East Durham Wind Energy Centre

FINAL Noise Assessment

December 10, 2013

Prepared for:
NextEra Energy Canada, ULC
390 Bay St., Suite 1720
Toronto, ON M5H 2Y2

Prepared by:
GENIVAR Inc.
600 Cochrane Drive, 5th Floor
Markham, Ontario L3R 5K3

Project No.: 111-15446-00

GENIVAR

111-15446-00

December 10, 2013

Director of Environmental Assessment and Approvals Branch
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, ON M4V 1L5

Re: East Durham Wind Energy Centre
Noise Study Report

Dear Sirs:

Please find, attached, a copy of Noise Study Report carried out for the East Durham Wind Energy Centre to be located within the Municipality of West Grey, Grey County, Ontario.

If you have any question, please, feel free to contact Bhuwan at 905-475-7270 ext. 18384/ bhuwan.prasad@genivar.com or Pat at 416-529-3613/ pat.becker@genivar.com.

Yours truly,
GENIVAR Inc.

Bhuwan M. Prasad, P. Eng.
Environmental Engineer

Patricia Becker, M.E.S.
Project Manager

/bp
Enclosure

cc: Adam Rickel, NextEra Energy Canada, ULC, 390 Bay St., Suite 1720, Toronto, ON M5H 2Y2

600 Cochrane Drive, Suite 500, Markham, Ontario L3R 5K3
Telephone: 905.475.7270 • Fax: 905.475.5994 • www.genivar.com

Executive Summary

East Durham Wind, Inc., a wholly owned subsidiary of NextEra Energy Canada, ULC (NextEra), is proposing to construct a Class 4 wind energy project in the Municipality of West Grey, Grey County, Ontario. The Project will be referred to as the East Durham Wind Energy Centre (the "Project") and will be located on private lands located east of the Community of Durham and west of the Village of Priceville.

The Project will be owned and operated by East Durham Wind, Inc., a subsidiary of NextEra. NextEra's parent company is NextEra Energy Resources, LLC, a global leader in wind energy generation with a current operating portfolio of over 100 wind energy projects in North America.

Although NextEra is seeking to permit sixteen (16) wind turbine locations, up to a total of fourteen (14) GE turbines are proposed to be constructed comprising of a combination of twelve (12) to fourteen (14) GE 1.6-100 LNTE turbines, one (1) GE 1.39-100 LNTE turbine (T2) and one (1) GE 1.34-100 LNTE turbine (T6) for a maximum nameplate capacity of up to 23 MW and will also include one (1) transformer substation. The upwind, 3-bladed, horizontal-axis wind turbines will each have a hub height of 80 m and rotor diameter of 100 m. The Facility will convert wind energy into electricity to be fed into the Hydro One distribution system.

Sound generation and propagation from the proposed 23 MW East Durham Wind Energy Centre has been modelled for the worst case scenario in accordance with the Ontario Ministry of the Environment (MOE) publication entitled, "*Noise Guidelines for Wind Farms: Interpretation for Applying MOE NPC Publications to Wind Power Generation Facilities*", October 2008. The noise assessment results show that the worst case sound exposures at all non-participating points of reception (including dwellings and vacant lots) in the project area will comply with the applicable MOE wind noise guideline criteria.

The noise modelling has been performed for the worst-case scenario which assumes the highest sound power level from each wind turbine and concurrent propagation of noise from each wind turbine to each point of reception compared with the lowest MOE Class 3 sound level criterion of 40.0 dBA. This assumption means that the calculated noise impact on receptors located between two groups of turbines is higher than what would be observed under real operating conditions. Receptors located between two groups of turbines would never be downwind of all turbines concurrently, therefore, the actual noise impact on these receptors would be less than that indicated for the worst case scenario.

The environmental noise produced by the proposed East Durham Wind Centre turbines and transformer substation will be compliant with the applicable MOE environmental noise guidelines at all Points of Reception.

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1. Introduction and Facility Description

East Durham Wind, Inc., a wholly owned subsidiary of NextEra Energy Canada, ULC (NextEra), is proposing to construct a Class 4 wind energy project in the Municipality of West Grey, Grey County, Ontario. The Project will be referred to as the East Durham Wind Energy Centre and will be located on private lands located east of the Community of Durham and west of the Village of Priceville.

The purpose of this report is to assess and document the potential environmental noise impact of the proposed Class 4 East Durham Wind Energy Centre (Facility) in the area of Municipality of West Grey, Grey County, Ontario on neighbouring land uses that are considered noise sensitive.

The Project will be owned and operated by East Durham Wind, Inc., a subsidiary of NextEra. NextEra's parent company is NextEra Energy Resources, LLC, a global leader in wind energy generation with a current operating portfolio of over 100 wind energy projects in North America. Wind farms currently owned and operated by NextEra Energy Canada include: Mount Copper (54 MW) and Mount Miller (54 MW) located in Murdochville, Quebec; Pubnico Point, (30.6 MW) located near Yarmouth, Nova Scotia; Ghost Pine (82 MW) located in Kneehill County, Alberta; and Summerhaven (124.4 MW) and Conestogo (22.9 MW) in Haldimand and Wellington Counties, Ontario, respectively.

This facility will convert wind energy into electricity to be fed into the Hydro One grid. The wind turbine technology proposed for the Project is the GE model wind turbine. The Project has a maximum nameplate capacity of up to 23 megawatts (MW) and is categorized as a Class 4 facility. Although NextEra is seeking to permit 16 turbine locations, up to a total of 14 turbines are proposed to be constructed for the Project together with one (1) transformer substation. The following 16 turbines would be permitted:

- Fourteen (14) GE 1.6-100 LNTE turbines (rated at 1.62 MW)
- One (1) GE 1.39-100 LNTE turbine (rated at 1.39 MW) which is designated as Turbine T2
- One (1) GE 1.34 LNTE turbine (rated at 1.34 MW) which is designated as Turbine T6

The UTM coordinates for each model of turbine are provided for all sixteen turbines and this will not change regardless of which turbines are constructed. The decision on which 14 turbines will be constructed has not been made. The final nameplate capacity will depend on which turbine locations are constructed.

This study is part of the Renewable Energy Approvals (REA) process and ultimately is included in the formal REA application. This report has been prepared in accordance with the MOE document entitled "*Noise Guidelines for Wind Farms – Interpretation for Applying MOE NPC Publications to Wind Power Generation Facilities*" (October 2008, PIBS 4709e). The noise analysis has been conducted for the combined impact of both the wind turbines and the transformer substation.

2. Project Layout

The Project is located in Grey County, east of Durham and west of Priceville in south-western Ontario on private lands with lease arrangements. The Study Area for the Project is located in the Municipality of West Grey, Grey County. Figure 2-1 as provided in Attachment A shows the general Project Boundary (Study Area) of the Project. The Project Boundary is generally bounded by:

- Concession Road 6 to the north
- Sideroad 40, Townline Artemesia-Glenelg and Sideroad 50 to the east
- West Grey – Southgate municipal boundary to the south
- Baseline to the west

The following coordinates (in UTM NAD 83, Zone 17N coordinate system) define the extremities of the Study Area for the Project:

Study Area Corner	Easting	Northing
North-west	517446.0	4898788.0
North-east	528740.2	4899612.1
South-east	529409.0	4890833.0
South-west	519266.3	4889235.1

The defined Project Boundary, presented in Figure 2-1, covers approximately 10,050 hectares east of the community of Durham. The typical "footprint" of land used is approximately 0.6 hectares per turbine. The actual area occupied by turbines, roads, construction, laydown area and transformer station for the Project is approximately 20 hectares in total. Most of the land in this area is rural farmland with some wooded areas and aggregate extraction areas.

In addition, the turbines, associated infrastructure and substation will be located on privately owned farmland as shown in Figure 2-1 in Attachment A. The legal descriptions of the parcels of land that will host the Project were provided in the final REA application. The property owners have signed lease option agreements with NextEra to host infrastructure on their properties for the Project (these are identified as participating receptors on Figure 2-1). In addition, electrical collection lines will be located in municipal road right of ways which will require a separate agreement with the host municipality.

The proposed Project schedule sets the commercial operation date in May 2014.

The zoning of the relevant land within the project area is agricultural. The lands are mainly rural and used for agricultural purposes. The land use map for the project area is shown on Figure C1 in Attachment C. For the purpose of the noise analysis, the project has been defined as a Class 3 area (rural).

There are no other operating or approved wind farms or wind farms pending review by the MOE within 5 km of any turbine generator of the proposed East Durham wind farm. There are numerous wind farms (operating, approved or pending review by the MOE) that are greater than 15 km from the proposed East Durham wind farm. Some examples of these wind farms include Melancthon (Phases I and II), Dufferin Wind Farm, Skyway 126 Wind Energy, Grand Valley Wind Farms (Phases 1, 2 and 3), Grey Highlands Clean Energy Wind Project and the Grey Highland Zero Emission People Wind Farm.

3. Project Information

3.1 Facility Components

Wind turbines produce electricity by converting the kinetic energy in the wind into a mechanical rotation of a generator. The major components of the Project are as follows:

- Up to 16 GE model wind turbines permitted with 14 turbines constructed that are some combination of 12 to 14 GE 1.6-100 (1.62 MW), one GE 1.34-100 (1.34 MW) (T6) and one GE 1.39-100 (1.39 MW) (T2) wind turbine generator locations and pad mounted step-up transformers are proposed for permitting (a maximum of 14 turbines will ultimately be constructed);
- Turbine laydown and storage areas (including temporary staging areas, crane pads and turnaround areas surrounding each wind turbine);
- Construction laydown area (including staging areas for construction materials, construction trailers and associated facilities and a temporary electrical service line to provide power to the construction trailers);
- Approximately 28.3 km of 34.5 kV underground electrical collection lines and ancillary equipment (e.g., above ground electrical junction boxes) to connect the turbines to the proposed transformer substation;

- Pad mounted 690 V/ 34.5 kV step up transformers located at or near the base of each turbine;
- A transformer substation to connect to the Hydro One distribution system;
- Overhead 44 kV line to connect the transformer substation to the Hydro One electrical grid;
- Approximately 13.8 km of turbine access roads;
- An operations and maintenance building (located outside the project location and already constructed and in use by the Conestogo Wind Energy Centre); and
- 1 to 2 meteorological towers.

3.1.1 Turbine Specifications

As stated in an earlier section, the wind turbine technology proposed for this Project for a total maximum nameplate capacity of up to 23 MW is as follows:

The following 16 turbines would be permitted with only fourteen (14) turbines to be constructed:

- Fourteen (14) GE 1.6-100 LNTE turbines (rated at 1.62 MW) which are designated as Turbines T1, T3 to T5, T7, T8, and T10 to T17
- One (1) GE 1.39-100 LNTE turbine (rated at 1.39 MW) which is designated as Turbine T2
- One (1) GE 1.34 LNTE turbine (rated at 1.34 MW) which is designated as Turbine T6

(Note: there is no Turbine T9)

The GE model wind turbines are 3-bladed, upwind, horizontal-axis wind turbines that are state of the art technology. The turbines have a 100 m rotor diameter with a swept area of 7,854 m^2; each blade is connected to the main shaft via the hub. The nacelle houses the main components of the wind turbine such as the rotor shaft, gear box, couplings, control panel, bearing brackets and the generator. The nacelle is equipped with sound-proofing, is ventilated and the interior is illuminated with electric lights. Some of the wind turbines will have external lighting in accordance with the requirements of Transport Canada.

The turbine is mounted on an 80 m tubular steel tower which contains an internal ladder provided for maintenance access. The turbine will be constructed on a foundation that is approximately 400 m^2. The foundation consists of a wooden frame, poured concrete and steel rebar to provide added strength.

The nacelle (located at the top of the tower) houses the main components of the wind turbine such as the rotor shaft, gear box, couplings, control panel, bearing brackets and the generator. The nacelle is equipped with sound-proofing, is ventilated and the interior is illuminated with electric lights.

A summary of the turbine specifications of the GE model wind turbine that will be used for the Project is as follows:

Table 3-1 Summary of Wind Turbine Technical Specifications

Specification	Turbine-A	Turbine-B	Turbine-C
Make	General Electric	General Electric	General Electric
Model	1.6-100 LNTE	1.39-100 LNTE	1.34-100 LNTE
Name Plate Capacity	1.62 MW	1.39 MW	1.34 MW
Hub Height	80 m	80 m	80 m
Rotor Diameter	100 m	100 m	100 m
Minimum Rotational Speed	9.75 rpm	9.75 rpm	9.75 rpm

Specification	Turbine-A	Turbine-B	Turbine-C
Maximum Rotational Speed	15.33 rpm	13.2 rpm	12.8 rpm
Sound Power Level	103 dBA	101 dBA	100 dBA

No supplementary fuel sources will be used to generate electricity.

3.1.2 Electrical System

Electricity will be generated at approximately 690 V at the turbine and will step up to a local 44 kV collection system through a pad-mounted transformer located at each turbine and equipped with anti-vandalism protection. The approximate dimensions of these transformers are 2.5 metres in length and width, and 2 metres high. The transformers are totally self-contained with no need for exterior fencing.

Direct buried cables will connect the wind turbines to the electrical substation. The buried cables will consist of three single conductor cables, with cross-linked polyethylene insulation, suitable for direct burial. To the extent possible, the underground collection lines will be constructed on private property, adjacent to the access roads.

The Project will have an electrical substation which will consist of a 34.5 kV/44 kV transformer and associated ancillary equipment. If required, a 44 kV electrical line will connect the transformer to the Hydro One distribution system using standard poles within municipal road right-of-ways. In some cases, there will be joint use poles with Project electrical lines and Hydro One electrical lines. Typically, each pole is between 13 metres and 17 metres in height.

The interconnection plan for any wind farm is subject to study, design and engineering by the Integrated Electricity System Operator which manages the province's electricity grid, Hydro One which owns the electrical lines, the local distribution company and the Ontario Energy Board, which regulates the industry through the Transmission System Code and the Distribution System Code. Details regarding the transmission lines, their routes, and the electrical substation will be developed during the Pre-Construction Design Phase of the Project.

4. MOE Noise Guidelines

4.1 Overview

The applicable noise guideline for the proposed East Durham wind farm project is the MOE's, October 2008 publication entitled, "*Noise Guidelines for Wind Farms: Interpretation for Applying MOE NPC Publications to Wind Power Generation Facilities*" (PIBS 4709e). This document establishes the sound level limits for land-based wind power generating facilities and describes the information required for noise assessments and submissions under the Environmental Assessment Act and the Environmental Protection Act.

The MOE guideline describes the various noise sources of a wind farm and provides limits for them. It defines a wind farm as a facility comprised of an array of wind turbines, located within the same area, used for the production of electric power. Large wind farms may also include a transformer substation that collects and increases the voltage produced by the turbines to the higher voltage for the grid transmission system. The MOE has set guidelines for sound level limits for three different scenarios of wind farms: (i) wind turbine generators, (ii) wind turbine generators and transformer substations, and (iii) transformer substations. Each is described in detail below.

4.2 Limits for Wind Turbine Generators

A wind turbine consists of a tower, a nacelle (hub or housing) containing the gearbox (drive-train) and generator mounted on top of the tower, and three blades that rotate around a horizontal hub protruding from the nacelle. There are two potential sources of noise: (i) aerodynamic noise due to the turbine

blades passing through the air as the hub rotates, and (ii) mechanical noise emitted by the gearbox and generator in the nacelle. Around the areas nearby the turbine, the noise typically exhibits a swishing sound as the blades rotate. However, the effect reduces as the distance from the turbine increases.

The noise limits for the wind turbine generators in the Guideline document are consistent with the MOE criteria set in the technical publications titled "*Sound Level Limits for Stationary Sources in Class 3 Areas (Rural) – Publication NPC-232*" and "*Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban) – Publication NPC-205*". The noise limits for wind turbines are based on the existing criteria for night time hours described in publications NPC-205 and NPC-232. The sound level limit for the residential receptors in a Class 3 area can be described as follows:

- For wind speeds at or below 6 m/s at a reference height of 10 m:

  The sound level limit at a Point of Reception, expressed in terms of the hourly equivalent energy sound level (Leq) is 40.0 dBA or the minimum hourly background sound level established in accordance with requirements NPC-232/NPC-233, whichever is higher.

- For wind speeds above 6 m/s at a reference height of 10 m:

  The sound level limit at a Point of Reception in a Class 3 Area (rural), under conditions of average wind speed above 6 m/s respectively, expressed in terms of the hourly equivalent energy sound level (L_{eq}), is the wind induced background sound level, expressed in terms of ninetieth percentile sound level (L_{90}) plus 7 dB, or the minimum hourly background sound level established in accordance with requirements in Publications NPC-232/NPC-233, whichever is higher.

The applicable sound levels at the receptors at integer values of the wind speeds for Class 3 areas (Rural) are provided in Table 4-1 below.

Table 4-1 Summary of Sound Level Limits for Wind Turbines (One-hour Leq, dBA)

Wind Speed (m/s) at 10 m height	4	5	6	7	8	9	10
Wind Turbine Sound Level Limits Class 3 Area (dBA)	40	40	40	43	45	49	51

4.3 Limits for Wind Turbine Generators and Transformer Substations

For projects such as East Durham where the noise impact at a Point of Reception is composed of combined contributions due to the Transformer Substation as well as the wind turbine generators, the applicable limits are those shown in Table 4-1 above. The transformer substation noise is produced by vibration of the transformer core and its associated components, and due to operation of other equipment such as cooling fans. Transformer substation noise generally exhibits a pronounced hum, associated with the fundamental electrical frequency and its harmonics and hence such noise is perceived as tonal.

Unlike noise produced by the wind turbines which are wind speed dependent, the noise from a transformer substation is independent and unrelated to the wind speed. In determining the combined impact, MOE Guidelines state to add a 5 dB adjustment for the transformer substation noise, consistent with MOE Publication NPC-104: *Sound Level Adjustments*.

4.4 Limits for Transformer Substations

In a situation where the noise impact assessment is limited to the operation of the transformer substation alone, the applicable sound levels at the receptors are in accordance with the MOE publication NPC-205 for urban areas (Class 1 & 2) or publication NPC-232 for rural areas (Class 3). The limit is independent of wind speed, however, a 5 dB adjustment has to be made to the noise emission levels to account for the tonal characteristics of the transformer substation noise as described above. The sound level limits are based on nighttime values as summarized in Table 4-2 below.

Table 4-2 Summary of Sound Level Limits for Transformer Substations

Area	Applicable NPC	Noise Level, One-hour Leq, dBA
Class 1 & 2 Area	NPC-205	45 dBA
Class 3 Area	NPC-232	40 dBA

Class 1 & 2 noise levels are presented for reference purposes only since the East Durham study area is considered Class 3, but occasionally the substation transformer is located far away from the wind farm and may potentially be in an area with a different sound level classification.

5. Receptors

Section 6.3 of the MOE's Noise Guidelines for Wind Farms states: "receptors mean Points of Reception and Participating Receptors, including vacant lots". Participating receptors are associated with the wind farm by means of a legal agreement with the property owner for the installation and operation of wind turbines or related equipment located on the property and the sound level limits stated in the Section 4 (as per Section 6.4.6 of the MOE Guideline) do not apply to these receptors. Non-participating vacant lots that have been zoned by the local municipality to permit residential or similar noise-sensitive uses are included as receptors due to their potential for residential development in the future.

All receptors within 2000 m of the proposed wind turbine locations have been considered. This included all vacant lots within 2000 m of the wind turbines and the MOE guideline for establishing receptor location within the vacant lot was used. The building permit information used to identify receptors was initially provided in July 2012. The data was reviewed in August 2013 resulting in minimal changes to the receptor layer. The final list provided in this revised noise report is based on the updated review (August 2013).

All participating receptors have agreements in place that will allow the installation and operation of the whole and/or part of the renewable energy generation facility on their lands.

For all points of reception, participating receptors and vacant lots, the receptor height was conservatively assumed to be 4.5 m above grade. For points of reception and participating receptors, the height was set at the centre of the dwelling. For vacant lots, the receptor height was set at the centre of the 1 hectare building envelope.

According to Section 6.4.1b of the MOE's Noise Guidelines for Wind Farms: "a detailed noise impact assessment of the Wind Farm including a Transformer Substation is required if one or more Points of Reception or Participating Receptors are located within 1500 m of a wind turbine generator." For the proposed East Durham wind farm, there are 11 participating receptors and 285 non-participating receptors as well as 3 participating vacant lots and 113 non-participating vacant lots in the study area within 2000 m of a wind turbine. In total, noise impacts have been evaluated at 412 sites.

5.1 Determination of Vacant Lot Receptors (VLR)

The MOE Noise Guidelines for Wind Farms states the following with regards to the location of receptors on vacant lots:

6.3.3 Vacant Lots

> *Receptors include vacant lots that have been zoned by the local municipality to permit residential or similar noise-sensitive uses, as described in the definition of a Point of Reception in Section 3.*
>
> *The receptor location, if unknown at the time of the proposal, shall be based on a 1 hectare (10,000 m²) building envelope within the vacant lot property that would reasonably be expected to contain the use, and that conforms with the*

municipal zoning by-laws in effect. The specific receptor location for assessment purposes should be assumed to be 4.5 m above grade and:

a) consistent with the typical building pattern in the area, or

b) at the centre of the 1 hectare building envelope.

For the purposes of placing VLRs for the East Durham project, receptors were placed using method a) which requires that receptors be placed in a location that is consistent with the surrounding building pattern and conforms to the municipal zoning. This method has been used because it allows for greater flexibility in the placement of VLRs and results in a more realistic simulation of where the potential receptor is likely to exist. In short, this method simply makes more sense.

Alternatively, method b) requires that receptors be placed at the centroid of a 1 ha building envelope (100m x 100m). This method allows for little to no flexibility in the placement of receptors and does not necessarily reflect the location where a potential receptor is most likely to be built. It is for these reasons that this method has not been used.

The following outlines the rules that have been used in the location of VLRs for the East Durham project:

- VLRs have been placed on lots that have been identified as vacant and are zoned to permit a receptor;
- VLRs have been placed only in areas of the parcel that that are zoned to permit a receptor;
- Where possible, VLRs have been placed in a location that is consistent with the typical building pattern in the surrounding area. Instances when this is not possible are due to constraints caused by zoning or other physical constraints (i.e., drains, wooded areas).

Some project specific examples of determination of vacant lot receptors and clarifications on receptor locations (i.e., receptors EDU 699, EDU 709 and EDU 711, etc.) are provided in Attachment H.

Workflow and Methodology:

1. Isolate features that are considered receptors (based on REA guidelines) from receptor layer provided;
2. Identify all parcels that do not have an existing receptor;
3. Ensure all parcels identified as “vacant” have a VLR associated with it;
4. Eliminate all VLRs from parcels that have an existing receptor – possibly as a result of parcels being merged;
5. Review local Zoning By-laws to identify areas/parcels that prohibit the placement of a VLR
   Reasons include: Zone does not permit a receptor and/or parcel does not have frontage on an open right-of-way (ROW)
6. Remove VLRs from parcels that prohibit receptors based on zoning;
7. Added two fields to the parcel fabric called “NO_BUILD” and “REASON” to identify parcels that prohibit receptors;
8. Relocate VLRs that have been placed in a zone that does not permit receptors; and
9. Update/recalculate Northing and Easting fields in the Receptor layer to reflect new VLR locations.

QA/QC procedures used to verify Vacant Lot Receptors

- Perform a series of GIS queries to ensure that:
  - vacant lots have VLRs (except for lots that prohibit receptors)
  - vacant lots that prohibit receptors do not have a VLR
  - no lot has both a VLR and an existing receptor
- Visual check to ensure that VLR placement is consistent with the typical building pattern of the area
- Visual check to ensure that VLRs are not located in areas that are zoned to prohibit receptors

- Ensure that attributes associated with VLRs are complete including recalculating the northing and easting fields

6. Detailed Noise Impact Assessment

6.1 Wind Turbines

The sixteen (16) proposed GE wind turbines consist of twelve (12) to fourteen (14) GE 1.6-100 with LNTE turbines, one (1) GE 1.39-100 with LNTE turbine and one (1) GE 1.34-100 with LNTE turbine. The turbines are 3-bladed, upwind, horizontal-axis wind turbines with a hub height of 80 meters and a 100 meter rotor diameter.

The maximum rated electric capacity per turbine is 1.62 MW for GE 1.6-100 with LNTE, 1.39 MW for GE 1.39-100 with LNTE and 1.34 MW for GE 1.34-100 with LNTE when the operating mode of the turbine is "Normal Operation". The turbine manufacturer's noise data as per IEC is included in Attachment B and summarized in Table 9-1,

Table 9-2 and

Table 9-3 in Section 9.1 list the make and model, electrical rating, hub height, and the acoustic emission sound power levels.

As shown in Attachment B, the wind turbine overall sound power levels increase with the increase in wind speed but starts tapering off at the higher wind speeds and becomes constant from the wind speed 8 m/s onwards even though there may be a slight variation in their individual octave bands.

All calculations were performed in terms of octave band sound levels (63 to 8000 Hz) using the worst case wind speed of 10 m/s described above and as such, repeated analysis at different wind speeds are not necessary because the worst case conditions are independent of the actual value of wind shear. For reference, the range of 10 m height wind speeds between 6 to 10 m/s corresponds to 80 m hub height wind speeds of 8.4 to 14 m/s. The approach used will, therefore, provide the highest noise value regardless of wind speed with reference to the lowest sound level criterion.

The predictable worst case scenario approach employs the maximum sound power level for the wind turbine and lowest sound criteria level at the receptor, which is representative of the theoretical worst case wind shear condition. As a result, the wind shear information for the site is not included since it cannot represent a scenario worse than the theoretical scenario presented in the noise assessment.

The wind turbine sound power levels were adjusted to a 'predictable worst case scenario' at each wind speed so that the maximum sound power level was used in each case. This adjustment is included due to the potential for wind shear and therefore each wind speed is modelled at the maximum predictable worst case scenario.

The locations of the wind turbines are provided in Table 9-5 in Section 9.3 that lists the wind turbine ID and UTM co-ordinates (the Z coordinate represents the hub height above sea level, which is 80 m above ground elevation). Each proposed wind turbine has an individual adjacent pad-mount transformer and there is one large transformer substation for the overall wind farm as described below.

As stated earlier, there are no other wind farms nearby. There are no turbines from any other project located within five (5) km from the proposed East Durham Wind Energy Centre and thus no other wind farm turbines have been included as the distance is greater than those specified in sections 6.4.1 and 6.4.9 of the Noise Guidelines for Wind Farms, October 2008 and Section 55(1) of O. Reg. 359/09, as amended. Therefore, none of the Points of Reception or the Participating Receptors of the proposed East Durham Wind Energy Centre are being affected by any other wind farm.

6.2 Substation Transformer

The transformer substation noise data is provided in Attachment B. The noise data calculation with a 5 decibel (dB) tonal penalty is summarized in Table 9-4 in Section 9.2. Based on Section 6.2.4 of the MOE

Guideline, while the large transformer substation needs to be taken into account for noise assessment purposes, the small pad-mount transformers are insignificant sources and therefore do not need to be included in the noise assessment. The transformer substation is also included in Table 9-5 as TR, with UTM co-ordinates shown and a height of 3.07 m above ground elevation (the Z coordinate represents the height above sea level which is 459 m ASL for the transformer substation).

As specified in Sections 4 and 6.4.8 of the MOE's Noise Guidelines for Wind Farms, any tonal characteristics associated with wind turbine noise is generally associated with maintenance issues and therefore the prediction assumed that the wind turbine noise required no adjustment for special quality of sound described in Publication NPC-104. However, transformer substations generally exhibit a pronounced hum and the noise perceived at receptors is typically tonal. Since transformer acoustic emissions are tonal, an adjustment of 5 dB was added to the specified acoustic emissions in accordance with NPC-104 as shown in the Table 9-4.

6.3 Noise Barrier Wall

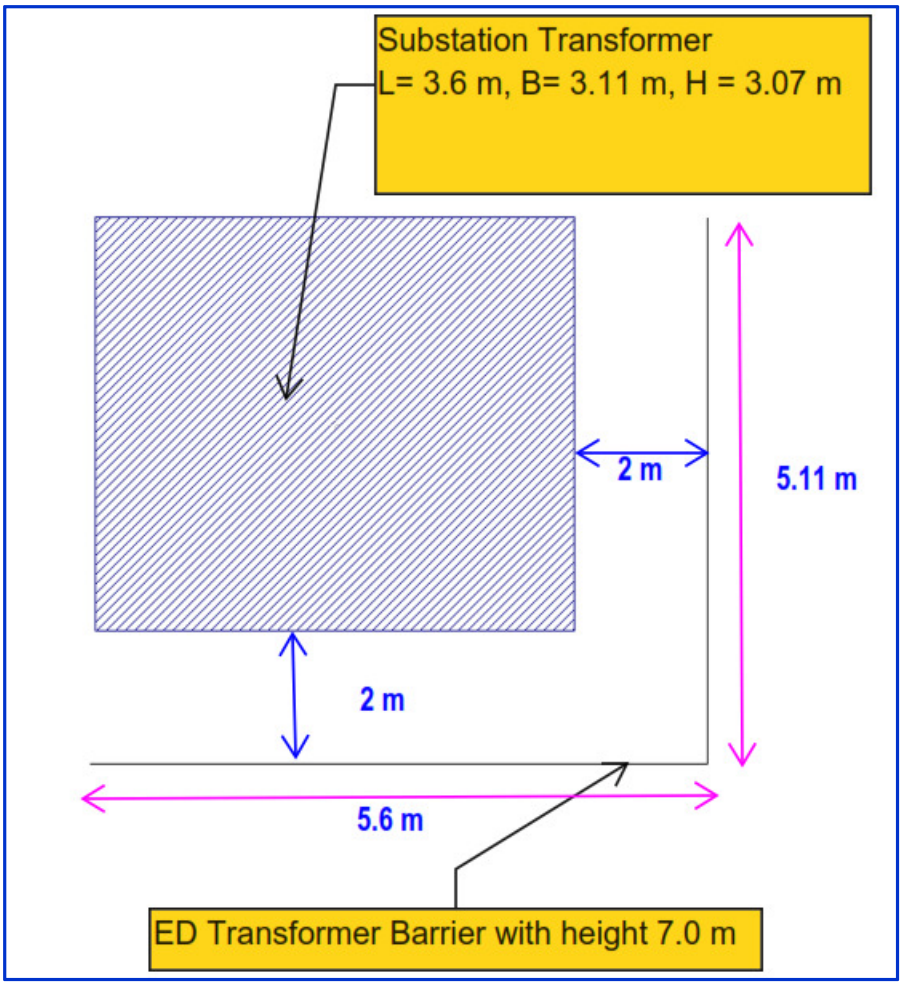
In order to achieve compliance with the current noise propagation model, the Substation Transformer noise needs to be mitigated and the mitigation measures in terms of an acoustic barrier has been identified. The substation transformer will have a 7.0 metre high noise barrier on the south and east sides of the transformer. The noise barrier will have an absorptive surface on the side facing the transformer with a minimum Noise Reduction Coefficient (NRC) of 0.8 and as per the absorption data given in Table 6-1, this also helps in eliminating the reflection from the barrier wall. The noise barrier will have a minimum surface density of 20 kg/m^2 or a minimum Sound Transmission Class (STC) of STC32 and should not have any gaps or cracks.

Table 6-1 Suggested Noise Barrier Acoustical Data

Source	Absorption Data by Octave Band Frequency (Hz)						NRC
	125	250	500	1000	2000	4000	
Suggested Noise Barrier		0.15	0.55	0.86	0.95	1.01	0.8

An L-shaped noise barrier wall has been proposed as shown in Figure 1 below. The figure is not to scale. The UTM coordinates for the noise barrier wall are shown in
Table 9-6 of Section 9.3.

Figure 1 Noise Barrier Configuration



6.4 Receptors

The receptors were configured such that they considered the impact of the whole wind farm with a maximum calculation distance of 5 km being applied, as per Section 6.4.9 of the MOE's Noise Guidelines for wind farms. The receptors were considered to be two storey dwellings at a height of 4.5 m above grade at the centre of the dwelling, consistent with Section 6.3.1 of the MOE Guideline. For vacant lots, a similar approach was used based on zoning considerations regarding where a dwelling could be located (see Section 5.1). Table 9-7 in Section 9.3 provides the locations of the Points of Reception (POR), including non-participating receptors and vacant lots along with the UTM co-ordinates (the Z coordinate represents the receptor height above sea level (Ht ASL), which is 4.5 m above the ground elevation). Note the POR IDs as provided in the second column, some consecutive numbers are missing because those were within five (5) kilometres and the same IDs were followed. The IDs in the first column were the very initial ones with 'EDU' prefixed to distinguish them from latter IDs.

Table 9-8 in Section 9.3 provides the location of the participating receptors for the East Durham project along with the UTM coordinates (the Z coordinate represents the receptor Ht ASL, which is 4.5 m above the ground elevation).

6.5 Nearby Wind Farm Sources

There are no other operating or approved wind farms or wind farms pending review by the MOE within 5 km of any turbine generator of the proposed East Durham wind farm. There are numerous wind farms (operating, approved or pending review by the MOE) that are greater than 15 km from the proposed East Durham wind farm. Some examples of these wind farms include Melancthon (Phases I and II), Dufferin Wind Farm, Skyway 126 Wind Energy, Grand Valley Wind Farms (Phases 1, 2 and 3), Grey Highlands Clean Energy Wind Project and the Grey Highland Zero Emission People Wind Farm.

6.6 Ground Absorption Rationale

To assess the relative flatness of the land the Institute of Acoustics (IOA) guide "*A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise*" (May 2013) was followed. Specifically the IOA's definition of defining flat/concave terrain:

$h_m \geq 1.5 \times (abs(h_s - h_r)/2)$

h_m is the mean height above the ground of the direct line of sight. Therefore, provided the mean height above ground of this line is less than 56.625 m, the ground would be classified as flat.

For concave ground, the position recommended by the authors of the paper (Cooper and Evans) referenced in the IOA Guide is that modelling with a ground absorption of 0.0 should be undertaken. For Ontario this is more appropriate than the addition of 3 dBA. The reason for this is that at some concave sites, Cooper and Evans found an under-prediction of up to 0.7 dBA with a ground absorption of 0.0. However, the mean predicted was much less than this, and for a slight concave terrain they found that the model over-predicted by 1.0 dBA.

As noted, the recommendation from the authors of the paper (Cooper and Evans) on the issue of flat/concave ground is that concave ground be assessed using a hard ground (G=0) absorption factor. However, the recommendation under the Good Practice Guide is more conservative; they recommend that 3.0 dBA be added to the noise level for the turbine-receptor pairs that are deemed to be concave. The reason for implementing this conservative approach is to address the model's margin of accuracy described above and to ensure that under all scenarios the sound levels would be below the predicted level.

However, it is our professional opinion that the addition of 3.0 dBA would not necessarily be consistent with the assessment methodology used in Ontario, and that it would be more appropriate to use hard ground (G=0.0). For clarification, it is not the addition of 3.0 dBA and the use of hard ground for the calculation, it would be one or the other.

However, since a policy decision by the MOE has not been made on this issue, the more conservative approach recommended by the Good Practice Guide was adopted for the East Durham project.

The CadnaA modelling as outlined in Section 6.7 was undertaken for the Project. For East Durham, there were 21 turbine-receptor pairs (some receptors are associated with more than one turbine) with an h_m greater than 56.625 metres and with their separation distance of within 5 km. The focus was on the remaining 6 turbine-receptor pairs that were at a distance of less than 2 km (as highlighted in Table 6-2).

Table 6-2 Summary of Turbine-Receptor Pairs, h_m >56.625 m

Receptor	Turbine	Turbine – Receptor Distance (metres)	h_m (metres)
4	T10	624.60	59.89
	T4	2497.85	62.06
11	T4	3566.48	58.39
36	T2	4094.78	58.89
62	T3	1388.44	58.63

Receptor	Turbine	Turbine – Receptor Distance (metres)	h_m (metres)
139	T3	1456.12	59.14
	T4	1590.16	57.57
158	T3	1344.81	56.89
194	T1	4679.43	58.01
	T4	4740.06	59.68
206	T10	772.93	57.5
	T4	2685.90	59.36
217	T1	4832.51	57.43
	T4	4898.82	58.93
405	T15	4042.72	56.94
406	T15	4061.08	57.05
407	T15	4077.02	57.01
422	T14	3554.35	57.25
	T15	3861.42	59.51
425	T15	3939.83	58.98
473	T15	3910.40	57.77

For the 21 turbine-receptor pairs, shown in Table 6-2, the terrain can be considered to be slightly concave. Therefore, for East Durham a ground absorption factor of G=0.7 was used for all of the turbine-receptor pairs but to account for the concave turbine-receptor pairs, 3.0 dBA was added to the noise level for these 21 turbine-receptor pairs.

For East Durham all the non-participating receptors are within the compliance limit of 40 dBA. It should be noted that the study has made many conservative assumptions which would not be encountered in the real world including:

1. Assuming all receptors are downwind of all noise sources at all times;
2. Assuming all receptors are 4.5 m (two-storey) high above grade;
3. Assuming the maximum sound power level is emitted from the turbines at all wind speeds;
4. Assuming the maximum sound levels for the wind turbines at the higher speed (10 m/s) but comparing this with the MOE standards of 40 dBA at the lowest wind speed;
5. Providing no allowance for vegetation and woodlots which may shield receptors; and
6. Assigning vacant lot receptors to all parcels which could build a residence when in all likelihood most may never be built.

6.7 Modelling

The noise analysis was conducted using the CadnaA (computer aided noise abatement) 3-D acoustical modelling software V4.2 to predict the noise levels at the points of reception. CadnaA is based on ISO Standard 9613-2 "*Acoustics - Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation*". The software incorporates digital terrain modelling inputs, which takes topography into account and the 80 m hub height of each turbine and 4.5 m dwelling height for each receptor was added to the ground elevation.

The modelling of the transformer substation was initially carried out as follows: the transformer walls were modelled as vertical area sources and the transformer top was modelled as a horizontal area source. Given the relatively large size of the transformer and barriers, modelling the transformer as an area

source is a more realistic approach than assuming a point source, in this case. However, following review of the draft Noise Assessment Report, the MOE indicated that it was required that the model be based on point source at maximum height. Therefore, while area source was initially modelled this was changed to point source at maximum based on the MOE's requirement. The maximum height was determined for East Durham to be 3.07 m (as shown in Attachment C).

The model assumes that all receptors simultaneously experience conditions favourable to sound propagation from all wind turbine sources (operating at the maximum sound power level) to each receptor. This represents the worst case for noise impact because subject to local wind conditions, only some of the receptors will be downwind at any one time.

The attenuation due to atmospheric absorption was based on the atmospheric coefficients for 10°C temperature and 70% relative humidity. The following steps were used for modelling in order to address ground terrains for various turbine-receptor combinations.

a) First the CadnaA modelling was carried out with G=0.7, C1=1, C2=0, C3=0 for all receptors and all turbines and without noise barriers and transformer. The results were inserted into an Excel table provided in Attachment G.

b) From the CadnaA protocol, the combinations of turbines and receptors exceeding an h_m value of 56.625 metres were identified.

c) For the identified turbine-receptor combinations (exceeding an h_m value of 56.625 metres), those with a separation distance between turbine and receptor of less than 5 km were considered further.

   Based on clause 6.4.9 of the MOE Guideline, all receptors within 1.5 km of turbines must be assessed. For each receptor that is assessed, the contribution of all turbines within 5 km must be used. This means that all turbine/receptor pairs under 5 km (and inside 1.5 km from the closest turbine) were included, from both the East Durham project, and any surrounding projects. There are no surrounding projects within 5 km and thus only the turbines in the East Durham project needed to be considered.

d) For only the turbine-receptor combinations identified in c), partial noise levels were noted for the applicable receptors.

e) The partial noise levels for these combinations were increased by 3 dBA to account for the 'concavity' factor.

f) For the rest of the partial noise levels, no increment was applied as their h_m values were less than 56.625 metres.

g) All partial noise levels were then logarithmically summed up. This can also be achieved by logarithmically subtracting the partial noise levels of the affected turbine-receptor combinations to the total noise level, then logarithmically summing the partial noise levels by enhancing them by 3.0 dBA arithmetically. One sample calculation for Receptor 4 is provided below:

   The overall noise level at the Receptor 4 from CadnaA modelling = 35.3 dBA

   Partial noise level for receptor 4, and the T10 contribution from CadnaA modelling= 34.7 dBA

   Partial noise level for receptor 4, and the T4 contribution from CadnaA modelling= 21.9 dBA

   $L_r = 10\log_{10}(10^{3.53} - 10^{3.47} - 10^{2.19} + 10^{3.77} + 10^{2.49}) = 38.1$ dBA

h) With a barrier, modelling was carried out with G=0.7, C1=3, C2=20, C3=0 only for the transformer and the results were inserted into an Excel Table which is provided in Attachment G.

Finally, the noise impact levels were determined by logarithmically summing up the noise levels from step g) and step h) to get the overall level at each receptor.

7. Infrasound

The public occasionally expresses concern about infrasound generation from wind turbines. Technically, infrasound is defined as acoustical energy at frequencies below which are generally audible to humans, typically 20 Hz or lower. Modern wind turbines using upwind rotor technology such as the GE 1.6-100 with LNTE and its sister units proposed for the East Durham Wind Farm do not generate infrasound energy of any significance. This has been acknowledged by the MOE and other regulatory approval agencies. Published literature is available confirming that infrasound is not a concern for modern wind farms. The Ontario Chief Medical Officer of Health issued a report entitled "The Potential Health Impact of Wind Turbines" on May 20, 2010 which indicated that low frequency sound and infrasound from current generation upwind model turbines are well below the pressure sound levels at which known health effects occur.

8. Results and Conclusions

The environmental noise produced by the proposed East Durham wind turbines and transformer substation was determined to be within the acceptable limits at all Points of Reception for wind speeds of 6 to 10 m/s at a reference height of 10 m when modelled according to the ISO 9613-2 standard and the conditions specified in the MOE Noise Guideline for Wind Farms. The summary tables provided in Section 9.4 summarize the results of the noise modelling performed for the proposed East Durham Wind Farm and demonstrate compliance with the applicable MOE environmental noise guidelines.

Table 9-9 and Table 9-10 in Section 9.4, show the combined sound pressure level at the receptors of the wind turbines and the transformer substation for the East Durham wind farm, the distance from the closest turbine to each receptor, the calculated sound pressure level at that receptor for wind speeds 6 m/s to 10 m/s (based on the worst case wind turbine sound power level of 10 m/s at an 80 m hub height), and the sound level limit for each wind speed according to MOE noise guidelines.

Figure E1 in Attachment E shows the sound level contours for 15.0 dBA and above in 5 dBA increments, with all sources and receptors shown in the vicinity of the wind turbines exported from the Geographic Information System (GIS). The sources and receptors are labelled, in conjunction with road locations and other land features.

Tables 9-9 and 9-10 provide the combined sound pressure level but partial levels were also logarithmically added to account for the presence of concave land for the 21 turbine-receptor pairs identified in Table 6-2 in Section 6.6. The sound level contours (shown in Figure E1) are not exact for these 21 turbine-receptor pairs since approximately 3.0 dBA was added to the output from the CadnaA model. For all but 3 of these turbine-receptor pairs the change was minimal and the contour map provided in Attachment E is still accurate. However, for 3 pairs (R4, R139 and R206) the end result is that the original sound pressure level and the revised level for these 3 pairs fall within two different sets of noise contours. The sound level contours provided in Figure E1 (Attachment E) show the sound power levels with turbine and transformer combined but do not have the partial levels to account for this addition to the 21 turbine-receptor pairs where h_m is greater than 56.625 m. For receptors R4, R139 and R206 the adjusted number is shown in a box in Figure E1 to indicate that it should be mapped within a different sound power level contour. For the remainder of the 21 turbine-receptor pairs the change in the number, when the partial level was accounted for, is less than 0.5 dBA and the same sound power level contour is still applicable.

9. Summary Tables

9.1 Wind Turbine Acoustical Emissions Summary Table

Table 9-1 Wind Turbine Acoustic Emissions Summary (GE 1.6-100 LNTE)

Make and model: 1.6-100 LNTE –Octave Spectra (dB) Rating: 1.62 MW Hub Height (m): 80 m Wind shear coefficient, as per Subsection 6.2.3: not applicable, select maximum sound power level										
	Octave Band Sound Power[1] Level (dB)									
	Manufacturer's Emission Levels					Adjusted Emission Levels				
Wind Speed[2] (m/s)	6	7	8	9	10	6	7	8	9	10
Frequency (Hz)										
32	70.1	73.5	73.7	73.6	73.5	73.5	73.5	73.5	73.5	73.5
63	80.3	84	84.1	84.1	84	84	84	84	84	84
125	88.4	91.6	91.8	91.8	91.7	91.7	91.7	91.7	91.7	91.7
250	94.7	95.4	95.3	95.4	95.5	95.5	95.5	95.5	95.5	95.5
500	95.5	97.1	96.6	96.7	97	97	97	97	97	97
1000	91.8	97.1	97.5	97.6	97.8	97.8	97.8	97.8	97.8	97.8
2000	92.4	95.7	95.7	95.5	95.1	95.1	95.1	95.1	95.1	95.1
4000	88.9	89.7	89.1	88.4	87.9	87.9	87.9	87.9	87.9	87.9
8000	70.3	70.4	70.6	69.4	69.1	69.1	69.1	69.1	69.1	69.1
Overall, dBA	100.5	103.0	103.0	103.0	103.0	103.0	103.0	103.0	103.0	103.0

Note: [1] **At 10 m/s wind speed at 80 m hub height.** [2] **At 10 m reference height.**

Table 9-2 Wind Turbine Acoustic Emissions Summary (GE 1.39-100 LNTE)

Make and model: 1.39-100 LNTE–Octave Spectra (dB) Rating: 1.39 MW Hub Height (m): 80 m Wind shear coefficient, as per Subsection 6.2.3: not applicable, select maximum sound power level										
	Octave Band Sound Power[1] Level (dB)									
	Manufacturer's Emission Levels					Adjusted Emission Levels				
Wind Speed[2] (m/s)	6	7	8	9	10	6	7	8	9	10
Frequency (Hz)										
32	70.2	70.8	70.9	70.8	70.6	70.6	70.6	70.6	70.6	70.6
63	80.3	81.5	81.6	81.5	81.4	81.4	81.4	81.4	81.4	81.4
125	88.5	89.4	89.5	89.5	89.4	89.4	89.4	89.4	89.4	89.4
250	94.9	93.8	93.6	93.6	93.7	93.7	93.7	93.7	93.7	93.7
500	95.6	95.4	95.2	95.3	95.6	95.6	95.6	95.6	95.6	95.6
1000	91.8	94.9	95.4	95.5	95.6	95.6	95.6	95.6	95.6	95.6
2000	92.5	93.4	93.1	92.7	92.1	92.1	92.1	92.1	92.1	92.1
4000	89.1	87.2	87.3	86.1	85.3	85.3	85.3	85.3	85.3	85.3
8000	70.5	68.3	68.6	66.3	66.5	66.5	66.5	66.5	66.5	66.5
Overall, dBA	100.7	101.0	101.0	101.0	101.0	101.0	101.0	101.0	101.0	101.0

Note: [1] At 10 m/s wind speed at 80 m hub height. [2] At 10 m reference height.

Table 9-3 Wind Turbine Acoustic Emissions Summary (GE 1.34-100 LNTE)

Make and model: 1.34-100 LNTE–Octave Spectra (dB) Rating: 1.34 MW Hub Height (m): 80 m Wind shear coefficient, as per Subsection 6.2.3: not applicable, select maximum sound power level										
	Octave Band Sound Power[1] Level (dB)									
	Manufacturer's Emission Levels					Adjusted Emission Levels				
Wind Speed[2] (m/s)	6	7	8	9	10	6	7	8	9	10
Frequency (Hz)										
32	69.5	70.0	70.0	70.0	69.8	69.8	69.8	69.8	69.8	69.8
63	79.7	80.5	80.6	80.6	80.5	80.5	80.5	80.5	80.5	80.5
125	87.9	88.4	88.5	88.5	88.4	88.4	88.4	88.4	88.4	88.4
250	94.1	93.0	92.6	92.7	92.7	92.7	92.7	92.7	92.7	92.7
500	94.6	94.5	94.3	94.4	94.7	94.7	94.7	94.7	94.7	94.7
1000	90.8	93.6	94.4	94.5	94.5	94.5	94.5	94.5	94.5	94.5
2000	91.7	92.2	91.9	91.4	90.8	90.8	90.8	90.8	90.8	90.8
4000	88.2	86.4	86.3	84.9	84	84	84	84	84	84
8000	69.4	68.2	67.4	65.1	65.2	65.2	65.2	65.2	65.2	65.2
Overall, dBA	99.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: [1] At 10 m/s wind speed at 80 m hub height. [2] At 10 m reference height.

9.2 Transformer Substation Acoustical Emissions Summary Table

Table 9-4 Octave Band Centre Frequency for Transformer Substation

		Octave Band Centre Frequency (Hz)								
	31.5	63	125	250	500	1000	2000	4000	8000	Overall
TR PWL, dBA	50.3	69.5	81.6	84.1	89.5	86.7	82.9	77.7	68.6	**93.0**
Tonal Penalty (TP), dBA	5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
TR with TP PWL, dBA	55.3	74.5	86.6	89.1	94.5	91.7	87.9	82.7	73.6	**98.0**

9.3 Locations of Wind Turbine Generators, Transformer Substation, Noise Barrier & Receptors

Table 9-5 Noise Source Locations

Turbine/Transformer ID	Equipment Make & Model	UTM Coordinates		Ht ASL
		X	Y	Z
T1	GE 1.6-100 LNTE	522697	4894753	520
T2	GE 1.39-100 LNTE	523810	4895004	525
T3	GE 1.6-100 LNTE	523031	4894158	533
T4	GE 1.6-100 LNTE	523425	4894086	540
T5	GE 1.6-100 LNTE	523815	4894179	525
T6	GE 1.34-100 LNTE	524812	4894414	529
T7	GE 1.6-100 LNTE	525170	4894597	534
T8	GE 1.6-100 LNTE	525783	4894560	545
T10	GE 1.6-100 LNTE	522761	4892274	526
T11	GE 1.6-100 LNTE	525698	4893320	544
T12	GE 1.6-100 LNTE	527137	4897555	542
T13	GE 1.6-100 LNTE	528474	4893041	560
T14	GE 1.6-100 LNTE	527940	4897664	540
T15	GE 1.6-100 LNTE	527547	4897779	545
T16	GE 1.6-100 LNTE	527680	4893745	555
T17	GE 1.6-100 LNTE	527506	4893375	556
TR	Northern Transformer	524146	4893780	458.81

(Note: there is no Turbine T9, UTM co-ordinates of TR are centroid with length = 3.6 m and breadth= 3.11, height = 3.07 m)

Table 9-6 Noise Barrier Locations

Barrier Sides	UTM Coordinates		Ht ASL	Ground Height, m
	X	Y	Z	
W-most	524144.43	524144.43	462.49	455.49
SE	524149.96	4893776.71	462.49	455.49
N-most	524149.96	4893781.82	462.97	455.97

Table 9-7 Point of Reception Locations

Project Name: East Durham Wind Farm					
POR Old ID	POR ID	Description	UTM Coordinates		Ht ASL
			X	Y	Z
EDU42	1	Res	528882	4899051.6	472.2
EDU384	2	Res	526823	4893441.9	478.6
EDU401	3	Res	524930	4891692.2	469.1
EDU407	4	Res	522844	4891657.9	464.5
EDU419	5	Res	520917	4891725.8	414.1
EDU450	6	Res	522554	4893853.1	423.6
EDU464	8	Res	526485	4894076.7	468.7
EDU466	9	Res	527118	4896302.4	459.1
EDU468	10	Res	526746	4896248.3	453.0
EDU473	11	Res	526660	4895585.3	470.5
EDU487	12	Res	524292	4896236.9	430.7
EDU499	13	Res	522477	4895307.9	432.7
EDU505	14	Res	522256	4895915.5	426.4
EDU510	15	Res	522048	4896447.4	412.0
EDU525	16	Res	521132	4895046.3	404.6
EDU544	17	Res	523812	4895639.8	438.9
EDU548	18	Res	524283	4895687.5	434.5
EDU554	19	Res	527666	4896422.4	454.2
EDU556	20	Res	527271	4896614.9	456.8
EDU557	21	Res	528164	4896478.3	459.6
EDU568	22	Res	528697	4896302.3	458.2
EDU587	23	Res	526541	4891928.8	471.5
EDU631	24	Res	528873	4898387.9	465.8
EDU634	25	Res	529020	4897055.7	467.3
EDU648	26	Res	527677	4896046.0	456.2
EDU663	27	Res	529118	4896219.2	479.8
EDU676	28	Res	528206	4892475.5	484.5
EDU705	29	Vlr	521927	4893190.3	413.9
EDU710	30	Vlr	523803	4893508.3	443.8
EDU739	31	Vlr	520889	4891999.0	408.7
EDU754	32	Vlr	525127	4895862.8	451.6
EDU771	33	Vlr	528911	4896612.6	468.8
EDU782	34	Vlr	528516	4894647.1	479.2
EDU783	35	Vlr	529461	4894730.6	472.6
EDU790	36	Vlr	526468	4898118.1	460.4
EDU796	37	Vlr	522870	4891292.4	449.9
EDU6	38	Res	526444	4898387.4	456.5
EDU24	39	Res	527755	4899513.9	470.4
EDU27	40	Res	528190	4899603.6	480.5

Project Name: East Durham Wind Farm					
POR Old ID	POR ID	Description	UTM Coordinates		Ht ASL
			X	Y	Z
EDU43	41	Res	528794	4898707.7	471.9
EDU261	42	Res	529629	4896653.6	479.4
EDU389	43	Res	527593	4892438.7	480.3
EDU390	44	Res	527264	4892079.5	476.7
EDU391	45	Res	527106	4892071.5	474.5
EDU412	46	Res	521870	4891333.0	429.6
EDU422	47	Res	520867	4892228.8	408.6
EDU442	48	Res	521779	4893075.1	414.5
EDU463	49	Res	526397	4894073.9	466.0
EDU465	50	Res	527162	4896101.3	459.4
EDU467	51	Res	526993	4896325.2	450.4
EDU471	52	Res	526064	4896199.8	462.0
EDU491	53	Res	523764	4896945.9	421.4
EDU507	54	Res	522126	4896095.2	419.5
EDU527	55	Res	520902	4894915.7	402.1
EDU542	56	Res	523839	4895679.8	438.6
EDU570	57	Res	529768	4892312.6	484.4
EDU571	58	Res	529822	4892193.2	484.6
EDU574	59	Res	529131	4891572.6	487.3
EDU599	60	Res	521839	4895004.9	424.5
EDU610	61	Res	523476	4895945.3	430.9
EDU611	62	Res	523045	4895543.0	435.4
EDU625	63	Res	525345	4897921.7	444.5
EDU629	64	Res	527932	4898382.3	469.1
EDU652	65	Res	522076	4896504.1	405.0
EDU654	66	Res	529171	4894560.5	479.0
EDU655	67	Res	529373	4894601.7	478.7
EDU671	68	Res	529158	4892542.6	479.3
EDU675	69	Res	528334	4892216.4	484.5
EDU686	70	Res	523934	4895546.3	448.6
EDU712	71	Vlr	523430	4893038.9	438.5
EDU717	72	Vlr	524739	4891646.9	467.9
EDU722	73	Vlr	526245	4891879.1	478.5
EDU723	74	Vlr	525972	4891835.9	474.9
EDU732	75	Vlr	527199	4896337.0	458.2
EDU740	76	Vlr	520831	4892366.0	409.4
EDU766	77	Vlr	525114	4893731.2	469.6
EDU768	78	Vlr	528528	4894284.4	480.8
EDU777	79	Vlr	529425	4892421.1	474.5
EDU875	80	Res	529837	4893243.5	470.5

Project Name: East Durham Wind Farm					
POR Old ID	POR ID	Description	UTM Coordinates		Ht ASL
			X	Y	Z
EDU10	81	Res	527277	4898436.3	470.8
EDU47	82	Res	528575	4898628.3	472.6
EDU326	83	Res	528051	4899589.5	473.8
EDU378	84	Res	527980	4894214.2	484.5
EDU386	85	Res	526890	4893177.9	474.5
EDU418	86	Res	520943	4891634.7	423.7
EDU444	87	Res	522101	4893245.7	419.1
EDU447	88	Res	522597	4893312.4	450.1
EDU449	89	Res	522471	4893784.8	424.7
EDU453	90	Res	524100	4893319.9	439.0
EDU454	91	Res	523104	4893402.3	465.5
EDU460	93	Vlr	525348	4893781.2	461.1
EDU488	94	Res	524174	4896309.5	430.4
EDU498	95	Res	522707	4895471.0	430.5
EDU503	96	Res	522083	4895721.9	424.3
EDU511	97	Res	521932	4896559.3	393.8
EDU538	98	Res	521437	4893324.4	410.5
EDU547	99	Res	524386	4895436.6	435.8
EDU564	100	Res	529165	4896650.1	474.5
EDU582	101	Res	527704	4896009.4	457.8
EDU613	102	Res	522451	4893958.4	419.4
EDU618	103	Res	529355	4891475.2	488.0
EDU639	104	Res	528596	4896536.9	458.8
EDU670	105	Res	529784	4892594.0	471.9
EDU694	106	Vlr	527286	4896349.8	458.5
EDU702	107	Vlr	524933	4892682.5	470.3
EDU747	109	Vlr	522058	4896394.7	418.7
EDU749	110	Vlr	526119	4896969.1	454.1
EDU770	111	Vlr	528177	4896329.7	457.6
EDU772	112	Vlr	529186	4896520.7	474.5
EDU776	113	Vlr	529726	4892472.3	474.5
EDU780	114	Vlr	529282	4894824.0	474.5
EDU784	115	Vlr	528875	4894317.6	479.7
EDU793	116	Vlr	528423	4894417.5	480.4
EDU828	117	Vlr	520954	4891432.8	418.8
EDU859	118	Vlr	529618	4893756.2	477.2
EDU874	119	Res	529805	4893482.9	470.2
EDU878	120	Res	529899	4892401.5	478.2
EDU5	121	Res	526254	4898361.2	457.5
EDU12	122	Res	527688	4898511.8	473.7

Project Name: East Durham Wind Farm					
POR Old ID	POR ID	Description	UTM Coordinates		Ht ASL
			X	Y	Z
EDU259	123	Res	529373	4896675.1	475.8
EDU260	124	Res	529625	4896792.3	477.6
EDU333	125	Res	529131	4897582.8	464.6
EDU334	126	Res	529151	4897507.5	464.6
EDU385	127	Res	526950	4893350.9	480.1
EDU392	128	Res	526824	4892108.4	478.5
EDU393	129	Res	526794	4892016.0	480.5
EDU395	130	Res	525808	4892276.3	471.6
EDU400	131	Res	524927	4891936.5	469.0
EDU405	132	Res	524306	4891579.8	468.9
EDU411	133	Res	521835	4891210.7	431.0
EDU435	134	Res	520917	4892995.3	408.5
EDU439	135	Res	521416	4893337.9	410.5
EDU445	136	Res	522340	4893539.9	428.0
EDU459	137	Res	525034	4893615.4	474.5
EDU480	138	Res	523951	4895693.1	442.6
EDU496	139	Res	522984	4895610.4	440.5
EDU509	140	Res	521983	4896377.9	415.6
EDU535	141	Res	526579	4893767.4	470.5
EDU543	142	Res	523859	4895735.5	436.8
EDU545	143	Res	523669	4895625.4	432.0
EDU559	144	Res	527928	4892600.5	484.5
EDU573	145	Res	529196	4891438.7	485.3
EDU586	146	Res	527217	4891519.9	481.2
EDU630	147	Res	528117	4898411.3	469.1
EDU633	148	Res	529011	4897380.2	464.5
EDU640	149	Res	528399	4896392.3	456.5
EDU642	150	Res	528203	4895421.1	473.2
EDU645	151	Res	528138	4895471.8	474.5
EDU646	152	Res	527671	4895914.5	463.4
EDU662	153	Res	529068	4896063.7	465.7
EDU692	154	Vlr	523283	4895808.2	428.5
EDU693	155	Vlr	524270	4896018.4	434.5
EDU700	156	Vlr	524756	4893501.5	457.8
EDU701	157	Vlr	524807	4893309.7	460.9
EDU703	158	Vlr	522930	4895495.7	438.8
EDU728	159	Vlr	521979	4896277.9	415.9
EDU731	160	Vlr	525187	4895976.1	446.5
EDU736	161	Vlr	525682	4893971.4	472.5
EDU803	162	Vlr	524110	4895797.0	444.1

Project Name: East Durham Wind Farm					
POR Old ID	POR ID	Description	UTM Coordinates		Ht ASL
			X	Y	Z
EDU8	164	Res	526836	4898500.2	465.7
EDU11	165	Res	526363	4898528.0	458.5
EDU14	166	Res	528160	4898521.9	468.1
EDU213	167	Res	529550	4898529.3	467.5
EDU379	168	Res	528037	4894316.5	480.6
EDU402	169	Res	524880	4891776.6	468.5
EDU406	170	Res	523125	4891402.9	448.5
EDU409	171	Res	522110	4891420.6	441.2
EDU437	172	Res	521368	4893241.0	410.5
EDU441	173	Res	521696	4893052.6	414.5
EDU443	174	Res	522061	4893473.6	418.4
EDU451	175	Res	522883	4892977.5	440.1
EDU462	177	Res	526195	4893711.0	463.2
EDU477	178	Res	524860	4895810.3	434.5
EDU485	179	Res	524283	4895829.7	436.4
EDU497	180	Res	522791	4895485.5	433.1
EDU500	181	Res	522183	4895412.3	433.6
EDU502	182	Res	522149	4895464.7	433.2
EDU523	183	Res	521632	4895379.9	416.7
EDU549	184	Res	523415	4895513.1	434.5
EDU550	185	Res	525629	4895921.8	459.0
EDU560	186	Res	528315	4892353.3	484.5
EDU563	187	Res	529029	4896763.6	470.9
EDU572	188	Res	529818	4892048.9	488.5
EDU578	189	Res	529361	4891396.3	486.3
EDU581	190	Res	525930	4897290.8	448.5
EDU583	191	Res	529625	4892464.5	475.4
EDU597	192	Res	522903	4892932.7	435.1
EDU614	193	Res	526971	4896261.8	451.9
EDU626	194	Res	526007	4898060.5	456.0
EDU635	196	Res	529106	4896976.1	467.8
EDU647	197	Res	527632	4895963.8	461.6
EDU653	198	Res	528919	4894524.1	478.6
EDU666	199	Res	529565	4893916.4	483.5
EDU669	200	Res	529700	4892801.1	474.5
EDU673	201	Res	529012	4892143.7	481.9
EDU674	202	Res	528710	4892278.5	484.5
EDU690	203	Vlr	521951	4895345.6	436.3
EDU704	204	Vlr	521110	4893066.1	410.5
EDU707	205	Vlr	522473	4891472.1	449.8

Project Name: East Durham Wind Farm					
POR Old ID	POR ID	Description	UTM Coordinates		Ht ASL
			X	Y	Z
EDU708	206	Vlr	522672	4891508.9	461.0
EDU726	207	Vlr	521936	4896446.4	405.9
EDU735	208	Vlr	525576	4893955.3	466.1
EDU742	209	Vlr	525326	4891738.3	470.5
EDU751	210	Vlr	527395	4896359.7	453.7
EDU755	211	Vlr	523540	4895592.3	433.9
EDU769	212	Vlr	529031	4892465.6	480.0
EDU778	213	Vlr	529242	4891296.6	482.5
EDU871	214	Res	529673	4893962.6	484.2
EDU872	215	Res	529704	4893737.5	476.5
EDU3	216	Res	525844	4898277.6	447.3
EDU4	217	Res	526083	4898199.9	455.5
EDU329	218	Res	528276	4899626.5	480.5
EDU383	219	Res	526807	4893526.8	476.4
EDU388	220	Res	527377	4892289.4	480.5
EDU396	221	Res	525524	4892012.5	471.5
EDU397	222	Res	525437	4891730.9	471.5
EDU398	223	Res	525194	4891650.1	474.5
EDU399	224	Res	525062	4891820.9	469.0
EDU438	225	Res	521194	4893608.3	410.0
EDU452	227	Res	523164	4893079.1	434.2
EDU469	228	Res	526691	4896147.9	450.5
EDU470	229	Res	526329	4896267.1	452.4
EDU472	230	Res	526065	4895644.7	463.6
EDU474	231	Res	525384	4895817.2	454.2
EDU475	232	Res	525218	4895871.9	449.7
EDU476	233	Res	525095	4895949.6	448.0
EDU478	234	Res	524438	4895626.3	432.5
EDU479	235	Res	524198	4895679.3	447.6
EDU484	236	Res	524374	4894786.2	451.5
EDU501	237	Res	522229	4895111.0	434.5
EDU524	238	Res	521246	4895442.8	406.5
EDU536	239	Res	526740	4893411.0	475.4
EDU541	240	Res	523943	4895760.0	442.4
EDU552	241	Res	526828	4896160.4	448.8
EDU575	243	Res	529119	4891772.5	486.1
EDU576	244	Res	529255	4891209.8	482.9
EDU638	246	Res	528826	4896600.4	465.4
EDU644	247	Res	528072	4895433.6	474.5
EDU649	248	Res	525978	4896724.6	447.7

Project Name: East Durham Wind Farm					
POR Old ID	POR ID	Description	UTM Coordinates		Ht ASL
			X	Y	Z
EDU678	249	Res	528054	4891650.9	483.1
EDU697	250	Vlr	526837	4894052.0	479.2
EDU698	251	Vlr	526775	4893810.7	472.5
EDU713	252	Vlr	523237	4892961.0	437.3
EDU716	253	Vlr	524539	4891615.1	464.6
EDU729	254	Vlr	522513	4895569.1	429.4
EDU746	255	Vlr	521931	4896516.3	397.5
EDU750	256	Vlr	526167	4896716.4	456.3
EDU775	257	Vlr	529496	4894252.8	479.7
EDU791	258	Vlr	526796	4898176.7	459.1
EDU794	259	Vlr	529508	4894526.5	475.3
EDU812	260	Vlr	525775	4898138.8	442.8
EDU813	261	Vlr	525340	4898060.0	438.5
EDU817	262	Vlr	528696	4898601.9	471.0
EDU870	263	Res	529665	4894045.7	488.5
EDU1	264	Res	525695	4898596.6	447.2
EDU45	265	Res	528527	4898598.4	468.5
EDU404	267	Res	524340	4891696.7	465.1
EDU436	268	Res	521266	4893298.2	410.5
EDU440	269	Res	521687	4893366.3	411.9
EDU448	270	Res	522604	4893235.8	452.1
EDU486	273	Res	524266	4896112.8	434.5
EDU489	274	Res	524242	4896480.2	432.7
EDU508	275	Res	522186	4896307.9	428.9
EDU526	276	Res	520870	4895268.8	405.1
EDU539	277	Res	522489	4893824.9	423.1
EDU565	278	Res	529139	4896744.9	474.3
EDU566	279	Res	529130	4896416.4	475.2
EDU580	280	Res	525642	4897954.7	441.8
EDU584	281	Res	528352	4891110.2	484.5
EDU604	282	Res	526798	4897997.0	461.6
EDU616	283	Res	520859	4892143.5	406.9
EDU617	284	Res	529347	4891515.1	488.3
EDU632	285	Res	528744	4897642.6	462.5
EDU636	286	Res	528982	4896279.8	476.6
EDU637	287	Res	528736	4896553.8	460.4
EDU641	288	Res	527716	4896653.4	454.5
EDU643	289	Res	528001	4895420.1	474.5
EDU667	290	Res	529568	4893825.5	480.6
EDU668	291	Res	529503	4893526.0	475.4

Project Name: East Durham Wind Farm					
POR Old ID	POR ID	Description	UTM Coordinates		Ht ASL
			X	Y	Z
EDU672	292	Res	529155	4892310.8	478.9
EDU685	293	Res	529255	4892143.0	480.2
EDU689	295	Vlr	521053	4895399.4	404.5
EDU696	296	Vlr	526975	4894042.3	480.5
EDU706	297	Vlr	522353	4893262.9	430.6
EDU759	298	Vlr	524855	4893036.8	464.7
EDU826	299	Vlr	527642	4896247.1	451.1
EDU848	300	Vlr	527070	4898366.4	466.7
EDU25	301	Res	527911	4899540.5	470.5
EDU26	302	Res	527939	4899668.5	470.5
EDU212	303	Res	529038	4898221.6	474.5
EDU377	304	Res	528130	4894151.1	482.5
EDU381	305	Res	526773	4894164.0	478.5
EDU387	307	Res	527005	4892570.2	473.4
EDU394	308	Res	526385	4892023.4	478.5
EDU403	309	Res	524640	4891736.7	464.5
EDU408	310	Res	522306	4891495.3	438.5
EDU410	311	Res	522049	4891099.7	444.8
EDU413	312	Res	521670	4891274.6	422.3
EDU414	313	Res	521281	4891190.8	418.5
EDU417	314	Res	520984	4891413.0	416.5
EDU420	315	Res	520843	4892050.6	408.7
EDU457	316	Res	524528	4893844.0	446.5
EDU482	317	Res	524570	4895301.1	436.2
EDU483	318	Res	524375	4894835.8	451.2
EDU490	319	Res	524111	4896639.1	427.0
EDU492	320	Res	523710	4896973.6	421.3
EDU504	321	Res	522071	4895800.7	418.9
EDU506	322	Res	522187	4895986.2	420.5
EDU534	323	Res	527500	4894277.1	478.1
EDU551	324	Res	525900	4896082.6	468.8
EDU553	325	Res	527517	4896225.1	452.9
EDU555	326	Res	527894	4896305.7	457.6
EDU558	327	Res	528581	4894432.0	484.5
EDU562	328	Res	528275	4891547.5	484.5
EDU567	329	Res	529050	4896344.2	479.3
EDU615	330	Res	523389	4893179.7	434.7
EDU624	331	Res	525157	4897526.5	439.0
EDU650	332	Res	525569	4896687.9	454.3
EDU651	333	Res	524041	4896300.5	429.2

Project Name: East Durham Wind Farm					
POR Old ID	POR ID	Description	UTM Coordinates		Ht ASL
			X	Y	Z
EDU664	334	Res	529499	4894363.7	478.9
EDU665	335	Res	529570	4894002.7	486.6
EDU677	336	Res	527237	4891652.1	479.8
EDU695	337	Vlr	527358	4894245.1	476.7
EDU721	338	Vlr	525786	4891807.9	470.5
EDU724	339	Vlr	526966	4891973.2	474.5
EDU737	340	Vlr	521324	4893088.1	410.5
EDU756	341	Vlr	527874	4894277.0	481.2
EDU765	342	Vlr	521842	4895331.7	431.6
EDU781	343	Vlr	528698	4894697.2	475.4
EDU785	344	Vlr	529275	4894346.6	484.5
EDU792	345	Vlr	528889	4896288.1	467.7
EDU873	347	Res	529733	4893650.6	473.3
EDU876	348	Res	530199	4892650.7	475.4
EDU877	349	Res	530075	4892651.0	474.4
EDU880	350	Vlr	528581	4898491.0	466.5
EDU879	351	Vlr	526866	4892752.0	474.1
	352	Vlr	522535	4895465.1	430.2
	376	Vlr	529912	4892343.4	479.4
	377	Res	530161	4892477.6	485.6
	378	Res	530304	4892462.9	486.3
	380	Res	530268	4892710.2	475.5
	381	Res	530430	4892864.1	476.2
	382	Res	530117	4894046.7	484.5
	383	Vlr	530025	4894060.7	484.5
	384	Vlr	529657	4894083.7	487.1
	385	Res	529868	4894113.1	489.1
	389	Res	529987	4894284.3	482.7
	390	Res	529956	4894279.9	483.6
	391	Res	529839	4894221.6	485.6
	392	Vlr	529998	4894227.9	483.9
	393	Vlr	529721	4894184.1	486.1
	394	Res	529631	4894193.4	485.0
	395	Res	529976	4894349.3	483.6
	397	Res	529922	4894395.9	486.2
	398	Res	529857	4894368.1	486.7
	399	Res	529809	4894366.8	486.5
	400	Res	529824	4894298.3	486.1
	401	Res	529932	4894319.5	484.3
	402	Vlr	529890	4894377.1	486.5

Project Name: East Durham Wind Farm					
POR Old ID	POR ID	Description	UTM Coordinates		Ht ASL
			X	Y	Z
	403	Vlr	529896	4894324.1	485.2
	404	Vlr	529858	4894314.5	485.9
	405	Vlr	529801	4894423.6	487.7
	406	Res	529843	4894430.0	488.2
	407	Res	529882	4894437.5	488.2
	409	Res	529752	4894413.3	485.3
	410	Res	529704	4894378.4	484.1
	411	Res	529624	4894359.3	481.6
	412	Res	529622	4894411.3	479.1
	413	Res	529660	4894443.5	479.9
	414	Res	529698	4894433.9	481.7
	415	Res	529735	4894439.5	484.0
	416	Vlr	529668	4894375.4	481.7
	417	Vlr	529586	4894383.5	479.9
	418	Res	529593	4894547.4	479.7
	419	Res	529637	4894506.4	480.4
	420	Res	529659	4894494.5	481.3
	421	Res	529703	4894493.2	485.0
	422	Res	529724	4894590.0	490.5
	425	Vlr	529780	4894533.4	490.5
	439	Vlr	528147	4899621.3	479.1
	440	Vlr	528241	4899606.0	480.5
	450	Vlr	528018	4899575.6	470.5
	451	Vlr	527816	4899581.6	470.5
	452	Vlr	527809	4899520.1	470.6
	453	Vlr	527896	4899653.0	470.0
	454	Vlr	527827	4899670.2	469.2
	455	Vlr	527868	4899713.9	468.6
	456	Vlr	528008	4899709.9	472.2
	458	Vlr	527704	4899549.2	466.8
	459	Vlr	527708	4899610.0	464.5
	460	Vlr	527722	4899677.5	465.0
	461	Vlr	527742	4899725.8	464.5
	462	Vlr	527782	4899780.0	464.5
	465	Vlr	527876	4899562.9	470.5
	472	Vlr	525744	4898959.0	446.5
	473	Vlr	529708	4894520.2	487.6
EDU699	474	Vlr	525955	4893877.9	464.9
EDU711	475	Vlr	524253	4893753.3	457.8

Please note the POR IDs as provided in the second column, some consecutive numbers are missing because those were within five (5) kilometres and the same IDs were followed. The IDs in the first column were the very initial ones with 'EDU' prefixed to distinguish them from latter IDs.

Table 9-8 Point of Participating Receptor Locations

Project Name: East Durham Wind Farm					
Old POR ID	POR ID	Description	UTM Coordinates		Ht ASL
			X	Y	Z
EDU461	7	Res-P	525854	4893967.5	469.6
EDU458	92	Res-P	524720	4893993.9	459.5
EDU734	108	Vlr-P	525325	4893917.6	459.4
EDU827	163	Vlr-P	525560	4893821.4	468.0
EDU456	176	Res-P	524059	4893675.0	452.9
EDU628	195	Res-P	527692	4898341.9	472.0
EDU446	226	Res-P	522456	4893305.2	434.2
EDU561	242	Res-P	528761	4892651.0	480.2
EDU627	245	Res-P	527390	4898197.0	470.5
EDU380	266	Res-P	527653	4894460.7	479.7
EDU455	271	Res-P	523212	4893663.9	464.5
EDU481	272	Res-P	524262	4895466.6	436.5
EDU382	306	Res-P	527338	4894048.2	474.9
EDU825	346	Vlr-P	522266	4895398.5	433.2

9.4 Noise Impact Assessment Summary Table

Table 9-9 Combined Wind Turbine & Transformer Noise Impact Summary – Points of Reception

(**Note:** refer to Section 8 for a discussion on receptors 4, 139 and 206 and the reason for additional numbers provided on the sound contour map (Attachment E) than shown in Table 9-9)

Point of Reception ID	Description	Height Above Grade (m)	Distance to Nearest Turbine Noise Source (m)	Nearest Turbine Noise Source ID	Calculated Sound Level (dBA) at Selected Wind Speeds (m/s)					Sound Level Limit (dBA)				
					6	7	8	9	10	6	7	8	9	10
1	Res	4.5	1678.4	T14	27.7	27.7	27.7	27.7	27.7	40	43	45	49	51
2	Res	4.5	690.5	T17	37.1	37.1	37.1	37.1	37.1	40	43	45	49	51
3	Res	4.5	1801.6	T11	28.8	28.8	28.8	28.8	28.8	40	43	45	49	51
4	Res	4.5	624.6	T10	38.1	38.1	38.1	38.1	38.1	40	43	45	49	51
5	Res	4.5	1926.9	T10	25.4	25.4	25.4	25.4	25.4	40	43	45	49	51
6	Res	4.5	576.4	T3	38.5	38.5	38.5	38.5	38.5	40	43	45	49	51
8	Res	4.5	855.4	T8	36.1	36.1	36.1	36.1	36.1	40	43	45	49	51
9	Res	4.5	1255.5	T12	32.0	32.0	32.0	32.0	32.0	40	43	45	49	51
10	Res	4.5	1367.0	T12	31.5	31.5	31.5	31.5	31.5	40	43	45	49	51
11	Res	4.5	1351.5	T8	31.9	31.9	31.9	31.9	31.9	40	43	45	49	51
12	Res	4.5	1327.1	T2	31.1	31.1	31.1	31.1	31.1	40	43	45	49	51
13	Res	4.5	603.4	T1	36.8	36.8	36.8	36.8	36.8	40	43	45	49	51
14	Res	4.5	1246.9	T1	30.8	30.8	30.8	30.8	30.8	40	43	45	49	51
15	Res	4.5	1817.7	T1	27.7	27.7	27.7	27.7	27.7	40	43	45	49	51
16	Res	4.5	1596.0	T1	28.5	28.5	28.5	28.5	28.5	40	43	45	49	51

Point of Reception ID	Description	Height Above Grade (m)	Distance to Nearest Turbine Noise Source (m)	Nearest Turbine Noise Source ID	Calculated Sound Level (dBA) at Selected Wind Speeds (m/s)					Sound Level Limit (dBA)				
					6	7	8	9	10	6	7	8	9	10
17	Res	4.5	641.6	T2	35.7	35.7	35.7	35.7	35.7	40	43	45	49	51
18	Res	4.5	836.0	T2	34.4	34.4	34.4	34.4	34.4	40	43	45	49	51
19	Res	4.5	1253.1	T12	32.6	32.6	32.6	32.6	32.6	40	43	45	49	51
20	Res	4.5	953.5	T12	34.0	34.0	34.0	34.0	34.0	40	43	45	49	51
21	Res	4.5	1209.4	T14	31.9	31.9	31.9	31.9	31.9	40	43	45	49	51
22	Res	4.5	1559.9	T14	29.4	29.4	29.4	29.4	29.4	40	43	45	49	51
23	Res	4.5	1628.2	T11	29.9	29.9	29.9	29.9	29.9	40	43	45	49	51
24	Res	4.5	1183.5	T14	30.8	30.8	30.8	30.8	30.8	40	43	45	49	51
25	Res	4.5	1241.8	T14	30.4	30.4	30.4	30.4	30.4	40	43	45	49	51
26	Res	4.5	1605.2	T12	30.8	30.8	30.8	30.8	30.8	40	43	45	49	51
27	Res	4.5	1865.1	T14	27.8	27.8	27.8	27.8	27.8	40	43	45	49	51
28	Res	4.5	630.5	T13	36.2	36.2	36.2	36.2	36.2	40	43	45	49	51
29	Vlr	4.5	1243.8	T10	32.0	32.0	32.0	32.0	32.0	40	43	45	49	51
30	Vlr	4.5	675.7	T5	39.7	39.7	39.7	39.7	39.7	40	43	45	49	51
31	Vlr	4.5	1895.7	T10	25.8	25.8	25.8	25.8	25.8	40	43	45	49	51
32	Vlr	4.5	1269.3	T7	32.7	32.7	32.7	32.7	32.7	40	43	45	49	51
33	Vlr	4.5	1432.7	T14	29.6	29.6	29.6	29.6	29.6	40	43	45	49	51
34	Vlr	4.5	1232.1	T16	31.5	31.5	31.5	31.5	31.5	40	43	45	49	51
35	Vlr	4.5	1958.4	T13	27.6	27.6	27.6	27.6	27.6	40	43	45	49	51
36	Vlr	4.5	878.1	T12	33.9	33.9	33.9	33.9	33.9	40	43	45	49	51
37	Vlr	4.5	990.6	T10	31.0	31.0	31.0	31.0	31.0	40	43	45	49	51
38	Res	4.5	1086.4	T12	32.2	32.2	32.2	32.2	32.2	40	43	45	49	51
39	Res	4.5	1749.0	T15	27.8	27.8	27.8	27.8	27.8	40	43	45	49	51
40	Res	4.5	1935.8	T15	26.8	26.8	26.8	26.8	26.8	40	43	45	49	51
41	Res	4.5	1350.2	T14	29.7	29.7	29.7	29.7	29.7	40	43	45	49	51
42	Res	4.5	1969.3	T14	26.6	26.6	26.6	26.6	26.6	40	43	45	49	51
43	Res	4.5	943.4	T17	34.3	34.3	34.3	34.3	34.3	40	43	45	49	51
44	Res	4.5	1320.3	T17	31.3	31.3	31.3	31.3	31.3	40	43	45	49	51
45	Res	4.5	1366.0	T17	31.0	31.0	31.0	31.0	31.0	40	43	45	49	51
46	Res	4.5	1299.5	T10	28.5	28.5	28.5	28.5	28.5	40	43	45	49	51
47	Res	4.5	1898.5	T10	26.1	26.1	26.1	26.1	26.1	40	43	45	49	51
48	Res	4.5	1272.4	T10	31.2	31.2	31.2	31.2	31.2	40	43	45	49	51
49	Res	4.5	787.2	T8	36.5	36.5	36.5	36.5	36.5	40	43	45	49	51
50	Res	4.5	1456.3	T12	31.3	31.3	31.3	31.3	31.3	40	43	45	49	51
51	Res	4.5	1241.7	T12	32.0	32.0	32.0	32.0	32.0	40	43	45	49	51
52	Res	4.5	1665.8	T8	31.1	31.1	31.1	31.1	31.1	40	43	45	49	51
53	Res	4.5	2440.9	T1	27.9	27.9	27.9	27.9	27.9	40	43	45	49	51
54	Res	4.5	1462.3	T1	29.4	29.4	29.4	29.4	29.4	40	43	45	49	51
55	Res	4.5	1806.5	T1	27.5	27.5	27.5	27.5	27.5	40	43	45	49	51
56	Res	4.5	681.9	T2	35.2	35.2	35.2	35.2	35.2	40	43	45	49	51
57	Res	4.5	1486.4	T13	27.6	27.6	27.6	27.6	27.6	40	43	45	49	51
58	Res	4.5	1593.9	T13	27.0	27.0	27.0	27.0	27.0	40	43	45	49	51
59	Res	4.5	1610.3	T13	27.2	27.2	27.2	27.2	27.2	40	43	45	49	51
60	Res	4.5	899.8	T1	33.3	33.3	33.3	33.3	33.3	40	43	45	49	51
61	Res	4.5	1003.3	T2	32.9	32.9	32.9	32.9	32.9	40	43	45	49	51
62	Res	4.5	867.3	T1	35.8	35.8	35.8	35.8	35.8	40	43	45	49	51
63	Res	4.5	1831.6	T12	27.8	27.8	27.8	27.8	27.8	40	43	45	49	51
64	Res	4.5	719.7	T15	37.0	37.0	37.0	37.0	37.0	40	43	45	49	51
65	Res	4.5	1861.6	T1	27.5	27.5	27.5	27.5	27.5	40	43	45	49	51
66	Res	4.5	1673.9	T13	29.2	29.2	29.2	29.2	29.2	40	43	45	49	51
67	Res	4.5	1803.0	T13	28.3	28.3	28.3	28.3	28.3	40	43	45	49	51
68	Res	4.5	849.9	T13	32.8	32.8	32.8	32.8	32.8	40	43	45	49	51

Point of Reception ID	Description	Height Above Grade (m)	Distance to Nearest Turbine Noise Source (m)	Nearest Turbine Noise Source ID	Calculated Sound Level (dBA) at Selected Wind Speeds (m/s)					Sound Level Limit (dBA)				
					6	7	8	9	10	6	7	8	9	10
69	Res	4.5	839.8	T13	33.5	33.5	33.5	33.5	33.5	40	43	45	49	51
70	Res	4.5	561.4	T2	36.6	36.6	36.6	36.6	36.6	40	43	45	49	51
71	Vlr	4.5	1019.8	T10	35.9	35.9	35.9	35.9	35.9	40	43	45	49	51
72	Vlr	4.5	1929.8	T11	28.7	28.7	28.7	28.7	28.7	40	43	45	49	51
73	Vlr	4.5	1542.6	T11	29.7	29.7	29.7	29.7	29.7	40	43	45	49	51
74	Vlr	4.5	1510.8	T11	29.5	29.5	29.5	29.5	29.5	40	43	45	49	51
75	Vlr	4.5	1222.5	T12	32.2	32.2	32.2	32.2	32.2	40	43	45	49	51
76	Vlr	4.5	1935.8	T10	26.1	26.1	26.1	26.1	26.1	40	43	45	49	51
77	Vlr	4.5	718.5	T11	38.1	38.1	38.1	38.1	38.1	40	43	45	49	51
78	Vlr	4.5	1007.5	T16	33.3	33.3	33.3	33.3	33.3	40	43	45	49	51
79	Vlr	4.5	1138.4	T13	30.1	30.1	30.1	30.1	30.1	40	43	45	49	51
80	Res	4.5	1381.2	T13	28.6	28.6	28.6	28.6	28.6	40	43	45	49	51
81	Res	4.5	714.3	T15	36.4	36.4	36.4	36.4	36.4	40	43	45	49	51
82	Res	4.5	1156.5	T14	31.4	31.4	31.4	31.4	31.4	40	43	45	49	51
83	Res	4.5	1880.6	T15	27.0	27.0	27.0	27.0	27.0	40	43	45	49	51
84	Res	4.5	561.6	T16	37.6	37.6	37.6	37.6	37.6	40	43	45	49	51
85	Res	4.5	652.2	T17	37.0	37.0	37.0	37.0	37.0	40	43	45	49	51
86	Res	4.5	1930.3	T10	25.5	25.5	25.5	25.5	25.5	40	43	45	49	51
87	Res	4.5	1179.6	T10	33.0	33.0	33.0	33.0	33.0	40	43	45	49	51
88	Res	4.5	954.3	T3	35.5	35.5	35.5	35.5	35.5	40	43	45	49	51
89	Res	4.5	681.5	T3	37.2	37.2	37.2	37.2	37.2	40	43	45	49	51
90	Res	4.5	909.2	T5	36.3	36.3	36.3	36.3	36.3	40	43	45	49	51
91	Res	4.5	758.8	T4	37.9	37.9	37.9	37.9	37.9	40	43	45	49	51
93	Vlr	4.5	578.7	T11	39.0	39.0	39.0	39.0	39.0	40	43	45	49	51
94	Res	4.5	1358.5	T2	30.8	30.8	30.8	30.8	30.8	40	43	45	49	51
95	Res	4.5	723.7	T1	35.7	35.7	35.7	35.7	35.7	40	43	45	49	51
96	Res	4.5	1150.8	T1	31.3	31.3	31.3	31.3	31.3	40	43	45	49	51
97	Res	4.5	1965.6	T1	26.9	26.9	26.9	26.9	26.9	40	43	45	49	51
98	Res	4.5	1693.7	T10	29.7	29.7	29.7	29.7	29.7	40	43	45	49	51
99	Res	4.5	726.0	T2	35.9	35.9	35.9	35.9	35.9	40	43	45	49	51
100	Res	4.5	1591.5	T14	28.5	28.5	28.5	28.5	28.5	40	43	45	49	51
101	Res	4.5	1648.7	T12	30.7	30.7	30.7	30.7	30.7	40	43	45	49	51
102	Res	4.5	623.6	T3	38.0	38.0	38.0	38.0	38.0	40	43	45	49	51
103	Res	4.5	1798.0	T13	26.1	26.1	26.1	26.1	26.1	40	43	45	49	51
104	Res	4.5	1306.4	T14	30.7	30.7	30.7	30.7	30.7	40	43	45	49	51
105	Res	4.5	1387.4	T13	28.3	28.3	28.3	28.3	28.3	40	43	45	49	51
106	Vlr	4.5	1217.4	T12	32.3	32.3	32.3	32.3	32.3	40	43	45	49	51
107	Vlr	4.5	998.5	T11	33.3	33.3	33.3	33.3	33.3	40	43	45	49	51
109	Vlr	4.5	1764.7	T1	27.9	27.9	27.9	27.9	27.9	40	43	45	49	51
110	Vlr	4.5	1177.5	T12	31.6	31.6	31.6	31.6	31.6	40	43	45	49	51
111	Vlr	4.5	1357.7	T14	31.1	31.1	31.1	31.1	31.1	40	43	45	49	51
112	Vlr	4.5	1692.1	T14	28.2	28.2	28.2	28.2	28.2	40	43	45	49	51
113	Vlr	4.5	1377.9	T13	28.3	28.3	28.3	28.3	28.3	40	43	45	49	51
114	Vlr	4.5	1932.9	T16	28.1	28.1	28.1	28.1	28.1	40	43	45	49	51
115	Vlr	4.5	1327.2	T16	31.4	31.4	31.4	31.4	31.4	40	43	45	49	51
116	Vlr	4.5	1005.0	T16	33.1	33.1	33.1	33.1	33.1	40	43	45	49	51
117	Vlr	4.5	1996.2	T10	24.9	24.9	24.9	24.9	24.9	40	43	45	49	51
118	Vlr	4.5	1351.5	T13	29.3	29.3	29.3	29.3	29.3	40	43	45	49	51
119	Res	4.5	1405.1	T13	28.6	28.6	28.6	28.6	28.6	40	43	45	49	51
120	Res	4.5	1563.6	T13	27.2	27.2	27.2	27.2	27.2	40	43	45	49	51
121	Res	4.5	1198.8	T12	31.2	31.2	31.2	31.2	31.2	40	43	45	49	51
122	Res	4.5	749.7	T15	36.0	36.0	36.0	36.0	36.0	40	43	45	49	51

Point of Reception ID	Description	Height Above Grade (m)	Distance to Nearest Turbine Noise Source (m)	Nearest Turbine Noise Source ID	Calculated Sound Level (dBA) at Selected Wind Speeds (m/s)					Sound Level Limit (dBA)				
					6	7	8	9	10	6	7	8	9	10
123	Res	4.5	1742.1	T14	27.7	27.7	27.7	27.7	27.7	40	43	45	49	51
124	Res	4.5	1897.7	T14	26.8	26.8	26.8	26.8	26.8	40	43	45	49	51
125	Res	4.5	1196.2	T14	30.5	30.5	30.5	30.5	30.5	40	43	45	49	51
126	Res	4.5	1223.7	T14	30.3	30.3	30.3	30.3	30.3	40	43	45	49	51
127	Res	4.5	561.9	T17	38.3	38.3	38.3	38.3	38.3	40	43	45	49	51
128	Res	4.5	1440.6	T17	30.9	30.9	30.9	30.9	30.9	40	43	45	49	51
129	Res	4.5	1536.2	T17	30.4	30.4	30.4	30.4	30.4	40	43	45	49	51
130	Res	4.5	1052.0	T11	32.0	32.0	32.0	32.0	32.0	40	43	45	49	51
131	Res	4.5	1585.7	T11	29.7	29.7	29.7	29.7	29.7	40	43	45	49	51
132	Res	4.5	1694.7	T10	28.8	28.8	28.8	28.8	28.8	40	43	45	49	51
133	Res	4.5	1413.0	T10	27.7	27.7	27.7	27.7	27.7	40	43	45	49	51
134	Res	4.5	1983.7	T10	27.0	27.0	27.0	27.0	27.0	40	43	45	49	51
135	Res	4.5	1718.9	T10	29.6	29.6	29.6	29.6	29.6	40	43	45	49	51
136	Res	4.5	933.0	T3	35.0	35.0	35.0	35.0	35.0	40	43	45	49	51
137	Res	4.5	730.2	T11	37.5	37.5	37.5	37.5	37.5	40	43	45	49	51
138	Res	4.5	708.2	T2	35.0	35.0	35.0	35.0	35.0	40	43	45	49	51
139	Res	4.5	907.5	T1	35.6	35.6	35.6	35.6	35.6	40	43	45	49	51
140	Res	4.5	1777.8	T1	27.8	27.8	27.8	27.8	27.8	40	43	45	49	51
141	Res	4.5	990.5	T11	36.1	36.1	36.1	36.1	36.1	40	43	45	49	51
142	Res	4.5	738.4	T2	34.7	34.7	34.7	34.7	34.7	40	43	45	49	51
143	Res	4.5	643.9	T2	35.7	35.7	35.7	35.7	35.7	40	43	45	49	51
144	Res	4.5	705.4	T13	36.4	36.4	36.4	36.4	36.4	40	43	45	49	51
145	Res	4.5	1759.0	T13	26.4	26.4	26.4	26.4	26.4	40	43	45	49	51
146	Res	4.5	1879.0	T17	28.4	28.4	28.4	28.4	28.4	40	43	45	49	51
147	Res	4.5	771.3	T14	35.7	35.7	35.7	35.7	35.7	40	43	45	49	51
148	Res	4.5	1111.0	T14	31.2	31.2	31.2	31.2	31.2	40	43	45	49	51
149	Res	4.5	1354.6	T14	30.7	30.7	30.7	30.7	30.7	40	43	45	49	51
150	Res	4.5	1757.8	T16	29.6	29.6	29.6	29.6	29.6	40	43	45	49	51
151	Res	4.5	1788.2	T16	29.7	29.7	29.7	29.7	29.7	40	43	45	49	51
152	Res	4.5	1726.9	T12	30.5	30.5	30.5	30.5	30.5	40	43	45	49	51
153	Res	4.5	1959.1	T14	27.7	27.7	27.7	27.7	27.7	40	43	45	49	51
154	Vlr	4.5	1210.6	T1	33.6	33.6	33.6	33.6	33.6	40	43	45	49	51
155	Vlr	4.5	1117.6	T2	32.3	32.3	32.3	32.3	32.3	40	43	45	49	51
156	Vlr	4.5	963.2	T11	36.4	36.4	36.4	36.4	36.4	40	43	45	49	51
157	Vlr	4.5	894.5	T11	35.6	35.6	35.6	35.6	35.6	40	43	45	49	51
158	Vlr	4.5	782.7	T1	36.1	36.1	36.1	36.1	36.1	40	43	45	49	51
159	Vlr	4.5	1688.9	T1	28.2	28.2	28.2	28.2	28.2	40	43	45	49	51
160	Vlr	4.5	1382.0	T7	32.1	32.1	32.1	32.1	32.1	40	43	45	49	51
161	Vlr	4.5	601.6	T8	39.5	39.5	39.5	39.5	39.5	40	43	45	49	51
162	Vlr	4.5	851.6	T2	33.9	33.9	33.9	33.9	33.9	40	43	45	49	51
164	Res	4.5	994.9	T12	33.7	33.7	33.7	33.7	33.7	40	43	45	49	51
165	Res	4.5	1246.1	T12	31.0	31.0	31.0	31.0	31.0	40	43	45	49	51
166	Res	4.5	888.7	T14	34.4	34.4	34.4	34.4	34.4	40	43	45	49	51
167	Res	4.5	1829.1	T14	26.5	26.5	26.5	26.5	26.5	40	43	45	49	51
168	Res	4.5	678.0	T16	36.1	36.1	36.1	36.1	36.1	40	43	45	49	51
169	Res	4.5	1748.6	T11	29.1	29.1	29.1	29.1	29.1	40	43	45	49	51
170	Res	4.5	947.4	T10	31.6	31.6	31.6	31.6	31.6	40	43	45	49	51
171	Res	4.5	1076.6	T10	30.3	30.3	30.3	30.3	30.3	40	43	45	49	51
172	Res	4.5	1699.9	T10	29.3	29.3	29.3	29.3	29.3	40	43	45	49	51
173	Res	4.5	1323.6	T10	30.8	30.8	30.8	30.8	30.8	40	43	45	49	51
174	Res	4.5	1192.3	T3	33.2	33.2	33.2	33.2	33.2	40	43	45	49	51
175	Res	4.5	719.1	T10	36.1	36.1	36.1	36.1	36.1	40	43	45	49	51

Point of Reception ID	Description	Height Above Grade (m)	Distance to Nearest Turbine Noise Source (m)	Nearest Turbine Noise Source ID	Calculated Sound Level (dBA) at Selected Wind Speeds (m/s)					Sound Level Limit (dBA)				
					6	7	8	9	10	6	7	8	9	10
177	Res	4.5	637.1	T11	37.5	37.5	37.5	37.5	37.5	40	43	45	49	51
178	Res	4.5	1256.2	T7	33.1	33.1	33.1	33.1	33.1	40	43	45	49	51
179	Res	4.5	955.6	T2	33.4	33.4	33.4	33.4	33.4	40	43	45	49	51
180	Res	4.5	743.7	T1	35.6	35.6	35.6	35.6	35.6	40	43	45	49	51
181	Res	4.5	840.5	T1	33.9	33.9	33.9	33.9	33.9	40	43	45	49	51
182	Res	4.5	902.3	T1	33.3	33.3	33.3	33.3	33.3	40	43	45	49	51
183	Res	4.5	1240.3	T1	30.5	30.5	30.5	30.5	30.5	40	43	45	49	51
184	Res	4.5	650.4	T2	36.2	36.2	36.2	36.2	36.2	40	43	45	49	51
185	Res	4.5	1373.2	T8	32.3	32.3	32.3	32.3	32.3	40	43	45	49	51
186	Res	4.5	710.0	T13	35.0	35.0	35.0	35.0	35.0	40	43	45	49	51
187	Res	4.5	1415.0	T14	29.5	29.5	29.5	29.5	29.5	40	43	45	49	51
188	Res	4.5	1671.9	T13	26.6	26.6	26.6	26.6	26.6	40	43	45	49	51
189	Res	4.5	1870.2	T13	25.8	25.8	25.8	25.8	25.8	40	43	45	49	51
190	Res	4.5	1238.9	T12	30.9	30.9	30.9	30.9	30.9	40	43	45	49	51
191	Res	4.5	1290.3	T13	28.9	28.9	28.9	28.9	28.9	40	43	45	49	51
192	Res	4.5	679.9	T10	36.3	36.3	36.3	36.3	36.3	40	43	45	49	51
193	Res	4.5	1307.0	T12	31.7	31.7	31.7	31.7	31.7	40	43	45	49	51
194	Res	4.5	1241.2	T12	30.8	30.8	30.8	30.8	30.8	40	43	45	49	51
196	Res	4.5	1355.7	T14	29.7	29.7	29.7	29.7	29.7	40	43	45	49	51
197	Res	4.5	1668.3	T12	30.7	30.7	30.7	30.7	30.7	40	43	45	49	51
198	Res	4.5	1465.9	T16	30.3	30.3	30.3	30.3	30.3	40	43	45	49	51
199	Res	4.5	1401.1	T13	29.2	29.2	29.2	29.2	29.2	40	43	45	49	51
200	Res	4.5	1252.1	T13	29.3	29.3	29.3	29.3	29.3	40	43	45	49	51
201	Res	4.5	1049.0	T13	30.9	30.9	30.9	30.9	30.9	40	43	45	49	51
202	Res	4.5	801.9	T13	33.5	33.5	33.5	33.5	33.5	40	43	45	49	51
203	Vlr	4.5	956.5	T1	32.7	32.7	32.7	32.7	32.7	40	43	45	49	51
204	Vlr	4.5	1834.4	T10	27.9	27.9	27.9	27.9	27.9	40	43	45	49	51
205	Vlr	4.5	855.4	T10	32.3	32.3	32.3	32.3	32.3	40	43	45	49	51
206	Vlr	4.5	772.9	T10	36.0	36.0	36.0	36.0	36.0	40	43	45	49	51
207	Vlr	4.5	1859.9	T1	27.4	27.4	27.4	27.4	27.4	40	43	45	49	51
208	Vlr	4.5	644.1	T8	39.5	39.5	39.5	39.5	39.5	40	43	45	49	51
209	Vlr	4.5	1626.5	T11	29.0	29.0	29.0	29.0	29.0	40	43	45	49	51
210	Vlr	4.5	1226.0	T12	32.3	32.3	32.3	32.3	32.3	40	43	45	49	51
211	Vlr	4.5	653.7	T2	35.8	35.8	35.8	35.8	35.8	40	43	45	49	51
212	Vlr	4.5	804.6	T13	33.3	33.3	33.3	33.3	33.3	40	43	45	49	51
213	Vlr	4.5	1907.8	T13	25.7	25.7	25.7	25.7	25.7	40	43	45	49	51
214	Res	4.5	1513.8	T13	28.5	28.5	28.5	28.5	28.5	40	43	45	49	51
215	Res	4.5	1416.2	T13	28.8	28.8	28.8	28.8	28.8	40	43	45	49	51
216	Res	4.5	1484.1	T12	29.2	29.2	29.2	29.2	29.2	40	43	45	49	51
217	Res	4.5	1238.3	T12	31.1	31.1	31.1	31.1	31.1	40	43	45	49	51
218	Res	4.5	1987.2	T15	26.5	26.5	26.5	26.5	26.5	40	43	45	49	51
219	Res	4.5	719.3	T17	37.0	37.0	37.0	37.0	37.0	40	43	45	49	51
220	Res	4.5	1095.8	T17	32.8	32.8	32.8	32.8	32.8	40	43	45	49	51
221	Res	4.5	1321.0	T11	30.4	30.4	30.4	30.4	30.4	40	43	45	49	51
222	Res	4.5	1611.9	T11	29.0	29.0	29.0	29.0	29.0	40	43	45	49	51
223	Res	4.5	1745.7	T11	28.6	28.6	28.6	28.6	28.6	40	43	45	49	51
224	Res	4.5	1630.1	T11	29.3	29.3	29.3	29.3	29.3	40	43	45	49	51
225	Res	4.5	1892.3	T1	28.8	28.8	28.8	28.8	28.8	40	43	45	49	51
227	Res	4.5	904.9	T10	36.0	36.0	36.0	36.0	36.0	40	43	45	49	51
228	Res	4.5	1479.1	T12	31.3	31.3	31.3	31.3	31.3	40	43	45	49	51
229	Res	4.5	1523.3	T12	31.1	31.1	31.1	31.1	31.1	40	43	45	49	51
230	Res	4.5	1123.8	T8	32.9	32.9	32.9	32.9	32.9	40	43	45	49	51

Point of Reception ID	Description	Height Above Grade (m)	Distance to Nearest Turbine Noise Source (m)	Nearest Turbine Noise Source ID	Calculated Sound Level (dBA) at Selected Wind Speeds (m/s)					Sound Level Limit (dBA)				
					6	7	8	9	10	6	7	8	9	10
231	Res	4.5	1241.4	T7	32.9	32.9	32.9	32.9	32.9	40	43	45	49	51
232	Res	4.5	1278.6	T7	32.6	32.6	32.6	32.6	32.6	40	43	45	49	51
233	Res	4.5	1357.4	T7	32.3	32.3	32.3	32.3	32.3	40	43	45	49	51
234	Res	4.5	889.2	T2	34.5	34.5	34.5	34.5	34.5	40	43	45	49	51
235	Res	4.5	782.7	T2	34.6	34.6	34.6	34.6	34.6	40	43	45	49	51
236	Res	4.5	608.8	T2	39.5	39.5	39.5	39.5	39.5	40	43	45	49	51
237	Res	4.5	595.8	T1	36.7	36.7	36.7	36.7	36.7	40	43	45	49	51
238	Res	4.5	1610.8	T1	28.2	28.2	28.2	28.2	28.2	40	43	45	49	51
239	Res	4.5	771.0	T17	36.5	36.5	36.5	36.5	36.5	40	43	45	49	51
240	Res	4.5	772.0	T2	34.4	34.4	34.4	34.4	34.4	40	43	45	49	51
241	Res	4.5	1431.4	T12	31.4	31.4	31.4	31.4	31.4	40	43	45	49	51
243	Res	4.5	1425.2	T13	28.2	28.2	28.2	28.2	28.2	40	43	45	49	51
244	Res	4.5	1992.3	T13	25.3	25.3	25.3	25.3	25.3	40	43	45	49	51
246	Res	4.5	1386.6	T14	29.9	29.9	29.9	29.9	29.9	40	43	45	49	51
247	Res	4.5	1735.5	T16	29.9	29.9	29.9	29.9	29.9	40	43	45	49	51
248	Res	4.5	1429.0	T12	30.7	30.7	30.7	30.7	30.7	40	43	45	49	51
249	Res	4.5	1454.3	T13	29.3	29.3	29.3	29.3	29.3	40	43	45	49	51
250	Vlr	4.5	900.8	T16	36.0	36.0	36.0	36.0	36.0	40	43	45	49	51
251	Vlr	4.5	855.3	T17	36.4	36.4	36.4	36.4	36.4	40	43	45	49	51
252	Vlr	4.5	840.4	T10	35.9	35.9	35.9	35.9	35.9	40	43	45	49	51
253	Vlr	4.5	1897.3	T10	28.7	28.7	28.7	28.7	28.7	40	43	45	49	51
254	Vlr	4.5	841.5	T1	34.2	34.2	34.2	34.2	34.2	40	43	45	49	51
255	Vlr	4.5	1926.2	T1	27.1	27.1	27.1	27.1	27.1	40	43	45	49	51
256	Vlr	4.5	1285.0	T12	31.3	31.3	31.3	31.3	31.3	40	43	45	49	51
257	Vlr	4.5	1587.4	T13	28.7	28.7	28.7	28.7	28.7	40	43	45	49	51
258	Vlr	4.5	713.9	T12	36.2	36.2	36.2	36.2	36.2	40	43	45	49	51
259	Vlr	4.5	1812.2	T13	27.9	27.9	27.9	27.9	27.9	40	43	45	49	51
260	Vlr	4.5	1485.5	T12	29.2	29.2	29.2	29.2	29.2	40	43	45	49	51
261	Vlr	4.5	1869.1	T12	27.5	27.5	27.5	27.5	27.5	40	43	45	49	51
262	Vlr	4.5	1206.3	T14	30.8	30.8	30.8	30.8	30.8	40	43	45	49	51
263	Res	4.5	1559.5	T13	28.4	28.4	28.4	28.4	28.4	40	43	45	49	51
264	Res	4.5	1781.4	T12	27.6	27.6	27.6	27.6	27.6	40	43	45	49	51
265	Res	4.5	1105.6	T14	31.8	31.8	31.8	31.8	31.8	40	43	45	49	51
267	Res	4.5	1682.0	T10	29.1	29.1	29.1	29.1	29.1	40	43	45	49	51
268	Res	4.5	1815.7	T10	28.8	28.8	28.8	28.8	28.8	40	43	45	49	51
269	Res	4.5	1536.1	T10	31.0	31.0	31.0	31.0	31.0	40	43	45	49	51
270	Res	4.5	977.3	T10	35.3	35.3	35.3	35.3	35.3	40	43	45	49	51
273	Res	4.5	1202.4	T2	31.8	31.8	31.8	31.8	31.8	40	43	45	49	51
274	Res	4.5	1541.0	T2	29.9	29.9	29.9	29.9	29.9	40	43	45	49	51
275	Res	4.5	1639.2	T1	28.6	28.6	28.6	28.6	28.6	40	43	45	49	51
276	Res	4.5	1902.4	T1	26.8	26.8	26.8	26.8	26.8	40	43	45	49	51
277	Res	4.5	645.9	T3	37.6	37.6	37.6	37.6	37.6	40	43	45	49	51
278	Res	4.5	1512.4	T14	28.9	28.9	28.9	28.9	28.9	40	43	45	49	51
279	Res	4.5	1725.4	T14	28.1	28.1	28.1	28.1	28.1	40	43	45	49	51
280	Res	4.5	1550.5	T12	28.9	28.9	28.9	28.9	28.9	40	43	45	49	51
281	Res	4.5	1936.1	T13	26.3	26.3	26.3	26.3	26.3	40	43	45	49	51
282	Res	4.5	562.6	T12	38.0	38.0	38.0	38.0	38.0	40	43	45	49	51
283	Res	4.5	1909.8	T10	25.9	25.9	25.9	25.9	25.9	40	43	45	49	51
284	Res	4.5	1759.3	T13	26.3	26.3	26.3	26.3	26.3	40	43	45	49	51
285	Res	4.5	807.7	T14	34.1	34.1	34.1	34.1	34.1	40	43	45	49	51
286	Res	4.5	1733.8	T14	28.4	28.4	28.4	28.4	28.4	40	43	45	49	51
287	Res	4.5	1368.3	T14	30.2	30.2	30.2	30.2	30.2	40	43	45	49	51

Point of Reception ID	Description	Height Above Grade (m)	Distance to Nearest Turbine Noise Source (m)	Nearest Turbine Noise Source ID	Calculated Sound Level (dBA) at Selected Wind Speeds (m/s)					Sound Level Limit (dBA)				
					6	7	8	9	10	6	7	8	9	10
288	Res	4.5	1038.7	T14	34.1	34.1	34.1	34.1	34.1	40	43	45	49	51
289	Res	4.5	1707.5	T16	30.0	30.0	30.0	30.0	30.0	40	43	45	49	51
290	Res	4.5	1348.5	T13	29.4	29.4	29.4	29.4	29.4	40	43	45	49	51
291	Res	4.5	1140.8	T13	30.6	30.6	30.6	30.6	30.6	40	43	45	49	51
292	Res	4.5	1001.6	T13	31.3	31.3	31.3	31.3	31.3	40	43	45	49	51
293	Res	4.5	1193.0	T13	29.7	29.7	29.7	29.7	29.7	40	43	45	49	51
295	Vlr	4.5	1770.4	T1	27.4	27.4	27.4	27.4	27.4	40	43	45	49	51
296	Vlr	4.5	768.9	T16	36.7	36.7	36.7	36.7	36.7	40	43	45	49	51
297	Vlr	4.5	1074.1	T10	34.3	34.3	34.3	34.3	34.3	40	43	45	49	51
298	Vlr	4.5	892.5	T11	34.7	34.7	34.7	34.7	34.7	40	43	45	49	51
299	Vlr	4.5	1404.8	T12	31.6	31.6	31.6	31.6	31.6	40	43	45	49	51
300	Vlr	4.5	760.6	T15	36.2	36.2	36.2	36.2	36.2	40	43	45	49	51
301	Res	4.5	1800.3	T15	27.5	27.5	27.5	27.5	27.5	40	43	45	49	51
302	Res	4.5	1931.2	T15	26.7	26.7	26.7	26.7	26.7	40	43	45	49	51
303	Res	4.5	1232.8	T14	30.3	30.3	30.3	30.3	30.3	40	43	45	49	51
304	Res	4.5	610.3	T16	37.1	37.1	37.1	37.1	37.1	40	43	45	49	51
305	Res	4.5	1001.7	T16	35.6	35.6	35.6	35.6	35.6	40	43	45	49	51
307	Res	4.5	951.8	T17	33.9	33.9	33.9	33.9	33.9	40	43	45	49	51
308	Res	4.5	1468.8	T11	30.4	30.4	30.4	30.4	30.4	40	43	45	49	51
309	Res	4.5	1905.9	T11	29.0	29.0	29.0	29.0	29.0	40	43	45	49	51
310	Res	4.5	906.2	T10	31.8	31.8	31.8	31.8	31.8	40	43	45	49	51
311	Res	4.5	1375.7	T10	28.0	28.0	28.0	28.0	28.0	40	43	45	49	51
312	Res	4.5	1482.9	T10	27.3	27.3	27.3	27.3	27.3	40	43	45	49	51
313	Res	4.5	1837.1	T10	25.5	25.5	25.5	25.5	25.5	40	43	45	49	51
314	Res	4.5	1977.8	T10	25.0	25.0	25.0	25.0	25.0	40	43	45	49	51
315	Res	4.5	1934.2	T10	25.7	25.7	25.7	25.7	25.7	40	43	45	49	51
316	Res	4.5	791.7	T5 (*)	38.5	38.5	38.5	38.5	38.5	40	43	45	49	51
317	Res	4.5	930.3	T7	36.4	36.4	36.4	36.4	36.4	40	43	45	49	51
318	Res	4.5	594.1	T2	39.3	39.3	39.3	39.3	39.3	40	43	45	49	51
319	Res	4.5	1665.4	T2	29.3	29.3	29.3	29.3	29.3	40	43	45	49	51
320	Res	4.5	2442.8	T1	27.8	27.8	27.8	27.8	27.8	40	43	45	49	51
321	Res	4.5	1224.6	T1	30.8	30.8	30.8	30.8	30.8	40	43	45	49	51
322	Res	4.5	1338.1	T1	30.2	30.2	30.2	30.2	30.2	40	43	45	49	51
323	Res	4.5	567.0	T16	37.7	37.7	37.7	37.7	37.7	40	43	45	49	51
324	Res	4.5	1529.0	T8	31.5	31.5	31.5	31.5	31.5	40	43	45	49	51
325	Res	4.5	1385.9	T12	31.6	31.6	31.6	31.6	31.6	40	43	45	49	51
326	Res	4.5	1361.5	T14	31.6	31.6	31.6	31.6	31.6	40	43	45	49	51
327	Res	4.5	1135.2	T16	32.3	32.3	32.3	32.3	32.3	40	43	45	49	51
328	Res	4.5	1508.7	T13	28.6	28.6	28.6	28.6	28.6	40	43	45	49	51
329	Res	4.5	1725.5	T14	28.3	28.3	28.3	28.3	28.3	40	43	45	49	51
330	Res	4.5	913.1	T4	36.7	36.7	36.7	36.7	36.7	40	43	45	49	51
331	Res	4.5	1982.6	T12	27.8	27.8	27.8	27.8	27.8	40	43	45	49	51
332	Res	4.5	1793.8	T12	29.9	29.9	29.9	29.9	29.9	40	43	45	49	51
333	Res	4.5	1320.4	T2	30.8	30.8	30.8	30.8	30.8	40	43	45	49	51
334	Res	4.5	1675.1	T13	28.4	28.4	28.4	28.4	28.4	40	43	45	49	51
335	Res	4.5	1459.8	T13	29.0	29.0	29.0	29.0	29.0	40	43	45	49	51
336	Res	4.5	1745.5	T17	29.0	29.0	29.0	29.0	29.0	40	43	45	49	51
337	Vlr	4.5	599.8	T16	37.5	37.5	37.5	37.5	37.5	40	43	45	49	51
338	Vlr	4.5	1516.5	T11	29.4	29.4	29.4	29.4	29.4	40	43	45	49	51
339	Vlr	4.5	1504.5	T17	30.4	30.4	30.4	30.4	30.4	40	43	45	49	51
340	Vlr	4.5	1655.2	T10	28.9	28.9	28.9	28.9	28.9	40	43	45	49	51
341	Vlr	4.5	571.1	T16	37.4	37.4	37.4	37.4	37.4	40	43	45	49	51

Point of Reception ID	Description	Height Above Grade (m)	Distance to Nearest Turbine Noise Source (m)	Nearest Turbine Noise Source ID	Calculated Sound Level (dBA) at Selected Wind Speeds (m/s)					Sound Level Limit (dBA)				
					6	7	8	9	10	6	7	8	9	10
342	Vlr	4.5	1036.1	T1	32.1	32.1	32.1	32.1	32.1	40	43	45	49	51
343	Vlr	4.5	1396.5	T16	30.5	30.5	30.5	30.5	30.5	40	43	45	49	51
344	Vlr	4.5	1533.7	T13	29.4	29.4	29.4	29.4	29.4	40	43	45	49	51
345	Vlr	4.5	1673.3	T14	28.7	28.7	28.7	28.7	28.7	40	43	45	49	51
347	Res	4.5	1401.7	T13	28.8	28.8	28.8	28.8	28.8	40	43	45	49	51
348	Res	4.5	1770.5	T13	26.1	26.1	26.1	26.1	26.1	40	43	45	49	51
349	Res	4.5	1650.4	T13	26.7	26.7	26.7	26.7	26.7	40	43	45	49	51
350	Vlr	4.5	1048.9	T14	32.2	32.2	32.2	32.2	32.2	40	43	45	49	51
351	Vlr	4.5	896.9	T17	34.5	34.5	34.5	34.5	34.5	40	43	45	49	51
352	Vlr	4.5	735.9	T1	35.3	35.3	35.3	35.3	35.3	40	43	45	49	51
376	Vlr	4.5	1600.6	T13	26.9	26.9	26.9	26.9	26.9	40	43	45	49	51
377	Res	4.5	1779.8	T13	26.0	26.0	26.0	26.0	26.0	40	43	45	49	51
378	Res	4.5	1920.9	T13	25.3	25.3	25.3	25.3	25.3	40	43	45	49	51
380	Res	4.5	1826.6	T13	25.8	25.8	25.8	25.8	25.8	40	43	45	49	51
381	Res	4.5	1966.1	T13	25.2	25.2	25.2	25.2	25.2	40	43	45	49	51
382	Res	4.5	1927.6	T13	26.3	26.3	26.3	26.3	26.3	40	43	45	49	51
383	Vlr	4.5	1857.6	T13	26.7	26.7	26.7	26.7	26.7	40	43	45	49	51
384	Vlr	4.5	1578.9	T13	28.3	28.3	28.3	28.3	28.3	40	43	45	49	51
385	Res	4.5	1759.8	T13	27.3	27.3	27.3	27.3	27.3	40	43	45	49	51
389	Res	4.5	1960.0	T13	26.5	26.5	26.5	26.5	26.5	40	43	45	49	51
390	Res	4.5	1932.8	T13	26.6	26.6	26.6	26.6	26.6	40	43	45	49	51
391	Res	4.5	1806.1	T13	27.2	27.2	27.2	27.2	27.2	40	43	45	49	51
392	Vlr	4.5	1933.2	T13	26.5	26.5	26.5	26.5	26.5	40	43	45	49	51
393	Vlr	4.5	1693.2	T13	27.8	27.8	27.8	27.8	27.8	40	43	45	49	51
394	Res	4.5	1634.6	T13	28.2	28.2	28.2	28.2	28.2	40	43	45	49	51
395	Res	4.5	1993.0	T13	26.4	26.4	26.4	26.4	26.4	40	43	45	49	51
397	Res	4.5	1984.2	T13	26.6	26.6	26.6	26.6	26.6	40	43	45	49	51
398	Res	4.5	1918.3	T13	26.9	26.9	26.9	26.9	26.9	40	43	45	49	51
399	Res	4.5	1882.6	T13	27.1	27.1	27.1	27.1	27.1	40	43	45	49	51
400	Res	4.5	1846.6	T13	27.1	27.1	27.1	27.1	27.1	40	43	45	49	51
401	Res	4.5	1940.8	T13	26.6	26.6	26.6	26.6	26.6	40	43	45	49	51
402	Vlr	4.5	1948.1	T13	26.7	26.7	26.7	26.7	26.7	40	43	45	49	51
403	Vlr	4.5	1916.9	T13	26.8	26.8	26.8	26.8	26.8	40	43	45	49	51
404	Vlr	4.5	1882.4	T13	27.0	27.0	27.0	27.0	27.0	40	43	45	49	51
405	Vlr	4.5	1917.9	T13	27.2	27.2	27.2	27.2	27.2	40	43	45	49	51
406	Res	4.5	1951.8	T13	27.6	27.6	27.6	27.6	27.6	40	43	45	49	51
407	Res	4.5	1984.6	T13	26.8	26.8	26.8	26.8	26.8	40	43	45	49	51
409	Res	4.5	1877.0	T13	27.2	27.2	27.2	27.2	27.2	40	43	45	49	51
410	Res	4.5	1818.9	T13	27.5	27.5	27.5	27.5	27.5	40	43	45	49	51
411	Res	4.5	1751.1	T13	27.8	27.8	27.8	27.8	27.8	40	43	45	49	51
412	Res	4.5	1789.6	T13	27.7	27.7	27.7	27.7	27.7	40	43	45	49	51
413	Res	4.5	1838.4	T13	27.5	27.5	27.5	27.5	27.5	40	43	45	49	51
414	Res	4.5	1856.3	T13	27.4	27.4	27.4	27.4	27.4	40	43	45	49	51
415	Res	4.5	1884.6	T13	27.2	27.2	27.2	27.2	27.2	40	43	45	49	51
416	Vlr	4.5	1792.1	T13	27.6	27.6	27.6	27.6	27.6	40	43	45	49	51
417	Vlr	4.5	1744.8	T13	28.0	28.0	28.0	28.0	28.0	40	43	45	49	51
418	Res	4.5	1878.1	T13	27.5	27.5	27.5	27.5	27.5	40	43	45	49	51
419	Res	4.5	1872.7	T13	27.5	27.5	27.5	27.5	27.5	40	43	45	49	51
420	Res	4.5	1877.3	T13	27.4	27.4	27.4	27.4	27.4	40	43	45	49	51
421	Res	4.5	1903.8	T13	27.2	27.2	27.2	27.2	27.2	40	43	45	49	51
422	Res	4.5	1991.5	T13	27.4	27.4	27.4	27.4	27.4	40	43	45	49	51
425	Vlr	4.5	1984.3	T13	26.9	26.9	26.9	26.9	26.9	40	43	45	49	51

Point of Reception ID	Description	Height Above Grade (m)	Distance to Nearest Turbine Noise Source (m)	Nearest Turbine Noise Source ID	Calculated Sound Level (dBA) at Selected Wind Speeds (m/s)					Sound Level Limit (dBA)				
					6	7	8	9	10	6	7	8	9	10
439	Vlr	4.5	1938.6	T15	26.7	26.7	26.7	26.7	26.7	40	43	45	49	51
440	Vlr	4.5	1955.4	T15	26.7	26.7	26.7	26.7	26.7	40	43	45	49	51
450	Vlr	4.5	1858.8	T15	27.2	27.2	27.2	27.2	27.2	40	43	45	49	51
451	Vlr	4.5	1824.1	T15	27.3	27.3	27.3	27.3	27.3	40	43	45	49	51
452	Vlr	4.5	1762.2	T15	27.7	27.7	27.7	27.7	27.7	40	43	45	49	51
453	Vlr	4.5	1907.7	T15	26.9	26.9	26.9	26.9	26.9	40	43	45	49	51
454	Vlr	4.5	1913.4	T15	26.8	26.8	26.8	26.8	26.8	40	43	45	49	51
455	Vlr	4.5	1962.7	T15	26.6	26.6	26.6	26.6	26.6	40	43	45	49	51
456	Vlr	4.5	1986.5	T15	26.4	26.4	26.4	26.4	26.4	40	43	45	49	51
458	Vlr	4.5	1778.8	T15	27.6	27.6	27.6	27.6	27.6	40	43	45	49	51
459	Vlr	4.5	1839.8	T15	27.2	27.2	27.2	27.2	27.2	40	43	45	49	51
460	Vlr	4.5	1908.2	T15	26.8	26.8	26.8	26.8	26.8	40	43	45	49	51
461	Vlr	4.5	1958.2	T15	26.6	26.6	26.6	26.6	26.6	40	43	45	49	51
462	Vlr	4.5	2016.3	T15	26.3	26.3	26.3	26.3	26.3	40	43	45	49	51
465	Vlr	4.5	1815.5	T15	27.4	27.4	27.4	27.4	27.4	40	43	45	49	51
472	Vlr	4.5	1980.2	T12	26.6	26.6	26.6	26.6	26.6	40	43	45	49	51
473	Vlr	4.5	1927.4	T13	27.4	27.4	27.4	27.4	27.4	40	43	45	49	51
474	Vlr	4.5	619.4	T11	38.6	38.6	38.6	38.6	38.6	40	43	45	49	51
475	Vlr	4.5	614.6	T5	40.0	40.0	40.0	40.0	40.0	40	43	45	49	51

Table 9-10 Combined Wind Turbine &Transformer Noise Impact Summary – Participating Receptors

Participating Receptor ID	Description	Height Above Grade (m)	Distance to Nearest Turbine Noise Source (m)	Nearest Turbine Noise Source ID	Calculated Sound Level (dBA)at Selected Wind Speeds (m/s)				
					6	7	8	9	10
7	Res-P	4.5	601.5	T8	39.10	39.10	39.10	39.10	39.10
92	Res-P	4.5	435.6	T6	39.69	39.69	39.69	39.69	39.69
108	Vlr-P	4.5	700.9	T7	39.20	39.20	39.20	39.20	39.20
163	Vlr-P	4.5	525.5	T11	39.60	39.60	39.60	39.60	39.60
176	Res-P	4.5	564.6	T5	45.39	45.39	45.39	45.39	45.39
195	Res-P	4.5	585.8	T15	38.20	38.20	38.20	38.20	38.20
226	Res-P	4.5	1033.3	T3	34.83	34.83	34.83	34.83	34.83
242	Res-P	4.5	491.0	T13	37.80	37.80	37.80	37.80	37.80
245	Res-P	4.5	452.5	T15	40.20	40.20	40.20	40.20	40.20
266	Res-P	4.5	720.1	T16	35.70	35.70	35.70	35.70	35.70
271	Res-P	4.5	479.0	T4	41.26	41.26	41.26	41.26	41.26
272	Res-P	4.5	652.9	T2	36.13	36.13	36.13	36.13	36.13
306	Res-P	4.5	464.0	T16	39.70	39.70	39.70	39.70	39.70
346	Vlr-P	4.5	780.8	T1	34.52	34.52	34.52	34.52	34.52