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Kentucky State Board on Electric Generation
211 Sower Boulevard
PO Box 615
Frankfort, KY 40602

Case: Wood Duck 2024-00337

To Whom It May Concern:

I would like to provide the following comments on the Sound Study by Stantec.

There are 2 distinctions that must be made to accurately assess the noise levels. First, there is the **construction noise** and then there is **operational noise** that will continue forever.

This report fails to identify any addresses in the entire report, choosing instead to use "Sound Receptors (SR)" in a random manner and then plotting them on a map in a manner which is unreadable. A person cannot look at the map and determine where the SR's are located, nor can you determine if every residence along each road has an SR. This project involves 20-30 miles of road frontage and every residence should have been evaluated. The maps are so small, the human eye cannot see locations of homes and property. However, it is clear that Stantec did not evaluate EVERY home.

Additionally, the placement of the SRs appears to be random and does not follow a consistent methodology such as "every residence along the roads which have solar panels shall be evaluated for noise" and "after EVERY residence is evaluated within the project area, then they will evaluate every residence within a 2,000 feet radius of the outside of the project boundaries." Each SR should be noted clearly on the map and every evaluation complete and concise which would allow homeowners and more importantly at this time, the commission members the opportunity to see how each homeowner is going to be affected by this project.

At no time have the non-participating, but land adjoining landowner/residents been provided with any information related to sound, glare, landscaping or traffic.

Stantec has used creative definitions and terms to reduce the decibel readings and unless the reader is paying close attention, it will not be noticed. We ask that the commission to consider these numbers.

There are also multiple omissions of data where Stantec failed to include the necessary and proper equipment and many of their ratings conflict with standard AI searches.

It is important to note that Wood Duck did not provide information about noise/sound at the information sessions held at the Cave City Convention Center and they have never presented this information to the public and in fact, the information they shared with the Barren County Planning Commission is false.

During the meeting on December 18, 2023 with the Barren County Planning commission, Wood Duck stated the following:

"A Sound study conducted by Stantec has been presented by the applicant in Attachment D. Page 9 of this study states that sound produced during normal operation of the solar farm will produce sounds heard at 47 decibels. Decibels produced during the construction phase of this project will range from 69 to 74. These decibels as they relate both indoor and outdoor activity are show on the "Noise Scale" chart including in the portion of the study." (Source: meeting minutes, page 5, #7)

These statements are blatantly false. When you review the study, it should be listed as 47 **dBa LEQ**. dBa and dBa LEQ are not the same and is purposely misleading. **Inverters will be at least 99 dBa for the life of the project, day and night.**

According to the study, Stantec used a numbering system from 1-266. They state, "One-hundred thirty (130) of the 266 residential receptors are located with in **eight** areas that meet the definition of "residential neighborhoods" according to KRS 278.700 which include populated areas of five or more acres containing at least one residential structure per acre." They listed Millstown Road, Bon Ayr, Den Drive, Bent Creek Drive, Dripping Springs Road, Apple Grove Road, Rick Road and Fairview Church Road.

So, there are **8 residential neighborhoods** in this project. Why are we adding 28 separate commercial public utility facilities in residential neighborhoods? Review what Kirkland says about residential (22 out of 27 parcels have residences, page 4). Consider what Cardno says about prime farmland. (below)

Wood Duck states in their application, "The majority of the project area is currently used for crop production or cattle grazing, so the need for extensive tree removal and earthmoving to prepare the site is anticipated to be minor."

Kirkland's data states this quiet differently. He states this is residential and the Critical Issues Analysis by Cardno states **449.37 acres of deciduous forest (section 3-1) will be destroyed** while the majority of the land is prime, state important or potentially prime farm land.

So, clearing all of this land will create a lot of noise and Stantec **failed** to list several pieces of construction equipment that will be used during this process and failed to provide evaluations for each surrounding home to the parcels which will be cleared. They have failed to disclose the lay-of-the-land and the impact it will have on residential communities.

Residents request that the noise levels be reviewed in the fact these are residential neighborhoods. **People LIVE here, there is an Amish school on Millstown Road and a business, and several people work from home.** The noise levels to clear the land and noise levels to construct and noise levels after construction have never been accurately presented.

The Stantec study states:

- SR-137 is 430 feet from an inverter.
- SR-082 is 597 feet from a substation.
- SR-154 is 83 feet away from a solar panel
- SR-137 is 243 feet from a solar panel
- SR-024-034 will be 343 feet from a solar panel. How can 10 addresses have the exact same measurement?
- SR-137 is 430 feet from an inverter
- SR-082 is 597 feet from a transformer
- SR-024-034 will be 835 feet from an inverter. How can 10 addresses have the exact same measurement?
- 17 homes are less than 2,000 feet from the transformer at the substation

This entire chart (page 4) is missing a lot of data. **We must ask for each SR, what is next to it? Is there another residence? Was every residence evaluated? How many were skipped? Why are there multiple numbers with the same footage designated? If SR-154 is 83 feet away from a solar panel, what house is the next closest and what are the ratings for 155? 156? 157? How far are each of those?**

Stantec does not disclose what is close to each one. What is next door? Did they measure next door or was this random? It would manipulate the results if they skipped a few houses. Was it random selection of properties? To evaluate “clusters” of houses fails to address other homes which will be adversely affected.

In a farming community, houses are generally not built close together, but that doesn't mean the noise isn't going to be unbearable if panels are on surrounding properties. Maybe that property was skipped also?

And the people who live at these locations do not have a clue as they have never been told.

The BIGGEST MISTAKE by Stantec

“Stantec states: Noise sensitive receptor locations were identified **within 2,000 feet** of the project boundaries by reviewing high resolution aerial imagery. ” page 3

The project boundaries go for 20-30 miles. So, did they measure everything close to the solar panels or did they go **2,000 feet away** from the solar panels, inverters, etc. to measure? Did they assess the noise level to remove the woodlands?

When you look at the maps, the red boundary line appears to be 2,000 feet **away** from the project lines. That does nothing for the houses that are within the project area along the many winding roads. There are houses next to the roads who will have panels behind and beside their homes. EVERY residence and structure within the project area should have been evaluated first, and then measured outside of the area.

This study needs to be redone to measure noise from each residence for the removal of woodlands, digging and trenching, the installation of panels and evaluated for noise and distance in relation to inverters, the transformer substation and tracking racks.

The Department of Transportation states the following:

Construction Equipment Noise

https://www.fhwa.dot.gov/ENVIRonment/noise/construction_noise/special_report/hcn04.cfm#sit

“Powered equipment, truck or power hand tools that produces a maximum sound level exceeding the following limits **shall not be used** during construction operations. The sound level limits specified are referenced to a distance of 50 feet from the equipment. Sound levels shall be measured in substantial conformity with Standards and Recommended Practices established by the Society of Automotive Engineers, Inc., including the latest revisions to SAE J366a and SAE J952b.

Where required by agencies having jurisdiction, certain noise producing work may have to be performed during other than regular working hours or only at specified periods.”

Type of Equipment	Sound Level Limits
(a) Construction and Industrial machinery, such as crawler-tractors dozers, rotary drills and augers, loaders, power shovels, cranes, derricks, motor graders, paving machines, off-highway trucks, ditchers, trenchers, compactors, scrapers, wagons, pavement breakers, compressors, and pneumatic power equipment.	90 dBa
(b) Highway Trucks	88 dBa

Wood Duck failed to include graders, dozers, augers, crawler-tractors dozers, ditchers, pavers and graders, wood chippers, etc. Wood Duck has failed to identify the number (8) and location of the laydown areas and provide specific noise assessments for each location. Wood Duck has failed to provide the accurate number of inverters, adding 10 after this report was done. Therefore, the additional 10 locations were not evaluated in this study and that is a major flaw.

Wood Duck states, “the noisiest portion of the construction includes the use of pile drivers...” It should be noted, there are over 28,500 piles to be driven and they will reach EVERY single adjoining property which is 70-80 residential properties.

In the application, the chart submitted by Wood Duck uses the incorrect dBa for a pile driver. According to AI Google, Impact pile drivers generate high levels of noise, typically ranging from 120-140 decibels (dBa) at close proximity. This noise is a significant concern in construction, especially in urban areas, as it can cause disruptions, noise complaints, and even lead to health issues. Monitoring and managing noise levels is crucial for the safety of workers and the public. Impact pile drivers can produce noise levels of 120-140 dBa at a distance of 10 feet.

Here is where Stantec manipulates the data by using converting decibels into dBa Lmax and dBa Leq.

AI Overview Lmax and Leq are both acoustic measurements, but they represent different aspects of sound. Lmax, or maximum sound level, represents the highest instantaneous sound pressure level measured during a period, while Leq, or equivalent continuous sound level, represents the average sound energy over that same period. Essentially, Lmax captures the loudest, while Leq provides a measure of the overall sound exposure. Here's a more detailed breakdown:

Lmax (Maximum Sound Level): Definition: Lmax is the highest sound pressure level measured at any point during a specific time period.

- **Purpose:** It indicates the loudest point within a sound event, like the peak of a passing vehicle or the loudest moment of a machine.
- **Measurement:** Lmax can be measured with a time-weighted setting (Fast or Slow) on a sound level meter.
- **Example:** If a car passes by, the Lmax would be the highest sound level measured during its pass-by.

Leq (Equivalent Continuous Sound Level):

- **Definition:** Leq is the average sound level over a specific time period, representing the energy of the fluctuating sound as a steady, continuous sound.
- **Purpose:** It provides a single value that represents the overall sound exposure over a period, taking into account both the intensity and duration of sounds.
- **Measurement:** Leq is calculated by averaging the sound energy over a specified time interval.
- **Example:** If measuring the noise in a factory for an hour, the Leq would represent the average sound energy experienced throughout that hour.

Key Differences: Instantaneous vs. Averaged:

Lmax captures the peak level at a specific moment, while Leq provides an average over time. An average sound level over a designated period of time.

- **Energy vs. Level:** Lmax represents the sound pressure level, while Leq represents the energy of the sound.
- **Time Dependence:** Lmax is a snapshot in time, while Leq considers the duration of the sound event.

Residents request this report be rejected for failing to include a complete list of equipment and for using definitions to create an “error” of quietness.

Many issues have been identified with the noise level, but it must be noted, that we do not know what measurements/setbacks Stantec used on every property.

It does not state if they used the numbers stated on the map legends (300 feet from an occupied structure) dated June and July 2023 or if they used the 50-20-10 setbacks approved in December 2023. This needs to be clarified because it will move the equipment closer to the homes. The notice of intent and application all reference 50-20-10.

Did Stantec measure 300 feet from an occupied structure and then move 2,000 feet outside of the boundary? Or did they take 10 feet from the property line? This needs to be clarified and corrected so that each reading is from the actual residence.

Every property owner deserves the right to know where panels will be, where inverters will be, how far to a substation, what is the predicted glare and what is the sound during construction and operation. They should also know where the layout areas will be and how that will impact their life and traffic flow during the construction.

Residents request an updated study and maps with appropriate setbacks and appropriate measurements

In the application, Wood Duck repeatedly refers to “farm noise”, yet Kirkland’s report states that only 17% of the parcels are agriculture, so 17% of 27 equals **4.5 parcels** are actual agriculture. Therefore, the remaining **23 parcels** is residential neighborhoods and are full of people living a quiet life who have had no input into the proposal of this property. There is no baseline ambient noise.

Yet, this data from Kirkland **conflicts** with the Critical Issues Analysis by Cardno which states they identified 39 soil map units and according to their own study, most of this land is PRIME, STATEWIDE IMPORTANCE OR POTENTIAL PRIME LAND. Section 3-5

- 10 – soils are PRIME farmland
- 11 - Farmland of statewide importance
- 11 - not prime farmland
- 7 – are PRIME land, if drained or managed in some manner
- 39 total

So, does this mean we have abundance of residential areas on prime farmland in the project area? Why are we destroying this? Farmland should only be used as a last resort, after all strip mines, brownfields and parking lots are covered.

Therefore, the measurements performed by Stantec, are at best a **guess** and certainly not conclusive.

Stantec **failed** to evaluated the layout areas and each inverter location (it was only 25 at the time this report was prepared, so **3 parcels have not been studied**) is a gross error in project noise assessment. How close are houses to the layout areas and what should they expect?

Stantec states noise sensitive receptors were considered to include residences, schools, churches, hospitals, parks and cemeteries. (page 3, section 4.1). It does not define if the measurements are from an “occupied structure” or a “property line” or outside of the project boundary.

Residents request that Stantec evaluate each address **within** the project area and at least 2,000 feet from the project area. Every residence in the project area should be considered first. Then, move 2,000 feet outside of the project boundaries.

Residents request that Wood Duck provide **each** property owner **within** the project and **adjacent too**, for at least 2,000 feet outside of the project boundaries, a map with exact measurements detailing the distances from their home to **a solar panel, an inverter and the transformer substation** with the applicable **noise** (dBa and not dBa Leq) and **glare** readings. This should also include layout areas and information relating to traffic to help families prepare for transportation concerns. This should also include water tanks and fuel tanks.

Additionally, once this information is available, each homeowner's information should be reviewed to ensure that is adequate landscaping around their home to protect their property and to shield them from noise and dust.

Distances to non-occupied structures should also be included and allowances made for structures with animals. Landowners with animals need to know expectations so they can protect their investments.

This will clarify any misunderstanding and confusion on the maps, the distances, the numbers, etc. So, when construction starts, there will be no discrepancies or confusion and residents know what to expect.

The Stantec study for glare used latitude and longitude quadrants while the Stantec study for sound used "sound receptors" which are numbered structures along the roads and the maps do not identify the roads, so one cannot determine addresses. **Stantec should combine their systems to allow easy readability by the public.**

Stantec needs to use parcels and addresses so one can easily understand the impact of the project and how it will be designed.

Kirkland used last names and parcel numbers, which can't be related to the sound and glare studies, so there is no way to cross reference.

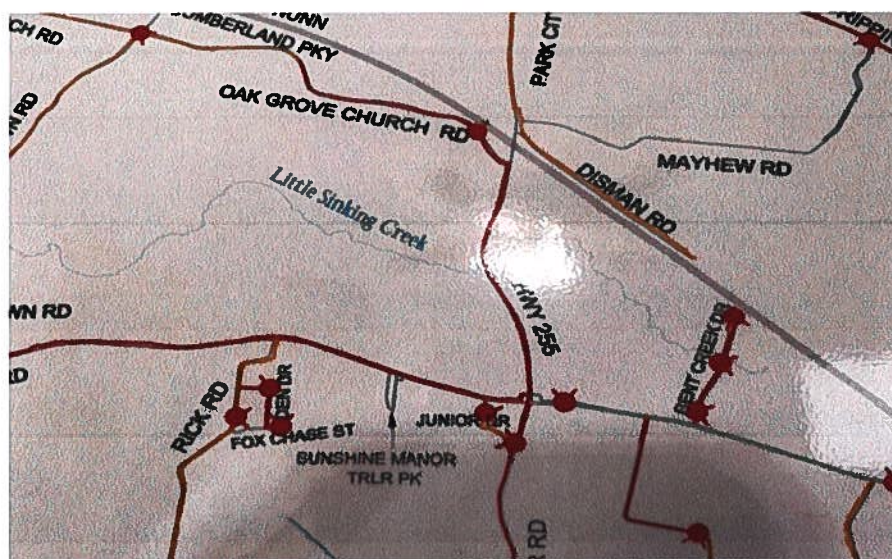
Perhaps designed to confuse?

Stantec states **130 of the 266 receptors fell within neighborhoods**, but it does not state they evaluated every home within the project area OR every property that adjoins the project area,

NOR did they evaluate every road within the project area. They should have evaluated every road in the project area and every property within the project area. This is a design flaw.

Several of the roads they analyzed (Den Drive and Bent Creek Drive), while meeting the definition of “neighborhood” they ignored the fact, there are other houses that will be just as close to panels and inverters, but do not fit within the definition of “neighborhood.” That does not negate the noise impact. See map for where these two roads are located. There are panels all around.

To simply evaluate “clusters” of houses fails to address other homes which will be adversely affected. The chart on page 12 fails to identify addresses, so we have no clue as to which Barren County residents will have solar panels within 83 feet, 243 feet, and 343 feet, etc. of their home. This is outrageous. The report doesn’t clarify if the measurements are from the occupied structure or the property line or the property address.



Solar panels are to be on Rick Road, 68-80, Waller Road, Highway 255, Oak Grove Church Road, Disman Road, Mayhew Road, etc. They ignored these roads and many homes have solar panels in their back and front doors.

Since Stantec did not identify the addresses by the SR numbers, it is impossible to know if they are even in the project area and they did not test every property that adjoins the development.

Additionally in this report, Stantec failed to address the noise from the motors that move the panels. The “small 24-volt brushless DC motors to track the arc of the sun.” Is this electric power or a battery? A 24-volt brushless DC motor is an electric motor that uses DC (direct current) power and is driven by an electronic controller instead of physical brushes. It's not a battery itself, but rather a component that requires a battery or other DC power source to operate. As stated previously, batteries are not acceptable to the residents of Barren County.

Stantec has listed the incorrect dBA for the tracking system. The NexTracker data sheets states 79 dBA. Stantec states “the nearest receptor (SR-154) will be at 38 dBA at 83 feet. In Stantec’s report on page 4 of Appendix A, states it is 38 dBA Leq. So, what this means is, it will be 79 dBA all day long, with a very short distance of 83 feet.

Notice how none of these are measured at 300 feet from an occupied structure as the map legend states it will be???? Why are there any solar panels less than 300 feet from homes?

The report states ONE receptor (SR-082) is approximately 597 feet away (from the substation transformer), which equates to a sound level of 45 dBA Leq, comparable to a quiet urban nighttime.” Page 13 Stantec’s sound study on page 1 states the substation transformer is 105 dBA. What a discrepancy and a manipulation of definitions to lower the noise levels!

However, the chart on page 12 lists residences SR-062-SR- 086 in Bent Creek neighborhood. Which is an additional 24 houses within 597 feet of the transformer. These are of the homes they measured, and again, we do not know how many they did not measure. How can 24 homes have the same distance?

Also, there are 36 houses in the Bon Ayr Neighborhood (SR-087-089, 091-103, 180-196, 246-248, 252-25) which are 648 feet from the substation transformer. These are of the homes they measured, and again, we do not know how many they did not measure. How can 36 homes have the same distance?

Notice how all are these are less than 1,000 feet as proposed by KRS. Again, without addresses, it is obvious they did not evaluate every address within the project area and simply evaluated “neighborhoods” which leaves all other homes unevaluated, but potentially adversely affected.

The substation step-up transformer is listed at 105 dBA. And even in their misguided study, at least 60 homes are within 648 feet of 105 dBA, which will run continuously and is considered a high noise level.

Residents request this study be excluded for the inconsistencies and omissions. Why are they hiding so much information?

Inverters have been established at 99 dBA per Stantec’s study, see page 1. “...each inverter at full load is 99 decibels.” This is a huge difference. This is not a vacuum cleaner. This is not a hum. Wood Duck listed 75 in the application. Why the discrepancy of 24 decibels?

The locations of the inverters have never been revealed to the community, nor has the study by Stantec addressed each location. Residents request a new study and measurements from each

inverter and then revisions to the landscaping plan with homeowner input as to what should be done there to mitigate the noise level.

According to AI, the inverter noise is 99 decibels which is a **very loud noise**, generally considered to be potentially damaging to hearing, especially with prolonged exposure. It's in the range of noises like lawnmowers, power tools, or a [concert at a loud volume](#). For reference, 85 dBa is the threshold **where long-term exposure can cause damage**, and 100 dBa is considered a high noise level.

Here's a more detailed breakdown for damages to hearing:

80-90 dBa: Loud noises that **can be harmful with prolonged exposure**. Examples include alarm clocks, traffic, and vacuums. **24-7-365 would qualify as prolonged exposure.**

90-100 dBa: This is where noises become even more potentially damaging. Examples include power tools, blenders, and snowmobiles.

Operation Noise

Wood Duck has identified the **Power Electronics HEM series Solar Invertor** which has a sound level of **99 dBa's** for each invertor in the Sound Study by Stantec, page 7, section 6.1. The project is proposing **35 inverters**.

The maps are so small, it is impossible to tell exact locations, but it appears, there will be three that are close to the corner of Millstown and Oak Grove Church Road which is 500 feet from the nearest home (1307 Millstown Road) and is really close to several houses, at least 10 homes with children and an Amish family which will have open windows. Inverters will run will all day. Invertors require forced air and/or water to keep them cool. It is unknown how much heat and noise this will generate in this area.

No one should have inverters close to their home, but as stated multiple times throughout this response, the public has never had an opportunity to comment and the project only identified 25 inverters in their submission to the planning commission.

Residents request an amended map be provided for public comment and that the noise study be revised to include the areas for layouts and inverters, then the public should have an opportunity to review and comment.

A quick AI Google search reveals this noise level during **operation** are **unacceptable**. There are at least 3 things which make noise: **inverters (35), motors within the tracking systems with batteries and the rotation and movement of the 204,525 panels on the tracking system. Plus the substation step-up transformer at 105 dBa.**

Each of the 35 invertors is a noise level of 99 decibels which is a **very loud noise**, generally considered to be potentially damaging to hearing, especially with prolonged exposure. It's in the

range of noises like lawnmowers, power tools, or a [concert at a loud volume](#). For reference, 85 dB is the threshold **where long-term exposure can cause damage**, and 100 dB is considered a high noise level.

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80-90 dBa: Loud noises that **can be harmful with prolonged exposure**. Examples include alarm clocks, traffic, and vacuums. **24-7-365 would qualify as prolonged exposure.**

90-100 dBa: This is where noises become even more potentially damaging. Examples include power tools, blenders, and snowmobiles.

100-110 dBa: These are considered very loud and can cause hearing damage quickly. Examples include concerts, car horns, and sporting events.

110+ dBa: These are considered deafening and extremely dangerous to the ears. In summary, 99 decibels is a high noise level that should be avoided for prolonged periods without hearing protection.

The tracking system noise, depending on which one they will use will average @ 80.5 It is unclear which brand they will use and their reports are conflicting.

In the Decommissioning Plan by Stantec on page 4, they list the DuraTrack HZ v3 tracker or similar system for the tracking system. The "Onsite-Acoustic Testing" on four models of the Dura Tracker indicated noise levels at **80.5 - 69.9**.

However, in the site assessment report, page 13, section 25 they reference using NexTracker or equivalent which Wood Duck states is 70 dBa. This is incorrect according to the material data sheets from the manufacturer **which state less than 80 dBa**. A discrepancy to conceal the true noise levels.

A noise level of 79 dBa is considered **loud**. Here's how it compares to some common sounds:
Normal conversation: 60-70 dBa., Washing machine: 70 dBa, Dishwasher: 70 dBa., Noisy restaurant: 70-80 dBa., Ringing telephone: 70-80 dBa., Alarm clock: 70-80 dBa, Moderate freeway traffic: 70-79 dBa.

To conclude, with just the inverter at **99 dBa** and the tracking system motors running at **80.5**, this creates an elevated noise level. A Google search indicates that when you have 2 separate noise levels, within 10 dB, the higher rating is the determining factor. "When two sounds of 99 dBa and 80 dBa are combined, **the resulting noise level is approximately 99 dBa**. Since the difference between the two noise levels is greater than 10 dBa, the lower noise level (80 dBa) has a negligible impact on the overall combined noise level. A 10 dBa increase in sound pressure level is perceived as twice as loud, according to University of California San Diego."

Here's why:

Decibels (dBa) are measured on a logarithmic scale, not a linear one. This means that a 10 dBa increase represents a tenfold increase in sound intensity.

Dominant Sound Source: When combining sound levels, the higher sound level dominates. In this case, the 99 dBa source is significantly louder than the 80 dBa source, making the 80 dBa source's contribution almost unnoticeable.

Simple Rule of Thumb: As a rule of thumb, when combining sound levels, if one source is at least 10 dBa higher than the other, you can essentially ignore the lower level when calculating the combined level, says United Steel Structures.

In the Stantec study, Appendix A, pages 1-7 it uses a popular measurement which is often not understood. It uses the "Sound Level (dBa Leq)" on 266 locations, assumingly to be 266 houses and they give a range or readings from 19-46 dBa Leq.

This makes the readings appear to be low when in fact, they are not. This is deceitful to the reader. HOWEVER, Leq is the equivalent continuous sound level or the sound level in decibels having the same total sound energy as the fluctuating level measured. It is the time-average sound level (LAT) which allows the higher level which was 99 dBa from the inverters to be averaged with **zero dBAs at night to provide a lower level of 46.**

Leq should NEVER be allowed for a measurement of noise in a residential neighborhood. Taking the time there is no noise does not mitigate the deafening noise levels produced by these instruments. This is a clever way to deceive the average reader.

Let's examine SR-126 (we do not know who this is), has a sound level of 46, and is 500 feet. The inverters will run from sun up to sun down. The decibels of noise are reduced when averaged with the hours of silence at night. This is a great way to confuse the reader and create numbers of lower values. The fact remains, it will be **99 dBa ALL day long and that is considered very loud and dangerous.** And it is possible they will run at night, depending on if/when the energy is stored.

We have found nothing in the research of the product material sheets and installation guides to substantiate Stantec's low number. Therefore, **Residents request** that the information provided by Stantec be disregarded because they **failed** to provide accurate numbers and **failed** to provide the numerous locations as the inverters and tracking systems that will surround homes and farms with animals.

Wood Duck did NOT provide a map which showed the locations of the inverters to the Barren County Planning Commission and therefore, this has not been reviewed by the county or the residents of Barren County. **Residents request** a new and amended map for public review.

The maps Wood Duck submitted to the PSC called “Noise Contour Map” and the “Noise Sensitive Receptors” are tiny and impossible to read; and again, have not been reviewed or commented on by the public. There is no way a resident could identify their property. **Residents request** this to be corrected.

There are 35 inverters referenced in the PSC application and only 25 referenced in the Barren County application. Another inconsistency. **Residents request** clarification, revised maps and an opportunity for public comment.

As to construction noise, the SAR response says they will use pile-driving machines and augers on page 3, #4 and on page 6, they forgot to include several types of equipment. Pile driving machines range from (120-140 dBa) and augers (80-106 dBa). This is an unacceptable noise level for residential neighborhoods and communities where children are in school. They forgot to include equipment for removing the woodlands and chipping the wood.

A pile driver and an auger are not the same thing, though they can be related in some foundation construction techniques. A pile driver is a machine that drives pre-formed piles (like steel or concrete columns) into the ground. An auger, on the other hand, is a tool or machine that drills holes by rotating a screw-like device. While pile drivers can be used to drive piles directly, they can also be used in conjunction with augers in techniques like auger cast piles.

Here's a more detailed explanation:

Pile Driver: A pile driver is a heavy-duty machine used to install piles into the ground. These piles are typically pre-formed and driven into the ground using a hammering action, often with a large weight or hammer. Pile drivers are used to create deep foundations for structures like bridges, buildings, and retaining walls.

Auger: An auger is a drilling tool with a helical screw (the flighting) that rotates to bore into the ground. Augers are used for various purposes, including digging holes for posts, planting trees, and, in construction, creating holes for cast-in-place piles.

Relationship in Construction: In some foundation construction methods, like auger cast piles, an auger is used to drill a hole, and then the hole is filled with concrete or grout. The pile driver might then be used to drive a pre-formed pile into the ground. In other cases, augers can be used to create a pilot hole for a pile, making it easier to drive the pile into the ground, according to Hercules Machinery Corp.

Stantec report indicates the pile drivers will range from 74-85 at 50 feet. Page 6 of the application. This is incorrect. According to AI Google, Impact pile drivers generate high levels of noise, typically ranging from 120-140 decibels (dBa) at close proximity. This noise is a significant concern in construction, especially in urban areas, as it can cause disruptions, noise complaints, and even lead to health issues. Monitoring and managing noise levels is crucial for the safety of workers and the public. Here's a more detailed breakdown:

- **Noise Levels:** Impact pile drivers can produce noise levels of 120-140 dBa at a distance of 10 feet.

Impact Noise: Impact pile driving is considered an impact noise source, characterized by its short duration (less than one second), high intensity, abrupt onset, and rapid decay.

Attenuation: Noise levels decrease with distance. For example, noise from a pile driver might attenuate to approximately 84 dBa at 50 feet, based on standard noise attenuation rates, according to Imperial County Planning & Development Services.

Environmental Impact: Excessive noise from pile driving can lead to annoyance, health problems, and even legal issues.

Mitigation: Strategies to reduce noise include using noise shrouds or curtains, limiting driving time to daylight hours, and reducing the overall driving time, according to Piling Canada.

Regulations: While there are no specific federal noise regulations for pile driving, the Occupational Safety and Health Act (OSHA) regulates workplace noise exposure, with permissible exposure levels for workers.

AI Overview of Vibratory Pile Drivers – should they use these....A vibratory pile driver uses vibrations to install piles into the ground, and its noise levels are typically measured in decibels A (dBa). These machines generate continuous, lower-frequency sounds compared to impact pile drivers, which produce loud, impulsive noises. While vibratory pile drivers have lower peak sound pressure levels, they can still be a significant source of noise pollution and may affect nearby residents or marine life.

How Vibratory Pile Drivers Work:

Vibratory pile drivers use a rotating eccentric mass to create vibrations that loosen the soil around the pile, allowing it to be pushed into the ground.

They are generally faster and more efficient than impact pile drivers, especially for driving sheet piles and some types of foundation piles.

Vibratory pile drivers are often preferred in urban areas or near environmentally sensitive areas due to the lower peak noise levels.

Noise Levels and Measurement:

A-weighted decibels (dBa): This is a standard measurement of sound that reflects how humans perceive loudness, with higher numbers indicating louder sounds.

Vibratory vs. Impact Pile Driving: Vibratory pile drivers produce lower peak sound levels but can generate continuous noise for extended periods, while impact pile drivers produce high-intensity, short-duration sounds.

Typical dBa Levels: Measurements of vibratory pile driving noise can range from 77.0 to 80.1 dBA, standardized at 50 feet, **with some measurements reaching 88 dBa during driving, according to a report from the Washington State Department of Transportation.**

Distance and Attenuation: Noise levels decrease with distance from the source. For vibratory pile drivers, noise levels can drop by 6 dBa for every doubling of distance.

Environmental Impact:

Noise Pollution: Vibratory pile driving can still cause noise pollution, **potentially disturbing residents or wildlife.**

Underwater Noise: Pile driving, including vibratory methods, can also **generate underwater noise that may harm marine life.**

Mitigation Measures: Various techniques can be used to reduce noise and vibration from pile driving, such as using noise shrouds, limiting driving times, and employing quieter equipment.

Stantec forgot to include Augers: Terrible Noise around 80-106 dBa

In the site assessment report, page 6, Wood Duck states they will use Augers. According to AI, Auger noise levels can vary, but they often fall within the range of 80-106 dBa, especially in underground mining operations. Construction equipment like auger drill rigs **typically register around 85 dBa**. Factors Affecting Auger Noise Levels: Type of augers: Auger types, like those used in mining or construction, will produce varying noise levels.

Operating Conditions: The environment (e.g., underground versus open-air) and the material being drilled can influence noise levels. **Construction Augers:** Auger drill rigs are generally around **85 dBa, according to Sonetics.**

Hearing Protection: **OSHA Standards:** OSHA requires **hearing conservation programs** for workers exposed to noise levels at or above 85 dBa averaged over 8 hours. Earplugs or earmuffs are often recommended when working with loud machinery like augers.

Stantec forgot to include trenchers which will be used to bury the cables. Terrible noise ranges 87-103 dBa.

Trenchers produce noise levels measured in decibels A-weighted (dBA). Walk-behind trenchers typically range from **87 to 103 dBa**. Ride-on trenchers, like the Ditch Witch RT45, can reach **96 dBa at the operator's position and 108 dBa outside**, according to one source.

Here's a more detailed look:

Walk-behind trenchers: A Ditch Witch CX series trencher is listed at **87 dBa** (ear sound pressure) and 100 dBA (overall sound pressure) according to Riegos programados.

Another walk-behind trencher, potentially 6" x 48", is listed at **93 dBa** (ear sound pressure) and 103 dBA (overall sound pressure) according to Grand Rental Station.

A 36"x4" gas walk-behind trencher is listed at **91 dBa** (ear sound pressure) and 100 dBA (overall sound pressure).

Ride-on trenchers: The Ditch Witch RT45 ride-on trencher has a noise level of **96 dBa** (operator) and 108 dBa (exterior).

Stantec forgot to include Crawler tractor dozers, also known as bulldozers and wood chippers, which can produce significant noise levels, often exceeding safe limits for prolonged exposure. While specific noise levels vary depending on factors like engine speed, machine condition, and operator environment, some studies show levels ranging from **85 dBa to over 110 dBa**. Hearing protection is often recommended when operating these machines.

Noise Levels and Impact: Construction sites and other work environments with dozers can experience noise levels ranging from 80-120 dBa.

Dozer-Specific Levels: A bulldozer can produce noise levels of around **110 dBa**, according to a blog post from Builders Mutual.

High Idle: A dozer at high idle can produce around **95.90 dBa**, according to e3 Diagnostics.

During Operation: During work, such as road construction, a dozer can reach **113.40 dBa**, according to e3 Diagnostics.

Operator Exposure: Noise levels inside dozer cabs can vary greatly, with some studies showing levels from **77 dBa to 109 dBa**, depending on factors like cab condition and whether doors and windows are open or closed.

Regulations and Recommendations:

OSHA Limits: OSHA considers sounds of **85 decibels or higher potentially damaging to hearing** with prolonged exposure. Workers should wear hearing protection when exposed to noise levels above 85 dBa for extended periods, according to a safety quiz from Oregon State University.

Stantec provides the following statement on page 9, Section 7.0 “Worst-case construction sound levels at the nearest residence are expected to range from 74 to 94 dBa Leq with multiple pieces of equipment operating simultaneously.” Again, they have manipulated the numbers and factored in the time that the equipment is not operational to lower the impact of the excessive noise which will be 120-140 dBa. They also failed to include augers, trenchers, crawler tractor dozers and other equipment in their assessment.

Residents request that their neighborhoods are not invaded with this machinery creating unbearable noise for their homes and animals.

Residents request that the siting board consider the impact of the excessive noise on animals.

Many farmers, who are not a participant in this project, have property that adjoins this project and they raise animals for their income. This noise can have a detrimental effect on them.

This is a farming community where people have cattle, horses, sheep, goats, bees, pigs, poultry and domestic animals. The impact of this level of noise during construction from these drivers and augers and during operation from the inverters, trackers and transformer can have a devastating effect. It is clear the noise levels will be over 99 dBa at all times.

AI Overview: A 99 dBa noise level is considered high and can be stressful for livestock, potentially impacting their health and productivity. While some noise is unavoidable in farming, understanding the effects of different noise levels is crucial for animal welfare.

Here's a more detailed explanation:

Impact on Livestock: High noise levels can cause stress, potentially leading to decreased milk yield, disruptions in feeding behavior, and even changes in hormonal balance.

Specific Examples: Research has shown that exposure to 80-100 dBa noise twice a day can reduce milk yield in dairy cattle. Similarly, prolonged exposure to 100 dBa noises has been shown to increase respiration rates in sheep.

Noise Sources: Common sources of noise in livestock farming include ventilation fans, tractors, high-pressure washers, and automated feeding systems.

Importance of Monitoring: Regular monitoring of noise levels within animal housing facilities is essential to identify potential issues and implement mitigation strategies.

Mitigation Strategies: Strategies for reducing noise exposure can include optimizing building design, using quieter equipment, and providing periods of quiet time for the animals.

Hearing Differences: It's important to remember that animals may have different hearing ranges and sensitivities than humans, so what may seem like a minor noise to us could be stressful for them.

Research at the National Agricultural and Food Center by J.Broucek examined "The Effect of Noise on Performance, Stress and Behavior of Animals" concluded that noise in farm animal environments has a detrimental factor to animal health. Especially longer lasting sounds can affect the health of animals. Noise directly affects reproductive physiology or energy consumption (Escribano et al., 2013). Noise may also have indirect effects on population dynamics through changes in habitat use, courtship and mating, reproduction and parental care. (p.114)

The noise threshold expected to cause a behavioral response **by cattle is 85 to 90 dBa** (Manci et al., 1988). Noises greater than threshold have provoked retreat, freezing, or strong startle response (Morgan and Tromborg, 2007). When the transmitter of ultrasound was switched on at a distance of 1 m, calves got up and orientated towards the sound source. After 30 s, all calves had their ears directed away from the sound source. After 10 min, some calves started to scratch their ears repeatedly. During the 10 minutes period of exposure, none of the calves would lay down again (Algers, 1984). Page 118

It is an interesting study that addresses horses, sheep, goats, and cattle. It concludes that loud noises can have a detrimental on an animal's health.

Why would Barren County introduce this construction project which will take 1-2 years of noise and the inverters located at 35 different sites will be at least 99 dBa?

It is also known that the panels can reach temperatures of 185 degrees. This will increase the air temperature around crops and pastures? Recent research into "Corn sweat" has confirmed that a corn crop can increase temperature and humidity. Think of what solar panels will do to the families and animals next door.

Residents request that the siting board consider the issue of animal and crop health: as well as, the fraudulent studies which are slanted to get this project approved at the detriment and health of others. This is the wrong project for Barren County, for our residences and farmland.

Residents request that each "Sensitive receptor" address be identified and cross referenced with inverters and a noise assessment completed with each address and that the homeowners be given an opportunity to respond.

Inverters and a transformer are within close range to many of the “sensitive receptors.” The public simply hasn’t had a chance to see any of this data and the report from Stantec conceals the noise levels using formulas to reduce the impact on tiny little maps no one can read.

Additionally, this study **failed** to address any noises associated with **decommissioning** of the land and the **equipment** that will be needed to remove all of panels and restore the land. It is unknown how long the de-construction will take and how much noise and dust will be produced.

It **also failed** to address the trucks and equipment that will be needed to ensure that all packing materials, wood pallets, etc. used during construction will be taken to a recycling center and not deposited into a landfill.

Additionally, this study **failed** to address the 439 acres of woodlands which will be destroyed and failed to identify the equipment (chainsaws, wood chippers, bulldozers, skid steers, etc.) which will be used in each of these areas and how far each location is from the nearest residence.

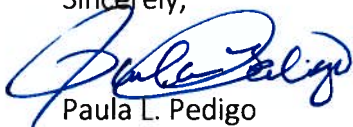
Residents request this report be denied on the excessive noise levels. Page 12 indicates that at least 25 homes will be within 597 feet of the inverter and there are several SR’s that will be within 648 feet of the transformer. Again, these are the ones that were assessed, not every residence was assessed and that is a major flaw in this study.

Should this project be approved, residents request that construction hours are limited from 8-4 Monday – Friday due to the fact this is a residential area where people live, work and play.

We also request that the landscaping plan be reassessed based on an accurate sound/noise study and that landscaping and sound barriers be put into place prior to construction to ensure the peace of residential neighborhoods is not disrupted. We respectfully request the siting board to consider what the local planning commission failed to address.

Thank you for reviewing these concerns.

Sincerely,



Paula L. Pedigo

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