



Environmental Review Tribunal

Case Nos.: 13-070 to 13-075

Bovaird v. Director, Ministry of the Environment

In the matter of appeals filed on June 25, 2013 by D&C Vander Zaag Farms Ltd., Conserve Our Rural Environment, Dennis Sanford, Roselyn Bovaird, John Maguire, and Kathleen Kurtin for a Hearing before the Environmental Review Tribunal pursuant to section 142.1 of the *Environmental Protection Act*, R.S.O. 1990, c. E.19, as amended with respect to Renewable Energy Approval Number 5460-98BPH8 issued by the Director, Ministry of the Environment, on June 10, 2013 to Dufferin Wind Power Inc. under section 47.5 of the *Environmental Protection Act*, regarding the construction, installation, operation, use and retiring of a Class 4 wind facility with a total name plate capacity of 99.1 megawatts at a location described in the Renewable Energy Approval as Dufferin Wind Power Project, Various Properties SWTS as in MEL3218, Lot 270, Concession 1, in the Township of Melancthon, County of Dufferin, Ontario; and

In the matter of a hearing held on August 20, 21, 22, 26-30, September 3-5, 9-13, 18, 24-26, October 7-11 and November 18, 2013 variously at the Grace Tipling Theatre, 203 Main Street East, Shelburne, Ontario, and at 655 Bay Street, Toronto, Ontario.

Before:

Heather I. Gibbs, Panel Chair
Dirk VanderBent, Vice-Chair
Maureen Carter-Whitney, Member

Appearances:

- | | |
|--|---|
| Laura Bisset, David Crocker and Chris Barnett | - Counsel for the Appellants, Roselyn Bovaird, Conserve Our Rural Environment (CORE), D&C Vander Zaag Farms Ltd., Kathleen Kurtin and John Maguire, and the Other Party, Dr. William Crysdale |
| Eric Gillespie | - Counsel for the Appellant, Dennis Sanford |
| Frederika Rotter, Phil Pothen, Matthew Horner, Sarah Wright, Courtney Harris and Daniel Huffaker | - Counsel for the Director, Ministry of the Environment |
| Dennis Mahony, John Terry, Andrew Finkelstein, Crawford Smith, Arlen Sternberg and Justin Necpal | - Counsel for the Approval Holder, Dufferin Wind Power Inc. |

- | | |
|---------------------------------------|---|
| Mayor Don MacIvor | - Representative for the Presenter, the Corporation of the Township of Amaranth |
| Joan Lever | - Presenter, on her own behalf |
| Leo Blydorp | - Representative for the Presenter, the Dufferin Federation of Agriculture |
| Norm Wolfson | - Presenter, on his own behalf |
| Bohdan Wynnycky and
Linda Laflamme | - Representatives for the Presenter, the Niagara Escarpment Commission |

Dated this **23rd** day of **December, 2013**.

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REASONS FOR DECISION

Background

[1] On June 10, 2013, Vic Schroter, Director, Ministry of the Environment (“MOE”), issued Renewable Energy Approval No. 5460-98BPH8 (the “Approval” or the “REA”) to Dufferin Wind Power Inc. (the “Approval Holder” or “Dufferin”) for the construction, installation, operation, use and retiring of a Class 4 wind facility with 49 wind turbine generators with a total name plate capacity of 99.1 megawatts (“MW”). The location is described in the Approval as Dufferin Wind Power Project, Various Properties SWTS as in MEL3218, Lot 270, Concession 1, and described in the application for the Approval as bound by the following roads: the Melancthon-Osprey Townline to the north, the Melancthon-Mulmur Townline to the east, Sideroad 15 in Melancthon to the south and 5th Line/6th Line northeast/ Sideroad 240/ County Road 2 to the west, in the Township of Melancthon, County of Dufferin, Ontario (the “Project”).

[2] The Approval was issued pursuant to Part V.0.1, s. 47.5 of the *Environmental Protection Act* (“EPA”).

[3] On June 25, 2013, Conserve Our Rural Environment (“CORE”), D&C Vander Zaag Farms Ltd., Roselyn Bovaird, John Maguire and Kathleen Kurtin filed notices of appeal of the Approval with the Environmental Review Tribunal (the “Tribunal”). They are represented by Davis LLP and raised issues related to both the health and natural environment grounds under s. 142.2 of the *EPA*.

[4] Also on June 25, 2013, Dennis Sanford, through his counsel Eric Gillespie, filed a notice of appeal with the Tribunal. He raised issues only in relation to the health ground.

[5] Therefore, the grounds for the appeals of the Approval are, collectively, that engaging in the Project will cause serious harm to human health and serious and irreversible harm to plant life, animal life or the natural environment, in accordance with s. 142.2 of the *EPA*.

[6] On July 22, 2013, the Tribunal held the preliminary hearing in Shelburne, Ontario. The Tribunal subsequently issued an order granting party status to Dr. William Crysedale, and presenter status to the Niagara Escarpment Commission (“NEC”), Norman Wolfson and Sandra Wong, Joan Lever, the Corporation of the Township of Amaranth (“Amaranth”), and the Dufferin Federation of Agriculture (“DFA”). Further

details and the specific terms under which status was granted can be found in the Tribunal's order dated August 8, 2013.

[7] On July 19, 2013, the Appellant Mr. Sanford served and filed a Notice of Constitutional Question (the "Notice"). In a letter dated August 8, 2013, Davis LLP filed a notice that Ms. Kurtin and Ms. Bovaird were joining Mr. Sanford in advancing the constitutional issues set out in his Notice. Those Appellants argue that the renewable energy approval process violated their right to security of the person under s. 7 of the *Canadian Charter of Rights and Freedoms* (the "Charter").

[8] The Director brought a motion for an order striking the Appellants' claim for constitutional relief, which was heard on August 12, 2013. On August 15, 2013, the Tribunal issued a disposition dismissing the Director's motion, with written reasons issued on September 6, 2013. As a result, the constitutional challenge is a matter before this panel.

[9] The hearing began on August 20, 2013. The Tribunal heard evidence and submissions over 26 days in August, September, October and November 2013. For the reasons that follow, the Tribunal dismisses the appeals.

Relevant Legislation

[10] The relevant legislation can be found throughout the body of this decision except for the following provisions:

Environmental Protection Act

1. (1) "natural environment" means the air, land and water, or any combination or part thereof, of the Province of Ontario; ("environnement naturel")

145.2.1 (2) The Tribunal shall review the decision of the Director and shall consider only whether engaging in the renewable energy project in accordance with the renewable energy approval will cause,

- (a) serious harm to human health; or
- (b) serious and irreversible harm to plant life, animal life or the natural environment.

(3) The person who required the hearing has the onus of proving that engaging in the renewable energy project in accordance with the renewable energy approval will cause harm referred to in clause (2) (a) or (b).

(4) If the Tribunal determines that engaging in the renewable energy project in accordance with the renewable energy approval will cause harm referred to in clause (2) (a) or (b), the Tribunal may,

- (a) revoke the decision of the Director;
- (b) by order direct the Director to take such action as the Tribunal considers the Director should take in accordance with this Act and the regulations; or

- (c) alter the decision of the Director, and, for that purpose, the Tribunal may substitute its opinion for that of the Director.

Issues

[11] The issues are:

1. Whether engaging in the Project as approved will cause serious and irreversible harm to plant life, animal life or the natural environment;
2. Whether engaging in the Project as approved will cause serious harm to human health;
3. Whether the renewable energy approval process violated the Appellants' rights under s. 7 of the *Charter* to security of the person.

Issue 1: Whether engaging in the Project as approved will cause serious and irreversible harm to plant life, animal life or the natural environment

[12] A number of Appellants raised issues including harm to farm animals due to electro-magnetic fields and harm to farming practices. Their evidence will be discussed below. However, counsel for the parties called expert evidence and focused on the following sub-issues under Issue No.1:

- a) Harm to soils;
- b) Harm to groundwater resources and local wells;
- c) Harm to the Niagara Escarpment Plan ("NEP") area;
- d) Harm to bats; and
- e) Harm to other animal life.

[13] As noted above, the Appellant Mr. Sanford raised issues only in relation to the health ground. In the discussion of Issue No. 1, the term "Appellants" refers to CORE, D&C Vander Zaag Farms Ltd., Ms. Bovaird, Mr. Maguire and Ms. Kurtin.

a) Harm to Soils

Evidence on Harm to Soils

[14] The Appellants submit that harm to soils is harm to the natural environment. They also submit that soil assessment, in the context of an agricultural setting, requires expertise in crop production.

[15] In the Appellants' submissions, there are four areas of dispute in relation to soils:

- the significance of Honeywood soils in the context of Ontario;

- the scale or amount of land permanently or temporarily affected by construction;
- the significance of the effect on soils arising from the construction, operation and decommissioning of the Project; and
- the ability to restore soil to preconstruction characteristics.

[16] The evidence of the witnesses called in relation to this issue addressed these four areas of dispute.

David Vander Zaag

[17] Mr. Vander Zaag, an owner of the Appellant D&C Vander Zaag Farms Ltd., did not seek to be qualified as an expert witness. He alleged that the Project will cause serious and irreversible harm to the natural environment and plant life. He expressed concern about the impact of the Project on the soils in the area that are rated Class 1 based on “soil capability class”, a seven class rating system (classes 1 through 7) that follows the Canada Land Inventory (“CLI”) system of soil classification. He also raised concerns that dairy cattle will be harmed by effects from the Project, and that the Project will sterilize farm properties for future agricultural use. He is a third generation farmer who grows 800 acres of potatoes adjacent to the Project site. He is also the owner and president of a dealership of specialized agricultural equipment and, as a result, has travelled extensively and gained knowledge of agricultural operations in many parts of the world.

[18] He testified that the Project is located on a 15,000 acre contiguous block of Honeywood silt loam called the Honeywood Plateau, which he stated provides some of the most valuable potato production in Ontario. Mr. Vander Zaag believes the Honeywood Plateau is special and rare, and says that “the very unique natural attributes which make this land and landscape so special will be forever altered” if the Project proceeds as planned.

[19] Mr. Vander Zaag submits that any harm to the soils should be considered serious due to the quality of the soils in the Project area. Specifically, they are Class 1 soils with premier characteristics. Mr. Vander Zaag testified that this land rates “excellent” on every one of the following seven characteristics, which make these soils so valuable:

- Soil type (sandy loam)
- Stone-free (ideal for potatoes; does not damage equipment)
- Flat (large equipment can work freely, and soil does not wash away)
- Uniform (each 100 acre block is the same soil type front to back)

- Contiguous (it is one large 15,000 acre block of the same soil type)
- Well drained (ideal for potatoes; underlain by karst limestone)
- Geographic Location (28" annual rainfall, moderate climate, 1 hour to large city)

[20] Mr. Vander Zaag submits that Dufferin's land lease agreements allow it to place the Project infrastructure in any location it chooses, with no regard for farming practices. As a result, the Project could legally take far more land out of useful production than what is listed as the footprint of the infrastructure. With respect to the roadways, Mr. Vander Zaag points out that the Project Description Report estimates that 26 kilometres ("km") of 5 metre ("m") wide roads will be built. This will result in 13 hectares ("ha") of prime Class 1 vegetable land being taken out of production and, he submits, soil forever altered from its natural state. He notes that the lease agreements do not require Dufferin to minimize the roadways or keep them to any specific width.

[21] Mr. Vander Zaag testified that vegetable production requires long straight flat fields for the operation of large and wide mechanical equipment. He said that obstructions, including laneways and "fenced 125 square metre blocks", seriously affect normal farming practices. This is particularly so for commercial potato farms, he noted, as the farmer must follow efficient practices to make the business viable. He also raised the concern that stripping topsoil and installing gravel laneways will cause irreversible harm to the soil profiles, which "have taken thousands of years to develop". In his view, the soil profiles of topsoil, subsoil, overburden and underlying limestone karst "are indeed one living thing". He stated that the edges of roadways are an example of how it is mechanically impossible to return soil to its natural state.

[22] Mr. Vander Zaag plans to locate a dairy cattle operation at his home farm, which is within 550 m of a proposed 2.6 kW turbine. He is concerned that electromagnetic fields, stray voltage, nuisance noise and blade flicker will all negatively impact dairy animals, which are "notoriously" highly susceptible to these impacts.

[23] Mr. Vander Zaag listed examples of how he believes the Project will sterilize lands from normal farming practices in the future. For the reasons noted above, he is concerned that new dairy facilities cannot be located at his home farm. He is also concerned that drainage and irrigation water lines across neighbouring fields, previously subject to understandings and cooperation between neighbours, will now be subject to permission from Dufferin. Mr. Vander Zaag alleges that this may interfere with historic practices as well as damage landowner cooperation. In addition, the presence of turbine towers will prevent aerial application of fertilizer or pesticides, which "will put

local farmers at a needless disadvantage versus farmers in other areas.” Similarly, the turbines will prevent the use of centre pivot irrigation in some locations. He testified that this “sterilizes the farm from future potential economic irrigation development.”

[24] In cross-examination, Mr. Vander Zaag agreed that he leases land from another local landowner, Arley Leader. Mr. Leader’s land has four wind turbines that have been operational since 2006, part of the Melancthon Phase 1 wind project. Mr. Vander Zaag acknowledged that he has not expressed any concern to Mr. Leader regarding the adverse effects of the turbines on his farming operations; he also noted that he values his relationship with Mr. Leader, and that good potato land is scarce.

[25] Mr. Vander Zaag agreed that he has removed buildings on land that he farms and remediated the soil, mainly because the building was in the way of a central pivot. However, he testified that the remediated soil is not the same as the surrounding soil, as the topsoil has been spread out thinly over top and now dries out faster.

Leo Blydorp, Dufferin Federation of Agriculture (“DFA”)

[26] Mr. Blydorp spoke on behalf of the DFA, which was granted Presenter status at the preliminary hearing. The DFA listed a number of reasons why it is opposed to Dufferin Wind Power’s Project.

[27] Mr. Blydorp raises the issue of the loss of prime agricultural land, testifying that only 0.5% of Canada’s land mass is classified as Class 1 land, of which 52% is in Ontario. He stated that as of 2001, 18% of Class 1 land in Ontario had been urbanized. He testified that prime agricultural land in Ontario is being lost at an alarming rate. The DFA is opposed to further non-agricultural development on prime agricultural land. He pointed out that s. 2.3.3.1 of the Provincial Policy Statement (“PPS”) states that permitted uses and activities in prime agricultural areas are “agricultural uses, secondary uses and agriculture-related uses.”

[28] Mr. Blydorp provided photographs to demonstrate how access roads cause the loss of agricultural land: under the road itself; on the edges of the road where gravel is present; in the adjacent fields due to water changes including flood damage; and on strips of land between the access road and the edge of the field where the strip of land is too small to farm.

[29] Mr. Blydorp said that the DFA believes that it is not possible to return land to agricultural use after construction, contrary to assertions made in the Approval Holder’s Construction Plan Report.

[30] Mr. Blydorp raises the concern in his submission that Project construction would create impediments to agricultural use, noting that:

[e]vidence from existing wind energy developments show that agricultural production problems continue to persist following commissioning of wind energy projects. Access roads have interfered with water flow and have damaged pre-existing subsurface tile drains.... Areas around the turbine are still littered with stones from the excavated subsoil removed to build turbine foundations.

[31] Mr. Blydorp stated that the DFA is not convinced the sites will be restored to pre-construction conditions following de-commissioning of the Project. The turbine foundations will be left in the ground, and it will be very difficult to remove the gravel from the access roads without mixing it with the topsoil. He also noted a number of other concerns, including that stray voltage may adversely affect livestock, and that doing field work could be dangerous at certain times of the year due to the strobing effect of the turning turbine blade in front of the sun. DFA has also received some reports by farmers of headaches due to working in the vicinity of turbines.

[32] He also noted that the DFA questions who will determine whether or not rehabilitation was successful and what the penalties will be if it is not successful, and noted that these questions are not answered in the REA.

Sam Squire

[33] Mr. Squire, who testified on behalf of the Appellants, was recognized by the Tribunal as an expert in potato cultivation, qualified to give opinion evidence about conditions and practices required for potato growing.

[34] In his witness statement, Mr. Squire noted that:

The construction, operation and decommissioning of the wind project will significantly affect potato plant life and the natural environment by reducing the productivity of the area's farmland. The natural environment will be harmed by removing highly productive land from use for potato farming. As well, heavy machinery will compact the soil and undermine the unique benefits of Honeywood Loam, causing long term damage to the ability of the land to support strong plant growth.

[35] Mr. Squire testified that the soil conditions required for potato cultivation are sandy loam/loam, well drained, stone-free, flat, and loose soil. He stated that all growers agree that potato land is in short supply. A field planted with potatoes should be in a three year rotation, so it is not used to grow potatoes for two out of three years. Mr. Squire testified that the predominant soil in the area between Shelburne and Honeywood is known as Honeywood loam, which was deposited by wind and covers an area of approximately 15,000 contiguous acres. He characterized it as ideal potato-

growing soil, noting that “this is a very special soil and it is, in my view, irreplaceable.” He said it has been carefully cultivated by farmers over the years to build on its inherent characteristics by, for example, rotating crops, fertilizing soil, installing drainage systems, and minimizing interference with fields.

[36] Mr. Squire said that, due to the expense involved in properly maintaining fields for potato production (approximately \$4,000 per acre), the yields must be good in order to remain in production. In this regard, Mr. Squire noted that Ontario has state-of-the-art machinery, growers and packaging. While he agreed on cross-examination that potatoes can probably be grown in soils from Classes 1 to 7, he added that they cannot profitably be grown in lower Classes of soils. If farmers cannot grow them profitably, he noted, they will not grow them. Thus, he said that the question of whether it would be theoretically possible to grow potatoes in Class 3 soil with appropriate inputs (like drainage tiles or fertilizer) is irrelevant.

[37] Mr. Squire is concerned about damage to both the soils and subsoils, and contamination of the subsoils and stored soils by aggregate materials brought on site for the access roads. He stated that Honeywood soil is very susceptible to compaction, which changes the drainage and distorts root growth. He is also concerned that the buried collection lines will interfere with drainage tiles, thereby causing drainage problems that could affect productivity and require costly repairs. Given that Dufferin has full discretion to place the turbine and road anywhere in a given field, Mr. Squire is concerned that the Project could damage up to 30% of a 100 acre field, if the components are poorly placed.

[38] With respect to rehabilitation of the land after development, Mr. Squire stated that he is unaware of any situation where “sensitive topsoil” has been taken off-site, replaced after damage to the subsoil, and returned to its previous state. He is not aware of any successful restoration of potato-growing agricultural land of this quality elsewhere.

Michael Hoffman

[39] Mr. Hoffman was qualified to give opinion evidence as an agrologist with special expertise in soil science. He is President of AgPlan Limited, which was retained by the Appellants to undertake a land assessment of the Dufferin Project. Mr. Hoffman authored a report entitled *Land and Surficial Soils Report for the Dufferin Wind Power Undertaking Located in the County of Dufferin*, dated August 13, 2013.

[40] In Mr. Hoffman’s opinion, the Project will cause serious and irreversible harm to land. He states the harm will be irreversible due to a “loss of land due to wind turbine

tower bases, permanent construction and/or maintenance areas and/or access areas,” as well as an “alteration of soils due to mixing, compaction and the spreading of excess soil materials on existing soil surfaces which will result, at minimum, in changes to soil layers (horizons), soil organic matter content, soil structure, water infiltration rate, soil hydraulic conductivity and plant available water.” Mr. Hoffman believes the harm will be serious because it affects the most productive soils. He noted that the definition of “natural environment” in the *EPA* is “air, land and water”, and that the definition of “land” in the *EPA* includes surface land and subsoil.

[41] Mr. Hoffman testified that he was unable to locate any scientific literature measuring the effects of wind turbine construction on productive lands. He therefore considered literature related to pipeline construction as a comparator. He disagreed with the conclusion of Dr. Gregory Wall, an expert witness for the Approval Holder, that the impact of construction of the Project on potato production is “infinitesimal”. He stated that, measured on the basis of area, potato production is the crop with the highest proportion (16%) of provincial production within Dufferin County. Mr. Hoffman noted that the Approval Holder’s project information shows 19 ha of land will be affected permanently (i.e., for the life of the Project), and he stated that the temporary land areas to be affected amount to approximately 427 ha. He therefore concluded that the success of land/soil mitigation for temporary use areas is significant. He explained that the “area of effect” for his analysis was measured on the basis of the shape files supplied by Dillon Consulting Limited (“Dillon”).

[42] Mr. Hoffman interpreted the determination of “serious” as having three components: rarity (relatively rare or in ‘short supply’ at a regional through to a national scale); mitigation limitations (rehabilitation will not result in soil that will “match or exceed” the land’s characteristics pre-construction); and necessity (a consideration of whether poorer lands are available).

[43] Mr. Hoffman analyzed the soil capability classes of the Project site, and soil potential ratings, noting that the best soils with no limitations for production of common field crops are ranked as Class 1. He concluded from his analysis that soil capability likely to be affected by the Project is almost entirely Class 1, and is much higher than the average for Dufferin County.

[44] He testified that, although the Project area has not been recognized as a specialty crop area from a land use planning perspective, the proposed Project location is at one of the locations in Dufferin County where it will cause the most serious harm. “Soil potential rank” rates soils for fruit and vegetable production. He testified that the

Project site has the soil potential for a “restricted range” of specialty crop, in that the soil potential for potato production is high. Mr. Hoffman disagreed with Dr. Wall’s contention that potatoes are considered a common field crop, and stated that potatoes “can reasonably be classified as a specialty crop” within the “fruit and vegetables” category. Mr. Hoffman further testified that, when corrected for size, Dufferin County is the most important potato producer in Ontario. He acknowledged that Simcoe County produces more potatoes, but noted that it is larger in size.

[45] Mr. Hoffman agreed with Dr. Wall that *Planning Act* considerations do not apply to the wind project. However, he used the PPS to demonstrate a relative hierarchy of value in land. He also noted that *Planning Act* considerations are relevant where an environmental assessment is required for electricity projects, where the Ontario Energy Board is considering the location of hydrocarbon pipelines.

[46] Mr. Hoffman considers “irreversible” to mean that “land will probably not regain its former productivity during the lifetime of the wind turbines.” He believes crop yields in this case will be affected to such a degree that soil capability Class 1 will “reasonably be reclassified as soil capability Class 2”. He concluded, at the end of his reply witness statement, the following:

The Dufferin Wind Power Undertaking will cause irreversible harm to land because changes to soil structure due to soil compaction cannot be mitigated except by the natural processes that created the soil structure in the first place.

[47] With respect to mitigation, Mr. Hoffman’s view is that avoidance of the better agricultural land should be the first mitigation measure considered. His criticisms of the Project’s planned mitigation measures are that little detail has been provided (e.g., no detailed soil map and locations of drainage swales), and there is no requirement for wet weather shutdown or criteria that would be used to indicate when the shutdown will occur. He disagreed with Dr. Wall’s statement that construction practices and soil management techniques have evolved considerably over the past 30 years. In Mr. Hoffman’s view, there is simply more oversight, which he calls a “policing” effect.

[48] Mr. Hoffman believes that the Project will cause considerably more soil compaction than would farm equipment, due to the difference in the number of machines and frequency of their use. He pointed out that Mr. McEwan, in his affidavit, does not reference the total number of trips, vehicle loads, number of passes and conditions that are laid out in tables in Dillon’s Final Construction Report (2012), such as Table 5 on page 42.

[49] Mr. Hoffman acknowledged that he was involved in a study prepared for the MNR in 1985 which found it was possible to rehabilitate gravel pits to tender fruit production in some cases. However, he testified that the literature does not say that rehabilitated soils will have the same percentage of productivity, i.e., the same output given the same inputs.

[50] In conclusion, Mr. Hoffman stated that the Project

is not a reasonable location for wind turbine development. There will be lands permanently affected by the proposed Undertaking and there are poorer lands available to accommodate the wind turbine use. Therefore, the proposed Dufferin wind power Undertaking will result in serious and irreversible harm to land.

Dr. Gregory Wall

[51] Dr. Wall was qualified as an expert in soil science. He was retained by the Approval Holder to provide opinion evidence on two points:

- Whether the Honeywood soils referred to in the Appellants' materials are unique soils particularly suited to potato farming; and
- Whether the Honeywood soils referred to in the Appellants' materials can be removed during the construction phase of Dufferin's wind farm project and subsequently restored to their current state.

[52] It is Dr. Wall's opinion that, "while the Honeywood soils in Dufferin County are well-suited to potato production, they are not the only soils in Ontario that are well-suited to potato production." In addition, his view is that "soil restoration, including with respect to Honeywood soils, is possible following development projects."

[53] Dr. Wall testified that the best farmland in Canada is within 100 miles of the Great Lakes, although nationally, it is in short supply. He said that Honeywood soils are fairly widespread in Ontario, Dufferin being only one county in which they are found (others include Oxford, Middlesex, Brant and Waterloo). He said that other soils are very similar, such as "Brant". Dr. Wall stated that there are approximately 45,000 acres of the Honeywood soil series in Dufferin County. He is not familiar with the "15,000 acre Honeywood Plateau" referred to by Mr. Vander Zaag, and does not believe there is any basis to differentiate the soils. He does not believe the soils in the Project area should be considered "unique".

[54] Dr. Wall stated that he is aware of successful rehabilitation of Class 1 soils, in contrast to Mr. Squire who said that he is not aware of such examples. He noted that, over the last number of years,

the installation of utilities on private land has undergone significant changes in terms of planning considerations, construction, restoration, and remediation techniques. The advent of comprehensive environmental assessments has resulted in much improved planning and construction techniques.

[55] He gave examples of such techniques in pipeline construction, and hydro towers. One technique involves building temporary access roads to maintain towers, which are then removed. Another is to keep the various layers of topsoil, subsoil and geologic materials separate when excavating, and return them in the proper order and compacted to original densities.

[56] Dr. Wall noted that some of the components and considerations of a plan for a new utility corridor on private land will now typically include:

landowner input, grading to original contour, topsoil stripping and storage, subsoil de-compaction, drainage (field tile and natural) management, restoration plans, landowner access consideration, third party monitoring of construction activities, wet weather shut down criteria, and seasonal construction restrictions.

[57] He testified that he is involved in monitoring construction of a pipeline in the London area, and that wet weather shut-down is an important component of the plan in that case. In his view, the soil modification required for a wind turbine is not as drastic as for a pipeline. The largest issue is one of compaction. He said that compaction is not irreversible; rather, it is the easiest thing to remediate. Dr. Wall testified that farmers, and pipeline companies, have been successfully remediating compacted soil for many years.

[58] Dr. Wall compared the tower base to a pipeline situation, noting that current construction practices go to great lengths to separate the topsoil from the subsoil and to not allow them to be mixed. In addition, he agreed the wet weather issue is an important one. No bulldozers should be allowed in when the soil is too wet. In the concluding paragraph of his witness statement, Dr. Wall gave the example of a soil restoration project with which he is currently involved, installing a pipeline of over 1 m in depth in a clay loam textured till. He stated that using modern construction and management techniques in pipeline installations, he “expects these lands to return to original crop production levels within ten years. It is my understanding that landowners affected by pipeline construction are often compensated on this basis.”

[59] With respect to the scale of the impact, Dr. Wall referred to s. 1.8.3 of the PPS, which states that renewable energy projects should minimize impacts on agricultural operations:

Alternative energy systems and renewable energy systems shall be permitted in settlement areas, rural areas and prime agricultural areas in accordance with provincial and federal requirements. In rural areas and prime agricultural areas, these systems should be designed and constructed to minimize impacts on agricultural operations.

[60] Dr. Wall testified in his witness statement to his understanding, based on his review of the Approval Holder's website, that the "wind farm project will be spread out over approximately 2,400 hectares". He noted that the wind turbines and other project components would be constructed on privately owned land, under lease agreements between landowners and the Approval Holder, and that much of this land is, and will continue to be, used for agricultural purposes. He calculated that the amount of topsoil temporarily impacted by the construction represents approximately 110 ha, or less than 5%, based on that total area.

[61] At para. 19, of his reply witness statement Dr. Wall put the amount of soil affected "into context" this way:

To put this in context, all of Dufferin County accounts for only 16% of potato production in the province... The area of the Dufferin wind farm project represents a small fraction of Dufferin County (Dufferin County covers an area of approximately 150,000 hectares). Within that small subset of Dufferin County, less than 5% of the soils in the project area will be affected. Accordingly, the impact of the construction on Dufferin's wind farm project on the total potato production in the province will be infinitesimal.

[62] He stated at para. 24 that "(t)here is no evidence that this effect will have any impact on the productivity of any farm in this area."

[63] In cross-examination, Dr. Wall confirmed that in his experience environmental assessments have resulted in improved construction techniques, and that no environmental assessment took place for this Project. He noted, however, that in his opinion a detailed assessment of soils and agricultural activity had been undertaken. Nonetheless, he agreed that in an environmental assessment situation, decisions about placement of infrastructure would have been based on their environmental impact. He agreed there are no conditions in this REA that require the use of mitigation techniques related to soils.

[64] Dr. Wall testified that pipelines that were installed without appropriate mitigation techniques in the 1960s resulted in significant yield restrictions. However, with the "major changes" in mitigation techniques, full yields are now experienced approximately two years post-construction.

[65] Dr. Wall stated that climate also plays a major role in remediation of disturbed land. He did, however, agree that “you cannot get better than a Class 1 soil. Rehabilitated soil could, at its maximum, return to its original capability.”

[66] Dr. Wall noted that the Ontario Power Authority has been directed by the Minister of Energy not to enter into contracts for certain solar power projects when those facilities would be located on prime (Class 1 to 3) agricultural lands or specialty crop areas as defined in the PPS. He was not aware of a similar restriction for wind farm projects.

[67] He acknowledged that the soil management plan referred to in para. 21 of his witness statement, which provides for the removal and temporary stockpiling of soil during construction, is not before the Tribunal, and that the REA has no condition requiring it.

Alex Campbell

[68] Mr. Campbell was qualified to give opinion evidence as a soil scientist with expertise in soil management. He testified on behalf of the Director. Mr. Campbell testified that any disruption to a soil surface as a result of construction will have some negative impact on the soil and crops grown, but that within five years or less crop yield rebounds and production levels are no longer affected. He cited as common examples: transmission power lines, pipelines, and drain layers. Even in cases of more serious disturbance, such as mine tailings storage, there are examples of areas rehabilitated to a point where crops could be grown. He indicated in cross-examination that these results were qualified, and that total crop failures had occurred in years of weather stress. However, he also noted that total crop failures could also occur on undisturbed land due to unfavourable weather.

[69] Mr. Campbell testified that impacts like compaction can be offset by other advantages; for example, tile drain installation can result in drastic improvements even where an entire field is ripped apart and heavy construction vehicles pass over almost every inch of the field. He stated that crops can continue to thrive and do better due to drainage. In his view, crop yield may be significantly impacted in the short term and immediately after construction, but will not be significantly impacted over the long term. In his experience with pipeline rights-of-way, crop yield returns to pre-construction activity levels within five years, and usually within one to two years. He said that soil compaction is one of the easiest disturbance impacts to mitigate, and that after mitigation the crop yield is very close to, if not better than, the production in surrounding soils.

[70] With respect to the amount of arable land involved, Mr. Campbell assessed the amount lost due to the presence of wind turbines to be insignificant. He noted that other normal farming practices would result in the loss of crops, such as putting in dairy facilities or using arable land as pasture. In response to Mr. Squire's contention that the soil is irreplaceable, Mr. Campbell's view was that "general best management practices and soil reclamation and conservation practices are such that the soil can be preserved, and a disturbed site can be rehabilitated to pre-disturbance conditions." He testified that these soils are very "forgiving".

[71] Mr. Campbell stated at para. 35 of his witness statement that:

Given proper land stewardship, best management practices, an environmental monitoring plan as required in the REA, the mitigation measures stipulated in the Public Consultations, Consultation Report, Final Construction Report and the Design and Operation Report of Dillon, for dealing with the construction activity, all but the permanent loss areas will be rehabilitated. It is necessary to ensure that these measures are undertaken, as per the required Environmental Monitoring Plan.

[72] Mr. Campbell then examined the allegations of "permanent loss" and "temporary loss" areas made by Mr. Hoffman and Mr. Vander Zaag concerning the 196 ha to be used for temporary storage and laydown, 427 ha of temporarily disturbed soils and 19 ha of permanently removed soils, totalling 642 ha. He noted that a total of 623 ha (97%) of the area will be subject to temporary uses and therefore not irreversibly harmed, and that the remaining 3% comprises the 19 ha that will be permanently lost. In determining whether the 19 ha of permanently lost soil is significant, Mr. Campbell compared it to "all known Honeywood Series soils in Dufferin County", stating that it makes up 0.1%. He further noted that the entire disturbed area of 642 ha makes up 3.5% of the Honeywood soil series.

[73] Mr. Campbell concluded that in his opinion, "what is being proposed and the resulting permanent loss is not serious as it represents less than 0.2% of the soils area of Melancthon Township and less than 0.1% of the estimated total amount of Honeywood soils." He noted that all of the Honeywood soils have not been mapped to date. Further, he testified that these soils are not unique, and not a special type of soil.

[74] On cross-examination, Mr. Campbell agreed with the statement that to minimize damage, one must handle the soils carefully and use proper techniques, and that the REA does not include these requirements. However, he believes it is not possible to include every detail as a condition in the REA. Instead, it is necessary to include the basics and accept the methodologies and best management practices that will be

applied. With respect to how long one can stockpile soil, Mr. Campbell testified that it can be stored for a number of years, but that five to ten years would be “pushing the envelope” because organic matter would not be inputted again.

Discussion, Analysis and Findings on Harm to Soils

[75] In addressing the question of harm to soils, the parties addressed the following issues:

- (i) Are soils under agricultural production included in the definition of “natural environment” in s. 1 of the *EPA*?
 - (ii) Is the Appellants’ concern harm to the natural environment or impact on commercial potato production?
 - (iii) Will the Project cause serious and irreversible harm to soils?
- (i) Are soils under agricultural production included in the definition of “natural environment” in s. 1 of the *EPA*?

[75] The Appellants note that the *EPA* defines “natural environment” as the “air, land and water”, and submit that soils are part of the land. They note the decision in *Kawartha Dairy v. Ontario (Director, Ministry of the Environment)* (2008), 41 C.E.L.R. (3d) 184 (“*Kawartha Dairy*”), in which the Tribunal accepted a residential dwelling to be part of the natural environment, and found that the “migration of a contaminant to the interior of a building resulted in an impairment of the quality of the nature of the natural environment for use as a residential property” (at para. 26).

[76] The Appellants further state that the *Natural Heritage Assessment Guide for Renewable Energy Projects* (“NHA Guide”) specifically lists an analysis of surface and subsurface soils as information that may be included on the existing environmental conditions for a proposed project (at page 43 – 44), and assert that soils are viewed as part of the natural environment in this context. They note Appendix A.2.1 to the NHA Guide, which lists information sources and techniques for describing existing environmental conditions, including with regard to soils.

[77] The Approval Holder submits that not everything that resembles a natural feature is actually natural, or treated under environmental legislation as such. As examples, it points to settling ponds and drainage ditches that are constructed as part of approved water treatment systems, as well as the plantings, soil structure and passive hydration systems used to create manufactured wetlands for the treatment of effluent. The

Approval Holder asserts that the soils at issue are not part of the “natural environment” because they are regularly processed and restructured due to agricultural activities.

[78] The Director agrees that soils are part of the land, and form part of the natural environment. However, he submits that there is nothing natural about these significantly disturbed agricultural soils. The Director also asserts that soils are not natural heritage features that must be considered and evaluated under the NHA Guide and that the NHA Guide does not provide guidance in evaluating and assessing the significance of soils. Furthermore, he notes that while Ontario Regulation (“O. Reg.”) 359/09 sets out categories of the natural environment where renewable energy facilities may not be built or may be built only subject to restrictions, it does not prohibit wind farms on productive agricultural soils.

[79] The Tribunal finds that the soil in the Project area is included in the *EPA* definitions of “natural environment” and “land” in s. 1. The definition of “natural environment” lists “land”, and soils are part of the land. The Tribunal sees no reason to exclude soils from the definition of “natural environment”, even where those soils have been worked for agricultural production. The Tribunal also notes that the NHA Guide provides for the analysis of surface and subsurface soils as part of assessing natural heritage features in the context of renewable energy projects.

[80] As noted by the Director, O. Reg. 359/09 does not prohibit wind farms on productive agricultural soils. The Tribunal notes that the Minister of Energy is prohibited from entering into contracts for solar panel projects on certain classes of agricultural soils. This suggests that wind projects are not prohibited on agricultural soils based on the assumption that they cover much smaller areas of land. However, this argument does not support a conclusion that agricultural soils are irrelevant to the analysis of harm to the natural environment.

(ii) Is the Appellants’ concern harm to the natural environment or impact on commercial potato production?

[81] The Appellants submit that it mischaracterizes their argument to say that their case is based on harm to commercial potato production. They say that the evidence of Mr. Hoffman, Mr. Squire and Mr. Vander Zaag was intended to give the Tribunal a practical understanding of how potato crop yields can serve as an indicator of the extent of the Project’s impact on soil health and capability’ i.e., to be used as a measurement tool.

[82] The Appellants assert that evidence was led on the impact of the Project on soils, and that evidence was not led to quantify the loss of commercial production. They also state that the loss of arable land is not purely an economic loss because it impacts the ability of the land to receive and transmit rainfall through the surface and subsurface layers.

[83] The Approval Holder submits that the Appellants' submissions and evidence indicate that their ultimate concern is to avoid any risk to commercial potato production on the lands at issue, and to preserve a commercial interest in potato production. It states that the Appellants claim that the soils in Dufferin County are well-suited to potato production, and assert that the Appellants are not asking the Tribunal to intervene to protect the natural environment.

[84] The Approval Holder submits that the Legislature did not intend that the Tribunal weigh the relative commercial value of wind farm development over commercial potato production, and that such an exercise is not properly before this Tribunal.

[85] The Director also submits that the Appellants' main concern is a disturbance in the ability to cultivate a profitable potato crop, and not harm to the environment. He states that the Appellants' evidence about the composition, characteristics, location and drainage of Honeywood soils does not establish them as significant natural heritage features, but does demonstrate that the terrain is well suited to potato production.

[86] While the Appellants have presented the issues relating to harm to soils in the context of commercial potato production, the Tribunal accepts that their case concerns the issue of harm to the natural environment. While the Appellants did focus on the impacts on soil productivity to illustrate the nature of the harm to the soil, they did not characterize the issues in purely commercial terms, which would not be a relevant consideration under s. 145.2.1 test, and did lead evidence alleging that the Project would have an impact on the soil itself. For example, Mr. Vander Zaag raised the issue of irreversible harm to the soil profiles of topsoil, subsoil, overburden and underlying limestone karst, noting that they were, in his view, "one living thing". Mr. Hoffman testified about changes to soil layers, soil organic matter content, soil structure and water infiltration rates.

(iii) Will the Project cause serious and irreversible harm to soils?

[87] The Appellants submit that the Project will cause serious and irreversible harm to soils in the Project area. They say that the soils in the Project area are significant based on a variety of measures of significance, stating that Mr. Hoffman testified on the scale of the disturbance to the soils and Mr. Squire and Mr. Vander Zaag identified

additional harms to the soils, including the limitations on farming the land leased for the Project. The Appellants argue that, in assessing the extent of lands that will be affected by the Project, the Tribunal should consider that significant amounts of productive agricultural lands, which are undisturbed by construction activities, may also be rendered sterile and unproductive due to poor layout of the Project, and the unimpeded discretion of the Approval Holder with respect to project placement. They assert that the Project will reduce the productivity of the farmland in the Project area by removing highly productive land from use for potato farming, by interfering with adjacent land, by compacting the soils, by mixing in gravel from access roads, and by disrupting drainage systems. They say that the current four soil horizons will become two horizons, changing the water movement within the soil.

[88] The Appellants argue that there are three components to “serious” harm in the context of soil: rarity; mitigation limitations; and necessity. They submit that significant disturbance to the soil and interruptions in drainage will affect productivity on lands with relatively rare characteristics and productivity. They say it is not possible for mitigation to restore or improve the soil characteristics to their pre-construction state. The Appellants assert that, even after temporary access roads are removed, the harm to the soil will not be reversible through human intervention because once the different horizons of the soil have been mixed, they cannot be unmixed and will be permanently changed. They also assert that it is not necessary to locate the Project on Class 1 lands with high soil capability, based on the seven CLI soil classes. They note other planning and assessment policies and guidelines that restrict the siting of development on prime agricultural lands.

[89] The Appellants submit that there will be a permanent loss of soil under the cement pads required for the Project and a partial loss in areas where the soil cannot be returned to its original character. While they acknowledge that the soils may return to their original condition over a long period of time due to the natural processes that produced the soils in the first place, they say it is more reasonable to consider irreversibility in the context of a 25 year period relative to the life of the Project. As noted above, they assert that harm to the soil will not be reversible because the soil horizons cannot be unmixed, once mixed, and so will be permanently changed.

[90] The Appellants argue that the harm will be irreversible because soil capability will be reduced and there will be crop yield losses following construction, even if mitigation measures are implemented and construction is adequately supervised, because the most productive soils cannot be returned, through rehabilitation, to pre-disturbance levels of productivity, with the same inputs and management. They further submit that

the Tribunal has no reliable evidence before it regarding the mitigation measures that will be implemented, and there are no conditions in the REA as to how soils will be treated in the Project area.

[91] The Approval Holder submits that the alleged harm to commercial soils is not serious, but narrow and economic. It further submits that all disturbance will be temporary, whether for construction or over the life of the Project. The Approval Holder disputes Mr. Hoffman's assumption that 427 ha will be affected by construction activities, and asserts that less than 110 ha of soil will be disturbed by construction. In response to Mr. Hoffman's allegation that 19 ha will be removed from the Project permanently, it says that approximately 17 ha will be affected throughout the life of the Project, or less than 1% of the entire 2,400 ha Project area.

[92] The Approval Holder states that the question of whether the Honeywood soils are unique is irrelevant, although it argues that they are not unique but abundant in Ontario, and just one of many Class 1 soils in the area. It submits that the question of the CLI soil classification may be relevant, and notes that 60% of the soils in Dufferin County are rated Class 1, and Class 1 soils are abundant in southern Ontario. The Approval Holder states that, while the Class 1 soils in Dufferin County are well suited to potato production, many other soil types in Ontario are also well suited, including the sandy Class 3 soils in Simcoe County, which produces the most potatoes in the province. It asserts that the Ontario government has restricted the construction of ground-mounted solar generation facilities greater than 10 kilowatt ("kW") on Class 1 to 3 soils, but has placed no such restrictions on wind turbines, and concludes on this basis that the Ontario Government "does not consider the minor displacement of Class 1 soils resulting from the installation of wind turbines to be sufficiently significant to warrant restrictions."

[93] The Approval Holder asserts that any impact of the Project on the soils will be minimal, both due to the small amount of land affected, as discussed above, and based on the Dufferin soil management plan that will be in place to protect the soils.

[94] The Approval Holder states that the Appellants have not shown that any loss of harvestable area caused by the presence of wind turbines is irreversible. It submits that, to be "irreversible", harm to the natural environment must be incapable of remediation following the decommissioning of the Project. The Approval Holder cites *Alliance to Protect Prince Edward County v. Ontario (Ministry of the Environment)*, [2013] O.E.R.T.D. No. 40 ("APPEC"), at para. 625, in which the Tribunal found that the wind power generation project at issue in that case would not cause irreversible harm to

plant life, recognizing that vegetation recolonizes wind turbine bases after the removal of wind turbine infrastructure. It asserts that, with the use of soil management techniques planned for the Project, such as separately stockpiling the topsoil and subsoil, the soils can be brought back within one or two years, or up to four to five years in the case of the most disturbed areas.

[95] The Director takes a similar position to that of the Approval Holder, and submits that construction will disrupt soils and have some negative impacts initially, but that mitigation measures can minimize impacts such as subsoil compaction. He argues that the loss of crop land as a result of the Project is comparable in scale to land used for other farm activities other than crop production, such as dairy facilities and pasture lands. The Director states that rehabilitation will depend on proper land stewardship, best management practices and compliance with the Environmental Effects Monitoring Plan (“EEMP”), as required in the REA, and with mitigation measures set out in the Approval Holder’s application documents incorporated into the REA.

[96] The Director also submits that the alleged harm is not irreversible, and that disturbance to land where no turbines are placed will be reversed and undetectable within five years. He further submits that best management practices can rehabilitate sites to pre-disturbance conditions, and that temporarily disturbed soil will be returned to its previous level of productivity or better.

[97] When applying the environmental branch of the test in *APPEC*, the Tribunal stated at para. 206: “the relevant factors, and their respective importance and weight, must be assessed on a case by case basis.” The Tribunal agrees with this approach and applies it in this case as well.

[98] The Tribunal has considered a number of factors in this case in determining whether the proposed soil disturbance amounts to serious and irreversible harm to soils. These factors include: the amount of soils affected; the quality of the soils (based, for example, on soil capability class, soil potential rank or soil productivity index) and their relative rarity; the degree of harm to the soils that will be caused by the Project; and the degree to which it is possible to restore the soils (remediation or rehabilitation success).

[99] The Tribunal finds that one of the factors listed by Mr. Hoffman, the “necessity” of using the soils in the Project location as compared to soils of a lesser quality elsewhere, is a land use planning consideration that is not within the purview of the Tribunal. Similarly, the concern raised by the some of the Appellants regarding interference with farming practices is not within the issues the Tribunal may determine under s. 145.2.1(2) of the *EPA*.

[100] In this case, the amount of soils affected is not large by any of the relevant scales referred to in the hearing. There are numerous scales at which the amount of soils to be disturbed could be assessed, as compared to: the total amount of Class 1 soils for in the province, or in Dufferin County, or in the Project area; the amount of Honeywood soils available at any of these scales; or the amount of soils used for growing potatoes at any of these scales.

[101] At the Project area scale, for example, there is a difference of opinion between the parties on the exact amount but it appears that, out of the 2,400 ha of land in the Project area, between 110 and 427 ha (or approximately 5 to 18%) of the soils will be disturbed by construction activities and between 17 and 19 ha (or approximately 0.7 to 0.8%) of the soils will be affected throughout the life of the Project. In addition, as noted by Mr. Campbell, approximately 196 ha of land (or 8%) will be used for temporary storage and laydown. Even assuming that potatoes are currently produced on all 2,400 ha of the land, the Tribunal finds these ranges to represent a relatively small percentage of the potential potato producing lands in the Project area.

[102] Dr. Wall described the impact of the Project, including construction, on potato production in Dufferin County to be “infinitesimal”. He said that Dufferin County covers approximately 150,000 ha of land. Map 3 in Mr. Hoffman’s report, filed as Exhibit 65, Tab 2, shows an abundance of Class 1 soils outside of the Project area in Dufferin County. Given that Dufferin County accounts for 16% of potato production in Ontario, it is apparent that much of this land is used for potato production. The Tribunal notes that the Project area takes up only a small part of Dufferin County, and finds that the land potentially taken out of potato production in the Project area, for construction and during the life of the Project, is extremely small in the context of potato production in Dufferin County.

[103] Honeywood soils are prevalent across Dufferin County. The Tribunal heard evidence, based on the May 25, 2010 report, “The Honeywood Soils Series and Potato Production in Dufferin County, Ontario,” by Dr. J. Kenneth Torrance, that there are approximately 45,000 acres (or approximately 18,210 ha) of Honeywood soil series in Dufferin County. When considered as a percentage of the highly productive Honeywood soils in Dufferin County, the maximum area of 427 ha to be affected by construction activities and the maximum area of 19 ha to be affected for the life of the Project, taken together, represent less than 1%.

[104] The Tribunal therefore finds that, at all of these scales, the amount of soils affected by the Project does not amount to serious harm.

[105] It is clear that the construction activities and Project components, once installed, will impact the surface soil that has been disturbed by agriculture. However, as noted above, the Project area is small, relative to the size of Dufferin County. Thus, a relatively small amount of soil will be disturbed for the Project. The Tribunal heard evidence that a certain amount of soil is disturbed and not available for crop production in the normal course of farming activities as well, through such activities as barn construction and pasture land. The Tribunal finds that the amount of soil to be disturbed in order to construct and operate the Project is consistent with the scale of disturbance for roads, farm buildings and other facilities required in the normal use of agricultural lands. The Tribunal adds that the above findings are specific to this case and that a relatively small disturbance to an environmental feature that is less widespread may be considered serious.

[106] With respect to the quality of the soils, the Honeywood soils are not identified as a “specialty crop area” under the PPS, and the Tribunal heard no evidence that the Honeywood soils constitute a significant natural heritage feature. However, the Honeywood soils are Class 1 and clearly of high quality and prized, among other things, for profitable commercial potato farming. These soils possess special characteristics that allow potatoes, for example, to be grown at high production rates with relatively few inputs. The Tribunal finds that it is unnecessary to make a finding respecting whether reducing soils now classified as Class 1 to Class 2 or a lower CLI classification post-remediation would constitute serious and irreversible harm as the Tribunal finds, as discussed below, that in this case, the Appellants have not established that the soil will be reduced to a lower CLI classification post-remediation.

[107] The Tribunal will now turn to the question of whether remediation of these Class 1 soils is likely to be successful. With respect to soil that is intended to be remediated after the Project is decommissioned, the Tribunal finds that a time scale spanning the operation and decommissioning is appropriate for analyzing irreversible harm to soil. The Tribunal notes that different time scales may be more appropriate for other environmental features and for different types of harm, such as animal mortality.

[108] The Tribunal observes that, although it is not a condition of the REA, the Approval Holder is developing a soil management plan that seeks to preserve and ultimately restore the soils that are disturbed through construction of the Project.

[109] The success of mitigation and remediation measures is crucial to determining the extent of the long-term impact. The Tribunal heard evidence that, in accordance with the soil management plan, soil would be removed in layers, stockpiled and eventually

used to reconstruct reasonably productive agricultural soil. The experts had different views as to whether the reconstructed soil would be as productive as it was prior to disturbance, but no one testified that the reconstructed soils would not be capable of producing agricultural crops, nor even potatoes.

[110] The Tribunal notes that the soil management plan is not included as a specific condition in the REA. However, condition J1 of the REA states that the Approval Holder shall implement the EEMP and the commitments made in the listed reports, including the Environmental Impact Study (“EIS”) report. The EIS sets out a description of Project construction activities, including soil management, at s. 7.

[111] The Appellants have not satisfied the Tribunal in this case that the soils will be reduced to a lower CLI classification post-remediation. The evidence of the Appellants on this point did not rise above the level of a concern. The Tribunal accepts Dr. Wall’s evidence in this regard, which is based on his considerable experience with respect to pipeline construction, that Class 1 soils can be successfully rehabilitated.

[112] The Tribunal accepts that the mitigation measures, if applied as described by the experts for the responding parties, will be successful in restoring the soils to productive agricultural use and are appropriate to the scale of soil disturbance as a result of the Project. Therefore, the Tribunal finds that the Appellants have not established that the Project will cause serious and irreversible harm to soils.

b) Harm to Groundwater Resources and Local Wells

[113] Mr. Vander Zaag raised concerns related to water quality and quantity, in particular the potential for the Project to interfere with the water supply to irrigation wells in the area. He noted a concern that excavation during construction of the Project “could intersect our underground streams that exist in the karst as well as allow foreign material from the construction process to enter the karst ‘water highways’ unfiltered.” Mr. Vander Zaag notes there is no detailed analysis in Dufferin’s materials of each foundation site, to determine if Dufferin is going to be blasting into the limestone rock. In addition, Ms. Bovaird’s notice of appeal lists a concern about the impact of the Project on water bodies in the areas bordering the Niagara Escarpment.

[114] No expert witnesses were called by the Appellants related to the impact of the Project on the water supply, although witnesses who testified on soil and agricultural impacts touched on water recharge and the permeability of the soil.

John Petrie

[115] The Approval Holder called Mr. Petrie to give evidence on the impact of the Project on groundwater in the area. Mr. Petrie was qualified to give expert opinion evidence as a hydrogeologist. Mr. Petrie was asked by Dufferin to provide an opinion on the potential for the planned construction of the wind turbine foundations to affect the water supply of the underlying aquifer or interfere with the performance of the irrigation wells in the area. He concluded that “the planned construction will not affect the water supply potential of the underlying aquifer or the performance of any high yielding bedrock irrigation wells located 500 m and more from the nearest foundation.”

[116] Mr. Petrie described the Amabel limestone, found in the Project area, as a regionally extensive aquifer which provides water supplies for a number of municipalities, rural residences and commercial irrigation requirements. In his witness statement, he described the aquifer as being “typically in excess of 20 metres thick and contains abundant quantities of good quality groundwater.” In oral testimony, Mr. Petrie described the limestone as being “weakly karstic in some places”, which means the water moves underground through fractures, fissures and some tunnels. If soil or sediment gets into the karst, it may result temporarily in cloudy water from a well in the aquifer, but would get flushed out within a day or so due to the overall movement of the water underground.

[117] Mr. Petrie explained that two tests have been done in the Project area to calculate the depth to groundwater. A study by SPL Consultants Limited (“SPL”) on behalf of Dufferin found groundwater more than 4 m below surface, while Dillon located groundwater less than 4 m from the surface at 25% of the locations surveyed. Mr. Petrie stated the results likely differ due to the timing of the measurements, as groundwater rises in the spring. The SPL measurements took place in the winter, and the Dillon measurements took place in the spring.

[118] In any event, Mr. Petrie testified, excavation for the turbine bases will be less than 3 m in depth and will not encounter groundwater. He described the footprint of each turbine tower as “small”, measuring 25 m x 25 m, which would not eliminate recharge but deflect it to the sides of the turbine base. Mr. Petrie testified there is no reason to believe the Project will have any effect on local wells, or on the recharge of aquifers.

[119] In cross-examination, Mr. Petrie testified that the amount of hydrogeological study that should take place prior to a development is dependent on the impact the proposed development is likely to have. A quarry, for example, which would excavate

below the groundwater level and require pumping, would require far more extensive hydrogeological studies. In this case, however, there is no likelihood of interference with any local wells and sufficient study has taken place, in his view.

Analysis and Finding on Harm to Groundwater Resources and Local Wells

[120] The expert evidence of Mr. Petrie was not challenged by the Appellants, who simply raised concerns unsupported by evidence. On the basis of Mr. Petrie's evidence, the Tribunal finds that the Appellants have not established that the Project will have a negative impact on the aquifer, and consequently on the well water, in the area. The Tribunal finds therefore that the Appellants have not established that the Project will cause serious and irreversible harm to groundwater resources and local wells.

c) Harm to the natural environment through visual impact in relation to the Niagara Escarpment

[121] The NEC was granted Presenter status at the preliminary hearing. Two persons spoke at the hearing on its behalf: Bohdan Wynnycky, manager of the NEC, who was qualified to give expert opinion evidence as a professional planner; and Linda Laflamme, a landscape architect who was qualified to give expert opinion on visual impacts.

[122] Under the *Niagara Escarpment Planning and Development Act* ("NEPDA"), the NEC is charged with implementing the NEP. While no portions of the Project are planned within the NEP boundaries, several proposed turbines are located adjacent to the NEP area.

[123] The purpose of the NEP is:

to provide for the maintenance of the Niagara Escarpment and the land in its vicinity substantially as a continuous natural environment, and to ensure only such development occurs as is compatible with that natural environment.

[124] The objectives of the NEP include: (iv) "To maintain and enhance the open landscape character of the Niagara Escarpment in so far as possible, by such means as compatible farming or forestry and by preserving the natural scenery;" and (v), "to ensure that all new development is compatible with the purpose of the Plan."

[125] The NEC has addressed the issue of wind power projects and the Niagara Escarpment in two policy papers, delivered in 2003 and 2004, which are now operational policy. Specifically, the Commission Recommendations from 2004 include the following:

Recommendation 4

The Niagara Escarpment Commission should review wind power proposals in areas adjacent to the Niagara Escarpment Plan boundaries where the physical presence of the structures and the motion of the blades may have a visual impact on prominent Escarpment features and landscapes, and provide comments based on the effects the facility(s) may have on the Escarpment landscape character and natural scenery.

Bohdan Wynnycky

[126] Mr. Wynnycky testified that, from March to June 2012 there was active consultation and interaction between NEC staff and the Approval Holder's agent, Dillon, during which the Approval Holder was made aware of the NEC's specific concerns. A viewshed analysis was prepared by Dillon, on behalf of the Approval Holder.

[127] Mr. Wynnycky said that s. 62.0.2 of the *Planning Act* provides that the NEP continues to apply with respect to renewable energy undertakings, while other provincial plans do not. It reads:

62.0.2 (1) Despite any Act or regulation, the following do not apply to a renewable energy undertaking, except in relation to a decision under section 28 or Part VI:

1. ...
2. a provincial plan, subject to subsection (2)

Exception

- (2) Subsection (1) does not apply in respect of,
- (a) the Niagara Escarpment Plan...

[128] Mr. Wynnycky argues that the objectives of the NEP and its policies continue to be in play if the NEP area is impacted by a proposed development, whether or not the development is physically located in the NEP area.

[129] In 1976, the Ministry of Natural Resources ("MNR") and the NEC jointly produced a Landscape Evaluation Study for the Niagara Escarpment Planning Area, which rates the scenic resources of the area. The introduction to that document notes that:

the Niagara Escarpment Commission viewed the landscape study as a pre-requisite to pursuing one of the stated objectives of the Plan – that of "maintaining and enhancing the Escarpment's open landscape character". An assessment of landscape quality was regarded as an essential factor both in determining policies that might be developed to protect scenic areas and to arrive at judicious land use allocations in the planning process.

[130] Mr. Wynnycky stated that several of the proposed turbines are in areas deemed to be of "outstanding" visual quality within the NEP area, which was the highest rating

for scenic resources in the 1976 study. Such views are afforded an exceptional level of protection within the NEP. It is for this reason that the NEC argues that the Tribunal should give serious consideration where initiatives may have an impact.

[131] Mr. Wynnycky agreed on cross-examination that the *NEPDA* includes an entire legislative scheme for development permits within the NEP development control area; a scheme which includes a review by the Hearing Officers where a permit is refused, and penalties for undertaking development without a permit. Development outside the development control area, however, does not require a development permit from the NEC.

Linda Laflamme

[132] Ms. Laflamme testified to the viewshed report prepared by Dillon and the NEC's resulting recommendations.

[133] She testified that the NEC has policies related to "open landscape character" and scenery. She referred to the Purpose of the NEP, which states it applies to the "vicinity" of the Escarpment.

[134] The NEC has a policy that "adequate public access" includes visual as well as physical access to the NEP area.

[135] The NEC considered the Project proposal and concluded that only four of the proposed 49 wind turbines would significantly visually impact the protected "outstanding" views, and recommended that four turbines (T1, T2, T20 and T21) be relocated to minimize the impact.

[136] Ms. Laflamme testified that, rather than implement the NEC recommendations, Dufferin left all four turbines and further chose to replace T21 with a taller turbine, creating a more significant visual impact (from 130 m to 136.5 m).

[137] Ms. Laflamme referred to several Observation Points ("OP"), and in particular OP 13, which looks across the Noisy River Valley. This particular viewscape, over a pristine/intact area is rated "outstanding" in the 1976 report. OP 13 is 5.5 km from the closest turbine, T1, with T2 a close second. The NEC recommended to Dufferin that those two turbines should be moved. The computer modeling analysis shows a number of other turbines will be clearly visible at OP 13.

Norman Wolfson

[138] Mr. Wolfson was granted Presenter status. Mr. Wolfson, together with Sandra Wong, owns a 100-acre property on the crest of the Niagara Escarpment in Mulmur.

They are primarily concerned about serious and irreversible harm to the natural environment, particularly as a result of visual impact, light pollution and flicker from the proposed 49 turbines. Mr. Wolfson states that the “natural environment in this area includes not only flora and fauna, but also landforms (and the visual integrity to, of and from the landform of the Niagara Escarpment).”

[139] Mr. Wolfson supports the NEC’s views that the turbines will have an impact on the visual landscape, and in particular he is concerned about their interference with the views of the Escarpment enjoyed from his home.

[140] Mr. Wolfson is particularly concerned with turbine T21, which is situated between his home and the setting sun, and he fears the flicker impacts and pulsating lights “will prove to be intolerable”. He said that his home is located approximately 3,000 m from T21. Mr. Wolfson is concerned he may have to make alterations to the house because currently, the bedroom, study and studio all face west. He is also concerned about the impacts of turbine noise on their peaceful enjoyment of their property.

[141] Mr. Wolfson raised concerns with the accuracy of Dillon’s visual assessment document, which he finds misleading. In particular, he believes the elevations are wrong as T21 is shown at 136 m above sea level while his house is approximately 500 m above sea level.

[142] Mr. Wolfson further raised concerns regarding the loss of prime agricultural land, and negative impacts on birds and bats. In this regard he testified that his home is in a migration pathway and that geese barely get above the house, on the 500 m above sea level natural ridge. He recently counted 28 species of birds in one day. In addition, Mr. Wolfson sees numerous bats in the area, in the evening.

[143] Mr. Wolfson and Ms. Wong request that the Project be deferred until study on health impacts currently underway by Health Canada is complete, especially in view of the fact that Melancthon Township already has a high concentration of turbines. Mr. Wolfson testified that the proposed Project will result in one industrial wind turbine for every 14.82 residents, making it the highest per capita concentration of turbines in North America.

Joan Lever

[144] Ms. Lever, a Presenter at the hearing, also provided testimony and documents in support of the environmental concerns raised by the Appellants and other Presenters. Ms. Lever’s submissions will be more fully described below, under the portion of the decision dealing with alleged harm to human health.

Eha Naylor

[145] Ms. Naylor was qualified to give opinion evidence as an expert planner and landscape architect with expertise in assessing visual impacts. She is a partner at Dillon, which was retained by the Approval Holder to conduct a visual impact assessment of the potential impact of the Project to the viewsheds from the public areas within the NEP area, following concerns raised by the NEC. She confirmed that the “Draft” Report dated October 2012 is the only one that was prepared, and testified that this type of assessment is not a requirement of the REA process.

[146] Ms. Naylor described the process for preparation of the visual impact assessment, which involved computer modeling of the location of the Project through GIS mapping which was layered with other information to predict where the turbines would be visible within the “Escarpment view”. She testified that Dillon followed the NEC process, which was detailed and prescriptive, and resulted in a conservative estimate. For example, woodlots were considered to be at a 15 m height, while in Ms. Naylor’s experience they are generally considered to be at a 25 m height, further obscuring views of the turbines.

[147] Ms. Naylor’s conclusion was that the four turbines about which the NEC is concerned, T1, T2, T20 and T21, have no significant impact on scenic resources. She acknowledged that a visual assessment is a largely subjective exercise, and that context is important. Elements considered include the complexity of the landscape, where the turbines are sited, and their distance from the viewer. The further away, she testified, the smaller the impact.

[148] Ms. Naylor commented on the view from the various OPs modeled. Elements taken into consideration by Ms. Naylor, in assessing views from each observation point, include:

- Distance between OP and turbines;
- Other elements in the scene;
- Whether it is a “complex landscape”;
- Whether or not it is a “continuous viewshed” ; and
- The level of rated attractiveness of the scene to begin with.

[149] In her analysis, Ms. Naylor considered whether the Project diminishes the “visual experience” in the NEP area. In general, Ms. Naylor considers the turbines to be “part of the view” and “part of the scene”.

[150] With respect to the concern expressed by the NEC witness that T1 and T21 were made taller after the NEC suggested they be moved due to diminishment of scenic value, Ms. Naylor's witness statement explains that some turbines were increased in height from the original plan, and others were reduced in height, depending on optimization of the Project. She agreed in her witness statement that T1 and T21 were modeled at 130 m, but then were changed to 136.5 m in height. Ms. Naylor testified that both T1 and T21 are located in close proximity to 136.5 m turbines, and that the 6.5 m difference in the turbine height would not be discernible from 3.7 km away, the closest OP.

[151] Ms. Naylor agreed that it is a subjective assessment and what is acceptable to her, may not be acceptable to other viewers. She also agreed that the area is composed of forested hills and agricultural lands now, and that wind turbines introduce a visual quality very different from the current view. She agreed that areas ranked "attractive" or "very attractive" are sensitive to change, and that in a normally evolving rural landscape, acceptable change is incremental change.

[152] Ms. Naylor further agreed that, where there are views of turbines from the NEP area, the visual characteristic will change. However, she testified that the issue Dillon addressed was whether there would be "significant change"; i.e., whether the change would significantly impact one's enjoyment when using the NEP area. She agreed there would be some diminishment of the visual experience.

[153] When asked whether the Project view will be consistent with the Purpose of the NEP, "to maintain... as a continuous natural environment", (i.e., whether non-incremental change to a sensitive area of the Plan is "maintenance" of the Escarpment), Ms. Naylor testified that the Project is not within the NEP area, that the views across the Plan area to the Project area are in limited locations and a considerable distance from the Project, and that in her view maintenance of the quality within the Plan area remains intact.

[154] When it was put to her in cross-examination that the NEP requires maintenance of land in the plan "and in its vicinity", Ms. Naylor testified that the Plan has boundaries, and that the "vicinity" of the Plan is not clearly established here. The closest turbine is 3.7 km away. In her view, "vicinity" would have to be interpreted as a very large distance to have any impact here.

Analysis and Finding on Harm to the Natural Environment through Visual Impact in Relation to the Niagara Escarpment

[155] The Appellants support the submission of the NEC that if the Tribunal is satisfied that lands within the NEP area may be impacted by the Project, its decision should be subject to the policies of the NEC. They also support the NEC's position that the Project will have a visual impact on lands within the NEP area as viewed from the Escarpment. They submit that the Project is not in keeping with the purpose and objectives of the NEP because it will not maintain the Niagara Escarpment as a continuous natural environment and does not preserve the natural scenery of the NEP area.

[156] The Approval Holder states that the NEC did not address the statutory test on this appeal under the *EPA*, but spoke to the NEC's governing statute, the *NEPDA*, and the NEP. It submits that there is no legal basis for the position that the policies of the NEC should apply to the Project and this proceeding. The Approval Holder says that the *NEPDA* empowers the Minister to designate lands within the Niagara Escarpment planning area as areas of development control, but the NEC cannot exercise its development control jurisdiction outside of the NEP, and the Project is not within the NEP. It goes on to assert that any impact on the views from the NEP area cannot constitute serious and irreversible harm to the natural environment within the meaning of the *EPA*.

[157] The Director submits that the issue of visual impacts is not properly before the Tribunal because visual impacts are not natural heritage features that must be considered and evaluated in a NHA under O. Reg. 359/09. The Director states that the Project is not located within the NEP area and, therefore, is not subject to development control. He further submits that visual impact assessment is a subjective exercise and, in this case, the visual simulations provided by the Presenters demonstrate that the turbines appear as generally distant objects that have no negative impact on the view.

[158] The Director asserts that the issue of visual impacts was not raised as an issue in this appeal by a party to these proceedings, while acknowledging that the Appellant Mr. Maguire raised the "considerable visual impact and degradation of the Niagara Escarpment" in his notice of appeal. The Director says, however, that Mr. Maguire did not raise visual impact as a specific issue, nor did he claim that the visual impact of the Project would cause serious and irreversible harm.

[159] The Tribunal has recently addressed the distinction between grounds of appeal and issues in *Moseley v. Ontario (Ministry of the Environment)*, [2013] O.E.R.T.D. No. 74. In that decision, the Tribunal stated, at paras. 24 and 25:

Thus, in an appeal under s. 142.1 of the *EPA*, the maximum number of grounds that can be raised is two [serious harm to human health or serious and irreversible harm to plant life, animal life or the natural environment]. ...

Rule 29(e) sets out an additional requirement that goes beyond the basic requirements of the *EPA*. This Rule requires an appellant to provide additional information so that the responding parties (and any proposed presenters and participants) know and can prepare for the issues and facts to be raised in the appeal, which is required to be expedited under the legislation.

[160] Therefore, the “issues” that may be considered in a REA appeal are limited to those that the Appellants have identified in their notices of appeal. Mr. Maguire did raise the issue of visual impact in relation to the Niagara Escarpment in his notice of appeal. Thus, the Tribunal finds that this issue has been raised by an Appellant in these proceedings.

[161] The Tribunal must next turn to the question of whether it has jurisdiction to deal with this issue in the context of a REA appeal. The Appellants submit that the NEP applies to the Project on the basis of the *Planning Act*, which states at s. 62.0.2(1)2 that provincial plans do not apply to renewable energy undertakings, but makes an exception to that provision in respect of the NEP in s. 62.0.2(2)(a).

[162] While the NEC provided comments on the Project, it understood that the Project was outside of its specific geographic jurisdiction. The Tribunal accepts the Approval Holder’s submission that the exemption in s. 62.0.2(2)(a) of the *Planning Act* applies only to renewable energy projects that are within the NEP. The Project is outside the boundaries of the Niagara Escarpment planning area, and those boundaries may only be altered by regulation by the Lieutenant Governor in Council, under s. 3(2) of the *NEPDA*. The exception in s. 62.0.2(2)(a) does not expand the scope of the NEP outside of the planning area with respect to a renewable energy project.

[163] Section 145.2.1 of the *EPA* sets out what the Tribunal must consider in a REA hearing under s. 142.1. Pursuant to s. 145.2.1(2), the Tribunal shall review the decision of the Director and shall consider only whether engaging in the renewable energy project in accordance with the REA will cause: (a) serious harm to human health; and (b) serious and irreversible harm to plant life, animal life or the natural environment. In a REA appeal, the Tribunal is constrained by the legal tests set out in this provision.

[164] The Tribunal, therefore, finds that it is beyond its jurisdiction to address the specific question of whether impacts on the scenic resources of the Niagara Escarpment are consistent with the NEP.

d) Harm to Bats

Evidence on Bats

[165] The Tribunal heard evidence from six expert biologists, three of whom were experts specifically on bats.

[166] The areas of dispute among the experts that are relevant to the issues the Tribunal must decide are the following:

- Whether the Project will negatively impact bat habitat (or whether there is sufficient information to make such an assessment);
- The extent to which the Project will cause bat collision mortality;
- The extent to which collision mortality caused by this Project will impact bat species through cumulative effects; and
- How the Project will impact endangered species of bats.

[167] The following biological information was not in dispute. There are eight bat species in Ontario: five species of hibernating bats that are resident year-round; and three migratory species that are present in Ontario part of the year. Hibernating bats are active from late April to approximately October in Ontario. They roost in colonies in the summer, in barns or old trees called “snags”. In the winter they hibernate in caves, mines and some in old buildings. Migratory bats are present from approximately early May until late September. They are strictly tree-roosting. Bats are insectivores and play an extremely important pest control role in the ecosystem. Each bat eats approximately half its body weight in insects, each night.

[168] White-nose syndrome (“WNS”), a disease caused by a fungus that kills bats during hibernation, has devastated hibernating species in the last few years. Two species have recently been put on the endangered list in Ontario: the Little Brown Myotis, also known as the Little Brown Bat, and the Northern Myotis, also known as the Northern Long-eared Bat. Estimates are that 80 to 90% of the Little Brown Myotis species has been killed from WNS in the past few years.

[169] Migratory bats make up the highest percentage of bat deaths due to wind turbines across Canada, and 80% of such deaths across North America. Most are killed in Canada during the fall migration from late July to September. Little is known about migratory bat species, and in particular their migratory routes.

[170] In preparing its application for this Project, Dufferin retained Dillon to conduct a NHA of the Project area. Natural Resources Solutions Inc. (“NRSI”) was in turn retained by Dillon to conduct portions of the NHA specific to bats and bat habitats. NRSI prepared the *2011 Bat Monitoring Report and Environmental Impact Study*, dated December 12, 2011 (the “Bat Report”).

Dr. Robert Barclay

[171] Dr. Barclay was qualified to give expert opinion evidence as a biologist with expertise in bats and their interaction with wind turbines. Dr. Barclay testified on behalf of the Appellants.

[172] Dr. Barclay’s criticisms of the bat work done for this Project include the following: it ignores cumulative effects; it relies on the MNR *Bat Guidelines* which use an arbitrary mortality threshold that is not based on science; it under-reports the bat use of the Project area; and two bat species became listed as species-at-risk under the *Endangered Species Act, 2007*, S.O. 2007, c. 6 (the “ESA”) since the Bat Report was prepared.

[173] Dr. Barclay contends that the MNR *Bat Guidelines*’ threshold of 10 bats per turbine per year, before mitigation is required, is not based on science, but an arbitrary number.

[174] Dr. Barclay testified that the Bat Report does not accurately reflect bat activity over the Project area, and opined that the area is more important to bats than reported. He gave the following reasons:

- The Bat Report focuses on bat roosting sites only, ignoring foraging habitat. Bats are not killed while roosting or hibernating, but when they are foraging for food, commuting or migrating. If there is significant foraging on site, bats can be attracted from a long way away. The *Bat Guidelines* ignore feeding habitat, which is critical habitat in Dr. Barclay’s view. Other jurisdictions do consider feeding habitat, when considering the impact of development on bats.
- Most bats killed by wind projects are migratory, but the Bat Report and EIS looked only at hibernating bats. NRSI did its monitoring in late June and early July, prior to the commencement of the narrow six-week window during fall migration. It is simply unknown, therefore, whether the Project includes critical habitat for migratory species of bats. Wind turbine collision mortality impacts migratory bat populations at a broader scale than for hibernating

bats, as it will impact their populations in their overwintering sites in the south, as well as summer roosting sites further north. The current state of science is such that we are not able to identify migratory routes. If a project is located along a migratory route, it may eliminate that route altogether.

- Dillon and NRSI placed microphones to record sounds at only two snags (roost trees) for the entire Project area, which was insufficient. In addition, the chosen trees were in forested areas, but few bats feed within forests, as they prefer forest edges.
- In calculating abundance from the sound recordings, the number of calls was averaged out over 10 hours, while bats are only active at that time of year for 7.5 hours per night. Dr. Barclay calls this “sloppy science”.

[175] With respect to endangered species, the Little Brown Myotis and Northern Long-eared Myotis have been put on the endangered list in Ontario since the initial EIS studies were done. Dr. Barclay commented that Little Brown Myotis fatalities at the nearby Melancthon wind project represent a significant percentage of its population. The *ESA* prohibits the killing of endangered species. Dr. Barclay emphasized that the population is in desperate trouble, and that additional fatalities caused by wind turbines at this Project will only exacerbate the situation. Dr. Barclay noted that, according to the Bird and Bat monitoring database, almost 25% of bats killed at turbines in Ontario from 2006 to 2010 were Little Brown Myotis.

[176] Dr. Barclay put the levels of permitted bat fatalities under the REA into context by stating that the 490 bats allowed to be killed per year at this Project without mitigation (10 per turbine, 49 turbines), cannot be replaced. The number represents several entire maternity colonies for the Little Brown Myotis.

[177] In order to estimate the bat fatality rate that will occur from this Project, Dr. Barclay used the fatality rates recorded at the Melancthon wind project as a comparator. Based on his calculations, the fatality rate at Melancthon would result in approximately 78 bat deaths per year at this Project. It represents the approximate size of a Little Brown Myotis colony in a tree, and therefore is equal to killing an entire Little Brown Myotis colony per year. He testified that, with the population having been devastated by WNS, 78 bats deaths /year at one project could have a significant impact on the entire population.

[178] Dr. Barclay acknowledged that, had he done his bat fatality estimate per turbine for the Melancthon data as opposed to per mW, then the fatality estimate for this Project would be 17% less. He noted that there is an ongoing debate as to which method of

calculation is more relevant, but, in any event, it still represents thousands of bat deaths, which is especially harmful in conjunction with the other proposed or approved wind turbine facilities within 20 km of Dufferin.

[179] It is estimated that WNS has killed 80 to 90% of the population of Little Brown Myotis. In Dr. Barclay's view, with endangered species any additional mortality is a significant impact, as it will speed up the demise of the population. One cannot simply discount other causes of mortality due to WNS.

[180] In response to Dr. Fenton's comment that agricultural lands have low bat activity, Dr. Barclay noted that studies of wind turbine projects on agricultural lands in Alberta have shown high rates of bat fatality. Further, studies in Alberta have shown that, with an activity rate of six to eight bat passes per night, the project recorded a fatality rate of over 20 bats/turbine/year. Thus, although the activity rate was not deemed to be high, it was related to high levels of fatality.

[181] With respect to cumulative effects, Dr. Barclay's concern is that MNR's *Bat Guidelines* view each facility in isolation. He said that both migratory and hibernating bats are very mobile, travelling tens of km per night for commuting and feeding. The *Bat Guidelines* provide that, where 10 bats or more are killed per turbine per year across a project, mitigation measures come into play. The *Bat Guidelines'* focus on a particular number of bats killed per turbine, rather than calculating mortality on a population or landscape level, could lead to very high bat mortality with no requirement for mitigation measures.

[182] Dr. Barclay noted that three other wind projects already operate in the surrounding area (Plateau, Grand Valley I and II, and Melancthon), and 12 more are proposed or already approved. He indicated that the population of bats in the entire area should be considered, on a landscape scale.

[183] With respect to the effectiveness of mitigation measures, Dr. Barclay agreed that bats do not fly at high wind speeds, and studies have shown that increasing the turbine blade cut-in speed to 5.5 m/sec has been shown to reduce bat fatalities by 60%.

[184] Dr. Barclay noted that this REA focuses on mitigation during the migratory period (i.e., Condition J 8 (1) notes from July 15 to September 30). This is strange, he found, as the report itself focuses on resident hibernating bats. Dr. Barclay testified that, if the mitigation measures in this REA were to cover the active period for hibernating bats, it would extend from late April to the end of September.

Amy Cameron

[185] The Director called Amy Cameron, a biologist with the MNR, who reviewed, and approved, the NHA. Ms. Cameron was qualified to give opinion evidence as a biologist with expertise in the MNR's REA Guidelines and as an expert in reviewing natural heritage assessments for REA projects. The Tribunal observes that, while Ms. Cameron was qualified to provide opinion evidence, the majority of her evidence was factual.

[186] Ms. Cameron described the REA process, and testified that the Approval Holder's NHA was deemed to fulfill the requirements of the Regulation, and the MNR's *Bat Guidelines*.

[187] Ms. Cameron noted that condition J15(2), with respect to reporting requirements for species at risk, requires immediate reporting to the MNR if a carcass of an endangered bat is found, so that mitigation measures can be taken immediately.

[188] She testified that proponents are subject to the *ESA*, which is separate from the REA requirements.

David Restivo

[189] Mr. Restivo was qualified, on behalf of the Approval Holder, as an expert biologist with expertise conducting environmental assessments of wind projects. He works for Dillon which prepared the NHA. Dillon conducted site investigations and identified six woodland candidate bat habitats for further consideration by NRSI biologists.

[190] He stated that the "Project Location", as defined by the REA Regulation, includes all development activities proposed to occur on land or in the air. The "Project Area" includes all land, water and air within 120 m of the Project Location.

Andrew Ryckman

[191] Mr. Ryckman was qualified by the Tribunal on consent of all parties to give opinion evidence as a biologist with expertise in conducting environmental assessments of wind projects, including assessment of impacts on bats and bat habitats. He testified on behalf of the Approval Holder.

[192] Mr. Ryckman works for NRSI, which was retained by Dillon to do a bat study for the Project location. He testified that the work conducted by NRSI "confirmed the existence of the candidate significant bat habitat within the project area that had been identified by Dillon, assessed the likely impact of the project on such habitat and

determined appropriate mitigation measures to address and minimize any potential negative impacts as need be.” Mr. Ryckman’s witness statement notes that “our overall conclusion in respect of the NHA bat assessment is that, assuming the mitigation measures incorporated in the REA are followed, the anticipated impacts of the Dufferin Project on bats and bat habitats are expected to be minimal.”

[193] In Mr. Ryckman’s view, the habitat-based focus of the NHA ensures protection of significant wildlife habitats, and therefore protects the wildlife that rely on those habitats.

[194] Mr. Ryckman said that, of the six woodland candidate bat habitats identified by Dillon, three are farther than 120 m from the nearest turbine and therefore fall outside the REA Regulation stipulation that “only suitable habitats within 120 m of the Project location be considered during the evaluation of significance.”

[195] Mr. Ryckman testified that, in the evaluation of significance stage, NRSI investigated for two types of habitat: bat hibernacula, and bat maternity colonies. Of the three candidate bat habitats that were within the 120 m setback, all three were considered to be significant after an evaluation in accordance with the bat monitoring protocol outlined in the MNR *Bat Guidelines* 2010. Two were confirmed significant upon further investigation (BMA-003 and BMA-005), and one was assumed significant due to lack of access (BMA-006).

- BMA-003 is a natural feature 4.5 ha in size, which is 86 m to the closest turbine.
- BMA-005 is a natural feature 19.2 ha in size, which is 80 m to the closest turbine.
- BMA-006 is a natural feature 9 ha in size, which is 29 m to the closest turbine, identified as suitable habitat for roosting bats.

[196] Mr. Ryckman noted that section 7.3 of the NRSI Bat Report states that NRSI biologists did not find suitable habitat for bat hibernacula within the Project area, according to the guidelines established in the MNR’s Significant Wildlife Habitat Technical Guide (“SWHTG”), and the *Significant Wildlife Habitat Ecoregion Criteria Schedules Addendum (draft guidance, undated)*.

[197] Mr. Ryckman indicated that, under the REA Regulation, since only three locations were identified as “significant natural features”, an EIS leading to possible mitigation measures need only be conducted for these features.

[198] Mr. Ryckman described the surveys conducted. Mr. Ryckman testified that provincial standards provide for a minimum of five hours of acoustic surveys, but NRSI

chose 10 hours to get a better picture of bat activity in the woodlots through the night. In response to Dr. Barclay's concern that the survey took place partially during daylight hours, Mr. Ryckman testified that NRSI's interpretation of the MNR *Bat Guidelines* is that the standard time for surveying is to begin one half hour before sunset (in order not to miss the bats emerging from their roosts), and end at approximately sunrise. Mr. Ryckman stated that NRSI clarified with the MNR that "dusk" means one half hour before sunset.

[199] Mr. Ryckman agreed with Dr. Barclay that the focus of the NRSI Bat Report was on maternity roosting colonies rather than bat foraging habitat, but in his view the protection of these habitats has the effect of also protecting foraging habitat, because any habitat that is considered to be significant is delineated to contain the entire woodlot in which it is found.

[200] Mr. Ryckman testified that foraging bats are generally not at risk of collision mortality with wind turbines, because they fly at a lower height than the blade swept area.

[201] Mr. Ryckman also agrees with Dr. Barclay that the Bat Report's focus was on hibernating bats, rather than migrating bats.

[202] Mr. Ryckman testified that he is confident there is low bat use of the area, despite his acknowledgement that NRSI does not have information on the size of the bat population using the Project area. This is consistent with his understanding that bats do not make extensive use of agricultural fields.

Dr. Scott Reynolds

[203] Dr. Reynolds, who testified on behalf of the Approval Holder, was qualified to give expert opinion evidence on bats and impacts of wind farms on bats.

[204] Dr. Reynolds testified that the Dufferin site does not contain any of the features that would make it significant habitat for migratory bat activity, such as mountain ridges, large riparian corridors, or coastal shorelines which act as a visual marker during migration. Dr. Reynolds acknowledged that the Niagara Escarpment may act as a geographic landform for migrating bats, but if it were used by bats they would migrate along it, rather than across it. Given its orientation with respect to the Project site, Dr. Reynolds testified the Project would not put any migrating bats at greater risk and they would be unlikely to be impacted by turbines.

[205] Dr. Reynolds testified there would be no loss of bat habitat because the EEMP provides there will be no removal of significant bat habitat, and in his view there will be no indirect effects on habitat.

[206] With respect to collision mortality, Dr. Reynolds testified that foraging and commuting bats would fly below the turbine blade swept area and therefore not be at risk during those behaviours (3 to 12 m above the ground for commuting). Further, the mitigation measure of increasing the cut-in speed to 5.5 m/s has been proven to be an effective mitigation measure to reduce bat collision mortality. He provided his opinion that the threshold of 10 bats/turbine/year is a reasonable operational threshold.

[207] Dr. Reynolds testified that the availability of bat mortality information for the neighbouring Melancthon wind project gives him further comfort in his conclusions. In his view, the Melancthon data, for a project on similar landscape to this Project and in the same general area, shows low collision mortality for bats. According to Dr. Reynolds' interpretation of the data, 98% of the mortality occurred during the fall migratory period, affecting migratory bats, whereas Dr. Barclay had interpreted the mortality as affecting endangered bats.

[208] Dr. Reynolds stated that, while much is not known about bats, it is known that three species of bat have consistently been most affected by collision mortality at wind facilities: the migratory tree bats (silver-haired, red, and Hoary bats.) He stated that 80% to 87% of all bat mortality is attributed to these three species.

[209] While the Bird and Bat Monitoring Database shows a figure of 23.5% of bat mortality attributed to local hibernating Little Brown Myotis, Dr. Reynolds is confident the number is not an accurate estimate for the Dufferin site for three reasons: the database number is a composite and not predictive for any one project; the data is from a time when the Little Brown Bats were much more numerous on the landscape (2006 to 2010); and almost all the projects from which the data was taken are located within 15 km of a shoreline of a major water body. It is common ground that bats are attracted to shorelines. Dr. Reynolds believes the location of the Dufferin Project inland, away from large water bodies, makes it a much lower risk for bat mortality.

[210] Dr. Reynolds agreed in cross-examination that the sampling efforts of NRSI were to sample for summer resident bat activity, not for migratory activity. He testified that, since Melancthon data is available, from a location less than 10 km away, the absence of fall migratory data is not an impediment to reaching a conclusion on bat activity in this Project area.

[211] Dr. Reynolds testified in cross-examination that, due to the current lack of knowledge about migratory habitats, he would look for features that suggest migratory concentrations to identify migratory routes. Dr. Reynolds agreed that it “would have been helpful” in this instance to monitor the wetlands on the Project site for bat activity.

Dr. Melville Fenton

[212] Dr. Fenton was called by the Approval Holder and qualified to give expert opinion evidence as an expert on bats and bat habitats. Dr. Fenton is the Chair of the Committee on the Status of Species at Risk in Ontario (“COSSARO”).

[213] Dr. Fenton concludes that, regardless of the issues raised by Dr. Barclay with respect the NHA report underestimating bat use of the area, “it seems clear that, compared to other sites in southern Ontario, the Dufferin site is not an area of high bat activity”. Dr. Fenton states that agricultural fields are typically low bat use areas, although no scientific literature was filed to back up this statement.

[214] Dr. Fenton relies on the mitigation requirements of the REA to conclude that, even if the bat use of the area is higher than predicted, this does not mean the Project will cause serious and irreversible harm to bat species. He testified that the mitigation measures that will be triggered if the threshold of 10 bats/turbine/year were to be exceeded would significantly reduce the level of any mortality.

[215] Dr. Fenton concludes there is unlikely to be any significant mortality risk from this Project to species-at-risk bats, for two reasons: (i) the site is “an area of low activity for them (again there is no hibernacula or swarming site present)”, and (ii) the two endangered species of bats are not generally present in the blade-swept area. The Little Brown Myotis forages close to the ground, within 1 to 2 m of the surface of the water, and a maximum of 2 km from maternity roosting habitat. The commuting height for this bat is also below the blade-swept area. Northern Long-eared Myotis mainly forage within wooded areas close to vegetation, and their height depends on the tree canopy.

[216] Dr. Fenton stated that the mitigation measures in the REA give him further comfort in stating that bats will not be seriously impacted by this Project.

[217] With respect to cumulative impact, Dr. Fenton states that the sizes of the bat populations in Ontario are not known, and as a consequence it is not possible to know whether the mortality level, even if the MNR *Bat Guidelines* threshold were exceeded, would cause any serious and irreversible harm to populations of bats in southern Ontario.

[218] Dr. Fenton agreed there is no population database for bats, in the way there is for birds. COSSARO recommended that two species of bats be listed as endangered because of “catastrophic declines” due to WNS, in the order of 95% of the population within one to two years. Based on MNR surveys, 30,000 bats were found to be hibernating in 2009 while in 2013, less than 100 were found.

[219] Dr. Fenton reviewed the COSSARO and Committee on the Status of Endangered Wildlife in Canada (“COSEWIC”) reports in his evidence. He testified that there is no evidence that wind turbines are causing a precipitous decline in bats. The COSSARO report mentions wind farms as an “additional potential agent of mortality” in deaths of endangered bat species, but Dr. Fenton said the Little Brown Myotis was listed due to concern about WNS, which in his view “trumps everything”.

[220] Dr. Fenton testified that it is expected that Little Brown Myotis will probably be extinct in five years. For the Northern Myotis, all information is based on American data as there is no data in Canada, and no data on population sizes in Canada. He stated that, regarding the question of how long it will be before the Northern Myotis are extinct, COSEWIC states five generations. However Dr. Fenton said this is a guess because of the lack of knowledge as to what a generation is.

[221] In Dr. Fenton’s view, the chance of mortality of either of these two endangered species due to operation of the Project is “extremely low”.

Submissions, Analysis and Findings on Bats

[222] To summarize, the Appellants assert that there will be serious and irreversible harm to bats if the Project is permitted in accordance with the REA. Their submissions greatly focus on hibernating bats, and particularly on the two endangered species, Little Brown Myotis and Northern Myotis. The Approval Holder and the Director argue that none of the experts on bats asserted that the Project will cause serious and irreversible harm to bats. The Director’s submissions were generally consistent with those of the Approval Holder.

Appellants’ Submissions

[223] The Appellants argue that the Tribunal should apply the framework it established for the analysis of an endangered species in *APPEC*, and does not need to make a finding about the number of individual bat fatalities that would constitute serious and irreversible harm. They say that the Tribunal has the evidence it needs to make a finding on the population impact of the Project on Little Brown Myotis and Northern Myotis.

[224] The Appellants submit that the Tribunal should apply the same factors as it did in its analysis of harm to the endangered Blanding's turtle in *APPEC*, because these two species of bat are also endangered. Those factors are: conservation status of the species; species habitat on the site and in the area; vulnerability of the population; type and extent of harm caused by the Project; vulnerability of the species to this type and extent of harm due to its life history traits; mitigation measures in the REA; and demonstrated effectiveness of the mitigation measures.

[225] The Appellants state that although Little Brown Myotis and Northern Myotis are listed as endangered under the *ESA* in Ontario, they are not protected by that legislation due to the July 2013 exemption for wind facilities in O. Reg. 242/08. As a result of that exemption, the *ESA* prohibitions on killing, harming, harassing, capturing or taking a living member of an endangered species, and on damaging or destroying the habitat of the species, no longer apply to a person engaged in operating a wind facility if they meet the conditions included in the regulation. Those conditions include giving notice to the MNR of the operation of the wind facility, preparing a mitigation plan, and monitoring and reporting on the effects of the operation on the endangered species. They note that the Approval Holder's mitigation plan under the *ESA* was not entered into evidence.

[226] The Appellants assert that there is confirmed significant bat habitat for endangered bats in the Project area, noting that there are three bat maternal roost colony habitats that were evaluated by Dufferin as significant or deemed to be significant and potentially sensitive to development. These habitats include habitat for Little Brown Myotis and Northern Myotis. Two of these habitats are located 5 m from Project components, and the other is 20 m from Project components.

[227] The Appellants submit that Dr. Barclay doubted that the acoustic and visual surveys conducted on behalf of the Approval Holder accurately assessed the abundance and diversity of bats in the Project area, and said that the *Bat Guidelines* do not require adequate habitat monitoring in the vicinity of renewable energy projects, making it likely that the extent of bat habitat and number of bats in the Project area have been underestimated. They also say that it is not clear that the distances between the bat habitat and the Project components are great enough to adequately scientifically assess the use of the Project area by bats.

[228] The Appellants also raise concerns that, at the Evaluation of Significance stage of the REA application process, the MNR only requires assessment of bat hibernacula up to 1km from the Project area, bat maternity colonies within 120 m of the Project area, and bat migratory stopover areas.

[229] The Appellants submit that the Little Brown Myotis is at imminent risk of extinction, and the Northern Myotis is also at risk of extinction in the future. They state that COSSARO has identified WNS and wind farms as direct threats to the endangered bat species, stating that COSSARO identified wind farms as “an additional agent of mortality” for Little Brown Myotis and as “an additional *potential* agent of mortality” for Northern Myotis.

[230] The Appellants, based on Dr. Barclay’s evidence, assert that, although much of the feeding by some of the resident bat species, such as the Little Brown Myotis, occurs relatively low to the ground, below the blade-swept area of turbines, these species often commute at greater heights, potentially placing them at risk. They say Dr. Barclay’s opinion is substantiated by August 2012 post-construction monitoring data from the nearby Melancthon project indicating that Little Brown Myotis represent 24% of total bat fatalities from wind turbines in Ontario. They submit that the combined effect of WNS and wind turbine-related fatalities needs to be considered in assessing the vulnerability of the population.

[231] The Appellants argue that the conservation status of the two species of endangered bats, and the cumulative impacts on their populations of the many wind farms in the region as well as WNS, render those populations vulnerable to serious and irreversible harm from the Project.

[232] The Appellants say there is no dispute that the turbines are a direct mortality threat to bats, and it is nearly certain that bats will die as a direct result of the Project. They dispute the assertion by the Approval Holder that the Project Area is a low use area for bats, and any bat mortality will be low and mitigated. They assert that there is ample suitable habitat for bats in and around the Project Area, and that acoustic and visual monitoring has confirmed the presence of Little Brown Myotis and Northern Myotis in the Project Area. While the Appellants do not dispute that bats prefer woodland edge habitats and water bodies over all other habitat types, they assert that there is no evidence before the Tribunal that bats are not present on agricultural landscapes. Instead, they say there is evidence of bat fatalities from turbines in agricultural areas, and submit that post-construction fatality data shows that Little Brown Myotis is the second most frequently killed species of bat by wind turbines.

[233] The Appellants note the evidence that bats have long lifespans and slow reproductive rates, so that bat populations cannot increase rapidly after a drop in population size. They submit that the life history traits of Little Brown Myotis and Northern Myotis do not allow their populations to absorb the impact of additional

mortality from wind turbines. They further note that bats' feeding habits require them to leave their roosts and trees to search for food, and they must fly among wind turbines that are present in their habitats.

[234] The Appellants note the mitigation measures related to bats in the REA, but submit that the Tribunal should be satisfied that the impacts to bats of the Project are acceptable without the mitigation measures in place, in the event that those measures fail. They say that none of the mitigation measures recommended by Mr. Ryckman are requirements in the REA. They observe that there is no requirement that one of the three significant bat habitats be monitored because access to the property has been denied to the Approval Holder, and submit that the Project components impacting on that habitat should not be built if the area cannot be monitored.

[235] The Appellants assert that the EIS Report does not contain any commitments and is incapable of implementation or enforcement, and that the EEMP contains mistakes. They state that the REA conditions do not indicate which turbines will be monitored or whether the turbines selected will indicate the direct mortality impacts across the site. They assert that, unless all of the turbines are monitored, it will not be possible to know for certain whether the mortality threshold is being exceeded.

[236] The Appellants argue that 490 bats must die before operational mitigation is required, and that operational mitigation will not eliminate mortality given the evidence that these measures would reduce mortality by about 60%. They submit that wind turbine mortality will accelerate the extinction of the Little Brown Myotis and Northern Myotis species. They also point out that there is no basis for the Tribunal to evaluate the effectiveness of the contingency plan mitigation measures because contingency plans have not been developed.

[237] The Appellants state that migratory bats are also vulnerable to wind turbine fatalities as they have long lives and slow reproduction rates, and there is greater potential that they will encounter wind turbines due to long distance travel during migration. They say that their submissions regarding mitigation measures and their effectiveness in respect of hibernating bats apply equally to migratory bats. They note that migratory bats do not share the same endangered status as hibernating bats, and there is there little information about the vulnerability of their populations to harm from wind turbines.

[238] The Appellants submit that migratory bats were ignored in the Approval Holder's bat assessment, because the MNR does not require the assessment of migratory bat habitat. They note that proponents are not required to assess bat migratory stopover

areas because there are no criteria in the Significant Wildlife Habitat Ecoregion 6E Criterion Schedule. They further submit that post-construction monitoring data from other projects indicates that migratory bats are the bats most harmed by wind facilities.

The Director's Submissions

[239] The Director disagrees with the Appellants' suggestion that O. Reg. 242/08 exempts wind farms from compliance with the general *ESA* prohibitions applicable to endangered species. He notes that the Approval Holder's compliance with the requirements in O. Reg. 242/08 will effectively minimize and mitigate any harm to endangered bats from the Project.

[240] The Director submits that the evidence demonstrates that there is no reasonable expectation of high bat activity and use in the Project area due to its geographic and topographic features, and that no development of the Project will occur within the boundaries of any significant bat habitat, so no bat habitat will be affected or destroyed.

[241] The Director also submits that WNS, not the negligible impacts of wind turbines, is responsible for the serious population decline in endangered species bats. He further states that the endangered bat species are unlikely to be present at the site in any significant numbers. The Director asserts that, based on the evidence of the Approval Holder, there will be very little, if any, collision mortality to the Little Brown Myotis from the operation of the Project. He says that any minimal collision mortality suffered by endangered bats will not cause serious and irreversible harm to those species.

[242] The Director submits that the issue of cumulative impacts of all wind energy projects on bats is outside the Tribunal's jurisdiction because the test in s. 145.2.1(2) of the *EPA* is whether this Project will cause serious and irreversible harm to bats, not whether the cumulative impacts of all wind energy development in Ontario will cause serious and irreversible harm.

[243] In response to the Appellants' argument that mitigation measures not specifically set out as REA conditions may not be implemented, the Director submits that all of the conditions, commitments and mitigation measures referred to in the Bat Report and the conditions in the EIS Report are incorporated by reference into the REA by condition J1. He notes that Ms. Cameron confirmed in cross-examination that these requirements are considered mandatory and the Approval Holder would be considered to have contravened the REA if they are not complied with. The Director also addressed the errors in the EEMP, saying that Ms. Cameron had indicated that she would ensure they are corrected. He also notes the finding by the Tribunal in *APPEC*, at para. 518, that

the mitigation measures required to be implemented are effective at significantly reducing the risk of collision mortality.

[244] The Director submits that there are no regulatory requirements or criteria for surveying bat migration pathways and stopover areas because it is currently not possible to effectively monitor where bats are travelling to and from. He says that the evidence of Dr. Fenton and Dr. Reynolds indicated that if migrating bats use the Project area as a migratory pathway, they would likely fly along the eastern side of the Niagara Escarpment, which is the furthest side from the Project.

Findings on Bats

Harm to Bats from the Project

[245] It has been established in the evidence that there are three bat maternal roost colony habitats in the Project area that were evaluated as, or deemed to be, significant. It is clear that there are bats in the vicinity of the Project area, and pre-construction monitoring suggests the presence of the Little Brown Myotis and Northern Myotis in these habitats. Both of these hibernating bat species are listed as “endangered” under the *ESA*. However, as the Appellants point out, endangered species within a wind facility are subject to a regulatory exemption in amendments to O. Reg. 242/08 that came into effect in July 2013.

[246] Under s. 23.20 of O. Reg. 242/08, a person engaged in operating a wind facility will not be subject to the prohibitions in s. 9(1)(a) and s. 10 of the *ESA*, which include killing or harming a listed species, or damaging or destroying their habitat, if the conditions set out in s. 23.20 are met. These conditions include giving notice to the MNR and preparing a mitigation plan. While the wind facility is operating, the proponent must comply with the mitigation plan and ensure that reasonable steps are taken to minimize adverse effects on listed species. Generally speaking, prior to the July 2013 amendments, wind facility proponents were required to obtain a permit under the *ESA* where species listed under the *ESA* were present. The mitigation plan required under O. Reg. 242/08 will be further discussed below, in addition to the mitigation measures required in the REA.

[247] There is no dispute that WNS has caused the population decline, at the provincial scale, of the Little Brown Myotis and Northern Myotis, which has led to their being listed as endangered under the *ESA*. The Appellants acknowledge that the primary reason for the conservation status change for both species is the impact of WNS. This dramatic decline, which has taken place over a short period of time, makes it less likely that significant numbers of the endangered species bats will be present at

the local scale in the Project area. As discussed below, it is possible that some additional endangered bats may be killed as a result of the operation of the Project. However, the Tribunal accepts the evidence of Dr. Reynolds that the current downward slope of the population trajectory of Little Brown Myotis is due to WNS, and that incidental mortalities from this Project will not be scientifically significant, and will not affect the slope of that trajectory, either at the local scale or the provincial scale. The Tribunal therefore finds that the Appellants have not shown that the number of fatalities of endangered bats, in addition to the overwhelming number of deaths due to WNS, will constitute serious and irreversible harm.

[248] The evidence was clear that the Project does not require the removal of any of the significant bat habitats. All of the Project components will be located outside of these habitats and all of the construction will be done outside the boundaries of the habitats. The Tribunal finds that the evidence does not show that the construction and operation of the Project will impact the significant bat habitats in the Project area in any way other than the potential for collision fatalities.

[249] The Appellants argue that the Project area is a high use bat activity area, based on Dr. Barclay's opinion that the surveys done to support the NHA report underestimate the bat use of the area. The responding parties say the surveys were adequate, and rely on evidence that bat activity is low on the type of agricultural habitat predominantly found in the Project area because it provides few areas for adequate roosting and foraging. Dr. Fenton, who is familiar with the region where the Project is proposed, testified that the Project site is an area of low activity where there are no hibernacula or swarming sites.

[250] Although the MNR *Bat Guidelines* do not require an assessment of bat foraging habitat, the Approval Holder says that foraging habitats in woodlands were included in the surveys for the Project. However, the Appellants point out that wetlands were not surveyed, and assert that wetlands attract foraging bats. Dr. Reynolds agreed that wetlands should have been evaluated as potential bat habitat for the Project.

[251] Dr. Barclay disagrees with the contention that this is a low use area on the basis that, in his opinion, the assessment of bat activity was flawed. The REA application process established that there are bats and significant bat habitats near the Project area, but the level of study required by the REA Regulation is not sufficient for the Tribunal to make a determination as to whether this is a low or high use area for bats. There may be higher use by bats of the area than was recorded.

[252] There is a dispute between the Appellants and the responding parties concerning whether there is a risk to hibernating bats while foraging and commuting. The respondents' experts gave evidence that hibernating bats fly below the sweep of the turbine blades, and may prefer to forage over open water and along forest edges. It seems clear, however, that they are present in agricultural fields at times, given the evidence that Little Brown Myotis carcasses have been found at turbines located in agricultural fields. Dr. Barclay suggested that there was potential for bats to commute at greater heights and be put at risk. The Tribunal finds, based on the evidence, that the hibernating bats may at times fly at blade height where they are at risk to be killed as a result of the operation of the Project.

[253] While the Tribunal accepts that there may be a higher use of the Project area by bats than was reflected in the NHA report, and that there is potential for the bats to fly at the height of the sweep of the rotor blades, the Tribunal finds that it was not presented with evidence that the Project will cause serious and irreversible harm to the bats when operated in accordance with the REA conditions.

Mitigation

[254] The following monitoring and mitigation measures in the REA relate to bats:

J4. The Company shall implement the post-construction monitoring described in the Environmental Effects Monitoring Plan and the Environmental Impact Study, described in Condition J I, including the following:

- (1) Disturbance Monitoring for Bat Maternal Roost Colony Habitat (BMRC 1 and BMRC 4).

...

POST CONSTRUCTION MONITORING - BIRD AND BAT MONITORING

J6. The Company shall implement the post-construction bird and bat mortality monitoring described in the Environmental Effects Monitoring Plan, described in Condition J1, at a minimum of 15 of 49 constructed turbines. Turbine 15 must be monitored as one of the selected turbines.

THRESHOLDS AND MITIGATION

J7. The Company shall contact the Ministry of Natural Resources and the Director if any of the following bird and bat mortality thresholds, as stated in the Dufferin Wind Power Inc. Natural Heritage Environmental Effects Monitoring Plan for the Dufferin Wind Farm described in Condition J1, exceeds:

- (l) 10 bats; per turbine per year across the Facility

...

J8. If the bat mortality threshold described in Condition J7 (1) is exceeded, the Company shall:

- (1) implement operational mitigation measures consistent with those described in the Ministry of Natural Resources publication entitled "Bats and Bat Habitats: Guidelines for Wind Power Projects" dated July 2011, or in an amended version of the publication. Such measures shall include some or all of the following:
 - (i) increasing cut-in speed to 5.5 m/s and/or feather wind turbine blades when wind speeds are below 5.5 m/s between sunset and sunrise, from July 15 to September 30 at all turbines or a select number of turbines as deemed appropriate by the Ministry of Natural Resources; or
 - (ii) implementing an alternate plan agreed to between the Company and the Ministry of Natural Resources.
- (2) implement an additional three (3) years of effectiveness monitoring.

J9. If the bat mortality threshold described in Condition J7 (1) is exceeded after operational mitigation is implemented in accordance with Condition J8, the Company shall prepare and implement a contingency plan, in consultation with the Ministry of Natural Resources, to address mitigation actions which shall include additional mitigation and scoped monitoring requirements.

...

REPORTING AND REVIEW OF RESULTS

J14. The Company shall report, in writing, the results of the post-construction disturbance monitoring described in Condition J4 and J5, to the Ministry of Natural Resources for three (3) years on an annual basis and within three (3) months of the end of each calendar year in which the monitoring took place.

J15. The Company shall report, in writing, bird and bat mortality levels to the Ministry of Natural Resources for three (3) years on an annual basis and within three (3) months of the conclusion of the November monthly monitoring, with the exception of the following:

- (1) if either of the bird mortality thresholds described in Conditions J7 (5) or J7 (6) is exceeded, the Company shall report the mortality event to the Ministry of Natural Resources within 48 hours of observation;
- (2) for any and all mortality of species at risk (including a species listed on the Species at Risk in Ontario list as Extirpated, Endangered or Threatened under the provincial Endangered Species Act, 2007) that occurs, the Company shall report the mortality to the Ministry of Natural Resources within 24 hours of observation or the next business day;
- (3) if the bat mortality threshold described in Condition J7 (1) is exceeded, the Company shall report mortality levels to the Ministry of Natural Resources for the additional three (3) years of monitoring described in Condition J8, on an annual basis and within three (3) months of the conclusion of the October mortality monitoring for each year.

[255] The Tribunal notes that the mitigation measures are consistent with those in other REAs, including the conditions before the Tribunal in *APPEC*. In *APPEC*, at para. 518, the Tribunal accepted that, with these mitigation measures in place, the Project as approved would not cause serious and irreversible harm to bats.

[256] The Appellants raised a concern about the mortality threshold of 10 bats/turbine/year across the Project, which must be met before mitigation measures under the REA are invoked. This threshold comes from the MNR *Bat Guidelines* and is a requirement in O. Reg. 359/09 under the *EPA*. Dr. Barclay testified that he could not discern any scientific basis to support this mortality threshold. According to Dr. Reynolds' evidence, it is a reasonable operational threshold.

[257] The Tribunal observes that the state of scientific knowledge with respect to bats is very rudimentary at present. The Appellants' concerns with the protective effect of the threshold mortality levels in the *Bat Guidelines* arise because of recorded bat mortality elsewhere. However, the Tribunal was not provided with evidence upon which the Tribunal could rely to make a finding that the threshold of 10 bats/turbine/year will cause serious and irreversible harm to bats in relation to this Project. In fact, both Dr. Reynolds and Dr. Fenton testified that this threshold is protective.

[258] The Appellants raise a number of other issues with the mitigation measures, including the following: the question of which turbines would be monitored; the fact that one habitat was not required to be monitored because the property owner had not granted access; lack of inclusion of commitments and mitigation measures in the Bat and EIS Reports; whether operational mitigation measures are likely to be successful; and lack of information about contingency plan measures. The responding parties put forward a number of responses to these issues, noting in particular that the measures referred to in the Bat and EIS Reports are incorporated by reference into the REA by condition J1, and that these requirements are considered mandatory.

[259] The Appellants argue that a decision to issue an approval should not be based on the anticipated effectiveness of mitigation measures, but on adequate pre-construction site investigation. They say that the Tribunal should be satisfied that the impacts to bats from the Project are acceptable even without the mitigation measures in place.

[260] The Tribunal finds that this recommended approach is not consistent with the wording of the *EPA* test. A "decision to issue an approval" is one taken by the Director. Whether it is "based on adequate pre-construction site investigation which demonstrates acceptable environmental impacts" is not a question for the Tribunal to

determine. The Tribunal notes that the mitigation measures are precautionary in nature, and are required in order to address the currently insufficient knowledge about the natural environment to conclusively understand impacts.

[261] The Tribunal observes that, in the case of the endangered species bats, condition J15 requires the Approval Holder to promptly report even a single mortality of an endangered bat. In addition, the provisions of s. 23.20 of O. Reg. 242/08 under the *ESA* come into play, which require the preparation of a mitigation plan for approval by the MNR. The mitigation plan must include the steps set out in s. 23.20(11) to minimize the adverse effects on the species from wind turbines. These steps include adjusting the blades of the turbines, changing the speed of wind turbines, and periodically shutting the turbines down at times of highest risk. The Tribunal accepts the evidence before it that these mitigation measures are effective at significantly reducing collision mortality.

Migratory Bats

[262] The Tribunal received relatively little in the way of submissions and evidence with respect to migratory bats. There is no requirement in the REA application process to assess bat migratory pathways and stopover areas. The Director says that this is because it is currently not possible to monitor them. The evidence established that migratory bats are the most at risk from wind turbines, and are also more abundant than hibernating bats. The Tribunal notes that they are not listed under the *ESA*. The responding parties' evidence was that the Project area would not be a significant migratory pathway, and that monitoring of other projects in the area indicates that mortality to migratory bats will be low.

[263] Based on the evidence before it, the Tribunal finds that the Appellants have not shown that the Project will cause serious and irreversible harm to migratory bats.

[264] However, the Tribunal notes that the Appellants have raised some valid questions about the MNR *Bat Guidelines*, including whether the required surveys are adequate to determine the number of bats present in the area, and whether the 120 m setback of the Project area from significant bat habitats is sufficient to prevent bat fatalities. The regulatory requirements in the REA application process are based on an analysis of wildlife habitat and its significance within 120 m of the Project. The Tribunal notes the evidence of Dr. Reynolds that: when assessing bat hibernacula, he looks for hibernacula as far away as 100 miles from a project; when assessing foraging habitat he looks as far away as 10 miles; when assessing maternity roosts he looks as far away as two miles; and when assessing migratory habitat, he looks as far away as 20 miles.

The MNR *Bat Guidelines* do not address the assessment of habitats used by migrating bats at all. The Tribunal heard no evidence as to why 120 m was chosen as an appropriate setback for bats.

[265] Mr. Ryckman testified that the “habitat-based focus of the NHA ensures protection of significant wildlife habitats, and therefore protects the wildlife that rely on the habitats.” The Tribunal notes two assumptions embedded in this statement: that the NHA process identifies all significant wildlife habitats; and that protecting “significant wildlife habitat”, as defined by the MNR, is sufficient to protect the wildlife.

[266] As set out in *Lewis v. Ontario (Ministry of the Environment)*, [2013] O.E.R.T.D. No. 40 (at para. 16), the Tribunal must assess harm under the test set out in s.145.2.1 of the *EPA*, which is different from the REA approval process undertaken by the Director and the processes or regimes in which the MNR is involved. As the Tribunal stated in *Lewis* (para. 16) “[t]he information generated and decisions made by those agencies may be relevant to, though not determinative of, the question before the Tribunal.”

[267] The Tribunal found in *Lewis*, at para. 32, that

the work done at the REA approval stage (including any MNR sign-off regarding natural heritage features) and in other regimes (such as the *ESA* and Bald Eagle Guidelines) may be relevant information to consider under the *EPA* test, but it is not determinative because the statutory test is part of a distinct appellate process, which involves a different test than what is used by other decision-makers in reviewing applications for renewable energy approvals and other regimes.

[268] The guidance documents assume that, if no “significant habitat” is present in the project area or within 120 m, there will be minimal impact on a species. At the REA approval stage, the analysis of the Project’s impact, therefore, depends entirely on the value of the REA Regulation and MNR’s *Bat Guidelines* in identifying threats to a bat species by identifying only threats to what is deemed significant habitat. The *EPA* test that the Tribunal must apply, on the other hand, does not focus on “significant habitat” but on “plant life”, “animal life”, and the “natural environment”, which is defined as “air, land and water”.

[269] In exercising its function, then, the Tribunal would be wrong to rely simply on O. Reg. 359/09 and the various MNR guides (including the SWHTG, and the *Bird* and *Bat Guidelines*) in assessing whether a project will cause serious and irreversible harm to plant life, animal life, or the natural environment.

[270] This is clear in the present case, with respect to migratory bats. The MNR guidance documents recognize that migratory routes can be significant habitat. However, as there is no guidance in identifying them, they are simply disregarded. It is therefore conceivable that a project could cause serious and irreversible harm to migratory bats without causing serious and irreversible harm to resident local bats, because bat hibernacula and maternity roosting sites are the only two habitat types singled out for protection by the MNR guidance documents. The SWHTG identifies three types of significant habitat for bats, which proponents must identify and evaluate in the course of preparing their NHA. However, the Tribunal heard testimony that there are other elements to significant bat habitat, such as foraging grounds, migratory routes, and commuting areas. These areas are not identified in the NHA and thus not evaluated.

[271] The legal test in the *EPA* cannot mean that the Tribunal is unable to find serious and irreversible harm where there has not been adequate research done by the Approval Holder or Director. The fulfillment of the regulatory and guideline requirements provides a baseline amount of information that can begin to inform the Tribunal in its determination of whether the requisite harm will occur, but that is only part of the information base that may be relevant to the statutory test utilized in an appeal. Appellants can bring evidence that the information generated in the REA approval process needs to be supplemented by other information more directly addressed at the appeal test. For example, information on significant wildlife habitat may be only part of the relevant evidence to determine if there will be serious and irreversible harm to animal life. Nevertheless, the onus is on the Appellants to show that the test has been met, regardless of the inadequacies of the information generated in the REA approval process. As noted above, the Tribunal recognizes that there are still many unknowns in the science regarding bats, particularly with respect to migratory bats. The Tribunal urges the MNR to monitor and support ongoing research on bats in order to strengthen the REA regulatory requirements and guidelines that relate to them.

Conclusion on Bats

[272] In conclusion, the Tribunal finds that the Appellants have not met the legal test of demonstrating that the Project will cause serious and irreversible harm to plant life, animal life or the natural environment with respect to bats.

e) Harm to Other Animal Life

Roselyn Bovaird

[273] Ms. Bovaird testified concerning health effects but also raised concerns about harm to animal life she has observed on her property and in the region, in addition to bats. These include snapping turtles and painted turtles.

Dr. Dale Strickland

[274] Dr. Strickland was qualified to give opinion evidence as a wildlife ecologist with expertise in assessing impacts of wind turbines on wildlife, including turtles.

[275] Dr. Strickland was called by the Approval Holder to address the concerns raised by Ms. Bovaird with respect to any possible impact of the Project on turtles.

[276] Dr. Strickland testified that the Project data suggests there are very few turtles present. In his view there is very little potential turtle habitat in the Project area.

[277] The Records Review Report identified that snapping turtles may exist within the Project area, and one was seen during the site investigation. Dr. Strickland testified, however, that there is no significant snapping turtle habitat based on MNR criteria. While snapping turtles are a special concern species under the *ESA*, Dr. Strickland notes that they may be legally harvested in Ontario with a valid fishing license. Few painted turtles were observed in the Project area. They are considered a common and secure species and have a healthy population in Ontario. Dr. Strickland testified there is no significant painted turtle habitat in the Project area according to MNR criteria.

[278] According to the documents he reviewed, Dr. Strickland concluded Blanding's turtle is not present in the Project area. He noted that "using appropriate descriptions of habitat, and the information obtained through field investigations, potential habitat for Blanding's turtles in and adjacent on the project location was assessed by Dillon Consulting". Dillon concluded that no significant turtle habitat exists within the Project area or 120 m setback. Dr. Strickland concluded that "it is highly unlikely that Blanding's turtle occurs or will occur in the future in the Project area".

[279] Dr. Strickland testified that no roads are planned through wetland areas, and it is very unlikely there would be any biologically significant turtle mortality due to the Project. Dr. Strickland testified that any contact with turtles would likely occur with workers, and therefore a Worker Awareness Program is essential.

Findings on Harm to Other Animal Life

[280] The Tribunal finds that the Appellants have adduced no evidence to counter the expert evidence of Dr. Strickland. The Tribunal finds that the Appellants have not shown that the Project will cause serious and irreversible harm to other types of animal life.

[281] While some of the Appellants raised concerns about harm to other animal life, such as dairy cattle, and to other unspecified plant life, no evidence was tendered other than that relating to the plant life and animal life already discussed.

Summary of Findings on Issue No. 1, Environment

[282] In conclusion, the Tribunal finds that the Appellants have not established that engaging in the Project as approved will cause serious and irreversible harm to plant life, animal life or the natural environment.

Issue 2: Whether engaging in the Project in accordance with the REA will cause serious harm to human health

[283] In the discussion of Issues 2 and 3, the term “Appellants” includes all of the Appellants, including Mr. Sanford.

Overview

[284] The test under s. 145.2.1(2) (a) of the *EPA*, is whether engaging in the renewable energy project in accordance with the renewable energy approval will cause serious harm to human health (the “Health Test”). Pursuant to conditions imposed in the REA, noise generated by the Project cannot exceed 40 dbA measured at the exterior of buildings which are non-participating receptors as this term is defined in the regulations. Residential homes are an example of such non-participating receptors. The setback distance from Project components is 550 m. Section 145.2.1(3) of the *EPA* states that the onus of proving that such serious harm will occur rests with the Appellants. Therefore, they must demonstrate that serious harm to human health will occur in circumstances where these conditions have been met. If the evidence suggests that serious harm will occur only in circumstances where noise levels exceed 40 dbA at a non-participating receptor and/or at a distance less than 550 m from a receptor, then the Health Test will not be satisfied.

[285] The Appellants were represented in two groups. CORE, D&C Vander Zaag Farms Ltd., Ms. Bovaird, Mr. Maguire, Dr. Crysedale, and Ms. Kurtin (collectively referenced as the “CORE Appellants”), and Mr. Sanford. However, these two groups relied on the evidence adduced by each other, and filed joint written submissions regarding the Health Test in this proceeding.

[286] The Tribunal heard extensive evidence on this issue, and, as well, extensive written submissions from the parties numbering several hundred pages. While the Tribunal has reviewed and considered the evidence and submissions in detail, it is not feasible to include a detailed synopsis of all of the evidence or the submissions within a decision of reasonable length.

[287] During the course of the hearing, the parties made several references to the Tribunal’s decision in *APPEC*. In this regard, the Tribunal notes that many of the same witnesses testified in both this proceeding and *APPEC*, and, particularly with respect to the same or similar issues that have been raised in both proceedings. The Appellants dispute an assertion made by the Director that the case presented by the Appellants is, in essence, a duplicate of the case presented in *APPEC*. The Tribunal finds that,

although the evidence, issues, and submissions are very similar, this case is not a duplicate of *APPEC*. The Tribunal has undertaken its own deliberation of the evidence and submissions of parties in this proceeding, and has independently arrived at its own conclusions respecting the issues raised. However, as the Tribunal's findings are similar to those in *APPEC*, the Tribunal has structured its analysis and discussion in a manner similar to the approach adopted by the Tribunal in *APPEC*. In this regard, the Tribunal accepts that its analysis of Issue 2 should be addressed under three sub-issues:

- 2A. Whether the Appellants have established a causal link between wind turbines and human health effects where there is a 550m setback and 40 dBA noise limit;
- 2B. Whether engaging in this Project in accordance with the REA will cause serious harm to human health; and
- 2C. Whether Sarah Laurie should be qualified as an expert to give opinion evidence.

[288] In this proceeding, the Appellants approached the test outlined in s. 145.2.1(2) (a) of the *EPA* as building on the groundwork laid by *APPEC and Erickson v. Director (Ministry of the Environment)*, [2011] O.E.R.T.D. No. 29 ("*Erickson*").

[289] As stated in the Appellants' joint submissions on the Health Test:

187. The following findings were made in *Erickson*, on a much more fulsome record with far more expert evidence available:

The Known Effects of IWTs Are Serious: Para. 640 - In this case, there is apparent agreement that many of the medical conditions discussed by the witnesses are serious (the debate on those is, therefore, confined to whether they will result from the Project).

Mechanism Is Not Required: Para. 819 - For the purposes of this Decision, the Tribunal finds that the Appellants can attempt to satisfy the section 145.2.1(2) test even if there is uncertainty about the specific mechanism that causes the alleged health effects.

IWTs Can Cause Harm to Human Health: Para. 872 - While the Appellants were not successful in their appeals, the Tribunal notes that their involvement and that of the Respondents, has served to advance the state of the debate about wind turbines and human health. This case has successfully shown that the debate should not be simplified to one about whether wind turbines can cause harm to humans. The evidence presented to the Tribunal demonstrates that they can, if facilities are placed too close to residents. The debate has now evolved to one of degree. The question that should be asked is: What protections, such as permissible noise levels or setback distances, are appropriate to protect human health?
[Emphasis added]

188. The Appellants submit that the Tribunal's decision in the within proceedings should be reflective of the *Erickson* findings. These are fundamental issues that were fully considered and determined in *Erickson*. For many reasons, they should not be relitigated in this or future ERT hearings. The time and costs alone of revisiting each of these issues would be extremely onerous and unmanageable. *Erickson* allows the process to move forward, to look at the real question that must be determined in each subsequent case, which the Tribunal clearly articulated above.

...

[290] The evidence on causation, as described in *Erickson* and subsequent Tribunal decisions, can be described as falling within one of two general categories. The first is described as a direct effect such as hearing loss. The second category is described as an indirect effect. This refers to health effects alleged to result from annoyance, stress and sleep disturbance associated with living in proximity to a wind turbine or related components.

[291] Under either of these two categories, there are two bases on which the Appellants seek to establish that engaging in the Project in accordance with the REA will cause serious harm to human health. The first basis is to show that current experience with wind farm projects, both in Ontario, and elsewhere in the world, demonstrates that it is sufficiently predictable that some or all persons living within the vicinity of wind project components (wind turbine(s) being the prominent component) will experience serious health effects. This may be generally described as a generic approach, as it does not seek to establish causation with respect to specific identified individuals. To support their position in this regard the Appellants adduced evidence regarding the incidence of annoyance, which they assert will be caused by wind turbine projects, as well as evidence that environmental noise and annoyance cause stress and sleep disturbance. The Appellants also adduced evidence of persons living in the vicinity of existing wind turbine projects, both in Ontario and elsewhere in the world, who report adverse health effects attributed to their exposure to these wind turbine projects.

[292] The second basis on which the Appellants seek to establish that the Health Test is met is to show that specific individuals have suffered serious harm to their health as a result of living in proximity to wind project components. In this case, the Appellants have adduced evidence of persons living in the vicinity of existing wind turbine projects in Ontario who report adverse health effects which they assert are caused by these wind turbine projects ("the post-turbine witnesses").

[293] In overview the Appellants assert that they have established causation on both bases. Based on the generic approach, they maintain that it is predictable that a certain

percentage of the persons living in proximity to the Project will suffer adverse health effects. Based on the approach respecting the experience of specific individuals, they maintain that the evidence of the post-turbine witnesses establishes that wind turbines do cause harm to human health, and, more specifically, that wind turbines exacerbate certain types of pre-existing medical conditions. The Appellants then argue that this evidence will establish causation with respect to this Project. In this regard, they point to evidence they have adduced respecting individuals who will live in the vicinity of wind turbines in the Project (the “pre-turbine witnesses”), asserting that each of these individuals currently suffers from medical conditions that will be exacerbated by exposure to wind turbines. The Appellants maintain that the evidence of these pre-turbine witnesses “is highly relevant to establish a causal link between the proposed Project and the more likely than not probable effect on those living nearby.”

[294] In summary, it is the Appellants’ position that this evidence, considered in the context of the *Erickson* and *APPEC* decisions, demonstrates that engaging in the project in accordance with the REA will cause serious harm to human health.

Issue 2A: Whether the Appellants have established a causal link between wind turbines and human health effects where there is a 550m setback and 40 dBA noise limit.

[295] Paragraph 88 of the Appellants’ written submissions states: “The causal links between the risk of harm and IWTs are amply established in the evidence.” Implicitly, their argument is that this risk, if established, will be sufficient to meet the Health Test in this case. As discussed below, the Tribunal finds that the Appellants have not established this causal link. Consequently, it is unnecessary for the Tribunal to address whether such causal link, if established, would be sufficient to satisfy the Health Test as it applies to the Project under appeal in this proceeding.

[296] The Appellants seek to establish the causal link between wind turbines and human health based on the following evidence:

- The evidence of the “post-turbine witnesses”, who each report that they have experienced adverse health effects. They assert their conviction that these symptoms are caused by wind turbines.
- The medical opinion evidence of Dr. Robert McMurtry which supports the views of the post-turbine witnesses. Dr. McMurtry also provides his own opinion respecting the causation issue.

- The evidence of Ms. Laurie regarding her work with persons in Australia living in proximity to industrial wind projects, who have also reported that they experience some of the health effects listed above.
- The evidence of Brian Howe respecting annoyance.

[297] The Tribunal has structured its analysis and findings in two sections: the Appellants' case based on the evidence of the post-turbine witnesses; and the Appellants' case based on the evidence of Ms. Laurie, Dr. McMurtry, and Mr. Howe.

Appellants' Case Based On The Evidence Of The Post-Turbine Witnesses

Appellants' Evidence

[298] The Appellants' submissions summarize the evidence of the post-turbine witnesses, stating that they gave testimony:

... regarding their debilitating and enduring experiences with sleep disturbance, vertigo, nausea, tinnitus, heart palpitations, memory and concentration loss, mood swings, chronic fatigue, breathing difficulty, headaches/migraines, and even suicidal thoughts. Those with pre-existing medical conditions such as back pain, chronic fatigue, fibromyalgia, and high blood pressure, spoke of how these conditions worsened with the turbines becoming functional.

They also testified that when away from their homes, they gained respite from their various symptoms.

[299] The Appellants characterize these health effects as falling within the category of indirect harm. As stated at paras. 72 and 73 of the Appellants' submissions:

72. There is therefore undisputed evidence before this Tribunal that at sound levels at or below those approved for the operation of this Project, 6-20% of people will be very annoyed. There is a causal chain between annoyance, stress, sleep disturbance, and adverse health effects.

73. This causal chain is evidenced by the adverse health effects suffered by the post-turbine witnesses who testified in this case...

[300] All of the post-turbine witnesses provided a witness information form which essentially sets out their responses to a list of questions regarding their medical history, self-reported health symptoms, and other personal information. They each provided medical records that they were able to obtain in time to present at the hearing. Some of these medical records included documents setting out medical opinions respecting specific conditions. None of these witnesses provided a medical opinion which attributed exposure to wind project components as the cause of their complaints. Dr. McMurtry has expressed an opinion in this regard. The Tribunal addresses his

evidence below. Despite any pre-existing medical condition these witnesses may have, they each testified that, after the wind turbines became operational in their environs, they have experienced adverse health effects which they had not experienced before. They state their views that exposure to the wind farm project in the vicinity of their residences has caused these adverse health effects. They maintain that they had no negative perceptions or expectations respecting the impacts of wind turbine projects prior to experiencing adverse health effects.

[301] They cite one or both of the following reasons to support their assertion regarding causality:

- The adverse health effects they have experienced manifested when the wind farm project commenced operation, or shortly thereafter, and they have been unable to find any other explanation for their condition; and
- They have gained respite from their various symptoms when they leave their homes, more specifically, when they are no longer in the vicinity of the wind farm for a period of time (where symptom relief is either immediate or gradual). Their symptoms resume upon returning to their homes either immediately or shortly thereafter.

[302] Inherent in the views expressed by the post-turbine witnesses are two major premises: (i) for the post-turbine witnesses with pre-existing conditions, the adverse health effects they experience are in fact, different from the health effects associated with their pre-existing conditions, or potential side effects from the medication they are currently taking; and (ii) their inability to find another cause for their symptoms, considered together with the relief they experience when they remove themselves from exposure, is, in their view, conclusive evidence that their adverse health effects are caused by wind turbines. Both these premises are challenged by witnesses called by the Director and the Approval Holder.

Respondents' Evidence

[303] The Director and the Approval Holder called the following witnesses:

- Dr. Robert McCunney, who was qualified as medical doctor specializing in occupational and environmental medicine with particular expertise in health implication of noise exposure;
- Dr. Cornelia Baines, who was qualified as an epidemiologist with special expertise in design measurement and evaluation of research studies.

- Dr. Kieran Moore, who was qualified as a physician with expertise in family and emergency medicine, public health, and preventative medicine.

[304] For ease of reference, the Tribunal collectively describes these witnesses as the respondents' health experts. Each of them has testified in *Erickson*, *APPEC*, or both. The Tribunal's decisions in these cases already provide detailed summaries of their evidence. Much of the evidence they gave in those cases has been repeated in this proceeding. Therefore, the Tribunal does not find it necessary to provide a detailed synopsis of all of their evidence in this decision.

[305] In summary, the evidence of these witnesses is that the reliable determination of causality with respect to adverse health effects is a very complex exercise.

[306] In addressing both premises, they note that many of the symptoms reported by the post-turbine witnesses are known to commonly occur in the general population and have numerous causes. Considerations related to medical causality assessment are discussed in paras. 75 to 82 of Dr. McCunney's witness statement:

Causality Assessment

75. The information in the Information Forms is insufficient to conduct formal individual causality assessments, most notably because of limited diagnostic work ups and the absence of noise measurements. The collection of statements is also not appropriate for a group analysis, in part, since they represent different sites and different times of exposure that may not be representative of each particular site.

76. A proper causality assessment includes a thorough review of symptoms and past medical history with appropriate diagnostic studies. The determination of causality is an important exercise in health care, but it is customarily only undertaken after diagnosis and treatment. A causality assessment should also consist of a thorough review of noise measurements conducted in the vicinity of the home along with a comparison of the symptoms, diagnosis and noise levels in light of what has been published in the peer reviewed scientific literature.

77. As noted above, the symptoms reported in the Information Forms are common in the general population and have numerous causes. ... Other groups of symptoms, such as fatigue, loss of energy and poor concentration, reported in the Information Forms strongly suggest depression as the appropriate diagnosis.

78. Sleep disturbance, one of the symptoms described in the Information Forms, can be due to many factors ranging from stress and medications to potential serious medical diagnoses such as sleep apnea. Vertigo, another symptom reported in the forms, has numerous causes; it must be appropriately diagnosed before attributing causal links to any potential environmental concern. ...

79. It is important to distinguish the medical activities necessary in (1) forming a diagnosis of symptoms and (2) assessing the cause of the symptoms. A causality assessment customarily begins with a thorough

medical evaluation that leads to a diagnosis. The cause can be determined thereafter based on consideration of the scientific literature and alternative explanations.

80. Another key aspect of conducting a causality assessment is the determination of biological plausibility; in essence, does the proposed link make sense from a biological perspective? ... Since noise is the potential hazard associated with the operation of a wind turbine, it is not appropriate science to link these conditions to wind turbines if the conditions have not been definitively linked with noise exposure in other settings. Furthermore, many of the health conditions reported originated before the installation of wind turbines, thus making any causal connection with wind turbines implausible.

81. In any causality assessment, it is necessary to establish a diagnosis based on accepted medical criteria. ... Based on the information presented, it is not possible to determine whether the asthma reported in the symptom statements was made according to widely accepted medical criteria.

...

82. The symptoms and conditions described in the Information Forms need to be properly evaluated by a physician in the context of appropriate diagnostic studies before one could reliably form specific diagnoses or draw causal connections between the symptoms and living in the vicinity of a wind turbine. Forming a diagnosis is the first step in attempting to draw causal inferences between exposure to any type of hazard and health related symptoms from the exposure.

83. The Information Forms represent the self-reporting of individuals from various sites in Ontario who live in the vicinity of wind turbines. They do not represent a defined group of people, who could be evaluated in any systematic fashion, such as can be done in epidemiological studies. ...

[307] The above comments are made in specific reference to the witness information forms. The Tribunal notes that the medical records and oral testimony of the post-turbine witnesses as well as the information provided in telephone interviews conducted by Dr. McMurtry, are, for the most part, consistent with the information provided in these witness information forms. It should be noted that the information provided by the post-turbine witnesses in telephone interviews was not admitted into evidence by the Tribunal, as noted below.

[308] This evidence underscores that determining the cause of an adverse health effect requires comprehensive investigation in order to accurately ascertain symptom etiology. In this regard, Dr. McCunney also noted that information regarding the level of noise experienced by the post-turbine witnesses is absent. He explained that an exposure assessment is critical to any evaluation of causality in order to assess how the specific exposure compares with the dose-response results described in applicable scientific literature.

[309] Regarding the premise that a causal connection is demonstrated by the fact the post-turbine witnesses experience relief from their symptoms when they remove themselves from exposure to wind turbines, Dr. Moore also states in his witness statement at para. 106:

106. Since multiple witnesses have stated they have depression, this can be associated with somatoform disorders, which are characterized by physical symptoms that have a psychological, as opposed to a physical, cause. Also, conversion is a common disorder where stress and anxiety are unconsciously expressed as physical symptoms, such as sensation of tingling or discomfort, fatigue, abdominal pain, headaches, back or neck pain, weakness, loss of balance, and hearing and visual abnormalities. This could explain some of the symptoms that individuals report when returning to their homes, which is part of the syndrome discussed by Dr. McMurtry.

[310] Dr. Moore also testified that it is understandable that if someone's symptoms started when a wind turbine project commenced, they could believe that this has caused their symptoms. However, he points out that a temporal association between these two events does not establish causation. In referring to sleep disturbance, he states at paras. 22 and 23 of his witness statement:

22. Hence, sleep disturbance is a very common condition in the general older adult population and especially in those with underlying medical conditions. Sleep disturbance must be put in context and investigated as to its etiology. Sleep disturbances increase with age.

23. By extrapolation of the population prevalence data of insomnia or sleep disturbance, approximately one third of all adults exposed to wind turbines will experience insomnia. A significant portion of these, due to chance alone, could be temporally associated with the commencement of a wind turbine development. If patients have any chronic medical condition that causes pain, such as osteoarthritis the above study suggests that up to seventy percent could report poor sleep.

[311] The respondents' health experts note that, as associations between events can occur by chance, an epidemiological approach to assessment of causation is required. They note that the most widely accepted criteria, referred to as the Bradford Hill criteria, provide a reasonable framework to be applied when determining causal associations. These criteria include strength of association, consistency, specificity, temporality, biological gradient, plausibility, coherence, experimental evidence, and analogy. As their evidence in applying these criteria to this case is both detailed and lengthy, the Tribunal does not include a synopsis of this evidence in this decision. In summary, the conclusion drawn by the respondents' health experts is that, in applying these criteria, causation cannot be established based on the evidence adduced by the Appellants.

Findings

[312] The issue to be addressed by the Tribunal in respect of the post-turbine witnesses is whether they have experienced adverse health effects that have been caused by exposure to industrial wind turbines outside of the 550m regulated setback and under 40 dBA noise limit. For the following reasons, as well as the Tribunal's analysis and findings in respect of the other Appellants' health witnesses (discussed below), the Tribunal finds that the Appellants have not done so.

[313] The Tribunal does not question the sincerity of the post-turbine witnesses in giving their evidence. They acknowledge that the identification of their adverse health effects is through their own self-diagnosis. They also acknowledge that they have reached personal conclusions regarding the issue of causation. Several of them assert that they have had to do so, because they maintain that medical professionals either have no knowledge regarding the effects of wind turbines, or are skeptical or dismissive of the possibility that wind turbines can negatively affect human health. Nevertheless, none of the post-turbine witnesses adduced any medical opinion from their health practitioners which confirms that they have experienced symptoms caused by wind turbines. The Tribunal does not question that the post-turbine witnesses have experienced the symptoms they have described. After all, only they can say how they feel. However, in order to arrive at a reliable conclusion respecting causation, personal assessments which do not consider the full range of potential causes of these symptoms, are incomplete. Furthermore, the exercise of arriving at a diagnosis requires a level of education, training and experience, which none of the post-turbine witnesses possess. In this regard, the Tribunal notes that in *Kawartha Dairy*, the Tribunal found that confirmation of medical conditions requires the diagnostic skills of a qualified health professional. This conclusion was accepted in *APPEC*, and the Tribunal accepts that it applies in the circumstances of this case. As discussed below, the Tribunal also does not find that Dr. McMurtry's opinion about each of the post-turbine witnesses establishes they have experienced adverse health effects caused by wind turbines.

[314] The evidence adduced must support a conclusion that the post-turbine witnesses have experienced serious harm that is caused by wind turbines or related components. The Tribunal accepts that causality assessment is a complex exercise. The Tribunal finds that the evidence adduced by Dr. McCunney, Dr. Baines, and Dr. Moore respecting causality assessment has not been seriously challenged by the Appellants. Therefore, the Tribunal accepts their evidence in this regard. Their evidence is that there is a level of uncertainty regarding the conclusions reached by the post-turbine witnesses in several areas including: (i) failure to obtain qualified medical investigation

to rule out other potential causes of their symptoms, before arriving at the conclusion that their symptoms must by default, be caused by exposure to wind turbines or related components; (ii) failure to consider whether wind turbine noise is a plausible cause of their symptoms by considering existing known effects of noise exposure; and (iii) failure to consider the noise exposure levels experienced by these individuals. As a result, the Tribunal finds that the evidence adduced by the post-turbine witnesses is insufficient to support a conclusion that the post-turbine witnesses have experienced serious harm to their health caused by wind project components.

[315] Even if the Tribunal accepted that causation is established, it is unclear whether this evidence could be extrapolated to apply to the Project under appeal in this proceeding. In this regard, the Tribunal has noted that the evidence adduced does not include confirmation of the noise exposure levels experienced by the post-turbine witnesses. As such, the Tribunal finds that it has not been established that the adverse effects they have described, if attributable to industrial wind turbines, are caused by noise levels at or below 40 dbA.

[316] Finally the Tribunal notes that, although causation has not been established with respect to these individuals, this does not preclude their evidence from being considered as data in support of the Appellants' position that current evidence demonstrates that it is sufficiently predictable that some or all persons living within the vicinity of wind project components (wind turbine(s) being the prominent component) will experience serious health effects. This is considered below in the Tribunal's analysis respecting the evidence of Dr. McMurtry, Ms. Laurie, and Mr. Howe.

Appellants' Case Based On The Evidence of Ms. Laurie, Dr. McMurtry, and Mr. Howe

Appellants' Evidence

[317] As is discussed below, the Tribunal did not grant the Appellants' request that Ms. Laurie be qualified to give opinion evidence. Dr. McMurtry is a practicing medical doctor who was qualified to give opinion evidence as a physician and surgeon with experience in the delivery of health care, health care policy, and health policy. Mr. Howe was qualified to give opinion evidence as an acoustical engineer with specialized expertise in sound from, and the effects of sound from, wind turbines.

Ms. Laurie

[318] Ms. Laurie is a non-practicing physician, who was called by the Appellant, Mr. Sanford, to give evidence in this proceeding. He requested that she be qualified to give opinion evidence, a request that was supported by the CORE Appellants, and opposed

by the Director and Approval Holder. In an oral ruling, the Tribunal refused Mr. Sanford's request, indicating that its written reasons for this disposition would follow. As the Tribunal's written reasons for this disposition are lengthy they have been addressed separately under Issue 2C below.

[319] Ms. Laurie's experience respecting health impacts of industrial wind turbines has been gained primarily from her work for an organization known as the Waubra Foundation. In summary, Ms. Laurie testified that she has not approached communities to conduct surveys, and that she has not conducted formal structured research. She states that she conducts an ongoing survey, where, to date, she has spoken with approximately 130 people in Australia who live in the vicinity of industrial wind turbine projects. She indicated that these people have identified themselves to her, by contacting her directly, or indirectly by contacting the Waubra Foundation. She explained that these persons describe their symptoms to her and request information. She testified that the symptoms reported to her are consistent with the adverse health effects identified as being associated with industrial wind turbines by other researchers, including Dr. Geoff Leventhall, Dr. Nina Pierpont, and Dr. McMurtry. She provided a number of published articles and papers, and copies of written statements to agencies in Australia and elsewhere.

Dr. McMurtry

[320] Dr. McMurtry's evidence in this proceeding is, in part, similar to the evidence he gave in *APPEC*. As noted at para. 74 of that decision:

74. Although Dr. McMurtry's witness statement from the Erickson proceeding was referenced in his current witness statement and included in his book of documents, the focus of Dr. McMurtry's evidence in this proceeding centred on his proposed case definition as described in his article "*Toward a Case Definition of Adverse Health Effects in the Environs of Industrial Wind Turbines: Facilitating a Clinical Diagnosis*", which was published in the peer-reviewed journal *Bulletin of Science, Technology and Society*, 2011 31 : 316.

[321] For purposes of this decision, this is referenced as the Case Definition.

[322] Since giving his evidence in *APPEC*, Dr. McMurtry testified that he has prepared an update to the Case Definition. A copy of the Case Definition and this update are attached to this Decision as Appendix B. Dr. McMurtry testified that the updated Case Definition is intended to be used by primary health care physicians to diagnose whether a patient who lives in the environs of industrial wind turbines is experiencing adverse health effects. His update confirms that the deployment of the diagnostic criteria in the Case Definition "requires use by [a] health care practitioner licensed to take a history

and make diagnoses.” His update also states that a ‘probable’ diagnosis “indicates that AHE/IWT [adverse health effects in the environs of industrial wind turbines] more likely than not are the cause of the complaints. AHE/IWT is the working diagnosis. Other diagnostic possibilities continue to exist and should be considered in the differential diagnoses.”

[323] As noted in the Case Definition there are three categories of diagnosis: possible, probable, and confirmed. The update indicates the following:

- “possible” means that a diagnosis of such adverse effects is to be considered a potential diagnosis;
- “probable” indicates that it is more likely than not that living in the environs of industrial wind turbines is the cause of the complaints. This becomes the physician’s working diagnosis. Other diagnostic possibilities continue to exist and should be considered in the differential diagnosis;
- “confirmed” indicates other diagnosis is very unlikely, i.e., less than one chance in 20.

[324] Regarding a “confirmed” diagnosis, Dr. McMurtry explained that other diagnoses should be ruled out. As stated in the Case Definition, this is the responsibility of the licenced clinician.

[325] In his witness statement, Dr. McMurtry lists several reasons supporting his proposed diagnosis including:

- He notes that there are reports of adverse health effects in all countries where industrial wind turbines are erected;
- There is convergent validity of reports of adverse health effects in different cultures and languages;
- Infrasound and low frequency noise is a plausible mechanism for adverse health effects;
- There is no medical evidence to support set back distances intended to protect individuals from experiencing adverse health effects;
- There is a common finding that persons experiencing adverse health effects prefer being away from their homes for restoration and in some cases even abandon their home, and this is unique to persons in the environs of industrial wind turbines who experience adverse health effects;
- A dose-response relationship has been confirmed in many studies;

- Dr. Leventhall, an industry expert, acknowledges that “always a few” experience adverse health effects, and a “non-trivial percentage” will be highly annoyed; and
- The working diagnosis accords with principles of evidence-based medicine, which is defined to be the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.

[326] Respecting the post-turbine witnesses, Dr. McMurtry testified that he reviewed their witness information forms and the medical records that they have provided. Dr. McMurtry reported information that he obtained from these witnesses by conducting a telephone interview with each of them. At the hearing, each of these witnesses testified before Dr. McMurtry did. However, none of the witnesses disclosed that they had participated in an interview with Dr. McMurtry. Consequently, the Tribunal did not admit Dr. McMurtry’s evidence obtained from these interviews. In making this finding, the Tribunal noted that the best evidence regarding their medical condition is the testimony they each provided in this hearing. However, the Tribunal further notes that there was no substantive inconsistency between their oral evidence and what was reported by Dr. McMurtry.

[327] Dr. McMurtry applies the diagnostic criteria as set out in the Case Definition, and for each witness states his opinion that they satisfy the ‘probable’ criterion for experiencing adverse health effects from living in the environs of industrial wind turbines.

[328] Dr. McMurtry also provided his analysis of the Bradford Hill criteria, disagreeing with the conclusion of the respondent health experts. His evidence in this regard is summarized at para. 82 of the Appellants’ submissions:

82. In his reply affidavit, Dr. McMurtry criticized Dr. Moore's comments regarding criteria for causation, by stating in is affidavit, that these have already been met in relation to IWTs through the Bradford Hill, Criteria for Causation.

- (a) Strength: A small association does not mean that there is not a causal effect, though the larger the association, the more likely that it is causal.
- (b) Consistency: Consistent findings observed by different persons in different places with different samples strengthens the likelihood of an effect.

- (c) Specificity: Causation is likely if a very specific population at a specific site and disease with no other likely explanation. The more specific an association between a factor and an effect is, the bigger the probability of a causal relationship.
- (d) Temporality: The effect has to occur after the cause (and if there is an expected delay between the cause and expected effect, then the effect must occur after that delay).
- (e) Biological gradient: Greater exposure should generally lead to greater incidence of the effect. However, in some cases, the mere presence of the factor can trigger the effect. In other cases, an inverse proportion is observed: greater exposure leads to lower incidence.
- (f) Plausibility: A plausible mechanism between cause and effect is helpful (but Hill noted that knowledge of the mechanism is limited by current knowledge).
- (g) Coherence: Coherence between epidemiologist and laboratory findings increases the likelihood of an effect.
- (h) Experiment: "Occasionally it is possible to appeal to experimental evidence".
- (i) Analogy: The effect of similar factors may be considered. Unperceived stimuli of smell, touch, vision and taste are able to harm human health so there is no reason to believe that noise below the hearing threshold is harmless.

Mr. Howe

[329] Mr. Howe co-authored a report for the MOE, dated December 2010, entitled *Low Frequency Noise and Infrasound Associated with Wind Turbine Generation Systems, A Literature Review* (the "MOE Review Report").

[330] Mr. Howe testified that this report is a review of existing research papers on the topic, rather than being primary research. He confirmed that the statistics regarding the percentage of people very annoyed, and the decibel level of noise impacts, come from published studies.

[331] Mr. Howe testified that the relationship between the sound levels and annoyance is not clear; there are a number of non-acoustic factors that influence a reaction of annoyance, an important one being attitude toward the noise source. He testified that, if you do not like a source, you are more likely to find the sound from it to be annoying. In this regard, Mr. Howe agreed with the statement from the MOE Review Report at page 19, heading 3.10:

The wide availability of popular media items describing fears of direct health effects from wind turbine noise and infrasonic noise specifically may result in fears of the wind turbines in some people leading to increased annoyance with the sound. This may be exacerbated by certain moderating factors (Leventhall, 2004; Job, 1999; Guski, 1999;

Fields, 1993), including “anxiety about the source” and “suspicion of those who control the sources”.

[332] Regarding the MOE Review Report, Mr. Howe’s witness statement, at paras. 9 and 21, states:

9. The report concluded that, while the overall magnitude of the sound pressure levels, including infrasound, produced by wind turbine generators at the setback distances required in Ontario does not represent a direct health risk, annoyance will likely be experienced by some persons.

21. Based on research completed by HGC Engineering for the Ontario Ministry of the Environment, at the sound levels experienced at the receptor distances noted for this project, the audible sound from wind turbines is expected to result in a small percentage of persons being very annoyed. The largest and most comprehensive studies completed to date suggest that at noise impacts between 35 and 40 dBA, 6% will be very annoyed, while at noise impacts between 40 and 45 dBA, up to 20% of persons will be very annoyed. As with sounds from other sources, research has shown that annoyance associated with sound from wind turbines can be expected to contribute to stress-related health impacts in some persons. These findings have been supported by papers and general consensus of the Wind Turbine Noise 2011 conference held in Rome, [http://www.windturbine noise2011 .org/](http://www.windturbine noise2011.org/) and a comprehensive review by the Oregon Health Authority, 2013. The relationship between the sound level and the prevalence of annoyance is complicated, and is often influenced by other non-acoustic factors. Given the number of receptors expected to be impacted at a sound level between 35 and 40 dBA, it would be statistically invalid to predict the exact number of persons expected to be very annoyed, other than noting that those predisposed against the project are more likely to be annoyed.

Respondents’ Evidence

Dr. McCunney

[333] The evidence of Dr. McCunney is summarized in the submissions of the Approval Holder and the Director.

[334] On the issue of annoyance, the Approval Holder’s submission states:

With respect to annoyance, Dr. McCunney testified that annoyance is a subjective phenomenon that is usually self-reported. It is not considered a health effect. Dr. McCunney noted that he could not find “annoyance” in any medical dictionary and that annoyance is not part of the new International Classification of Diseases (10th edition). He stated that claims that “annoyance” is an adverse health effect reflect individual opinions rather than the consensus of the international medical community. He specifically noted that annoyance associated with wind turbines has been found to be primarily related to attitudes about the visual impact of wind turbines and financial interests, as reflected in the various studies referred to by the appellants’ noise expert, Brian Howe. Dr. McCunney further explained that, given its subjective nature,

annoyance in a given population is difficult to predict, and that even the largest studies of annoyance associated with wind farms (the Pedersen studies based on self-reports) are considered limited data sets by epidemiological standards, such that any attempt to apply those data sets to another population would be fraught with uncertainty and potential errors.

and the Director's submission states:

Dr. McCunney categorically disagreed with the proposition that some people will always exhibit effects, and provided examples where this was not the case. He referred to the recent study by Dr. Simon Chapman which showed large spatio-temporal variations in complaints about noise and health from wind farms. Chapman found that 33 of 51 wind farms in Australia had never been subject to noise or health complaints. Dr. McCunney preferred the evidence in this study to the less current opinion from Dr. Leventhall, and questioned whether Dr. Leventhall would have the same view as he previously expressed, given this new information.

[335] Respecting Dr. McMurtry's updated Case Definition, the Approval Holder's submission states:

108. Dr. McCunney was also critical of Dr. McMurtry's proposed case definition, concluding that it was devoid of scientific validity and of no value in assessing causal links between health effects and wind turbines. His specific criticisms included:

- (a) the flawed process by which it was developed and proposed for use (proposed by one individual, through a process that did not follow international standards for the development of consensus statements);
- (b) its lack of validation by any medical association (Dr. McMurtry himself admits that his proposed case definition has not been validated);
- (c) its lack of any scientific support for the exposure metric (i.e., living within 5 km of a wind turbine);
- (d) its lack of precision, which results in application difficulties (i.e. 3264 options for meeting second and third order criteria); and
- (e) its lack of any peer-reviewed citations to support its conclusions.

[336] Respecting the effects of noise exposure, the Approval Holder's submission states:

102. ...Dr. McCunney conducted a comprehensive literature search to review scientific literature, government reports and other articles related to potential health implications of living in the vicinity of wind turbines that have been published since the expert panel report was released in 2009. He testified that he has not identified any scientific support for a direct causal link between chronic noise exposure of less than 40 dBA and adverse health effects. Dr. McCunney highlighted field studies in the vicinity of operating wind farms in many different countries. These studies have demonstrated that infrasound and low-frequency sound from wind turbines are not at levels that are harmful to human health. He also highlighted human experimental studies conducted by NASA that

found no adverse health effects of infrasound levels several orders of magnitude higher than those measured in the vicinity of wind farms.

[337] Respecting the Appellants' post-turbine witness evidence, the Approval Holder's submission states:

103. With respect to the post-turbine witnesses, Dr. McCunney concluded that their evidence does not establish a causal link between health effects and living in the vicinity of wind turbines. He explained that to assess potential causal links between exposure to a hazard and an illness, the first step is to confirm the diagnosis of the illness or disease. Here, however, the information in respect of the post-turbine witnesses is too limited, according to Dr. McCunney, to make a definitive diagnosis of their symptoms based on contemporary medical standards. Dr. McCunney noted, in particular, the absence of appropriate diagnostic tests and results (such as sleep studies) in the medical records that had been provided by the post-turbine witnesses. He also noted that there were a number of inconsistencies between the self-reports of the witnesses and their medical records, such as pre-existing conditions and side-effects of medications that might explain the symptoms experienced by the witnesses after the installation of wind turbines.

104. Critical exposure information – the level of noise experienced by the post-turbine witnesses – was also absent. As Dr. McCunney explained, an exposure assessment is critical to any evaluation of causality in order to assess how the specific exposure compares with the dose-response results described in applicable scientific literature.

105. Dr. McCunney further noted that many of the symptoms reported by the post-turbine witnesses lack biological plausibility, based on his experience in evaluating health effects from high noise level exposures in industrial environments. Dr. McCunney explained that "biological implausibility" is one of the fundamental principles of occupational and environmental medicine: as he put it, "if there is no link at high levels of exposure to a hazard ... it is virtually implausible that low levels would cause an effect that is not noted at high levels." Dr. McCunney further noted that in his 30 years of experience in occupational and environmental medicine, he has never encountered so many symptoms attributable to a single hazard.

[338] Dr. McCunney's opinion respecting the pre-turbine witnesses was that there was no reason to conclude that they will be affected by the operation of the Project, having regard to the medical information they provided and the scientific literature.

Dr. Baines

[339] At para. 14 of Dr. Baines' witness statement, she states:

14. With respect to demonstrating causation, six criteria are applicable to wind turbines:

- a. The first is an appropriate temporal relationship between cause and effect, namely that the cause precedes the effect. It is claimed the symptoms begin after exposure to wind turbines. However when data are gathered in a biased fashion (sampling bias)

together with the potential for suggestibility bias (filling out a questionnaire labelled adverse health effects of IWTs, reading media reports of illness due to IWTs, concern about loss of property values) may all lead to heightened awareness of symptoms previously ignored.

- b. The second criterion is a strong association between the cause and the effect. Unfortunately, the adverse effects reported are also observed in the absence of wind turbines and only a minority of those exposed experience symptoms.
- c. The third criterion is specificity. Does the cause produce an effect not seen in other situations? Clearly this criterion is not fulfilled.
- d. The fourth criterion is constancy, the effect reliably follows the cause, and we know that not all people exposed to IWTs experience the adverse effects claimed. As well, people not exposed experience the same symptoms reported by plaintiffs.
- e. A fifth criterion is a dose-response effect meaning that the more intense the exposure, the more severe the effect. This has never been persuasively demonstrated in the anti-turbine literature.
- f. The sixth criterion is biological plausibility. It is generally accepted that a wide range of symptoms involving many body systems will not be due to a single cause or, in the case of IWTs, arise from the visual and sound consequences of their presence. With the wide range of reported symptoms, virtually all of which are experienced widely in the general population, the case for causality due to IWTs is weak.

Findings

Dr. McMurtry's qualification as an expert witness

[340] The Director and the Approval Holder opposed the Appellants' request that Dr. McMurtry be qualified to give opinion evidence as a physician and surgeon with expertise in the delivery of health care, health care policy and health policy. Dr. McMurtry testified in *APPEC*, where a request for the same qualification was also opposed. In *APPEC*, at paras. 72 and 73, the Tribunal provided a summary of the submissions made in respect of this request for qualification, and the Tribunal's reasons for granting the request:

72. The Approval Holder and the Director objected to the qualification of Dr. McMurtry and to the admissibility of his evidence. While the Approval Holder and Director took no issue with Dr. McMurtry's expertise as requested, they argued that it was irrelevant to the issue to be determined by the Tribunal. Specifically, he is an orthopedic surgeon, not an epidemiologist or an expert in any of the illnesses allegedly caused by exposure to wind turbines. Secondly, they argued the evidence should be inadmissible as Dr. McMurtry could not be neutral and unbiased as required of an expert witness under the Tribunal's Practice Direction, due to involvement in wind turbine issues as an advocate. Dr. McMurtry is a former Director of *APPEC*.

73. The Tribunal found that, despite Dr. McMurtry's involvement in wind turbine issues in general and with APPEC in particular, he could be qualified as an expert. The reasons include that health impacts of wind turbines is an emerging area of science with few experts at the ready to testify; that Dr. McMurtry has engaged with more individuals alleging these health effects than anyone in Canada; that Dr. McMurtry testified as an expert in the Erickson hearing; and due to his demonstrated personal integrity as an advocate of public health. The Tribunal found that issues of bias would go to weight, rather than admissibility of the evidence. With respect to the area of expertise, the Tribunal found Dr. McMurtry to be an expert in the area requested, and that it was not able to make a determination on relevance at the qualifications stage in the proceeding. ...

[341] The Tribunal finds that these paragraphs adequately describe the submissions made and the Tribunal's reasons for granting the requested qualification in this case.

Whether Dr. McMurtry's proposed reply evidence should be accepted

[342] As explained more fully in the Tribunal's order of November 27, 2013, it was not possible to hear *viva voce* evidence from the Appellants' proposed reply witnesses during the scheduled days for the hearing. The Tribunal therefore outlined a schedule whereby the Appellants' reply evidence would be filed by way of affidavits, along with the transcripts of the cross-examinations of those witnesses. As the Approval Holder and the Director submitted that the evidence was not proper reply, the Tribunal directed the parties to address this issue in their final written submissions. All parties did so.

[343] The Director and Approval Holder argue that Dr. McMurtry's reply affidavit is improper reply and should not be accepted by the Tribunal. The Director discussed bringing a motion to exclude the proposed reply evidence, but the Tribunal ruled orally on October 7, 2013 that it would receive the evidence via affidavit, and consider submissions on admissibility of the proposed reply evidence along with the final submissions of the parties.

[344] The Director and Approval Holder note that Dr. McMurtry's reply affidavit includes reference to studies by Pedersen and a report by the World Health Organization ("WHO") (Europe), *Burden of Disease from Environmental Noise: Quantification of Healthy Life Years Lost in Europe*, 2011 (the "WHO (Europe) 2011 Report"). They argue that, if Dr. McMurtry was relying on them, he should have included them in his original witness statements and during oral testimony before the Tribunal. They argue that the reply affidavit does not reply to constitutional evidence adduced by the Director.

[345] The Appellants argue that Dr. McMurtry has been qualified as an expert in health care policy and his reply affidavit is within his expertise, and responds to the Director's

evidence asserting that the purpose of the renewable energy approval provisions is constitutional. It is thus *Charter*-related reply, they submit, and is proper.

[346] The Tribunal finds that paras. 6, 7 and 8 of Dr. McMurtry's reply affidavit discuss Ontario's energy mix and its electricity generating capacity. These are clearly not within Dr. McMurtry's area of expertise and the Tribunal does not admit them as evidence.

[347] Paragraphs 9 to 13 of Dr. McMurtry's reply affidavit respond to Dr. Moore's comments regarding criteria for causation, and evidence entered during the Approval Holder's case regarding annoyance. An excerpt from the WHO (Europe) 2011 Report referred to in para. 13, for example, was entered into evidence during Dr. McCunney's testimony. For this reason, the Tribunal allows those paragraphs into evidence, along with the documents they refer to, as reply evidence on the health case.

Dr. McMurtry's opinions respecting the post-turbine witnesses

[348] As noted earlier in the description of his evidence, Dr. McMurtry states his opinion that each of the post-turbine witnesses satisfies the 'probable' criteria for experiencing adverse health effects from living in the environs of industrial wind turbines. The Tribunal notes that he did not expressly state that this was his *diagnosis* respecting each of these individuals. However, as he noted in his update to the Case Definition, a 'probable' diagnosis "indicates that AHE/IWT [adverse health effects in the environs of industrial wind turbines] more likely than not are the cause of the complaints. AHE/IWT is the working diagnosis. Other diagnostic possibilities continue to exist and should be considered in the differential diagnoses."

[349] The Tribunal notes the purpose of opinion evidence is to assist the Tribunal in making its decision respecting the statutory test under the *EPA*, which is a legal determination. Dr. McMurtry is clearly asserting that it is more likely than not that each of the post-turbine witnesses has suffered adverse health effects caused by industrial wind turbines. Consequently, the nature of this opinion evidence is to be assessed in this legal context, and not the context of how a health practitioner may differentiate between commenting on whether a post-turbine witness satisfies the criteria of the Case Definition and making a diagnosis. In the legal context, the Tribunal finds that any such differentiation is artificial.

[350] The Tribunal also notes that Dr. McMurtry's updated Case Definition sets out diagnostic criteria intended for use by primary health care physicians to diagnose whether a patient who lives in the environs of industrial wind turbines is experiencing adverse health effects. As such, this Case Definition is based on the presumption that adverse health effects are caused by being in proximity to industrial wind turbines.

Therefore, the Case Definition, in and of itself, does not establish causation. As stated in Dr. Moore's witness statement at para. 142, "Case studies and the associated methodology is a particular way of defining cases, and not a way of analyzing cases or a way of modeling causal relations."

[351] The basis on which Dr. McMurtry concludes that industrial wind turbines cause adverse health effects is summarized in the Introduction to the Case Definition, which states:

These [adverse] health effects *appear to correlate* with proximity to IWTs [industrial wind turbines], the frequency of the noise, the time of exposure, and individual response. The pattern of individual's complaints demonstrates a striking similarity internationally in media reports and in physician-generated case series. [emphasis added]

[352] The Tribunal notes that evidence of the post-turbine witnesses, and Ms. Laurie's evidence respecting her survey of 130 Australians, provide data in support of this statement. However, while correlation can be indicative of causation, it is not synonymous with causation, because, as noted in Dr. Moore's evidence, associations between events can occur by chance. The evidence adduced by the respondents respecting causality assessment and the accepted use of the Bradford Hill criteria for assessing causal associations indicate that more than correlation is required in order to establish causation.

[353] The Tribunal recognizes that the reasons advanced by Dr. McMurtry also include his observation respecting the incidence of reports of adverse health effects in all countries where industrial wind turbines are erected, and that the reports of adverse health effects are similar despite differing culture and languages (described as convergent validity). While these considerations are not to be discounted, the Tribunal finds that it has received insufficient evidence to establish that a causal association can be made, based on this information alone. While it is Dr. McMurtry's opinion that such a conclusion is established, the respondents' health experts clearly express their opinion that all of the Bradford Hill criteria must be satisfied, and, in this case, that these criteria have not been met.

[354] As is discussed in greater detail below, the evidence here is closer to the hypothesis generating phase of scientific research than it is to the point where conclusions can be made on causation. Consequently, the Tribunal finds that the Case Definition does not establish causation. In reaching this conclusion, the Tribunal also relies on its analysis and findings, described below, respecting Dr. Leventhall, and the evidence respecting annoyance.

[355] In light of the above finding, it follows that any diagnosis based on the assumption that adverse health effects are caused by living in the environs of industrial wind turbines, also does not establish causation.

[356] As the Tribunal has found that the Case Definition does not establish causation, the Tribunal finds that it is unnecessary to address the respondents' submissions challenging other aspects of the validity of the Case Definition.

Appellants' Submission respecting evidence of Dr. Leventhall in *Erickson*

[357] The Appellants assert that there is a causal chain between annoyance, stress, sleep disturbance, and adverse health effects. In their submissions in support of this position, they maintain that the evidence of Dr. Leventhall, as reported in *Erickson*, that annoyance is a psychological effect, predominantly somatoform disorders, which occur in small numbers of people. The Appellants further maintain that: (i) he stated that the effects of extreme annoyance include symptoms such as sleep disturbance, headache, tinnitus, ear pressure, dizziness, vertigo, nausea, visual blurring, tachycardia, irritability, problems with concentration and memory, panic episodes; and (ii) he acknowledged that sleep disturbance is an adverse health effect.

[358] The Appellants state, that, in *APPEC*, the Tribunal found that if the approval holder disagreed with how Dr. Leventhall's evidence was interpreted in *Erickson*, or wished to have him give different or updated evidence, it had the opportunity to do so. The Appellants assert that the Tribunal, therefore, inferred that Dr. Leventhall's evidence from *Erickson* was not contested. The Appellants point out that the Approval Holder could have called Dr. Leventhall to give evidence in this proceeding and has not done so. Therefore, the Appellants submit that the Tribunal should draw the same inference in these proceedings as they assert was drawn in *APPEC*.

[359] The Tribunal notes that the reference quoted from *Erickson* is with respect to the *evidence* of Dr. Leventhall, not any *finding* made with respect to this evidence. Nowhere in *Erickson* did the Tribunal make a specific finding in respect of this evidence. At paras. 832 and 836, the Tribunal in *Erickson* stated:

832. Given the current level of science, the Tribunal finds that it is not necessary to make major findings regarding the weight that should be attached to each witness' testimony.

836. In many cases, the evidence (as opposed to the conclusions) was simply different, but not divergent. To use an example, the Appellants put forward a non peer-reviewed study that showed an association between distance from turbines and reports of effects. The Director and Suncor did not counter with a similar study that did not find an association (a point that was generally made by Dr. Shepherd).

Rather, they provided expert evidence on some of the apparent weaknesses in the study and conclusions on why definitive causal correlations could not be found. They also provided evidence about what the existing peer-reviewed articles have studied (for example, perceived impacts, such as "annoyance", "high annoyance", etc.) and contrasted them with what the legal test asks for. This type of evidence added to the evidentiary picture presented to the Tribunal. In very few instances did the scientific evidence run in completely opposite directions. Indeed, the Tribunal heard evidence from Dr. Mundt that many of the applicable peer-reviewed articles are about the perception of noise from wind turbines and not necessarily health effects. *This, in part, led to the significant debates about the applicability of words like "annoyance" in the perception of noise studies to the test used in this proceeding, which focuses on health. Obviously, the Tribunal would have preferred clear evidence from peer-reviewed studies that actually measured health effects and their relation to wind turbines, but research in that area is still quite limited.* [emphasis added]

[360] Secondly, in *APPEC*, the Tribunal did not make a finding accepting Dr. Leventhall's evidence. Instead, the Tribunal in *APPEC* addressed an issue regarding the interpretation of Dr. Leventhall's evidence in *Erickson*. At para. 49, the Tribunal stated:

Dr. Leventhall testified for the approval holder in *Erickson*, and although originally on the witness list for the Approval Holder in this proceeding, he was never called. If the Approval Holder disagreed with how Dr. Leventhall's evidence was interpreted in the earlier decision, or wished to have him give different or updated evidence, it clearly had the opportunity to do so. The Tribunal therefore infers that Dr. Leventhall's evidence, as reflected in *Erickson*, was not contested.

[361] In any event, Dr. Leventhall did not testify in this proceeding. Consequently, his work in this area is relevant only to the extent that it has been referenced by the experts who have testified in this proceeding who rely on his work in support of the opinions they have expressed.

Annoyance

[362] The Tribunal now turns to the Appellants' submissions regarding annoyance. They rely on Mr. Howe's evidence as described above. They submit that, there is, therefore, undisputed evidence before this Tribunal that, at sound levels at or below those approved for the operation of this Project: (i) 6 to 20% of people will be very annoyed, and (ii) such persons will experience adverse health effects, as there is a causal chain between annoyance, stress, sleep disturbance, and adverse health effects.

[363] For the following reasons, the Tribunal does not accept the Appellants' assertion that this evidence is undisputed, or that it has been conclusively established that such persons will experience adverse health effects.

[364] The Tribunal first notes that it accepts, as stated in *Erickson* at para. 630, that “sometimes a causal link can be established, even if the specific mechanism responsible for that link has not been identified with certainty within a suite of plausible pathways.” However, to establish causation, there is still a requirement to demonstrate that annoyance *will* result in the adverse health effects listed by the Appellants, even if the exact mechanism is not identified.

[365] Supporting the Appellants’ position is the evidence of Mr. Howe, who is a professional engineer specializing in acoustics. While the Tribunal accepts that the nature of his work as an acoustician includes consideration of whether noise can cause annoyance, it has not been suggested that he has the qualification to comment on the health effects that can be expected to result from annoyance. Instead, in his witness statement, he states that research has shown that annoyance associated with sound from wind turbines can be expected to contribute to stress-related health impacts in some persons. Mr. Howe included as part of his evidence, a report he authored for the MOE, the MOE Review Report noted above, which indicates that the referenced research is primarily the published work of Dr. Leventhall. Mr. Howe also refers to a 2013 review conducted by the Oregon Health Authority, entitled *Strategic Health Impact Assessment on Wind Energy Development in Oregon* (the “Oregon Study”), and a recent study conducted by the University of Scotland. Dr. McMurtry’s evidence on these issues refers to Mr. Howe’s MOE Review Report.

[366] The Director and Approval Holder do not agree with the Appellants’ position. They rely on the evidence of the respondents’ health experts, and in particular, the evidence of Dr. McCunney described above, wherein he disputes that some people will always exhibit effects, and refers to a study which indicates that some wind projects had never been subject to noise or health complaints.

[367] Based on the evidence adduced in this proceeding, the Tribunal finds that the proposition that annoyance will occur as a result of exposure to noise levels between 35 to 40 dBA has not been clearly established, as the expert opinion on this issue is divided. In this regard, for example, Mr. Howe relies on the work of Dr. Leventhall, as well as a 2009 study by a group of researchers (Pedersen et al.) that states that close to 20% of people were “very annoyed” by wind turbine sound levels. Dr. McCunney refers to a more recent report by Dr. Chapman which showed large spatio-temporal variations in complaints about noise and health from wind farms. Dr. Chapman found that 33 of 51 wind farms in Australia had never been subject to noise or health complaints. While the information respecting these studies has been provided to the Tribunal, no evidence has been provided to indicate that one study should be relied on over another. For

example, when challenged in cross-examination as to whether Dr. Leventhall would accept the Chapman study, Dr. McCunney testified that Dr. Leventhall would have to testify to indicate how this more recent study would affect his views.

[368] The divergence of opinion in this area is also documented by the WHO (Europe) 2011 Report referenced by Dr. McMurtry. This report includes a chapter on “Environmental Noise and Annoyance”, which highlights the debate and uncertainty respecting noise annoyance. At page 91 the report states:

Noise annoyance is widely accepted as an end-point of environmental noise that can be taken as a basis for evaluating the impact of noise on the exposed population. As a consequence, EU Directive 2002/49/EC recommends evaluating environmental noise exposures on the basis of estimated noise annoyance.

As discussed in Chapter 1, WHO defines health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”. This *implies* that noise-induced annoyance may be considered an adverse effect on health. People annoyed by noise may experience a variety of negative responses, such as anger, disappointment, dissatisfaction, withdrawal, helplessness, depression, anxiety, distraction, agitation or exhaustion. Furthermore, stress-related psycho-social symptoms such as tiredness, stomach discomfort and stress have been found to be associated with noise exposure as well as noise annoyance. *Some public health experts feel that severe forms of noise-related annoyance should be considered a legitimate environmental issue affecting the well-being and quality of life of the population exposed to environmental noise.* The most important issue in the present context is to what extent health (according to the broad definition given above) is reduced by noise and whether a DW that expresses this reduction, when combined with the prevalence of annoyance, leads to a significant burden of “disease”. *The other possibility would be that noise annoyance does not significantly contribute to disability and, hence, should not be taken into account when considering the noise-induced burden of disease.* (emphasis added)

[369] At page 93, this report also confirms that data below 45 dBA was not considered “because the risk of unreliable noise data is high at very low levels ...” This report further notes, at page 97, that:

Uncertainty with respect to the exposure–response relationship

One cause of doubt regarding the predictability of noise annoyance is that the studies show a large variation in individual annoyance reactions to the same noise exposure level. The other cause of doubt is that attempts to integrate the results from different studies show that there is a large variation in the relationships found in different studies. The large individual variation and the large study variation suggest that it is difficult to predict annoyance with sufficient accuracy. Indeed, the annoyance response of a particular individual or group of individuals can be predicted on the basis of the exposure only with a large amount of uncertainty. ...

[370] The Tribunal notes that it is also unclear whether adverse health effects will occur only at elevated levels of annoyance. In this regard, there is nothing in the

evidence to indicate how levels of annoyance would be measured. In addition, Mr. Howe, in his witness statement, notes that “it would be statistically invalid to predict the exact number of persons expected to be very annoyed, other than noting that those predisposed against the project are more likely to be annoyed.” Furthermore, if there is any consensus to be found among the experts who testified, it is that annoyance is not likely to result solely from exposure to noise, but includes other factors affecting an individual’s attitude toward the project.

[371] If the intent of this evidence regarding annoyance is to support a generic approach to establish causation, i.e., where causation is not in relation to specific identified individuals, then it is clear that the epidemiological framework set out in the Bradford Hill criteria is relevant. Dr. Baines was qualified to give opinion evidence as an epidemiologist. As noted above, in para. 14 of her witness statement, she reviews these criteria and concludes that, in respect of wind turbines, none of these criteria have been fulfilled. The opinion evidence respecting the application of the Bradford Hill criteria is conflicting. Dr. McMurtry’s analysis of these criteria is clearly at odds with the conclusions of Dr. McCunney, Dr. Moore, and Dr. Baines. While the Tribunal does not conclusively reject Dr. McMurtry’s evidence, the Tribunal finds that it is not sufficiently compelling to lead the Tribunal to conclude that the opinions of Dr. McCunney, Dr. Moore, and Dr. Baines should be rejected. Consequently, in weighing this evidence, the most that can be said is that the preponderance of this opinion evidence favours the position of the Director and the Approval Holder. Based on these conclusions, the Tribunal finds that the evidence is inconclusive respecting whether industrial wind turbines would cause annoyance. Assuming that the evidence established that annoyance will be caused, the Tribunal also finds this evidence is inconclusive regarding the degree of annoyance which would be caused, and, in turn, whether such annoyance will result in adverse health effects.

[372] The Appellants assert that the causal chain between annoyance, stress, sleep disturbance, and adverse health effects, is evidenced by the adverse health effects suffered by the post-turbine witnesses who testified in this proceeding. The Tribunal does not accept that this has been established by the Appellants. Instead, the Tribunal finds that, based on the evidence adduced in this proceeding, the symptoms reported by the post-turbine witnesses *may* be evidence of the causal chain between annoyance, stress, sleep disturbance and adverse health effects. In this regard, the Tribunal notes that the Appellants did not adduce any opinion evidence by a qualified health practitioner to confirm that the symptoms reported by the post-turbine witnesses

resulted from annoyance, manifested through a somatoform or other disorder or condition.

[373] In summary, the Tribunal finds that the evidence is inconclusive on the issue of whether wind turbine noise at 40 dBA or less, and other associated factors, such as being predisposed against a wind turbine project, can be expected to cause annoyance that will result in serious harm to human health for a small percentage of the population that will be exposed to the Project under appeal. In this regard, Tribunal finds that the Tribunal's finding in *Erickson*, at para. 838, also applies here:

838. To summarize, the evidence in this Hearing on serious indirect harm was largely exploratory. The evidence on a lack of serious indirect harm was also limited (the evidence on a lack of serious direct harm is much stronger, however). The Tribunal is not giving significant weight to the latter and little to the former in reaching its conclusion. That is because the legal test itself tilts the balance in one direction. The onus is on one side (in this case, the Appellants). That side has provided evidence that the Tribunal finds to be exploratory in nature, even if given significant weight. Put another way (using the wording of Dr. Mundt), the present situation is closer to the hypothesis generating phase of scientific research than it is to the point where conclusions can be made on causation (with respect to the sound levels expected at the Project's receptors). Or, using the approach of Dr. Shepherd, it is clear that we are not yet at the third stage of research on a new condition where intensive research has been completed so as to determine causation. We are at a much earlier stage, where there have been adverse event reports and some exploratory studies, such as the Nissenbaum Study. It is, therefore, no surprise that the legal test, which requires proof of harm, has not been satisfied when the applicable scientific evidence is in such an early stage of development.

Low Frequency Noise and Infrasound ("LFNI")

[374] Mr. Howe's evidence briefly touched on LFNI. Both Dr. McMurtry and Dr. McCunney addressed the issue of LFNI in greater detail in their witness statements. The Tribunal has not found it necessary to include a synopsis of this evidence in this decision, as they both testified in *Erickson* on this issue, and much of their evidence adduced in this proceeding is as described in that decision. Regarding Dr. McMurtry's evidence in this proceeding, he relies on his witness statement which was filed in *Erickson* in 2011. In this proceeding, Dr. McCunney's witness statement further addresses LFNI, providing reference to studies published after 2011. In summary, there is a clear difference of opinion between them regarding whether LFNI generated by wind turbines will cause harmful effects to humans.

[375] The Tribunal notes that the Appellants' submissions did not address LFNI separately from the issue respecting the health effects resulting from annoyance. The Tribunal also notes that para. 193 of the Appellants' submissions states:

... there remain key gaps in the information available about the relationship between IWTs and human health:

- Sleep disruption and health effects from long-term exposure to low levels of low frequency sound and infrasound.

[376] In light of the divergent expert opinions on this issue, and the current status of the research in this area, the Tribunal finds that the present situation still remains closer to the hypothesis generating phase of scientific research than it is to the point where conclusions can be made on causation. Consequently, the Tribunal finds that the Appellants have not established that LFNI generated by wind turbines will cause serious harm to human health.

Conclusion on Issue 2A

[377] For the above reasons, the Tribunal finds that the Appellants have not established a causal link between wind turbines and human health effects where there is a 550m setback and 40 dBA noise limit.

Issue 2B: Whether Engaging in This Project in Accordance with the REA Will Cause Serious Harm to Human Health

[378] As the Tribunal has noted earlier in this decision, the Appellants seek to establish causation by establishing that specific individuals have suffered serious harm to their health as a result of living in proximity to wind project components, maintaining that this evidence establishes that wind turbines will exacerbate certain types of pre-existing medical conditions. The Appellants maintain that the pre-turbine witnesses who have testified in this proceeding, are vulnerable people living in the vicinity of the Project who have such pre-existing medical conditions. The Appellants assert, therefore, that their testimony respecting their pre-existing medical conditions is highly relevant to establish a causal link between the proposed Project and "the more likely than not probable effect on those living near the Project".

[379] The pre-turbine witnesses each testified that they had or have a pre-existing medical condition. They each expressed their concern that, due to their proximity to the proposed wind turbines in the Project, they could experience a resumption or exacerbation of their symptoms, or suffer additional adverse health effects. They each produced medical records that they were able to obtain regarding their past medical history. However, none of them presented opinion evidence from a qualified health

practitioner to confirm that their concerns will occur. In the absence of such medical opinion, the Appellants rely on the evidence of the post-turbine witnesses to establish their assertion that exposure to wind turbines will exacerbate pre-existing medical conditions.

[380] In light of the Tribunal's findings above that the Appellants have not established a causal link between wind turbines and human health effects, and, in particular, that causation has not been established in respect of the post-turbine witnesses, the Tribunal finds that the Appellants have not established that any of the pre-turbine witnesses will suffer serious harm to their health as a result of the Approval Holder engaging in the Project in accordance with the REA. As such, the Tribunal finds it is unnecessary to engage in a detailed review of the medical evidence respecting their pre-existing conditions. However, the Tribunal will address the evidence of one pre-turbine witness, as her evidence includes an assertion of direct causation, namely, that shadow flicker will cause her to experience epileptic seizures. For ease of reference, the Tribunal will refer to this pre-turbine witness as "PTW".

Evidence of Witness PTW

[381] PTW owns a 22 acre property in the Project area, and plans to retire in December 2013 and use this rural property as her primary residence. She believes the Project will cause serious harm to her health due to two health conditions: high blood pressure and epilepsy. She has been taking blood pressure medication for many years, having been hospitalized in the past due to high blood pressure. She testified that she monitors her blood pressure every day, and works hard to keep it at a reasonable level by, among other things, a daily fitness regime.

[382] She testified that she has suffered from epileptic seizures from the age of two. PTW testified that she can recognize the onset of an episode with approximately two hours' warning, which has allowed her to live a fairly normal life. She states that each episode of an epileptic seizure is extremely physically taxing, and she fears ongoing damage to her health. She described episodes she has experienced, which she states have had a significant impact on her. She cites, for example, that a single seizure will leave her bedridden for days and take several weeks for a full recovery. Multiple seizures will require an even longer recovery process.

[383] PTW has become attuned to triggers throughout her life, and finds that nausea is a trigger, as well as illness and fatigue. She states that she attempts to minimize the likelihood of epileptic seizures through lifestyle, including a regular exercise regime and

sufficient sleep. When she feels a seizure coming on, it is very important to find a quiet place so she can “push it away”.

[384] PTW makes use of her property for outdoor recreation, gardening, and tapping maple trees in the early spring. She is concerned that the wind turbine project may cause her a loss of sleep, headaches and nausea, all of which increase the likelihood of suffering an epileptic seizure. In addition, she notes the shadow impacts will occur during seasons when she is using the outdoor space, including tapping the maple trees in early spring and gardening in the fall. She feels she cannot live on the property and put herself at risk of seizures, should the Project proceed.

[385] In cross-examination, PTW agreed that flashing lights have never triggered a seizure in the past, but she is not willing to test it. Her main concern is nausea associated with moving shadows.

[386] PTW filed a review of the literature on health impacts of wind turbines, in a paper prepared by Knopper and Ollson (2011). She notes that the authors state “in Ontario it has been common practice to attempt to ensure no more than 30 hours of shadow flicker per annum at any one residence” (page 6). She also notes that Germany has regulations related to shadow flicker, and stipulates a maximum of 30 hours per year for worst case scenario, and eight hours per year (30 minutes on any one day) actual amounts of shadow flicker. She states that the United Kingdom (“UK”) takes the approach of a minimum setback (9 or 10 times the rotor diameter of the blade, and or 10 times the tower height to the hub) to reduce shadow flicker. According to her calculations, the UK regulations would result in Turbines T1 and T2 of the Project being set back 850 m to 1,030 m from her home, were they to apply in Ontario.

[387] Regarding shadow flicker, Steve Hilditch gave opinion evidence regarding the time of the year that shadow flicker from the two turbines would affect PTW’s property.

[388] In response, the Approval Holder called Shant Dakouzian to respond to Mr. Hilditch’s evidence. Both Mr. Hilditch and Mr. Dakouzian used computer simulation modelling as the basis for their evidence. It was not disputed by Mr. Dakouzian that PTW’s property would be subject to shadow flicker at some times of the year, although it is his opinion that, given the distance from the turbines, the intensity of the shadow would be diffused. Mr. Hilditch’s estimates of the amount of time each day that PTW’s property would be exposed to shadow flicker is higher than Mr. Dakouzian’s estimates. The Approval Holder also called Dr. McCunney to respond to PTW’s health concerns. His evidence is described below.

Findings Regarding Evidence of PTW

[389] In summary, PTW asserts that she will experience increased risk of having epileptic seizures as a result of potential for sleep deprivation from noise, or as a result of nausea and risk of increased blood pressure caused by wind turbine shadow flicker from the two Project turbines to be located nearest her property. Regarding sleep deprivation from noise, this issue has already been addressed under Issue 2A, particularly in respect of the post-turbine witnesses.

[390] The Tribunal finds that it does not need to make specific findings respecting these areas of disagreement between the shadow flicker experts, because (i) they both agree that her property will be affected to some degree by shadow flicker each year; and (ii) PTW's evidence is that she will be at risk of experiencing a seizure if she is exposed to any shadow flicker.

[391] The Tribunal notes that PTW has adduced some evidence that shadow flicker affects people with photo-sensitive epilepsy. The Knopper and Ollson paper notes at page 5, however, that "turbines are designed not to pose a risk of photo-induced epilepsy". They state:

Harding et al. and Smedley et al. investigated the relationship between photo-induced seizures (i.e., photo-sensitive epilepsy) and wind turbine blade flicker (also known as shadow flicker). This is an infrequent event, typically modelled to occur less than 30 hours a year from wind turbine projects we have reviewed and would be most common at dusk and dawn, when the sun is at the horizon. Both studies suggested that flicker from turbines that interrupt or reflect sunlight at frequencies greater than 3 Hz pose a potential risk of inducing photosensitive seizures in 1.7 people per 100,000 of the photosensitive population. For turbines with three blades, this translates to a maximum speed of rotation of 60 rpm. The normal practice for large wind farms is for frequencies well below this threshold.

[392] The practice in Ontario to attempt to ensure no more than 30 hours of shadow flicker per annum on a residence, as referenced by PTW, is directed to reducing the "annoyance" factor, rather than any likelihood of photosensitive epileptic seizures.

[393] In response to PTW's evidence, Dr. McCunney's uncontradicted opinion evidence is as follows:

7. Concerns about the potential health impact of wind turbine operations on people who have been diagnosed with epilepsy have been addressed in the peer reviewed scientific literature. (Smedley et al, 2010 and Harding et al, 2008) The type of epilepsy that has been suggested as possibly at risk from wind turbine operations is known as "photosensitive epilepsy". Photosensitive epilepsy, which occurs in about 1 in every 4000 people (0.025%), may be precipitated by flickering

sunlight. However, flicker that occurs at less than 3 cycles per second, (180 revolutions per minute) such as occurs in wind turbine operations, does not pose a risk of provoking photo-epileptic seizures. (Harding et al, 2008) As indicated above, there is no evidence in [PTW's] records that she is part of the small fraction of the population that has photosensitive epilepsy. This conclusion is corroborated by the fact that [PTW] had an EEG on October 24, 2008 in which photic stimulation triggered no results.

8. In my view, the evidence does not support the view that shadow flicker from the wind turbines will pose a risk of provoking a seizure in [PTW] because the evidence does not indicate that [PTW] has photosensitive epilepsy. The type of her epilepsy - at the most recent evaluation - appears, based on the records produced, very stable in that she has had very few seizures since her early college days, and had a normal EEG in 2008.

9. Even if [PTW] did have photosensitive epilepsy, the shadow flicker from the wind turbines would not pose a significant risk of provoking a seizure. My opinion is based on a review of pertinent scientific studies (Harding, 2008; Smedley, 2010), and the technical Specifications for the GE turbines planned for the Dufferin wind farm which indicate that the rotating blade frequency will not exceed 16.18 revolutions per minute (rpm), which is less than 10% of the threshold proposed by Smedley et al as capable of provoking a photo-epileptic seizure. (Technical Documentation Wind Turbine Generator Systems GE 1.6-100-50 Hz/ 60 Hz and General Electric 2.75 MW Turbines) The turbine blades will not rotate at a sufficiently high frequency, i.e. > 3 cycles per second (180 revolutions per minute) to provoke a photo epileptic seizure. (Smedley et al, 2010) In a comprehensive report prepared for the state of Massachusetts, the expert panel came to a similar conclusion, finding that the scientific evidence suggests that there is no risk of seizure from shadow flicker caused by wind turbines. (MDPH, 2012)

10. *Effect of shadow flicker on blood pressure.* Apart from her concern about epilepsy, in her witness statement [PTW] also raised concern that shadow flicker has the potential to affect her blood pressure. There is insufficient scientific evidence to suggest that shadow flickering will cause blood pressure to elevate and cause hypertension, and in fact experts have concluded that shadow flicker does not cause any adverse health effects. (MDPH, 2012) As [PTW] herself has observed, there is only one German study that indicates that prolonged shadow flicker (more than 30 minutes) *could* result in stress--related health: effects, (Pohl et al, 1999) A single study does not constitute enough to prove a link. That is particularly true in light of the fact that other studies conducted among people living in the vicinity of wind turbines have not shown causal links between wind turbines and hypertension. (Pedersen, 2011)

[394] The Tribunal notes that Dr. McCunney's uncontroverted evidence provides the only qualified medical opinion respecting PTW's condition. While the Tribunal accepts PTW's description of her symptoms, this evidence does not establish that: (i) she, in fact, suffers from photo-sensitive epilepsy; (ii) the frequency of shadow flicker from wind

turbines will trigger photo-epileptic seizures; or that (iii) shadow flicker will cause elevated blood pressure resulting in hypertension. For these reasons, the Tribunal finds that the Appellants have not established that PTW will suffer serious harm to her health caused by the Project wind turbines that will be located near her property.

Evidence of the Other Party, Participant and Presenter

Joan Lever (Participant)

[395] Ms. Lever lives in the vicinity of the Project and expressed her view on the harm that she believes will be caused by the Project. She has been a dedicated follower of this proceeding, and she is a vocal opponent of locating wind project development close to peoples' homes.

[396] Ms. Lever supports the position of the Appellants in this proceeding. Her evidence touched on many, if not all of the issues before the Tribunal, including the impact of wind turbine noise, and sleep disturbance on human health. She also spoke passionately regarding the social impact of turbine projects on communities.

[397] Ms. Lever's evidence included a sophisticated multi-media presentation that included excerpts from the CBC television documentary, "Wind Rush", as well as video footage from community demonstrations, and of a case of turbine fire. She appended many of the scientific documents that were also referred to by Ms. Laurie.

[398] Ms. Lever expressed concern about direct health effects from low-frequency noise and infrasound, as well as indirect effects from stress and sleep disturbance. She asserts that the current set-back distances are entirely insufficient, citing her understanding of set-back requirements in other jurisdictions, including Australia, New Zealand, and a number of US states. She maintains that, in all cases, they are well beyond Ontario's 550 m requirement.

[399] Ms. Lever is also concerned with safety issues, such as fires and ice throw. She supports the submissions by the Municipality of Amaranth, with respect to the danger of installing overhead transmission lines within this municipality.

Dr. William Crysdale (Party)

[400] Dr. Crysdale is a retired physician who, when in active practice, specialized in children's health. He testified as a witness with respect to human health issues, although he did not seek to be qualified to give opinion evidence. He stressed the importance of recognizing that adverse health effects are serious.

[401] Dr. Crysdale expressed his concern that the regulated set-back of 550 m is insufficient and is becoming ever more insufficient, given the increasing size of wind turbines. He asserts that Australia and New Zealand currently have established residential setbacks of 1.5 to 2 km.

[402] Dr. Crysdale refers to several abstracts of studies and other papers supporting the view that low frequency noise and infrasound may impact a person's health, and that chronic annoyance is a risk factor for other types of diseases.

[403] Dr. Crysdale is particularly concerned with the impact of loss of sleep on children. He asserts that independent research into the health effects of existing wind farms is long overdue, and is alarmed that the current Health Canada study to better understand health impacts of wind turbine noise, will not include anyone under the age of 18.

[404] Dr. Crysdale submits that "the precautionary principle is one of the central concepts of modern environmental policy." He discussed a number of examples where it has been applied. After examining factors used by an Ontario medical officer of health to apply the precautionary principle, Dr. Crysdale concludes, that "at least a moderate precautionary principle" approach should be adopted. In reaching this conclusion, he relies, in part, on his assertion that there is a "low societal need for the electricity produced".

[405] Dr. Crysdale also commented that he has proposed to the Hospital for Sick Children, where he worked until his recent retirement, that they undertake a study related to wind turbine noise and its impact on children's health.

Don MacIver (Presenter)

[406] Mr. MacIver is the mayor of the Corporation of the Municipality of Amaranth (the "Municipality"), in which the Project is located. He gave a detailed presentation of the Municipality's health and safety concerns regarding the Project's proposed overhead transmission line. As his presentation was extensive, the Tribunal will only highlight the subject areas covered in his presentation:

- high voltage transmission lines impact human health;
- the multi-use of an elevated recreational trail within the Municipality will be severely limited, as a section of the Project overhead transmission line will be situated in close proximity to a section of this trail, causing safety concerns;
- electro-magnetic fields caused by transmission lines may be linked to a variety of human health problems, impact property values, and effect livestock.

[407] Mayor Maclver testified that the Municipality wants the transmission line buried throughout the Municipality.

Norman Wolfson (Presenter)

[408] Mr. Wolfson testified regarding both the health case, and concerns related to the natural environment. In the portion of his presentation which addressed health issues, he expressed significant concern about the potential for noise generated by 49 industrial wind turbines, some of which, he stated, are to be built in close proximity to his home. He further stated that this noise will disrupt his family's peaceful enjoyment of their property and the surrounding area.

[409] Mr. Wolfson asserts that the area already has an inordinately high number of wind turbines, and maintains that the Project area is much too small to accommodate 49 industrial wind turbines.

[410] Mr. Wolfson states his understanding that the Approval Holder has not conducted studies on possible impacts on human health, and states that he cannot understand why the Approval Holder's application for the REA could not have been deferred until the completion of the current study by Health Canada.

Findings Regarding Evidence of the Other Party, Participant, and Presenter

[411] The evidence of Ms. Lever, Dr. Crysdale, Mayor Maclver and Mr. Wolfson, has been of assistance to the Tribunal in better understanding the issues to be addressed in this proceeding. The Tribunal notes that much of the evidence presented by Ms. Lever, Dr. Crysdale, and Mr. Wolfson, has been addressed by the other parties in this proceeding, and as such, their concerns and submissions have been addressed by the Tribunal elsewhere in this decision.

[412] Regarding the Municipality's evidence respecting the health and safety impacts of above ground transmission lines, the Tribunal notes that a presenter may only give evidence respecting the issues raised in the appeal. Some of the appeals, in referring to adverse health effects, do state that it is more likely than not that they are caused by a number of factors including stray voltage or electromagnetic fields. However, neither the Appellants' evidence nor their submissions in respect of the Health Test, have directly addressed this issue. Therefore, it is not entirely clear that this issue is before the Tribunal. However, assuming that it is, the Tribunal notes that no expert opinion evidence has been adduced to support the views expressed in Mayor Maclver's presentation. Consequently, the Tribunal finds that Mayor Maclver's evidence does not

establish that serious harm to human health will be caused by high voltage transmission lines.

Conclusion on Issue 2B

[413] The Tribunal finds that the Appellants have not established that any pre-turbine witnesses will suffer serious harm to their health caused by the Project wind turbines.

[414] As noted above, the evidence in this proceeding does not establish a causal link between wind turbines and either direct or indirect serious harm to human health under the conditions imposed in the REA requiring a setback distance of 550 m, and a maximum noise level of 40 dBA.

[415] Consequently the Tribunal finds that the Appellants have not established that engaging in the Project in accordance with the REA will cause serious harm to human health.

Issue 2C: Whether Ms. Laurie should be qualified to give opinion evidence

[416] The Appellant, Mr. Sanford, called Ms. Laurie as a witness to give opinion evidence respecting the issue whether engaging in the Project in accordance with the REA will cause serious harm to human health. As noted earlier in this decision, Mr. Sanford requested that she be qualified as “a physician with experience in the delivery of health care.” In an oral ruling, the Tribunal refused Mr. Sanford’s request, indicating that its written reasons for this disposition would follow. The Tribunal’s reasons are provided below.

Ms. Laurie’s Education, Training, and Experience

[417] The factual evidence regarding this witness’ education, training, and experience in support of the requested qualification is not in dispute. Ms. Laurie obtained a Bachelor of Medicine, Bachelor of Surgery in 1995 from Flinders University, South Australia, and subsequently practiced, and obtained a Fellowship with the Royal Australian College of General Practitioners (“RACGP”) awarded in 1999, and Fellowship with the Australian College of Remote and Rural Medicine (“ACRRM”) in March 2000. She stopped practicing medicine in April 2002 due to personal circumstances. Ms. Laurie testified that in order to practice medicine, and more specifically, to diagnose and treat patients, Australian law requires that she must be registered with Australian Health Practitioners Registration Authority (“AHPRA”). She indicates that she let her registration lapse approximately two and half years after she ceased practicing in 2002. Ms. Laurie indicates that it is her intention to re-register with AHPRA. However, she

stated that she must complete some self-study, particularly to update her knowledge respecting medication regimes, before she will be ready to re-apply. She confirmed that, to date, she has not done so. In light of these circumstances, Ms. Laurie confirmed that she cannot diagnose patients or prescribe medication for them.

[418] As a result of a complaint filed with the AHPRA in 2013 that her current activities (discussed below) constituted practice as a physician, she voluntarily agreed not to use the title/honourific “Doctor” or “Dr.”. She states that she has done so, in order to avoid any potential misunderstanding by members of the public regarding her status as a practicing physician. Documentary evidence respecting the complaint was adduced in evidence and marked confidential, i.e., it is not included in the public record in this proceeding. Ms. Laurie was cross-examined on this evidence. The Tribunal finds that this evidence supports Ms. Laurie’s assertion that the AHPRA did not make any finding in respect of the complaint made against her.

[419] In terms of her other professional training and experience, Ms. Laurie acknowledges that she has no training or experience in conducting medical or scientific research. She further acknowledges that she also does not have any training or experience in research methodology and design, other than some undergraduate exposure when obtaining her medical degree, and does not have post-graduate experience in this area. She acknowledges that she is not a qualified acoustician, and she has no experience or training in acoustics generally, or, in particular, pertaining to noise generated by industrial wind turbines, although she has reviewed publications in the subject area of acoustics, and has consulted with acousticians.

[420] Ms. Laurie testified that she first became interested in the potential health impacts of industrial wind turbines, specifically resulting from noise generated by industrial wind turbines, in 2010, when a wind project was proposed to be situated near her home (but subsequently never built). Since that time, she accepted an invitation to be the medical director of foundation known as the Waubra Foundation, a volunteer position, which has subsequently changed to her current volunteer position as Chief Executive Officer. Ms. Laurie testified that the Waubra Foundation was formed in March 2010 to facilitate research into the adverse health impacts being described by neighbours to wind developments in Australia. She also stated that this Foundation has a particular interest in the role of low frequency industrial noise from any source, and resultant health problems.

[421] The majority of Ms. Laurie’s work experience related to health impacts of industrial wind turbines, comes from her work for the Waubra Foundation which is a full

time volunteer position. In summary, Ms. Laurie testified that she has not approached communities to conduct surveys, and that she has not conducted formal structured research. She states that she conducts an ongoing survey, where, to date, she has spoken with approximately 130 people in Australia who live in the vicinity of industrial wind turbine projects. She indicated that these people have identified themselves to her, by contacting her directly, or indirectly by contacting the Waubra Foundation. She explains that these persons describe their symptoms to her and request information. She maintains that, when speaking with these people, she does not provide an individual diagnosis. She states that she has not ever taken a formal medical history, which is what a registered medical practitioner would do. She asserts that, instead, she provides information which people can choose to take to their health care practitioner, if they wish to do so, and that, sometimes, their practitioner will contact her for information. Ms. Laurie states that she is interested in learning about their problems, so she can provide information to enable them to assist their own practitioners in working out whether or not their symptoms are related in any way to a source of noise, whether the source is an operating wind turbine, or some other source.

[422] Ms. Laurie explained that the Waubra Foundation is solely concerned with the human health consequences of exposure to operating industrial wind turbines and other sources of infrasound and low frequency noise. She states that she does not oppose industrial wind projects *per se*, but is concerned about the current practice of siting wind turbines in locations where, in her view, they are likely, on the basis of current knowledge, to cause harm to human health.

[423] Apart from interviewing self-identified individuals as described above, Ms. Laurie states that she also works with acousticians to advance multi-disciplinary research which she asserts is needed. She further testified that she has conducted reviews of the published literature in this field, both in the subject area of noise impacts on human health associated with or caused by wind turbines or other sources, and in the subject area of noise acoustics. She also consults with other professionals who are working in this area, both in Australia and internationally, and, in this context, is familiar with the work of Dr. McMurtry, who has also testified in this proceeding.

[424] In her witness statement, Ms. Laurie, in describing her work in this area, makes the following assertions:

My own field work, and knowledge of the field work of others including acoustic and psycho acoustic measurements and physiological research, is appreciated by those genuinely seeking to understand why people are becoming unwell living near wind turbines. My help, knowledge and advice is sought by doctors, acousticians and researchers working in this

field in Australia and overseas. My ability to understand and communicate the essence of the existing acoustic and human health evidence, has contributed to the general community understanding of the existing known pathophysiological pathways which make this condition so devastating to a significant proportion of wind project neighbours.

Ms. Laurie's Proposed Opinion Evidence

[425] Ms. Laurie's opinion evidence is set out in her witness statement which has been filed in this proceeding. Although the Tribunal has given careful consideration to each of the opinions advanced in her witness statement, for the purpose of this decision, it is sufficient to describe these opinions by way of a summary overview. Ms. Laurie's opinion evidence falls into three main areas.

[426] First, Ms. Laurie reviewed the witness statements and other information respecting Ontario residents who have testified in this proceeding. These witnesses fall into two categories:

- The post-turbine witnesses who reside in the vicinity of existing wind turbine projects who assert they have suffered harm to their health as a result of exposure to operating wind turbines.
- the pre-turbine Witnesses residing in the vicinity of Project wind turbines.

[427] There are other persons referenced in Ms. Laurie's witness statement who did not testify in this proceeding.

[428] In her witness statement Ms. Laurie states that she was retained to read the witness statements from the people named in her witness statement, and comment on:

- a) whether they conform with Dr. McMurtry's case definition (described previously in this decision); and
- b) whether they are in accordance with her own knowledge of the range and pattern of health problems being reported by residents living near industrial wind turbines.

[429] In this regard, Ms. Laurie also reviewed medical records provided by these witnesses and questionnaires completed by them, and conducted a telephone interview with each of the witnesses who testified in this proceeding.

[430] In her concluding remarks regarding the post-turbine witnesses, Ms. Laurie states:

Despite the individual differences between these witnesses with respect to the type, range and severity of the symptoms experienced, the speed of onset of symptoms, there is a clear pattern of exposure to operating

wind turbines being associated with the symptoms, which are relieved or improve with cessation of exposure, ...

Overall, it is clear that all of them have experienced serious health impacts as a result of exposure to wind turbines. This makes it probable that others will experience similar effects if they are exposed to turbines.

[431] In her concluding remarks regarding the pre-turbine witnesses, Ms. Laurie states:

It is probable that each of these individual residents will have serious adverse health impacts from wind turbine emissions from the proposed wind development.

Each of them has one or more of the risk factors identified by Dr. Nina Pierpont and Dr. Geoff Leventhall, being either at the extremes of age, or a clinical history of migraines, motion sickness, or inner ear pathology.

In addition each of them have underlying medical conditions which make them more likely to suffer the health damaging consequences of exposure to wind turbine noise because of the well established effects of sleep deprivation and physiological stress from exposure to infrasound and low frequency noise.

[432] In her witness statement, Ms. Laurie describes a study by Dr. Pierpont, who is a practicing medical physician. Ms. Laurie provides an overview of symptoms identified by Dr. Pierpont, and she states that Dr. Levanthall, an acoustician, has acknowledged that these symptoms have been known to him to result from exposure to environmental low frequency noise. These symptoms are:

- Sleep disturbance and sleep deprivation
- Headaches
- Tinnitus (ringing in the ears)
- Ear Pressure
- Dizziness
- Vertigo
- Nausea
- Visual Blurring
- Tachycardia (fast heart rate)
- Irritability
- Problems with concentration and memory
- Panic episodes associated with sensations of movement,
- Quivering inside the body that arise when awake or asleep

[433] Ms. Laurie also describes four specific risk factors identified by Dr. Pierpont as increasing the risk of developing characteristic symptoms from exposure to wind turbine noise. These are:

- The extremes of age – babies and young children and older citizens
- History of migraines
- History of motion sickness
- History of pre-existing otological (ear) conditions including inner ear disorders and industrial deafness

[434] Ms. Laurie also expressed opinions that each of the post-turbine and pre-turbine witnesses who testified in this proceeding, satisfy the criteria for the ‘probable’ category of diagnosis as defined in Dr. McMurtry’s Case Definition. She also expressed further opinions respecting these witnesses as described below.

Findings Regarding Mr. Sanford’s Request to Qualify Ms. Laurie to Give Opinion Evidence

[435] Tribunal Rule 170 regarding the production of witness statements, confirms that the Tribunal requires that a witness who wishes to give opinion evidence must be qualified to do so. Regarding the nature of these qualifications, the Tribunal has issued a Practice Direction for Technical and Opinion Evidence (the “Practice Direction”). Paragraphs 5 and 9(c) of this Practice Direction state:

5. To give opinion evidence, a witness must have specialized education, training, or experience that qualified him or her to reliably interpret scientific or technical information or to express opinions about matters for which untrained or inexperienced person cannot provide reliable opinions. ...

9.(c) The witness should express an opinion to the Tribunal only when the opinion is based on adequate knowledge and sound conviction. The witness should be reluctant to accept an assignment to provide evidence for use by the Tribunal if the terms of reference of the assignment do not allow the witness to carry out the investigations and obtain the information necessary to provide such an opinion. A witness who accepts an assignment under these circumstances should advise the Tribunal of the limitations that the terms of reference place on his or her ability to provide the information necessary to assist the Tribunal in making a sound decision.

[436] The Tribunal notes Rule 170(d) requires that a witness who proposes to give opinion evidence, must complete Form 5, which requires that the witness acknowledge that the witness’ evidence will be fair, objective and non-partisan. Therefore, it is clear that the witness’ duty in this regard, is provide opinions which will assist the Tribunal to make a sound decision.

[437] The requirement set out in para. 5 of the Practice Direction, reflects the law of evidence that, in order to give opinion evidence, a witness must have acquired special or peculiar knowledge through study or experience that is beyond the knowledge of the

common person. So long as the witness satisfies this requirement, the way in which a witness has acquired the knowledge is immaterial (see *R. v. Kinnie* (1989), 450 B.C.L.R.(2d) 369 (“*Kinnie*”), and *R. v. Mohan* [1994] 2 S.C.R. 9 (“*Mohan*”), and cases cited therein). As such, the fact that Ms. Laurie is not registered with the AHPRA, and, therefore, cannot practice medicine (which includes making diagnoses and prescribing medication), does not, in and of itself, preclude her from being qualified to give opinion evidence. The test is whether she has the special or peculiar knowledge in respect of the matters on which she undertakes to testify.

[438] However, the rationale for this requirement is to ensure that such opinions meet a basic threshold of reliability. As noted in *Mohan* (at page 25), where the proposed opinion evidence advances a novel scientific theory or technique, such evidence is to be subjected to special scrutiny to determine whether it meets the reliability threshold.

[439] Clearly, the obligation of the expert witness is to provide opinions which are not subject to any limitation or deficiency which causes the Tribunal to question their reliability. In this regard, the Tribunal observes that para. 9(c) of the Practice Direction, is an example of such scrutiny. The underlying rationale for paragraph 9(c) is that opinion evidence which is proffered subject to restrictions or conditions, will limit its assistance to the Tribunal in making a sound decision.

[440] In this case, the terms of reference of Ms. Laurie’s retainer do not place any limits on her ability to provide the information necessary to assist the Tribunal in making a sound decision. Instead, Ms. Laurie herself stipulates the limitation that her opinion evidence cannot and does not include diagnostic opinion.

[441] The Tribunal accepts that Ms. Laurie, in her curriculum vitae and her oral testimony during the qualification phase of her testimony, clearly indicates this limitation. However, such acknowledgment, in and of itself, does not mean that the opinions she proposes to advance are sufficiently reliable to assist the Tribunal in making a sound decision. The Tribunal’s decision in this regard is discussed below.

[442] The Tribunal has reviewed Ms. Laurie’s proposed evidence in detail. For reasons described below, the Tribunal finds that Ms. Laurie, in expressing her opinions either:

- makes a diagnosis;
- applies diagnostic interpretation of pre-existing medical conditions to reach conclusions that exposure to operating industrial wind turbines has exacerbated such conditions, or has resulted in additional health problems; or

- as in the case of the pre-turbine witnesses, includes the application of diagnostic interpretation to formulate opinions as to the likelihood that these individuals will suffer health damaging consequences if exposed to an operating industrial wind turbine.

[443] The Tribunal has addressed Dr. McMurtry's evidence previously in this decision. However, for the purpose of determining whether Ms. Laurie should be permitted to give opinion evidence in this proceeding, it is sufficient to note that Dr. McMurtry has clearly identified that the deployment of the diagnostic criteria set out in the Case Definition should be conducted by a health care practitioner licensed to take a history and make diagnoses.

[444] Ms. Laurie testified that she did not consider that she made diagnoses of any of the pre-turbine or post-turbine witnesses. Her witness statement indicates that she was asked to comment on whether the medical information she reviewed for each witness, conforms with the Case Definition. In cross-examination, she stated that she is not making a diagnosis in the sense of seeing somebody professionally, providing medical services, and providing a diagnosis on the basis of seeing the patient. She acknowledged that she clearly is not able to do this at the present time, and stated that she would not do so. She also maintains that the purpose of the Case Definition is to assist physicians in making a diagnosis. Respecting this latter statement, the Tribunal notes that Ms. Laurie did not dispute that the Case Definition does describe a medical diagnosis.

[445] In addressing this aspect of Ms. Laurie's evidence, the Tribunal first repeats its earlier finding made in respect of Dr. McMurtry's opinion evidence. The purpose of opinion evidence is to assist the Tribunal in making its decision respecting the statutory test under the *EPA*, which is a legal determination. Consequently, the nature of the proposed opinion evidence is to be assessed in this legal context, and not the context of how a health practitioner may differentiate between commenting on conformity with the Case Definition and making a diagnosis. In the legal context, the Tribunal finds that any such differentiation is artificial. An opinion that the diagnostic criteria set out in the Case Definition are satisfied *is* a medical diagnosis. As Dr. McMurtry noted in his update to the Case Definition, a 'probable' diagnosis "indicates that AHE/IWT [adverse health effects in the environs of industrial wind turbines] more likely than not are the cause of the complaints. AHE/IWT is the working diagnosis. Other diagnostic possibilities continue to exist and should be considered in the differential diagnoses."

[446] In any event, the Tribunal also finds that the opinions expressed by Ms. Laurie go well beyond mere commentary regarding conformity with the Case Definition. As noted earlier in this decision, her general opinion in respect of the post-turbine witnesses is: “Overall, it is clear that all of them have experienced serious health impacts as a result of exposure to wind turbines.” Her opinion in respect of the pre-turbine witnesses is: “In addition each of them have underlying medical conditions which make them more likely to suffer the health damaging consequences of exposure to wind turbine noise.”

[447] The Tribunal does not consider that a detailed review of every opinion in Ms. Laurie’s witness statement is necessary. The Tribunal accepts that Ms. Laurie provided a fair overview of her opinions when providing what she describes as her overall conclusions. The Tribunal will, however, provide one example. In respect of the pre-turbine witness identified earlier in this decision as PTW, Ms. Laurie states:

For someone like [PTW] with epilepsy, known by her to be triggered by sleep deprivation, she is rightly very concerned about the impact of wind turbine noise on her health, and her ability to live on her property, specifically because of the likely impact on her sleep, and therefore on her epilepsy. . . .

Sleep deprivation is known by clinicians generally to lower the threshold for seizures, . . .

She will have no control over the wind turbine infrasound and low frequency noise emissions she is exposed to inside her home if the project proceeds. In particular, there is no way of successfully preventing the effects of the frequencies below 200Hz (infrasound and low frequency noise) from penetrating, resonating and potentially amplifying inside her home and causing disturbed sleep. It is predictable the proposed wind turbine project in this case will cause serious adverse health impacts if the project is allowed to proceed.

[448] Apart from the consideration that this opinion is, in part, based on assumptions regarding noise acoustics, the Tribunal finds that Ms. Laurie is clearly making a diagnostic interpretation of PTW’s current medical condition, and applying this interpretation to formulate her opinion that PTW will suffer serious health impacts if exposed to noise from an operating industrial wind turbine.

[449] The Tribunal has considered whether it should find Ms. Laurie is qualified to provide such diagnostic opinions, notwithstanding that she has indicated that she cannot provide such opinions. In this regard, the Tribunal notes that she has a medical degree and has a number of years of past experience practicing as treating physician. However, the Tribunal has found that most of the opinions expressed by Ms. Laurie do require the making of a diagnosis, or the application of diagnostic interpretation. Therefore, the Tribunal finds that it cannot ascribe sufficient reliability to these opinions, in contradictory circumstances where diagnostic opinion is being proffered by the

witness, while, at the same time, the witness stipulates that she cannot provide such diagnostic opinion.

[450] The above analysis and findings address the opinions in Ms. Laurie's witness statement which require the making of a diagnosis and/or the application of diagnostic interpretation as described above.

[451] The Tribunal now turns to consideration of Ms. Laurie's opinions based on the risk factors identified by Dr. Pierpont. The Tribunal notes that Ms. Laurie made specific reference to these risk factors in her concluding remarks regarding the pre-turbine witnesses, and that she included consideration of these factors in her individual evaluation of each of these witnesses. Although she did not make express reference to Dr. Pierpont's work in respect of the post-turbine witnesses, it is the Tribunal's understanding that her acceptance of these risk factors also informed her conclusions respecting these witnesses.

[452] The Tribunal finds that Ms. Laurie's evaluation of:

- (i) whether any of the witnesses exhibited symptoms identified by Dr. Pierpont as resulting from exposure to low frequency noise, and
- (ii) whether the any of the witnesses exhibit the risk factors identified by Dr. Pierpont,

again, requires the application of diagnostic interpretation. To find otherwise, would be to conclude that no special expertise would, in most cases, be required to conduct such an evaluation. In further support of this finding, the Tribunal also observes that these symptoms and risk factors are similar to the adverse health effects identified in Dr. McMurtry's Case Definition. Again, Dr. McMurtry has clearly identified that the deployment of the Diagnostic Criteria set out in the Case Definition should be by a health care practitioner licensed to take a history and make diagnoses.

[453] The Tribunal now turns to consideration of Ms. Laurie's experience in terms of her survey work in interviewing and documenting the health symptoms reported by people who have contacted her. As noted earlier in this decision, Ms. Laurie acknowledges that she has no training or experience in conducting medical or scientific research, nor has she any training or experience in research methodology. She states that her only training in research design has been some undergraduate exposure while obtaining her medical degree, but she provided no specific particulars of the education or training that she received. She acknowledges that she does not have post-graduate experience in this area. The Appellant, Mr. Sanford, did not seek to qualify Ms. Laurie

as an expert in these areas. The Tribunal finds that, based on Ms. Laurie's acknowledgements, she cannot be qualified to give opinion evidence in these areas. Consequently, the Tribunal finds that Ms. Laurie is not qualified to give her proposed opinion evidence based on expertise in medical or scientific research or research methodology and design. However, for reasons discussed below, this does not preclude her from describing the results of the survey work she has done, including making comparisons to the similarity of the results from this survey work to the results of similar surveys conducted elsewhere.

[454] The Tribunal now turns to another aspect of Ms. Laurie's witness statement, namely her review of published literature on the subject of the health impacts from noise exposure from a variety of noise sources, industrial wind turbines in particular. In her witness statement, she summarizes information from some of these publications, which includes publications in the subject area of noise acoustics. In her testimony, Ms. Laurie has acknowledged that she has no expertise as an acoustician. However, she has also stated that she consults with other experts in the areas of acoustics and psycho acoustic measurements, to promote a multi-disciplinary approach in order to contribute to the general community understanding of what she asserts are "the existing known pathophysiological pathways which make this condition so devastating to a significant proportion of wind project neighbours." Although she has undertaken self-study to inform herself on the issue of noise acoustics, Ms. Laurie did not suggest that her self-study is sufficient to qualify her to express expert opinion on noise acoustics. Consequently, the Tribunal finds that she is not qualified to give opinion evidence in the subject area of noise acoustics, and, in particular, opinions regarding the noise to be generated by the industrial wind turbines in the Project, and the noise levels at sensitive receptors in the Project area.

[455] The Tribunal accepts that it is appropriate for Ms. Laurie to consider existing published research or other literature in formulating her opinions. However, the Tribunal has already found that Ms. Laurie cannot be qualified to give opinion evidence based on formal medical or scientific research, or research design and methodology. The Tribunal has also found that she cannot be qualified to give opinion evidence requiring diagnostic opinions, or the application of diagnostic interpretation to formulate conclusions on the potential health impacts of exposure to operating industrial wind turbines. This raises the question whether she can be qualified to give her proposed opinion evidence on the basis of the experience she has obtained through self-study of the published research and other literature. The Tribunal accepts that the time Ms. Laurie has devoted to this aspect of her work experience is not insignificant. However,

Ms. Laurie's evidence does not indicate that she has conducted a comprehensive review of all literature, nor that she has the expertise to assess the sufficiency of the research methodology in individual research studies. Consequently, the Tribunal finds that her self-study of the published literature, as described in her witness statement, even if considered in conjunction with her survey of self-identified participants, is not sufficient to meet the basic threshold of reliability necessary to assist the Tribunal in making a sound decision.

[456] In summary, the Tribunal has found that the Appellant, Mr. Sanford has not established a basis on which Ms. Laurie can be qualified to give her proposed opinion evidence in this proceeding.

[457] The above finding, however, does not preclude Ms. Laurie from giving evidence. As a fact witness, she can testify respecting her work in this area, particularly the information she has obtained from the survey work that she has conducted. It may be less clear whether other aspects of her evidence are strictly fact evidence. However, the Tribunal notes that the Practice Direction recognizes that a witness who provides technical evidence may, to some extent, interpret information that is essential to the Tribunal's understanding of the issues. In this regard, the Tribunal finds that Ms. Laurie's training, education and experience is certainly sufficient to qualify her to provide this level of interpretation. Accordingly, the Tribunal is prepared to hear her evidence regarding the similarity of health complaints obtained through her survey work, as compared to the health complaints reported in similar surveys conducted elsewhere in Australia and other jurisdictions.

[458] Similarly, the Tribunal has allowed her evidence respecting her review of published research and literature to be submitted, as set out in her witness statement, subject to the important *caveat* that none of the articles, studies, or reports attached to, or described in her witness statement are being accepted as proof of the opinions and conclusions stated therein. This part of Ms. Laurie's witness statement has been accepted solely on the basis that it describes some of the current body of research and academic or other informed discussion which has been published in this field. In this regard, the Tribunal notes that the other parties did not object to the receipt of this part of Ms. Laurie's evidence, subject to this *caveat*.

[459] Finally, the Approval Holder and the Director opposed Ms. Laurie's qualification on the grounds of bias. As stated earlier in this decision, the Tribunal, in its oral ruling, confirmed that the Tribunal would consider the evidence and submissions of the parties

respecting the issue of bias, as it relates to the weight to be given to Ms. Laurie's evidence.

Issue 3: Whether the renewable energy approval process violated the Appellants' right under section 7 of the Charter to security of the person

[460] The Appellants allege that the renewable energy approval process violates their right to security of the person under s.7 of the *Charter*.

[461] Section 7 of the *Charter* provides:

7. Everyone has the right to life, liberty and security of the person and the right not to be deprived thereof except in accordance with the principles of fundamental justice.

[462] The Appellants request a remedy under s. 24(1) of the *Charter* and s.52(1) of the *Constitution Act, 1982* which provide:

24. (1) Anyone whose rights or freedoms, as guaranteed by this Charter, have been infringed or denied may apply to a court of competent jurisdiction to obtain such remedy as the court considers appropriate and just in the circumstances.

52. (1) The Constitution of Canada is the supreme law of Canada, and any law that is inconsistent with the provisions of the Constitution is, to the extent of the inconsistency, of no force or effect.

[463] A legal analysis of s. 7 of the Charter involves two steps: first, a determination of whether the legislation causes a deprivation of the right to security of the person; and second, a determination of whether the deprivation is in accordance with the principles of fundamental justice.

[464] The provisions of the *EPA* that are challenged in this appeal are the following.

47.5 (1) After considering an application for the issue or renewal of a renewable energy approval, the Director may, if in his or her opinion it is in the public interest to do so,

- (a) issue or renew a renewable energy approval; or
- (b) refuse to issue or renew a renewable energy approval.

Terms and conditions

(2) In issuing or renewing a renewable energy approval, the Director may impose terms and conditions if in his or her opinion it is in the public interest to do so.

Other powers

(3) On application or on his or her own initiative, the Director may, if in his or her opinion it is in the public interest to do so,

- (a) alter the terms and conditions of a renewable energy approval after it is issued;

- (b) impose new terms and conditions on a renewable energy approval; or
- (c) suspend or revoke a renewable energy approval.

Same

- (4) A renewable energy approval is subject to any terms and conditions prescribed by the regulations.

142.1 (1) This section applies to a person resident in Ontario who is not entitled under section 139 to require a hearing by the Tribunal in respect of a decision made by the Director under section 47.5.

Same

- (2) A person mentioned in subsection (1) may, by written notice served upon the Director and the Tribunal within 15 days after a day prescribed by the regulations, require a hearing by the Tribunal in respect of a decision made by the Director under clause 47.5 (1) (a) or subsection 47.5 (2) or (3).

Grounds for hearing

- (3) A person may require a hearing under subsection (2) only on the grounds that engaging in the renewable energy project in accordance with the renewable energy approval will cause,
- (a) serious harm to human health; or
 - (b) serious and irreversible harm to plant life, animal life or the natural environment.

[465] During the preliminary stages of this proceeding, the Director brought a motion for an order striking the Appellants' claim for constitutional relief, on the basis that the s. 142.1 challenge was too vague, and that the Tribunal does not have jurisdiction to consider the constitutionality of s. 47.5. The Tribunal issued an order on August 15, 2013, with reasons issued September 6, 2013, dismissing that motion. With respect to the challenge to s. 47.5 of the *EPA*, the Tribunal made no ruling on the jurisdictional argument. It observed at para. 43 that "the focus of the constitutional claim relates to s. 47.5 only to the extent that it relates to the grounds stated in s. 142.1," and therefore the Tribunal "need not determine whether it has jurisdiction to consider a constitutional challenge to this more narrow aspect of s. 47.5. In effect, a determination of the constitutionality of s. 142.1 in this case will result in a similar legal effect for the challenged aspects of s. 47.5." The parties in this case, therefore, brought evidence and argument related to both challenged sections of the *EPA*, and the Tribunal has considered them only to the extent that they relate to the grounds stated in s. 142.1.

[466] The following passages from Mr. Sanford's Notice of Constitutional Question, which the other Appellants support, outline the basis for the challenge:

4. The legislative scheme for granting approvals to wind farm projects violates the Applicant's right to security of the person as guaranteed

by section 7 of the *Charter* in that approvals can be issued to project proponents notwithstanding the known adverse health effects.

5. Industrial wind turbines (IWT's) are recognized for causing a range of serious health effects such as sleep disturbance, headache, tinnitus, ear pressure, dizziness, vertigo, nausea, visual blurring, tachycardia, irritability, problems with concentration, and so on, particularly when IWTs are erected within 2 kilometres of an occupied residence.
6. As a result of the regulatory process which does not require the project proponent to establish that there are no adverse health effects associated with IWTs, it is clear that there will be health effects that will violate the section 7 rights of the Applicant.
7. Furthermore, reversing the burden of proof in circumstances where there *is* evidence of adverse health effects is itself a violation of s. 7.
8. The Director has the discretion to grant or refuse approval of a renewable energy project. The Director's decision *must* conform to the *Charter*. By approving this project the Director has violated the Applicant's right to security of the person and such violation is not in accordance with the principles of fundamental justice.

[467] In addition, the following three paragraphs in the joint written submissions by all the Appellants also assist in understanding their constitutional challenge (emphasis added):

- The Appellants argue that “**permitting the Project as set out in the REA** puts the Appellants’ physical and psychological integrity at risk, directly and indirectly, thereby depriving them of their right to security of the person.” (para. 20)
- “In sum, the Appellants are at risk of serious physical and psychological harm as a **result of the approval of the Project pursuant to the REA provisions of the EPA.**” (para. 88)
- In reply submissions, the Appellants clarify that they “assert a **right not to be placed in harm’s way by state action**, which is a right the Charter protects.”

[468] Thus, the Appellants argue that it is the process by which the approval is issued, pursuant to the renewable energy legislative provisions, that deprives them of their right to security of the person.

[469] The Director and Approval Holder argue there is no deprivation of the Appellants’ right to security of the person. The Director includes three reasons for this position:

- For s. 7 to be engaged, the impugned laws must actively cause a serious harm to physical health or create serious state-imposed psychological stress. The impugned legislation in this case does not cause a deprivation of rights;

- For s. 7 to be engaged, the deprivation must be “serious”. Taking the Appellants’ evidence at its highest, the harm to human health in this case does not rise to the level of serious; and
- Even if s. 7 is engaged, the Appellants must prove a serious harm. They have not discharged their onus of proving serious harm to human health at a 550m setback/40 dBA sound level limit.

[470] The Appellants disagree with the Director’s position that s. 7 creates no positive obligation on the state to ensure security of the person. The Appellants argue that the courts have found a s. 7 violation where there was only indirect state action. Further, the Appellants argue that an increased risk of serious harm has been found to be sufficient for a s.7 violation.

[471] The Tribunal’s s. 7 analysis is structured according to the following three sub-issues:

- (a) Whether s. 7 of the Charter is engaged due to state action.*
- (b) Whether the deprivation of security of the person is serious.*
- (c) Whether the Appellants have proven that the impugned provisions or government conduct will cause serious psychological or physical harm (i.e., has the Appellant proven the harm exists, or simply a risk of harm?)*

[472] As discussed below, the Tribunal finds that, assuming that the *Charter* is engaged, the Appellants have not established that there would be a serious deprivation of security of the person, nor that the impugned provisions or government conduct would cause serious psychological or physical harm. Consequently, it is not necessary to make a finding whether the *Charter* is engaged due to state action. However, as this Tribunal received extensive submissions respecting sub-issue (a), the Tribunal has included a review of these submissions in this decision.

Sub-issue (a): Whether s. 7 of the Charter is engaged due to state action

Submissions

[473] The Appellants argue that the Supreme Court of Canada has not determined that s. 7 may never create a positive obligation on government to ensure the rights listed therein, but has consciously left the door open for such a finding. In support of its position, the Appellants cite Madam Justice Arbour’s dissent in the case *Gosselin v. Attorney General for Quebec*, [2002] 4 S.C.R. 429 (“*Gosselin*”). Paragraphs 308 and 309 of her dissent in that decision read:

[308] I would allow this appeal on the basis of the appellant's s.7 *Charter* claim. In doing so, I conclude that the s.7 rights to "life, liberty and security of the person" include a positive dimension. Few would dispute that an advanced modern welfare state like Canada has a positive moral obligation to protect the life, liberty and security of its citizens. There is considerably less agreement, however, as to whether this positive moral obligation translates into a legal one. Some will argue that there are interpretive barriers to the conclusion that s.7 imposes a positive obligation on the state to offer such basic protection.

[309] In my view these barriers are all less real and substantial than one might assume. This Court has never ruled, nor does the language of the *Charter* itself require, that we must reject any positive claim against the state – as in this case – for the most basic positive protection of life and security. This Court has consistently chosen instead to leave open the possibility of finding certain positive rights to the basic means of subsistence within s.7. In my view, far from resisting this conclusion, the language and structure of the *Charter* – and of s.7 in particular – actually compel it. (emphasis in the original)

[474] Further, the Appellants draw an analogy between the fact situation in *New Brunswick (Minister of Health and Community Services) v. G(J)*, [1993] 3 S.C.R. 46 ("G(J)"), referred to by Justice Arbour in her dissent, and the present case. In *G(J)*, a child was removed from the custody of the child's parents. The Supreme Court of Canada held that in the ensuing court proceedings, the failure of the state to provide legal aid to the child's parents engaged their s. 7 right to security of the person. The Appellants draw the analogy that the state acted by issuing the REA for the Project; the subsequent failure of the province to provide for safe set-back distances and/or to conduct studies that prove the safety of the Project then engage the Appellants' s. 7 rights.

[475] The Appellants also argue that s. 7 can be engaged where the harm is caused by state action in an indirect way, citing *Bedford v. Canada (Attorney General)*, 2010 ONSC 4264, affd 2012 ONCA 186 (upheld by the Supreme Court of Canada on December 20, 2013) ("*Bedford*"). *Bedford* addressed a claim that, by prohibiting prostitutes from taking certain actions that were protective of their health, such as working indoors, the state increased a risk of harm to sex workers. In that case, the Ontario Court of Appeal found s. 7 to be engaged despite the fact that it was the behaviour of the clients that directly caused the harm, not state action. Drawing a parallel to the present case, the Appellants argue that the Province does not need to own the turbines, in order to indirectly cause a harm sufficient to deprive the Appellants of their s. 7 right to security of the person.

[476] The Director and the Approval Holder submit that there is an established line of cases from the Supreme Court of Canada stating that s. 7 of the *Charter* does not

provide a “freestanding right” to security of the person. Only state action (i.e., legislation) that limits the right to life, liberty and security of the person will attract s. 7 scrutiny. They agree that the Supreme Court has determined that security of the person under s. 7 of the *Charter* protects against state interference with the physical and psychological integrity of the individual.

[477] The Director points out that Madam Justice Arbour’s dissent in *Gosselin* has been discussed but not been followed in subsequent Supreme Court jurisprudence. The Director notes that the majority opinion in *Gosselin* is stated in para. 81, by Chief Justice McLachlin:

Even if s. 7 could be read to encompass economic rights, a further hurdle emerges. Section 7 speaks of the right not to be deprived of life, liberty and security of the person, except in accordance with the principles of fundamental justice. Nothing in the jurisprudence thus far suggests that s. 7 places a positive obligation on the state to ensure that each person enjoys life, liberty or security of the person. Rather, s. 7 has been interpreted as restricting the state’s ability to deprive people of these. Such a deprivation does not exist in the case at bar. (emphasis in the original)

[478] McLachlin, C.J. goes on to recognize that the Constitution is a “living tree” such that the current interpretation of s. 7 is not frozen, and that “one day it may be interpreted to include positive obligations” (para. 82). The Director argues, however, that thus far the Court has consistently refused to interpret it in that way and in every case where s. 7 has been engaged, there has been a legislative prohibition on conduct.

[479] The Director argues that the case of *G(J)*, relied on by the Appellants, is not an example of the Court recognizing positive rights because there was a “profound” state-imposed deprivation of a s. 7 right (serious psychological harm through removal of the litigant’s child), and for that reason it was found that legal aid funding had to be extended to the parents.

[480] Similarly in *Chaoulli v. Quebec (A.G.)*, [2005] 1 S.C.R. 791 (“*Chaoulli*”), the Quebec provincial legislation in question prohibited people from obtaining private health care where it was established on the evidence that people died while on public health care waiting lists. It was the fact that the legislation deprived citizens of the opportunity to seek alternative forms of health care, that engaged s. 7.

[481] The Approval Holder argues that the Appellants are incorrect in their submissions that the Ontario Court of Appeal in *Bedford* expanded the scope of state action that is proscribed by s. 7, to indirect effects. Rather, the Approval Holder argues that the Court

of Appeal in that case found a direct link between the Criminal Code provisions and the impact on security of the person.

[482] The Director argues that *Bedford* is also an example of state prohibition engaging the s. 7 right. There, the impugned provisions criminalized basic actions that sex workers might take to reduce their risk of physical harm. In para. 111, the Court of Appeal notes:

On the facts as found by the application judge, each of the provisions criminalizes conduct that would mitigate, to some degree, the risk posed to prostitutes. On those findings, the relevant Criminal Code provisions, individually and in tandem, increase the risk of physical harm to persons in engaged in prostitution, a lawful activity.

Discussion of sub-issue (a)

[483] The Supreme Court of Canada has consistently found that s. 7 of the *Charter* protects only against state-imposed deprivations of security of the person and rejected arguments that s. 7 can apply in the absence of a prohibition that deprives a person of a protected right. Examples of the approach include *Gosselin* and *Chaoulli*. The Supreme Court of Canada decision in *Canada (Attorney General) v. Bedford*, 2013 SCC 72, which was issued after final submissions had been filed in this proceeding, upholds the Ontario Court of Appeal decision which was extensively referred to and cited by the parties, and is consistent with this pattern.

[484] The following passage from *Flora v. Ontario (Health Insurance Plan, General Manager)*, 2008 ONCA 538 (“*Flora*”), a case where Mr. Flora alleged that a refusal by the Ontario Health Insurance Plan (“OHIP”) to reimburse him for an out-of-country medical treatment for liver cancer violated his right to security of the person, helps clarify the distinction between state conduct which might infringe s. 7 by imposing a legal prohibition, and other forms of state conduct:

In *Chaoulli*, *Morgentaler* and *Rodriguez*, but not in Mr. Flora’s situation, the state took action to prohibit something. The prohibition in these cases meant that the individual was not allowed to take his or her desired course of control over his or her own health without suffering consequences imposed by the state (*Chaoulli* at para. 122). These are all very much cases essentially dealing with freedom “from” state interference in the manner in which individuals arrange their health care. While the decision by the state to fund or not to fund a particular course of treatment may certainly impact a person’s s. 7 interests, such an effect is not the type of infringement contemplated by s. 7. If it were, it would seem that the burden on the government would be limitless.

[485] The Supreme Court of Canada has expressed the *caveat*, as noted in Chief Justice McLachlin’s comments at para. 82 in *Gosselin*, that s. 7 may be interpreted

more expansively in the future. This *caveat* was expressed by Cronk, J.A. of the Ontario Court of Appeal in *Flora* as “s. 7 may one day be interpreted to include positive obligations in special circumstances where, at a minimum, the evidentiary record discloses actual hardship” (at para. 105).

[486] It is not a straightforward exercise in this case, however, to determine whether or not the alleged deprivation is attributable to the state. As Madam Justice Arbour observed in *Gosselin*: “It may also be the case that no such definitive state action can be located in the instant appeal, though this will largely depend on how one chooses to define one’s terms and, in particular, the phrase “state action”.” (para. 319)

[487] The Appellants argue that they “do not assert a positive right to a constitutionally-mandated process for restricting the development of IWTs. The Appellants assert a right not to be placed in harm’s way by state action, which is a right that the Charter protects.” Further, the Appellants argue that “(t)he legislative means chosen to implement the decision to permit IWTs do cause or increase the risk of serious harm to the Appellants, at the hands of the state. There are known health effects associated with placing IWTs within 550 metres of human beings.”

[488] The Director and the Approval Holder argue that it is not state action that “places” the Appellants “in harm’s way” (even if this were made out on the facts). They argue that renewable energy projects are private businesses, not government projects. On the contrary, they argue the renewable energy approval process is *protective* of human health by requiring set-backs and maximum sound levels for these private projects. The Approval Holder argues that the renewable energy approval regime prohibits wind projects to start with, unless they meet certain criteria, including an onerous, prescriptive process, intensive review, and an appeal process open to any person. The Approval Holder argues that the Appellants’ real complaint here is that the protective measures should be more rigorous, which, it suggests, is an assertion of a right to positive state action.

[489] The Approval Holder submits: “In stark contrast to the legislation at issue in such cases as *Morgentaler*, *Rodriguez*, *Chaoulli*, *Bedford* and *PHS*, the REA process imposes no prohibitions on individuals that would interfere with a person’s ability to take control over his or her own body or impose serious psychological stress.”

[490] The Director argues that, unlike in *Bedford*, the alleged harm here is not state-imposed. Rather, the current situation is more like *Flora*, noted above. At issue there was a section in the regulation that had been amended to alter the test for OHIP funding, such that under the earlier version of the regulation Mr. Flora would have

qualified for reimbursement for out-of-country medical treatment, but he did so no longer. The Ontario Court of Appeal found at para. 101 that the regulation in question “does not prohibit or impede anyone from seeking medical treatment”:

Section 28.4(2) neither prescribes nor limits the types of medical services available to Ontarians. Nor does it represent governmental interference with an existing right or other coercive state action. Quite the opposite. Section 28.4(2) provides a defined benefit for out-of-country medical treatment that is not otherwise available to Ontarians – the right to obtain public funding for certain specific out-of-country medical treatments. By not providing funding for all out-of-country medical treatments, it does not deprive an individual of the rights protected by s.7 of the *Charter*.

[491] Further, the Director argues that *Flora* clarifies the principle that a *Charter* breach is not made out where a change in law allegedly takes away privileges that were available under an earlier law. In this regard the Ontario Court of Appeal in *Flora* cites *Ferrel v. Ontario (Attorney General)* (1998), 42 O.R. (3d) 97 at p.110, as follows: “If there is no constitutional obligation to enact [the legislation at issue] in the first place, I think that it is implicit, as far as the requirements of the constitution are concerned, that the legislature is free to return the state of the statute book to what it was before [the impugned legislation].” On this point, the Director argues that if you strip away the regulatory protections such as set-back requirements and appeal rights, the only protections otherwise available to Ontarians are under the common law, not the *Charter*. Thus, it does not assist the *Charter* argument for the Appellants to claim that they have less protection under the current regime than under the pre-renewable energy approval regime.

[492] The Approval Holder argues that the renewable energy approval process promotes and protects human health, including by:

- promoting renewable energy to protect the environment, including human life;
- establishing a mandatory application process for renewable energy projects, which includes, among other things, (i) an extensive consultation process; (ii) adherence to setback requirements; and (iii) demonstrated management of potential environmental effects;
- requiring compliance with the Noise Guidelines;
- requiring the Director to form an opinion as to whether it is in the public interest to issue a renewable energy approval;
- conferring on the Director significant continuing powers over renewable energy projects;

- conferring a wide right of appeal to a specialized tribunal for a specific, independent and fresh review of whether the project, as approved, will cause serious harm to human health;
- conferring a further right of appeal to the Minister of the Environment, for a further consideration of the public interest.

[493] The Tribunal finds that the core of the Appellants' claim is that greater protections are required for human health than what are currently provided for under the requirements for renewable energy approvals. This claim applies to **all** renewable energy approvals, not just the current Project, despite the fact that under the legislative scheme it is the approval for the Project that is under appeal to the Tribunal.

[494] Such a characterization might lend itself to a finding that the current appeal is analogous to the OHIP case of *Flora*; that is, the impugned sections of the *EPA* are protective of security of the person, rather than causing a deprivation of a freestanding right.

[495] At the same time, the demand for greater health protections only arises because of the Director's decision to allow a wind project in an area where it did not previously exist. The Appellants argue that the protections built into the approval are insufficient **in the context of** a project that is being allowed to proceed. In this regard the present case is more akin to *G(J)*, where the state action in allowing the Project necessitates sufficient protections to prevent harm to human health. Viewed in this manner, it is the Director's decision, or the statutory scheme that has charged the Director with making this decision based on "public interest" factors, that would engage s. 7.

[496] As noted above, the Tribunal finds that it is not necessary to determine which characterization is more appropriate in this case, in light of its findings respecting sub-issues (b) and (c). Either characterization may be argued and considered by the Tribunal in future.

Sub-issue (b): Whether the deprivation of security of the person is serious.

[497] As noted above, for the purposes of analysis of this sub-issue, the Tribunal assumes that s. 7 is engaged due to state action in this case.

[498] The Approval Holder cites the Supreme Court of Canada decision in *Blencoe v. British Columbia (Human Rights Commission)*, [2000] 2 SCR 307 ("*Blencoe*") for the proposition that state action is a deprivation of security of the person only when it interferes "with an individual interest of fundamental importance" (at paras. 81-83).

[499] The Director argues that the Supreme Court of Canada has been clear in holding that the right to security of the person is not engaged by ordinary stresses and anxiety, citing Chief Justice Lamer in *G(J)*.

[500] The Approval Holder referred to two Supreme Court of Canada decisions in particular, as illustrative of what is, and what is not, serious harm engaging s. 7. In *Chaoulli*, the Court found that the anxiety associated with waiting for health care could “have a serious and profound effect on a person’s psychological integrity”, and therefore s. 7 was engaged. The evidence in that case was that patients had died as a result of waiting lists for public health care. On the other hand, the Court found in *Blencoe* that depression, anxiety and psychological problems associated with a delay in having a human rights complaint heard did not engage s. 7. In that case, the Approval Holder submits, the delay and associated psychological impacts did not interfere with an individual interest of fundamental importance.

Findings on sub-issue (b)

[501] The Tribunal agrees with the Approval Holder and Director, that harm must be “serious” in order to engage s. 7. As the Supreme Court of Canada held in *Chaoulli* at para. 123:

Not every difficulty rises to the level of adverse impact on security of the person under s. 7. The impact, whether psychological or physical, must be serious.

[502] See also *Blencoe*, at para. 81:

In order for security of the person to be triggered ... the impugned state action must have a serious and profound effect on the respondent's psychological integrity.

[503] The Chief Justice in *G(J)* explained the threshold in a more fulsome way, at paras. 59 – 60:

Dickson C.J. in *Morgentaler*, *supra*, at p. 56, suggested that security of the person would be restricted through “serious state-imposed psychological stress” (emphasis added). Dickson C.J. was trying to convey something qualitative about the type of state interference that would rise to the level of an infringement of this right. It is clear that the right to security of the person does not protect the individual from the ordinary stresses and anxieties that a person of reasonable sensibility would suffer as a result of government action. If the right were interpreted with such broad sweep, countless government initiatives could be challenged on the ground that they infringe the right to security of the person, massively expanding the scope of judicial review, and, in the process, trivializing what it means for a right to be constitutionally protected [emphasis in original]

For a restriction of security of the person to be made out, then, the impugned state action must have a serious and profound effect on a person's psychological integrity. The effects of the state interference must be assessed objectively, with a view to their impact on the psychological integrity of a person of reasonable sensibility. This need not rise to the level of nervous shock or psychiatric illness, but must be greater than ordinary stress or anxiety.

[504] As discussed above, the Appellants brought evidence in this case that some people will be annoyed by wind turbine projects. As noted in the Tribunal's findings in the health section above, whether a person will be annoyed by wind turbine noise at 40 dBA is a subjective reaction which cannot be predicted with any accuracy, and the impact of that annoyance on the person's health status is not clear.

[505] As concluded in the WHO (Europe) 2011 Report, annoyance is difficult to define. While it may be that severe and prolonged annoyance may lead to stress-related physical effects in some cases, the evidence before the Tribunal in this case does not make even that qualified a connection between possible stress-related physical effects and wind turbines, where noise is limited to 40 dBA.

[506] On the evidence before us, the Tribunal finds that the annoyance referred to in the Howe study is a subjective psychological state. According to the Supreme Court of Canada in *Blencoe*, an interference with psychological integrity must have a "serious and profound effect on psychological integrity", to engage s. 7 of the *Charter*. The Appellants in this case have not established human health effects through annoyance to be more significant than "ordinary stress or anxiety", as discussed in *Blencoe*.

[507] Supreme Court of Canada jurisprudence has stated that physical harm must be "serious" to engage s. 7. If annoyance were accepted to have physical effects, which was not established on the evidence, those effects would have to be serious to engage s. 7. The Tribunal finds the evidence in this proceeding does not rise to the level of seriousness required to engage s. 7.

[508] With respect to the post-turbine witness' evidence, as noted above it has not been established that the health complaints they assert are causally connected to wind turbines, including those resulting from annoyance caused by wind turbines.

[509] In conclusion, the Tribunal finds that the Appellants have not established that annoyance could be considered serious for either of the tests sought to be met: s. 145.2.1(2)(a) of the *EPA* "serious harm to human health", or serious enough for s. 7 of the *Charter* to be engaged (i.e., "serious" from *Chaoulli* para. 123, or "serious and profound effect on psychological integrity" from *Blencoe* para. 81).

Sub-issue (c): Whether the Appellants have proven that the impugned provisions or government conduct will cause serious psychological or physical harm (has the Appellant proven the harm exists, or simply a risk of harm?)

[510] As noted above, for the purposes of analysis of this sub-issue, the Tribunal assumes that s. 7 is engaged due to state action in this case. The Appellants argue that the Supreme Court has found s. 7 of the *Charter* to be engaged where a risk of harm is established. They refer to *Bedford* (Criminal Code provisions preventing sex workers from taking steps to protect their health and safety), *Chaoulli* (risk of harm due to waiting lists for health care), and *PHS Community Services Society v. Canada (Attorney General)*, [2011] 3 S.C.R. 134 (“*Insite*”) (decision to close safe injection site increases risk to intravenous drug users), as support.

[511] The Appellants argue the Constitution should be given a generous interpretation (*R. v. Big M Drug Mart*, [1985] 1 S.C.R.295 at 344).

[512] The Director argues that proving a risk of harm is not sufficient; rather, that real harm must be proven to be caused by the provision in question. The Director argues that, in cases where a “risk of harm” was established, such as the *Insite* and *Bedford* cases, the impugned prohibitions were proven to cause an increased risk of serious harm in circumstances where an existing serious harm has already been proven.

[513] In *Insite*, the Court's finding of a deprivation of security of the person was grounded in the trial judge's finding of fact that there was a pre-existing risk of serious physical harm from drug addiction and the injection of drugs. The Court recognized that “[t]he risk of morbidity and mortality associated with addiction and injection is ameliorated by injection in the presence of qualified health professionals” and that the criminal prohibition (without an exemption) increased that risk. The Court in that case concluded that where a law “creates a risk to health by preventing access to health care, a deprivation of the right to security of the person is made out.” (*Insite*, para. 93)

[514] Similarly, in the case of *Chaoulli* (para. 123):

... because patients may be denied timely health care for a condition that is clinically significant to their current and future health, s.7 protection of security of the person is engaged. ... As we noted above, there is unchallenged evidence that in some serious cases, patients die as a result of waiting lists for public health care. ... The evidence here demonstrates that the prohibition on health insurance results in physical and psychological suffering that meets the threshold requirement of seriousness.

[515] The Director argues that, in *Bedford*, the Ontario Court of Appeal found that by prohibiting prostitutes from working at home and hiring a bodyguard, the legislation

increased pre-existing, inherent risks involved in the profession of prostitution, including physical violence or death (upheld by the Supreme Court of Canada).

[516] The Director argues that the risk of a known harm was proven in each of the cases where s. 7 was found to be engaged. By contrast, the Director argues that the Appellants in this case have no such evidentiary basis.

[517] The Approval Holder argues that *Charter* jurisprudence has consistently relied on expert evidence to establish the harm. In this regard the Approval Holder cites the Federal Court decision in *Truehope Nutritional Support Ltd. v. Canada (Attorney General)* 2011 FCA 114 (CanLII), para. 89, which held that determining whether psychological prejudice engages the right to security of the person requires “a critical analysis of not only [the plaintiff’s] subjective evidence but also relevant objective evidence with respect to the content of [the plaintiff’s] subjective claim in order to determine the weight to be given to [the] subjective evidence.”

Findings on sub-issue (c)

[518] The Tribunal finds that in all of the Supreme Court of Canada cases where a risk of harm has engaged s. 7 of the *Charter*, the “risk of harm” described is with respect to a proven pre-existing harm. In this case, the “risk of harm” is better characterized as a risk that a harm may result from a wind turbine project operating at the established decibel limit; not that a known harm has an increased chance of occurring. Tribunal decisions on wind energy appeals have consistently noted the lack of current scientific evidence establishing a causal link at regulated noise levels and setbacks, and indeed Health Canada has instigated a study on this topic in order to better understand the effects, if any, of wind turbines on human health.

[519] The Tribunal finds that the state of the evidence in this case is on all fours with *Operation Dismantle v Canada*, [1985] 1 SCR 441 (“*Operation Dismantle*”), where the Supreme Court stated:

Section 7 of the *Charter* cannot reasonably be read as imposing a duty on the government to refrain from those acts which might lead to consequences that deprive or threaten to deprive individuals of their life and security of the person. A duty of the federal cabinet cannot arise on the basis of speculation and hypothesis about possible effects of government action. Such a duty only arises, in my view, where it can be said that a deprivation of life and security of the person could be proven to result from the impugned government act. (at para 29)

[520] Consequently, the Tribunal finds that the Appellants have not established that the impugned provisions or government conduct will cause serious psychological or physical harm.

Summary of Findings on Issue 3

[521] Assuming, without deciding, that wind turbines will cause annoyance in a percentage of the population consistent with Mr. Howe's report, the Appellants have nevertheless not established that annoyance per se constitutes serious harm to human health, or even that this Project will cause any health impacts at the set-back distances and sound pressure levels mandated. Annoyance per se has not been proven to be a health effect, and is too vague a concept to be considered serious harm so as to engage s. 7 of the *Charter*. The constitutional challenge therefore fails on the evidence.

[522] Given the Tribunal's finding that s. 7 of the *Charter* is not engaged due to lack of an evidentiary foundation of serious harm, there is no need to proceed to the second stage of the analysis relating to whether the deprivation is in accordance with the principles of fundamental justice.

DECISION

[523] The Tribunal finds that the Appellants have not established that engaging in the Project as approved will cause serious and irreversible harm to plant life, animal life or the natural environment.

[524] The Tribunal finds that the Appellants have not established that engaging in the Project as approved will cause serious harm to human health.

[525] The Tribunal finds that the Appellants have not established, on the facts of this case, that the renewable energy approval process violated the Appellants' right to security of the person under section 7 of the *Charter*.

Appeals Dismissed

"Heather I. Gibbs"

Heather I. Gibbs, Panel Chair

"Dirk VandeBent"

Dirk VanderBent, Vice-Chair

"Maureen Carter-Whitney"

Maureen Carter-Whitney, Member

Appendix A

Case Definition

The criteria for making an individual diagnosis of probable AHEs in the environs of IWTs are presented in the following paragraphs. The definition endeavors to be specific and sensitive. While the definition has not been validated formally in practice, it has proven useful. The case definition represents an important starting point for future international research collaboration. The genesis of the definition is based on a review of the literature and direct experience with those individuals experiencing AHE/IWT. It has been used to provide guidance to physicians and other primary health providers when they are asked to manage individuals following exposure to IWTs. The value of this proposal is based on the absence of a specific case definition either in the peer-reviewed or gray literature.

Diagnosis of Adverse Health Effects in the Environs of Industrial Wind Turbines

Possible adverse health effects.

Report of a change in health status by people living within 5 km of a wind farm installation. Further confirmation is required to validate or exclude AHE/IWT by establishing a medical history that satisfies the criteria identified under “Probable Adverse Health Effects” below.

Probable adverse health effects.

1. First-order criteria (all four of the following must be present):
 - (a) Domicile within 5 km of industrial wind turbines (IWT)
 - (b) Altered health status following the start-up of, or initial exposure to, and during the operation of, IWTs. There may be a latent period of up to 6 months
 - (c) Amelioration of symptoms when more than 5 km from the environs of IWTs
 - (d) Recurrence of symptoms upon return to environs of IWTs within 5 km
2. Second-order criteria (at least three of the following occur or worsen after the initiation of operation of IWT):
 - (a) Compromise of quality of life
 - (b) Continuing sleep disruption, difficulty initiating sleep, and/or difficulty with sleep disruption
 - (c) Annoyance producing increased levels of stress and/or psychological distress
 - (d) Preference to leave residence temporarily or permanently for sleep restoration or well-being

3. Third-order criteria (at least three of the following occur or worsen following the initiation of IWTs):

- (i) Otological and vestibular
 - (a) Tinnitus
 - (b) Dizziness
 - (c) Difficulties with balance
 - (d) Ear ache
 - (e) Nausea
- (ii) Cognitive
 - (a) Difficulty in concentrating
 - (b) Problems with recall or difficulties with remembering significant information
- (iii) Cardiovascular
 - (a) Hypertension
 - (b) Palpitations
 - (c) Enlarged heart (cardiomegaly)
- (iv) Psychological
 - (a) Mood disorder, that is, depression, anxiety
 - (b) Frustration
 - (c) Feelings of distress
 - (d) Anger
- (v) Regulatory disorders
 - (a) Difficulty in diabetes control
 - (b) Onset of thyroid disorders or difficulty controlling hypo- or hyperthyroidism
- (vi) Systemic
 - (a) Fatigue
 - (b) Sleepiness

Confirmed adverse health effects.

The confirmation of AHE/IWT is achieved by a clinical evaluation and physiological monitoring of individuals during exposure to IWT sonic energy or an accurate facsimile (recording or other imitative source of IWT sound). Ideally, sleep studies should be carried out in the home of people experiencing AHEs. The complex physiological monitoring equipment required for a sleep study is not readily made mobile. Accordingly, sleep studies need to be carried out in an established clinical sleep laboratory with a source of sonic energy that accurately reflects the person's exposure to IWTs.

The process may be simpler once controlled studies comparing possible victims with a nonexposed matched population are carried out. These studies could help determine

the core physiological change(s) that is (are) likely occurring to those who live in the environs of IWTs.

The need to rule out alternate explanations is the responsibility of the licensed clinician. While adherence to the criteria has resulted in no false positive diagnosis to date further validation is required.

Update to Case Definition

1. The deployment of the Diagnostic Criteria requires use by health care practitioner licensed to take a history and make diagnoses.

2. Exclusion criteria were not included in the first paper and are itemized below.

A person is to be excluded those if the individual is;

- under the age of 18
- lacking in English language skills in the verbal domain
- sufficiently cognitively impaired to be unable to answer questions reasonably and consistently
- suffering from recent illness or injury which interferes with cognitive function

3. There are 3 categories of diagnosis, possible, probable and confirmed.

“Possible” diagnosis indicates that the diagnosis of adverse health effects in the environs of industrial wind turbines (AHE/IWT) should be considered as a potential diagnosis and considered among differential diagnoses of the presenting complaints.

“Probable” diagnosis indicates that AHE/IWT more likely than not are the cause of the complaints. AHE/IWT is the working diagnosis. Other diagnostic possibilities continue to exist and should be considered in the differential diagnoses. “Confirmed diagnosis” indicates that other diagnosis are very unlikely i.e. less than one chance in twenty.

4. Among the original three orders of criteria for diagnosis of AHE/IWT i.e. First-, Second- and Third-order, the first two orders have proven consistently vigorous in practice and robust when challenged in quasi-judicial processes (example Environmental Review Tribunals or ERT). In addition the Case Definition has been cited 10 times (1) in the literature according to Google Scholar. The Third-order criteria have been misunderstood and proven to be a major focus of authors criticizing and in some instances denying the existence of AHE/IWT (Simon Chapman).