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Resource Consent Application

Long Gully Wind Farm Windflow Technology Limited

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FORM 9

Application for Resource Consent under Section 88 of the Resource Management Act 1991

To: **Wellington City Council**

Windflow Technology Limited applies for the resource consent described below:

- The names and addresses of the owners and occupiers of land to which the application relates are as follows:

Owner	Legal Description	Turbines	Other Project Features
FRST Developments Limited	Lot 2 DP 82764	All turbines	1. Roothing and other earthworks 2. Operations and maintenance building 3. Upgraded overhead electricity lines 4. New overhead electricity lines
Wellington City Council (Southern Landfill)	Pt Lot 1 DP 29398	None	New Landfill route electricity line
Airways Corporation of New Zealand (Hawkins Hill radar site)	Section 1 and Section 2 SO 31242	None	Roothing earthworks
Shenva Windfarm Developments Ltd.	Lot 2 DP 82764	None	Upgraded Karori route electricity line
Wellington Natural Heritage Trust Inc.	Lot 1 DP 82764	None	Upgraded Karori route electricity line
Wellington Windfarms Ltd.	Lot 3 DP 26908	None	Upgraded Karori route electricity line
Wellington City Council (Karori Sanctuary)	Lot 1 DP 313319	None	Upgraded Karori route electricity line
Crown and / or Wellington City Council	Wrights Hill Recreation Reserve (various titles)	None	Upgraded Karori route electricity line

Anecdotal

Certificates of Title for the land listed above are attached as Appendix J. Agreement has been entered into with FRST Developments Limited to use parts of Lot 2 DP 82764 for wind farm purposes. No agreements have been entered into with other landowners in relation to the upgrade of the Karori route electricity lines as access to land for that purpose is subject to the Electricity Act 1992 and its amendments. No agreement has been entered into with Wellington City Council in relation to a new electricity line in Pt Lot 1 DP 29398 (Landfill route).

- The general location to which this application relates is the area known as Long Gully, to the west of Brooklyn and south of Karori. The location is further described (including a location map) in the attached annexure at section 3.

3. The type of resource consent sought is a **land use consent**

Consent is requested for the construction, operation and maintenance of a wind farm and ancillary activities.

4. A description of the activities to which the application relates is set out below:

- a) The erection, operation and maintenance of 25 wind turbines for the generation of electricity, within a 50m radius of the positions shown on drawings attached to the application.
- b) The erection and operation of two wind monitoring masts, within 70m – 135m of any final turbine position.
- c) Erection and operation of an operation and maintenance building.
- d) Installation of overhead cables and other electrical infrastructure to connect the wind farm to the local electricity network.
- e) Importation and / or excavation and use of basecourse material.
- f) Land disturbance within the areas generally shown on the plans and in particular for:
 - (i) Access formation to turbine sites.
 - (ii) Establishing laydown / construction platforms at each turbine site.
 - (iii) Placement of fill.
 - (iv) Establishing a platform for an operation and maintenance building.
 - (v) The erection of electricity poles.
- g) Maintenance and replacement of all works, equipment and facilities as required during the life of the wind farm.
- h) Decommissioning of the wind farm.

A more detailed description of those activities and an assessment of their effects on the environment are included in the attached application documents, including the specialist assessments attached as Appendices to the annexure, and separate folders enclosing: 1. Civil engineering drawings and 2. illustrative visual material.

5. In accordance with section 125 of the Resource Management Act 1991, the applicant seeks a term of ten years from the date of commencement to give effect to the resource consents.

6. The following additional consents are needed for the proposed activity:

Landowner consents in relation to proposed new or relocated electricity routes
(NB: these are non-RMA consents)

-
7. The attached documents, including the Appendices and separate folders of drawings and illustrative material, form part of this application and provide a description of any effects on the environment in accordance with the Fourth Schedule to the Resource Management Act 1991.

Dated: 15 May 2007



.....
Mark Ashby, on behalf of the applicant

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Annexure: A description of the proposal for which the above resource consents are sought, an assessment of effects on the environment in accordance with the Fourth Schedule of the Act, and annexures thereto being part of and comprising detailed reports on matters referred to in the assessment of effects.

1. Executive summary

1.1 The proposal

Windflow Technology Limited (“Windflow”) proposes to construct a wind farm located at Long Gully south west of Wellington. The proposed Long Gully wind farm is located within one property legally described as Lot 3 DP 82764.

The site is situated within Wellington City Council (“WCC”) and the Greater Wellington Regional Council’s (“GWRC”) jurisdiction.

The proposal is for 25 *Windflow 500* turbines with a total capacity of 12.5MW. Long Gully wind farm will generate sufficient electricity to power the equivalent of 5,000 – 6,000 homes. The proposed Long Gully wind farm is the first example of a fundamentally different wind farm to those already operating and being constructed in New Zealand. This proposed wind farm is different because it will be significantly smaller than most wind farms constructed in New Zealand to date, and provides ‘distributed generation’, rather than ‘grid integrated’ generation.

Distributed generation refers to power sources that feed into an area’s local ‘domestic’ power lines, with the electricity always being consumed locally. In contrast, grid integrated generation feeds into the national (Transpower) transmission system. Although electricity from a grid integrated power source may then feed into local power lines, it is most often transported to other parts of the country.

Distributed generation reduces the amount of energy lost in transmitting electricity (typically 15%), because the electricity is generated close to users. Another characteristic of distributed generation is the lesser size of power lines that are required. It also has the advantage of building resilience and lower costs into the New Zealand-wide electricity network. However, a disadvantage is that economies of scale are quite different when compared with a power source of ten or twenty times the size. A distributed generation project must be relatively low cost for it to be economically feasible.

Specific to the Long Gully project, it is also different because it will use wind turbines designed and manufactured in New Zealand, and thus preserve and create jobs for New Zealanders. It will also save foreign exchange, and help lay the groundwork for a sustainable and renewable electricity industry in New Zealand. In addition, the turbines are 46.6 metres in height, and thus much smaller than many foreign manufactured wind turbines, and are specifically designed for New Zealand wind conditions.

The completed wind farm will include:

- 25 wind turbines of 500kW individual capacity, and up to 46.6 metres in height (base to vertically extended blade tip);
- Improved access roading between individual turbines (starting from the vicinity of the Hawkins Hill radar dome) to facilitate erection and ongoing maintenance;
- Connection to the local electricity distribution network;
- An associated operations and maintenance building;

- Meteorological masts.

The turbines are intended to operate on a continuous 24-hour basis, although that is dependent on the wind resource. The turbines have an operational life of up to 20 years, but would be subject to regular maintenance and replacement of various parts over that period.

1.2 Indicative numbers

The following numbers provide an indication of the scale and effects of the proposed wind farm.

Turbine / Wind Farm Parameters

Turbines	25
Individual turbine capacity.....	500kW
Total wind farm capacity	12.5MW (500kW x 25 turbines)
Height to hub.....	30m
Rotor diameter	33.2m
Total turbine height	46.6m (from base to vertically extended blade tip)
Sound level of wind farm.....	40dBA ^a at 960m – 1,180m from wind farm ^b
Wind monitoring masts	2 (30m – 50m height each)

Construction Facts

Internal site roads ^c	3m straight road width (plus drainage on one or both sides)
Laydown / construction pads	25 pads (1 per turbine), typical maximum size 20m x 7m (140m ²)
Earthworks volume	7,500m ³ to 10,000m ³
Construction time	5 months
Heavy vehicles	4 – 7 per day (average over construction period)

Surrounding Environment

Nearest existing dwelling ^d	approx 1.0km, “The Castle”
Nearest dwelling in Brooklyn.....	approximately 3.5km (southern end of Ashton Fitchett Drive)
Nearest dwelling in Karori	approximately 1.4km (southern end of South Karori Road)
Distance to Karori Sanctuary	approximately 1.2km (closest turbine), 4.0km (furthest turbine)

Annual Outcomes

Electricity output.....	approximately 46,000 Megawatt hours
Equivalent CO2 emissions avoided	approximately 29,000 tonnes
Equivalent households supplied	approximately 5,000 – 6,000 ^e
Equivalent trolley bus use	enough electricity to run Wellington’s trolley bus fleet for over 10 years (16 million km of travel) ^f

^a 40dBA is a basic threshold of acceptability under the relevant NZ noise standard. See the project’s acoustic assessment for more detail (Appendix C)

^b For any one direction out from the wind farm, the actual 40dBA distance can vary between and below these figures, depending on localised cumulative effects of specific turbines, and the effects of shielding provided by topography

^c Most of the internal roading will be farm roads that already exist

^d Excludes dwellings on landowner’s property (FRST Developments Ltd).

^e By way of comparison, there were just over 5,000 households in Karori at the 2006 Census

1.3 Resource consents

Resource consents for the wind farm proposal are required from Wellington City Council under the Operative Wellington City District Plan and Plan Changes 32 and 33 to the District Plan. The following activities have been identified as requiring consent from WCC:

- The construction, operation and ongoing maintenance of a wind farm and ancillary structures, including anemometer masts, and an operations & maintenance building
- To undertake earthworks that exceed permitted thresholds and include ridgelines and hilltops;
- To erect temporary buildings
- To upgrade and extend the 11kV local electricity distribution network
- To handle and store hazardous substances

As set out by section 7 (page 38) of this application, no resource consents are required from the Greater Wellington Regional Council.

No written approvals have been sought from potentially affected parties. Windflow anticipates that the Council will publicly notify this application, including direct notification to adjoining landowners. However, Windflow has consulted with various parties (see section 10) and will continue to consult leading up to the consent hearing.

1.4 Project programme

The project programme (see Table 6 in section 4.13 of this report) envisages construction of the wind farm beginning in 2010. The intervening period will allow Windflow to finalise commercial arrangements and properly prepare for the construction exercise that the wind farm will entail. Importantly, it will allow further refinement and investigation to ensure that potential environmental effects are appropriately managed during and after construction. The process of 'further refinement' will, for instance, involve micro-siting of proposed turbine positions, within a 50 metre radius of each proposed position, to achieve the best balance between:

- The energy output of each turbine
- The cost of earthworks
- Ease of construction
- The ecological effects of earthworks

^f Based on figures provided by Infratil (owner of the trolley bus fleet) in *Infratil Update*, 9 March 2006

1.5 Summary of effects

A team of specialist consultants has worked together on the design of Long Gully wind farm to assess the potential effects on the surrounding area of constructing and operating the wind farm. The specialist assessments of effects examine issues such as effects related to landscape, traffic, acoustics, ecology, radiocommunications, Civil engineering, geotechnical engineering, and cultural heritage. The full assessment reports are attached as appendices to this resource consent application, but the main findings from each report are summarised in section 9, and are referred to at other places in the application document.

Windflow has consulted widely with the public and potentially interested parties such as the Department of Conservation, Karori Wildlife Sanctuary, and the Airways Corporation to help determine the range of possible effects. Windflow also intends to conduct ongoing consultation with the public, consent authorities, interested parties and iwi leading up to and during the construction process.

Based on the assessments that have been carried out, the overall conclusions that can be drawn about the effects of the development include:

- The visual impact of the wind farm will be minor, especially in the context of the consented landscape which includes Project West Wind. Even in the context of the existing landscape, the scale of the landscape can readily accommodate the wind farm's presence.
- Sound levels from the wind farm will meet National Standards and District Plan standards at the nearest dwellings outside the wind farm site.
- The earthworks will have only minor ecological and landscape effects.
- The earthworks will have minor or less than minor effects on water quality during the construction period.
- There are no sites of archaeological or cultural significance that would be adversely affected.
- The potential for interference effects on communications has been assessed. Effects will either not occur, or are capable of being either avoided, or overcome if they do occur.
- Windflow and the Airways Corporation are able to reach agreement on a protocol that will avoid any potential effects on the Hawkins Hill radar.
- The effects of transportation and construction on the public and road users will be minor.
- The effects of an upgrade to the existing 11kV electricity network will be minor.
- The effects of a relatively short new 11kV electricity line will be minor
- Potential cumulative impacts associated with landscape or noise impacts will be no more than minor.

Overall, the assessments that contribute to these findings demonstrate that the effects of the Long Gully wind farm are either minor, or can be appropriately avoided, remedied or mitigated.

1.6 Positive outcomes

The wind farm's positive outcomes can be achieved in ways that avoid, remedy or mitigate adverse effects. Positive and sustainable outcomes, coupled with practical efforts to address other effects, are consistent with the approach and purpose of the Resource Management Act. Significant benefits both locally and nationally result from the Long Gully wind farm project. These benefits include:

- Provision of greater diversity in the supply of energy for New Zealand;
- Addition of a further strategic electricity generation resource within Wellington, assisting local security of supply;
- Use of a renewable resource, in preference to using finite sources such as fossil fuels to generate electricity;
- Avoidance of carbon dioxide, sulphur and nitrous oxides emissions that would otherwise be released by equivalent fossil fuel generation;
- Addition of a substantial distributed generation power source, with all the benefits which that implies (see page 1);
- Spending within the local economies during the construction phase;
- The use of New Zealand manufactured turbines;
- Wind farm income received by the landowner will support an ongoing ability to provide site access to the public and organised recreational groups.

It should also be noted that, once the wind farm has outlived its usefulness, the turbines and associated structures can be removed, more or less returning the landscape to its current character.

With a capacity of 12.5MW, the Long Gully wind farm can be expected to generate on average about 46 gigawatt hours (GWh) of energy each year.

The New Zealand Climate Change Office states that the current New Zealand emissions factor for electricity production equates to 625 tonnes of carbon dioxide (CO₂) per GWh. The emissions factor implies that the proposed Long Gully wind farm project has the potential to mitigate around 29,000 tonnes of CO₂ emissions each year.

Windflow is a New Zealand company. Around 90% of the components for its turbines are manufactured in New Zealand, and production of the various components takes place at locations throughout the country. For instance, the tubular steel towers for the Long Gully wind farm will be manufactured in Petone. Windflow is therefore a significantly positive contributor to New Zealand's economy.

The positive outcomes of the wind farm can be achieved in a way that avoids, remedies or mitigates adverse effects. Achieving positive, sustainable outcomes, while making practical efforts to deal with adverse effects, is consistent with the purpose of the Resource Management Act 1991.

1.7 Windflow and a sustainable environment

Established in 2001, Windflow is New Zealand's only manufacturer of utility-sized wind turbines. The Company, its shareholders and staff have a strong commitment to building a sustainable future in New Zealand. In 2007, Windflow won the Energy Efficiency and Conservation Authority's Product Innovation Award and the Southern Region Product Design and Innovation Award for the Sustainable Business Network.

The Company has built a strong design team in Christchurch where it has established an assembly factory for components that are manufactured throughout New Zealand. Only 10% of the turbine components are imported.

Windflow has fifty five staff (up from fifteen in April 2007) and provides employment for many more people in New Zealand through its manufacturing and construction opportunities. In 2003 it built its test turbine near Christchurch and opened the Te Rere Hau wind farm near Palmerston North in 2006, which has 43 operational turbines (as at 6 May 2009). It is supplying a total of 97 turbines for Te Rere Hau.

It is estimated that the manufacture of Windflow turbines has created 500 jobs in New Zealand.⁹

Windflow is contracted by Mighty River Power to project manage the resource consent of the Long Gully wind farm. Provided that appropriate resource consent is granted, Windflow is further contracted to supply wind turbines for the site and project manage the construction of the wind farm.

1.8 Mighty River Power

Mighty River Power ("MRP") is a state owned electricity retailer and generator, formed following the break-up of the Electricity Corporation of New Zealand in 1999. MRP's generation assets produce up to 22% of New Zealand's peak energy demand. While MRP's generation activities have historically been focused on hydro-electric and geothermal generation, it is currently seeking to diversify its generation portfolio.

MRP has erected wind monitoring equipment at a number of locations throughout New Zealand to assess the viability of these sites as wind farms.

As a State Owned Enterprise, MRP's principal objective is to be a successful business, that is, an entity that is as profitable and efficient as comparable private companies. The State Owned Enterprises Act 1986 also requires MRP to be a good employer; to be an organisation that is economically focused; and to demonstrate social responsibility to its communities. MRP aims to be a leader in the achievement of sustainable development through world class management and utilisation of natural resources.

⁹ A report for the Industry Capabilities Network by Business and Economic Research Ltd concluded that for every million dollars of import substitution, 11.8 jobs would be created in New Zealand (ICN, 2004). In other words, for every million dollars that is spent on locally made turbines instead of imported turbines, 11.8 jobs would be created.

Accordingly, MRP is committed to managing wisely and sustainably the resources on which it depends to help meet New Zealand's energy needs. MRP is also committed to sustainable business practices and environmentally responsible operations, and it is a member of the New Zealand Business Council for Sustainable Development.

1.9 Windflow 500 turbines

The *Windflow 500* combines cost-effectiveness, simplicity and reliability in a world leading design. The turbine has been designed for New Zealand's strong and turbulent wind conditions and is currently being certified to the International Electrotechnical Commission (IEC) WT-01 Class 1A. Its size, performance and light-weight design makes it suitable for wind farms, islanded grids, and single installations and allows it to be transported to and installed in mountainous regions with limited road access.

The *Windflow 500* is characterised by its two blades and relatively small size. Being around the same height as the Brooklyn wind turbine, it is less than half the height of other turbines used in larger wind farms. It has been chosen for the Long Gully site because its scale is considered appropriate for the area.

The two-bladed rotor is mounted on a hinge, allowing it to teeter back and forth slowly as it rotates. The proven advantage of teetering is that it greatly reduces fatigue loads, allowing a robust, but light and therefore cost-effective design, which is well suited to gusty wind conditions.

The light-weight, compact design enables a piled foundation using 45m³ or less of concrete, components transportable with standard trucks on 3 - 4 metre wide roads, and a nacelle and rotor able to be installed in one easy lift with an 100 tonne on-road crane.

With a hub height of 30 metres (46.6 metres to the tip of the blade), the visual catchment of the wind farm (or a single turbine) is less than for taller turbines. *Windflow 500* turbines are painted a light blue/grey to blend in with typical sky colours, and are small enough that they do not require warning lighting under New Zealand aviation regulations.

2. Introduction

2.1 Purpose of report

This report and its Assessment of Effects on the Environment (“AEE”), is submitted in support of the resource consent applications made by Windflow pursuant to section 88 and the Fourth Schedule to the Resource Management Act 1991 (RMA). The AEE and resource consent applications relate to the construction, commissioning, operation, maintenance and decommissioning of the Long Gully Wind Farm.

The proposed wind farm will be located on Long Gully Station, and approximately 840 ha landholding which lies west of Brooklyn and south of Karori. The actual area occupied by the wind farm will be a very small proportion of the total Long Gully property.

Long Gully wind farm is proposed to have 25 wind turbines. The *Windflow 500* is the only turbine proposed to be used, and it has a capacity of 500kW (0.5 MW). The capacity of the entire wind farm would therefore be 12.5MW.

The purpose of this report is to provide a description of the proposed activity, an assessment of the actual and potential effects on the environment and an assessment of the activities in relation to the relevant provisions of the RMA and the relevant district and regional plans.

2.2 Structure of report

This report is intended to provide information related to Windflow’s application for resource consents for the construction, operation and maintenance of the Long Gully wind farm. In that regard, it addresses matters associated with both regional and district issues to allow a comprehensive assessment of the proposal.

Where necessary, clarification is provided regarding the particular applications for resource consent to which the information relates.

This report consists of the following sections:

Section 3 – Site description

This section sets out the existing context for the project including the surrounding land uses, landscape setting, ecological values, geological conditions, historical and cultural context, the wind at the site and transportation and access to the area.

Section 4 – The proposal

This section details the activities and structures associated with the construction, operation, commissioning, and maintenance of the wind farm.

Sections 5 and 6 - National policy and Regional policy

These sections highlight aspects of national and regional policy that are relevant to an assessment of the proposed wind farm.

Section 7 - Regional rules

This section outlines the regional rules which would be potentially applicable to a large construction project, but concludes that the Long Gully wind farm is able to comply and that regional resource consents are therefore not needed.

Section 8 – District rules

This section outlines the district plan rules that will apply to the development, principally the renewable energy provisions that specifically refer to wind farms. It also identifies the need for consent in relation to the district plan's utilities provisions, for the proposed new or upgraded electricity lines. This section also includes an assessment against applicable district plan criteria.

Section 9 – Assessment of environmental effects

This section details the actual or potential effects associated with the proposal and how these can be avoided, remedied or mitigated. The section summarises the main findings of the specialist assessment reports, which are incorporated in full in the Appendices.

Section 10 – Consultation

This section outlines the consultation that has been undertaken with affected parties, key stakeholders and the community during the development of the proposal.

Section 11 – Conclusion

This section briefly concludes that there are no significant adverse effects associated with the development, and that there are strong positive reasons for granting consent.

Appendices

The appendices include the full reports of the specialist consultants employed to assess the effects of the proposed wind farm, and an outline of the relevant objectives and policies.

Drawings

Separate folders of drawings related to:

- The Civil engineering assessment, showing proposed earthworks
- The Landscape and Visual assessment, including various illustrative material

3. Site description

3.1 Long Gully Station

The proposed wind farm is entirely on land owned by the Long Gully Station Trust. The approximately 840 hectare farm, known as Long Gully Station (Lot 2 DP 82764, owned by FRST Developments Ltd.), is located southwest of Ashton Fitchett Drive. Long Gully Station is bounded to the west by Kinnoull Station, which is accessed from South Makara Road, to the north by Karori Wildlife Sanctuary, to the east by the Southern Landfill and recreation land owned by WCC, and to the south by Cook Strait.



Figure 1 - Location of Long Gully Station, the site of the proposed wind farm

(Further locality plans are attached in Appendix A of this report.)

The main valley floor (Long Gully) contains a north flowing stream (Silver Stream) that is one of the headwater branches of the Karori Stream. The stream and valley floor also follow the line of the Wellington Fault, one of the major active earthquake fault lines in the Wellington region. The topography of the surrounding land is generally steep, although some of the ridge tops are comparatively broad.

Long Gully Station encompasses land from near sea level to a high point of 495m, known as Hawkins Hill. It also includes the slightly lower (485m) high-point of Te Kopahou. The topography of Long Gully Station is best described as steeply undulating hill country, consisting of alternating gullies and ridges, but dominated by

the central southwest / northeast 'long gully' that follows the fault line. The eastern boundary of the landholding generally follows the major ridgeline that runs from the Brooklyn wind turbine, through Hawkins Hill, to Te Kopahou. The specialist assessment reports attached as appendices to the application variously refer to this as the Hawkins Hill ridge, the eastern ridge, the southern ridge^h, or the Te Kopahou ridge. The cultural assessment notes that the historical name for the entire ridgeline, from the headwaters of the Kaiwharawhara Stream (which includes Karori Sanctuary) down to the coast, is Te Kopahou. The same name also was, and still is, applied to the southern high point.

Another ridgeline separates Long Gully from other sub-catchment areas; those that drain north into the Karori Stream, and those that drain south into Cook Strait. The western boundary of Long Gully Station generally follows an unnamed ridgeline abutting Kinnoull Station.

The raised topography and location near Cook Strait contribute to the high wind environment of Long Gully. Wind monitoring has taken place at various locations throughout Long Gully Station since late 2004. The data collected by the monitoring indicates that the area has an excellent wind resource, well suited to the establishment of a wind farm. Although existing consent conditions allow for up to six masts to be erected at any one time, there are currently only two masts in place – in the vicinities of proposed Turbines 9 and 17.

The vegetation within Long Gully Station is a mixture of exotic and indigenous. Towards the coast and the coastal escarpment, the vegetation is low and scrubby. A notable exception on the coastal section is a grove of Karaka trees located in a sheltered gully. The central area of the site is dominated by pasture on the upper ridgeline slopes and broader tops, while regenerating native bush and scrub is taking hold on the steeper slopes and in sheltered gullies. There are also a few pockets of exotic pine tree plantations. The northern end of the site is more sheltered and contains some established native vegetation.

Goat, horses, cattle and sheep are the predominant animals. A regionally threatened weevil may occur on native speargrass within Long Gully, and some of the rocky outcrops provide likely lizard habitat. A typical variety of common introduced and native bird species inhabit Long Gully. There may also be an occasional visit from less common native species – but the land generally lacks the habitat to support roosting and breeding.

There are several permanent structures, located towards the southern end of the site. In the south-central section of the site there are two residential dwellings (including the landowner's house), a barn and a small bach. The landowner's home (shown on drawing SK05 in Appendix E) sits near the saddle between the main north and south flowing streams. On the coast there is a small stand-alone bach to the southeast and a cluster of five baches to the northwest. The bach owners have lease and access agreements with the Long Gully landowner. A Vodafone NZ cell phone mast is located on land leased from Long Gully Station, in the vicinity of proposed Turbine 13 (shown on drawing SK01 in Appendix E). An 11kV overhead electricity line extends down from Karori in the north, following the course of the main valley. The general route of that line is shown by the electricity route drawing in Appendix A.

^h The use of both "eastern" and "southern" reflects the fact that the ridgeline has a southwest – northeast alignment.

Other notable features on the site include what was an airstrip to the far north of the site (partly shown on drawing SK13 in Appendix E), which is part sealed and sometimes used as a 'drifting' strip by car enthusiasts, and a 4WD / motocross track located on the central ridges of Long Gully Station (shown on drawings SK06 and SK07 in Appendix E). There is also a challenging series of downhill mountainbike tracks on the western slopes of the Hawkins Hill ridge, constructed and maintained by a mountainbike club. All of these facilities are used by invitation or by prior arrangement between the landowner and various recreation clubs.

Long Gully Station has extensive internal farm access roads which have existed for many years. Some parts of these roads have been upgraded, extended or relocated since 2007. The Wellington City Council approved farm road upgrades as part of a subdivision and other related consents (see section 3.4 on page 17).

3.2 Site access

The following plan and table illustrate the rights of way and easement arrangements for Long Gully Station and surrounding properties. Each coloured line represents a different right of way and easement arrangement. Access to the Long Gully site and surrounding properties is via a time controlled automatic gate leading from Ashton Fitchett Road (see Figure 2). From there, the access route follows a private right of way (identified by brown line) which is located within Wellington City Council land (and a small section within Airways Corporation of New Zealand property which is identified by the purple line). The remaining right of ways (red, green, yellow and blue) stem off from this right of way and provide access to individual properties.



Figure 2 - Time controlled gate at Ashton Fitchett entrance

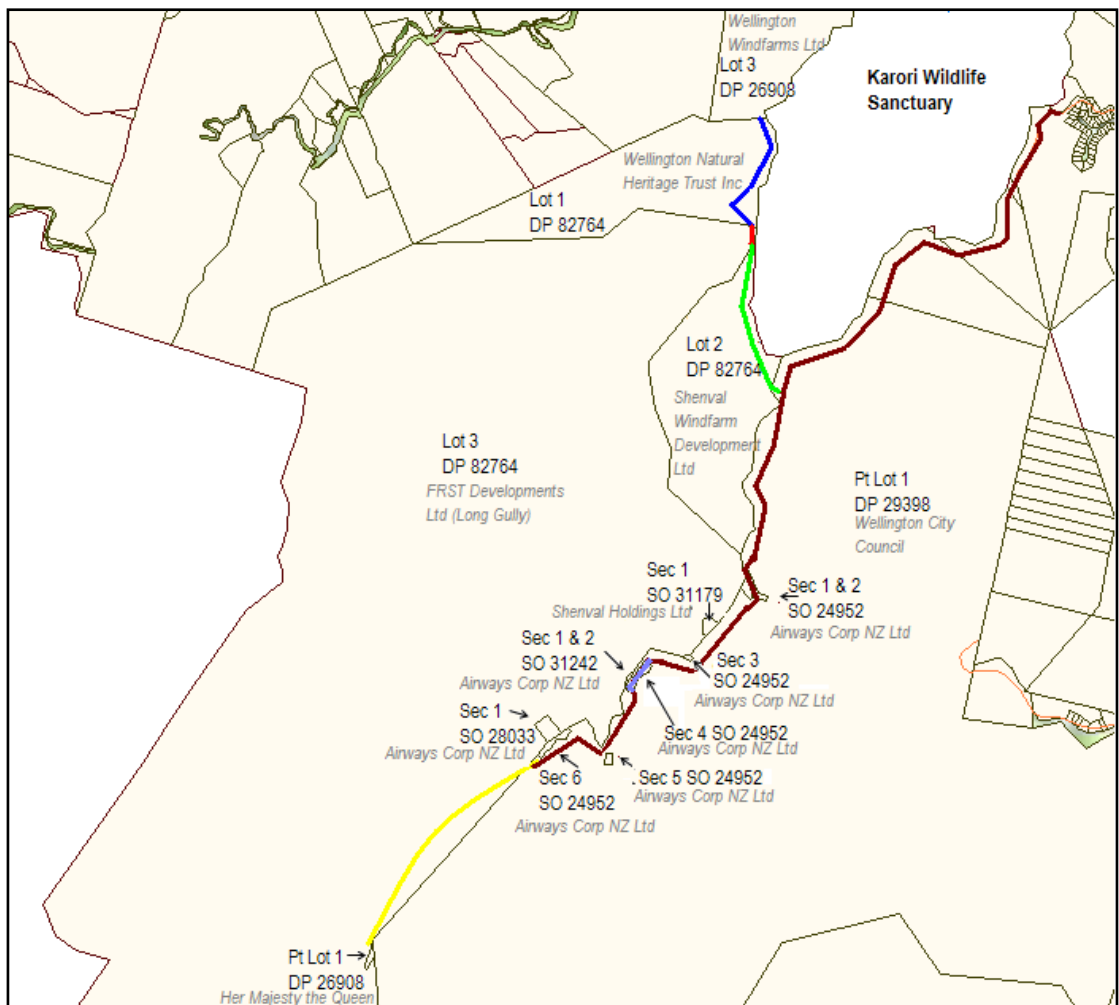








Figure 3 - Legal Access Rights of Way

Table 1 - Legal access servient / dominant

<i>Right of way</i>	<i>Servient Tenement</i>	<i>Dominant Tenement</i>
	Lot 1 DP 82765 (Wellington Natural Heritage Trust Inc.)	<ul style="list-style-type: none"> Lot 3 DP 26908 (Wellington Windfarms Ltd)
	Lot 3 DP 82764 (FRST Developments Ltd)	<ul style="list-style-type: none"> Lot 1 DP 82764 (Wellington Natural Heritage Trust Inc.) Lot 3 DP 26908 (Wellington Windfarms Ltd)
	Lot 2 DP 82764 (Shenval Wind Farm Development Ltd)	<ul style="list-style-type: none"> Lot 3 DP 82764 (FRST Developments Ltd) Lot 1 DP 82764 (Wellington Natural Heritage Trust Inc.) Lot 3 DP 26908 (Wellington Wind Farms Ltd)
	Pt Lot 1 DP 29398 (Wellington City Council)	<ul style="list-style-type: none"> Lot 3 DP 82764 (FRST Developments Ltd) Pt Lot 1 DP 26908 (Her Majesty the Queen) Lot 3 DP 26908 (Wellington Windfarms Ltd) Lot 2 DP 82764 (Shenval Wind Farm Development Ltd) Sec 1 SO 31179 (Shenval Holdings Ltd) Lot 1 DP 82764 (Wellington Natural Heritage Trust Inc.) Section 1 & 2 SO 31242, Sec 1,2, 3, 4 and 6 SO 24952, Sec 1 SO 28033, (Airways Corp NZ Ltd) Lot 2 DP 82764 (Shenval Wind Farm Development Ltd)
	Sec 1 and 2 SO 31242 (Airways Corp NZ)	<ul style="list-style-type: none"> Lot 3 DP 82764 (FRST Developments Ltd) Pt Lot 1 DP 26908 (Her Majesty the Queen) Lot 1 DP 82764 (Wellington Natural Heritage Trust Inc.) Lot 3 DP 26908 (Wellington Windfarms Ltd) Pt Lot 1 DP 29398 (Wellington City Council) Lot 2 DP 82764 (Shenval Wind Farm Development Ltd).
	Lot 3 DP 82764 (FRST Developments Ltd)	<ul style="list-style-type: none"> Pt Lot 1 DP 26908 (Her Majesty the Queen)

(Table to be read in conjunction with Figure 3)

There is another access arrangement (not shown) which runs from Long Gully Station through Pt Lot 1 DP 12981 and onto South Karori Road (B704306.1TE, 877383EC). This right of way is not intended to be used for any activities associated with the construction or operation of the proposed wind farm.

During the construction period of the proposed wind farm, vehicles associated with the project will gain access to the site via the main (brown line) right of way, which then extends through the Airways Corporation radar station site (purple line) and in to Long Gully (yellow line). Egress from the development site, for some of the larger vehicles, will be via an uphill route within the Shenval Wind Farm Developments Ltd (green line) right of way.

The main right of way (brown) is within the Wellington City Council's land, making the Council the Servient Tenement of this right of way. From the available title plans and easement certificates, including historical titles, the following property owners have been identified as Dominantⁱ Tenements and therefore have rights to use this right of way for access:

- FRST Developments Trust (Long Gully)
[with the same rights of access assigned to their "tenants, servants, agents, workmen and visitors" – which includes Windflow and MRP]
- Her Majesty the Queen (access to a KiwiRail radiocommunication installation)
- Wellington Windfarms Ltd
- Shenval Windfarm Developments Ltd
- Shenval Holdings Ltd
- Wellington Natural Heritage Trust Inc
- Airways Corporation of New Zealand Ltd.

The proposed access route passes through Airways Corporation of New Zealand property (Radar Station). Airways is the Servient Tenement in relation to this section of access, with Long Gully and other parties have rights to use the access through the radar dome land.

Within Long Gully Station, a wide farm road follows the valley floor of the central 'long gully'. At its northern end, this farm road connects to the Shenval Windfarm right of way (green line). At the southern end of Long Gully Station, four-wheel drive access is possible via legal unformed road along the coast to Owhiro Bay. However, this coastal access will not be used for any purpose associated with the wind farm.

ⁱ In relation to access, a dominant tenement is a party who has rights of passage across an area of land that is owned by another party (the servient tenement).

3.3 Surrounding land uses

In general terms the land to the north, west and east is pasture, regenerating native scrub and bush, or forestry plantation. The exceptions to this are the Karori Wildlife Sanctuary to the northeast and the Southern Landfill to the east.

Mostly along the eastern boundary of Long Gully Station, there are various small land parcels used for communications purposes. These include those owned by Airways Corporation Limited, KiwiRail, and the Hawkins Hill radar station. The KiwiRail radiocommunications site is marked on drawing SK01 in Appendix E, and the radar station site is marked on drawing SK04. There is also a cell phone tower, owned by Vodafone NZ on land leased from the owners of Long Gully Station, in the vicinity of proposed Turbine 13.

As noted earlier, Long Gully Station is used for a variety of motorised and non-motorised recreational activities (motocross, car drifting, mountain biking, horse riding, 4WD driving and walking, and some of these activities also take place on nearby land.

The area immediately surrounding Long Gully Station has a low density of human occupation. The nearest rural-residential concentrations are along South Makara Road (minimum of 2km west) and South Karori Road (minimum of 1.2km north). Other than the two main dwellings within the site, the closest residential dwelling is 'The Castle', located on the Hawkins Hill ridgeline, which will be about 1 kilometre from Turbine 1. To the west, Kinnoull Station has received approval for a rural-residential subdivision that incorporates fifteen potential new house sites. None of these house sites has been built on as yet. A map showing the potential sites is included in Appendix A of this report. Resource consent for the subdivision and development of the potential dwelling sites, scattered throughout the farm, was confirmed by the Environment Court in September 2007^j. Some of those sites are located close to the boundary shared with Long Gully Station.

Further to the west and northwest, beyond Kinnoull Station, Meridian Energy's wind farm 'Project West Wind' is under construction. Project West Wind will have 62 wind turbines of a type that is much larger than those proposed for the Long Gully wind farm.

^j Only eleven dwellings can actually be built, as some of the 15 sites are *alternative* locations. See Condition (T)(2) of the Environment Court's decision.

3.4 Previous resource consents

Over the years, a number of resource consent applications and other approvals have been granted in relation to Long Gully Station. A summary of these consents is set out in the following table:

Table 2 - Summary of previous Long Gully resource consent applications

Consent Reference	Proposed Activity	Status
SR 28316	Consent for additions and alterations to existing bach on coast	Granted
SR 38338	Consent for the construction of a new residential dwelling	Lapsed
SR 60625	7 lot subdivision, including ROWs	Lapsed
SR 94643	Time extension of the 7 lot subdivision	Lapsed
SR 94657	Change of condition to (d) SR60625	
SR 101832	Consent for a wind monitoring mast	Granted 21/10/03
SR 102986	Consent for the upgrade of a cell tower	
SR 146415	9 lot subdivision, including ROWs and amalgamation. (Retrospective consent for 5 baches and to retain a farm accessory building and earthworks within Lot 4 of Subdivision).	Granted 24/05/07
SR 170239	Change of condition to vehicle access condition (d) of subdivision consent SR 146415	Granted 13/12/07
SR 14093	Application for temporary meteorological monitoring masts	Granted
SR 175133	Application for recreational activities in rural areas	Granted
SR 170143	Land use consent for the re-grading of two tracks	Granted 17/12/07
SR 172207	Approval of Vehicle Access Authority – improving grade of internal access track	Approval 03/12/07
SR 172204	WCC Bylaws consent to carry out earthworks (Track 1 and 2).	Approval 03/12/07
SR 173997	Residential dwelling in Rural Area	Granted 03/04/08

4. The proposal

4.1 Project overview

The proposed wind farm will consist of 25 turbines located within the property known as Long Gully Station. The Long Gully property comprises 840 hectares, but the construction works associated with the wind farm will potentially affect only about 15 hectares^k (2%) of the landholding.

The construction, operation and maintenance of the proposed wind farm will include the following activities:

- The erection of 25 wind turbines in two ‘strings’ (the turbine locations are shown on Figure 4, and on drawing SK00 in Appendix E)
 - 17 turbines in the southern string
 - 8 turbines in the northern string
- The placement of 25 transformers^l, one located near each turbine.
- The construction of an operations and maintenance building to house general maintenance equipment and materials (the location of the O & M building is shown near Turbine 12, on drawing SK01 in Appendix E).
- Earthworks – approximately 7,500m³ to 10,000m³ incorporating the following:
 - Improvements to existing farm roads
 - Laydown / construction pads (approximately 2,900m³)
 - Turbine foundations (approximately 800m³ to 1,100m³)
 - Foundations for operations building
 - Redepositing excess fill (approximately 6,000m³)
- Underground cabling within each of the turbine strings
- Three ring main units^m (one for the northern string and two for the southern string)
- The rehabilitation of the site in general such as regrassing exposed areas
- Maintenance, and where necessary, upgrading of all equipment and structures

In addition, the following works will be necessary to facilitate the connection of the wind farm to the local electricity network:

- Poles and overhead electrical cables to connect the northern turbine string ring main unit to the existing 11kV overhead line in Long Gully
- Poles and overhead electrical cables to connect one of the southern turbine string’s ring main units to the existing 11kV overhead line in Long Gully
- The upgrade of the existing 11kV electricity route in Long Gully from near the landowner’s home to a point near the edge of suburban Karori

^k The calculation of the potentially affected area is based on a 20 metre radius construction zone surrounding and connecting all of the turbines within each string. Based on that calculation, the area affected by the northern string will be around 3ha, and for the southern string the area will be around 8ha. An additional allowance of 4ha has been added to account for sundry earthworks associated with road improvements and fill disposal areas.

^l The size of these transformers is approximately 1.42m high, 1.51m wide, and 1.45m deep

^m The size of these ring main units is approximately 1.53m high, 0.95m wide, and 1.4m deep

- Poles and overhead cables to connect the southern turbine string's second ring main unit to existing electrical infrastructure on Landfill Road

The general locations of the upgraded and new overhead electrical lines are shown by the electricity route drawing in Appendix A.

It is anticipated that the construction timeframe for all works, depending on weather conditions, will take 5 to 8 months. A timeline of activities is provided by Table 6 in section 4.13 of this report.

4.2 Initial investigations

An initial layout of 28 turbines was provided by Windflow to its consultant team in mid-2008. This layout formed the basis of investigations, and was the layout presented to the community at the open evenings held in November 2008.

Following the completion of the initial investigations and consultation, a meeting of the full consultant team was held to discuss the joint findings. As an outcome of that meeting, Windflow chose to delete the turbines referred to as turbines A, B, and C. The positions of some other turbines were also adjusted to a greater or lesser degree. All of these changes were made in response to various issues raised by the assessments. The removal of three turbines left a 25 turbine layout, which is the layout for which consent is being sought. The deleted and altered turbine positions are shown on a drawing included in Appendix A.

The consequences of the 25 turbine layout were reassessed by the consultant team, and that layout forms the basis of the specialist assessments attached as appendices to this resource consent application.

4.3 Wind turbines and site layout

The overall wind farm site layout is shown on the map in Figure 4 below, and also in Drawing SK00 attached in Appendix E. The specialist assessments attached as appendices to the consent application variously refer to Turbines 18 – 25 as being on the “northern” or “western” ridge, and Turbines 1 – 17 as being on the “southern” or “eastern” ridge”. The differences in naming reflect the fact that the ridges generally have a southwest – northeast alignment.

The location coordinates of each turbine is provided in Table 3 which also shows the height of each turbine base in relation to sea level. The proposed layout of the wind farm has been determined by taking into account several factors. Those factors include the wind resource at the site, the desire to minimise earthworks, accessibility, localised ecology, visual and other environmental factors.

After consent is granted, some turbine locations may need to be moved slightly to address location specific geotechnical or ecological conditions that come to light during detailed design, or during the construction process. Therefore, in accordance with usual practice in wind farm applications, consent is sought for the 25 turbines to be located within a radius of 50m from the positions provided in the following table.

This distance is significantly less than the radius sought for wind farms that use larger turbines. As an example, the radius granted for the West Wind wind farm is 100 metres.

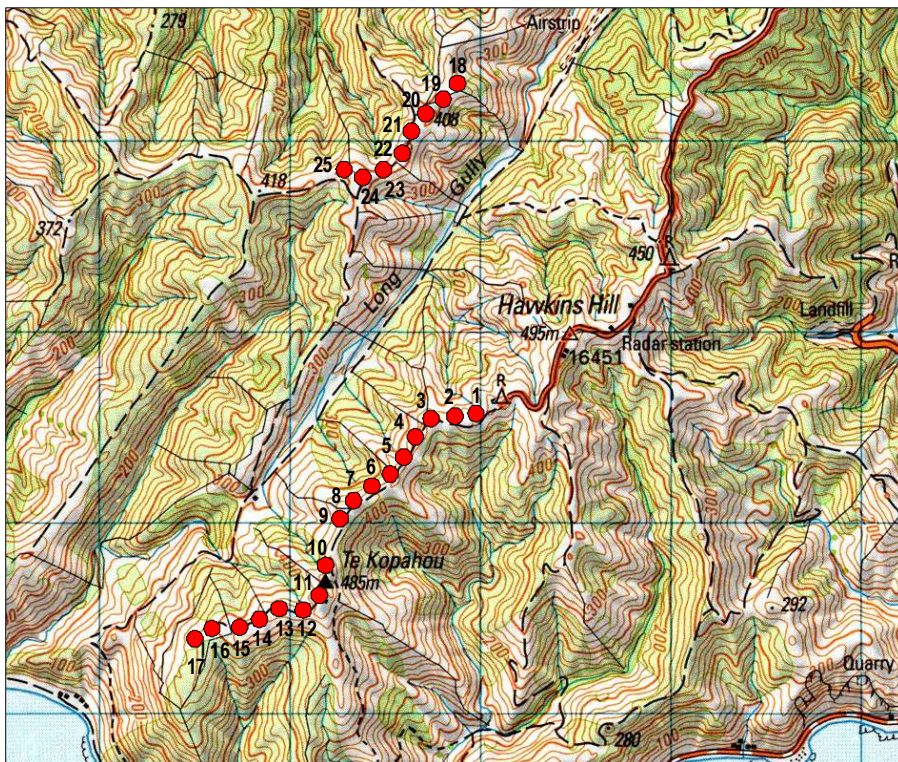


Figure 4 - Map showing location of proposed turbines

ⁿ The southern / eastern ridge is also sometime referred to as the Hawkins or Te Kopahou ridge

Table 3 - Coordinates for turbine locations

Turbine Number	Coordinate System NZTM		Coordinate System WGTN Circuit 2000		Coordinate System NZ Map Grid		Turbine Base Elevation
	mE	mN	mE	mN	mE	mN	
T1	1743949.0	5422850.0	395301.7	796458.6	2653971.1	5984561.1	456.7
T2	1743846.0	5422842.0	395198.9	796448.5	2653868.1	5984553.1	455.0
T3	1743738.0	5422842.0	395090.9	796446.3	2653760.0	5984553.1	444.0
T4	1743662.0	5422762.0	395016.5	796364.7	2653684.0	5984473.1	450.0
T5	1743605.0	5422655.0	394961.7	796256.6	2653627.1	5984366.0	442.0
T6	1743530.0	5422580.0	394888.2	796180.0	2653552.1	5984291.0	448.0
T7	1743470.4	5422460.9	394831.1	796059.7	2653492.5	5984171.9	439.4
T8	1743382.9	5422420.0	394744.4	796017.0	2653405.0	5984131.0	454.8
T9	1743294.9	5422368.0	394657.5	795963.2	2653317.0	5984079.0	455.8
T10	1743186.0	5422017.0	394555.8	795610.0	2653208.1	5983727.9	472.0
T11	1743134.6	5421886.6	394507.1	795478.5	2653156.7	5983597.5	466.8
T12	1743046.9	5421814.1	394420.9	795404.3	2653069.0	5983525.0	452.6
T13	1742938.0	5421824.0	394311.8	795412.0	2652960.1	5983534.9	448.2
T14	1742786.9	5421763.2	394161.9	795348.1	2652809.0	5983474.0	431.0
T15	1742700.0	5421726.0	394075.8	795309.1	2652722.1	5983436.8	425.4
T16	1742596.0	5421727.0	393971.8	795308.0	2652618.1	5983437.8	402.5
T17	1742507.0	5421693.0	393883.5	795272.1	2652529.1	5983403.8	389.7
T18	1743838.0	5424556.0	395155.8	798162.2	2653859.8	5986267.2	395.6
T19	1743761.0	5424494.0	395080.0	798098.7	2653782.8	5986205.2	405.0
T20	1743701.0	5424402.0	395021.9	798005.4	2653722.8	5986113.2	404.0
T21	1743618.2	5424348.8	394940.2	797950.5	2653640.0	5986060.0	392.0
T22	1743566.0	5424232.0	394890.4	797832.7	2653587.8	5985943.2	406.3
T23	1743499.0	5424145.0	394825.2	797744.3	2653520.9	5985856.1	404.4
T24	1743408.7	5424119.9	394735.4	797717.4	2653430.5	5985831.1	408.4
T25	1743301.0	5424144.0	394627.2	797739.3	2653322.8	5985855.2	419.2

4.4 Key components

The *Windflow 500* is the turbine proposed for Long Gully wind farm. These are the same type of turbines that have been erected at Te Rere Hau near Palmerston North, as shown in Figure 5.

Windflow 500 components

The 500kW turbine is an up wind generation turbine with the rotor facing towards the wind. Each turbine comprises:

- A foundation and turbine platform which is revegetated during site reinstatement
- A tubular steel tower 29m in height
- A nacelle (contains the gearbox, generator, rotor shaft, main control and safety systems) which sit on top of the tower
- A two bladed turbine rotor

The turbines will be painted using materials and finishes that minimise reflectivity. The colour of the coating will be Jungle Mist (a light blue / grey). This colour has generally been found to be the most suitable in a range of daily light conditions, varying seasons as well as climatic conditions and against a range of backdrops.

The turbines will operate on a continuous 24-hour basis, depending on the wind resource. While the turbines have a nominal design life of up to 20 years, they will be subject to a regular maintenance programme that includes the replacement of parts when required.

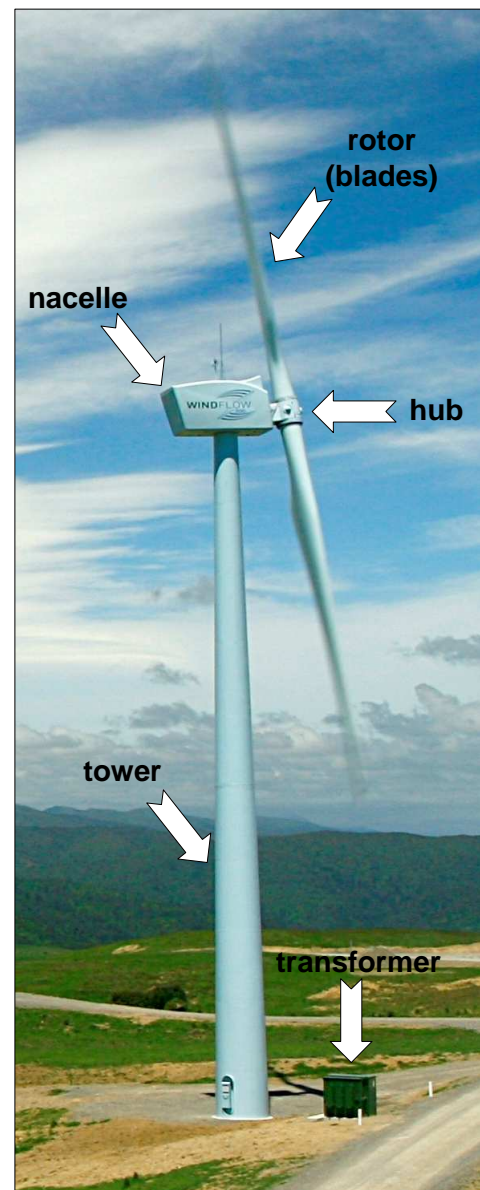
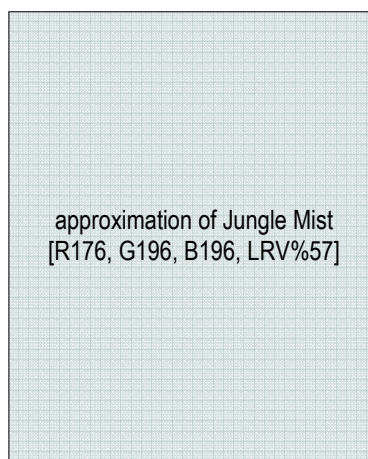


Figure 5 - *Windflow 500* at Te Rere Hau

Cranes and foundations

Two cranes would be used during the erection phase; a 50/60 tonne crane and a 100 tonne crane. Details of the cranes and the tasks they perform are provided in Table 4.

Table 4 - Crane requirements

Description	Crane: 50 / 60 tonne	Crane: 100 tonne
Tasks performed	<ul style="list-style-type: none"> • Unloading trucks • Erecting tower base and tower top sections • Installation of electrical cabinets • Assembly of nacelle and blades (on ground) 	Nacelle/rotor assembly lift
Number required	1	1
Time on site during construction phase	Full time	Approximately 20% of the time
Truck width	2.55 m	3.0 m
Maximum height	3.9 m	4.0 m
Length	11.6 m	14 m

The lift of the nacelle/rotor assembly is both the heaviest and the highest lift required. The assembly weighs 12,700kg and is secured atop a 29m tower.

The crane pads, upon which the cranes stand and where the turbines are assembled, require a relatively flat area of around 140 m². This area is relatively small by comparison with wind farm projects that use larger turbines, or have turbines with three blades. Therefore the two-bladed design of the *Windflow 500* helps to reduce the dimensions of the required assembly area. To provide the required area, crane pads of 20m x 7m are shown beside each turbine location in the drawings of the Civil engineering assessment (see Appendix E). To further minimise the need for earthworks, and take advantage of existing flat areas, seven of the 25 proposed crane pads make full or partial use of the existing farm roads.

A general laydown area, to store components prior to their use, is not required for this project.

The foundation for each turbine will be a pile measuring 2.4m in diameter, and 7m – 10m in depth. No large-scale concrete production will be required on site to provide the concrete for the foundations. The required concrete will be delivered to the site via standard concrete trucks, which carry up to 6 m³ of concrete. Depending on the final design of each individual pile foundation, they will each require 5 – 7 truck loads of concrete. An additional trip to transport the foundation reinforcing cage will be required per turbine.

4.5 Proposed access route

The turbine components will come from several different parts of New Zealand and will either be delivered direct to the site, or first be unloaded at the Wellington wharfs. Regardless, the ultimate common route for all components will be via Brooklyn Hill Road, Todman Street, the southern part of Mitchell Street, Karepa Street, and Ashton Fitchett Drive.

From part way along Ashton Fitchett Drive, the route will then traverse the right of way (see section 3.2) that leads to the Brooklyn wind turbine, and which from there eventually enters Long Gully Station. All parts of this route are negotiable by standard sized trucks (see section 4.6, section 9.9 and Appendix F).

With minor modifications, the existing farm roads on Long Gully Station will provide access to all of the proposed turbine sites. The Civil engineering drawings in Appendix E indicate those parts of the existing farm roads that will require minor modifications or short extensions. All of the proposed turbine sites are located very close to the existing farm roads. An advantage of these locations is that the larger crane which performs the final lift of the nacelle / blades can stand on the roadway, and the size of the crane pads can therefore be relatively small.

Within Long Gully Station, the existing farm road from the southern turbine string, down to the valley floor, is too steep for an uphill journey by the larger vehicles. For that reason, larger vehicles will enter and exit the site via a clockwise route, starting at Turbine 1 (the northern end of the southern string) and, after delivering materials to either the southern or northern turbine sites, exit uphill via the Shenval Windfarms right of way (see Figure 3 in section 3.2). Those vehicles capable of travelling uphill from the valley floor to the southern string have the option of exiting in either direction. The internal routes used will be at the discretion of the construction project manager, and will be based on the safest and most efficient management of the works.

4.6 Transportation

As the *Windflow 500* turbines are relatively small and lightweight, they can be transported to sites with limited road access and with standard trucks (a semi trailer). Standard vehicles will be used to transport components to the site. The longest load at 16.8m is a truck with two sets of blades; the heaviest load is the tower bottom half at 10.7 tonnes. The number of trips for component delivery averages fewer than four per turbine.

The widest component of the *Windflow 500* is the nacelle. As the nacelle is narrower than a standard shipping container, no special permits are required for road transport. Two nacelles can fit on a standard truck as shown in Figure 6.

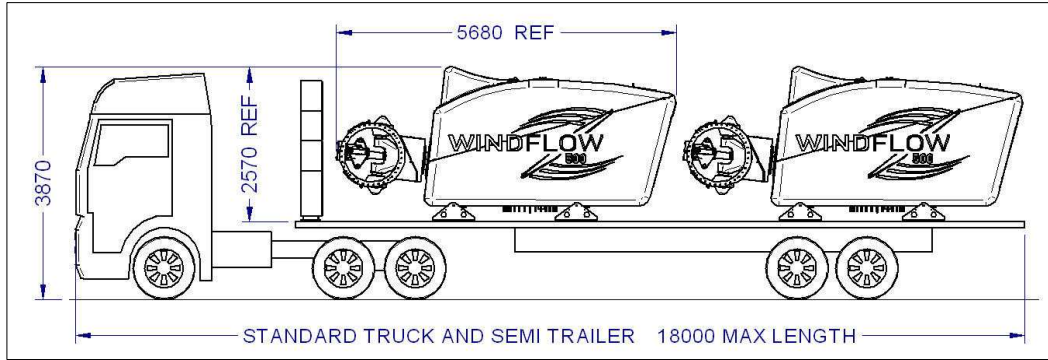


Figure 6 - Two *Windflow 500* nacelles loaded for transport

The longest component is the blade, which can be transported as shown in Figure 7.

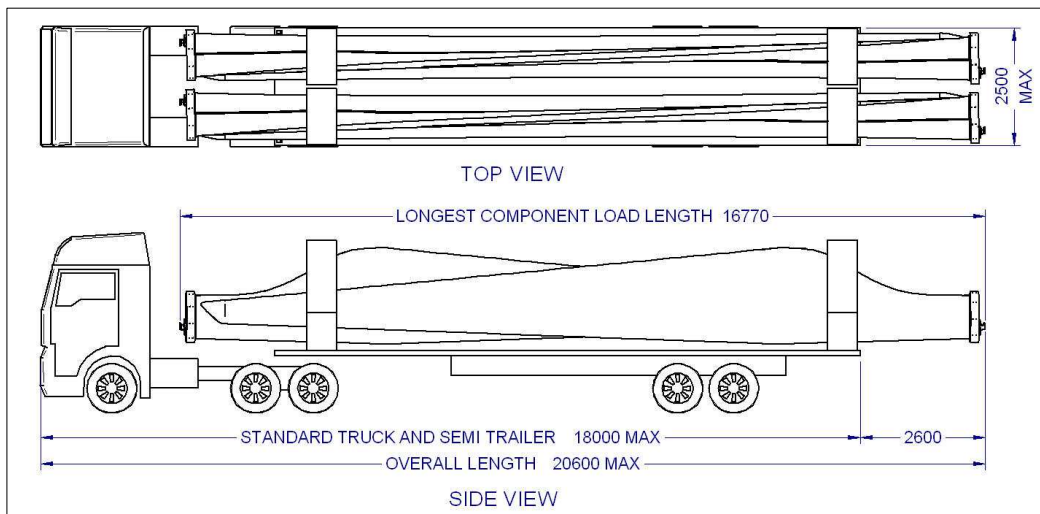


Figure 7 - Two pairs of *Windflow 500* blades loaded for transport

As the widest delivered component in the *Windflow 500* is narrower than a standard truck bed, the *Windflow 500* can be comfortably delivered over farm roads.

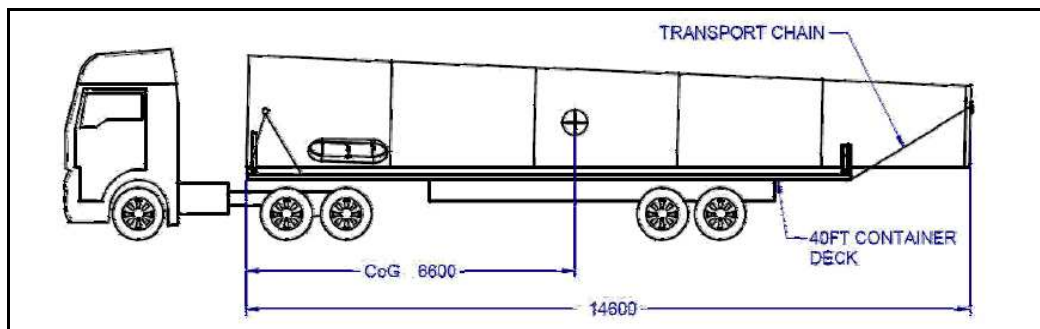


Figure 8 - One *Windflow 500* tower base section loaded for transport

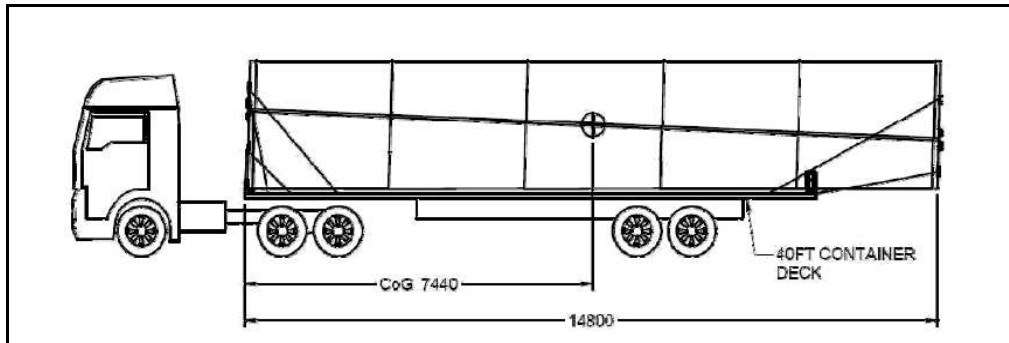


Figure 9 - Two Windflow 500 tower top sections loaded for transport

The size and weight of the components of the *Windflow 500* are detailed in the following table. The associated truck movements for each turbine are also listed.

Table 5 - *Windflow 500* delivered components sizes and truck loads required

Turbine Component	Length (m)	Width (m)	Height (m)	Net weight (kg)	Loads (per turbine)
Nacelle in transport frame	5.7	2.4	2.5	10,000	0.5
Pair of blades in cradles	16.8	1.2	2.3	2,700	0.5
Tower top section	14.5	1	1.6	4,700	0.5
Tower base section	14.5	2.2	2.2	10,700	1
Electrical cabinet	0.4	1.0	2.3	300	0.125

The lifting frames and other ancillary equipment required for turbine installation can be provided by one additional truck movement for the entire wind farm.

The number of proposed turbines, and parameters set out in Table 5, lead to there being approximately 66 long standard truck visits to the site over the construction period. Depending on the type of foundation used, there will also be 125 – 175 trucks carrying concrete^o, and one truck per turbine carrying the foundation reinforcing cage. Two cranes will be required.

Counting each visit as two movements (one in, one out) these requirements equate to a total of 387 – 487 large vehicle movements over the construction period of the wind farm. Given the likelihood of pile foundations being used (see the Geotechnical report in Appendix I) the actual movements are likely to be at the lower end of this range.

The movement of the vehicles to the site on publicly accessible roads will be subject to a traffic management plan for which a condition of consent is considered appropriate. The traffic management plan would be developed in conjunction with the road controlling authorities and would identify the transport route, the time of

^o These figures are based on a concrete truck carrying approximately 6 m³ of concrete, and the turbines being attached to single pile foundations 7m – 10m deep, that each require 30 m³ – 45 m³ of concrete.

movements and the number of trucks as well as management measures including road controls.

Larger vehicles would be escorted to the site by a pilot vehicle. Some of the smaller vehicles (those that do not require pilot vehicles) may use Apuka Street as an access route, but the larger vehicles will use a route that follows Todman Street, Mitchell Street (south), and Karepa Street.

Earthworking vehicles and trucks for the internal site movement of excavated materials will also need to leave and enter the site. However, the majority of these vehicles are likely to stay on site for the duration of the works.

Alternative methods of transporting turbine components were considered, such as via helicopter or coastal barge. However, these methods would be either physically impracticable, and / or have potentially greater effects on the environment or residents, than the use of overland transport.

4.7 Earthworks

Earthworks are required for the following purposes:

- Modifying parts of the existing farm roads
- Establishing short lengths of access track to particular turbines
- Establishing reasonably flat laydown / construction areas at each turbine site
- Excavating turbine foundations
- Disposal of cut material at approved disposal areas
- Establishing a platform for an operations/maintenance building
- Managing stormwater runoff paths

Preliminary investigations and conservative estimates put the potential earthworks volume in the range of 7,500m³ to 10,000m³ for the access roads and turbine platforms combined. A proportion of that total volume will be capable of reuse in relation to roading and platform construction. However, around 6,000m³ will not be suitable for these uses and will therefore need to be disposed of on site. The disposal of unusable materials will take place at a number of locations around the Long Gully property.

An Erosion and Sediment Control Plan (ESCP) will be prepared for the project. Windflow proposes to prepare the ESCP in consultation with the Regional Council, and submit it for the final approval of both consent authorities. The earthworks will be undertaken in accordance with the ESCP.

Earthworks are described in more detail below and in:

- Section 9.8 (page 65);
- the Civil engineering report; and
- by the plans that accompany the Civil engineering report (Appendix E).

The following paragraphs summarise the proposed earthworks as described in Appendix E.

Internal roads and tracks

The existing farm roads are also largely suitable for the needs of wind farm construction and operation. Limited improvements (e.g., batter trimming, smoothing of vertical curves, easing of grades) will need to be made in some areas, and the general locations of those works are indicated on the drawings attached to the Civil engineering assessment (Appendix E). Where not already suitable, the farm roads will be altered to provide a typical straight road width of 3m, plus an allowance for drainage on one or both sides of road. There will need to be wider road width on some corners. Typical road cross sections are shown on drawing SK12 in Appendix E. Some roading basecourse material may need to be imported to the site. Care would be taken to source the material from a site free of weed species that are currently not present at Long Gully.

Although some proposed turbine locations are very close to the existing farm roads, others are 10m – 80m distant. The drawings of the Civil engineering assessment therefore show a combined total of 500m – 600m of new access tracks from the farm roads to 12 of the proposed turbine sites (40m – 50m average length). In three locations, the access tracks follow already formed farm tracks. Turning areas would need to be formed at the ends of each turbine string, that is, near turbines 17 and 19. The road along the floor of Long Gully may be used for access / egress, and one hairpin bend may need to be eased for that purpose, as shown by Appendix E, drawing SK13.

The laydown / construction pads for Turbines 7, 10, 11, 23 and 24 lie either totally or substantially on the internal roading. In addition, the site of Turbine 7 itself is on a road. Windflow's decision to place these pads and Turbine 7 on the roads is in response to the desire to minimise excessive earthworks. In instances where a pad or turbine location would otherwise interfere with the transport of components and machinery from one part of the site to another, the issue will be dealt with through appropriate construction sequencing.

Turbine Foundations

Single pile foundations are proposed for the turbines. Nominal dimensions of the single pile foundation are 2.4m diameter by 7 – 10m deep (depending on individual site conditions) corresponding to a volume of 32m³ – 45m³. Following construction, the platform area will be rehabilitated to achieve an appropriate balance between revegetation and providing continued access for maintenance.

Disposal Areas

Excavated material that is not used for re-filling and not usable elsewhere on the site will be placed at approved farmland locations. The general locations of the various spoil disposal areas are shown by the drawings in Appendix E. Drawing SK13 shows the major potential disposal area on site.

4.8 Operations and maintenance building

A single operation and maintenance building of 100-150m² will be required on site, and is proposed to be in the vicinity of Turbine 12. The building materials will be selected based on location requirements with particular attention to security.

At 3.3 metres high to its ridgeline, the building will be of similar scale to a rural farm building and will contain control equipment, general maintenance equipment and materials associated with the wind farm site, and staff amenities.

Water supply for the permanent operations and maintenance building will be from a rainwater collection system with on-site storage in a tank. A septic tank will be associated with the operations and maintenance building for sewage disposal. The expected low level of septic tank use means that it will not require a discharge permit from the Regional Council.

All operational control for the turbines will be either automatic, or carried out via telecommunications links with monitoring equipment.

4.9 Monitoring masts

The purpose of a meteorological mast is to collect data on wind speed and other characteristics before the wind farm is built. There is an existing resource consent (see Table 2) to establish, operate and maintain up to 6 monitoring masts on the Long Gully wind farm site; with the following consent conditions:

- No more than six masts may be erected within zones 1 to 4 at any one time
- The maximum height is 60m
- No more than four 60m masts may be erected at any one time
- Masts cannot be installed within 500m of the radar installation

Two permanent monitoring masts will be included as part of the consented wind farm.

One mast would be associated with the northern string of

turbines, and one with the southern string. These masts will have a minimum height of 30m and a maximum height of 50m. Although permanent, it is proposed that the consent for the monitoring masts allow them to be moved anywhere within 70 metres to 135 metres^P of one of the consented turbines.

When the overall wind farm consent application is granted, the existing consent for up to six monitoring masts will be surrendered.



Figure 10 - Consented wind monitoring zones

^P For IEC purposes masts must be located between 2 and 4 rotor diameters from the a turbine.

4.10 Electrical components

Individual transformers

Beside each turbine base, it is proposed that there will be a freestanding transformer housed in a cubicle steel box. The *Windflow 500* requires an external transformer to step up the generator voltage to distribution levels. The transformer units will be situated between 2m and 15m from the base of each turbine tower. The dimensions for the required 11kV transformers are: 1.45m long, 1.51m wide and 1.42m high. Each transformer contains 527 litres of oil. Windflow does not have a standard transformer supplier so the above dimensions are indicative, although not likely to be exceeded. A typical transformer can be seen in Figure 5 on page 22.

The transformer units will be coated or painted in a recessive colour that reflects the landscape. The transformers will be oil filled and will have appropriately designed bunds to retain any oil leakage and to avoid any contamination of stormwater runoff in the unlikely event of an oil spillage.

Underground cabling

Within each of the turbine strings, there would be underground cabling to connect each turbine to the overall electricity export system for the wind farm. The cabling would be laid within the formed area of the existing and proposed roading and access tracks. The underground cabling would connect to Ring Main Units (see below) before surfacing to be strung on overhead poles.

Ring Main Units

In place of a single large substation (typical of other wind farms), three modular Ring Main Units (RMUs) will be used. The dimensions of the units are 1.4m long, 0.95m wide and with a height of 1.53m. The drawing showing electricity routes in Appendix A also shows the location of the units, identified by crosses.

Overhead lines

Various possibilities were investigated for exporting electricity from the wind farm. However, the only feasible option requires electricity output from the wind farm to be split, and to flow along two routes. One of the routes involves providing three additional cables along the existing 11kV line that runs from Long Gully through to Karori. The other route involves adding a new single circuit 11kV line down through the adjacent Southern Landfill. The types of poles that would be used along each route are shown by the electricity route drawing in Appendix A. With regard to the Karori route, the need for additional cables would only extend as far Wrights Hill, with no need to upgrade the line through suburban Karori. The existing Long Gully line largely⁹ skirts the western edge of the Karori Wildlife Sanctuary and passes through the Wrights Hill area.

Both the southern and northern turbine strings would be connected to the existing (and upgraded) Long Gully 11kV line via overhead pole routes. Indicative locations of the proposed new and upgraded routes are shown by the electricity route drawing in Appendix A. The overhead poles will be wooden or concrete and would be 8m – 12m in height along the Karori route, and 8m – 11m in height along the Landfill

⁹ A few of the existing poles lie within the legal property boundary of the Sanctuary, but not inside the predator proof fence, as in many locations that fence has not been built on the legal boundary.

route. The height of individual poles would vary to take account of topography and vegetation, and a 'typical' height would be around 9m. These heights are similar to power poles seen in urban streets. The Karori upgrade is likely to require the use of entirely new poles, rather than simply being an addition to the existing poles.

Landowner approvals (where necessary) in relation to proposed new or upgraded routes have not yet been resolved. These negotiations will take place in the context of the Electricity Act 1992 and its amendments. Negotiations with landowners along the routes of the Karori upgrade and the new Landfill route may lead to the need for alternatives in the siting of some poles. For that reason, Windflow is seeking consent for route alignments that are generally in accordance with those shown by the electricity route drawing in Appendix A, but which allow a reasonable degree of flexibility. For instance, it may be useful to resite some of the poles on the existing Karori route (within 30m – 40m of the existing route), subject to landowner agreements.

4.11 Temporary facilities

As for any typical construction site, there will be temporary facilities that will be removed following commissioning of the turbines. These facilities will therefore be in place for the construction period. Relocatable structures will be installed providing offices, chemical toilets, changing room and canteen. Temporary electrical connections will be made to the nearest electricity lines. A temporary water tank or tanks may be needed to hold water used in the construction process.

4.12 Construction process

It is proposed to construct all 25 turbines within a 5 to 8 month period. If resource consent approval is obtained then construction could commence as early as the first half of 2010.

Wind farms are relatively straightforward to construct. They consist of seven basic elements:

- Civil infrastructure (roads and earthworks);
- Concrete works (turbine pile foundations);
- Electrical infrastructure (mostly underground cables);
- Electrical distribution (overhead poles and cables);
- Operations / maintenance building;
- Turbine erection and commissioning; and
- Wind monitoring (anemometer) mast erection.

For the Long Gully wind farm project, the construction process will involve the following aspects, some of which will be carried out concurrently:

1. Implementation of measures to mitigate safety and other effects on: holders of the access easement; recreational users of the access easement ; recreational users of Long Gully Station.
2. Improvements to the existing Long Gully Station farm roads, and construction of short lengths of new access track for 14 of the 25 turbines, including crane platforms and underground electrical cables.
3. The erection of an operations and maintenance building. The building will contain general maintenance equipment and materials associated with the wind farm site.
4. Installing erosion and sedimentation control measures.
5. Preparing sites for disposal of unsuitable earthworks cut materials.
6. Preparation of laydown / construction platforms at each turbine site.
7. Upgrade of existing overhead electrical route, and installation of new overhead routes.
8. Progressive boring and construction of reinforced concrete turbine foundations with a tower base section set in each foundation.
9. Lifting and installing the tower bottoms and tops.
10. Fixing the blades to the nacelle hub on the ground near the tower and lifting to secure to the top of the tower.
11. Completion of electrical works within the site.
12. Commissioning of the turbines for the generation of electricity.
13. Removing temporary services and site offices, rehabilitating construction and foundation areas and general site reinstatement.

4.13 Timeline for construction

Subject to the consent process, possible timing for the wind farm construction is outlined in Table 6. This timeline gives the anticipated major construction activities, their sequencing and indicative timeframes.

Table 6 - Indicative construction durations

Activity	Indicative Start	Indicative Duration
Detailed design & tender preparation	January 2010	Three months
Tender Evaluation & Contractor Selection	May 2010	Two months
Civil Works (roads, hardstands & turbine foundations)	November 2010	Two months
Electrical works (cabling, turbine connection)	December 2010	Four months
Turbine Erection	December 2010	Three months
Wind Turbine Commissioning	January 2011	Three months
Wind Farm fully operational	April 2011	
Site revegetation and restoration	April 2011	

The timing of the development is dependent on many factors, these include resource consent and other approvals, selection of a suitable civil contractor, detailed design, equipment manufacture and negotiations with the electricity network operator.

The project programme envisages construction of the wind farm beginning in 2010. The intervening period will allow Windflow to finalise commercial arrangements and properly prepare for the major construction exercise that the wind farm will entail. Importantly, this period will allow further refinement and investigation to ensure that potential environmental effects are appropriately managed during, and after, construction.

4.14 Construction and operation workforce

The approximate work force requirements for this project are provided in the following table:

Table 7 - Workforce requirements during construction

<i>Description</i>	<i>Civil works</i>	<i>Turbine installation</i>
Length of phase	2 months (6kms of road, 25 turbines)	3 months (25 turbines)
Workforce numbers	7 people	7 people

The Long Gully wind farm construction should take approximately five months with up to 14 people on site at any time.

The turbines require scheduled maintenance every six months. Over a year this consists of one vehicle and two people on site for four days per turbine. For the 25 turbines proposed, the total would therefore be two people on site for 100 days – spread over the course of a year.

4.15 Site reinstatement

At the end of the construction period, areas which have been disturbed by heavy machinery will be regraded and foundation sites will be filled with topsoil. Revegetation of exposed areas of cut and fill will occur and all temporary stockpiles of materials and equipment will be removed.

The excess material from excavation will be stockpiled and used to rehabilitate fill sites. Following completion of the works, the turbine platform areas will be rehabilitated to achieve a balance between revegetation and continued access for maintenance. The works may include, to a greater or lesser extent, backfilling and revegetation. The intention will be to reduce any erosion potential and, as far as is practicable, to re-establish the natural rural use and appearance of the area.

4.16 Maintenance and decommissioning

MRP will take over the management of the wind farm, using best practice maintenance and operational processes. In the first year, each turbine will normally have three, six and twelve-month maintenance checks. Those checks will be extended out to six and twelve-monthly service intervals after the first year of operation. The longer term operation and maintenance of the wind farm involves two scheduled maintenance visits per turbine annually.

Maintenance of the turbines will be undertaken by two people on site for up to four days per turbine. The maintenance work will be undertaken by staff using an All-Terrain 4WD vehicle which will be driven on the access tracks and existing farm tracks and will gain access to the site from Ashton Fitchett Drive. There may be occasional call out activities in addition to the scheduled routine maintenance

programme. The maintenance activities will require approximately two vehicle trips per month.

Routine service and maintenance work is mostly carried out within the confines of the nacelle, accessed via internal ladders in the towers. Major repairs or overhauls may infrequently use a crane to aid dismantling of the rotor and/or nacelle. An internal hoist in each turbine will typically be used for all routine work.

The turbines have an expected life of 20 years. At the end of this time the site may be decommissioned or have parts replaced to extend the operation period. Replacing parts or decommissioning the wind farm will involve the use of cranes and trucks to transport new and old equipment.

Decommissioning would involve the removal of all turbine structures. Turbine foundations would be removed to ground level, covered with topsoil, and regrassed. The farm roads would remain for use by the landowner.

5. National policy

5.1 Energy policy

Until recently, the Government's stated energy policies were relatively broad, being set out in the Sustainable Programme of Action, and the Energy Policy Framework. Now, the recently released New Zealand Energy Strategy, and the revised National Energy Efficiency and Conservation Strategy (NEECS), provide a more detailed approach that builds on the earlier work.

The Government's NZ Energy Strategy (NZES) has identified a National Policy Statement (NPS) for Renewable Energy Generation as being one means of enabling renewable energy projects such as wind farms to take a smoother path through the resource consent process. NPS sit at the top of the hierarchy of plans in the RMA, with the objective of establishing objectives and policies on matters of national significance. The NPS on Renewable Energy Generation is currently being prepared.

The development of a wind farm is broadly consistent with these government policy documents, and receives **positive** support from them.

5.2 Resource Management Act

In making decisions under the Resource Management Act (RMA), local authorities must have particular regard to the matters listed by section 7 of the Act. Among other matters, section 7 includes two clauses that have particular relevance to wind farms.

Section 7(i) of the RMA is "the effects of climate change". This clause requires the consideration of a negative outcome that international science has linked to the release of greenhouse gases. Section 7(i) is relevant to wind energy as greater use of wind to produce electricity can help avoid the release of greenhouse gases associated with some alternative forms of power generation.

Section 7(j) of the RMA requires that those exercising functions and powers under the Act (the Crown, and district and regional councils) have particular regard to "the benefits to be derived from the use and development of renewable energy". The government has stated that this provides a stronger legal mandate for consideration of the value of renewable energy, so that decisions and council plans take into account national objectives such as those detailed in the NZ Energy Strategy. The intention is that proposals for renewable energy do not encounter unnecessary barriers.

The development of the wind farm is broadly consistent with these sections of the Act and receives **positive** support from them.

5.3 NZ Coastal Policy Statement

There is an existing New Zealand Coastal Policy Statement (NZCPS), and a Proposed NZCPS. Both documents have some relevance as the southern edge of the wind farm abuts land which the project's landscape consultant assesses as being within the coastal environment. The wind farm will also be visible from within the coastal environment, principally from shipboard locations such as the Cook Strait ferries.

The proposed NZCPS differs from the existing NZCPS in seeking that local authorities should identify environmental qualities that contribute to defining the landward extent of the coastal environment. The proposed Wellington Regional Policy Statement (see section 6 below) acts on this direction by specifying the need to identify coastal (landward) sites of regional significance. However, the proposed RPS does not itself specifically identify any areas. This approach contrasts with the draft RPS where the coastal area immediately adjacent to the southern end of the wind farm was identified as being significant. No part of the wind farm will lie within this area, and to that extent, the coastal environment policies of the NZCPS may have limited relevance. Cumulative and precedent effects are also a consideration of specific policies.

The project's Landscape and Visual assessment addresses visual impacts related to the coastal environment (see section 9.4 and Appendix B), including cumulative impacts.

The Long Gully wind farm does not lie within the coastal environment and will only be seen from the coastal environment by boat passengers in Cook Strait. Views from Cook Strait will be dominated by the existing West Wind wind farm, and the Long Gully wind farm will add little cumulative impact.

The wind farm's adverse effects are therefore only **minor** in terms of the NZCPS.

6. Regional policy

Windflow's assessment of regional rules (see section 7) concludes that no regional resource consents are required. Notwithstanding that fact, there are some aspects of regional policy (as expressed in the Regional Policy Statement) that are relevant to Wellington City Council's overall assessment of the land use consent application.

Operative and Proposed RPS

There is an existing Regional Policy Statement (RPS) that was made operative in 1995. However, the Regional Council is currently in the process of reviewing the RPS and has recently notified a proposed RPS.

Because it is only recently notified, the proposed RPS has limited statutory weight, but it can be taken as the latest word in the Regional Council's thinking. As such, the City Council, in making consent decisions under s.104 of the Act, should consider the general directions being set by proposed RPS.

The proposed RPS addresses energy and infrastructure in the Region. Among its objectives and policies are the following:

Objective 9: Energy

The region's energy needs are met in ways that:

(c) maximise the use of renewable energy resources.

(d) reduce dependency on fossil fuels.

Policy 6

District and regional plans shall include policies that recognise:

(b) the social, economic, cultural and environmental benefits of energy generated from renewable energy sources including:

(i) security of supply and diversification of our energy sources;

(ii) reducing dependency on imported energy resources; and

(iii) reducing greenhouse gas emissions.

The Long Gully project will clearly be consistent with this regional objective and policy, and receives **positive support** from them.

7. Regional rules

Windflow's assessment of potentially relevant regional rules (set out below) concludes that **no regional resource consents are necessary** for the proposed works. That assessment is based on a review of provisions in the Regional Soil Plan, Regional Freshwater Plan, and Regional Discharges to Land Plan.

7.1 Regional Soil Plan

The three potentially applicable rules are Rule 1 (roading and tracking), Rule 2 (large scale disturbance on erosion prone land), and Rule 3 (disturbance to vegetation).

Rule 1 – roading and tracking

Consent is only required for roading and tracking under Rule 1 if the earthworks will create an upslope batter greater than 2 metres high, and with a continuous length of 200m or more.

There will be no earthworks that exceed these thresholds. The farm roads already exist, and only minor earthworks in discrete areas are required to upgrade them. There will be some lengths of new track (access tracks to some turbines – see section 4.7) but none of these will exceed around 80 metres.

Based on the above assessment, consent is not required under Rule 1 of the Regional Soil Plan.

Rule 2 – large scale soil disturbance

Consent is only required for soil disturbance on erosion prone land under Rule 2 if:

- The land exceeds 28 degrees slope; and
- The disturbance is greater than or equal to 1,000m³ within any 10,000m³ (1 hectare) area.

It is also important to note that Rule 2 excludes any soil disturbance undertaken in relation to roading and tracking.

There will be no earthworks that fall under the provisions of this Rule. Although there is land that exceeds 28 degrees slope in the vicinity of the works, the works are largely confined to much flatter slopes (refer to slope maps 1 – 3 in Appendix A). Some of the minor road upgrades may affect small areas of land on existing road cut batters^r that exceed 28 degrees in slope, but the Rule specifically excludes roading and tracking.

The earthworks associated with laydown / construction platform excavation will occur in discrete, well separated locations. Individually, no laydown construction platform will exceed 1,000m³ (the largest volume will be around 450m³). Collectively, over any 1 hectare part of the site, the combined total of laydown / construction pad earthworks will also not exceed the threshold.

Based on the above assessment, consent is not required under Rule 2 of the Regional Soil Plan.

Rule 3 – disturbance to vegetation

Consent is potentially only required for disturbance to vegetation under Rule 3 if it occurs on a continuous area of more than 1ha on erosion prone land. However, in this case, the total area of vegetation disturbance (other than pasture) across the entire wind farm will be around 0.57ha (see Ecology assessment in Appendix D).

Based on the assessment above, consent is not required under Rule 3 of the Regional Soil Plan.

7.2 Regional Freshwater Plan

The two potentially applicable rules are Rule 5 (stormwater discharges) and Rule 25 (river crossings in intermittently flowing streams).

Rule 5 – stormwater discharges

Consent is only required if the discharge breaches the threshold set by Rule 2, by originating from an area of bulk earthworks greater than 0.3 hectares (3,000m²).

As noted elsewhere, the proposed earthworks will occur in small discrete areas. In no case will any of those individual areas exceed the 3,000m² threshold. Cumulatively, all the discrete areas of cut, fill, spoil disposal, and road regrading will total around 6,000m² to 7,000m² across the entire project. However, as noted above, the earthworks will occur in discrete locations rather than being a single

^r These areas are too small to be shown by the slope maps

area. In addition, there is a separation of several kilometres between the earthworks associated with the northern and southern turbine strings.

The largest single area of earthworks will be an excess spoil disposal site, located at the northern end of the old airstrip (see drawing SK13 in Appendix E). This site will be around 2,500m² in area.

Based on the above assessment, consent is not required under Rule 5 of the Regional Freshwater Plan.

It should be noted that compliance with the stormwater discharge provisions of the Freshwater Plan obviates the need to assess stormwater discharges from earthworks against the provisions of the Regional Discharges to Land Plan.

Notwithstanding compliance with the regional rules in relation to stormwater runoff from earthworks, Windflow proposes to prepare and implement an Erosion and Sediment Control Plan. The ESCP would be prepared in consultation with Greater Wellington, based on regional guidelines, and would be submitted to both the City and Regional councils for their approval.

Rule 25 – river crossings

Consent is only required under Rule 25 if the upstream catchment area is more than 50 hectares.

In no case on the Long Gully site will this occur. The likely location of culverting (crossing) of intermittent watercourses is near the proposed minor road upgrades, new access tracks, and laydown / construction pads. All of these works will take place on or near ridgelines, with no possibility of an upstream catchment of any significant size.

Based on the above assessment, consent is not required under Rule 25 of the Regional Freshwater Plan.

7.3 Regional Discharges to Land Plan

Two potentially applicable rules are Rule 2 (discharges of contaminants not otherwise provided for) and Rule 8 (discharges containing human sewage not otherwise provide for).

Rule 2 – contaminants not otherwise provided for

Rule 2 is a 'catch all' rule that applies to all discharges unless they are otherwise permitted.

Stormwater discharge, on an ongoing basis post-construction, is permitted by Rule 3. Stormwater discharges during construction are covered by Rules 2 and 5 of the Regional Freshwater Plan (see 7.2 above). Greywater discharge, up to 2,000m² per day, is permitted by Rule 4. There would be some greywater discharge from the site's operation and maintenance building, but the low level of use means that the threshold would not be exceeded (also see discussion below in relation to O & M building sewage).

Based on the above assessment, consent is not required under Rule 2 of the Regional Discharges to Land Plan.

Rule 8 – discharges containing human sewage not otherwise provided for

Rule 8 requires consent for sewage discharges that are not provided for by Rule 7 (on-site sewage treatment and disposal).

The wind farm's operation and maintenance building will, on an ongoing basis, provide sewage and greywater disposal facilities for the workers who visit there. Rule 7 permits on-site sewage disposal provided that the discharge does not exceed 1,300 litres per day. The ongoing maintenance of the wind farm will require a staff of two, visiting the site for 100 days, spread out over the course of a year. With that level of use, the threshold of 1,300 litres per day will not be exceeded. Even during periods of higher intensity use (such as major turbine refurbishment), the number of workers using the facilities would be relatively small and the threshold would not be exceeded.

8. District rules

8.1 District planning map features

The applicable rules are governed by the zones or other mapped features that the project works fall within. The Long Gully wind farm project falls entirely or partly within the following areas:

- Turbines and earthworks Rural zone, ridgeline and hilltops area (southern turbine string only)
- Wind monitoring masts Rural zone, ridgeline and hilltops area (one mast)
- Operations and maintenance building Rural zone, hilltops and ridgeline area
- Landfill electricity route Rural zone, Open Space zone, Landfill designation, Suburban Centre zone, ridgeline and hilltops area
- Karori electricity route Rural zone, Open Space zone, Wrights Hill Heritage area, ridgeline and hilltops area

The site also adjoins or contains the following further district plan features:

- Rimurapa Landscape Feature Precinct
- Hazard (Fault Line) Area
- Designation A4 and A6 (Radar Communications Sites) – Airways Corporation Ltd
- Designation R3 (Railways Purposes) – KiwiRail (formerly Ontrack)

There are a number of designated (section 168 RMA) sites in the wider vicinity, but only two will be physically affected by the project. Those sites are the Airways Corporation radar station and the Southern Landfill. The Airways site will be affected by earthworks for roading, and the Landfill site will be affected by the proposed Landfill electricity route.

Any physical effect within these designated areas will require the written approval of the requiring authority for that site, under the provisions of section 176(1)(b) of the RMA. Windflow has initiated consultation with the relevant requiring authorities.

8.2 Renewable energy and wind rules

The wind farm and its ancillary activities are subject to assessment under the following main provisions of the district plan.

Renewable Energy

*Renewable
Energy*

26.1.1 Where the rules in this chapter apply to any proposal the relevant area based rules do not apply to that proposal.

The district plan includes a chapter specific to renewable energy. These rules override all other zone based rules. The renewable energy chapter, and provisions related to ridgelines and hilltops, were introduced to the district plan by plan changes 32 and 33. The Environment Court, in its 29 January decision on plan changes 32 / 33 endorsed this approach and noted [para 37] that “broadening the assessment criteria to those of the Rural Area generally is both unnecessary and potentially confusing”. However, the Court accepted that the specific rules for renewable energy should also be “supported by the objectives and policies for the underlying area” [para 38].

The assessment of the wind turbines and earthworks for the Long Gully Proposal should therefore be restricted as determined by the Court. That is, the applicable rules and assessment criteria are those of the Renewable Energy chapter (chapter 26). The wording of the following rules and assessment criteria are as determined by the Environment Court in its further (and final) decision on plan changes 32 / 33, issued 30 April 2009^s. Where useful, relevant objectives and policies from the underlying zone (the Rural Area in relation to the turbines and earthworks), have also been incorporated as part of the assessment.

The proposed overhead electricity lines (including both new lines and upgraded lines) are subject to the separate provisions of the Utilities chapter of the district plan.

Wind energy facility

*Renewable
Energy*

Rule 26.3.1 Wind energy facilities in the Rural Area are Discretionary Activities (Unrestricted)

The construction of a wind farm, and permanent ancillary structures such as anemometers and an operations building, are specifically provided for as a discretionary activity (unrestricted) in the Rural Area. This rule is governed by the district plan definition of “wind energy facility”, which includes buildings, substations, turbines, structures, underground cabling, earthworks, access tracks and roads associated with the generation of electricity by wind force, but excludes overhead electricity lines.

^s Environment Court Decision W31/2009

This is therefore the main relevant rule for the assessment of the Long Gully wind farm project, as the majority of the works will take place within the Rural Area.

The assessment criteria associated with this rule are fully set out and commented on in section 8.3.

Wind monitoring

Renewable

Energy

Rule 26.2.1 Anemometers (including associated support structures) established for the purpose of measuring wind in the Rural Area are a Discretionary Activity (Restricted) in respect of:

- *26.2.1.1 Siting and Design*
- *26.2.1.2 Duration*
- *26.2.1.3 Height.*

Wind monitoring masts (to support anemometers and other measuring equipment) are separately provided for by the district plan. However, like the remainder of the wind energy facility covered by Rule 26.3.1, wind monitoring equipment is a discretionary activity (restricted). The site already has consent for wind monitoring equipment (see section 4.9), which allows up to six masts – four of which could be up to 60 metres high.

Windflow proposes that the existing wind monitoring consent be replaced by the overall wind farm consent, with only two masts of up to 50 metres being required. The siting of the masts would be flexible, allowing the two masts to be moved around to gather data from different parts of the operating wind farm. International measurement standards set minimum and maximum distances from turbines, which in this case, are 70m and 135m respectively. With regard to duration, the masts would be used for the life of the wind farm.

In the context of the surrounding wind farm, the effects of the wind monitoring masts would **no more than minor**. The effects will be less than is currently permitted under the existing consent.

8.3 Wind energy facility assessment

The following paragraphs comment on each of assessment criteria for Rule 26.3.1.

*Assessment
Criteria*

26.3.1.1 *The actual or potential noise effects of the proposal.*

The project's Acoustic assessment has determined that the sound level output from the wind farm will be able to meet NZS6808 in all conditions. The assessment included a consideration of special audible characteristics and the potential effects on settlements or other residential locations. The overall finding of the Acoustic assessment is that sound effects will be **no more than minor**. Refer to section 9.5 and Appendix C for further details.

*Assessment
Criteria*

26.3.1.2 *The extent to which the proposal will affect the amenity values (other than noise) of the surrounding environment with particular regard to the effects on residential locations, including any potential 'nuisance' effects on communities including:*

- *electromagnetic – interference to broadcast or other signals*
- *blade glint – resulting from the reflection of the sun from the turbine blades*
- *shadow flickering – occurring when the blades of an operating wind turbine pass between the sun and an observer, generating flickering light.*

The project's Landscape and Visual impact assessment has had regard to visual amenity values and the potential for nuisance effects. The potential for effects related to blade shadowing, glint, or shadow flicker is considered to be **non existent or negligible**, given the distance from the turbines to the nearest residential locations. Refer to section 9.4 and Appendix B for further details.

The project's Radiocommunications assessment has considered the potential for interference with broadcast or other signals that may create a nuisance effect for residents or communities. This issue principally relates to TV, radio, and cell phone reception. The potential for effects was found to be **non existent or negligible**. Refer to section 9.10 and Appendix G for further details.

As noted by the Acoustic assessment, there is no evidence that vibration from turbines will be an issue. The Environment Court in its 29 January 2009 decision [para 36] on plan changes 32 / 33 expressed the same view (with regard to all wind farms) and effectively excluded vibration from consideration as an issue.

Dust control will be a normal part of the general construction management process, and there is little or no potential for dust to adversely affect the general public.

Assessment
Criteria

26.3.1.3

The visual effects of the proposal, including:

- *The extent to which the proposal will impact on rural character*
- *The extent to which the proposal will be visible from residences, key public places including roads, and recreation areas*
- *The relationship of the proposal to the Ridgeline and Hilltop overlay*
- *The visibility of the proposed development*
- *The extent to which the proposal will impact on the natural character of the coastal environment, including on cliffs and coastal escarpments*
- *The extent to which any aspects of the proposal can be sited underground*
- *The scale of any proposed development, including the number of turbines, their height, and the cumulative visual effect of the development as a whole.*

The project's Landscape and Visual assessment (Appendix B) has considered the potential effects of the wind farm, including all of the bullet point matters listed above. The conclusions of the assessment are that construction impacts on the landscape in the immediate area will be **moderate**. These effects will reduce to minor following ground restoration at the end of the construction period. Having regard to the turbines themselves, the landscape and visual effects are considered to be **no more than minor**. Notwithstanding this *overall* finding, there are *component* findings which differ in the assessed level of effects, and these are outlined below.

With regard to rural character, the landscape assessment considers the area of the wind farm to be 'peri-urban'. Wellington's peri-urban areas contain other vertical structures such as pylons and telecommunications masts. The assessment found that the limited number of turbines visible from most locations will not appear as features that are out of character in this wider landscape. A Windflow company logo will be on each turbine nacelle, but the landscape assessment considers it to be low key and only discernable at close quarters. The low impact of this signage is consistent with Rural Objective 14.2.2, and Policy 14.2.2.3.

With regard to the relationship of the proposal to the ridgeline and hilltops overlay, parts of the wind farm (the entire southern string of turbines) will be located within the overlay. The assessment found that because the wind farm is located on prominent ridges, that the effect on the immediate landscape character area[†] will be **moderate**. The effect on immediately adjoining character areas was found to be **minor to negligible**.

There will be visual effects for some houses in the area. The affected houses will be in a small area to the north of the wind farm. The assessment identifies 47 houses within 3km of the wind farm that may experience some degree of visual effect. Only two of those houses are considered to experience a **high** visual effect, while most (36) houses would experience effects that are **very low to low**. The houses with 'high' visual effects are 'The Castle' (988m to nearest turbine), and a house on the property owned by Shenval Wind Farm Developments (1.76km to nearest turbine).

[†] The Long Gully landscape character area, see Figure 5 in Appendix B *Illustrative Material*

The wind farm will not be visible from the majority of central Wellington, its northern or western suburbs, or the village of Makara.

Public viewpoints are also addressed by the project's Landscape and Visual assessment. Intervening topography means that visibility of the wind farm will be limited from most locations. In general the wind farm will be most visible from hilltops on open elevated farm land, and from where residential areas obtain elevated views. The transitory views that would be obtained from Cook Strait passenger ferries were also considered. With regard to recreation, the assessment's finding is that recreational experiences will not be unacceptably altered. The public land, sea, and recreation based assessments all contributed to the overall conclusion that landscape and visual effects will be **no more than minor**.

Viewed from offshore, the turbines will appear as very limited scale features on a small section of the horizon. The effect on the natural character of the coastal environment will therefore be **minor**. Viewed from within the coastal environment on land, the turbines will be medium sized structures introduced into the landscape, and will have a **significant** but constrained effect in that immediate area.

In terms of cumulative effects, the assessment considered the visual and landscape effects of the Long Gully wind farm, combined with the Brooklyn wind turbine, and the West Wind, Mill Creek, and (proposed) Puketiro wind farms. Having regard to views both from offshore, and from vantage points on land, the cumulative effects are considered to be **minor**. These conclusions were reached because of the degree of separation between the various projects, their different scales, and the generally minor impacts of the Long Gully project itself on the wider landscape.

As noted in relation to Assessment Criterion 26.3.1.11 (page 51), the underground siting of associated electricity lines is not technically practicable, or economically feasible.

Refer to section 9.4 and Appendix B for further details.

*Assessment
Criteria*

26.3.1.4

The ecological impact of the proposal – including:

- *The extent to which vegetation will be removed or disturbed during construction and operation of the wind energy facility*
- *The sensitivity of the site to disturbance*
- *The potential effects on birds or other fauna, either migratory species or resident populations on site*
- *The extent of any proposed earthworks and the degree to which runoff and the effects on local catchments can be managed.*

The project's Ecology assessment has considered the potential ecological implications of the wind farm, including all of the bullet point matters listed above. The assessment found that a negligible amount of vegetation (other than pasture) would be affected by the development, and that the site is not especially sensitive in ecological terms. Potential effects on birds and other fauna were considered. The wind farm site was found to provide little suitable habitat for at risk bird and bat species, and such species are likely to be only occasional visitors. Other fauna likely to be on site (lizards, speargrass weevil) were also considered and the potential

impacts found to be **no more than minor**. Overall, the risks of impacts for birds or other fauna were considered to be **minor**.

In consultation with the project's Civil engineering advisors, the ecology assessment considered the extent of proposed earthworks, the likely runoff, and the extent to which effects on local catchments can be managed. The conclusion with regard to these earthworks issues is that effects will be **minor**. Refer to sections 9.6 and 9.8, and Appendices D and E for further details.

The external transformers located beside each wind turbine contain approximately 500 litres of oil. Rule 3.5.2.1 (13) of the District Plan exempts transformers containing less than 1,300 litres of oil from the District Plan's Hazardous Facilities Screening Procedure (HFSP), provided that they are used, stored and transported in a way that prevents the accidental release of oil. Windflow will manage the installation and use of the transformers in ways that meet this requirement.

Assessment

Criteria

26.3.1.5 *The effects of traffic and vehicle movements and the extent that traffic or site management plans can be implemented to mitigate effects.*

The project's Traffic assessment considered the movement of all turbine components and machinery to the project site. The overall finding of the traffic assessment is that because the number of traffic movements will be relatively small, and because standard sized trucks will be used, the potential effects will be **minor**. Traffic management plans were recommended by the assessment, and will be put in place by the consent holder. Refer to section 9.9 and Appendix F for further detail.

Assessment

Criteria

26.3.1.6 *The resulting effects of any alteration to natural landforms required, earthworks, including access tracks and roads, turbine platforms and the rehabilitation proposed. Major alterations to landforms should be avoided.*

The project's Civil engineering assessment sets out the extent of proposed earthworks. Earthworks in the northern turbine string will not take place within a ridgeline and hilltop area and will not alter ground levels by more than 2.5m. Earthworks associated with the southern turbine string will all take place within an identified ridgeline and hilltop area. The height / depth of earthworks in this area may exceed 2.5m in some isolated instances.

The earthworks associated with the main excess spoil disposal area (northern end of the old airstrip) will exceed 2.5m in depth if the area's potential to hold over 7,500m³ is fully taken advantage of. If the fill depth was limited to 2.5m, it would still allow approximately 6,000m³ of spoil to be placed in the airstrip area. In terms of earthwork volumes that might reasonably be associated with farm road development, the Long Gully wind farm earthworks will be of a comparable scale (with potentially lesser effect). Overall, it is considered that the physical effects of the proposed earthworks will be **minor**. Refer to section 9.8 and Appendix E for further detail.

The project's Landscape and Visual assessment considered the effects of alterations to natural landforms, and the nature of the proposed earthworks (including mitigation / rehabilitation). The conclusion is that because the volume of earthworks is relatively low, large scale cuts or filling are not required, and the works are visually distant from settlements, the overall visual impacts will be **minor**. Refer to section 9.4 and Appendix B for further detail.

*Assessment
Criteria*

26.3.1.7

The extent to which the proposal will impact on:

- *identified sites of significance to tangata whenua*
- *heritage items*
- *geological or archaeological values*
- *landscape values*
- *recreational values*
- *the surrounding land use.*

The project's Cultural and Heritage assessment considered sites of significance to tangata whenua. The assessment included recorded sites, as well as the cultural significance of the landscape. The overall conclusion of the assessment is that effects will be **no more than minor**. Refer to section 9.11 and Appendix H for further detail.

The project's Landscape and Visual assessment took account of heritage items (Wrights Hill, in relation to the proposed Karori electricity route upgrade), open space values, and landscape features. The conclusions of the assessment are that the overall effects of the wind farm will be **no more than minor**. In reaching that opinion, sites of significance to tangata whenua, heritage items, open space values, geological or archaeological values, landscape features, and surrounding land uses were noted and taken into account. There was a comprehensive characterisation of these qualities in association with each landscape character area. Refer to section 9.4 and Appendix B for further detail.

Surrounding land uses have formed a part of Windflow's general consideration of issues and have been implicit in the various assessments where necessary. In particular, Windflow has had regard to the potential impacts on the operation of the Hawkins Hill radar facility, and has entered into negotiations with Airways Corporation about potential mitigation measures. The effects are considered to be **minor**. Windflow has taken the same approach with Vodafone, KiwiRail, and MetService – companies which all have facilities in the vicinity of the wind farm. Refer to section 9.10 and Appendix G for further detail.

The recreation use of the surrounding land (and of Long Gully itself) has also been taken into account. Windflow acknowledges that careful management of construction vehicles will be necessary to minimise risks to the public during the construction period. Overall, effects on recreation are considered to be **minor**. Refer to section 9.12 for further detail.

Assessment

Criteria

26.3.1.8 *Where a development is located within a Hazard Area the extent that measures are taken to mitigate the effects of the hazard event.*

The project's Geotechnical investigation notes the existence of the Wellington Fault that runs through Long Gully Station. The fault is also identified on district plan maps. None of the turbines lie within the fault zone. An existing farm road, which links the southern and northern turbine strings, crosses the fault zone. The proposed overhead electrical line to connect the northern and southern turbine strings to the existing Long Gully 11kV line will cross or pass close to the fault zone. The existing 11kV Karori electricity route which will be upgraded as part of the project, crosses the fault line in several places. The conclusion of the Geotechnical assessment is that the risk posed by the existence of the fault line is **no more than minor**, being less than the wind force exerted on turbines or electrical infrastructure. Refer to section 9.7 and Appendix I for further detail.

Assessment

Criteria

26.3.1.9 *The cumulative effects of the proposal.*

The project's landscape and acoustic assessments have had specific regard to the potential for cumulative effects. The source of potential cumulative impacts arises from the combined presence of the West Wind and Long Gully wind farms. The conclusion of the Acoustic assessment is that cumulative effects on sound levels will be **no more than minor**. The conclusions of the Landscape assessment have also had regard to the combined effects of Long Gully and other consented and proposed wind farms – from both onshore and offshore viewing positions. Landscape and visual impacts are concluded to be **no more than minor**. Refer to sections 9.5 and 9.4, and Appendices C and B for further detail.

The production of more renewable energy is a **positive cumulative effect** that must also be taken into account, and is an effect that is encouraged by the District Plan, formative regional policy, high level government policy and the Resource Management Act.

Assessment

Criteria

26.3.1.10 *The extent to which the proposal is consistent with any relevant aspects of the Rural Area design guide.*

The Rural Area Design Guide has been taken into account by the project's Landscape and Visual assessment. In particular, sections 3 and 6 (*Natural Features, Ecosystems and Habitats and Access*) were considered in the overall evaluation of the proposed wind farm. The minor degree of landform modification associated with providing construction access is considered entirely consistent with the Design Guide. However, there is inevitably some degree of conflict with objective O1 of the Design guide, which is *"to protect and enhance the distinctive natural character of prominent landforms, the coastal environment, wetlands, streams and their margins"*. Despite that degree of conflict, the landscape

assessment has found that impacts are **moderate** in the immediate area of the turbines, and **negligible to minor** elsewhere.

Assessment

Criteria

26.3.1.11 *Operational or technical considerations.*

Wind farms need to be located in areas that have a good wind resource. Long Gully is such a location. The best wind resource is found on the higher ridgelines, and these are the areas in which Windflow proposes to locate its turbines. There are no alternative turbine locations within Long Gully Station that would significantly reduce the perceived impacts of the wind farm.

With regard to the overhead electricity lines proposed as part of the development, these are also governed by operational and technical considerations. Overhead lines are easier to maintain and quicker to repair, which is especially relevant for lines lying in close proximity to the Wellington Fault. The alternative of placing the proposed lines underground is prohibitively expensive – with costs estimated at approximately ten times the cost of overhead installation. If the project was faced with those costs it would not be viable.

Assessment

Criteria

26.3.1.12 *The effects of any proposal on aircraft safety, radar stations and navigation sites and facilities.*

As noted above, Windflow has had regard to potential impacts on the operation of the Hawkins Hill radar facility. Windflow has had ongoing discussions with Airways Corporation about the potential for impacts, and has entered into negotiations about how to address any impacts *before they occur*. Airways Corporation has expressed a relatively low level of concern, based on the location of the turbines and their heights above sea level in comparison to the radar station. Notwithstanding that low level of concern, Windflow and Airways Corporation will continue to review the potential for effects, including during the actual erection of the turbines when decisions about turbine operation, relocation, or deletion may need to be made. Windflow intends that the actual adverse effects on aircraft safety should be **nil**.

Assessment

Criteria

26.3.1.13 *The benefits to be derived from the proposal, including its contribution to central government energy policy objectives and renewable energy targets.*

Government energy policy encourages the exploitation of renewable sources of energy. Although the amount of electricity produced by the Long Gully wind farm will be small in a national sense, it is a useful contribution in the local context. (see section 1.2). The local context is most important when considering this wind farm, as it will be connected to the local electricity network, rather than the national grid (see section 1.1). The wind farm will therefore have a **positive effect**.

8.4 Above ground electrical lines assessment

The District Plan has provisions that relate specifically to utilities, and which override the zone rules. This approach is the same as for the Renewable Energy provisions of the district plan. The project's above ground lines must therefore be assessed solely under the Utility provisions.

Utility

Rule 23.1.3 *The repair, maintenance, and replacement (including replacing multiple lines with fewer lines), and minor upgrading of overhead and underground lines is a Permitted Activity*

The proposed works are excluded from being considered a permitted activity under Rule 23.1.3, as they will fail to meet the district plan's definition of 'minor upgrading'. That definition excludes any new route, such as the proposed Landfill route, and also excludes the addition of further circuits to an existing route – as is proposed for the Karori electricity route.

Utility

Rule 23.3.4 *New or additional overhead lines that are not provided for as a Permitted Activity or do not meet the Permitted Activity conditions are Discretionary Activities (Restricted) in respect of:*

- 23.3.4.1 *visual effects*
- 23.3.4.2 *siting*

The proposed lines are excluded from being considered discretionary activity (restricted) under this rule as they will fail to meet the associated standard that "no new support structure is erected". This standard clearly cannot be met for the entirely new lines within Long Gully Station, or the new Landfill electricity route.

In addition, it appears likely that the Karori route upgrade will fail to meet the "no new support structures" standard, as some or all of the poles on that route are likely to be replaced.

Utility

Rule 23.4.2 *New or additional overhead lines and cables that are not provided for as Permitted or Discretionary (Restricted) Activities or that do not meet the conditions or standards and terms for Permitted Activities or Discretionary (Restricted) Activities are Discretionary Activities (Unrestricted)*

The proposed new lines and upgrade therefore need to be considered as a discretionary activity (unrestricted) in terms of Rule 23.4.2 and its associated assessment criteria. The Rule's assessment criteria are set out below, followed by paragraphs that comment on each criterion in turn.

Assessment
Criteria

23.4.2.1 *Whether the size and scale of the proposed new or additional lines in is keeping with the size and scale of any overhead reticulation which currently exists.*

There is an existing overhead 11kV electricity line that runs the length of the central valley in Long Gully Station. Heading north from Long Gully, the line roughly follows the boundary of the Karori Wildlife Sanctuary before passing through the Wrights Hill open space area – including the Wrights Hill heritage area. The line also passes beneath a 110kV pylon-mounted national grid line that runs through the Karori Sanctuary and on to the Central Park substation.

Two new lines are proposed within Long Gully, feeding electricity from the northern and southern turbine strings down to the existing line. These will be relatively short lines that take the most practicable and shortest routes down into the valley. Physically and visually, these lines will be entirely contained with Long Gully Station and will be completely in keeping with the existing 11kV line, being similar in size to the existing poles. The effects would therefore be **no more than minor**.

The upgrade of the existing Karori route will require adding three further cables, in addition to the existing three cables. It is very likely that some or all of the existing poles would be replaced as part of the upgrade, and it is possible that some of the poles would be relocated to within 30m – 40m of their present locations, subject to landowner negotiations. Although carrying additional cables, the new poles would only be around 1m – 2m higher than the existing poles. Overall, the completed upgrade would be similar to the existing line. The effects would therefore be **minor**.

The proposed new Landfill line will include a short length along the Hawkins Hill ridgeline, but would mostly follow an existing four-wheel drive track from near the Hawkins Hill radar station, down towards Landfill Road. There is some minor overhead reticulation on the Hawkins Hill ridgeline, but none in the vicinity of the track that traverses the hillside down towards Landfill Road. On Landfill Road itself, there are existing overhead lines of a similar scale to those proposed. Although there is a general lack of existing overhead reticulation in the vicinity of this proposed line, the effects would be either **less than minor** (for the Landfill section), or **no more than minor** (for the ridgeline section).

Assessment
Criteria

23.4.2.2 *Whether there are any technological, operational or topographical reasons why the new or additional lines cannot be placed underground.*

The proposed overhead electrical line to connect the northern and southern turbine strings to the existing Long Gully 11kV line will cross or pass close to the fault zone. The existing 11kV Karori electricity route which will be upgraded as part of the project crosses the fault line in several places. Repair in the event of a damaging seismic event will be easier and quicker if the lines are overhead rather than underground. The steep and rough nature of the topography beneath the routes of the new lines would also make placing lines underground technically difficult and would expose steep erosion prone land.

Similar considerations apply to the Landfill route, even though the topography is not as rough as that in Long Gully.

Assessment

Criteria

23.4.2.3

Whether the location of new or additional overhead lines will have an impact upon:

- amenity values of the area, including rural and residential amenity
- significant public views
- areas of landscape or open space values
- streetscape

The new lines within Long Gully itself will have **no impact** in terms of any of the listed considerations.

The upgraded Karori route would pass through or near areas with landscape, open space, and amenity values. However, given the context set by the existing 11kV and 110kV overhead lines, the additional cables would have only a **minor** impact.

The Landfill route will pass through land zoned Open Space. However, the same land is designated as part of the Southern Landfill and its amenity levels are significantly affected by the proximity of the landfill, its associated activities, and the industrial uses in Landfill Road. Given this context, the effects of the Landfill route on amenity, public views, and landscape / open space values would be **less than minor**.

With the exception of Landfill Road (where the streetscape effects would be **less than minor**), there are no areas of streetscape that would be affected by the proposed lines.

Assessment

Criteria

23.4.2.4

In respect of heritage items whether the heritage significance of the area or site is affected by the lines construction or placement.

The existing Karori route passes through land identified as the Wrights Hill heritage area and skirts the southern and western edges of the parade ground. The addition of three more cables, and 1m – 2m extra height will not significantly increase the existing impacts. There will be no direct physical impact on any of the heritage features within the overall heritage area. Given these considerations, the effect on the Wrights Hill heritage area is judged to be **minor**.

Assessment
Criteria

23.4.2.5

Where proposed within identified ridgelines and hilltops, except in relation to new or existing National Grid transmission lines, whether the extent of new or additional overhead lines and cables are sited and designed in ways that avoid as far as practicable being visually obtrusive by:

- *ensuring visual continuity of relatively undeveloped land is maintained on the upper slopes and summit of the ridgeline or hilltop*
- *minimising as far as practicable the visibility of the overhead lines and cables in relation to district wide, local and neighbouring views*
- *the co-siting of new and additional overhead lines and cables with existing overhead lines and cables where this will not result in cumulative adverse effects*
- *ensuring where possible the overhead lines and cables are seen against a landform backdrop and not the sky in relation to district wide, local and neighbouring views*
- *mitigating against potential adverse visual effects of overhead lines and cables by sensitive siting and design and appropriate planting and/or screening if and where appropriate*
- *the use of external colour and materials to minimise the visual contrast with the surrounding environment for example, the use of neutral, recessive colours.*

With regard to the proposed new Landfill line, its potentially most visible section is a short length along the Hawkins Hill ridge. However, the land in this particular location is far from “undeveloped” as it already hosts existing overhead lines, and various telecommunication and radar facilities. The visibility assessment (see separate folder) shows that views of the upgraded (Karori) and proposed new lines, when seen from surrounding areas, are relatively limited.

Adding additional cables to the Karori line gives effect to the concept of ‘co-siting’, with a minimal degree of cumulative adverse effect. It is not practicable to completely minimise visibility, as the line already exists. However, the degree of visible change to the line will not be extreme, and it has low visibility except from relatively close quarters.

From most locations, the upgraded and new electricity lines will not be visible against a backdrop of sky. Short lengths of line, such as along the Hawkins Hill ridge, may be visible against the sky from some locations, but most viewers will observe the line from a distance, which will minimise adverse visual effects.

There is little or no potential for planting / screening to mitigate against potential adverse effects. However, the Landfill line in particular is surrounded by regenerating vegetation that, over time, will assist in softening the line’s visual presence.

The preceding assessments note that the effects in almost all cases will be no more than minor, minor, or less than minor. In none of these cases would there be a significant cumulative aspect to the associated effects.

8.5 Summary of consents and activity status

The proposal requires land use consent under the Wellington City District Plan under the following rules, and in relation to the following activities:

1. Wind energy facility (Rule 26.3.1) – discretionary activity (unrestricted)
 - Turbines and associated transformers
 - Underground electrical cables
 - Other electrical infrastructure (excluding overhead lines)
 - Earthworks
 - Operation and maintenance building
2. Wind monitoring masts (Rule 26.2.1) – discretionary activity (restricted)
3. Utilities (Rule 23.4.2) – discretionary activity (unrestricted)
 - Upgrade of existing Karori 11kV electricity route
 - New overhead lines connecting the northern and southern turbine strings to the existing Karori line
 - New Landfill electricity route

Overall, the application is deemed to be a Discretionary Activity (Unrestricted) under the Wellington District Plan.

In making the assessments under district plan rules, relevant objectives and policies – including those set out in Appendix K – have been taken into account.

9. Assessment of environmental effects

The purpose of this chapter is to review the actual and potential effects on the environment associated with the development of the Long Gully wind farm. Specialist consultants have been commissioned to investigate these effects and to identify potential measures to avoid, remedy or mitigate adverse effects as necessary.

In conducting the specialist assessments and reviewing their findings in the following sections, relevant objectives and policies – including those set out in Appendix K – have been taken into account.

Consent authorities are required to have regard to any actual or potential effects on the environment of allowing the activity. This requirement is subject to Part II of the RMA.

Section 3 of the RMA notes that “effects” can include:

- Positive or adverse effects,
- Temporary effects,
- Past, present and future effects, and
- Cumulative effects which arise over time or in combination with other effects.

9.1 Background matters

As a precursor to the various specialist assessments, refined topographical contour data was obtained for the areas immediately surrounding the proposed turbines. Although 20 metre and 5 metre contour data exists for the wider area, Windflow obtained 2 metre data for the land within approximately 200 metres of all turbine locations. This level of information allowed the assessments to be conducted with a good degree of accuracy where necessary, and helps to avoid potential effects being either magnified or missed.

It is important to bear in mind that, prior to construction, the wind farm project will go through a process referred to as ‘micro-siting’. Micro-siting involves making decisions about the exact final location of individual turbines, based on a combination of factors. The basic intention of micro-siting is to maximise turbine output through small changes to the location of individual turbines, while at the same time minimising environmental effects. The process involves detailed on-site inspections to check and re-check the potential impacts of optional turbine movements. As an example, micro-siting provides an opportunity to minimise earthworks and its associated potential effects on location specific ecology. Windflow is seeking approval to micro-site its turbines within a 50 metre radius of the positions listed in Table 3.

9.2 Effects of initial layout

As noted in section 4.2, Windflow’s consultant team initially assessed a layout of 28 turbines. Based on the initial assessments, the layout was reduced to the 25 turbine locations for which Windflow is now seeking consent. The decision to delete specific turbines was made to address various potential effects. The initial assessment also led to the movement in position of some turbines – again, to address specific effects. The deleted turbines are referred to below as “A”, “B” and “C”, and their locations are shown on the drawing in Appendix A. That drawing also shows the movement made to some of the proposed turbine positions.

The changes to layout, and the effects that have been either avoided or minimised through those changes, are set out in Table 8 below.

Table 8 - Changes related to initial wind farm layout

Turbine Number	Action	Change in Effects
A	Deleted	Enables wind farm to meet NZS6808 noise standard at all Kinnoull Station consented house sites
B	Deleted	Enables wind farm to meet NZS6808 noise standard at all Kinnoull Station consented house sites
C	Deleted	Removes turbine from location potentially considered as being within the ‘coastal environment’ Avoids impacts on good quality vegetation, arising from significant earthworks to facilitate access
1	Moved 20m	Provides greater clearance from property boundary (no blade overhang)
11	Moved 30m	Provides greater clearance from property boundary (no blade overhang)
15	Moved 40m	None. Moved as a consequence of other turbine movements
16	Moved 30m	None. Moved as a consequence of other turbine movements
17	Moved 135m	Removes turbine from location potentially considered as being within the ‘coastal environment’
19	Moved 30m	Reduces earthworks effects
20	Moved 20m	Reduces earthworks effects
21	Moved 70m	Reduces earthworks effects
25	Moved 45m	Enables wind farm to meet NZS6808 noise standard at all Kinnoull Station consented house sites

9.3 Positive effects

Wind energy is an important alternative energy source. The New Zealand Wind Energy Association has stated that preliminary assessments suggest that wind turbines within the next few years could provide about 20% or up to 2,000 MW of total electricity demand, which would provide greater security for electricity supply. Security of energy supply is important to New Zealand for economic productivity. With demand for electricity expected to grow between 1.4% and 2.1% annually, there is the need for additional power generation.

The Kyoto Protocol is an international agreement signed by the New Zealand Government. The Kyoto Protocol was developed in response to growing concerns about the impact of increasing levels of greenhouse gas emissions (predominantly from the burning of fossil fuels) and their impact on the climate. The Government's climate change policy recognises that wind energy has a part to play in reducing the impact of energy use on New Zealand's greenhouse gas emissions.

The Government's Energy policy recognises the place of renewable energy in providing access to alternative and sustainable electricity supply. Recent concerns have been raised regarding the availability of electricity supply particularly given the decline in the Maui gas field and Project Aqua not proceeding. In recent submissions to resource consent applications for other wind farm projects, the NZ Government has confirmed the position of supporting wind energy as a source of energy supply in New Zealand.

The proposed Long Gully wind farm is the first example of a fundamentally different wind farm to those already operating and being constructed in New Zealand. This proposed wind farm is different because it will be significantly smaller than most wind farms constructed in New Zealand to date, and provides distributed generation, rather than grid integrated generation.

Distributed generation reduces the amount of energy lost in transmitting electricity (typically 15%), because the electricity is generated close to users. Another characteristic of distributed generation is the lesser size and number of power lines that must be constructed. It also has the advantage of building resilience and lower costs into the New Zealand-wide electricity network.

Specific to the Long Gully project, it is also different because it will use wind turbines designed and manufactured in New Zealand, and thus preserve and create jobs for New Zealanders. It will also save foreign exchange, and help lay the groundwork for a sustainable and renewable electricity industry in New Zealand. The turbines are also 46.6m in height, and thus much smaller than many foreign manufactured wind turbines, and are specifically designed for New Zealand wind conditions.

9.4 Visual and landscape

An assessment of visual and landscape related issues was carried out by Isthmus Group Limited (landscape architects). The full visual and landscape report is attached as Appendix B. A separate A3 sized folder titled *Illustrative Material* should be read in conjunction with Appendix B. The folder of *Illustrative Material* includes maps that indicate the visibility of the wind farm from surrounding areas, and also includes photosimulations of the wind farm from various public locations.

As background to the assessment, the landscape within 10 kilometres of the wind farm was divided into Landscape Character Areas (LCAs). For each LCA, a thorough review of its landscape and other qualities was undertaken. This assessment forms the basis against which potential landscape and visual effects have been measured.

The assessment also covers:

- Effects on landscape character, rural character, and amenity.
- Visual effects, including those from public viewpoints and houses within a 3km radius.
- Effects on the natural character of the coastal environment.
- Cumulative effects of the wind farm in conjunction with other existing or consented or proposed wind farms in the study area, including the Brooklyn turbine and the West Wind, Mill Creek, and Puketiro wind farms.

In combination, through landscape character analysis and the analysis of visual material, the assessment has reached the conclusion that the site is an appropriate landscape for this particular wind farm. That conclusion is based on the following facts that:

- The immediate site is off-the-beaten-track and thinly settled, even though it is relatively close to the city, so that any close by visual effects are very limited; but it is not so remote that it is valued for wilderness qualities.
- It is a productive rural landscape.
- It has a topography that can accommodate the scale of the components required.
- There are no outstanding natural landscapes that would be affected.

In summarising effects relating to amenity and the quality of the (landscape and visual) environment, the overall conclusion of the assessment is that:

“Due to the scale and layout of the wind farm and its resultant limited visibility in the wider area, and the characteristics of the receiving landscape, ... the landscape and visual effects will be no more than minor.”^u

With regard to earthworks, the sections of new track are limited in extent and often at grade with the surrounding land contours; avoiding the creation of large new cut faces and batters on exposed slopes and ridges.

^u Appendix B – Landscape and Visual Assessment, section 8.16

With regard to the proposed upgraded and new lengths of overhead electricity lines, the visual and landscape assessment considers that effects will be minor or less than minor. From most viewpoints the poles will appear intermittently as a limited minor feature, with visibility constrained by distance, and by intervening topography, structures and vegetation.

9.5 Acoustic

An assessment of sound related issues was carried out by Malcolm Hunt and Associates (acoustic consultants). The full acoustic report is attached as Appendix C.

The methods and criteria used in the assessment are based on recommendations in the New Zealand Standard “NZS6808 Acoustics – The Assessment & Measurement of Sound from Wind Turbine Generators”. Predictions of the future wind farm sound levels were specifically based on the characteristics of the *Windflow 500* turbine. The predictions take into account sound power data specific to that turbine, as well as distance, terrain and meteorological conditions. The reported predictions set out the potential environmental sound impact at specific rural residential locations in the area surrounding the wind farm.

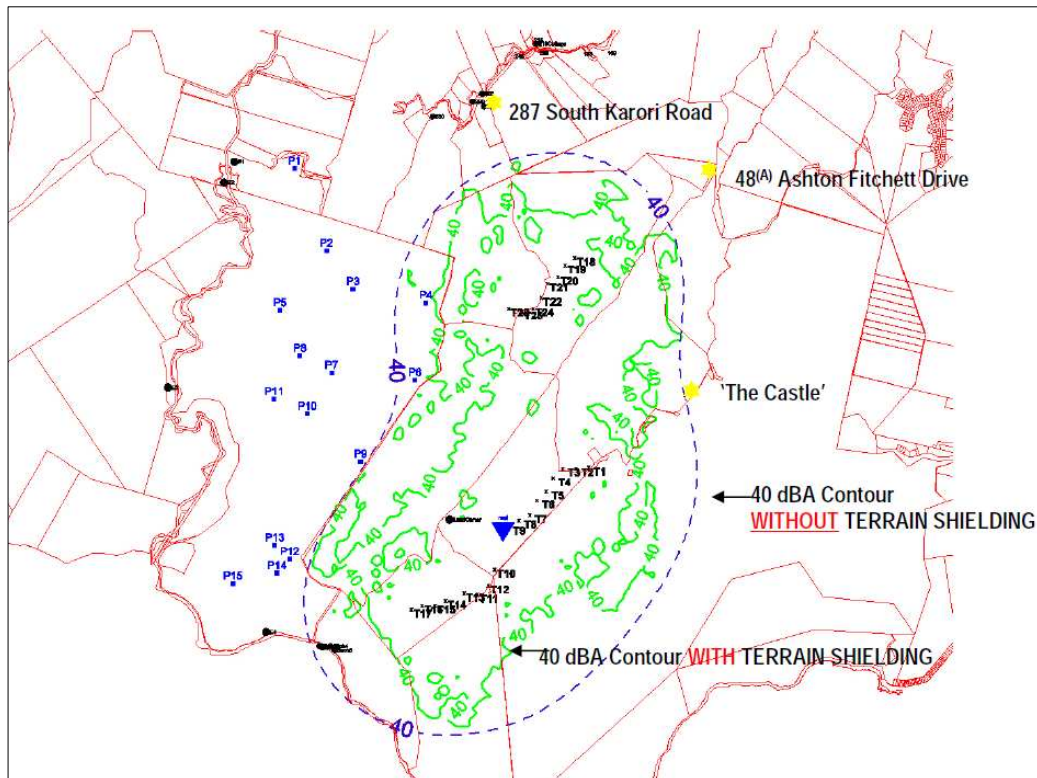


Figure 11 - Predicted sound pressure levels (40dBA) with and without terrain screening

The Acoustic assessment considers the amount of pre-existing ambient (background) sound in the area, measured at selected sites, and compares it with the predicted wind farm sound emissions. In making comparisons and judging effects, the assessment follows the guidance of NZS6808:1998. This Standard

outlines limits of acceptability for sound emitted from wind farms, when received at residential and noise sensitive locations. In summary, the Acoustic assessment has found that maximum levels of wind farm sound received at existing rural residential sites, under worse case conditions, will comply with the NZ Standard.

The assessment also investigated whether there is any potential for cumulative effects to arise from simultaneous operation of the West Wind and Long Gully wind farms. The conclusion reached by the assessment is that the combined emissions from both projects will fully comply with the limits set out in NZS6808:1998, and will therefore also comply with Wellington City District Plan requirements.

The construction based component of the activity has also been assessed as being able to comply with the relevant NZ Standard, NZS6803:1999 Acoustics – Construction Noise.

The overall conclusion of the acoustic assessment is that *“the proposed wind farm installation will not represent a noise nuisance or problem for the community”*.

9.6 Ecology

An assessment of ecology related issues was carried out by Wildland Consultants Limited (ecology consultants). The full ecology report is attached as Appendix D.

The project ecologists undertook surveys throughout the area of the proposed development. All proposed turbine sites and related roading have been visited and evaluated. With regard to plant life, no threatened species were recorded. The vegetation of the wind farm site is predominantly grassland and / or open indigenous and exotic shrubland.

With regard to birds, animals and insects within the wind farm area, the ecology report notes that any effects are expected to be minor, despite the potential presence of the regionally threatened speargrass weevil. The site surveys and other relevant data show that there is only limited use of the wind farm site by indigenous birds, and that the available habitat is not particularly suitable for those bird species that are considered threatened^v. Although New Zealand falcon, kaka, kereru (wood pigeon), and bats are known from the surrounding area, the Ecology assessment concluded that they are probably only sporadic visitors to the locations of the proposed turbines. Notwithstanding that assessment, Windflow has agreed to a recommendation that bird and bat monitoring should take place post-commissioning, to detect if there are any blade-strike issues.

The ecology assessment had specific regard to the existence of the Karori Wildlife Sanctuary and other nearby forest remnants, which host a range of rare or threatened species. The assessment also had regard to the Outer Green Belt Management Plan, which identifies the main ridge between the Landfill and the wind farm site as a “secondary linkage”. The finding of the ecology assessment is that *“given the current lack of suitable habitat for all of these species immediately around the proposed turbine sites it is unlikely that these species will be at risk. ... Overall the risk to threatened avian species is considered to be minor”*.

^v Threatened in the general sense of being rare, rather than by the potential existence of a wind farm

The ecology assessment recommends that some specific rock outcrops be avoided in order to conserve lizard habitat. The project's Civil engineers have confirmed that this outcome can be achieved by detailed design during the micro-siting of turbines, crane pads, and access tracks. Based on the ecology recommendations, Windflow will make use of speargrass (*Aciphylla squarrosa*) at appropriate sites during revegetation, to provide habitat for the speargrass weevil.

Browsing by goats was identified as a potential threat to the success of revegetation efforts following construction. Windflow will therefore investigate opportunities with the Regional and City councils, and the landowner, to reduce goat numbers within the wind farm.

The ecology assessment also took into account the upgraded and new electricity routes that will be needed to connect the wind farm to the local Wellington network. With regard to the existing Karori route which will be upgraded, the ecology report noted that flying fauna (birds and bats) are unlikely to be adversely affected as similar poles and wires already exist. The effects of the electricity line upgrade are considered to be "very minor". With regard to the proposed new Landfill electricity route, the ecology report notes that parts of the route comprise regenerating native vegetation. For that reason, some ecological sensitivity and long term foresight are considered necessary in terms of line and pole placement. Provided that such care is taken, the ecology assessment is that the impacts of the Landfill electricity route will be "minor".

Some turbine locations may need to be adjusted slightly during the construction process (see section 9.1 above). In terms of ecology effects, the potential effects of changes in location are considered minor. The ecology investigation covered the ground within a 25 metre radius of each turbine position, and few of the sites are considered to have ecological restrictions.

With regard to the potential effects of construction works, the ecology assessment found that *"there will be few and only minor construction effects in relation to ecology"*; *"if sediment run-off is adequately managed then road improvement and access track formation is likely to have minor adverse effects"*; and *"the overall ecological impacts from the construction works are considered to be very minor"*.

9.7 Geotechnical

An assessment of geotechnical engineering related issues was carried out by Aurecon New Zealand Limited (engineering consultants). The full geotechnical engineering report is attached as Appendix I.

The Geotechnical assessment was undertaken early in the overall programme of environmental investigations related to the wind farm site. The findings of the Geotechnical assessment were then able to be fed into the later Civil engineering assessment. As an example, the Geotechnical assessment recommends parameters related to the slope of cut and fill batters that will eventually be the subject of detailed Civil engineering design.

The Geotechnical assessment of the proposed turbine locations, and the site generally, concluded that ground conditions are suitable for either piled or pad foundations. Windflow prefers (and is proposing) the use of pile foundations as they are less costly than pad foundations and have the benefit of minimising the likely area of ground disturbance.

The geotechnical assessment also took into account the potential for erosion risk at the site, based on the types of soils and the slopes of the areas likely to be disturbed by the wind farm construction works. The assessment's overall conclusion is that *"there are no areas of the site that pose a particular erosion risk" and generally speaking there will be little silty soil near ridge tops with more expected in gullies and saddles*". Despite that general finding, the report notes various measures that should be acted on to minimise the extent of erosion, especially in newly exposed cut batters. These are standard measures, assessed as being adequate for the site conditions, and include:

- Minimising the extent of cutting (which is part of Windflow's general philosophy)
- Hydroseeding or other protection of cut faces
- Collection of run-off sediment (e.g., vegetated strips or silt fences)
- Control of overland stormwater flows (e.g., cut-off drains)

The geotechnical assessment also noted that soil conditions will generally be dry, and that soil and rock fills will require wetting to avoid the production of excessive dust.

One of the region's major earthquake fault lines runs through the middle of the site. The geotechnical assessment took earthquake risk into account but concluded that *"due to the relatively low mass of the turbines, we do not anticipate that seismic loading will cause any particular difficulties in the design of either piled or pad foundations"*.

^w The planning assessment (see section 7.1) provides extra evidence that there 'no particular' erosion risk, based on the Regional Soil Plan definition of "erosion prone land". A site plan showing erosion prone land, based on that definition, is included in Appendix A. The areas that will be subject to earthworks largely avoid such land.

9.8 Civil

An assessment of Civil engineering related issues (principally earthworks) was carried out by Aurecon New Zealand Limited (engineering consultants). The full Civil engineering report is attached as Appendix E.

As noted above, the Civil engineering assessment takes into account the findings of the geotechnical assessment. The assessment was also based on a survey of the existing farm road alignments, as the location and extent of these differ from the available aerial photography. The drawings in the civil report show the actual surveyed farm road edges, but the underlying aerial photography shows the farm roads as they were before the recent (2007) upgrades carried out by the landowner.

The existing farm road network is a significant benefit for the wind farm project. However, the farm roads were upgraded to their present standard as part of a consented but unbuilt rural-residential subdivision. Some sections of the roads have been constructed to a standard well in excess of what would be required for the wind farm development. However, not all parts of the farm roads (in terms of grade, width and alignment) are suitable for a wind farm, the construction of which involves the movement of large components.

The Civil assessment therefore addresses the work that will be necessary to bring the existing farm roads up to a suitable standard. In summarising the earthworks impacts, the civil assessment notes that *“the civil construction works to upgrade these existing tracks and provide new crane pads (with associated short access tracks as required) is relatively minor in scale”*.

The Civil report lists three key construction issues, being:

- Management of disposal of excess cut material
- Stormwater management (both temporary and permanent)
- Erosion and sediment control measures

The civil report concludes that *“employing standard engineering procedures for steep construction sites will ensure that the above issues are adequately managed both during and post construction, ensuring the effects on the environment will be no more than minor”*.

The report summarises the aspects of site earthworks which include:

- New short access track lengths, where the turbine position is not directly beside an existing farm road
- Works in the vicinity of the Hawkins Hill radar station, where the existing road alignment is constrained by various features
- The smoothing of parts of existing farm roads to ease grades or reduce vertical curves
- The development of crane pads beside each turbine
- The disposal of excess cut material

With regard to the effects of these works, the civil assessment describes them as “relatively minor”. As an example, the earthworks for crane pad construction range from negligible up to 300m³, with an average of around 100m³ per pad. The total

volume of all earthworks for the project is estimated at between 7,500m³ to 10,000m³. For an indication of the relatively small size of this volume of earthworks, see Table 9 on page 71.

Around 75% (6,000m³) of the total volume will be unsuitable for other on-site wind farm construction purposes and will need to be disposed of elsewhere on site. The Civil assessment therefore identifies a number of specific disposal locations within Long Gully Station – including one at the northern end of the old airstrip which on its own could accommodate over 7,500m³. There is therefore ample opportunity within the property for disposing of excess cut material.

All of the proposed earthworks, including cuts, fills, and the disposal of excess materials, must have regard to potential environmental effects. The civil assessment lists four broad parameters that should be applied to all earthworks on the site, which are the need to:

1. Reflect the existing scale and topography of the site.
2. Ensure rock outcrops or significant natural features or vegetation are avoided and not buried or otherwise destroyed.
3. Ensure the surface compaction is suitable to establish and support regrassing or other vegetation as necessary.
4. Ensure all stormwater control requirements and erosion control measures will be met.

The project's Civil engineer, Ecologist and Landscape Architect have conferred on parameters 1 - 3, and it is clear that positive outcomes can be achieved during the detailed design stage. With regard to the fourth parameter, Windflow proposes to address the issues through the development of an Erosion and Sediment Control Plan (ESCP) which will be prepared prior to construction. The ESCP will address minimisation of overland stormwater flows, and the treatment of any potentially sediment laden run-off. Control of sediment runoff will be especially important in areas such as Turbines 1 to 10, which lie on the boundary of the Waipapa Stream catchment. This catchment was identified as regionally significant by the draft Regional Policy Statement (RPS), but is not identified by the proposed RPS.

The report notes that regard has been given to the recreation use that is often made of the Long Gully site; that access being through prior permission from the landowner. Recreation access will only need to be curtailed at particular times for safety reasons, for example, during peaks in the number of concrete truck movements.

The Civil assessment is effectively a 'worst case' scenario. Detailed design during the micro-siting process (see section 9.1) provides the potential to reduce earthwork volumes and minimise potential adverse effects. It is only when the micro-siting process is in train that the fine details of stormwater control can be accurately addressed. An ESCP, prepared at the micro-siting stage, is therefore the most logical means of providing relevant details to the consent authorities.

9.9 Traffic

An assessment of traffic / transport related issues was carried out by Traffic Concepts Limited (traffic engineering consultants). The full traffic report is attached as Appendix F.

The Traffic assessment included an examination of alternative routes for construction traffic (including the turbine components) accessing the wind farm site. Possible routes included one via Landfill Road (off Ohiro Road) and another via South Karori Road. However, the most appropriate route was considered to be via Brooklyn Hill Road / Todman Street / the southern part of Mitchell Street / Karepa Street / Ashton Fitchett Drive. There is no need for widening works on any of the public roads.

The route was subjected to practical testing, with the size of truck (a semi-trailer) that would be used in delivery of the largest turbine components to the site being driven along it. This test demonstrated that, with appropriate management, even the tightest intersection (Todman Street / Mitchell Street) is capable of being negotiated by the delivery vehicles. The Traffic assessment concluded that all of the roads used in accessing the site have sufficient capacity to accommodate the proposed construction traffic as well as the existing traffic flows. Although the Todman Street / Mitchell Street intersection is a hairpin bend, it can still be negotiated by semi trailers without the need to remove any legal parking.

As a result of the on vehicle route testing, the Traffic assessment recommends various mitigation measures. These measures, which Windflow will implement, include the preparation of a traffic management plan to minimise any disruption that might be caused to other road users during the construction phase of the project. Another important measure will be the use of pilot vehicles to accompany the larger deliveries, which will only be via the Todman Street, Mitchell Street (south), Karepa Street route. However, smaller vehicles (those that do not require accompanying pilot vehicles) may also use the alternate Apuka Street route.

The Traffic assessment calculates delivery of components to the site would require around 100 semi-trailer truck loads (which equals 200 trips – being one in and one out). In addition there would be around 100 loads of concrete delivered, and the occasional trip by another large vehicle, such as a crane or earthmoving equipment transporter.

Over the life of the construction project, the predicted vehicle flows add would on average be 2 to 3.5 vehicles per day (4 – 7 trips per day).

Potentially sensitive land uses along the route were assessed, such as the Brooklyn Kindergarten on Todman Street. The Traffic assessment concludes that there would be no effects on traffic safety.

The overall conclusion of the Traffic assessment is that *“the transport arrangements for the turbines are expected to work safely and efficiently with minimum disruption to existing road users. Accordingly no adverse traffic effects are expected to arise from the proposed development”*.

9.10 Radiocommunications

An assessment of radiocommunication related issues was carried out by Kordia (radiocommunication consultants). The full radiocommunication report is attached as Appendix G.

The report identifies that effects will either not occur, or are capable of being either avoided or overcome if they do occur. The assessment has formed the basis for discussion with Vodafone, and KiwiRail (formerly Ontrack), both of which are operators of communications equipment in the vicinity.

In addition to the work carried out by Kordia, Windflow has undertaken direct consultation with Airways Corporation and MetService regarding their respective aircraft and weather radar systems. The layout of the wind farm has deliberately been kept more than 500 metres from the Hawkins Hill radar station as a first step in avoiding any effects on the aircraft radar operated by Airways Corporation.

Windflow and Airways Corporation are continuing to discuss and investigate the potential for effects, which may ultimately need to be tested in the field when the turbines are being installed. Windflow and the Airways Corporation have agreed they are able to reach agreement on a protocol that will avoid any potential effects on the Hawkins Hill radar. Part of the protocol is likely to include an agreement about staging construction.

Similarly, Windflow and MetService will agree on measures necessary to protect the functioning of the weather radar at Outlook Hill.

9.11 Cultural heritage and archaeology

An assessment of cultural heritage related issues was carried out by Raukura Consultants (cultural heritage consultants). The assessment was endorsed by the Wellington Tenth Trust and the Port Nicholson Block Settlement Trust, and the full report is attached as Appendix H. The report identifies that an archaeological study is not required.

The cultural heritage assessment examined the Maori history of occupation and use in the vicinity of the proposed wind farm. Although the report notes that *“there are few early sites of significance to Māori, within the actual wind farm site (or even the Long Gully property)”*, consideration was given to the potential effects on sites that do exist. The assessment had regard to potential effects such as sediment runoff affecting water quality, scarring of the landscape through earthworks, and the visual impact of the turbines themselves. An overall conclusion of the report is that:

“As all the kāinga / village sites are outside the scheme area and will not be affected by site roading there should not be any effects on them from the scheme. Generally the village sites and other cultural sites (e.g. those listed as archaeological sites) are not visited by Māori today and the impacts on these sites including visual impacts are limited.”

Notwithstanding that general conclusion, the report notes the general need to avoid or minimise adverse environmental effects.

Windflow will negotiate with the Wellington Tenth Trust an accidental discovery protocol to manage any discovery of possible Maori cultural material and archaeological material on the site.

9.12 Recreation

Long Gully Station, its surrounding ridges, and the adjoining coastline are valued by the general public and organised clubs for a variety of recreation uses. Mountain biking, walking, four-wheel driving and orienteering are just a few of the organised or casual activities that take place in the area. With regard to the use of Long Gully Station itself, public access is by arrangement with, or at the invitation of, the landowner.

An example of such an arrangement is with the Wellington Mountain Bike Club. Club members have key access to the locked gates that control entry to Long Gully Station, and have constructed the club-run "Long Gully Downhill Park". Windflow has had initial discussions with the Wellington Mountain Bike Club regarding the club's activities and the potential impacts arising from wind farm construction. The Wellington Mountain Bike Club's downhill courses terminate at the main Long Gully valley bottom road. As this road will be used by various vehicles during construction, the safety of club bikers will need to be addressed.

Although recreation use of Long Gully Station itself is controlled, recreation on the surrounding land is not. Bikers and walkers frequently use the Hawkins Hill ridgeline road, including a route from Brooklyn, along the ridge, and down to Red Rocks. General public safety during the construction period is a potential issue, given the need for construction vehicles to traverse much the same routes as recreational users of the area.

Windflow proposes that the construction management plan prepared for the project should address on-site and off-site safety issues specific to recreation users.

Post-construction, the situation regarding recreation access to Long Gully Station will remain as at present. That is, the landowner will maintain control of visitors to the site. Therefore, by invitation or prior arrangement with the landowner, recreational users of the land will be able to traverse the farm roads that pass beside the wind turbines.

9.13 Cumulative effects

The assessment of cumulative effects has been addressed by the acoustic, and landscape and visual assessments (Appendices C and B respectively). As noted elsewhere in this AEE, the conclusions of both assessments are that cumulative effects will be no more than minor. These assessments are based on modelling of predicted wind turbine sound, and on modelling of visibility and the assessment of photosimulations.

9.14 Physical effects comparison (Mill Creek v Long Gully)

Wellington City has seen two previous applications for wind farms – the West Wind and Mill Creek projects, both of which have been granted consent. To help understand the difference in scale and effect between Long Gully and these other projects, the following table sets out a comparison between Long Gully and Mill Creek, in terms of some of those projects’ physical attributes. Mill Creek has been used in preference to West Wind, as the number of turbines consented for Mill Creek (29) is far closer to the 25 proposed for Long Gully – as compared with the 66 turbines being erected at West Wind.

Table 9 below sets out some basic comparisons between the Long Gully and Mill Creek wind farms. Of particular note is the scale of the earthworks involved. Long Gully’s earthworks will be about 1% - 2.5% of the volumes proposed for Mill Creek. This outcome is largely due to the fact that existing consented farm roads can be used at Long Gully, with only relatively minor modifications. The difference in the work associated with erecting each turbine is also demonstrated by the volume of concrete required for foundations. The volume of concrete likely to be used at Long Gully is about 9% of that proposed for Mill Creek.

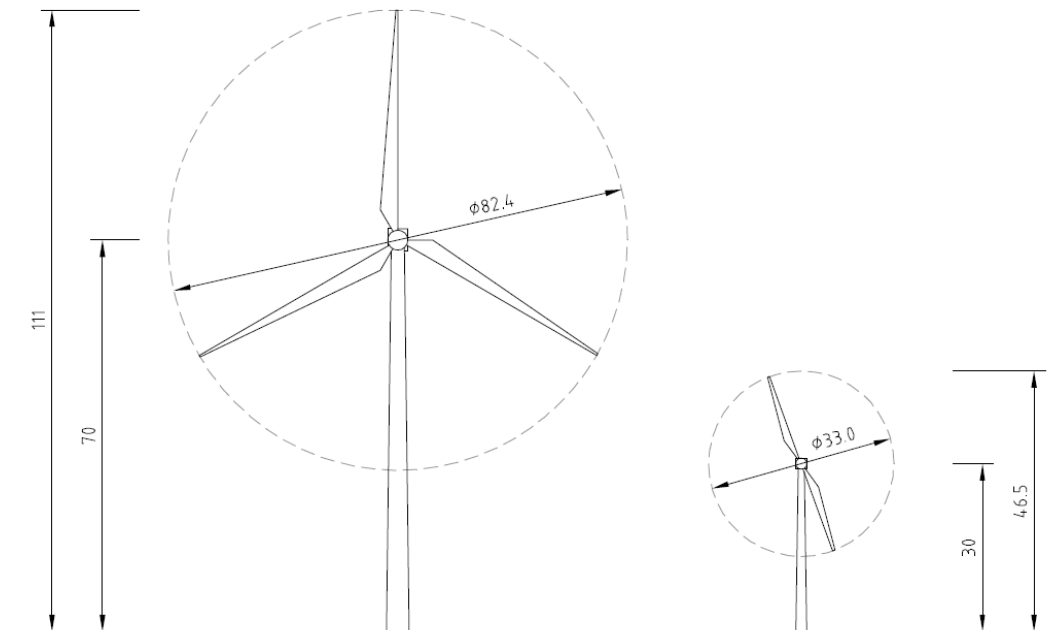


Figure 12 - Dimensions of Mill Creek and Long Gully wind turbines

Table 9 - Comparison of Mill Creek and Long Gully wind farms

Attribute	Mill Creek^x	Long Gully
Number of wind turbines	29	25
Total wind farm capacity	66.7MW	12.5MW
Type	Siemens	Windflow 500
Colour	Light grey	"Jungle mist" (light blue / grey)
Individual capacity	2.3MW	500 kW (0.5MW)
Number of blades	3	2
Rotor diameter	82.4 m	33.2 m
Tower type	tubular	tubular
Height of tower	67 m	29 m
Height from ground to top of rotor (when vertical)	111 m	46m
Aeronautical warning lights	Required by CAA regulations	Not required
Foundation base	16 m diameter	2.4m diameter
Foundation type	Gravity pad or rock anchor	7m – 10m deep pile
Substation	One large substation	Three small ring main units
Transformer	4.5m long, 3m wide and 2.5 m tall	1.5m long, 1.51m wide and 1.42m tall
Potential turbine re-positioning during micro-siting	Up to 100m	Up to 20m
Project footprint (post construction)	14 hectares	0.12 hectares
Total project earthworks	761,800m ³	7,500m ³ – 10,000 m ³
Excavation depth	1.5-3m for flat terrain 6.5m for undulating terrain	Batters up to 2m – 3m high
Earthworks required for roading	Batters up to 20m in height	Batters up to 2m – 3m high
Estimated vegetation clearance	44.28 hectares	0.57 hectares
Stream Crossings	2 x perennial streams 22 x ephemeral streams	None
Construction time	18 months	5 months
Crane pad / erection platform	40 m x 20 m – 40 m x 25 m	20m x 7m
Amount of concrete per foundation	400m ³ Total = 11,600m ³	30m ³ - 45m ³ Total = up to 1,125m ³
Length and width of access track construction	19 km long and 5-7m wide	Largely existing. Some modifications to achieve 3m – 5m width
Length of truck to transport	Overlength and overweight	Standard Trucks
Concrete batching plant	Yes	No
Laydown area	Yes	No

^x Source: Project Mill Creek Consent Application , Meridian Energy, April 2008; and subsequent decision of Wellington City Council

10. Consultation

10.1 Summary of consultation undertaken

Consultation for the Long Gully wind farm project has been carried out by Windflow, MRP, and the specialist consultants. A consultation strategy and consultation action plan were developed to structure the process, and to ensure that consultation was effective and able to capture the wider community reaction and provide feedback to the project.

The primary objective of the consultation process prior to lodgement of the resource consent application was to inform the community and to collect community views and opinions in order to achieve a better project. It was recognised that it was important that interested parties and the wider community were provided with the information necessary to understand the rationale for the wind farm proposed for Long Gully. The following is an outline of the objectives for consultation:

- brief relevant parties on the nature, scale and proposed location of the wind farm
- distribute possible effects of the proposal and options to avoid, remedy, or mitigate effects with affected parties and obtain feedback
- provide the wider community with an opportunity to air its views and to ask questions
- explain clearly to the community the timeframe and process for consultation
- identify possible methods of avoiding, remedying or mitigating adverse effects and provide feedback

Long Gully website (www.longgully.co.nz) was made publicly accessible from 3 November 2008. This website is continually updated with relevant information and a forum available for the public to make comments and respond. Phone and fax numbers, email and mail addresses were also made available.

Windflow and its partner Mighty River Power recognise the importance of consultation as a process not only to inform potentially interested parties and the wider community about the project, but also to seek responses and feedback.

A range of consultation methods have been implemented, and are outlined in more detail below. However, it is recognised that consultation is an ongoing process and will continue well after the lodgement of the consent application.

10.2 Public open evenings

Two project information evenings were held with displays in Karori and Brooklyn in mid-November to introduce the project and give the public an opportunity to learn about the proposal, ask questions and provide feedback.

The information evenings were publicised widely to the general public in Wellington through news media, posters, websites, email groups and other media. Approximately 10 members of the project team were present at each venue to discuss the project with the wider community and answer any questions.

The displays included:

- project overview
- location and layout map
- visual and landscape assessment (access to view preliminary photo simulations from representative viewpoints)
- environmental sound assessment
- ecological and environmental issues
- earthworks assessment
- traffic assessment
- recreational use assessment
- information on *Windflow 500* turbine

Brochures were available, which gave an outline of the proposal and preliminary results of the assessment of effects to date. Response forms were also available for filling out or returning at a later date. Approximately 17 comment forms were received as a result of the evenings.

A point of contact was provided to the community, as well as details of the Long Gully wind farm website, where information was continually updated.

Brooklyn meeting outcomes

- Approximately 40 residents attended.
- Comments mostly positive towards smaller scale development and turbines
- Main areas of interest:
 - recreational use/access
 - traffic implications in Brooklyn
 - effect on birds at Karori Wildlife Sanctuary
 - power line type and locations
 - noise
 - construction timing and effects
- Concerns raised via feedback forms submitted on evening (7)
 - noise – direct/indirect
 - view obstruction to neighbouring properties
 - seismic anchoring/fault line
 - location
 - access to site
 - interest in investing and taking power off

Karori meeting outcomes

- Approximately 60 residents attended.
- Several landowners at the end of South Karori Road expressed concern about another wind farm near them. Mainly interested in the specific visual and sound effects that they may experience from their properties, particularly from northern string of up to 10 turbines.
- Other comments mostly positive towards smaller scale development and turbines (appropriate scale, minimal negative impact).
- Main areas of interest were:
 - recreational access
 - views
 - sound effects
 - effect on wildlife and Karori Sanctuary
 - effect of construction runoff into streams/new marine reserve
 - power line type and locations
- No concerns were raised via feedback from three forms submitted at meeting.
- Subsequent comments received from general public:
 - 8 comment forms as of 1 December 2008
 - 1 email

10.3 Specific stakeholder consultation

Ongoing consultation has occurred with the landowner, Long Gully Trust and agreements are completed.

Neighbouring landowners

Windflow and Mighty River Power have been working with nearby residents to identify their concerns and possible mitigation measures. The adjoining landowners have been provided information on whether the turbines will be visible or heard from neighbouring properties. Background sound measurements were taken from some of these adjoining properties.

The neighbouring properties include:

- The Castle
- Kinnoull Station
- South Karori Road residents
- Wellington Natural Heritage
- Civil Aviation Authority/Airways

A follow up meeting to the open evenings was held on 9th December 2008 with the Project Manager, Landscape and Acoustic Consultant, attended by approximately 15 South Karori residents. As a result some background sound measurements were carried out at a South Karori property, and photo simulation (from South Karori Road) was produced.

Iwi

Wellington City Council advised that the Wellington Tenth Trust and Te Runanga o Toa Rangatira Inc were the relevant iwi to consult with as part of the consultation process. Windflow has consulted with the Wellington Tenth Trust and Te Runanga o Toa Rangatira Inc to determine whether or not there are sites or matters of interest to tangata whenua arising from this application.

An outcome of the consultation was to commission the Wellington Tenth Trust to prepare a cultural effects assessment (see section 9.11 and Appendix H). The assessment has been subsequently discussed with Te Runanga o Toa Rangatira.

Department of Conservation

Windflow and Aurecon staff met with Department of Conservation (DoC) staff on 4 September 2008 to introduce the wind farm project and discuss the interests that DoC has in the site and area. DoC responded that their primary interests were to ensure that there were appropriate levels of information in the application to assist decision makers in making informed decisions.

Relevant information included:

- Avifauna (resident, migratory and visiting – this would include future likely population spill-over from the Sanctuary as it develops)
- Terrestrial fauna present in Long Gully
- Aquatic fauna present in water bodies in Long Gully
- Flora present in Long Gully
- Mechanisms to avoid, remedy and mitigate any adverse impacts on these values.

Also, the ecology consultant completed a site visit to Long Gully with a lizard specialist from the Department of Conservation in mid November 2008. No lizards or signs of lizards were found. A follow up meeting was held in April 2009 with Windflow's project manager and ecology consultant, to discuss the findings of the ecology assessment.

Karori Wildlife Sanctuary

Windflow and Aurecon staff met with Karori Wildlife Sanctuary representatives in mid-August to discuss the project and potential interests and concerns.

In addition, the ecology consultant undertook a site visit with Raewyn Epton and Neil Anderson from Karori Wildlife Sanctuary in late November 2008 to assess the potential effects of the wind farm on the Sanctuary. It is noted that the Sanctuary has a 500 year plan to connect the Sanctuary to the study area and other forest remnants, but the state of the vegetation and lack of habitat at present means that overall the risk to endangered avian species is considered to be minor. A follow up meeting was held in April 2009 with Windflow's project manager and ecology consultant, to discuss the findings of the ecology assessment.

Airways Corporation

Windflow has undertaken consultation with the Airways Corporation, which has predominately involved an exchange of information. Windflow have obtained an understanding of how the Airways radar works and the potential impact the turbines could have on the radar. Discussions have also revolved around possible mitigation measures should there be any issues regarding radar interference. Airways

Corporation has also sought information about construction access occurring via the right of way through the radar dome site, and the potential effects of physical improvements that may be required to that access.

As a result, Windflow and the Airways Corporation will reach agreement on a protocol that will avoid any potential effects on operation of the Hawkins Hill radar, and minimise any effects related to construction access through the radar dome site.

Local authorities

The Wellington City Council and Greater Wellington Regional Council were informed about the project prior to lodgement and were taken on a site visit to the Long Gully site and shown the proposed sites for turbines.

Others

Windflow and Mighty River Power have consulted with other stakeholders as part of the project, including:

- Wellington Mountain Bike Club
- Vector / United Networks
- Vodafone
- Ontrack (now KiwiRail)
- Meteorological Service
- Historic Places Trust
- Wellington Natural Heritage Trust
- Airways Corporation

11. Conclusions

Windflow is seeking consent for a development that balances:

- the operational needs of the wind farm;
- environmental effects; and
- construction limitations related to the physical features of the site.

Under the district plan the proposed wind farm is classed as a discretionary activity (unrestricted) which requires the application to be considered under section 104 subject to Part 2 of the RMA. The matters to be considered under section 104 include:

- Any actual and potential effects on the environment
- Any relevant provisions of a National Policy Statement, the New Zealand Coastal Policy Statement, a Regional Policy Statement or Proposed Regional Policy Statement, a Plan or Proposed Plan
- Any other matters the consent authority considers relevant and reasonably necessary to determine the application
- Matters under Part 2 of the Resource Management Act

Actual and potential effects on the environment have been addressed in sections 9, 8.2, 8.3, and 8.4 in this AEE, as well as the relevant specialist assessments attached as appendices.

Having regard to the matters directly addressed by this application, as well as the general scheme of the RMA, the conclusion of this assessment is that the effects of the proposed project are not significantly adverse.

On the contrary, the positive benefits of distributed generation, producing renewable energy, can be considered as strong reasons for granting consent.