In Re Lighthouse Wind Energy Public Hearing

October 02, 2018

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LIGHTHOUSE WIND COMMUNITY FORUM

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Public Information Meeting

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Location: Lyndonville Central School District
25 Housel Avenue
Lyndonville, New York 14098

Date: October 2, 2018

Time: 7:00 p.m.

Reported By: MEREDITH A. BONN, CSR, RPR, NYRCR
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120 East Avenue, Suite 200
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Moderator:
Rita Coleman-Graham

Apex Clean Energy Representatives:
Paul Williamson
Dave Phillips
Tracy Butler
Steve Wilkinson
Robert O'Neal
Jim Muscato

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LIGHTHOUSE WIND ENERGY

TUESDAY, OCTBER 2, 2018;

(Proceedings in the above-titled matter commencing at 7:03 p.m.)

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MS. COLEMAN-GRAHAM: Good evening. People in the back, please continue to come on in and grab a seat. We have got plenty of them here still.

I want to thank you for coming out tonight in kind of questionable weather and attending this public informational meeting about the Lighthouse Wind project proposed by Apex Clean Energy.

My name is Rita Graham and I'm an independent consultant from south of Pittsburgh, Pennsylvania and I'm here tonight as the moderator for this meeting. Now, my role tonight is to facilitate the meeting and to present your questions to the panelists over here for responses during the Q and A session.

Now, Apex Clean Energy comes here tonight with three main goals. Okay. The first goal is to present updated project information, which you can see from out in the lobby includes locational information about the proposed turbines.

The second goal is to have a panel of experts here today to provide information on wind energy

projects, information on their development, their permitting, their construction and their operation.

Okay. Now, the third goal for tonight is to gather as many questions as is needed to have -- for you to have -- for everyone to have a clear understanding of the Lighthouse Wind Project and to clarify any sort of misunderstandings that may be out there.

Now, this meeting is not a regulatory required meeting. Okay. It's not.

What it is is Apex chose to hold this meeting to better inform the community with updates on the project and to solicit and to respond to community questions about the project.

In addition, Apex chose to videotape and to transcribe tonight's presentation from the panel and the Q and A session that we are going to be doing with your questions. So that material can be readily available for maybe your neighbors, other interested communities, for other people to be able to see what they may have missed here not being able to be here in person.

Now, take a look at your agenda. It's on the flip side of this. Okay. And I'll go over what the format is going to be for our time together here tonight. In a few minutes I'm going to ask the

panelists to stand real quick and give a brief introduction of themselves.

That handout that has the agenda at the bottom, you are going to see there's bio information in more detail on each of the speakers. We are then going to move into the information presentation part.

And then that brings me to these. Everybody should have received when you came into the door, at least the door into the auditorium, four by six cards. These are what I'm going to refer to tonight as question cards.

I might slip up and say cue cards, because I wrote that in my notes. Okay. But they are your question cards.

So when one of the panelists is speaking and it brings a question to mind, I need you to jot it down on this card and we are going to collect them in between each panelist. And then I'm going to be reading your questions from these cards. Okay. So these are your question cards that we are going to engage the panel with.

Now, after each of the panelists speak, the way I'm going to collect these cards, is I'm going to ask you very nicely and quietly, pass your cards to

these two center aisles. And we are going to have two runners, Jessica and Gabe. Jessica is in the back. I think you saw Gabe -- Gabe is back there too. They are waving a little.

They will be coming up and down the aisles, picking those up. And then what they are going to do is they are going to bring those question cards up here to this table where I'm going to have two assistants. I have got one right now. The other one is still working out back -- or out front. Carmine and Rachel. And they are going to sort those question cards to make it efficient to be able to then pass them to me during the Q and A period so I can ask questions based on each of the topics.

Okay. So that's the method that we are using with the question cards.

If we happen to run out of time before I'm able to ask every one of those question cards, Apex has agreed that they will answer all of the questions and they'll provide the questions and answers on their website.

Okay. So if you don't get an answer to your question tonight, it will be answered and it will be posted. Now, as I mentioned, there's going to be a

video camera that's going to be capturing all of the activity here today. So we need to be careful on how we do question generation and the card collection. So please don't wave the cards around. Just sort of pass them to each person.

So I just need everybody to cooperate on that so that we will have a good quality video to be able to share with others.

Now, after the last speaker I'll present the audience questions. I'm going to read two or three questions for each of them. Cycle back around, two or three questions more, until 9:25.

We have told the school we would be out of here so they could lock up at ten. So that's what our timeline is.

Now, one last thing before we get started in the panel, I want to draw your attention to the ground rules. I've found that in facilitating large meetings that it's very helpful to have some ground rules. It's basically common courtesy type of stuff.

The first one I ask that you please listen without interruption. I want to make sure we don't have a lot of interruptions and distractions so that I'll have sufficient time to ask your questions and get

responses from the panel.

Already talked about writing your questions on the cards. Please put them in the form of a question. I won't be reading statements or proclamations. I will be reading things in the form of a question to get responses from the panel.

You already took care of the other one, no banners or signs. I don't want anybody's eyes poked out. So that was, that was my request there.

And, respect each other. I know that for some, emotion kind of runs high at these type of meetings and I understand that. I just need everybody to be courteous and to be respectful with one another. I want it to be a very productive meeting to get your questions done and answered here tonight.

So with that, please silence your cell phones, and refrain from any heckling or disruptive behavior.

For the record, I do want to note, as you saw, we have security on site. That's because when I do these kind of meetings, I always have a standard protocol to have security on the site, just in case there's disruptions.

And, come on, we all know what it's like out

there in the world now. It's to protect all of us and to keep everybody safe too. So please work with me. I've never had to engage security and I don't want to do that tonight.

Okay. Panelists, I'm going to ask you each to stand up, give your name, your company, your title and your topic for tonight.

MR. WILLIAMSON: Good evening. My name is Paul Williamson. I am the senior project developer with Apex Clean Energy and I'll be providing a general project overview and some background on how we have come up with our current design before then handing off to our next panelist.

MR. BUTLER: Hi, there. I'm Tracy Butler. I'm the director of civil engineering for Apex. I'll be chatting about engineering of a wind farm and construction of a wind farm.

MR. WILKINSON: Good evening. I'm Steve Wilkinson. I work with Fisher Associates. We are an engineering firm. We will be focused on designing the access roads into the project.

MR. PHILLIPS: Hi, my name is Dave Phillips. I oversee environmental permitting and compliance for Apex Clean Energy.

MR. O'NEAL: Good evening. My name is Rob O'Neal. I am a managing principal at Epsilon Associates. I'm here to talk about sound and answer your questions about sound tonight.

MR. MUSCATO: Hi, good evening. My name is Jim Muscato. I am with the law firm of Young Sommer. I am permitting counsel for Lighthouse Wind in the Article 10 process.

MS. COLEMAN-GRAHAM: Thank you, gentlemen. And, with that, we are going to ask Paul to come on up. And, remember, get out your question cards. If a question comes up, jot it down and we will collect it.

MR. WILLIAMSON: Okay. So, as I noted earlier, I'm going to provide general project overview. I believe that you had an opportunity to look at the current project layout as we have conceived it in the hallway and so I'll go over that.

I'll talk a little bit about how we come up with some of those decisions on where we locate turbines and I'll also talk about the impacts and benefits to the community.

One thing worth noting, as we talk about the layout tonight, this is a preliminary layout. We have been able to identify the turbine locations. That's the

first step in the process of designing a project and then we go and we will be working on the additional information that allows us to position access roads, collection lines, other facilities that will be associated with the project.

Through that process there's some additional field studies that we need to do. Completing those field studies will inform the project. So the project or the layout that you see today is subject to change as we go through that process. And also as we go through the engineering there's a number of different factors that can influence the project.

And, likewise, as we go through the permit review process, there are additional factors that may cause an alteration to the project. So, again, what we are showing you tonight is a preliminary layout. It's a foundation of where we get started with that entire process of developing and designing a project.

And the end result will look something close to this. But we can't guarantee that it will be exactly what we see tonight.

So, again, this is a copy of the map that you see out in the foyer. To generate this right now we are modeling, we have modeled actually several different

turbines for this project and the Vestas V150 is the model turbine that seems to be performing best in this area.

So we have generated our turbine layout based on that model. With that turbine we would have 47 turbines in the entire project area. The hub height of the turbines would be 345 feet high. The hub height is the center, or the top of the tower, from where you see the blades all attached. The maximum tip height would be 591 feet off the ground.

Rotor radius, the length of the blade essentially, would be 246 feet. I mentioned the Vestas V150. That is a 4.2 megawatt turbine and that would allow us to generate 197.4 megawatts in the project area.

With this layout there are 39 turbines located in the Town of Somerset and eight turbines located in the Town of Yates. This -- I have several slides here that just really kind of show a close-up. Again, probably best for you really, if you are extraordinarily interested, to really take a close look at the maps that we have out in the foyer.

This shows the turbine array in the western section of the project. I've put in some of the road

names there to help you get an idea where everything is located.

This is the current power plant that's in Somerset. So this shows two clusters of turbines that would be located just south of that.

As we go through this, and the engineering folks will talk about this a little bit further. You'll notice that the turbines tend to be located in clusters. And so, again, you see a small group of three there. And then seven turbines. This is in the central part of the turbine -- I mean the central part of the project area.

And then over in the eastern part of the project area you can see the town line there between Somerset and Yates. And this shows the final cluster of turbines over in the eastern part of the project area.

UNIDENTIFIED SPEAKER: Can you go back to the first picture please?

MR. WILLIAMSON: Sure.

Again --

(Indiscernible comment by audience member)

MR. WILLIAMSON: Okay. I'll ask you not to interrupt. There are maps that you can look at.

(Indiscernible comment by audience member)

MR. WILLIAMSON: There are maps that you can look at in the foyer. And I can assure you that all of the turbines in all of the facilities that we are currently working with are entirely on leased land. And so -- and I'll talk a little bit further about that too and how we have come up with this layout.

So this shows -- this is just south of the power station that currently exists in Somerset. This is an area that's five square miles.

And I'm just going to talk a little bit about the process of how we come up with locating the turbines. So this is five square miles in the western part of the project area.

This is an aerial photograph. So you can see these are the open farm fields. This shaded area in here, this darker green, that shows the wooded areas. You can actually make out the railroad that comes out of the current station. And there's Hosmer Road as well.

So here's what the land looks like when we first approach it. And then we start applying a number of different considerations to it as we inform where we want the turbines to go.

And we want to make sure that we take into consideration proper safety, setting back the turbines

from different areas of concern or futures of concern. And so I'll walk through that briefly with you.

So this is exactly the same area that I showed before. But you see some shaded areas coming in. This image shows the application of municipal and infrastructure features. So roads, electricity lines. That bright orange area, shaded area is the distance that we want to be back from the rail line.

So you can start to see that that five mile square area starts getting encroached upon a little bit. In all of these shaded areas we would not want to put a turbine in those areas because we, again, want to make sure we provide adequate safety distance between the turbines and any one of these features.

So this image shows the application of environmental features which include streams, wetlands, some of our setbacks. Also include the identification and setting back from bird flyway areas and there's additional environmental features that we apply as well.

So, again, more shaded areas now being imposed upon the area. Those shaded areas are not where we would want to locate turbines.

Then we go even a step further and we do setbacks from property lines. We try to create a good

safe distance from any residence. Both residents that are participating in the project and also residents that are not participating in the project.

And from that whole five, five square mile area, you can see that we end up with just four small areas that we can locate turbines and that would allow us to locate turbines, five turbines in that area.

Now, when we locate our turbine we want to have approximately 1,600 feet in between our turbines. Because the turbines can have an effect on how each turbine operates. And so we have to spread out those turbines a little bit. They can't be right beside each other.

And then the other thing that we take into consideration too when we put all this together is we want to make sure our grouping of turbines are set up in an area -- in a way so that we don't generate too much noise that would affect any of the nearby residents.

So in generating this project design, we have been able to achieve a number of different features that really take into consideration safety. For starters, the sounds generated from this project will not exceed 45 decibels at any nonparticipating residence.

So anybody who is not directly involved in the project outside of their house, the sound will never exceed 45 decibels while operating. Again, shadow flicker is often a concern for all nonparticipating houses. None of these turbines through an entire 365 days of the year, none of these turbines will generate shadow flicker on any residence any greater than 30 hours throughout an entire year. And that includes mornings, daytime, evening -- evening times.

Again, some additional notes on this project layout, we are over one mile away from the Barker School. No turbine is -- or all turbines are greater than one-third of a mile away from any nonparticipating home.

Nonparticipating property lines we are 650 feet back. Roads we are 885 feet back. Infrastructure, including transmission lines, gas lines, railroads, anything else, we would be 650 feet back and 492 feet back.

We even take into consideration structures such as barns, silos, all that including all lands that we have under lease. Because, again, this project is being designed with safety in mind.

So when we develop a project there are

essentially three major elements when you put together a project like this. And the process -- the process requires three major elements. One of those being land. The other one being the interconnect process, where and how we plug the project in to the grid. And then, finally -- or, not finally, coherent or in parallel the permit.

And so when you develop a project like this you are trying to kind of line all of these things up together so that the outcomes all are happening or the processes are all happening in parallel.

Now, with this project in particular, we have over -- we have leases signed with over a hundred different people and so that is a relatively high number and in getting there --

Keep moving down the line. Okay. So in getting there --

So, let's see. I was talking about the lands and signing a number of leases. We have received a number of questions over time. When are you going to release a turbine layout?

And, you know, we have been working to get to that point. But before we could get to that point we really needed to understand what properties we could

utilize and how we can connect all these properties together. And it really took us until this summer through all the time that we have been developing this project to coordinate, come up with contracts with all that land involved.

Now, I'm sure you can imagine that if we showed up and we previously showed a layout to people without having the lands properly contracted under lease, somebody might show up to that meeting and be somewhat upset if we were projecting a turbine on their property that was not under lease and so we wanted to avoid those kinds of problems.

And so that's one of the reasons why it's taken this long for us to really put this together because we -- this is a complex project. It involves multiple different leases and it's a large project with 47 turbines and we want to make sure that we get this right.

So from this step going forward we will have additional community meetings, as information becomes available, and we will be informing all of you about the different aspects of the project. Those meetings will be scheduled when there's information appropriate to be shared and not until that information is verified and we

can trust that we are providing accurate information to the public.

So, our schedule right now, again, I mentioned field studies that we needed to complete before we really get our permit application put together. So we are working on completing those field studies right now. We hope to be able to complete all of those field studies prior to the onset of winter. So we are working diligently to complete that.

Assuming we can get that process complete, we would be submitting our permit application in the winter of 2019. We expect that the application process will take approximately two years for us to get through. And then in 2021 we will be doing final project planning, go into preconstruction with the real heart of construction activities happening in 2022 and the project going operational towards the end of 2022.

So, this project is going to have an impact on the local area. You will be able to see turbines at times and some people will think that they really look fantastic and other people really won't like them. But the project is going to also bring additional impacts.

Obviously, the people who hold land leases will benefit from the project being here because they

will receive payments. But, the rest of the community also receive benefits as well. I've illustrated a number of benefits that other communities have had.

If you go up to the Orangeville Wind Farm in the Town of Orangeville, they have a line item in their budget in 2018 for over $500,000 generated specifically from the wind power project that's there. That payment will increase over time for that community.

The Noble Bliss Wind Farm in the Towns of Eagle and Arcade in Wyoming County, the county, the towns and the schools have already received investments of nearly $2,000,000.

In addition to that, the Town of Eagle, which is the host community, has a host community agreement of $6,400 per megawatt. They were able to eliminate all of their town taxes and all of their garbage fees within the town.

In the Dutch Hill Wind Farm in Steuben County, Towns of Cohocton, Avoca and Prattsburgh, the county, the towns and the schools have received 3.7 million dollars in tax payments from the project.

The Cohocton community -- the Cohocton community benefit payments have provided an additional 3.9 million dollars to the town. And that town has been

able to reduce their property taxes by 60 percent.

So these are the kinds of benefits that we really want to work with the community to amplify. So that is we are designing the project. We can bring it forward in a way that really creates high benefit for your area.

Right now in our initial estimates and modeling, we expect that the Lighthouse wind power project will be bringing 1.5 million dollars to the local communities, once it's operational. And, as this project is having impacts, we want to work cooperatively with the communities to make sure that there is a net positive of impacts from this project.

So, we know that communities really thrive and do well and have high value when there is community renewal investment. When there's a diverse tax base. When diverse businesses and job opportunities exist in the communities. When there's low and consistent taxes in those communities. And when there is healthy infrastructure and good educational systems.

And so this is an opportunity for us really to utilize this project as a vehicle to make sure that there are sustainable finances available to both towns to make sure that all of these elements exist. And,

Apex, as a company, really wants to engage in the near term with the communities to negotiate a community benefits agreement that really is planning the use of the investments so that it has the largest impact.

We want to hear from you and we want your impact on that and we want to work creatively to solve problems so that any kind of investment we bring to the community really directs -- directly impacts the community's needs and desires. Working together we can sustain the attractiveness and increase the value of living in both of these towns.

So our next steps, again, I mentioned the field studies and then we go into engineering and designing. Through that process we will also -- this will be informing the project layout as well. We will be working with federal and state agencies to enhance the environmental benefits of the project while also reducing any environmental conflicts that the project might create.

Additional community and information meetings will be held, again, when the information becomes available. Firsthand opportunities, we are going to generate a number of different firsthand opportunities for people to really start learning more

of the details about wind energy.

And, again, we really want to work directly with the communities to frame the benefits to best meet the needs and the desires.

We look forward to working constructively with all of you. Thank you for your time.

MS. COLEMAN-GRAHAM: Thank you, Paul.

Now, remember, if you had questions, please forward them in your aisles to the center here and Jessica and Gabe will get them.

And Tracy is up next.

MR. BUTLER: All right. So, again, I'm Tracy Butler, the director of civil engineering for Apex. I'm going to chat about engineering the wind farm and constructing the wind farm. So we have a couple of slides here.

This first slide kind of shows, schematically, the configuration of a wind farm and how it works and we are going to start here in the bottom left with the turbine itself. So the wind turbines that use the wind to turn the three-bladed rotor that you see there, which turns a generator and creates electricity. And that's the purpose of this.

So this project has 47 turbines, as Paul

mentioned, and they are laid out in a cluster array. Each turbine being approximately 1,600 feet from the next. And, as Paul mentioned, that's due to the design constraints of the turbines so that they don't wake each other.

So the turbine as it's generating electricity is transmitting that electricity down the tower, underground to a set of cables, collection cables that collect all the power from each turbine, one after the next, after the next. And that all gets wrapped up in a substation where there's a large transformer that increases the voltage from 34.5 kilovolts to 345 kilovolts.

So that's the voltage of the transmission grid. So the substation takes that power, gets it up to the transmission voltage, gets it on the grid and out to the grid.

I should note that these collection cables, there's a couple of cables in a trench for each run. There's three conductors, one for each phase. There's a fiber optic cable in there as well. There's a ground cable also, which is basically just a copper clad cable.

So, those all connect together in a substation, then to the transmission line. And then, I

guess, you know, in more detail here is a turbine with its various components. You'll see that there's a tubular steel tower right there and that is most likely for the turbine that we are looking at is going to be in four or five sections.

Then on top there's a nacelle which holds the generator and the gearbox. On the front of the nacelle there's a rotor or hub where all the blades get attached and that's the part that rotates.

And then you have the individual blades there. They are kind of like an airplane wing and they rotate and there you go.

So, in more detail, holding this whole thing up is a foundation and there's a little schematic diagram down here with foundation. For this turbine, the foundation is probably about 70 feet in diameter underground at the very bottom. And then you can see it's tapered up. You have got a pedestal at top here. So the part that sticks up out of the ground is about 18 feet in diameter. And that's about 11 feet deep. So a foundation of this size will probably have about a 1,000 cubic yards of concrete.

Okay. Moving on. Here we go. So this is the general steps in constructing a wind farm. The

first thing we are going to do is mobilize to the project area and build a lay down yard. Which we are doing up here.

And the lay down yard is where there will be temporary office trailers for the contractors. There will be places to put spools of cable, to put components, if needed. So it's generally like where the guys are staging everything and running the project from during construction.

Once that's done, or while it's being set up, we will get started on the access roads and the foundation. So the public roads will be improved, where needed, to allow the turbine components to come in and then there will be private roads constructed in the fields to get the components out to where the turbines are going to be.

So every one of those dots that Paul had on the map for the turbine will have a little access road going out to it so that the turbine can be delivered and so that operations and maintenance people can also get access to the turbine without driving through a field.

While the roads and foundations are being built, there will also be buried collection cable that I mentioned. You can see here, the way it works is, the

topsoil is slid off to one side with a motor grader and then a trencher comes through, which is basically a tracked machine with a trenching saw, which is kind of like a chainsaw in the ground and that will cut the trench.

And, if you can see it on this photo, it's kind of small, each of the cables is kind of coming over the trencher and down into the trench. So it goes along, cuts the trench, puts the cable in behind it and then a trackhoe or backhoe will come right behind it, compact the soils back in over top of the cable and put the topsoil back. Like I said, that goes from turbine-to-turbine connecting them all to the substation.

Then, at the same time, or shortly thereafter, turbine components will start showing up. And, what I mentioned in the previous slide, the turbine will have several tower sections; the nacelle, the blades and such. So each of those will come in on a separate truck. They will go right to the specific site of the turbine.

And then they will use cranes. As you can see there just to erect that turbine. It will start, obviously, with the tower getting stacked and then the

nacelle put on top and then -- here in this photo they are lifting the rotor as one unit. Which means they have assembled it on the ground and picked it up.

For a turbine, on this project, there will probably be a single blade direction where they would actually lift each blade up and stick it into the hub one at a time for all three.

While that's going on, the project substation will go under construction. And that's where all of the collection lines are bringing the power and then it's going to get transformed up to the voltage of the transmission line. So that will be built.

That will have circuit breakers and switches and a little control enclosure and then a connection to the existing transmission line that runs through the area. So that's generally the construction process.

I should note too that once the project is built and turbines are erected and commissioned, you know, we will start to peel back some of that disturbance. So the lay down yard, which was maybe ten acres or so. That was just temporary. That will go back to its previous condition.

Some of the road infrastructure, if like a big turn was put in an intersection, that will come back

out. Wherever the cranes walked from turbine-to-turbine, if it's in an ag field, that will get decompacted. So there is kind of a restoration that happens at the end of construction so that the impacts are minimal.

So really what is left is that little bit of foundation sticking above the ground, the turbine of course, and then the access road and everything else will be removed or underground.

That's generally it really. Okay. So I think next in line is wildlife and environmental for Dave.

MS. COLEMAN-GRAHAM: Okay. Again, if you have questions for this speaker on your cards, again, please pass them to the aisle like you did so they can be collected and brought up.

Okay. Dave.

MR. PHILLIPS: Okay. Hi. My name is Dave Phillips again. I'm the vice president of environmental compliance and permitting at Apex. I oversee our group that deals with birds and bats, wetlands, cultural resources, things like that.

I deal a lot with the DEC and the fishing wildlife service. There has been a lot of discussion I

think around this project being located near the south shore of Lake Ontario and concern about it being in a migratory pathway.

So representation of the Fish and Wildlife Service recommending that service is not -- wind projects are not placed in these locations. And so that's a pretty important consideration.

I want to talk to you a little bit about some of the work that we have done around siting the project, some of the considerations that we look at carefully before moving forward on a site like this. And, hopefully, present to you some facts and help your understanding of what we do with regard to environmental compliance. And if I don't answer your questions then, by all means, make sure you jot them down so that we can clarify any concerns.

As I mentioned, I work with four other environmental folks. Two are based in Denver, Colorado. Two are based in Charlottesville, Virginia in our main office. And I'm based near Albany, New York. Three of us are Master's level wildlife biologists. One has a graduate degree in environmental policy and the other is more of a GIS in wetland permitting specialist.

So basically we have five people that all

come from conservation or environmental background. We all care a great deal about the environment. So we are kind of lucky to be involved with a company that takes those kind of considerations seriously.

What do we do? We do a lot of managing the consultants that do the technical studies around the environmental resources. So we work with the agencies to identify what studies need to be done. We get those studies implemented and then we meet and work with the agencies to understand the results.

And then we go out and work with the many aspects of our company, the engineers, the business folks, the construction folks and help design a project, operate a project or build and operate a project that we can be proud of that we basically can check that it's operating without a lot of impacts, particularly to birds and bats and other things like water quality.

So my little diagram, kind of outlining what we do, starting at the lower left, we start with early site assessment work. And I'm going to walk through each of these fairly quickly. But as we agree on a site we then meet with the agencies and talk to them about our findings and why we want to be here.

Now, environmental, unfortunately, is only

one small aspect of our siting and design work. We have to consider transmission capacity, zoning, all kinds of other factors. But, you know, when we settle in on an area then I try to help us fine tune where we put our facilities to minimize impacts.

But we do the studies that the agencies recommend. We meet with them. We implement our avoidance and minimization measures, siting or operational protocols and build a project that we like, and, as I mentioned, can be proud of.

Once it's operational, we actually monitor the impacts to birds and bats pretty carefully. It's kind of a science that has evolved substantially over the years where we actually have biologists that go out and count things that collide with turbines; birds and bats. And estimate the specimens that are killed, the numbers that are killed and if we have concerns about either of those then we work with the agencies to try to resolve those.

Now, Apex, since its inception, has commercialized about four and a half gigawatts of wind power. We have yet to have a project that operates that kills an endangered species, has killed an eagle. So we have a very good track record along those areas.

Some projects, however, we expect that to occur at fairly low levels and we work closely with the agencies to permit those impacts and I'll talk to you a little bit about that through my presentation.

So putting the pieces together, as I mentioned, initially, the site assessment, there's a lot of publicly available data. New York is great. We have great inventory of wetlands, waters, eagles nests, sensitive areas, bird migratory routes, things like that. So we can look at all that before we ever even get started. That's something that we did starting in 2014 on this project.

We met with the agencies. We deal with Fish and Wildlife Service, DEC -- preservation office, Army Corps of Engineers and, you know, talked to them about the resource issues that are here on what information needs to be obtained in order to move forward through development.

We then turn the resource specialists in the field and they collect their data. Here we started doing bird and bat studies in late 2014. We did quite a suite of studies for about two years looking at avian use throughout the site. Bat activity, when and where are the bats occurring and when are they there at high

levels, what species are there.

Raptor nests surveys. Winter grassland raptor surveys. Breeding bird surveys. Avian radar surveys. Quite a list. After we collect that data, we then sit down with the agencies and talk about it. What does it mean? How do we avoid it and minimize risk, particularly to those more rare or sensitive species that may be out there.

The figure on the top right is simply a representation of our avian use survey plots. The biologist stands at the center of each one of those circles which represent the habitats that we plan to disturb. They basically count what's there.

Small birds for ten minutes. Raptors and large birds, like water fowl and gulls and things, for 20 minutes. And then eagles for an hour. They do that once or twice a month and that gives us a picture of what's out there. When do we have peaks of avian activity?

There are certain times of year when sensitive species are present that we need to consider. Some of the other studies identify very specific habitats that may be occupied by a State-listed specimens, for example, a short-eared owl, northern

harrier, other raptor species that the DEC, in particular, is concerned with.

The figure on the bottom, the black dots are areas where we know there is potential bat habitat for State-protected species. So the black dots are where biologists have actually gone out, set up mist nets, which are nets which capture bats. And they actually collect those bats by hand, identify them, take biological measurements and release them. So we sample these habitats to determine what's present and, more importantly, what's absent.

So in the end we wind up with cool maps like this which I then send to our engineers. We call it a constraints map. It identifies areas where we simply can't disturb the ground or we can't install turbines or that we can't construct during certain times of the year.

So this helps inform some of those turbine locations or all the turbine locations that Paul was speaking about earlier.

Once the project is built and operational we then actually for the course of sometimes two, three and even more years will evaluate the impacts. So we feel that we have done a good job avoiding and minimizing

risk of impact to birds and bats in particular, but we want to check that work.

So we actually have biologists going out at different times of the year and basically looking under the turbines. And some areas we will clear the plot -- clear plots, study plots around the turbines. And other areas they will just walk the cleared areas of the roads and the pads and they will do that consistently and basically count the things that they see.

This has been done at a lot of projects throughout the U.S. and so we have quite a data set to sort of predict risk in different settings. And I will talk about that a little bit in this presentation. But we check that very carefully here so that if there's a problem that we didn't anticipate, we pick it up. We pick it up early and then we are able to figure out ways to address that issue.

How many of you can see the bat in the lower left picture? I sort of gave it away. It's right there.

With these studies when biologists go out and they find four birds over the course of a year at a turbine, does that mean that turbine killed four birds? Probably not. They may only find half the birds that

are out there because of grass or other visual interference.

Another ten of them may have been carried away by foxes or crows or something like that. So they didn't pick them up. So we have to adjust their count data for the biases that are in those studies. And so, as I mentioned, this science has evolved pretty substantially to measure those biases.

We actually put test subjects out there. We test the observers so that we understand their searcher efficiency. We look at how long carcasses persist before they decompose at different weather conditions before they are carried away by scavengers. That all goes in to understanding the facility-wide estimates.

So pretty interesting stuff, if you are bio nerd like me I guess. But hopefully it's interesting to you.

Ideally we have projects that are operating basically in areas that are still functioning the way they were before, from an environmental standpoint. So we don't have these massive utility wind turbines generating clean, renewable energy, but we are still having occupancy by all these important animals.

So, to review, early site assessments, we

kind of go through this tiered decision-making process to inform our studies, to inform our siting and operations and then our monitoring during operations and response if we need to. Really trying to avoid and minimize impacts where we can. And, where we can't avoid them, particularly when it's required by regulation for protected species, we mitigate those impacts.

I like to think of that as if we are going to impact a particular bird species, if we are going to be responsible for taking two or three out of the air each year, we need to be responsible to put five or six back in the air that same year. Sounds bad if you are the individual that collided with the turbine, that is bad. But from a population viability standpoint, our goal is to not result in impacts or unstable populations.

So it's kind of like the deer hunter. Go out, go deer hunting, kill a deer. It is not good for that individual deer. But the herd is sustained and well-managed through the process that's occurring.

Okay. So I mentioned the Fish and Wildlife Service letter. And, actually, what they say is, previously, in a letter to us -- Fish and Wildlife

Service in 2015 wrote a letter to the project. I believe I have seen it on the internet, particularly from some of the websites that are not necessarily in favor of the project.

And, basically, they say in the past, the Service, has recommended that wind projects are not sited within three miles of the Great Lakes shoreline. They also have completed radar studies along the Great Lake shoreline. One study site is just to the west of our Lighthouse project that documents pretty large movements of bird and bat migration through the area.

So the issue with the Fish and Wildlife Service letter is interesting. It was written in 2007 and 2009. Actually two letters written to a project in Michigan, along the shoreline of Lake Michigan. That was in an area where there was not a lot of fatality studies done at operating projects, not a lot known about risk of projects sited near lake shorelines. And so there was a lot of concern.

But that project has since been constructed, has been operational, and has bird and bat impacts very similar to projects that operate in an Iowa cornfield or an Oklahoma ranch land area. So some of those worst fears from those earlier letters and advice were not

realized. They did not come true.

So that information though gets carried forward and used sort of to suggest that the Lighthouse project is a bad location. And the Fish and Wildlife Service radar data, which shows a lot of bird movement, particularly during the spring and fall migration, primarily the spring along the south shoreline of Lake Ontario, gets used to say there's a lot of birds here, you shouldn't put a turbine there.

But, fortunately, what we have seen is, as we have seen projects become installed along the Great Lakes, along the Atlantic Coast, along the Texas Gulf Coast where you have massive quantities of birds migrating through or wintering and stopping over there before flying across the Gulf, the fatality rates are very similar to what we see at projects throughout the country. So the risk profile presence of these large migratory movements doesn't necessarily equate to high collision risk.

So I will present some of the data that is behind those comments and we can talk about it.

So, in 2009, around the time of those Fish and Wildlife Service letters, some projects have been studied with various techniques. But, really, there

were only about a handful, about 14 that actually used fairly standardized methodology, sampled enough turbines, came up with reliable fatality estimates for birds.

The results weren't necessarily alarming. But it wasn't a lot of data. Not many projects -- none of the projects actually, at the time, were along coastal areas.

In 2014 though we have about ten more, ten times more studies. In 2017, we have about 250 studies, all of which have used very sort of defensible methods and techniques for estimating the fatalities. Most done in coordination with their regulatory agencies and the regions where they occur.

So we have this really large body of information to start teasing out, you know, what are the effects of wind energy.

This is an example -- basically those bars represent some of those 250 studies. Actually it's all of them. And we see the average is about three birds per megawatt per year.

You can also look at these as a per turbine, birds per turbine per year. But, the important thing is the impact on birds is actually quite low. When you

think in terms of there being ten billion, estimated ten billion birds, breeding birds in the U.S. in the spring of each year, and actually about twenty billion in the fall after reproduction. The impacts at this level are really very, very minor and they are spread across many species.

We look at the impacts of projects in the northeast or in New York in particular. We start to see patterns. They are very similar to what we see in the Midwest, in the Western U.S., in the Rocky Mountain States, the Appalachians, et cetera.

So the asterisks are New York projects. But, again, we see an average that is actually slightly lower than the national average in New York of about three birds per megawatt per year.

I meant to replace Maine with New York in this slide but didn't get around to it. But, again, this is just indicating that the birds per megawatt and birds per turbine per year within these 250 study sites is very consistent. Regional averages, state averages. New York is actually slightly less. They are very similar to Maine actually and similar to the Canadian averages. So we start to see kind of the same patterns.

We look at what actually is affected, what

birds. The majority of them, of those impacted are neotropical migrants. The little, small birds that migrate very long distances from Central and South America up into North America and Canada for breeding.

The fortunate thing about these is that they are very high reproductive rate birds and also very high mortality rate. So I mentioned ten billion in spring. Twenty billion breeding birds in the U.S. in fall. The next spring that's back to about ten billion.

So a lot of those die from electrocution, collision, "credation" and other causes. Some do collide with turbines. But the percentage that are actually flying into turbines is very small relative to other natural and human-caused types of mortality.

I should mention that we see -- we also find very few water fowl or water birds; gulls, terns, cormorants, herons, that sort of thing, in these data sets, which is an important consideration for these near-shore projects.

So to get your bearings, the slide on the left is the Great Lakes. The turbines are shown that are operating currently are shown as yellow dots. So we have a lot of projects that are operating in very close proximity to the great lakes.

The slide on the right is the Texas Gulf Coast. We have a lot of turbines operating right there and that actually has a phenomenal concentration of birds compared to the Lake Ontario shoreline. Some of those projects in Texas are basically right next to national wildlife refuges whose specific purpose is for bird habitat protection and protection of very large concentrations of wintering birds.

So a lot of these projects have been studied. We see the impacts are very similar to other projects in the interior of the U.S. Sometimes you have slightly different species composition, but the overall fatality rates are very similar.

This is a New Jersey project. A smaller utility scale project near Atlantic City. It operates in the presence of literally tens of thousands of terns and gulls and sandpipers and plovers and that kind of thing. Again, as it's studied very intensively, we see very little mortality there. So a lot of information to work with.

The other comment that I made was there have been Fish and Wildlife Service radar studies throughout the Great Lakes and basically they have been designed to evaluate the number of critters that fly by, when they

fly by and at what heights and at what numbers. So they have done a good job documenting that a lot of birds fly along the south shore of Lake Ontario or stop over there, particularly in the spring.

Their recommendation, remember, is no winds -- wind turbines within three miles. Their data basically shows that from zero to ten miles you have a lot of bird movement, and bat movement, and actually some of the larger movements is further inland, more like the ten mile inland study site.

So -- but the yellow -- the orange dots -- Maine is a nice state from a data standpoint because they have required a lot of preconstruction radar surveys and then those projects have gone on to be operational and so then you have preconstruction radar data, post-construction fatality data. The dots on the right we see fairly consistent passage rates of birds moving through an area.

And then the bars represent the fatality rates documented during operations and we see no real relationship between the two. So it kind of supports this idea of service documents high levels of avian movement. But it doesn't mean high presence is going to result in high mortality and actually even the highest

levels of mortality are relatively low.

What we do know is that lights attract birds and projects that leave a light on in a nacelle or have lights on in substations, that kind of thing, can have higher impacts. So that's something we can manage against very carefully by making sure the lights are off.

We avoid the use of guy wires on our met towers in particular. Put bird flight diverters on transmission lines where we install those and help minimize risk.

So, to kind of wrap it up, just to summarize, basically, we are seeing that we are anticipating that the impacts of the Lighthouse project will be very low. The data that we have, which is pretty robust data set, suggests that it's going to be very similar to the other coastal projects, the other New York projects, the other inland projects in other parts of the U.S.

There really aren't any data or studies along these coastal areas that suggest this would be a problematic site. So I think the important component is we have done a lot of screening work and a lot of preconstruction coordination with the agencies to make

sure this is okay and to take proper precautions in how we design and operate the project. And, once it's built, assuming it's built, we are going to monitor those impacts carefully and be in a position to respond.

So with that I hand it over to --

MS. COLEMAN-GRAHAM: Okay. Dave, thank you.

And, again, if you have questions for him, same thing as before, jot them down, pass them to the aisles. You can see we are kind of sorting them and getting them ready here.

Now, it's Rob.

MR. O'NEAL: Good evening, again. My name is Rob O'Neal. I'm with Epsilon Associates.

I've been doing community sound studies now for a little over 30 years. The last 14 of those years I have really focused on wind energy projects. So I have seen a lot of turbines, studied a lot of turbines, measured a lot of turbines, stood underneath a lot of turbines.

I am board certified by the Institute of Noise Control Engineers and I also am a certified consulting meteorologist. And tonight, I know we are getting into the evening here. I hope everyone can stay awake. I have got sort of five topics I'm going to

touch on each one relatively briefly.

The first thing I'll talk about is a little quick sound 101 by way of background. Some of it will be old hat. To some of you folks who might be new, it might helpful in terms of what we will talk about later.

The second thing is a little bit about monitoring, how we measure sound for this project and other projects. Third thing is modeling. How do we predict sound levels that we can expect from a wind turbine project such as the Lighthouse project?

Number four, I'll talk a little bit about infrasound and low frequency noise. Again, a topic I get a lot of questions about sometimes. And, finally, I will wrap up with a few design goals and permit conditions that a project like this is likely to end up with.

So a couple slides on sound 101. Two sound sources of equal sound level. Since sound in decibels are logarithmic. So a sound of 30 decibels add to a sound of 30 decibels is 33 decibels. It's not 60 decibels. So that's logarithmic math, decibel math. Just basic concept. But it's important to keep in mind.

On the other hand, if you have a source of sound that's at least ten decibels louder than another

source of sound, this hypothetical example, a cricket at 30 decibels, an air conditioner at 40 decibels, but what you hear really is the 40 decibels. Ten or more decibels louder is generally just going to be just the loudest source of sound.

Sound is made up of frequencies. Different wavelengths of different frequencies. Long wavelengths are low frequency infrasound. Middle wavelengths are just that, they are in the middle. And high frequency have very short wavelengths.

This graph here shows you a chart of one-third octave band frequencies on the bottom. The infrasound range is from 20 hertz and below. I should mention frequencies are measured in hertz, cycles per second.

So infrasound is 20 hertz and below. And the message here is that at each of these individual frequencies, this curve here shows audibility. So for us to hear infrasound, the source of sound would have to be very, very, very loud.

For example, at four hertz would have to be about a 105, 106 decibels at that particular frequency to be audible.

Now, our human ear hears very well at the

middle and higher frequencies. So right down here you can see that this audibility curve goes much lower. So, again, this shows you the different frequencies, the different sort of categories for discussion sake about infrasound and low frequency.

This next graph we usually talk about A-weighted decibels. So the A-weighted is basically taking all those frequencies together and giving you a one number. So each individual frequency adds up to total X dba or A-weighted decibels.

And, again, this chart, this is a stand -- this is by ANSI standard that every frequency has a certain contribution to A-weighted levels. And, again, the middle frequencies and higher frequencies contribute pretty equally and pretty much straight up to the A-weighted levels.

The low frequency infrasound does not. We don't hear those. That's the takeaway from this slide.

All right. Enough of the sound 101. The second thing I want to talk about was monitoring or measurements. For a project such as this, Lighthouse, or any other wind project, we have sound level instruments like this.

We have lots of sound level meters. They

have ANSI standards associated with them. We use and follow the ANSI standards to collect and measure sound levels in a community like the Lighthouse community and any other place we measure sound.

For wind projects, we also measure ground level winds and wind speeds. That's what the small six foot or two meter meteorological towers in that bottom photograph. So this type of equipment is what is used to measure sound.

This slide here is from a publicly available report. It's not the Lighthouse data. But it was collected in a rural community in New York State and it's over a two week period.

What it shows you really, the message here is what the variability is of sound in rural New York State. And I would expect that Lighthouse probably will not be markedly different than this.

What you have got here in the multi colors are four different locations within a community showing you the ups and downs over the course of two weeks measured 24 hours a day. Okay. And what you can see is the sound levels vary from as low as 17 decibels when the winds are basically dead calm.

This blue line at the bottom is the ground

level wind speed. To as high as 54 decibels appear on some occasions. And a lot of communities, like this area, wind itself will drive sound levels in addition to other manmade sources of sound.

And the point, again, this graph is the sound is not always at 17 decibels or 20 decibels. It is not always at 50 decibels. It varies quite a bit up and down, day and night.

All right. The third topic I want to touch on is modeling or sound level prediction. How do we take the layout that Paul and his team are going to give me and then calculate or estimate what the sound levels could be at every home in the community?

So to do that it's a pretty detailed process. There's a lot of bullets in here. I'm not going to hit every single one of them. The point is there's a lot of information we need to do those calculations.

We follow an international standard. ISO 9613-2 standard, which is what pretty much all voice calculations follow to take a source of sound and then take that source of sound and calculate it out to a location somewhere out in the community.

We get the layout. We need sound levels

from the turbine. Paul mentioned Vestas V150. So we get that sound level data from the turbine.

What is important to know about sound levels from a turbine is every manufacturer does very detailed tests of their turbines. Again, according to standard. And they provide a spec sheet. On that spec sheet it will tell us that the sound levels from their turbine are going to vary by wind speed.

So at what they call cutting wind speed, which is usually around three to four meters per second or seven to nine miles per hour up at the hub height, then the blades will start turning. Below that, they don't turn and no sound.

So at that cutting wind speed there is a certain sound level and it might be -- I'll say it's down here. And as the wind continues to increase, sound levels from the turbine will also increase until it reaches a plateau, usually around nine or ten meters per second, which is 18, 20 miles an hour, roughly.

And, at that point, even if the wind continues to get stronger and blow harder, the sound levels will not increase from the turbines. The sound levels plateau at that point. The blades feather and pitch and do certain things. So the wind might be

blowing stronger and making more noise at the ground, the wind itself, but the turbines will not generate any more sound.

That's important because we use that information, we use the highest sound level from the turbine spec sheet and we use that in our calculation. I'll show you in a minute here what you can expect for the worst case sound levels. We don't bother doing the much lower wind speeds and those lower sound levels. We go right to the worst case, which is the highest sound level from a turbine.

The last bullet at the bottom here too, this international standard requires that you make this worst case assumption that the wind is always blowing from a source of sound to the house. So even if your house has got a turbine to the east and a turbine to the west, the sound model blows the wind from the east and from the west at the same time. We do calculations at home, which is a little bit of conservatism because we know in the real world the wind doesn't blow from two different directions at the same time. So, again, it's a little bit conservatism. It is built into the standard and we are required to use that.

All right. So, again, this is not

Lighthouse. We haven't done this yet. But this is a real wind farm. It's the Eight Point Wind Farm in Steuben County, New York. This is publicly available. I worked on this one. It was submitted, their Article 10 application, a few months ago. You will see something like this for Lighthouse as well.

This shows the entire wind farm. From the seats you can't really see what's there. I apologize. But the point is this is the entire wind farm and a lot of information is there.

There's 20 different tiles or inset maps. I'm going to show you an inset map. This is what you are really going to see from the modeling effort. You are going to see every, every home. So, in this case, they are -- again, it's tough to see.

There's -- there's receptor numbers. There are symbols on there indicating where every house and where every turbine is shown. So here is a turbine right here. Here is a turbine right here. And then there are sound contour lines showing what the expected worst case sound levels are in the community anywhere within at least a mile of a turbine.

So you will have that same information for this project once we finish our work and that goes into

the application. There will be detailed maps like this showing the expected worst case sound levels.

This slide here is, again, not from Lighthouse. It's from another meteorological tower from another New York State wind project. What it shows you is one year's worth of hub height wind speed. So this is 8,760 hours. That's how many hours there are in a year and it is the hourly wind speed from January 1st to December 31st.

And, again, the message here is the wind does not blow constant all the time. It varies, up and down. Just like the map I showed you of existing sound levels, hypothetical example.

It can be down here at two meters per second, which means the turbines are not turning. It's below cutting speed.

People only at six meters per second. Eight, ten, 12, 14 meters per second. Once you get to those top wind speeds now you have got your worst case sound levels. Again, you are not going to experience those loudest sound levels all the time. It's going to vary by time of year, by wind speed.

This next plot shows you, again, hypothetical example that someone did in a paper that

took a year's worth of wind speed data, similar to what I just showed you in the previous slide, and they calculated what the sound level would be at a particular location for an entire year.

And, again, you can see every hour of the year where that wind is below the cutting speed and the sound level is zero from the wind project. The rest of the time it's going to be varying somewhere between 20 and 40 decibels at this site.

And what we are going to calculate is that worst case sound level right up here at the highest point. That's what you are going to see calculated.

Question I often get is, you know, how accurate are these models? Are they any good? Should we believe them? It's a fair question. Myself, and a lot of other engineers in the business, have done post-construction measurement programs to determine that. What we have found is that they are accurate.

If you put in reasonably conservative assumptions into the model, like we just talked about, the measuring programs we have done after the fact confirm the modeling as being accurate. Usually the actual sound levels are a few decibels lower than those predicted. It's hard to find those incredibly perfect

conditions to get the maximum sound levels that we are modeling.

The next two slides just show a couple of publications. This is a conference paper that I wrote which goes into the details of one of the programs I did to confirm operating wind farm sound levels were a little bit lower in reality than we modeled.

The second one here is the cover from a government-sponsored research study on wind turbine acoustics that the State of Massachusetts sponsored. My firm was a part of one of the team members on the team to do a lot of detailed measurements of operating wind turbines again, and compare that to modeling and find that the modeling does a really very accurate job predicting sound levels from a wind turbine project.

All right. Fourth topic I want to touch on is low frequency infrasound. Again, a topic I get a lot of questions about.

If you remember the graph I showed early on, the low frequency is the 20 hertz and below piece of the graph -- I'm sorry. Low frequency is 20 hertz to 200 hertz. Infrasound is below 20 hertz.

Infrasound is not audible in community applications. That's not disputed. Low frequency sound

is audible. And, again, it's just part of the environment.

There are many different standards. These ANSI standards, the American National Standard Institute, that go into what are some reasonable numbers. Criteria to prevent vibration or rattle or annoyance from low frequency infrasound and these will be included as part of the application. We will look at some of these.

Peer-reviewed publication that I did seven years ago in the Noise Control Engineering Journal. We did some infrasound and low frequency measurements at some operating wind farms. I'll keep moving along. I'm getting the five minute warning here.

This slide here shows actual example of three measurements. Two of them from the project area at Lighthouse and one from another project that had an operating wind farm.

The red line, this shows you infrasound right here up to 20 hertz. Low frequency sound in here. And mid and high frequencies over here. With no wind blowing, dead calm, this is the infrasound here in the project area.

With a three meter per second wind blowing,

so about seven mile an hour wind blowing, this is the infrasound level here in the community today. No wind turbines operating.

This purple plot is from another community that does have a wind turbine operating and that's the infrasound in that community with strong hub height winds blowing.

Again, the message is, infrasound is not unique or -- is not unique to wind turbines. It's present in our environment today. It's in the room here tonight in the HVAC system.

Here is a measurement I took of an air conditioner. Again, this is infrasound right here up to the black line. This is the sound from an air conditioner.

And that's why I got my sound meter here. When I'm not talking into the microphone, when I'm pausing in speaking and no one is speaking here, the sound level is between 48 and 50 decibels. Just to give you a ballpark for decibels. Because sometimes they can be kind of cryptic.

All right. So I'll wrap up here with some design goals. As Paul alluded to in his remarks, the project will be designed to be 45 decibels, or less,

under worst case conditions at a nonparticipating residence. That's outside. Sound levels inside will obviously be lower.

There will be low frequency noise, guidelines and criteria that the State is going to impose on this project and will be designed to. There will be tonality requirements. Again, wind turbines don't make tonal noise. That's a pure tone, that high pitch hum right here. The substation can be a source of tonal noise and that will be examined very closely to see if there are any tonal implications there. If there are, there will be noise control put in for that.

I think with that, I'm out of time, and I'm out of slides.

MS. COLEMAN-GRAHAM: Okay. Thank you.

Once again with the cards, if you have got questions for Rob, please pass them to the aisles so we can collect them.

And, Jim, I don't know if you want this microphone or if you are going to use that one.

MR. MUSCATO: I will try this one.

MS. COLEMAN-GRAHAM: Okay.

MR. MUSCATO: My name is Jim Muscato. I'm permitting counsel for Lighthouse Wind in the Article 10

process. So, as I said before, my name is Jim Muscato and I'm permitting counsel for Lighthouse Wind in the Article 10 permitting process. Article 10 is the name of the permitting. It's actually the name of the State law that is required to be followed for the permitting of this project prior to construction and operation of the Lighthouse Wind Project.

Article 10 is -- the result of the Article 10 process, if the project is approved, will result in the issuance of a certificate of environmental capability and public need.

Just very quickly, there are multiple phases in the Article 10 process. There is a preapplication phase, there's an application phase, there's a hearing phase and there's a compliance phase.

This project is very early in the Article 10 process. It's in the preapplication phase. A scoping document was filed in 2015 and since that time parties that have been involved in the Article 10 proceeding have been working on finalizing stipulations and the stipulations are, in essence, all of the studies and content of the application. The stipulations will reflect agreements on those studies and on the content of the application.

So following the finalization of the stipulations and in parallel with that, the consultants and experts that you have heard from today, as well as many others, will be working on the contents of the application which, as Paul said earlier, is anticipated in the spring or early summer of 2019. And so those are the immediate next steps in this process.

Those are the only remarks I had on the Article 10 process, Paul, so I'll kick it back over to you.

MS. COLEMAN-GRAHAM: We are talking about microphones here so we don't have a problem. Thank you.

I am going to bring this one over to your table because this one seemed to work quite well. There seemed to be some interference. So you guys can share that.

We are going to move into the question and answer cards here. Like I said --

MR. WILLIAMSON: Rita, your microphone doesn't appear to be on at this time.

MS. COLEMAN-GRAHAM: Right. There we go. Jason just got back there.

Okay. Now, the first questions that I have, the first stack here is, I think, mostly for Paul. But,

you can hand it off if you think somebody else is more appropriate to answer it.

This deals with the Tiger Paw Airport. How can you position three turbines in close proximity to Tiger Paw Airport?

MR. WILLIAMSON: So I have -- can you hear me?

So I have to confess, I'm not familiar with the location of Tiger Paw Airport. But I can say that we have filed notice with the FAA and the FAA has reviewed the turbine heights, the turbine locations and present no negative -- their findings present no negative impact on line of sight or navigational aids that this project would have on any airport.

MS. COLEMAN-GRAHAM: Okay. The next question: Is there any type of buffer zone distance where a neighbor would not be allowed to build something or construct something of any type like homes, barns or silo?

So they are looking to see if their ability to do something on their property is restricted based on a distance from a turbine or a facility.

MR. WILLIAMSON: So, in response to that question, from our work and our perspective, we do have

elements within our agreements that prevent somebody who we have an agreement with from building a high structure within a certain distance of our turbines. But, other than that, we don't have any further prohibitation of such activities.

Now, there are elements within recently adopted local zoning, local zone rules, that suggest that a permit application for a structure that was made within a certain distance from the turbine may be prohibited. But that is a town zoning rule that's been adopted and from our initial review of that it doesn't appear that that would be State supported.

MS. COLEMAN-GRAHAM: Okay. That's kind of a segue into the next question really.

On this project, will Apex be following setback distances as laid out by the Towns of Somerset and the Town of Yates? There are several similar, but I'll just read that one.

MR. WILLIAMSON: Sure. So Town of Somerset and the Town of Yates currently have setback distances in their zoning laws that would prohibit any development of a commercial utility scale wind power project in either town. So we are currently designing the project based on looking at projects that have been built,

permitted and safely operated within the State of New York.

We have looked at all of the standards for those types of projects and we have designed this project with the intent to meet or exceed all of those standards and we feel very confident that in doing so we can build and operate a responsible project that is safe for both communities.

(Indiscernible comment by audience member)

MR. WILLIAMSON: Again, we are designing the project according to the standards that we believe are safe and that would be acceptable by the State of New York.

MS. COLEMAN-GRAHAM: Okay. The next question we are going to take it to Tracy. It's his turn now.

There's several questions dealing with the substation. Where would it be located? Do you know anything about the layout of it?

MR. BUTLER: Sure. So the substation ideally is located near the point of interconnect, which is the existing transmission grid. The exact site has not been picked out yet.

The general layout of the substation, as I

mentioned, it will consist of several circuit breakers where each of those collection circuits come in. There will be some switch gear. Also then the large step-up transformer. So the configuration is basically circuit breakers, switches, the transformer and then it gets hooked, like I said, to the grid.

MS. COLEMAN-GRAHAM: Will you be using the existing substation?

MR. BUTLER: No. We have to build one specifically for the project.

MS. COLEMAN-GRAHAM: Okay. And will new high voltage power lines be required?

MR. BUTLER: No. The intent is to build our project substation near the existing transmission line such that we wouldn't have an extensive high voltage overhead line. It would just be a simple slack span from our project substation to the existing line.

MS. COLEMAN-GRAHAM: And where do you plan on locating the construction staging area?

MR. BUTLER: We have not nailed that down yet. Most likely it would be on a leased piece of land, but we don't have that exactly figured out yet.

MS. COLEMAN-GRAHAM: There were several questions to that one.

MR. BUTLER: Okay.

MS. COLEMAN-GRAHAM: This is a two-parter. Do the rotors of the turbines begin turning by wind power alone?

MR. BUTLER: So modern wind turbine has conductive coils in it that requires a little bit of power to energize those coils. So it will just set there without the wind blowing obviously, it won't turn without the wind blowing. But there is a little bit of power that comes to it to allow it to run. Then, when the wind blows, it generates power.

MS. COLEMAN-GRAHAM: Okay. The second question is really now I'm transitioning I think over to Dave on this one.

Why do other agencies, health departments, migratory bird agencies, for example, disagree, and so strenuously, with your data?

MR. PHILLIPS: I'm actually not familiar with the agencies or other entities that you are describing there. So we haven't had our data contested by any particular agency.

There are some environmental groups that I think are not happy with the site choice from a bird-risk standpoint. But that's really all I'm

familiar with.

I apologize to the questioner that I'm not able to answer it too well.

MS. COLEMAN-GRAHAM: Okay. Next questions here for you, Dave.

Are there any environmental hazards or risks to the area during or after construction of the turbines, any environmental hazards or risks?

MR. PHILLIPS: So Tracy may be better equipped to answer some of the questions. There are some fuel tanks at the construction staging area with precautions taken to avoid spillage or ground water contamination. They are pretty standard State and Federal kind of approaches.

The only other real hazard, that I can think of -- well, there is sedimentation runoff in particular in areas that are most steeply sloped. But we take erosion control measures to keep the soil on site during construction.

Late in construction, when the project is approaching operations, we actually go through a period of testing power. So it's technically not commercially operational, but it's functioning like an operational wind project, or certain turbines are. At that point

that's when the kind of bird and bat collision risk issue would become more apparent.

MS. COLEMAN-GRAHAM: Okay. Let me interject. We have one question here that's really to me and to the table. So let me give you a break for a second.

How do you determine which questions to ask tonight and which ones not to ask?

Very good question. First, I have to be able to read them. And what we are trying to do is group them together and then take similar ones and take whichever one sort of asks the most.

And, I'm also trying to make sure that we give them some hardball questions and, especially, as we are leading off here.

So all the questions will be answered. We just have to select some that we can do here tonight. But I am trying to make it as representative as I can.

Okay. Back to you, Dave. What are the proper precautions you are taking to minimize bird and bat fatalities?

MR. PHILLIPS: So, starting with birds, the primary siting measure -- well, one that we are kind of doing voluntarily, even kind of in, you know, not

necessarily in response to the data, but siting back, to some extent, from the shoreline, doing that as a more higher activity or a potentially higher risk area.

Avoiding wetlands, avoiding forest habitats, as much as we can, and trying to focus our ground disturbance in previously disturbed areas, i.e. tilled agriculture.

For bats, same thing, we really avoid the forested habitat where we have summer roosting, maternal colonies present. We also plan for this project to operate the project during the fall migration period, which is the bats, doesn't feel like fall, but July, August and September in this part of the country when we see a higher -- an elevated risk or higher mortality of bats.

So during that period, we actually raise the cut-in speeds of the turbines. So we feather the blades at the real low wind speeds and then up around five meters per second, when most of the smaller bats are not flying, it's basically too windy, we then unfeather the turbines and allow them to operate freely.

So we sacrifice a little bit of power generation, but we dramatically reduce the bat mortality that would otherwise result. The DEC estimates that

reduction would be about an 80 percent reduction in bat fatality. There's other research that operating at five meters per second.

MS. COLEMAN-GRAHAM: Okay. And excuse me if you had already answered this as part of that answer, but I want to ask the question.

How far from the turbine of 591 foot tip height do you examine for bats, song birds or raptors? How far out from the turbine of that height?

MR. PHILLIPS: Great question. A lot of that is basically determined by the agencies. But, there's a lot of research that we rely on to evaluate that and it can depend on the focus of the monitoring.

So most bats, believe it or not, fall very close to the nacelle, within about 40 meters or so. So if we are focusing our monitoring on bats, it's really kind of almost wasted effort to search out beyond that to pick up a few potential steady targets where some of the larger birds, particularly raptors, can fall even beyond the rotor radius.

One of the things that I mentioned the biases in the fatality monitoring studies. One of the correction factors that is applied is called an area correction factor. So, if we do a survey say out to 60

meters or out to a 100 meters, then we have to compensate for those areas that we haven't studied.

I also mentioned that in some -- we will often study just roads and pads for a subset of the project because we can study those very quickly. We have super high search efficiency. But we have a very kind of small area that's represented by that study. So we can study roads and pads really as far out as we want, you know, but then we sacrifice the other area that would not be otherwise evaluated.

So it's a long answer. It depends what DEC and Fish and Wildlife Service recommend. A standard is about 80 meters. But that's not consistent across all projects.

(Indiscernible comment by audience member)

MR. PHILLIPS: So the question was the turbine is 200 meters tall. So we -- that's the area correction factor that I'm considering.

We will often study one or two turbines out to that kind of a distance and then you actually get a project-specific basically area distribution. So you understand that when you go out two, 300 meters how many targets you are actually missing when you only study out to 80 meters.

So, very good question. And it kind of goes into that kind of evolving science of fatality monitoring. Some of these questions we are asked after some of the early studies were completed. The way the data was interpreted, the evaluation of those biases that need to be addressed has evolved substantially.

MS. COLEMAN-GRAHAM: Okay. Would you consider turning off the turbines during bird migratory periods or to turning off the turbines at night to protect bats?

MR. PHILLIPS: Actually, yes. That's the curtailment or the feathering up to five meters per second is an example of turning off turbines at night to protect bats. We do that in periods of higher activity and which are June -- July, August and September in this area.

For birds, I think that, you know, if there was an avian impact concern documented during a particular time period, I think that would be a viable approach. Other measures, which have been tried, are actually deploying avian radar. So that you are actually recording passage rates of birds during those higher use periods.

And, when they reach certain thresholds

within the rotor swept area, then you could curtail your turbines. So you really minimize your curtailment, but you do it in a time period that would potentially have the most effect.

MS. COLEMAN-GRAHAM: Okay. I have got two more for you. You are on a roll here.

Why do you buy - quote - kill permits - end quote - for endangered species such as bald and golden eagles?

MR. PHILLIPS: So there are permits for what is called nonpurposeful take for bald and golden eagles. Unfortunately, the cost of those is -- unfortunately it's not as simple as buying them. We go through a study process to evaluate the risk and the standards required by the State for permitting take of eagles and required by the feds, the Fish and Wildlife Service, are very different. The studies that are required, the process that goes into mitigating those impacts is very different.

But at a site like this, we know we have bald eagles, we document them in our surveys. Fairly low levels compared to a lot of areas in the State. But because they are present there's potential that over the life of the project some may be killed. So we need to

offset that.

The State standard is that we ensure a net conservation benefit to eagles. As I mentioned, if we are going to take three out of the air we want to be responsible for putting six, or something to that effect, in the air.

We can do that by working with the State to identify important mitigation projects that could be protecting a nest that may be potentially at risk of future development. So putting a conservation easement on the land near and around it so that that nest remains viable for life of the project or even in perpetuity.

There's other techniques that could be used for mitigation, such as lead shot abatement to reduce lead toxicity, funding wildlife rehabilitation that would potentially be rehabilitating injured or sick birds, that kind of thing.

MS. COLEMAN-GRAHAM: Okay. We are moving on to Rob now there. It looks like our house will have nine proposed turbines within about a mile of us. How do you know what the total sound will be? That's the first part.

MR. O'NEAL: Okay. Great question. So the way the modeling is done is we assume that all 47

turbines, including the nine around the questioner's house, are operating at full production, full power simultaneously. So we are going to assume all nine of those are producing their highest possible sound levels and calculate those at every residence in the study, including the questioner's.

MS. COLEMAN-GRAHAM: Okay.

The second part of that is: Where can we go to hear what that sounds and feels like, someplace that has the same size turbines?

Might be more Paul.

MR. O'NEAL: Might defer to Paul if he knows of any four megawatts that are up and operating today.

MR. WILLIAMSON: There's a number that are currently in the permitting process that are in advance of this project and I'll kick it back over to Jim to see if he can specifically talk about it. He may or may not be able to identify any.

MR. MUSCATO: There's a number of operating permit projects in New York. I was just saying there are a number of operating projects in New York.

New York has approximately 1,700 megawatts permitted wind projects. There's projects in Steuben County, Wyoming County. There's operating projects in

Clinton County. Obviously Lewis County, and other places. So any one of those would be potentially representative.

MR. WILLIAMSON: To address the question more specifically, the -- this is a more advanced model, a newer model, and a larger model than what you see at the additional or the existing operating projects.

At the same time, this is actually a much lower noise generating model than the previous. So with every generation of these turbines that are being created, the technology is improving, sound levels are going down, blade technology is improving, including putting serrated edges on the following portion of the blade, which helps reduce the amount of noise.

And Rob might be able to talk a little bit more about how some of that technology is evolving. And so these turbines that we will be installing will actually be lower noise models than anything that you currently see in New York.

MR. O'NEAL: It's worth expounding a little bit about what Paul said. He's right in terms of this new, the Vestas V150 4.2 that was the current potential turbine under consideration for this project has been submitted in other permit applications in New York.

Most recently the Blue Stone Project is looking at that turbine as well.

So I have seen the sound spec sheets and I can confirm what Paul said that the sound levels from this turbine, even though it's larger than some of the existing turbines here in New York, because of the technology of the serrated edges that Vestas puts on these now it is actually quieter than some of the older turbines.

Even though you can't see a 4.2 operating right now in New York, the sound profile of that is actually a little bit quieter than some of the older ones.

MS. COLEMAN-GRAHAM: Okay. This is a question that might pertain to one of your slides, Rob. Is the worst case sound map an average over time or is it a peak sound?

MR. O'NEAL: So, it's generally what you would expect to see if you measured for an hour or less. So the worst case wind blowing that time turning. As I said, the sound level from the turbine, once it reaches a certain wind speed, isn't going to increase any more.

You may get increased sound from a gust of wind itself which may raise the sound a little bit due

to the wind gust, but not from the turbine sound. So the map that I showed before in the example, the ones that you will see in the Article 10 application, are going to be short-term, highest sound levels.

MS. COLEMAN-GRAHAM: Okay. This is a series of three short questions that appear to deal mostly with stuff that's going on during construction and noise.

What infrastructure is required to install the towers, like roads, et cetera? And next part of that, so you know what it is leading to, is what is the impact on the noise level? I have read it can increase as much as four times.

MR. BUTLER: Okay. So I'll talk about the infrastructure that needs to be built and then Rob can talk about the sound, I suppose.

As I mentioned, you know, to get the turbine components to the project site we will have to do some road upgrades as well as build our own private access roads. So there's obviously some construction noise with building roads.

The other infrastructure is the collection system, which I mentioned is the trenching of the cable through the field. There, again, there's some construction equipment. So that would be a typical

construction noise.

And then the project substation, which would be pretty standard-issue construction as well. But that's the infrastructure that has to be built.

MS. COLEMAN-GRAHAM: Okay.

MR. O'NEAL: I can try to tackle the last part of that question.

So, once we have a general sense from Tracy and his team about the expected equipment that would be use in construction, which is generally your standard diesel-powered construction equipment. They are required, as part of the Article 10, is a construction noise analysis.

We will take that information and we will do sound level calculations of this diesel-power construction equipment at various locations within the project area on the nearest homes to the construction of those turbines and roads and so forth. So we will have expected construction sound levels as part of the application.

MS. COLEMAN-GRAHAM: Okay, Rob. Thanks.

I think the third part of this card is really for Paul.

Can land under and around the towers be

used, such as farmed?

MR. WILLIAMSON: I'll actually partner a little bit with Tracy on this, the answer to this question.

But, generally speaking, yes. And we have operating projects where right up to just a small buffer around the foundation or around that pedestal that comes up above the foundation can continue to be farmed.

So, again, if you recall that diagram that Tracy showed, it's kind of an upside down mushroom and where that upside down mushroom gets deep enough, as long as there's appropriate soils in excess of about 18 inches or so, then that can be farmed and it is.

Typically speaking, and this is somewhat rough math, and Tracy might refine this a little bit. Typically speaking, when we build a wind turbine, we are utilizing about one acre of land actually to build and that includes the laid out space around the turbine where the base is sitting, etc. But then once we have completed that we decompact the soils and the turbine itself is actually occupying a little bit less than a quarter of an acre.

And so when you look at how wind projects operate, in particular, in rural areas where there's

agriculture, it's just a really wonderful, compatible activity to happen in an agricultural rich area because it allows diverse revenues for the land owner for the farmers.

And, as we all know, farmers, the pressures upon farmers are continuing to increase while their revenues are not increasing. So having that additional diverse revenue coming in from a wind turbine that's really not taking up a whole lot of space and allowing them to continue to use a huge majority of their space to continue their farming activities is really a fantastic benefit for a community like this that is an agricultural community.

MR. BUTLER: Okay. You have got it right, Paul. So, as I mentioned in that diagram of the foundation, the pedestal comes up out of the ground. That is about 18 feet in diameter. And then there is a gravel beauty ring is what we call it where the access road comes to the turbine and there is a gravel ring around the bottom that is about ten feet wide. So that's pretty much the only ground surface that's occupied and you can farm right up to that.

MS. COLEMAN-GRAHAM: Thank you.

These two questions deal with

decommissioning. Okay. So I don't know if that's Paul or if that's maybe Tracy or Steve.

Can you please reiterate what happens to a turbine tower at the end of its service life?

MR. WILLIAMSON: I'll start with that and before we get to the end of its service life, I'll just talk a little bit about both our practices, as a company, and also the requirements within the State of New York are that we come up with a full decommissioning plan. That decommissioning plan needs to include financial security, that it is aligned with any costs associated with decommissioning.

That financial security is pledged for the lifetime of the project so that if we, as a company, ever go away, there is still the financial resources needed to decommission that project and that decommissioning plan needs to be revisited every several years and any changes in market forces, cost of materials, cost of labor, expected cost of decommissioning is updated. And, if needed, that financial security that goes along with decommissioning plan is updated as well.

So that's what we do on the forefront of the entire thing. And I'll let Tracy then talk a little bit

about how we actually take them apart.

MR. BUTLER: Sure. So the decommissioning itself is really just the reverse of the construction process. Cranes will be brought in and the turbines would be taken down piece-by-piece and then hauled off.

And then, depending on what the regulations are, the foundation would be removed down to a certain depth. So the whole thing probably wouldn't come out. But I believe here it is the top four feet would be busted out and removed so that you could restore that.

The access roads would also come out, unless the land owner or farm owner wanted to keep it, then it would just stay there. But, you know, if it was not desired to be kept, the stone gets taken off, then it gets decompacted and you can farm right over that as well.

MS. COLEMAN-GRAHAM: Okay. Have any turbines --

MR. WILLIAMSON: Real quick, I actually have additional question for Tracy that I have kind of wondered about and some of my colleagues and I were just recently talking about.

In the case where we are decommissioning and we have underground collection lines and those

underground collection lines may be underneath the amount of soil that we are planning on decommissioning, we have contemplated whether or not we would remove those lines, largely because of the value of the copper.

MR. BUTLER: Yes. So, that's a great question.

So I think that's really going to depend on the regulations and on the value of the copper at the time. Because if it's, you know, deep enough that it doesn't have to be decommissioned and the copper prices have it not being worth that much it would stay and effectively be, you know, three and a half or four feet deep and just sit there.

If it was such that it did have to come out, it's surprisingly easy to take out. A dozer basically hooks on to it and just pulls it out of the ground.

MS. COLEMAN-GRAHAM: Have any turbines been decommissioned in New York State as of this date?

MR. BUTLER: I don't know of any.

MS. COLEMAN-GRAHAM: Okay.

Two questions here for Jim. At least, I think they are for Jim.

Since both towns have opted out of the tax code 487, how will the turbines affect land owners

assessments?

MR. MUSCATO: Well, so I'm not the tax counsel. So I don't know that I'm the best person to answer the question actually.

MS. COLEMAN-GRAHAM: That would be one then that will be researched and answered and posted on the website.

Okay. Another one that Jim, we will try this. Has Article 10 been tested Constitutionally given New York State's home rule?

MR. MUSCATO: Well, so if the question is has there been a challenge filed against Article 10 in a civil court challenging its Constitutionality, the answer is no. There has been no Constitutional challenge by anyone in a civil case in New York.

MS. COLEMAN-GRAHAM: Okay. The next question is a little bit more loaded than that one. Do you believe Article 10 should preempt home rule?

MR. MUSCATO: I'm not certain what I believe really matters.

I think the fact is the State law, as it is right now, and projects that are going through the Article 10 process don't have the opportunity to either opt in or opt out. It's a mandatory provision of the

Public Service Law that if a project is proposed that is 25 megawatts or greater in size that it has to go through the Article 10 process.

And so up until the time that the legislation is changed or something else happens that's -- there's really no choice in the matter.

MS. COLEMAN-GRAHAM: Okay. These are ones from the other box. So we are not sure which of you will be answering them. These deal with property tax and land values.

Are the wind mills taxable as property to the homeowner? And, if so, who would pay that tax?

MR. WILLIAMSON: I'll add a little bit of information to that based on our agreements with the land owners. I don't know, Jim may or may not be able to add anything else based on State Law.

But with all of our lease agreements, we verify that any additional taxes assessed onto a property that are specifically due to the wind power project, any facilities or assets that we put on the property, we are fully responsible for.

The company, the wind power project is fully responsible for any of those additional taxes. We are not responsible for the base level taxes for the real

estate itself that already existed. But we are responsible for any added assets and the land owner is not responsible for those additional costs.

MS. COLEMAN-GRAHAM: Okay. There seems to be several, four, five questions here that deal with the possibility of a negative impact -- so I'm going to read this one first -- to property values.

If you truly believe an industrial wind farm will not negatively impact our property values, why not sign a property value guarantee?

MR. WILLIAMSON: So it's really difficult to look at any one area and determine what causes property values to go up or down. There's so many different market forces. And trying to identify one specific activity or one specific business that is responsible for increases or decreases of property values is somewhat difficult because there are so many different activities. There are market forces within the community. There are market forces outside the community.

And so -- but one of the things we do know that is absolutely true is that a healthy community continues to have high-value properties. In order to have a healthy community, as the slide that I showed

earlier, you need to have community renewal investment.

Community can't just be stagnant. You need to have a diverse tax base. You need to have diverse businesses and job opportunities for a community to be healthy. You have to have low and consistent taxes and you have to have healthy infrastructure and a good educational system.

As I illustrated before, this project is a fantastic vehicle to help accomplish all of those goals in both of these communities. And if all of those goals are really focused on, we can partner with you to make sure that this area is a high valuable area to live and work.

MS. COLEMAN-GRAHAM: Okay. The next question -- that was finished, right?

Okay. The next question is probably to Paul. Will Apex make these slide presentations available possibly online from tonight?

MR. WILLIAMSON: Cat? I just wanted to kind of verify with our coordinator for the event, Cat Mosley over here. Our plan is to take the slide materials, take the meeting transcript and also the video from this meeting and make it all available through our website to the public.

It will also be entered into the official State record as part of our Article 10 process as well.

MS. COLEMAN-GRAHAM: Thank you. I've started back around here now. So I'm actually back up to you, Paul.

What is the setback from homes, from houses?

MR. WILLIAMSON: So, again, as I illustrated, we, as we work through the design on this project, we were able to achieve relatively high setbacks. And so instead of really -- first we looked at standards of other projects that are operating in New York and then we took that and we said, can we achieve a greater distance from properties and from homes.

And so we really challenged ourselves to locate the turbines as far from all homes as possible and in doing so none of the turbines located are any closer than 1,800 feet from nonparticipating homes and none of the turbines located are any closer than 1,500 feet from any participating homes. And, again, 1,800 feet is greater than one-third of a mile.

MS. COLEMAN-GRAHAM: Okay. A wind mill is planned on my property line without my permission plus or minus two to 300 feet without my permission. What are my rights if I don't want it there?

MR. WILLIAMSON: So unless there's -- maybe there's an inaccuracy in the way the maps were printed, but based on all the parcel data that we have from the County, the deeds, et cetera, we have ensured that all turbines -- I wish I had the slide up right now because I just want to make sure I'm a hundred percent accurate, but I believe all turbines are greater than 650 feet, I believe, from any nonparticipating property line.

And so if you look on the map, again, that's a pretty broad map. Those dots are obviously much bigger than what would actually be, you know, at scale in place.

So you might see a little bit of a variation. But there are no turbines that are located on property lines, including no turbines located on participating property lines and no turbines located on the property lines where there are two different parcels and the same property owner owns both parcels. So all turbines are actually located away from the property lines.

And so if you are seeing that on one of the maps, then it's simply a, you know, a misalignment in the printing itself. As we move forward in the permitting process, there will be specific high level

detailed map showing the specific location of those turbines and we will verify, including through deed records and title research to make sure that we have full right for use and access to all the lands that we have under lease.

MS. COLEMAN-GRAHAM: Okay. It seems there are no houses visible in your preliminary presentation. How does the housing density in this project compare to most wind farms and is there an accepted level of density?

MR. WILLIAMSON: I am not able to answer a question on comparative density levels to other projects I am afraid. Maybe that's something we could look at and post answers to later on. I don't know if anybody else on the panel can answer that.

MS. COLEMAN-GRAHAM: Last one for Paul, then I'll move on to Tracy.

Would Apex consider contributing to high speed internet service for Lyndonville/Barker students as part of the host community agreement?

MR. WILLIAMSON: That is a great point. As I said before, we really want to engage the communities in dialogue and discussion about how we can use our investment to best benefit your communities. The last

thing we want to do, as we start talking about a community benefits agreement for the host communities, we don't want to come into the town and say, here's the money and you shall do this with it.

What we really want to do is we want to talk to you and we want to understand what are your most highest needs and highest interests. In some of our discussions, just talking in and around different citizens in both towns, high speed internet is one of the ideas that has come up.

So, by all means, if we can make investments that help forward that and that's truly, you know, a high interest in the community, that would be something that we would want to continue to explore and make investments in. Some other ideas that have been forwarded to us is investments in local hospital capacities. Investments -- well, lower tax rates. Investments in education.

But, again, it's really preliminary and it's early for us to really -- it's too early for us to say, we shall do this. What we really want to do is we want to have a healthy dialogue with the towns and with all the citizens that live in the town to understand what's your highest value and your highest interest so that we

can align the investments to meet those goals.

MS. COLEMAN-GRAHAM: Okay. This is probably Tracy.

How does the new turbines compare to the old as far as power output?

MR. BUTLER: Sure. So the turbines that we are contemplating here have 4.2 megawatt generators and that is, you know, larger than the older technology. Ideally new technology, as it's progressed with wind turbines, turbines have been, you know, more efficient. Cutting larger generators, typically a little taller where they can capture the faster wind speeds.

So, yeah, this plan generators 4.2 megawatts at name plate and, yeah, that's bigger than old technologies.

MS. COLEMAN-GRAHAM: Okay. Now, this deals with transportation problems during construction. How will Lighthouse manage and minimize any transportation problems for my commute based on large trailers bringing equipment in?

MR. BUTLER: Sure. So we will do a transportation study of the existing roads out here to determine, you know, their make, their width, whether they are adequate for the component trucks and then we

will have a transportation plan designed that shows the routes that the trucks will take to get to each of the turbines and it will show those improvements that need to be made.

So this plan will, you know, be part of a road-use plan, a road-use agreement that will dictate, you know, what our responsibilities are for maintaining the roads and fixing things as they get damaged. And, also, those agreements typically dictate, you know, things like interference with vehicles like you are discussing.

So, you know, sometimes our work is limited to where we can't transport during school, you know, bus routes or, you know, we can't move things at night. So it usually gets coordinated in that process.

MS. COLEMAN-GRAHAM: Okay. How many construction jobs would be created if this project proceeds and for what duration? And would any of these be a local work force?

MR. BUTLER: Sure. So during the peak construction, a project of this size would probably have, I would say, two to 300 construction workers working. The duration, for the project duration would be six to eight months.

So, you know, not that whole 300 is not working the whole time because you are going to have, as I mentioned with the sequence of construction, you have the earth work guys come in first and start working on the roads, and then foundation guys, then turbine direction guys. So that will all come in.

And then the locality, you know, the local people versus people from other places doing the work, really it's, you know, the contractor that gets selected typically does use local work where it's available because, you know, that's going to be the best, I guess the best priced to contractors.

MS. COLEMAN-GRAHAM: Okay. This question pertains really to what are quality issues.

What is the impact of a thousand cubic yards of cement for each wind turbine foundation on Lake Ontario? DEC frowns on concrete runoff into the lake and you are posing 47,000 cubic yards of it.

MR. BUTLER: Well, I guess the concrete is not running off into the lake. It's getting built into a foundation that's then underground at each of the turbine locations. So, you know, the concrete, once it's cured -- well, it's kind of always curing its whole life, but it's pretty inert. It gets poured. It starts

to cure. It stays there. There's not really a leaching or anything like that in typical concrete.

I think if the soils were super acidic maybe that could be possible. But that's not the case here.

MR. WILKINSON: During construction your concrete trucks need to be washed out. So there's wash pits at each turbine location. So the concrete trucks are rinsed out there and contained in those wash pits until concrete sets up and then they can dispose of it. So there is no free discharge of concrete anywhere.

MS. COLEMAN-GRAHAM: There is so many here for you, Dave, I'm trying to figure out which one to ask you.

Why aren't you following the guidelines set forth by the U.S. Fish and Wildlife Service regarding setbacks from the Great Lakes? And it goes on to say, no turbines should be near them three to five miles due to the area being a major migratory flyway.

MR. PHILLIPS: So the U.S. Fish and Wildlife guidelines, there's -- there are land-based wind energy guidelines for siting wind turbines. There is also eagle conservation plan guidance which is specific to eagles. I believe that's a misrepresentation of the guidelines.

However, what each does recommend is a process of coordination, coordinating with the agencies where you basically, as I describe, work with them on identifying is the area appropriate to proceed. Completing the studies that are necessary to evaluate risk and inform siting and project operations, as well as project monitoring, identifying the periods that may be more of concern than others that warrant those operational studies.

So we are, as a company, that work, we are very committed to adhering to those guidelines and coordinating with the agencies on all of our projects. So the question, why aren't we, is inaccurately posed actually.

MR. WILLIAMSON: I might add that, again, our work, our studies, our analysis and our project design all goes into a permit application and that permit application is reviewed by the agencies and the permit is awarded as long as we can demonstrate that the project can operate safely, safely within the environment, safely within the habitats.

And so when it comes to following the guidelines, the agencies who are reviewing our permit application have the final say on whether or not we are

following the guidelines and whether or not the projects can be conducted or operated in an appropriate manner.

MS. COLEMAN-GRAHAM: Okay. A wind turbine expert shared with us that new research shows infrastructure noise travels 20 miles. What will be the effect on the fish along Lake Ontario?

This is a international tourist area for fishing. Is this studied? Because they see no fish on your studied species.

MR. O'NEAL: The question said infrastructure sound. I'm assuming that's infrasound.

I'm going to assume that was an infrasound question. And, you're right, we don't study that. But what I would suggest is, yes, infrasound travels long distances. However, infrasound generated by boats and marine traffic on the lake is going to generate much more sound in the water than a turbine based on land.

MS. COLEMAN-GRAHAM: Okay. When will we see the actual results of your environmental studies?

Probably Dave.

MR. PHILLIPS: I'm going -- I'm actually not certain. I assume -- I know when the application is submitted those studies are provided. However, there are sort of nuances to the Article 10 process. So I'm

not sure when they are actually made public.

MR. MUSCATO: They are made public. They are made public as part of the Article 10 application.

The Article 10 application will include 41 exhibits and the related studies that support those exhibits, unless they are not applicable, and all of those studies and the information that supports the application would be submitted at one time.

MS. COLEMAN-GRAHAM: Okay. Dave, this is probably you.

You show bat habitats and turbines south of Golden Hill Park. What mitigation steps start up at five to six MPS radar sensing or red lights, et cetera, would be used? So it is what mitigation steps would be used.

MR. PHILLIPS: With regard to bat habitat in the park?

MS. COLEMAN-GRAHAM: Right.

MR. PHILLIPS: Well, we basically avoid the summer bat habitat or impacts to those habitats. We strive to avoid it by a minimum of a 1,000 feet because protected bats, which may occur there, tend not to forage greater than that distance. They do move greater than those distance during migration.

So there are siting considerations. There's also the operational curtailment, wind speed related curtailment that I mentioned.

MS. COLEMAN-GRAHAM: Okay. Another mitigation-type question. How do you mitigate against impact to nesting eagles and how many nesting pairs are here?

MR. PHILLIPS: There's one bald eagle site documented on the project site. It's in the coal plant property. And our nearest turbine to that eagle's nest is about 1.4 miles away in this current layout.

Basically the studies are designed to identify important use areas or periods of concentrated activity. We would expect, prior to those studies, that most of the movement from that nesting pair would be from the nest towards the water and along the shoreline.

The studies that we have done within the project area kind of support that because we have very low levels of kind of scattered use throughout the site without actually much use around the nest itself documented at all.

So the nest, certainly we would be adhering to the New York State conservation plan for eagles, which I believe was released in 2016 with regard to

construction setback, siting setbacks, et cetera.

We also would monitor the effects of the turbines on eagle mortality over the life of the project. If we were to have mortality that was not authorized or that was greater than what would be granted through a permitting process, we would be in violation of both the Federal Eagle Act and the State ESA, Endangered Species Act. I'm sorry.

So we take a lot of precautions to go through that process and establish kind of a regulatory compliance framework.

If we were to -- those permits actually have what are called adaptive management triggers. So you monitor mortality. Let's say we estimate three eagles would be killed over the life of the project for 30 years. If for some reason we killed three in the first year, you know, or three at year 15 we would be very much at -- we would expect to violate our permit.

So we would have a system set up so that if we estimate fatalities that may start to approach that threshold, we would then need to either amend our permit. But, more likely, take some sort of measure to prevent future mortality from occurring. At least at the rate that it was appearing to occur.

But, as I mentioned, any predicted take of a species is fully mitigated in advance of it occurring. So we actually are in a position to provide a lot of conservation funding when the project is approved to help the Fish and Wildlife Service and DEC accomplish some of their conservation regional landscape level conservation goals around those species through the permitting process.

MS. COLEMAN-GRAHAM: Okay. Two questions that sort of go along with what you were just saying. And I think this one deals with transparency.

Do you hide the number of raptor kills from the public?

MR. PHILLIPS: In New York State our fatality, fatality monitoring and all studies is public data. So, no. We cannot or would not.

Generally, that's fairly sensitive information. As you can imagine, it is often used against the wind industry. So when the fatality of anything can be misinterpreted and misrepresented fairly easily. So that's an unfortunate problem with some of the wind industry data that we have access to. It's very privately held by the owning entities, mostly as it relates to liability risk.

Drives me crazy because I'm a biologist. I kind of, you know, live on data, make decisions based on environmental data. But there's a lot of data out there that is not available both to us, as a company, from our competitors and to the general public.

So it's a good thing in New York, and some other states have the same policy where through the State permitting process monitoring plan is required and that data is required to be disclosed.

MS. COLEMAN-GRAHAM: Okay. Dave, what species of bats are in the area?

MR. PHILLIPS: There's quite a few. I have to pull out my -- the studies from the work that we completed. I can tell you that the two State listed bats that, you know, are generally of consideration in this part of the State are Indiana bat and northern long-eared bat.

We are just actually out of the Indiana bat range. The northern long-eared bat, which is both State and Federally threatened, the studies that we have done have demonstrated probable absence during the summer, during the summer roosting period. But we do know it's likely to migrate through here. So that's where we take those precautions during the migratory period.

The precautions that we take for that species actually also have the benefit of kind of minimizing risk for many other bat species that do occur.

MS. COLEMAN-GRAHAM: Two more questions for you and then I'll go on to some sound questions.

I'm going to change this one. This one begins with the word, "will," so it would be a yes or no. And I'm going to change it to: How would you prove to us that you mitigate or replace for each bird killed? So how do you prove to people that you are doing that mitigation?

MR. PHILLIPS: Well, through the Article 10 permitting process there's actually an Article 11 which addresses State endangered or listed species. The permitting, kind of the conservation plan and the mitigation that would be proposed would be clearly laid out in that plan, evaluated and adjusted and/or approved by the agency.

So, typically, that's kind of the best available science. So, you know, if we were predicting the take of 13 northern long-eared bats there are, kind of, resource equivalency analyses that are available to us. In other words, models to determine kind of how

many caves should we gate to ensure protected caves result in winter hibernacula protection to the bats.

How many acres of habitat would we need to protect, restore or enhance to offset that number of bats? You know, frankly, to the unaided reader or like non kind of wildlife-statistician-type it's a little bit, you know, statistical hocus pocus. But the minds behind it are generally people that are reputable scientists, usually from the USGS, United States Geological Survey, or U.S. Fish and Wildlife Service that have helped develop those models. So we rely on best available science and those kind of techniques.

Some mitigation projects can have a monitoring component where you actually collect baseline data. In other words, you are taking a habitat and converting it or managing it for a particular species. You may collect baseline data to document what's there and then monitor at annual or five-year intervals to see what's there in five, ten, 15, 30 years, i.e. was your mitigation effective?

Kind of like property values, that is really hard to gauge. So if you have three bats in a hundred acre parcel one year, you go back ten years and you have 30, you don't really know if it's because of the trees

you planted or trees you cut. Would certainly take credit for it in that situation.

But, if you have zero, you know, and you do all these effective habitat measures, you don't know if it went three to zero because of the work you had done or because of disease or some other factor. So it's a very hard thing to measure.

MS. COLEMAN-GRAHAM: Okay. This part of this question plays off of a little bit what you are talking about there.

When was your most recent avian survey and are more planned? I think the reason the person is asking is because in 2017-2018 there was a significant eruption in snowy owls in this particular area. So wondering when the most recent survey was and if more are planned.

MR. PHILLIPS: Most recent, we did two years of avian survey and they ended in December of 2016. The reason those are multiyear surveys is to try to address that annual variation that does occur.

So I'm actually trying to think back on the snowy owl data that we do have. We did identify areas of concentrated activity with a couple of State-listed species; short-eared owl, northern harrier and I don't

recall if snowy owls were included in that. But those are areas that we take into consideration with our layout so as not to disturb those important wintering habitats.

MS. COLEMAN-GRAHAM: Thank you. As you see, my timer went off saying it was 9:25. But I would like to finish off the panel here. If you bear with me a few minutes, add a little bit more time for the questions, so we can have gone through a cycle.

This is for Rob. What are the remedies for residents who are exposed to more than the maximum 25 decibel sound levels?

MR. O'NEAL: You said more than the maximum 25 sound decibels?

MS. COLEMAN-GRAHAM: I'm sorry. 45. Sorry, that was my mistake.

MR. O'NEAL: Right. I mean, I think we feel pretty confident that that will not be the case with properly designed and modeled project.

Hypothetically speaking, if one of the turbines, for example, was not performing properly and sound levels were over 45 decibels there are -- there are curtailments that are possible in a turbine called noise reduction option where the turbine can be

curtailed to generate lower noise, but also less power, which is obviously not desirable. But there are remedies available in extreme cases.

MS. COLEMAN-GRAHAM: Okay. What happens if they are found to exceed the 45 decibels?

MR. O'NEAL: Then the applicant is required to fix it. They have to make it less than 45. That will be part of the permit condition.

MR. MUSCATO: I was just going to expand on that and say, that, you know, ultimately, if the project is approved, it will be approved with a number of conditions. A lot of the conditions will reflect mitigation measures and other regulatory standards that have been mentioned here tonight.

And, ultimately, if the project is not in operation in the compliance with those permit conditions or certificate conditions, then there is enforcement mechanisms that are built into the certificate as well as under the law that would force compliance with those certificate conditions.

MS. COLEMAN-GRAHAM: Okay. And this is another sound one. It might be a clarification.

Rob, 45 decibels per 30 days per year was on one of the slides. What about the other 335 days?

MR. O'NEAL: So the question was 45 decibels for maybe 30 days a year?

MS. COLEMAN-GRAHAM: Yes.

MR. O'NEAL: So the other days of the year, if 45 is the maximum, the other days of the year will be less than that.

I could refer you back to -- and since these slides will be available, it will be useful. There is hypothetical graph that showed hypothetical sound levels over the course of a year where they, I would expect, a typical range of a turbine is more than 10 decibels from the loudest sound. So what we model when we calculate to get to that 45 or less. So it could be anywhere from 35 to 36 to 37.

MR. WILLIAMSON: I'm going to add a correction, because I think the question misunderstood the slide that was part of what I provided. And the decibels at residence will not exceed 45 decibels.

Shadow flicker, an entirely different subject, as a turbine is spinning and the sun is shining through that turbine and the shadow that is created by that turbine. Shadow flicker, that shadow going over a person's residence, will not exceed 30 hours within an entire year at any residence.

So when you look at the greater than 8,000 hours in a year, less than 30 hours will -- or no house over that 8,000 hour period will receive shadow flicker for any greater than 30 total hours for the entire year.

MR. O'NEAL: Okay. Thank you, Paul. I misunderstood the question.

I think the proper answer to the question will be sound level cannot be over 45 any of the 365 days per year.

MS. COLEMAN-GRAHAM: Okay.

Rob, what does 45 decibels sound like and is it louder than a whisper?

MR. O'NEAL: Yes, it's louder than a whisper. I tried to give you the example when I was standing up there, if we are all quiet in here and nobody talks, we just listen to the HVAC system here and nothing else, that is between 48 and 50 decibels, what you are hearing right there. So the highest sound level will be less than that. But it is louder than a whisper, yes.

MS. COLEMAN-GRAHAM: Okay. Another noise question here.

Are noise levels measured from the turbine blades? And how is that different from the noise from

the turbine? Actually the blades versus the whole structure.

MR. O'NEAL: Yeah, I'll do my best, and if questioner is still in the room and they want to come down and talk afterwards, I'm happy to try to -- I'll see if I have got the question right.

So the sound that's measured on the ground, if you will, or at somebody's house, that's total sound. That's the sound from everything. The three blades spinning, which is the aerodynamic sound.

Any mechanical noise that could be coming from the turbine, from the nacelle, which is generally very minimal these days. They are very well insulated, very well controlled.

So that -- what we measure with that sound instrument that I showed you is everything from the turbine, everything that could possibly be generated from it and it's measured at a point on the ground in a community typically relatively near a house. I'm not sure if that was the intent of the questioner. That's my best answer. I will try to answer it again later.

MS. COLEMAN-GRAHAM: Okay. The last question, and then I'm getting the signal we need to wrap it up. We have gone over here on the questions.

Why are you only addressing decibel levels of nonparticipating properties? Aren't decibel levels for participating properties higher?

MR. O'NEAL: So that's a fair question. Yes, every property, whether participating or nonparticipating, will be modeled and evaluated as part of the application. The limit that we have been talking about of 45 decibels is true, that's at a nonparticipating residence.

At a participating residence there will also be a limit. It is higher. It has generally been 55 decibels in other applications.

So, but participating residence will be modeled and included in the application as well.

MS. COLEMAN-GRAHAM: Okay. With that, that will conclude the question and answer session. But, like I said earlier, Apex has agreed that they are going to answer all the questions. And there are remaining questions there. And they will be posted on the project website. And the date they gave me would be November 2nd, which is basically a 30 day time period on that.

And just as a wrap up for next steps, as Paul mentioned earlier, Apex will be providing visual simulations of the wind turbines in the future and

there's going to be additional public information meetings. And, with that, I want to thank you all so much for coming out here tonight and for your participation and the wonderful questions and the great penmanship and your cooperation.

Thank you.

(TIME: 9:33 p.m.)

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LIGHTHOUSE WIND ENERGY

STATE OF NEW YORK:
COUNTY OF MONROE:

I, MEREDITH A. BONN, CSR, RPR, NYRCR, do hereby certify that I reported in machine shorthand the above-styled cause; and that the foregoing pages were produced by computer-aided transcription (CAT) under my personal supervision and constitute a true and accurate record of the testimony in this proceeding;

WITNESS my hand in the City of Rochester, County of Monroe, State of New York.

Meredith A. Bonn

MEREDITH A. BONN, CSR, RPR, NYRCR
Freelance Court Reporter and
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in and for Monroe County, New York

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