as having supply constraints.

8.4.2 State of resources

Issue 1.1 highlights the declining quality and quantity of natural and physical resources, and the objectives and policies seek to address these matters. A number of these issues will not be directly affected by this development. The project does not involve any significant works or structures within freshwater environments (other than replacement and upgrades to existing in-stream culverts), nor does it involve any structures or works within the coastal environment. Notwithstanding the above, there is potential for adverse effects, including the migration of sediments and contaminants generated from the site, to enter these sensitive aquatic environments.

The relevant objectives and policies (including Objectives 3.13, 3.14, 3.19, and 3.22) generally seek to maintain water quality and the indigenous biodiversity that these ecosystems can support. The proposal is considered to be consistent with these provisions of the WRPS. Site works will be managed in an appropriate manner that minimises any adverse runoff effects to the receiving environment as sought by the Policies to meet Objective 3.25. The implementation of erosion and sediment controls will assist in maintaining the function of these ecosystems to support any indigenous biodiversity and relevant habitats.

8.4.3 Managing the built environment

Issue 1.4 aims to ensure that development of the built environment (including infrastructure) is designed with the ability to sustainably manage natural and physical resources and provide for our wellbeing. The policy statement acknowledges *that increased need for future provision of infrastructure to respond to resource demands from within and outside the region and the need to enable efficient installation of that infrastructure*, while ensuring the effects associated with such development is managed in a sustainable manner.

Objective 3.12 states the outcomes sought for any built development within the region. Of particular relevance, Part (a) seeks to promote positive indigenous biodiversity outcomes. An ecological assessment has been undertaken and has determined that there are several threatened bird species and one bat species that could be adversely affected in the form of turbine blade strike. To mitigate these adverse effects, KWF proposes to contribute to conservation management involving pest control, ecological and habitat enhancement for key species. A monitoring programme is proposed to ensure that risks remain low and to allow for adaptive management risk minimisation contingencies if required. Offsetting measures are also proposed to address these effects and thereby promote overall positive biodiversity outcomes.

Objectives 3.12(b) seeks to protect natural character and outstanding natural features and landscape from inappropriate use, as does Objective 3.20. The WRPS also identifies outstanding natural features and landscape in the vicinity of the project site, particularly associated with the Kaimai Ranges and Mt Karangahake, which serve as a backdrop to the upper areas of the proposed wind farm. From a visual perspective, the landscape character, values and visual assessment undertaken for the proposed development, characterises two distinct areas in the project site. The more elevated parts of the wind farm have a higher sensitivity as a result of the adjacent outstanding natural landscape and the elevated ridgeline. In contrast, the lower areas of the wind farm will integrate more comfortably with the landscape because the immediate context is more modified (of working rural landscape character) and the location is less prominent. The adverse effects of the wind farm on landscape character and values will generally be moderate – significant due to the turbines being located within a moderately to highly natural and visually prominent backdrop. Based on the visual lightness of the turbine structures, it is not considered that they will ‘dominate’ the natural environment but rather they will detract from natural character values from some viewpoints. This does not necessarily make the wind farm an ‘inappropriate’ use for the purpose of these WRPS provisions, particularly when set against the directives of the NPS-REG.

8.4.4 Relationship of tangata whenua with the environment

Issue 1.5 identifies the relationship tangata whenua have with the environment, and the importance of sustainable management of activities in relation to values that are culturally significant to tangata whenua. This includes the protection of known archaeological sites identified on the planning maps and their historic values from damage, modification and destruction.

An archaeological assessment has been undertaken to assess the effects on known archaeological and heritage sites within the project area. This assessment has concluded that it is unlikely that any known archaeological sites or heritage sites will be damaged, modified or destroyed by the wind farm development. Additionally, KWF has undertaken consultation with relevant mana whenua and will continue to consult with iwi through the consenting process. Based on matters identified by Ngāti Hako (iwi) to date, it would appear that some significant concerns are held about the effects of the Project, particularly on what is described in broad terms as an area of high spiritual and cultural significance and an important cultural landscape (i.e. the Kaimai Mamaku range as a

whole). The applicant will continue engagement with iwi in relation to understanding the potential effects of the wind farm on cultural values, and progress measures to remedy or offset these concerns in a tangible way relevant to tangata whenua, and their status as kaitiaki.

8.4.5 Summary

Overall, the WRPS seeks to give effect to the Government targets for renewable electricity generation development, balancing this imperative against the potential and actual adverse effects. Having regard to the assessment above it is concluded that the proposal is generally consistent with, and not contrary to, the objectives and associated policies of the WRPS.

8.5 Waikato Regional Plan

The Waikato Regional Plan (“WRP”) contains various objectives and policies to assist the Council to carry out its functions under Section 30 of the RMA. From a policy perspective, the WRP integrates economic, environmental and social issues to achieve long-term outcomes across a range of challenging and complex regional issues. The most relevant provisions to the windfarm Project address management of water resources.

Objective 3.5.2 of the Waikato Regional Plan states that discharges of contaminants to water (in this case by way of stormwater) are to be undertaken in a manner that achieves sustainable water and land management techniques. The policies in 3.5.3 (of particular relevance to Stormwater is Policy 7) seek to encourage at source management and treatment of stormwater discharges to reduce water quality and water quantity effects of discharges on receiving waters. In this case, KWF propose to implement a comprehensive set of best practice erosion and sediment control techniques, as assessed and recommended by technical experts in this field (see Attachment B17). These measures will provide at source management of soil erosion and potential discharges of sediment-laden water, thereby avoiding, remedying or mitigating adverse water quality and quantity effects on receiving waters.

Objective 5.1.2 of the Waikato Regional Plan seeks to achieve a net reduction in accelerated erosion across the region, recognising that erosion and sediment runoff has the potential for significant adverse effects on water bodies, natural character and ecological values. Policy 5.1.3 seeks to minimise the adverse effects of soil disturbance in high risk erosion areas through “good practice” mechanisms. Land disturbance activities can be designed in a manner that minimises any adverse runoff effects from the project site, as has been outlined in the siltation report. A final detailed erosion and sediment plan and construction methodology will be prepared and submitted to Council prior to any works taking place, to ensure alignment with this policy direction.

8.5.1 Summary

It is considered the proposed wind farm is consistent with the WRP as the construction works and ongoing operations will be undertaken in a manner that minimises any effects on the surrounding waterbodies and water resources.

8.6 Hauraki District Plan

The District Plan contains a suite of objectives and policies that are potentially relevant to the wind farm proposal and grid connection, having regard to the Rural Zoning and site proximity to the Kaimai Ranges and Mt Karangahake which are mapped as Outstanding Natural Landscapes and Features. The following assessment focuses on those matters that are considered to be of particular relevance within the HDP and/or those matters which address the more fundamental factors and effects associated with a wind farm.

8.6.1 Provision for Network Utilities and energy generation

Objective and Policy 7.4.3(3) and 7.4.3(3)(a) seeks to “recognise and provide the opportunity for electricity generation from the district’s natural and physical resources, particularly those of a renewable nature, while as far as practicable avoiding, remedying or mitigating the potential effects on the environment.” The plan provides opportunities for renewable electricity generation within the district (within the right context). As previously stated, the location of the proposed wind farm heavily relies on the availability of the wind resource and the proximity to the transmission line (amongst other crucial factors). It would not be possible for a wind farm to avoid all adverse effects on the environment, particularly in the case of visual and landscape character when introducing such large structures into the environment.

Several iterations of the wind farm design have been undertaken to avoid or remedy effects that were considered to be unacceptable. This has included the removal of turbines, and reducing the height of the more prominent turbines located in the upper areas. Mitigation options for conservation/biodiversity initiatives are being proposed, as well as options for screening opportunities for those closest residents. As such, it is considered that the Project has avoided, remedied, and mitigated the potential effects on the environment “*as far as practicable.*”

The following summarises the assessment against the relevant objectives and policies of relevant planning sections of the HDP:

- The transport network will continue to operate efficiently and safely and it is demonstrated that materials and equipment associated with the turbines can be satisfactorily transported to the site. The internal access roads will be located on private land and so will not generate any wider effects on the transport network (Objectives 7.9.3(1) and (2) and Policy 7.9.3(2)(a); and
- The development can provide ample parking, manoeuvring and loading for the continued operation and maintenance of the wind farm; and
- The earthworks will not have significant adverse visual effects, as determined in the landscape character and visual assessment. Nor will they affect the vegetative cover or the soil profile (Objective 7.8.3(1)); and
- Stormwater from new impervious areas will be adequately provided for to manage any runoff effects; and
- The noise levels from the operation of the turbines, at all noise sensitive receivers (i.e. dwellings) will be within the requirements of *NZS6808:2010* (i.e. 40 dB L_{A90}) which will ensure the protection of health and reasonable amenity for surrounding residents; and
- The construction noise of the windfarm will be within the requirements of *NZS6803:1999* Acoustics – Construction Noise at all times; and
- An ecological assessment has been undertaken and has determined that there are several threatened bird species and one bat species that could be adversely affected in the form of turbine blade strike. To mitigate these adverse effects, KWF proposes to contribute to conservation management involving pest control, ecological and habitat enhancement for key species. A monitoring programme is proposed to ensure that risks remain low and to allow for adaptive management risk minimisation contingencies if required.
- There is no element of the proposal that will involve works within the Significant Natural Areas, the Conservation Area (Indigenous), Heritage Areas, or Wāhi Tapu sites.

8.6.2 Rural Zone

The development site is located within the *Rural Zone* of the Hauraki District Plan. The objectives and policies associated with the zone seek to provide for a range of compatible land use rural activities within the locality and to prevent fragmentation of rural production resources. Policy 5.1.2(1)(a) provides for “*a flexible approach to land use management with emphasis being placed on the effects of activities.*” On this basis, it is considered that the project site is an appropriate location for a wind farm due to the expansive scale of the landscape, and the surrounding productive farmland (in which wind turbines are not a foreign element), and agricultural practices will be able to continue to operate on surrounding sites helping to maintain the underlying rural character.

8.6.3 Protection of Outstanding Natural Features and Landscapes and District Amenity Landscapes

The district plan recognises national and regionally important landscapes. Of relevance to this proposal are the Kaimai Ranges and the Mt Karangahake, which are prominent natural features in the backdrop to the Project. Objective 6.3.3 (1) and Policy 6.3.3(1)(a) seek to protect the integrity and the aesthetic, cultural and intrinsic values of the outstanding landscapes by controlling land-use and development to avoid, remedy or mitigate adverse effects. A landscape character and visual assessment has been undertaken which concludes that:

In terms of the relevant assessment matters in the HDP and its fit with the relevant objectives and policies in the HDP and WRPS, the proposed wind farm is generally consistent with those matters protecting rural character and associated amenity values, but there are adverse effects on the values of the adjacent ONFL and the visual amenity values of neighbours.

On this basis, it considered the Project is not contrary to the intent of the objectives and policies pertaining to Outstanding Natural Landscapes and Features.

8.6.4 Assessment Criteria

The following assessment addresses the relevant criteria that has been outlined in the HDP for both activities occurring within the Rural Zone and for Discretionary Activities under the Energy Generation Activities section of the HDP. A number of these matters have been discussed in further detail above, and some of the analysis has come directly from the relevant specialist reports.

“Rural Zone” General Assessment Criteria (5.1.7.1)

	Assessment Criteria	Comment
1	The degree to which buildings, other structures and activities will adversely affect the rural landscape characteristics, particularly in relation to the open rural character.	<p>As has been outlined in the Landscape and Visual Effects assessment, the wind farm will change the existing rural character and will modify its naturalness. Essentially though, while there will be landscape change, the rural character per se will still be strongly expressed, albeit with a new layer of production added.</p> <p>Whilst they add a significant new element, they will not adversely affect the existing rural landscape elements, patterns or processes. In many parts of New Zealand wind farms are familiar elements in the rural landscape.</p>
3	Whether the activity should be located so that any actual or potentially productive land is not prejudiced from being used for purposes directly related to the inherent productive capability of the land.	Turbines have small footprints and rural activities can continue more or less unaffected. Again, wind farms in New Zealand are familiar within rural zoning.
4	<p>Whether traffic movements resulting from the activity will have any significant impact on the safe and efficient operation of any road. Pertinent matters for consideration in this regard are:</p> <p>(a) the carrying capacity, standard and status in the roading hierarchy of the road concerned;</p> <p>(b) the ability of the site to accommodate the activity requirements for on-site parking, loading and manoeuvring areas;</p> <p>(c) the means by which any likely adverse traffic effects can be avoided, remedied or mitigated;</p> <p>(d) the access, parking and loading standards for Permitted Activities which shall be used as a guideline in assessing applications for Discretionary Activities;</p> <p>(e) the comments of New Zealand Transport Agency on the possible adverse effects on the safe and efficient operation of the state highway network.</p>	<p>Traffic Matters have been addressed in an ITA prepared by Gray Matter. The conclusions of the ITA have considered this assessment criteria.</p> <p>The proposal is expected to comply with the assessment criteria for matters such as parking, loading, manoeuvring. The exception to this is that the proposed access does not comply with the standards for entranceway sight distance and separation distance, and the internal accessway is longer than 1000m.</p> <p>The entranceway sight distance does not meet the requirement for an entranceway generating more than 40vpd based on the posted speed of 100km/hr. However, the presence of the single lane bridge, means that drivers are expected to be alert. The through traffic volume is very low and the operating speed is expected to be 70-80 km/hr. The available sight distance is adequate for the operating conditions. The entranceway sight distance of 135m does not meet the HDC requirement for a speed environment of 70km/hr. Gray Matter have concluded that there are no adverse effects related to the departure from this standard.</p> <p>In terms of (c), mitigation measures include the upgrade of the SH26 and Rawhiti Road (north) intersection, the preparation of construction management plans, installation of signage, and ensuring that all traffic related to the wind farm use the SH26 – Rawhiti Road intersection.</p> <p>Discussions have been initiated with NZTA to provide feedback on the proposal as well as discuss the intersection upgrade works.</p>
6	Whether buildings are sufficiently set back from the boundaries of neighbouring properties to avoid causing a nuisance by way of overshadowing, obstruction of views, noise, glare and loss of privacy.	The nearest dwelling to the proposed turbines is 804m away from wind farm, and there are 67 dwellings within 2km of the nearest turbine. The Landscape and Visual Assessment has concluded that existing views from these dwellings or from nearby on the surrounding properties will be modified due to the introduction of large, visually significant structures. This assessment has not included site visits to any of the adjacent private properties and effects on these places can only be generalised from the assessments made from the nearby public roads. This assessment has considered different viewing audiences and carried

	Assessment Criteria	Comment
		<p>out assessments from public viewpoints including the review of computer-generated visual simulations from representative viewpoints. It is likely that there will be high adverse visual effects from some nearby properties.</p> <p>Glint effects on sunlight on the turbine blades will be mitigated by the use of matte paint finishes. There will be no effects on privacy.</p> <p>In terms of acoustic amenity, the assessment undertaken by Chiles Limited has concluded that the operational aspects of the wind farm will comply with the requirements of NZS: 6808:2010 and that the noise experienced in the receiving environment complies with both the HDP and the MPDP standards. The above standards seek to protect health and reasonable amenity. The noise effects of the wind farm are considered to be acceptable in this environment and ensure that the surrounding residences will retain a reasonable acoustic amenity. Despite compliance with the noise standards, the operation of the wind farm will be audible to receivers at times, but not within a range that would cause disturbance or undue annoyance on the aural amenity of the area.</p> <p>Additionally, the construction activities will be appropriately managed to ensure that no undue annoyance (noise, vibration, dust) will be experienced on the neighbouring sites.</p>
8	Whether features of the proposal including the location, design, and colour of buildings and structures, the planting of trees and shrubs, and the shaping of earth avoid, remedy or mitigate any adverse effect on the existing landscape.	<p>The wind farm is necessarily dictated by operational requirements which in this case, control the location, number and scale of the turbines required. It is proposed however to mitigate the visual and landscape effects to the extent possible within these parameters, particularly by undertaking earthworks in such a way as to facilitate rapid and effect revegetation of batter slopes. The current wind farm design represents a later version in which the height of the turbines on the high ridge have been reduced to manage these effects. Additionally, as part of the design process, several turbines have been removed from earlier design layouts to minimise adverse effects on neighbouring properties.</p> <p>Mitigation involving planting is impractical given the scale of the structures but could be considered for offsite locations to screen particular views if desired by affected neighbours. The turbine colour is set by Civil Aviation requirements and is appropriate to mitigate visual effects as the off-white colour helps to minimise contrast with generally light sky colours.</p>
10	Whether development adjacent to either the Conservation Zones, the Karangahake Gorge Zone or the Coastal Zone creates a situation where the buildings and activities dominate or detract from the natural environment of those zones.	As assessed in the Landscape and Visual Assessment report, the upper part of the site is adjacent to the Conservation (Indigenous Forest) Zone in the Hauraki District Plan. The wind farm will have no direct effects on the vegetation or landform within the conservation land but the higher turbine group will have adverse effects on the natural landscape character of the zone, particularly as viewed from the east. Given the visual lightness/low bulk of the turbine structures, they will not “dominate” the natural environment but they will detract from natural landscape character values.
12	Whether any exploration, mining, earthworks and/or tracks and driveways necessary to accommodate the activity would create a significant adverse visual impact, particularly in the Outstanding Natural Landscape Area and District Amenity Landscape Area.	There will be no earthworks within the ONL itself; however, they will be adjacent to the ONL. It is considered that the earthworks will be managed to the extent that they will have low adverse visual effects from beyond the site, particularly once revegetation of batter slopes is achieved. The earthworks will be staged and “open areas” will be limited and progressively stabilized/revegetated on completion of works.
13	Whether any signs proposed detract from the amenities of the area.	There are no signs proposed for the wind farm at this point.
16	Whether the nature of the activity has the potential to create nuisance and health and safety effects, which cannot effectively or practically be controlled by mitigation measures.	As stated above, the operation of the wind farm will comply the relevant NZS and district plan standards for noise, which seek to protect health and reasonable amenity.

	Assessment Criteria	Comment
		In terms of other effects that have the potential to cause nuisance and health and safety effects, the construction works will be managed to an extent that sediment/water runoff onto neighbouring sites does not occur. Additionally, dust will be managed to ensure no nuisance effects on neighbouring persons and their property.
18	Whether the hours of operation are appropriate having regard to those persons likely to be affected by the activity.	<p>The wind farm will be operated 24 hours a day, and it is considered that KWF has appropriately addressed matters that could affect neighbouring persons.</p> <p>In terms of the construction activities, these will be managed effectively within reasonable hours of operation (as to certain night time activities), with limited works occurring on weekends or public holidays.</p>
21	Whether the activity and any buildings and structures are of a scale and intensity which are in keeping with the character and amenity values of the existing rural environment.	The Landscape and Visual Assessment report has analysed this matter and concludes that in common with all wind farms, the Kaimai Wind Farm is of a character and scale that will contrast rather than integrate with, the rural landscape. However, this does not automatically make it in appropriate. The naturalness of the rural environment will be further modified but adverse effects will be mitigated by the low level of impact on the existing landscape elements, patterns and processes. In terms of turbine size, the number of turbines, and its geographic spread, the proposed wind farm is of considerable scale. Overall however, it will not dominate its landscape setting given the scale of the Kaimai Range and the expansiveness of the adjacent Hauraki Plains. The scale of the Waihi Basin to the east is smaller, but the wind farm is much less visible from this side.

Provision for Network Utilities and Energy Generation Activities – Assessment Criteria for Discretionary Activities (7.4.8)

Matter	Assessment Criteria	Comment
1 – Visual/ Landscape/ Amenity/ Heritage Impacts	<p>a) Whether the utility/activity will have an adverse visual impact on the natural and built environment, and in particular, whether it will detract from the surrounding landscape by:</p> <p>(i) markedly reducing the degree of visual openness and significance of the landscape;</p> <p>(ii) increasing the degree of modification in rural and non-urban coastal parts of the District, or reducing in other than a minor way the visual coherence of the landscape;</p> <p>(iii) being incongruous with the existing landform particularly with respect to ridge lines, promontories and coastline;</p> <p>(iv) obscuring or detracting from significant views obtained from public places;</p> <p>(v) being incongruous with existing heritage resources such as sites, buildings, places or areas of heritage, cultural and archaeological value.</p> <p>(b) Whether the height, colour, form and scale of the proposed utility/activity and its overall design and external appearance will result in any adverse effects being avoided or mitigated with respect to the scale and form of the buildings/structures on adjoining or neighbouring sites, or important aspects or characteristics of the landscape in which it is proposed to be located.</p>	<p>a) The proposed wind farm will increase the number and presence of built elements in the rural landscape in this locality but will not significant reduce openness per se. This is because of the slender form and low bulk of turbines which seen collectively add a layer to rural landscapes rather than altering their existing elements, forms and land uses. The wind farm will increase the complexity of the landscape but it will not obscure the existing landscape and will not significantly modify its visual coherence. Whilst the turbines relate to the pattern of ridgelines and promontories generally, at the finer scale there is some variability and the wind farm will modify coherence but to a modest extent. Landform coherence is currently modified anyway, with vegetation patterns sometimes overlaying awkwardly with the underlying topography. There are no significant views obstructed but views of the Ranges from surrounding areas will be modified.</p> <p>(b) The proposed wind farm will introduce a new element that will contrast with the existing landscape elements. Whilst adding a significant new feature, it will not otherwise significantly alter the landscape pattern and character. Turbine heights, colours and forms along with the overall wind farm layout are dictated to a large extent by operational requirements. Where possible modifications have been made to mitigate landscape character and visual effects, including reducing the turbine heights on the higher ridge and reducing the number of turbines generally.</p> <p>(c) The scale of the turbines is such that screening by vegetation is impossible. From the various viewpoints surrounding turbines are screened to varying extents by landform. As discussed already, the wind farm will contrast with the existing landscape but is not a feature inherently incompatible with rural landscapes. From most viewpoints it will be seen in the context of a modified working rural landscape. The</p>

Matter	Assessment Criteria	Comment
	<p>(c) Whether the utility/activity will be screened by landscaping or other means, sufficient to soften hard structures and minimise the scale of structures, and to result in a visual appearance compatible with the surrounding structures and built forms in the landscape, having regard to operational requirements.</p> <p>(d) Will the extent of earthworks for the creation of building platforms and access tracks create adverse visual effects that cannot be avoided, remedied or mitigated.</p> <p>(e) Whether there will be cumulative adverse visual effects on the landscape or character of the general vicinity as a result of adding to existing utility services and/or energy generating activities within the area, particularly overhead lines, radio communication or telecommunication facilities and turbine structures.</p> <p>(f) Whether the utility/activity will adversely affect biodiversity values by removing or modifying significant bush, vegetation, landform or other natural habitats, and/or impacting on bird and bat movement/migration.</p> <p>(g) Whether the utility/activity will result in any adverse impact on the existing character of the area in which it is proposed to be located, considering issues such as: (i) the scale of the work; (ii) the intensity of the proposed activity, including hours of use and the number of people involved, and the effects of traffic generated either during the construction or operational phase.</p> <p>(h) Whether there are activities existing or likely to exist that will potentially be adversely affected by noise, lighting, glare and/or radiofrequency and electric and magnetic fields generated by the utility/activity. Relevant New Zealand Standards and Codes of Practice will be used as a guide.</p> <p>(i) Whether the siting of a utility has taken into account the proximity and nature of existing dwellings/household units, or likely future dwellings/household units permitted by the Plan, in terms of visual impact, site access, noise and health and safety.</p>	<p>exception to this is where it is seen from the eastern side of the range. From this side, most of the turbines will be screened.</p> <p>(d) In general, the earthworks associated with the road upgrading, laydown areas and turbine platforms are located where they will not be significantly visible from surrounding viewpoints. They will be undertaken to ensure that successful and timely revegetation can be achieved.</p> <p>(e) There are no other wind farms within the landscape context of the proposed site and therefore, no cumulative effects in this sense. In terms of utilitarian element generally, the most significant element in this area is the Radio Communication tower on Mt Te Aroha and the 110kV Transpower electricity pylons – which are visible from both sides of the Kaimai Range and which affects its natural character. The proposed turbines, in the group on the top ridge, will further modify the naturalness of the range to a moderate extent.</p> <p>(f) An assessment has been undertaken by Kessels Ecology and Ecology New Zealand to determine the ecological effects associated with the project. The construction of the wind farm will occur within a site that encompasses mostly pasture coverage. No indigenous vegetation will need to be removed for the placement of the turbine structures, apart from Turbine 13. The assessment indicates that there may be potential for key forest and wetland bird species to be occasionally subject to turbine blade strike. Monitoring data of other wind farms in New Zealand suggests rates of bird strike will be low, but the possible presence of threatened species means that mortalities could have more than minor adverse effects.</p> <p>In terms of migratory birds, the estimated turbine strike for wader birds is considered by Kessels Ecology to be approximately 2-5 birds per annum. Again, while this strike level is considered to represent a minor effect on the shorebird species, there is potential for threatened or at-risk wader species such as wrybill and godwit to cross the site and therefore be at risk from turbine blade strike. Accordingly, KWF proposes to provide a mitigation package that will focus on conservation initiatives to offset this potential loss.</p> <p>During the surveys, the nationally vulnerable North Island long tail bat was detected in the locality. Kessels Ecology Limited consider that there is a moderate risk of bat strike that the proposed development. As such, the risk was reduced by removing turbines and will be managed by way of mitigation opportunities that contribute to conservation management.</p> <p>(g) The wind farm will result in a significant addition to the landscape that will alter the existing character. There will be some adverse effects, particularly in relation to naturalness values. These will be most significant where the existing natural landscape values are highest i.e. relating to the upper ridge and the landscape on the eastern side of the Range. Whilst the turbines will add another layer to the landscape, its existing pattern and land use processes will otherwise remain largely unchanged.</p> <p>(h) The wind farm will have visual impacts as viewed from surrounding dwellings, roads and towns. Potential blade glint effects will be mitigated by matte pain finishes. Adverse lighting effects on the character of the night sky and the naturalness of the Kaimai Range will be effectively mitigated by the proposed use of the active aviation light management system. The lighting that is proposed will comply will be well within the lighting standards of the district plan (8.0 lux).</p>

Matter	Assessment Criteria	Comment
		<p>The noise emanating from the turbines have been modelling as complying with the NZS 6808 and the district plan standards ensuring a reasonable sound level</p> <p>(i) The proposed development has been configured to ensure that turbines are not located in close proximity to existing and future dwelling sites. The site occupies higher elevation land with steeper slopes forming a buffer to the more densely settled areas at lower elevation. The design has been through various iterations which have involved removal of turbines to minimize effects on dwellings. Even so, the scale of the turbines is such that there will be significant adverse visual effects from some closer residential viewpoints. In these cases, mitigation planting options, to provide screening and visual buffering on the properties involved should be explored.</p>
<p>2 Social/ Economic Impacts</p>	<p>(a) Whether the siting and operation of the utility has taken into account the impact on farming activities and private airfields.</p> <p>(b) Whether the siting and operation of the utility will adversely impact on the functioning and enjoyment of public reserves, community and recreational facilities and marae in the vicinity.</p> <p>I The contribution the proposal will make to central and regional government energy policy objectives and renewable energy targets.</p>	<p>(a) Turbines have small footprints and rural activities can continue more or less unaffected. Again, wind farms in New Zealand are familiar within rural zoning. The aviation effects have been considered by Peet Aviation, who note that hang gliding and paragliding activities on the subject site can no longer occur. Overall Peet Aviation have concluded that the turbines will not obstruct aviation activities and that they can continue to safely occur, with specific management/ mitigation measures that have been outlined above.</p> <p>(b) An assessment has been undertaken by TRC Tourism Ltd – Attachment B19 to address the effects on tourism and recreational activities in the area. The assessment concluded that potential social, recreation and tourism effects arising from the construction of the wind farm will be minimal and can be appropriately managed. In terms of the effects associated with the continued operation of the wind farm, the effects of the turbines on the adjacent recreational and tourism amenities/facilities are such that the wind farm will be noticed but will not restrict public access and enjoyment of the nearby recreational and tourism facilities.</p> <p>(c) A full statutory assessment is undertaken through this AEE. The Kaimai Wind Farm should be recognised in terms of its national importance as a renewable energy generation development as well its contribution towards meeting the 90% target for renewable energy by 2025 which is strongly signalled from central government and is embedded in the NPS-REG.</p>
<p>3 Alternative Location / Co- location</p>	<p>(a) Whether alternative sites or routes have been considered, in particular to avoid, where feasibly practical, the location of the network utility in the Conservation (Indigenous Forest), Coastal, Karangahake Gorge and Reserve (Passive) Zones, and whether the impact of the alternatives on the environment is less than that of the proposal.</p> <p>(b) Whether there is technical and practical potential for co-location of facilities on other sites, and whether this has been considered by the applicant</p>	<p>(a) –(b) Wind farm locations are dictated by operational requirements. KWF have undertaken extensive monitoring of the site using various tall monitoring masts, yielding wind data to calculate energy yield estimates. A number of the proposed turbine sites have an average wind speed of 9m/s and some approaching 9.5m/s, in addition to low turbulence levels. These recorded parameters indicate an excellent wind regime relative to wind farms. The site also has a significant development advantage that the 110kV line passes through the project site at its southern end, meaning no additional transmission lines external to the site will need to be built. Refer Project Rationale report – Attachment B14.</p> <p>Kaimai Wind Farm have considered alternatives in the concept stages of the project. However, KWF consider that there is a lack of suitable alternative sites in the Upper North Island that satisfy the key criteria to develop a commercially viable wind farm. Such alternate sites face a range of constraints to development, largely due to grid distance. As such KWF does not consider any other location in the Upper North Island to be a more appropriate site for the development of a wind farm.</p>
<p>4 Other Matters</p>	<p>(a) The effects of any proposal on aircraft safety, radar stations and navigational sites and facilities.</p>	<p>These matters have all been addressed in the Aviation report – Appendix B2.</p>

8.6.5 Summary

The proposed development is generally consistent with the objectives and policies of the HDP, noting that the Plan enables opportunity for renewable electricity generation development within the district (while ensuring any adverse effects are reasonably managed).

8.7 Part 2 of Resource Management Act

As noted earlier, case law has determined that the Part 2 provisions are ‘not operative’ and that by giving effect to the provisions of the objectives and policies of the planning instruments (which “flesh out” or give substance to the Part 2 provisions in the local circumstances), the Part 2 provisions are necessarily addressed. To that extent, having regard to the assessment of the Project against these provisions above, it is considered that the Project would promote the sustainable management purpose of RMA, as set out in section 5 and Part 2 of the RMA more broadly. The following more general comments are made for completeness.

8.7.1 Part 5 Purpose of the RMA

Section 5 of the RMA states that the purpose of the Act is to promote the sustainable management of natural and physical resources. Section 5(2) goes on to state that sustainable management means managing the use, development and protection of natural and physical resources in a manner which enables people and communities to provide for their social, economic and cultural wellbeing, and their health and safety, while:

- (a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
- (b) Safeguarding the life-supporting capacity of air, water, soil and ecosystems; and*
- (c) Avoiding, remedying or mitigating any adverse effects of activities on the environment.*

Applying section 5 of the RMA, and the other relevant matters under Part 2 of the Act, can involve the assessment of conflicting considerations – including the positive and adverse effects of a proposed development. It is that balance that the NPS-REG aims to strike, and for renewable electricity generation, this national planning instrument sets the balance in favour of the development rather than protection of resources (with no national direction prevailing the other way).

The Project is undoubtedly one that enables people and communities to provide for their social and economic wellbeing, and to the extent reliant on a secure electricity supply, for their health and safety. Sections 1.1 and 3.6 above, and the associated Technical Reports (Attachments B8 and B14 in particular) confirm the local, regional and national significance of the Project for this element of the sustainable management purpose of RMA, as does the assessment in Section 8.3 relative to the NPS-REG. Wider social and economic benefits are as addressed in Section 7.16 above.

In similar vein, the Project is important (nationally significant) in terms of sustaining the potential of natural and physical resources to meet current and foreseeable demand for electricity, in a manner consistent with Government Policy direction.

As to Section 5(2)(b) and (c) the applicant has assessed Project viability in terms of ecological (birds, bats and lizards), visual, landscape and natural character, and amenity effects (including noise, vibration, glare). While wind farm design is largely dictated by operational requirements (including the location and number of turbines required), several iterations of the Kaimai Wind Farm have been undertaken with the intent of avoiding, remedying or mitigating adverse effects, where possible. This has included removing a number of turbines to minimise adverse effects on neighbouring properties, and reducing the height of the turbines on the high ridge in the most sensitive landscape area.

The proposal does not involve any direct disturbance of the coastal environment, or freshwater waterways (other than replacement upgrades to existing in-stream culverts). Land disturbance activities will be managed to minimise any migration of sediment or contaminants to the receiving environment. The life-supporting capacity of water, soil and ecosystem resources around the project site will be primarily safeguarded as a result of the design approach adopted by the applicant, as all important environmental areas (as to indigenous vegetation in particular) within or in the vicinity of the project site are protected or undisturbed. In terms of threatened bird or bat mortality, and while the effects in question are assessed as minor as to probability and extent, mitigation measures are proposed to address or offset those effects given the species concerned.

It is therefore considered that the Project would promote the sustainable management purpose of RMA as expressed in Section 5.

8.7.2 Section 6 – Matters of National Importance

Section 6 of the RMA identifies matters deemed to be of national importance, which must be recognised and provided for in achieving the sustainable management purpose of RMA. The matters of relevance are:

- (a) The preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins and the protection of them from inappropriate subdivision, use and development:*
- (b) The protection of outstanding natural features and landscapes from inappropriate subdivision, use and development:*
- (c) The protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:*
- (d) The maintenance and enhancement of public access to and along the coastal marine area, lakes and rivers:*
- (e) The relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu, and other taonga:*
- (f) The protection of historic heritage from inappropriate subdivision, use, and development:*
- (g) the protection of protected customary rights:*
- (h) the management of significant risks from natural hazards.*

6(a)

Section 6(a) is not considered relevant, as while part of the Site is visible at a considerable distance from some coastal areas to the east of the Kaimai Ranges, it is not within the coastal environment (including as defined under Policy 1 of NZCPs 2010).

6(b)

In terms of Section 6(b) of the RMA, the upper turbines will be located adjacent to the ONL as identified in the District Plan namely – Kaimai Range and Mt Karangahake, and in the WRPS. For the reasons addressed above in relation to Objective 3.20 of the WRPS, and having regard to the conclusions in the report prepared by Landscape Architect included in Attachment B12, it is not considered that the Project represents an inappropriate use in terms of section 6(b) of RMA. In particular, while the wind farm will add a significant new feature, it will not inherently change the present character, and existing landscape elements, patterns and process will remain unchanged.

6(c)

The ecological assessments undertaken have determined that any adverse effects on indigenous vegetation will not be significant, with no significant vegetation to be removed.

The adjacent SNA's support indigenous fauna notably long tailed bats and bush birds that have the potential to be affected by the proposal. In order to mitigate these adverse effects, KWF will contribute to conservation management involving either pest control, breeding programmes ecological and habitat enhancement primarily for the long-tailed bat and migratory bird species involved. A monitoring programme is proposed to ensure that risks remain low and to allow for adaptive management risk minimisation contingencies if required.

6(d)

The proposal will not affect public access to and from the coastal marine area, lakes and rivers.

6(e)

A range of consultation has been undertaken to date with local Iwi as detailed in Section 4.1, which reveals the potential for the wind farm to adversely affect the relationship Hauraki Māori have with the Kaimai Mamaku range, and the broader cultural landscape surrounding the Site. No specific issues relating to the Site itself have been identified, through the consultation to date. The applicant will continue engagement with iwi in relation to understanding the potential effects of the wind farm on cultural values, and progress measures to remedy or offset these concerns in a tangible way relevant to tangata whenua, and their status as kaitiaki.

6(f)

There will be no impact on historic heritage as concluded in the archaeological and heritage assessment.

6(g)

There are no relevant customary rights relating to the proposal.

6(h)

The most significant potential natural hazard relates to land stability. The site has been assessed by KGA geotechnical who determine there is no significant instability and the seismic risk is low. The project can be built and operated safely.

8.7.3 Section 7 – Other Matters

Section 7 of the RMA identifies additional matters that consent authorities must have particular regard to when exercising their functions and powers under the Act. With respect to the wind farm, the following matters in section 7 of the RMA are considered to be relevant:

(a) *kaitiakitanga*:

(aa) *the ethic of stewardship*:

(b) *The efficient use and development of natural and physical resources*:

(ba) *the efficiency of the end use of energy*:

(c) *The maintenance and enhancement of amenity values*:

(d) *Intrinsic values of ecosystems*:

(e) *[Repealed]*

(f) *Maintenance and enhancement of the quality of the environment*:

(g) *Any finite characteristics of natural and physical resources*:

(i) *The effects of climate change*:

(j) *The benefits to be derived from the use and development of renewable energy*.

In relation to these matters, and by way of further comment, it is considered that a wind farm is inherently an efficient use of a natural and physical resource (section 7 (b)). The wind farm will enable a reduction in the degree of reliance otherwise placed on thermal generation (coal and natural gas consumption) and on the storage of water for operating hydroelectric plant. The wind farm operation will, in turn, enable a reduction in greenhouse gas emissions, of relevance under sections 7 (i) and (j). These points are dealt with more fully in the Electricity Market report authored by ERS (Attachment B8).

The construction, operation and maintenance of the wind farm will have some impacts on amenity values and the quality of the environment related to the visual effects, construction and operational noise effects, along with construction traffic (sections 7(c) and (f)).

Sections 7(d) and (g) of the RMA relate to the intrinsic values of ecosystems, and the finite characteristics of natural and physical resources. It is considered that particular regard has been given to the intrinsic values of finite ecosystems. The wind farm has been designed to ensure that the ecosystem values of the project site will largely be retained as will any sensitive areas identified within and around the development site.

8.7.4 Summary

The development of the wind farm will have significant positive effects in terms of sustaining the social and economic wellbeing of the local, regional and national community, by contributing to New Zealand's supply of renewable electricity generation. Additionally, based on the assessments that have been undertaken to determine the viability of the site, it is considered the design and location of the wind farm is such that the environment will be safeguarded through the avoidance, remediation or mitigation of adverse effects. On this basis, the development represents sustainable management of natural and physical resources in accordance with Part 2 of the RMA.

8.8 Other Relevant Policies and Legislation

8.8.1 Climate Change Response Act

The Climate Change Response Act 2002 puts in place a legal framework to enable New Zealand to meet its international obligations under the United Nations Framework Convention on Climate Change and the Kyoto Protocol. This Act establishes the New Zealand Emissions Trading Scheme (NZ ETS), which is the government's key tool for reducing emissions and meeting our emission reduction targets. The settings of the ETS need to reflect the Government's decisions about how New Zealand is going to meet its targets.

The Ministry for the Environment (MfE) are progressing with work on strengthening and improving the operation of the NZ ETS. MfE are focused on:

- how best to implement the in-principle decisions made by the Government in July 2017, and
- advice on a package of forestry accounting and operational improvements, any future phase-out of free allocation and other operational and technical matters.

MfE plan to provide further advice to the Government on NZ ETS matters in mid-2018. Consultation with stakeholders will form a key part in developing the implementation details of these NZ ETS changes. MfE intend to consult with the public in late-2018 to help inform the Government's final policy decisions.

The Kaimai Wind Farm is consistent with the objectives of this Act, and it should be recognised in terms of its national significance as a renewable energy generation development providing both local and regional benefits in terms of security and diversity of supply, as well for its contribution towards meeting the 90% target for renewable energy by 2025 at a national level.

8.8.2 Zero Carbon Bill

New Zealand is on the path to a low emission, climate resilient future; and the Government aims to reduce our emissions to net zero by 2050.

- The New Zealand Government is committed to New Zealand becoming a world leader in climate change action
- It plans to introduce a new Zero Carbon Bill which seeks to set a new emissions reduction target by 2050
- It also plans to establish an independent Climate Change Commission.

The Kaimai Wind Farm is intrinsically aligned with the objectives of the Zero Carbon Bill by contributing to New Zealand's supply of renewable electricity generation.

8.8.3 Waikato Regional Energy Strategy

Alongside the WRP, the regional Council has developed the Waikato Regional Energy Strategy, of relevance under s104(1)(c) of the RMA. Despite being a non-statutory document, the strategy contains detail that will *"help to inform decision makers at the regional and district level"* and particularly *"local government has an important role to play in meeting the region's energy needs"*. The strategy's main emphasis is the balancing of supply and demand of energy, and it discusses the specific Waikato energy breakdowns and issues. The sections pertaining to renewable energy are aligned with the outcomes sought under the NSP-REG and WRPS.

8.8.4 New Zealand Coastal Policy Statement (2010) (NZ-CPS)

The objectives and policies of the NZCPS seek to safeguard and protect the resources of the coastal environment. A further key advantage of the Project is that it enables utilisation of a wind resource that is not within the coastal environment. As the Figure produced in Section 3.1 of this report reveals, this is a unique attribute of the Project, relative to other alternative potentially available wind resources in the upper North Island, and avoids any challenge to the imperatives of this national planning instrument that would otherwise have to be considered alongside (inter alia) the NPS-REG.

Out of completeness, it is noted that Policy 11 of the NZCPS "Indigenous Biodiversity" focuses on the protection of habitats of indigenous ecosystems or biodiversity values located in the coastal environment. While there is some potential risk to migratory birds that utilise such habitats, the effect is assessed as minor in terms of probability and extent, such that the intent of this provision is met.

8.8.5 National Policy Statement for Freshwater Management 2014 (NPS-FM)

The NZPSFM sets out objectives and policies that promote the management of freshwater in an integrated and sustainable way, while providing for development. The Project involves direct impacts on one stream within the Site, in the form of upgrades to existing culverts on that stream which have the potential to enhance the ecological values of that stream. Furthermore, construction works will be managed to ensure that any runoff from the site is minimised thereby creating limited opportunity for the migration of sediment or contaminants into any nearby freshwater environment. Accordingly, it is considered that the proposed wind farm development will be consistent with the objectives and policies outlined in the NZPSFM.

8.8.6 National Policy Statement on Electricity Grid Transmission

The National Policy Statement on Electricity Grid Transmission ("NPSEGT") sets out the national significance of the national electricity grid and provides guidance for RMA decision makers through establishing one objective and 14 policies.

The objective of the NPSEGT is “to recognise the national significance of the electricity transmission network by facilitating the operation, maintenance and upgrade of the existing transmission network and the establishment of new transmission resources to meet the needs of present and future generations, while:

- managing the adverse environmental effects of the network; and
- managing the adverse effects of other activities on the network.”

The proposed wind farm will connect to the grid and may require minor works to achieve this. It is considered that the project will be managed in a manner that is consistent with the intent of the NPSEGT.

8.8.7 Hauraki District Council Consolidated Bylaw

The intent of Hauraki District Council’s bylaws is to provide laws applicable only to Hauraki District that in general protect the public from nuisance; protect, promote and maintain public health and safety; and minimize the potential for offensive behaviour in public places. Part 7 – *Land Drainage* – needs to be considered to ensure that any works meet the criteria that is set out to protect the waterways. Our assessment against the relevant criteria of the bylaw is as follows:

- Section 3.0 contains standards for “defence against water”. The watercourses on the site do not include any dam, weir, groyne or reservoir; however, the standard can also apply to banks, carriageways and structures (which have the effect of controlling and diverting the flow of water within the watercourse). Having viewed the standards, it is considered that the proposal is able to comply with these criteria, given that the Project does not involve the introduction of any new structures into any of the watercourses and the fact that the access road will follow the alignment of the existing farm track. There will be no deposition of any substances/structures within the watercourse and there is no intention of planting or removing vegetation from the watercourse (within 15 metres of the stream banks). There will be no alteration of any banks, and no excavations within 15 metres of any “defence against water”.
- Section 5.0 contains provisions regarding “crossings” and requires that every owner of land on which any crossing is situated shall keep the crossing maintained to a standard that will enable safe passage over the crossing. It is considered that the existing crossings are capable of serving the wind farm and enabling safe crossing.
- Section 9.1 contains provisions regarding the “obstruction of drainage channels or watercourses”. As stated above, there is no intention to erect, deposit, or construct any structure or object that would interfere with or divert the flow of water in any of the watercourses.

Having viewed Part 7 of the Consolidated bylaw, it is concluded that the Project works are such that it does not introduce any element that is not provided for under the bylaw.

8.9 Particular Restrictions for Non-Complying Activities (Section 104D)

As outlined in Section 6.5, consent is sought on an un-bundled basis. The primary elements of the Project are considered a discretionary activity and are assessed on that basis. However a small component requires consent for a technical infringement to Rule 8.2A.1.3(1)(e) of the HDP; relating to structures and earthworks within the High Voltage Transmission Corridor. This element of the Project, alone, is subject to the RMA Section 104D two-part ‘gateway test’. This provides that:

Despite any decision made for the purpose of notification in relation to adverse effects, a consent authority may grant a resource consent for a non-complying activity only if it is satisfied that either—

- (a) The adverse effects of the activity on the environment will be minor (section 104D(1)(a)); or
- (b) The application for an activity will not be contrary to the objectives and policies of relevant plans and proposed plans (section 104D(1)(b)).

In respect of the proposed structures and earthworks within the High Voltage Transmission Corridor, this component of the Project meets both limbs of the gateway test. The adverse effects of this activity on the environment will be minor, including visual and ecological impacts, and it will not be contrary to the objectives and policies of the WRP and HDP.

8.10 Summary Discussion on Statutory Assessment

The construction and operation of the Kaimai Wind Farm requires land use consents for discretionary activities and a non-complying activity from the Hauraki District Council (for the discrete substation and termination structure elements). In addition, resource consents are required from the Waikato Regional Council, again as discretionary activities. The discrete non-complying activity consent required from HDC (relating to works within the High Voltage Transmission Corridor) is sought on an un-bundled basis, and the primary activity – being the construction and operation of the wind farm, is assessed as a discretionary activity. The discretionary activity status under both the HDP and WRP forms the foundation for the statutory assessment of the Project, as presented through section 0 of this report. This assessment addresses matters that the consent authority must have regard to when considering an application for a resource consent and any submissions received, including: the NPS-REG, Waikato RPS, Waikato RP, Waikato Regional Energy Strategy, Hauraki DP, and the Zero Carbon Bill.

In terms of the NPS-REG, its Objective is to recognise the national significance of renewable electricity generation activities by providing for the development and continued operation of new and existing renewable electricity generation activities, with the strategic target that 90% of New Zealand’s electricity is generated from renewable sources by 2025. The Kaimai Wind Farm would give effect to the NPS-REG.

The WRPS seeks to give effect to the Government targets for renewable electricity generation development, balancing this imperative against the potential and actual adverse effects. Having regard to the assessment above it is concluded that the proposal is generally consistent with, and not contrary to, the objectives and associated policies of the WRPS.

The WRP integrates policies on economic, environmental and social issues to achieve long-term outcomes across a range of challenging and complex regional issues. The most relevant provisions to the Project address management of water resources, and the Project is consistent with these provisions as effects on the surrounding water resources will be appropriately mitigated.

In tandem with the WRP, WRC has developed the Waikato Regional Energy Strategy. This strategy contains detail that will “*help to inform decision makers at the regional and district level*” and particularly “*local government has an important role to play in meeting the region’s energy needs*”. The sections pertaining to renewable energy are aligned with the outcomes sought under the NPS-REG and WRPS, and the Project would ultimately give effect to the Strategy.

The HDP contains objectives and policies that are relevant to the Project, having regard to the Rural Zoning and site proximity to the Kaimai Ranges and Mt Karangahake. The wind farm development is generally consistent with the objectives and policies of the HDP, noting that the Plan enables opportunity for renewable electricity generation development within the district (while ensuring any adverse effects are reasonably managed).

In terms of the Zero Carbon Bill, New Zealand is on the path to a low emission, climate resilient future; and the Government aims to reduce our emissions to net zero by 2050. The Kaimai Wind Farm is intrinsically aligned with the objectives of the Zero Carbon Bill by contributing to New Zealand’s supply of renewable electricity generation.

Overall, and in respect of the statutory planning framework that applies to the Kaimai Wind Farm, the Project is generally consistent with, and not contrary to, the objectives and associated policies throughout the relevant national, regional and district planning documents. Moreover, numerous objectives and policies throughout these relevant documents recognise the need to develop renewable electricity generation infrastructure, including at significant scale, and the need for such infrastructure to be located where the resource exists. There is also clear policy recognition that the development of renewable electricity generation activities responds to technical, functional and locational constraints that must be considered in determining the appropriateness of a site for development.

The assessment presented through this report and its attachments establishes that the proposed Kaimai Wind Farm achieves an appropriate balance in terms of its location and site design, and addresses the need for renewable energy generation, overall, in synergy with the statutory framework of relevance to this consent application.

9 Conclusion

This report forms an assessment of environmental effects pursuant to the Fourth Schedule of the RMA. It is presented in support of an application by KWF for resource consents to enable a proposed wind farm project located along the north-western extents of the Kaimai Ranges in the Waikato Region of New Zealand's North Island. The assessment has been informed by numerous technical assessments undertaken by experts in their respective fields, commensurate with the significance of this wind farm scheme, and in respect of both the construction and operational phases of the Project. The application is requested to be publicly notified.

The Project revolves around the establishment of 24 large scale wind turbines up to 207m high, designed through an iterative process over a number of years across a Site comprising 771 and 604 Rotokohu Road and 6356 State Highway 26 – with a combined site area of 1304 hectares. Ancillary structures and works are also required, including of a new 110kV sub-station with two new lattice transmission towers, two internal 33kV overhead lines, 18.9km of internal roading network, 24 turbine platforms, 3 component laydown areas, replacement of 8 existing culverts along the existing farm access track, and an underground cable network between the turbines. A comprehensive mitigation package is also proposed, including ecological, visual, cultural, traffic and landscape measures. These will be refined through the consent process, and in response to ongoing consultation with all stakeholders, building on the extensive consultation undertaken to date that has informed the overall proposal (section 4).

The Project requires land use consents for discretionary activities and a non-complying activity from the Hauraki District Council under its District Plan for one discrete aspect. In chief, renewable energy generation activities are a Discretionary Activity in the rural zone under rule 7.4.5.5(D1). Other associated activities for which consent is needed include ancillary electrical structures, earthworks, and minor traffic matters. The discrete non-complying activity aspect is a technical infringement associated with works in the High Voltage Transmission Corridor – and an activity that would likely always be required for a renewable energy generation project. This component is sought on an un-bundled basis, and with the primary elements (being the development and operation of the wind farm itself) sought as a discretionary activity. Resource consents are also required in tandem from the Waikato Regional Council under its Regional Plan, again as discretionary activities, and specific to proposed upgrades to existing in-stream culverts, earthworks, and associated discharges to land and water.

The assessment of environmental effects presented through Section 7 concludes that on balance, and in light of the findings, conclusions and recommendations from the various technical assessments, the Kaimai Wind Farm has been designed, and can be constructed and operated in a manner that will appropriately avoid, remedy or mitigate adverse effects on the environment. Overall, the Site is considered to be an appropriate location for a wind farm, particularly given the immediate proximity to the National Grid and the accessibility of a strong wind resource, the rural zoning and pastoral land use, available noise buffer separation distances from residential dwellings, and a lack of designated ecological or landscape values within the Site.

That being said, it is recognised that the potential adverse effects from the Project cannot be avoided, remedied or mitigated in their entirety. The adverse impacts on landscape character and values and visual amenity in this area have the potential to be high, as do effects on the cultural landscape valued by tangata whenua. In this regard, the Kaimai Wind Farm has evolved through an iterative design process – seeking to address often conflicting values, and the proposal now represents an appropriate and balanced outcome in terms of effects on visibility and the surrounding landscape and character, particularly when assessed in the context of the national direction provided by the NPS-REG.

The statutory assessment of the Project presented through section 0 of this report is founded on the discretionary activity status under both the HDP and WRP. The assessment addresses matters that the consent authority must have regard to when considering an application for a resource consent, including: the NPS-REG, Waikato RPS, Waikato RP, Waikato Regional Energy Strategy, Hauraki DP, and the Zero Carbon Bill. Overall, the Project is generally consistent with, and not contrary to, the objectives and associated policies throughout these relevant national, regional and district planning documents. Moreover, numerous objectives and policies throughout the relevant documents recognise the need to develop renewable electricity generation infrastructure, including at significant scale and the need for such infrastructure to be located where the resource exists. There is also clear policy recognition that the development of renewable electricity generation activities responds to technical, functional and locational constraints that must be considered in determining the appropriateness of a site for development.

Overall, the assessment presented through this report and its attachments establishes that the proposed Kaimai Wind Farm achieves an appropriate balance in terms of its location and site design, and the actual and potential adverse effects from the Project can be appropriately mitigated or offset. Finally, the Project addresses the growing need for renewable energy generation and is in synergy with the statutory framework of relevance to this consent application.

In that regard, and as to the promotion of the sustainable management purpose of RMA, the NPS-REG is of paramount importance to recognising renewable energy as a matter of national significance in its own right, and is the only national planning instrument of direct relevance to the Project, giving national direction as to how the Part 2 principles should be applied in assessing it.

ATTACHMENT A – Miscellaneous and Legal Documents

#	Reference
A1	Certificates of Title
A2	Written Approvals
A3	Consultation Record
A4	Consultation Information
A5	Proposed Conditions of Consent
A6	Table of RMA Fourth Schedule compliance
A7	Transpower High Level Review Report

ATTACHMENT B – Technical Reports

#	Specialty	Company and Expert
B1	Archaeological	Andrew Hoffman
B2	Aviation	Peet Aviation, Brian Whelan
B3	Civil Drawings	Tektus, Jack Turner [SEE ATTACHMENT D]
B4	Civil Peer Review	Tiaki, Hugh Barraclough
B5	Construction	Energy3, Tom Cameron
B6	Ecology (Site)	Kessels & Assoc., Gerry Kessels
B7	Ecology (Environs)	Ecology NZ; Simon Chapman
B8	Electricity Market	ERS, Ashley Wall
B9	Geotechnical	KGA, Jacqui McCord
B10	Noise	Chiles, Stephen Chiles
B11	Turbine Transportation	Tranzcarr, Warwick Bell
B12	Landscape	Mike Moore
B13	Landscape Peer Review	Boffa Miskell, Boyden Evans
B14	Project Rationale	Energy3, Tom Cameron
B15	Radio Communications	Lambda, Stephen Atkinson
B16	Shadow Flicker	Energy3, Tom Cameron
B17	Siltation	CES, Murray Preston
B18	Stormwater	CES, Murray Preston
B19	Tourism	TRC, Donna Graf
B20	Traffic	Gray Matter, Alasdair Gray

ATTACHMENT C – Miscellaneous Drawings

#	Reference
C1	Site Layout; Manawatu Aerial Mapping
C2	Dwellings within 2km; Manawatu Aerial Mapping
C3	Sub-Station Drawing; Siemens
C4	Farm Management Maps; Manawatu Aerial Mapping

ATTACHMENT D – Civil Drawings

#	Reference
D1	Civil Drawings; Tektus

ATTACHMENT E – Photomontages

#	Reference
E1	Photomontages; Energy3