



# ERNESTOWN

## Wind Park

### OVERVIEW

Welcome to the Ernestown Wind Park open house. This public meeting is being held to introduce the proposed wind farm to the general public, offer information, and answer questions.

Stakeholder input is a key component of the Renewable Energy Approval (REA) process. You can provide your comments, questions, and concerns by:

- Filling out the comment and survey form available at this open house
- Speaking with representatives of Ernestown Windpark at this open house
- Submitting comments to us through our contact info below

### CONTACT

Your input is critical to the process and important to us.

Please fill out the survey sheet before leaving. Thank you.

#### Ernestown Windpark Inc.

2300 Yonge Street, Suite 801  
Toronto, Ontario  
M4P 1E4

toll free: 1-877-389-4099

fax: (416) 864-9568

email: [info@ernestownwind.com](mailto:info@ernestownwind.com)



# ERNESTOWN

## Wind Park

### PROJECT DETAILS

#### LOCATION

The Ernestown Wind Park is proposed to be located in Loyalist Township adjacent to the Taylor Kidd Industrial Park. The Study area is between Millhaven Rd and Taylor Kidd Blvd, on private lands.

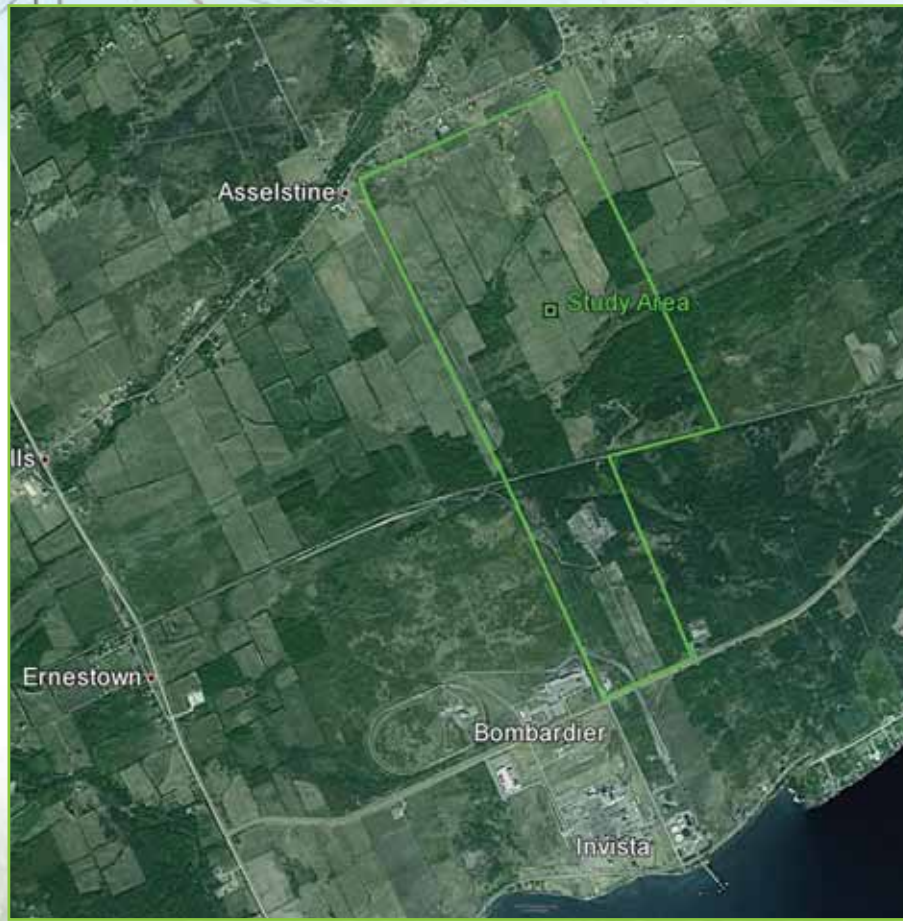
The wind turbines will be over ½ kilometer away from nearby homes.

#### SIZE

- Nameplate capacity of 10 MW
- 4-6 wind turbines
- Turbine heights between 80 to 108 meters
- Rotor diameter of 82 to 101 meters

#### ACTIVITIES TO DATE

- Wind measurements for over 12 months completed
- A Power Purchase Agreement entered with the Ontario Power Authority
- Notice of a Proposal and Public Meeting announcement
- A presentation to the Loyalist Township was made in June
- DRAFT Project Description Report available on website





# ERNESTOWN

## Wind Park

### PROJECT BENEFITS

The Ernestown Wind Park will power the future of local residents, the economy, and the community. The project is clean, green, and good for the environment.

### COMMUNITY BENEFITS

The Ernestown Wind Park will provide Loyalist Township with the potential for a prosperous future in the new Green Economy.

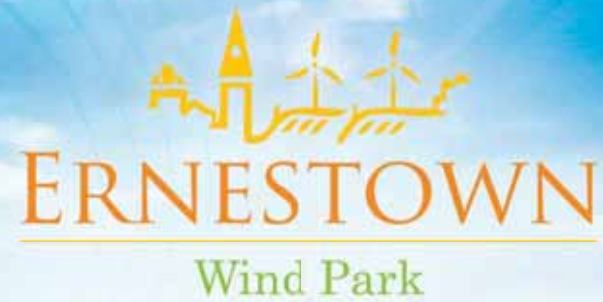
- **Jobs:** Both direct and indirect jobs during planning, construction, and life of facility
- **Clean Power:** The Ernestown Wind Park will provide clean power for 3000 homes
- **Tax Revenue** from each turbine benefits everyone in the community
- **Building up local expertise:** local professionals will be hired to work on the project
- **Improvements** to local infrastructure: power lines, roads
- **Leadership:** this project will add to this region's reputation as a leader in renewable energy

The proposed wind farm is sited in a good location close to an industrial park.

### BENEFITS OF WIND ENERGY

- Wind energy is clean, abundant, and reliable - with no emissions
- Wind is strongest during winter months, when our energy demands are high
- Wind power is one of the cleanest and cheapest sources of renewable energy
- Wind power will help Ontario reduce its overall greenhouse gas emissions

*This is only the beginning of the potential opportunities...*



# ERNESTOWN

## Wind Park

### RENEWABLE ENERGY APPROVAL PROCESS

This wind project requires an REA approval, as outlined in Ontario Regulation 359/09 made under the Environmental Protection Act.

### KEY STEPS IN REA PROCESS:

1. Confirm approvals and permits required with government agencies
2. Consult with stakeholders, conduct studies and obtain approvals and permits
3. Prepare a Draft REA report for public review (now available on project website)
4. Proponent submits REA application
5. Public Notice posted on the Environmental Registry
6. Ministry of Environment issues a decision
7. Third party hearing under the Environmental Review Tribunal (if required)

The REA process has begun for the proposed Ernestown Wind Park facility.



# ERNESTOWN

## Wind Park

### POTENTIAL IMPACTS

Compared to other forms of energy, wind energy has minimal impacts to environment. Common concerns surrounding wind energy are: noise, visuals, property value and wildlife impact.

### NOISE

Wind turbines produce low noise levels, primarily from the blade's movement through the air. To mitigate against possible noise impacts to residents, Ontario regulations call for a minimum 550m setback from homes. Ernestown Windpark is following these setback rules as set out by O.Reg 359/09.

The project is sited near an industrial park and CNR train tracks. Noise from these sources is greater than what is expected to be produced by the wind turbines.

### HEALTH

According to a recent report by Ontario's Chief Medical Officer of Health, the sound level from wind turbines at common residential setbacks is not sufficient to cause hearing impairment or other direct adverse health effects<sup>1</sup>.

*"According to the scientific evidence, there isn't any direct causal link between wind turbine noise and adverse health effects."*

~ Dr. Arlene King  
Chief Medical Officer of Health

### PROPERTY VALUES

Property values are not expected to be adversely affected by the proposed wind farm. According to recent findings by the Lawrence Berkeley National Laboratory, "neither the view of the wind facilities nor the distance of the home to those facilities is found to have any consistent, measurable, and statistically significant effect on home sales prices". A similar property value study in Ontario's Municipality of Chatham-Kent finds that there is no statistical evidence to demonstrate that wind farms negatively affect rural residential market values in the Chatham-Kent area<sup>2</sup>.

### WILDLIFE IMPACT

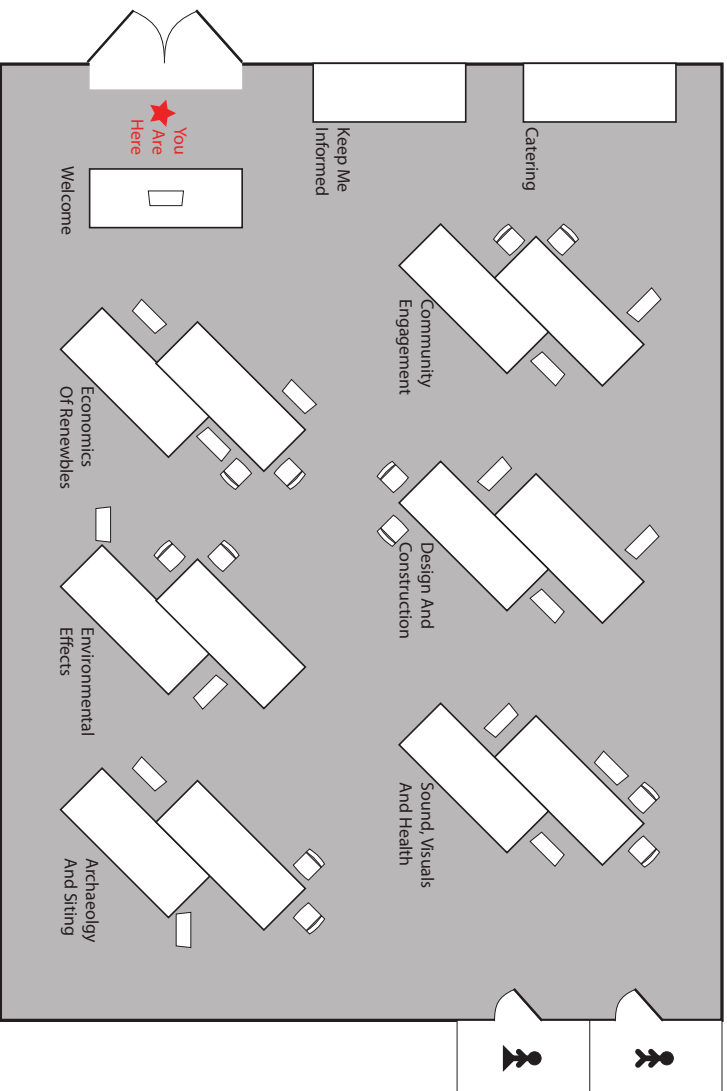
Environmental impact studies and consultations with conservation and environmental authorities focus on minimizing impacts to wildlife and identifying mitigation solutions when needed. The 4-6 turbines are expected to have low environmental impact on wildlife.

#### SOURCE

1: [http://www.health.gov.on.ca/en/public/publications/ministry\\_reports/wind\\_turbine/wind\\_turbine.aspx](http://www.health.gov.on.ca/en/public/publications/ministry_reports/wind_turbine/wind_turbine.aspx)  
2: [http://www.canwea.ca/wind-energy/talkingaboutwind\\_e.php](http://www.canwea.ca/wind-energy/talkingaboutwind_e.php)



# WELCOME TO THE AMHERSTVIEW ERNESTOWN WIND PARK OPEN HOUSE



## OUR OBJECTIVES FOR THIS OPEN HOUSE MEETING:

- Provide information about the proposed Ernestown Wind Park;
- Present information about the process of developing the Wind Park and the results of the environmental studies conducted;
- Demonstrate the community engagement events and consultation process;
- Provide information about common concerns relating to wind energy; and
- Introduce the Development Team of Ernestown Windpark Inc.

We invite you to view the display boards, speak to members of the Development Team and our Consultants; and complete a Feedback Form to provide your questions and comments.



**ERNESTOWN**

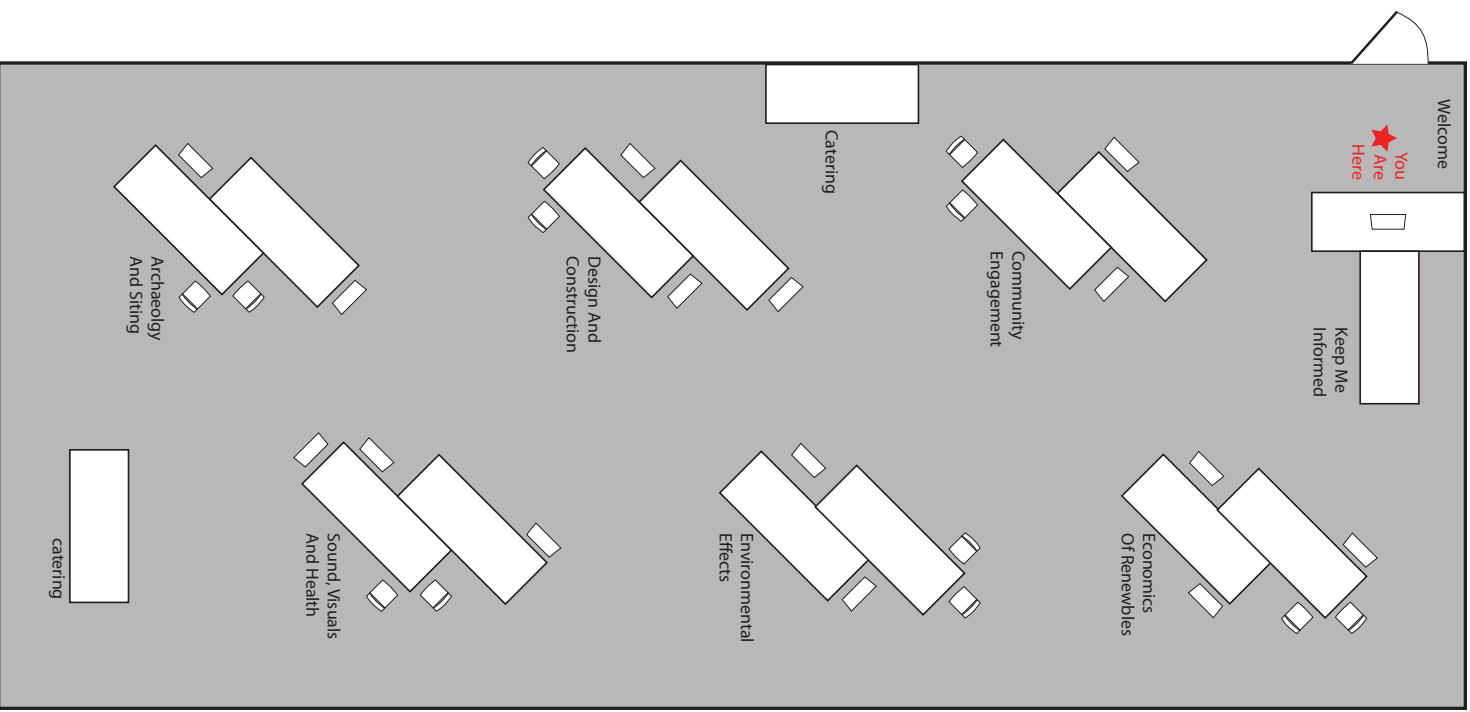
Windpark Inc.

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# ERNESTOWN

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WELCOME TO  
ERNESTOWN WIND PARK  
OPEN HOUSE

4-8PM



# ERNESTOWN WIND PARK OVERVIEW

## ABOUT ERNESTOWN WIND PARK

- The Wind Park will operate five 2.0MW wind turbine generators
- The Wind Park will also contain a switching station, electrical collector lines and other ancillary facilities, such as turbine access roads, an operation and maintenance building, and temporary construction areas.
- The Wind Park has a nameplate capacity of 10MW
- Located on Industrial and Agricultural lands deemed appropriate for wind energy development by Loyalist Township
- Ernestown Windpark Inc. was granted a 20-year Power Purchase Agreement with the Ontario Power Authority's Feed In Tariff program



## ABOUT THE DEVELOPER

Ernestown Windpark Inc. was founded in 2010 by a small family company called Horizon Legacy, which has more than 50 years experience in developing building and infrastructure projects in Ontario and abroad.

The company founder, Walter Zwig, is a lifetime achievement award winner for his dedicated work in the commercial development industry. The company's legacy continues in the renewable energy sector with his son, Anthony Zwig, who has developed commercial infrastructure and renewable energy projects in Canada, the US and in Sweden.

Horizon Legacy and it's daughter company, Ernestown Windpark Inc., have focused on developing a small project that works with the community that it has become a part of. Since the founding of the project in 2010, the team at Ernestown Windpark has prided itself in the relationships built with the community and the new approach to renewable energy development that has brought together local businesses, residents and a new future in clean energy.

**Ernestown Wind Park  
is the right sized  
project in the  
right location.**

  
**ERNESTOWN**

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# KEEPING YOU INFORMED

- We believe that small low-impact wind projects can be developed in harmony with rural communities, and contribute to the future and economic sustainability of these communities.
- Working to keep the community informed is a team effort. If we don't have an answer for you immediately, we will work together to provide it.
- Ernestown Windpark Inc. has a 20-year contract to generate renewable energy, and is committed to developing positive long term relationships in the community.
- Do you have a question or concern about the project? Please take the time to talk to us at this meeting. If you would rather call, email or write us, please take a business card with our contact information and get in touch.



## IN THE COMMUNITY

We have talked to hundreds of local community members, going door-to-door to meet the neighbours of the proposed site, attended 11 community events and gave 9 community group presentations in 2011 and 2012.

Would you like a presentation made to your group about the project, or know of a local event we should be a part of? Please call Community Relations Manager Melody Tomkow at 613-770-6116 to arrange a presentation.

Residents, municipality and businesses have shown support for Ernestown Wind Park. The Project Team has gathered over 140 signatures, postcards and letters of support for our project, including a letter of support from various individuals. If you would like to support the project, please fill in a postcard or sign our petition. Ernestown Windpark is proud to be a member of the community and looks forward to being here long term.



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# SUPPORTING COMMUNITY INITIATIVES

## If you could support any initiative in your community, what would it be?

We believe that the community should have the opportunity to benefit from the wind park, not just those with a direct financial stake.

Please tell us what's important to you about the community, and what projects, support or initiatives would support what's important to you.

## Think big. It's 'blue sky' time.

Jot down your ideas and put them in the box.

Please include your contact information so that we can follow up with you about your idea.

We are building ideas for an:

**ERNESTOWN**  
WIND PARK LEGACY FUND

We are here for the long haul and we want to do our part. Just to get you started, here's some of the things we have been thinking about at Ernestown Windpark Inc.:

- College/University Bursary – an annual bursary towards post secondary education
- Summer Camp Bursary - an annual bursary for a grade school student to attend an environmental or science summer camp
- Best Community Project (proposed) - an annual competition and financial award for the best proposed community project

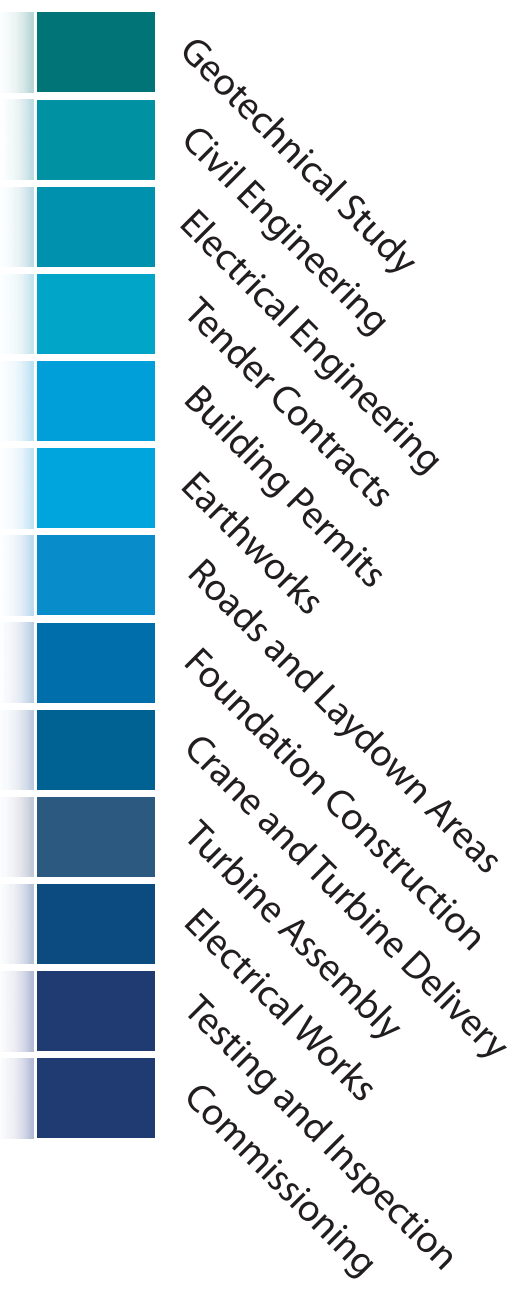
Please let us know what's important to you, and how we can support initiatives that support the environmental, social, and economic sustainability of the local area.



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# THE CONSTRUCTION PROCESS



## BEST PRACTICES FOR CONSTRUCTION



1. Work with local firms and engage early



2. Be present during construction



3. Respect the local environment



CONSTRUCTION ACTIVITIES YOU MIGHT SEE AT ERNESTOWN WIND PARK

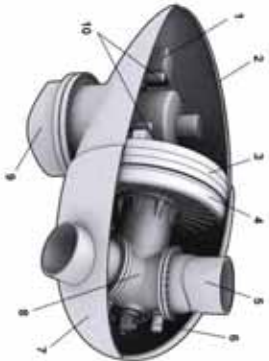
Dust Control  
Traffic Control

Turbine Delivery  
Turbine Assembly



# CONNECTING WIND TO THE GRID

## DIRECT DRIVE NACELLE - INTERNAL COMPONENTS



1. Control panel
2. Nacelle
3. Generator stator
4. Generator rotor
5. Blade root

6. Pitch drive
7. Nose cone
8. Main hub
9. Tower
10. Yaw drive

## HOW DO WIND TURBINES WORK?

Wind turbines convert the kinetic energy of wind to mechanical power that turns the generator, which spins magnets across superconductors to produce electricity.

Imagine that a wind turbine is the opposite of a fan:

A fan requires electricity to push air with the blades

A turbine has blades which are pushed by the wind to create electricity

## ELECTRICAL WORKS SPECIFICATIONS

(Note: all specifications are approximate)

Pole Spacing: 60-100m

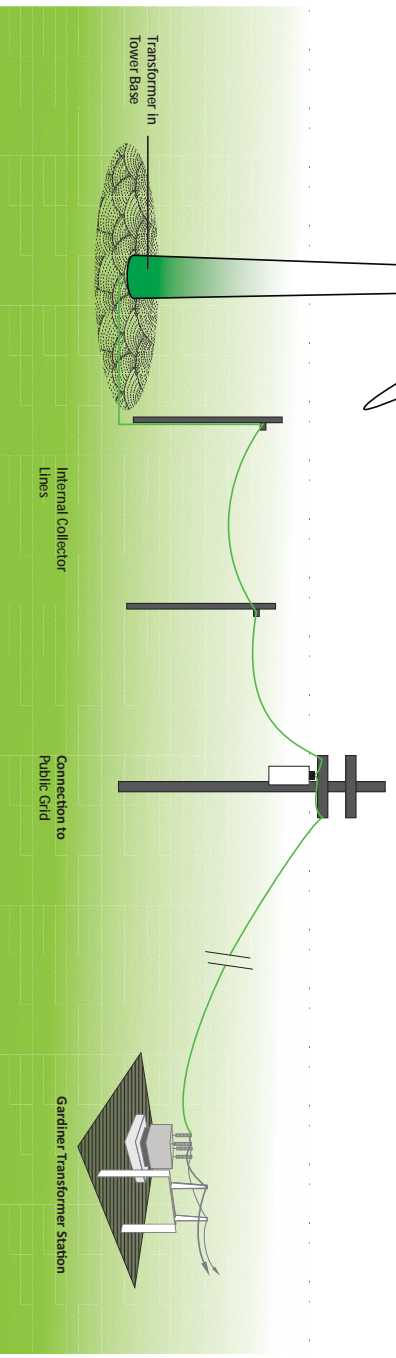
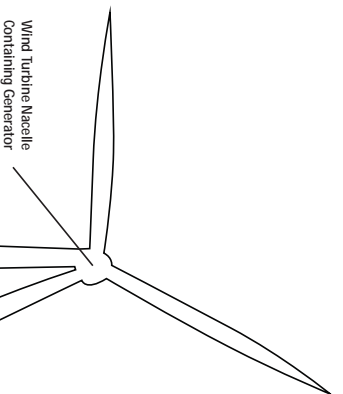
Pole Height (overhead): 13.1m

Minimum Wire Height (overhead): 7m

Voltage Output of E-92 Turbine: 400V

Collector Line Voltage: 44kV 3

Step-up transformer is located in the base of the turbine, converting the turbine output to 44kV



# PROPOSED TRANSPORTATION PLAN

## PROPOSED TRANSPORTATION ROUTES

■ Route Option One ■ Route Option Two



## PROPOSED ROUTE IMAGES



CN Rail Crossing on County Rd 4, looking north



Bridge on Millhaven Rd, looking west



Turn onto Millhaven Rd from County Rd 4

# ENVIRONMENTAL STUDIES



## NATURAL HERITAGE ASSESSMENT

The Natural Heritage Assessment, pursuant to Ontario Regulation 359/09 (O.Reg. 359/09), has four stages of investigation:

### 1. Records Review

Identification of known features, species at risk (SAR) and provincial records from the MNR and Cataraqui Regional Conservation Authority

Since 2009, the following Environmental Studies have been undertaken for the Project:

- Ecological Land Classification (ELC) Mapping
- Vegetation surveys
- Spring and Fall Migratory Bird Surveys
- Butterfly Migratory Stopover Surveys
- Wildlife Habitat Assessment and Mapping

### 2. Site Investigation

Collection of data from detailed field studies (listed to the right), filling in gaps in records and mapping

- Winter Raptor Surveys

### 3. Evaluation of Significance

Analysis of field study notes, comparison to provincial standards to establish "Significance"

- Wetland Evaluations

- Spring Waterfowl Surveys
- Bat Surveys (Acoustics and Radar)
- Breeding Bird Surveys

### 4. Environmental Impact Study

Identification of potential impacts to "Significant" features, proposal of mitigation measures, description of post-construction monitoring plans

- Herpetile (Amphibians and Reptiles) Surveys
- Species at Risk (SAR) Surveys
- Aquatic Surveys

For each natural heritage feature identified as significant, potential effects were assessed and mitigation measures/monitoring commitments proposed depending on the type of project infrastructure affecting the feature.



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# WATER BODIES AND WETLANDS

## ERNESTOWN WIND PARK WETLANDS

Wetlands exist within 120m of the proposed Ernestown Wind Park infrastructure. To date, there have been numerous field studies which have concluded that the wetlands are part of the watershed which runs into Parrott's Bay Conservation Area. The proposed Wind Park was designed to bypass all wetlands on the project location. The water

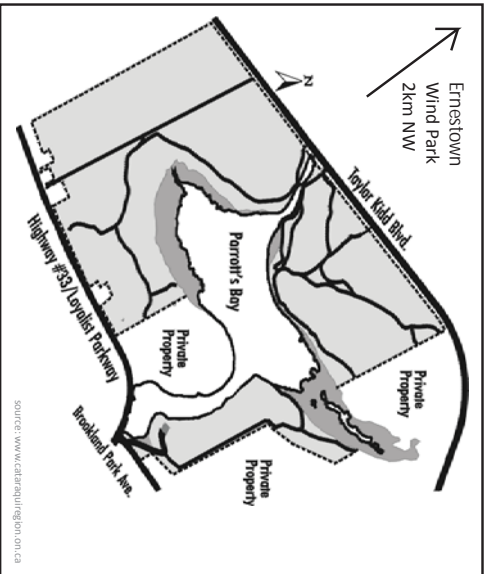


The box culvert is designed to be a safe and stable stream crossings that can accommodate wildlife and protect stream health while reducing expensive erosion and structural damage.

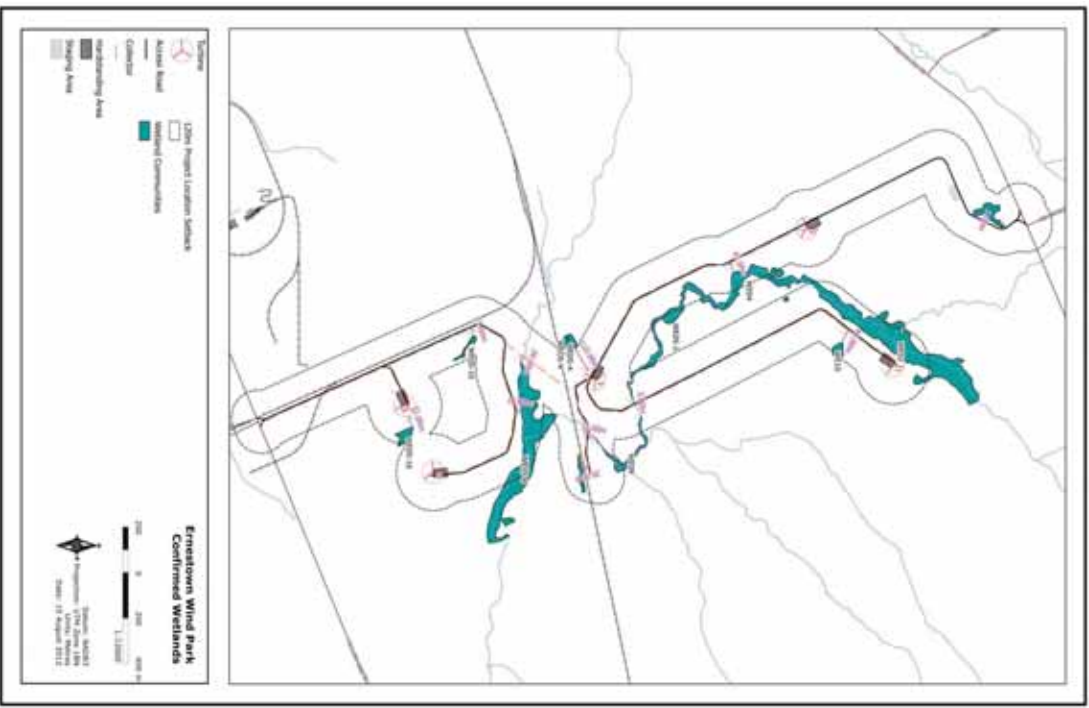
bodies which pass through the Project Location are intermittent and permanent streams, banked by wetlands and woodlands. The only water crossing was designed to minimize ecological impact and will look like the image shown below left. Erosion and sedimentation control measures will be monitored to assure this crossing is properly installed and maintained during and following construction.

## PARROTT'S BAY CONSERVATION AREA

Parrott's Bay Conservation Area is located east of the proposed Ernestown Wind Park. The area is of importance because the watershed passes through the project location, making the wetlands on site hydrologically connected and a part of the ecological complex.



source: www.ctdairmunicipal.ca



IMAGES FROM PARROTT'S BAY CONSERVATION AREA



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# ARCHAEOLOGY AND CULTURAL HERITAGE

**“As a result of the physical assessment of the property, no archaeological resources were encountered. Consequently, it is recommended no further archaeological assessment of the property is required.”**

– AMICK Consultants Limited

The methods employed in the archaeological studies were:

- Records review of known information about the study area and surrounding region;
- Photographic documentation; and
- Physical assessment:
  - Test pit surveys every 5m (see image, right);
  - High intensity pedestrian survey with 5m intervals between transects.



PLATE IMAGES FROM SITE RECONNAISSANCE



**“Cultural heritage resources comprise built heritage resources and cultural heritage landscapes. No built heritage resources or cultural heritage landscapes were identified within the study area. A Heritage Impact Assessment (HIA) is not recommended.”**

– AMICK Consultants Limited

Cultural Heritage Assessments include:

- Historical Research: Consulting maps, land records, photographs, publications, primary and other sources.
- Site Survey and Analysis: Windshield surveys, intensive surveys, site surveys and analysis of the various features and characteristics which make up the cultural heritage landscape as well as delineation of landscape boundaries.
- Evaluation: Applying criteria for evaluating design, history, and context of the entire subject area.



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# WHERE TO PUT A WIND PARK



1. Find reliable winds and conduct a wind resource analysis.



2. Work with land owners who want to be part of a renewable energy project



3. Follow the applicable regulations and study all natural features to identify environmental setbacks.



4. Conduct detailed Noise Impact Assessments and ensure that turbine are sited at least 550m from any home and sound levels are less than 40 decibels.

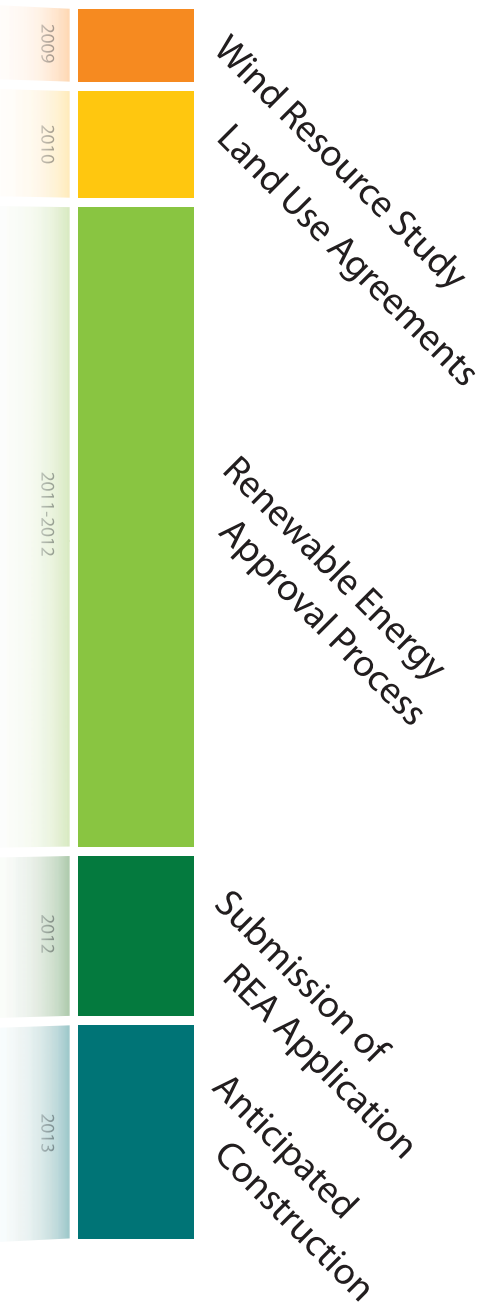


5. Consult with the community to keep the public and municipality informed and involved in the development process.



6. Develop the final site layout

# RENEWABLE ENERGY APPROVALS PROCESS



- Prepare Draft Project Description Report for the MOE
- Publish Notice of a Proposal and Public Meeting
- First Public Meeting
- Field Studies
  - Archaeology
  - Natural Heritage
  - Cultural Heritage
  - Water Bodies
- Prepare Draft Natural Heritage Assessment Reports
- Environmental Impact Assessments
- Make Draft REA Reports available to the public
- Publish and distribute a Notice of Public Meeting
- Second Public Meeting
- Preparation of Consultation Report
- Submission of the REA application to the Ministry of the Environment to review and approve



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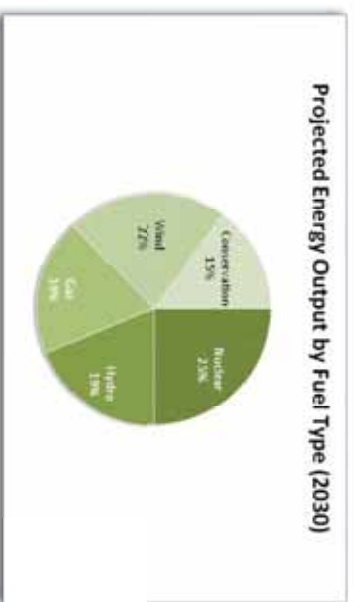
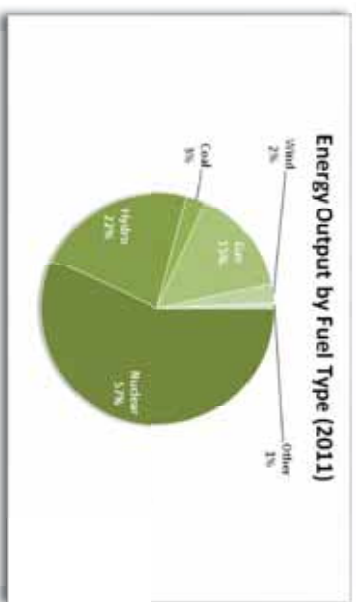
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# ECONOMICS OF RENEWABLE ENERGY

- The development of the proposed Ernestown Wind Park is privately financed, not paid with taxpayer's dollars
- Wind Energy contracts have a fixed rate over 20 years to keep the outlook consistent as energy prices rise
- Ernestown Windpark Inc. will pay for all infrastructure upgrades in the Loyalist Township to connect the project to the Grid.
  - » ie: Taylor-Kidd Boulevard hydro line upgrades, Jim Snow Drive extension
- Coal power is slated to be removed from the Ontario power mix by 2014; renewable energy is part of the distributed generation model.

## ENERGY PRODUCTION SOURCES

Source: Independent Electricity System Operator (IESO) 2012



Distributed generation is defined as a means of reducing environmental impacts and improving grid supply by generating power over many small generating facilities instead of fewer large facilities



# PROPERTY VALUES AND WIND ENERGY

- The 2003 Renewable Energy Policy Project study found an increase in real estate values within 8km of large wind generation facilities, in a study of more than 25,000 home sales in the US.
  - Hinman, J.L. (2010) Wind Farm Proximity and Property Values: A Pooled Hedonistic Regression Analysis of Property Values in Central Illinois



- A 2010 study showed correlations between a depression in property values before and during construction due to fears and a sharp increase in values post-construction.

-Hoen, Wiser, Cappers, Thayer, and Sethi (2009): *The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis*



- Statistics on property values are consistent with the results of these studies around the world where wind farms exist adjacent to residential-zoned lands.
































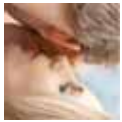




“Specifically, neither the view of the wind facilities nor the distance of the home to those facilities is found to have any consistent, measurable, and statistically significant effect on home sales prices.”

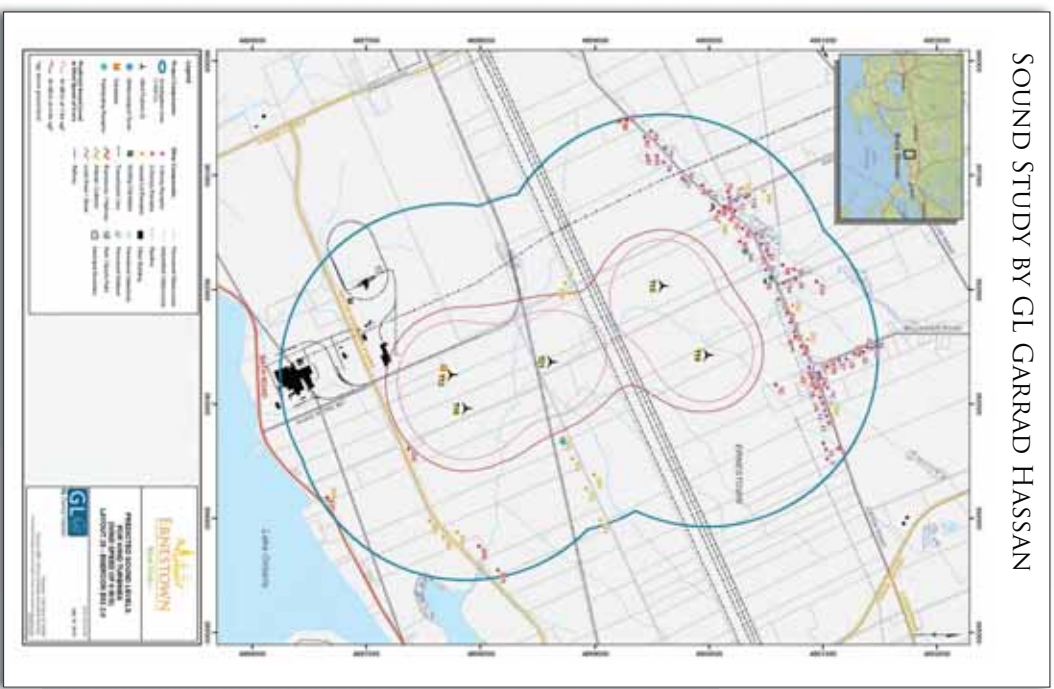
-Hoen et.al. (2009)



# SOUND LEVELS

## COMPARABLE SOUND LEVELS

			<b>150+ dB</b>	firecrackers exploding jet airplane taking off space shuttle launch
			<b>100-120 dB</b>	lawnmower at 2m passing transport truck at 4m hammer striking nail
			<b>90-100 dB</b>	motorcycle on the highway blender running infant crying
			<b>75-90 dB</b>	telephone ringing, alarm clock ringing, busy city traffic
			<b>65-75 dB</b>	quiet town traffic flushing toilet, average doorbell
			<b>60-65 dB</b>	washing machine, dishwasher running, snooring spouse
			<b>50-60 dB</b>	sound level possibly to wake someone up quiet conversation, electric toothbrush
			<b>45-50 dB</b>	bubbling brook, refrigerator, refrigerator
			<b>40-45 dB</b>	quiet home hallway, reading in a library, moderate rain shower
			<b>20-40 dB at 550m</b>	direct drive wind turbines generate sound as the blades pass through the air
			<b>20 dB</b>	leaves rustling, quiet whistler, empty theatre
			<b>10 dB</b>	infant of good hearing a pin drop hum of a lightbulb



“Noise is measured in decibels (dB). The decibel is a measure of the sound pressure level, ie. the magnitude of the pressure variations in the air. An increase of 10 dB sounds roughly like a doubling of loudness.

Measurements of environmental noise are usually made in dB(A) which includes a correction for the sensitivity of the human ear.

Direct drive turbines are the latest design concept in turbine technology. Simply put, these machines have no gearbox or drive train, and consequently no high speed mechanical (or electrical) components. Direct drive turbines are therefore much quieter than gearbox machines as they do not produce mechanical or tonal noise.”

- Renewable UK, <http://www.bwea.com/ref/noise.html>



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# VISUAL SIMULATIONS

The sight of wind turbines is subjective: many people love them!

The most reliable and moderate wind speeds occur in the winter at this location, based on the 2009 Wind Resource Study conducted by GL Garrard Hassan. Summer wind production is less, meaning that the turbines do not turn as fast or as often.

“Shadow Flicker” is the common term given to the moving blade shadows cast by an operating wind turbine. These shadows are slow-moving, unlike those seen while driving next to a stand of trees at sunrise or sunset. Additionally, as the seasons change, so does the track of the sun through the sky. In Ernestown, shadows cast from the wind turbines during the summer do not fall on any residences.



Kerry Heinrich and five-month-old daughter Emmison on their property at Black Springs.  
Picture: Chris Mangan  
Source: The Advertiser

**"I think they are quite stunning," she said.  
"They are just part of the landscape now."**

## VISUAL SIMULATIONS BY CARTOGRAPHICS

These simulations are intended to convey the general visual impact of proposed wind turbines from selected vantage points. The images were generated by creating a 3D digital model using

the most accurate and current data. The results of the simulation have not been purposely exaggerated or diminished in any way.



Looking East up the  
Hydro One corridor



Looking south from  
Millhaven Rd at Caton Rd



Looking West down  
Taylor-Kidd Boulevard



  
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# HEALTH CONCERNS: A REVIEW OF STUDIES

- Many studies have been conducted world-wide to examine the relationship between wind turbines and possible human health effects (e.g., audible/inaudible noise, shadow flicker, electromagnetic fields (EMF)).
  - Noise: Ontario's Chief Medical Officer of Health (May 2010) conducted a review of the scientific literature related to wind turbines and public health. The review concluded that:
    - o "while some people living near wind turbines report symptoms such as dizziness, headaches, and sleep disturbance, the scientific evidence available to date does not demonstrate a direct causal link between wind turbine noise and adverse health effects. The sound level from wind turbines at common residential setbacks is not sufficient to cause hearing impairment or other direct health effects, although some people may find it annoying."
    - o The Chief Medical Officer of Health also concluded that low frequency noise, vibration caused by low frequency, and infrasound from current generation upwind model turbines are well below the pressure sound levels at which known health effects occur.
  - Shadow flicker: Scientific evidence suggests that shadow flicker from wind turbines does not pose a risk of photo-induced seizures; modern wind turbines simply don't rotate at a speed that has been linked to this condition (generally less than 20 rpm vs. over 60 rpm).
  - EMF: Health Canada (2010) has stated: "You do not need to take action regarding daily exposures to electric and magnetic fields at extremely low frequencies. There is no conclusive evidence of any harm caused by exposures at levels found in Canadian homes and schools, including those located just outside the boundaries of power line corridors".
  - Overall, health and medical agencies agree that when sited properly, wind turbines are not causally related to adverse effects\*.
  - In Ontario "Ontario doctors, nurses, and other health professionals support energy conservation combined with wind and solar power – to help us move away from coal!"\*\*.
  - Scientists and medical experts around the world continue to publish research in this area. Through our health consultants, Ernestown Windpark Inc. is committed to keeping informed on this issue.
- \*Chatham-Kent Public Health Unit, 2008; Minnesota Department of Health, 2009; Australian Government, National Health and Medical Research Council, 2010; Australian Government, 2011; Massachusetts Department of Environmental Protection (MassDEP) and Massachusetts Department of Public Health (MDPH), 2012.
- \*\*Ontario College of Family Physicians, Registered Nurses Association of Ontario, Canadian Association of Physicians for the Environment, Physicians for Global Survival, the Asthma Society of Canada, and the Lung Association.



SOURCE: WWW.SSE.COM



SOURCE: TIONOMOLOGY.BLOGSPOT.CA



SOURCE: WWW.NHWI.NI



Ernestown Wind Park  
Visual Impact Assessment Report



Prepared by



Phone (519) 823-2113  
[www.cartographics.ca](http://www.cartographics.ca)  
GUELPH, ON CANADA

# Ernestown Wind Park - Visual Impact Assessment Report

## OVERVIEW

The goal of the project was to simulate, from selected vantage points, the visual impact of the installation of wind turbines within the area surrounding Ernestown, Ontario.

The visual simulations in this report are composed of photographs of the project area taken with a digital camera merged with rendered images from a 3D AutoCAD model. The panorama imagery was created by merging the original adjacent digital photos from each vantage point, with approximately 50% overlap, to form a photo that represents a viewing angle of approximately 90 degrees. A virtual camera was placed in the 3D AutoCAD model at all vantage points using the same coordinates from which the photographs were taken. From each vantage point, an image was rendered of the proposed turbines and surrounding topography and features. This rendered image was positioned and aligned with corresponding features and topography in the photographs to create the simulated images in this report.

## METHODOLOGY

### Vantage Points and Viewshed Map

An onsite visit was made by the client to determine appropriate locations for vantage points. A viewshed map (Zone of Visual Influence Map) was generated using ESRI Arcmap 3D Analyst to confirm the validity of the selected vantage points.

### Photography

The photographs were taken in September of 2010. The focal length of the camera was set to mimic, as closely as possible, the view seen with the human eye. A series of photographs with 50% overlap were taken from each vantage point. These images were merged together in Photoshop to form the panoramic images used in the report. The GPS coordinates of each photo location was recorded and used to position the cameras in the model.

### Computer Model

**3D Surface Model:** A Digital Elevation Model (DEM) with cell size 10x10 was acquired from the Ontario Ministry of Natural Resources data library through contract with the Land Information Distribution System (LIDS). ESRI's ArcMap 10 was used to generate contours from this DEM at a 2 m frequency and to generate a Triangulated Irregular Network (TIN) of the surface. The contours and TIN were imported into AutoCAD to form the ground surface. Relevant topographic features (e.g. water towers, radio towers, woodlots, roads, buildings and other topological features) were added to the model as 3D objects if required to aid in scaling and aligning the rendered images over the photographs.

**Turbine model:** An accurate 3D model of a Vestas V100 wind turbine was built in AutoCAD with blade length of 50 m and hub height of 95 m. The x, y, z coordinates of the proposed wind turbines were placed in the model and the base of the turbine model snapped to those coordinates for each turbine location.

**Vantage points and Cameras:** The GPS coordinates of the vantage points, which were collected at the time the photography was taken, were located on the modeled surface. Each vantage point was positioned 1.6 m above the surface to simulate the approximate distance of the human eye from the ground surface. A virtual camera, with focal length set to mimic the focal length used in the real photographs, was placed in the AutoCAD model at these locations to provide a simulated view that closely represents the view of the proposed conditions that an individual would see if standing in that location.

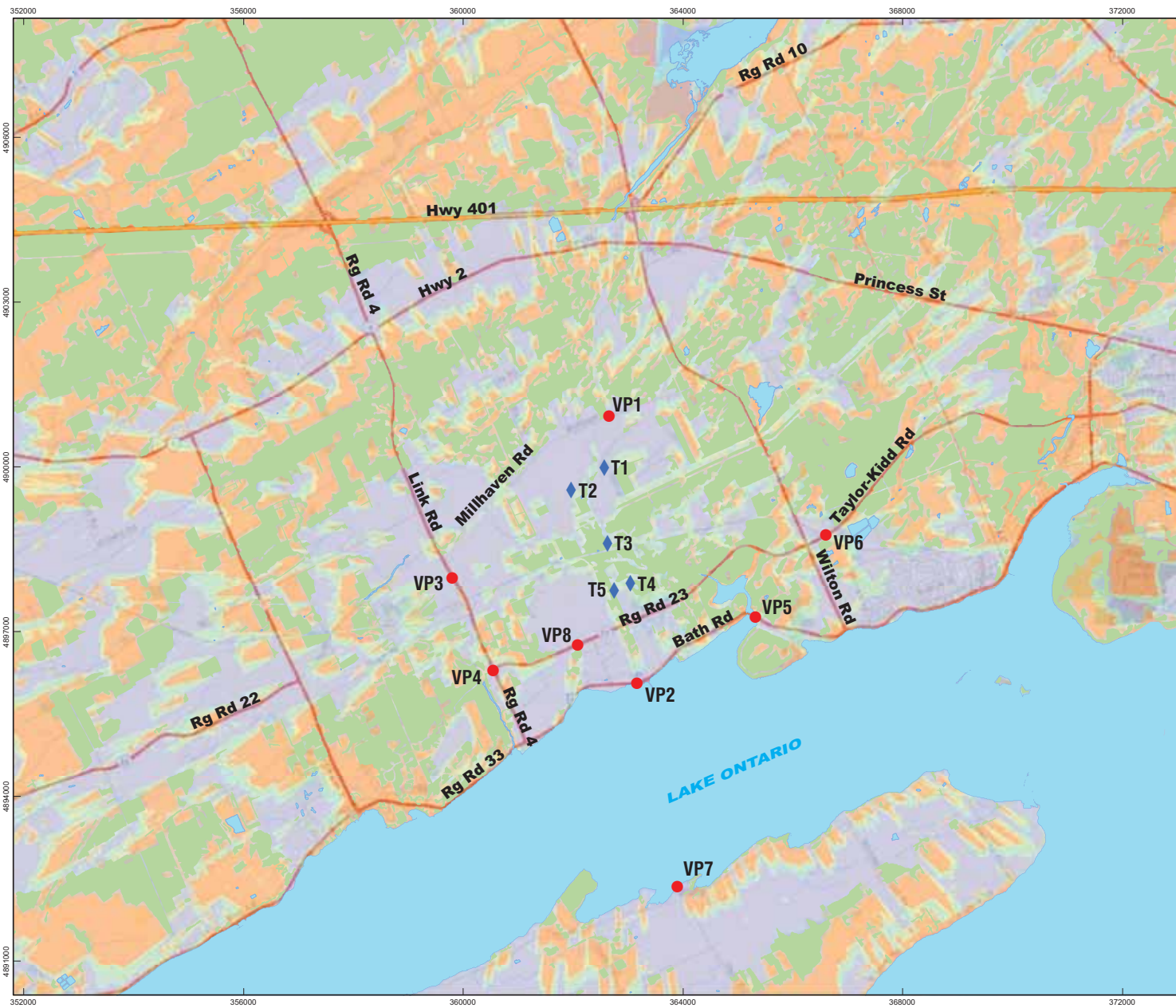
### Final Image Creation

The simulated view from each virtual camera was rendered and saved in a raster image format. The simulated view was superimposed and aligned over the photographic image. At least 3 visual cues were used to align the simulated view with the real image to produce the final panoramic simulations.

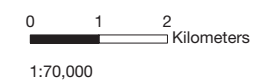
### Accuracy

These simulations are intended to convey the general visual impact of proposed wind turbines from selected vantage points. The 3D model was built using the most accurate and up-to-date data available. The data was used responsibly, and the results have not been purposely exaggerated or diminished in any way. The results are as accurate as the data will provide. These simulations represent, to the best of our knowledge and ability, how the proposed turbines would appear in real life if they were to be installed in the proposed locations.

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### ZONE OF VISUAL INFLUENCE



*Distance to nearest turbine*

- VP1 → T1 = 940m
- VP2 → T5 = 1754m
- VP3 → T2 = 2694m
- VP4 → T5 = 2639m
- VP5 → T4 = 2394m
- VP6 → T4 = 3665m
- VP7 → T5 = 5455m
- VP8 → T5 = 2381m

- Vantage Point
  - ◆ Turbine Location
  - Woodland (Average 20m canopy)
- No. of Visible Turbines**
- 0
  - 1
  - 2
  - 3
  - 4
  - 5

## Ernestown Wind Project Visual Simulations Ernestown, Ontario

# Vantage Point 1 - Millhaven Rd and Caton Rd

# Ernestown Wind Park Visual Simulations



T4 T5 T3 T1 T2

# Vantage Point 2 - Bath Rd (Regional Rd 33) and Jim Snow Dr

# Ernestown Wind Park Visual Simulations

**EXISTING**



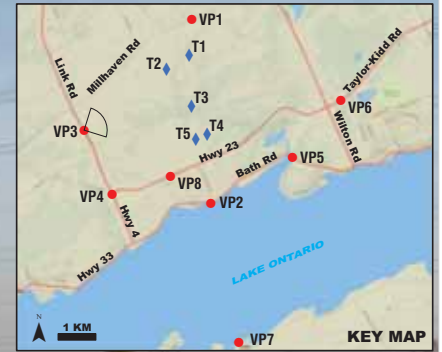
**PROPOSED**



T5 T3 T1 T4

# Vantage Point 3 - Hwy 4 and Hydro ROW

# Ernestown Wind Park Visual Simulations



T2 T1

T3

T4

T5

# Vantage Point 4 - Hwy 4 and Taylor Kidd Blvd

# Ernestown Wind Park Visual Simulations

**EXISTING**



**PROPOSED**



Vantage Point 5 - Bath Rd (Regional Rd 33) and Bayview Dr

Ernestown Wind Park Visual Simulations

EXISTING



PROPOSED



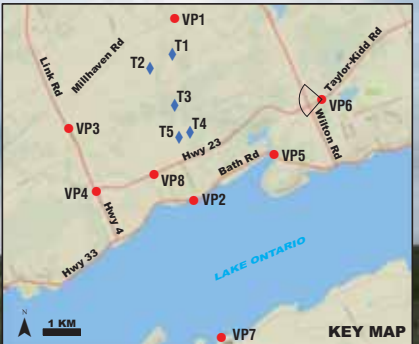
T5 T4 T3 T2 T1



# Vantage Point 6 - Taylor-Kidd Rd (Regional Rd 23)

# Ernestown Wind Park Visual Simulations

**EXISTING**



**PROPOSED**



T5 T4 T3 T2 T1

# Vantage Point 7 - Amherst Island Dock

# Ernestown Wind Park Visual Simulations

EXISTING



PROPOSED



T2 T5 T3 T1 T4

EXISTING



PROPOSED

