Long Island Regional Planning Council

LIRPC Meeting – July 14, 2021
Zoom Virtual Meeting Summary Minutes

LIPRC Members Present
John D. Cameron, Jr., Chair
Jeffrey Kraut, Treasurer
Theresa Sanders, Secretary
Supervisor Don Clavin
Elizabeth Custodio
Mayor Barbara Donno
Nancy Engelhardt
Jeff Guillot
Mayor Robert Kennedy
Supervisor Edward Wehrheim

Staff and Guests Present
Richard V. Guardino, Jr., Executive Director
Elizabeth Cole, Deputy Executive Director
Alan Belniak

Angie Apolinaris
Kendra Armstead
John Asbury
C. Bosco
Patti Bourne
Travis Brennan
Lisa Broughton
James Browne
Mary Byrne
Anthony Caniano
Tom Carrozza
Antoinette Clemetson
Jesse Cohen
Dorian Dale
Lorraine Deller
Maureen Early
Adrienne Esposito
Andy Fera
Paul Grosser
Katherine Heaviside
Scott Henderson
Linda Henninger
Liliana Canela Magarin
Antonios Marsellos
Jim Morgo
Rachel Neville

David North
Steve Racitti
H. Ring
Ed Sandkuhl
Jenny Kate Schlagel
Chris Schubert
Jacqueline Simms
Mark Smith
Suzanne Sullivan
Natalie Wright
Regina Zara

Meeting Commenced:
John D. Cameron, Jr., opened the meeting at approximately 10am.

John Cameron:
Good morning and welcome to the July meeting of the Long Island Regional Planning Council.

Pledge of Allegiance – Supervisor Edward Wehrheim

John Cameron:
Thank you, Supervisor. Our Executive Director, Rich Guardino, will now conduct a roll call.

Rich Guardino:
Welcome, everyone. Thank you all for being with us this morning.

Roll Call
John D. Cameron, Jr., Chair
Jeffrey Kraut, Treasurer
Don Clavin
Elizabeth Custodio
Barbara Donno
Nancy Engelhardt
Jeff Guillot
Robert Kennedy
Ed Wehrheim

Rich Guardino:
John, we do not have a quorum yet. Some of our Council members will be joining shortly. What we would like to do is have Alan Belniak of VHB, who's been assisting us the last few months with regard to our virtual meetings, explain how the technology will work for our audience. Thank you.

Alan Belniak:
Thank you for the opportunity to assist with this meeting. As a friendly reminder, for those who have not participated before, we do have a couple presentations this morning. At the end of each presentation, we'll invite the LIRPC Board and then members of the public to either ask a question or share a comment which can be done in one of two ways. If you are joining us through the Zoom platform on your mobile phone or your computer, there should be a Q&A button down below where

you can type in your question. When we get to the end of the presentation and it is time for Q&A, I will read the questions out loud and a member of the panel will respond. Another way to ask a question is to use the raise hand feature, which is below and looks like someone is giving you a high five. That sends a command to me to let me know that you would like to raise your hand and speak. When the time is right, I will call out your name, take you off mute and you can then either ask your question or share your comment. This meeting is being recorded for archival purposes. With that, I'd like to hand it back to Rich to continue the meeting.

Rich Guardino:
Thanks Alan. The first presentation we have this morning is the Bay Park Conveyance Project. Leading that presentation, we have Andy Fera who is with the New York State Department of Environmental Conservation. He is the project director for the Western Bays Resiliency Initiative. Welcome Andy.

PRESENTATION

Andy Fera:
Good morning, everyone. As Rich mentioned, I am Andy Fera. I'm the project director working for the New York State DEC which is leading the Bay Park Conveyance Project in collaboration with the Suffolk County Department of Public Works. I'm excited to walk you through the status of the project and where we are today. With me, I have Jesse Cohen who is running the presentation for me and Travis Brennan, who is the Public Information Officer for Western Bays Constructors (which is the design build joint venture that has won and is working on the Bay Park Conveyance Project).

I will begin with a brief overview of the agenda this morning. I'm going to start with the project background, what necessitated the project, and then I will talk about where we are today so that you know the overall scope and methodology used for this project. Next, I will dive into the progress we've made to date, as well as some of the upcoming activities we have extending through the summer and into the fall. Then I will turn it over to Travis Brennan and let him discuss some of the public outreach efforts that we are taking to engage the public to let everyone aware of what is going on. Our public outreach will also work to help best mitigate any impacts to the public as this project progresses over the coming years. Finally, we'll conclude with the Q&A session.

Before we get started, I would like to thank the environmental partners who have helped bring this project to fruition with tremendous benefits. We wouldn't be where we are today without these many partners. Thank you to Campaign for the Environment, Operation Splash, The Sludge Stoppers Task Force, The Nature Conservancy, and last but not least, the Long Island Regional Planning Council.

As previously mentioned, this is a collaborative effort. The NYS CDC and Nassau County have partnered, and we have a three party contract with the design builder to deliver this project. I want to re-emphasize that this is really a true collaborative effort, and we wouldn't be where we are without the tremendous efforts from both agency entities. It's really been a great partnership.

As many are aware, the Western Bays is struggling with a water quality issue specific to high levels of nitrogen. The high levels of nitrogen in the Western Bays cause a number of issues. One issue is that in the marshlands, the root structures don't grow as deep. Root structures reduce storm damage and coastal flooding protection. The shellfish and aquatic life have relocated to more suitable habitats, which is a significant change from what many of you remember in the past. There are significant reductions in recreation in the Western Bays. We recognize that one of the major factors that

contributes to the nitrogen rich water quality is that the formerly known Bay Park, now the South Shore Water Reclamation Facility, discharges effluent into Reynolds Channel which ultimately ends up in the Western Bays. The Bays themselves have poor flushing for mixing, so that nitrogen just sits there longer than Mother Nature is able to diffuse it. One of the things that we're trying to do, and really the primary purpose of the Conveyance Project, is to send that effluent to a new location. The effluent is rich in nitrogen and is fully treated by a very up to date wastewater treatment plant. However, nitrogen reduction at that scale is very difficult and so that necessitated this project and is why we're here today.

Before I go into the Bay Park Conveyance Project itself, I want to talk about a couple other efforts that the County is taking on themselves to reduce some of the nitrogen content. First is the BNR Level One Project. BNR is biological nutrient removal. This is basically a chemical process using denitrification, which converts ammonia into a nitrogen gas which is harmless. This essentially improves the quality of the effluent itself, reducing the nitrogen that is in it. This project has been completed and is going through what I would categorize as chemical commissioning because of the nature of the project.

The next project is the Sidestream Facility Project. The South Shore Reclamation Facility is what's called an activated sludge treatment plant. That activated sludge needs to be dewatered and the sludge needs to be disposed. That sludge is often rich in nitrogen and that water is actually sent back through the plant to be treated itself. The Sidestream facility will treat the water that comes from dewatering the sludge so what's entering the plant is not as rich in nitrogen. That project is well underway and should be completed in either late fall or early winter of 2022.

The Bay Conveyance Project, at a high level, is what we are doing to reduce the impacts to the Western Bays. As you see on the left side, that's where the effluent is currently discharging into the Reynolds Channel and ultimately, the Western Bays. We're looking to redirect that effluent through a force main up to Sunrise Highway through a slip line pipe (which I'll go into later) along Sunrise Highway into the entire area and then another force main down to Cedar Creek, which currently has its own ocean outfall. The effluent will join the Cedar Creek effluent and be discharged approximately three miles offshore into the ocean. A lot of people see this and say, aren't you taking the problem from one place and sending it to another? The reality is that in the ocean there's such a tremendous amount of mixing that goes on with the currents that it is diffused without having impacts to the environment. There's a diffuser ray that extends in each direction, east and west. There's not a single point where there's a high concentration. That nitrogen rich effluent is able to diffuse naturally, without having the impacts to the ocean environment than it does in the Western Bays where there is poor mixing.

What are the some of the benefits that we're looking to achieve here? The first benefit is storm protection. I mentioned before that the marsh roots aren't growing as deep as they would if we had a lower concentration of nitrogen. The marshland roots will begin to grow much deeper and will achieve a greater level of storm protection from erosion, flooding, and all those things that come with coastal storms with less nitrogen. The next is a quality of life. I'm sure many of you growing up on Long Island have memories of walking out in the Bays, picking shellfish or taking swimming lessons. There are all kinds of various experiences that folks down here have had and we're hoping to be able to return those experiences to future generations as a result of the project and lower nitrogen in the Bays. Along with that comes the economic benefits for those that use the Bays for economic resources. Once there's greater enjoyment and aquatic life the Bays can be used more recreationally and economically. We look forward to opportunities returning to the Western Bays.

So, where are we today? Here are just some of the things that we've accomplished. We did submit an Environmental Assessment, an EA, to FEMA and we received an issuance finding significant impact. That was issued back in October of 2020. We've held numerous public engagement seminar sessions through various hearings and public meetings. Now that the project is awarded, we are doing monthly stakeholder calls, as well as quarterly public meetings. We have our second public meeting coming up later in July. On the procurement side, we selected the Western Bays Constructors in October of 2020 and executed a contract with that Design Build joint venture at the end of February. We issued a notice to proceed on March 4 in terms of construction. We began that construction in April of this year. At this point, we're a couple months into construction on this project.

We started construction at Bay Park by way of the microtunneling, as well as the new pump station. We also have started at Cedar Creek. I'll go into some more specifics on that construction, but one of the highlights I want to cover here is the bold dark green showing 2023 as a completion date. In November of 2023 we plan to reach what's called mechanical completion. By definition that means that all of the elements of the project are constructed. This is the end of visible construction to the public and following that, it's largely commissioning and fine tuning the system before we are able to turn on the conveyance system and start conveying that flow over to Cedar Creek and Cedar Creek outfall. Ultimately, the construction does extend until the final acceptance in August of 2024.

Looking at the project in a little bit more detail, on the bottom left is where the South Shore Water Reclamation facility currently is. You see eight shafts which are the first part of the force main extending up to the connection to the existing aqueduct. On Sunrise Highway, you'll see numbers one through nine here. There was a shaft six which was in our procurement that was at the East Rockaway High School, but that shaft was eliminated. It's really a testament to the design build joint venture that was selected for the project that we were able to eliminate that shaft and avoid any impact to the high school due to the capabilities of the microtunneling company and this joint venture. Once we get to the aqueduct at Sunrise Highway, we're going to be essentially installing a pipe inside the existing steel aqueduct to create a new force main which will extend into the entire area where we will make a connection to another microtunneling force main extending down to the Cedar Creek facility. The two microtunneling force mains are 2 miles on the Bay Park end and 1.6 on the Cedar Creek side and we have about 7.3. miles of slip lining along Sunrise Highway.

So, look at the numbers overall. There are eight Bay Park shafts and there are 24 work pits which we will supply in from along Sunrise Highway. There are six Cedar Creek microtunnelshafts and all together a little over 57,000 linear feet of pipe and 42 months of construction. However, the construction will only be visible for 33 months.

Now we get into the construction overview. But before we go into the construction overview, I want to take a step back and describe the delivery method we're using as well as the joint venture that we have selected for this project. So just if you go to the next slide, we are using the design build project delivery method here. What design build means is that instead of having a contract with a design firm who would put together a final design and release it to a contractor, we have one procurement to a design build team and the contractor is teamed up with the designers. Together they are able to advance the design while they're advancing construction. That design build joint venture that we selected is comprised of John P. Picone, Inc. and Northeast Remsco. Picone is local contractor out of Lawrence and is highly experienced in water and wastewater projects in the area. Northeast Remsco is one of the industry leading microtunneling firms and also fairly local with a primary office in New Jersey. I mentioned that the contractor teamed up with the designers. The lead design team on this project is

McMillen Jacobs, a trenchless and underground construction firm, and they are doing the dominant work associated with the microtunneling and the bulk of the design work. Greeley and Hansen, which is a renowned firm for hydraulics, has completed the hydraulic model that was about a month ago and is really tasked with doing all of the hydraulics design on the conveyance project.

Talking about design build, what are some of the advantages of design? The collaboration between the contractor and the engineer and the designer is something that really can't be discounted because you get a more constructible project with far fewer issues between the designer and the contractor. It allows for reduced impacts to the community and it's a much more workable solution. Shorter construction duration is something that is important to highlight because one of the opportunities is that you can design a certain segment of the project and then begin construction on that segment while other parts of the design is still being advanced for other sections of the project. This allows for construction to advance much quicker. If there are any issues that arise, it provides a lot of flexibility in moving from one area to another, as there are various design packages which can be accelerated or brought up to a greater priority. This project is being designed considering a 100-year life so all elements of the project are to be designed for life of 100 years. One of the things that I like to highlight here is that we recognize that there will be some temporary inconveniences although we're doing our best in all areas to mitigate any impacts that we do have. We have asked for your understanding as any temporary and conveniences are really to facilitate a much greater good of returning the Bay to it to its former glory.

I want to talk about some of the techniques we're using to construct this project, the first being microtunneling. In the graphic that we have here to the right, what you see is a microtunneling shaft. The shaft itself is in gray, and then the pipeline which is ultimately the force main is the green pipe. What you can see from this graphic is that we're really far below the surface and we're able to microtunnel, which is trenchless. We're not having surface disturbance, except for the isolated case of where the shaft is located. I'll go into a little bit more detail on the next slide, but what you see here in the green pipe, all the way to the right, would be where the microtunnel boring machine is. As the microtunnel boring machine advances laterally through the earth, the pipe is dropped in immediately behind it so there isn't an opportunity for any settlement or any impacts to the surface. Again, just to reemphasize, what you have is the shaft that's shown on the left in gray, and then all the work takes place from that shaft. So along where the microtunnel boring machine is working, there isn't any surface disturbance.

This is an illustrative graphic that is going to walk us through what the microtunneling operation actually looks like. Here you have a fenced off construction site. The construction again is isolated to that site itself within the fenced in area. The ring that you see in the center is the supportive excavation. On this project, we are using two techniques; one is called secant piles and one is called cutters for mixing. For secant piles, long cylinders of concrete are drilled down and then concrete is poured in and those cylinders overlap as they as they follow that circumference of the ring that you see. Next, a concrete plug is poured in the bottom. What you have is a concrete cylinder which is watertight, which allows us to excavate the earth material that is inside of that and then a jacking structure which you see in yellow inside of that ring is installed in the bottom. What happens is the jacking structure thrust the microtunnel boring machine laterally into the earth and once it's fully extended, it retracts and a pipe segment is dropped down back in and then the jacking structure can force that pipe further. Earlier in the graphic, you could see the pipe segments actually being dropped in and that is the technique for microtunneling.

Just for one more moment, I'll talk about cutter soil mixing, which is the other technique that's being used. Cutter soil mixing is a large rig that has discs in the shape of approximately three by six foot rectangle and that machine actually forces those discs down into the ground and it stirs up the soil which of course here on Long Island is predominantly sand. Once it gets to the full depth, around approximately 75 feet, it begins retracting and as it slowly retracts out it, we inject a cementitious material that turns that three by six foot area into a watertight concrete panel. Those panels go around the full circumference of the shaft two layers deep and that's a retaining structure. It is supportive excavation that is similar to the secant piles. You can then excavate what's in the middle of the shaft you are creating.

Now to talk about pipe jacking, which is largely similar to microtunneling. A jacking structure is installed in a work pit. The primary difference between the two is that there's already an existing pipe there, so there's no need for the boring machine to be on the front of that pipe. We open up a work pit, which is the cutout that you see in the center of the graphic and then a pipe is dropped down onto a jacking structure which pushes that new pipe which is a fiberglass pipe inside of the existing steel pipe. Next, grout is injected in between the two the existing steel pipes and the new fiberglass so that the pipe can't move, and all the joints are firm and watertight. Something to emphasize here is that, again, the work is confined to that work pit and the area immediately surrounding it for deliveries and other construction equipment. Here is an example. So, I want to first say that, yes, this is a location that is on the project map, however, the traffic demonstration shown is not necessarily what is going to be the case for this exact location. What you see here is a rectangle that is dark and the interior of that is the work pit itself, where the pipe is being dropped down in and jacked from. Then, the immediate surrounding area is for equipment and pipe delivery workers. Timing varies on how much work we're doing. It could be four weeks, it could be 12 weeks, but always in a given location. This is one of those 24 work pits I outlined earlier. In each location, because the aqueduct does weave through various portions of Sunrise Highway, the maintenance of traffic will look different.

Here we are talking about the actual construction that we have today and what we've accomplished. What you see on the slide here is the excavator sitting on a guide wall which is what is the beginning of the secant piles for the first microtunneling shaft. To the left, you see the space for the diversion structure which will be diverting the effluent to the new pump station. Looking at what the construction site at Bayport looks like today, you see a lot of formwork and a concrete truck pouring concrete. There are a couple of reasons why this is taking place here. First, I covered that we had the formwork for the diversion structure. We also have the first Bay Park microtonal shaft that's at that location as well as the wet well and the foundation to the new pump station which is being constructed. Just to take a step back because I don't think I covered this earlier at this location, the new pump station that is being constructed is going to be capable of delivering 75 million gallons per day through the conveyance system. The Bay Park or South Shore Water Reclamation Facility has an average daily flow of approximately 54 million gallons per day so the system is appropriately sized to be able to convey that from Bay Park to the Cedar Creek facility.

On the left in this slide, you see them grading the area, preparing the cutter soil mixing to mobilize to the site. This is on site. A number of panels have been constructed which are being used to test the strength of concrete and make sure the production is watertight and safe before we construct a shaft and put people in it to work from. On the right is essentially a concrete spoils pit. When you inject the concrete, there's some that is excess and instead of that spilling all over. It's confined to this this area and as it dries it is demolished and hauled off to an approved site that can accept concrete debris. As

well as the work in terms of the excavation, we've also been doing utility test pits, relocating known utilities that are in the way.

There is also a jet grouting program. Jet grouting is essentially ground improvement to allow us to expose the existing effluent conduit without having concerns with groundwater infiltration or structural concerns of that existing conduit. At Sunrise Highway, because the aqueduct is 100 years old, we did expose sections of the aqueduct and Western Bays is currently surveying the condition of the aqueduct. They've assessed the condition of the steel. Here you see photos of exactly how they've cut into the aqueducts. That's a deep valve that was existing back when it was a water supply aqueduct. To the right, you see a worker in one of those pits also exposing the aqueduct to prepare it for an inspection. This work has been predominantly done at night because of the traffic on Sunrise Highway.

This slide shows the Cedar Creek facility and what you see here is utility testing. We are digging down to expose known and unknown utilities that could potentially be in conflict with the microtunnel alignment. Western Bays is currently working to relocate any existing utilities that are functional and also to move or demolish any of the abandoned utilities which are no longer functional that exist at the property.

For the construction look ahead, we wanted to provide an update of where we will be through the summer and into the fall. On this slide there's a table of various graphs of where we expect some progress to be. As you can see at Bay Park, mostly everything will be picking up this summer and fall. We're at Bay Park shaft one and two currently and we have fenced off shafts 5, 7 and 8 preparing the grade for the equipment that needs to mobilize. Bay Park shafts 3 and 4 are in Oceanside and we're expecting to mobilize to those two shafts in August of this year. Finally, shaft 9, which is where we are connecting to the aqueduct near Sunrise Highway, is expecting to begin in September timeframe this year.

On this slide you can see other locations which are exposed now and those surveys that we previously mentioned are being performed. So just going to wait one minute and allow everyone to take a look at this.

This is an interactive map to show where that progress is. As you can see, the yellow indicating what we just discussed and the last two slides are the entire Bay Park alignment. That's the microtunneling that we will be performing first this summer and fall. We will essentially be mobilizing to all those shafts, although the microtunneling itself is going to begin in the October timeframe. That's beginning down at Bay Park shaft two and tunneling toward shaft one, which is within the treatment plant boundary. The migratory activities themselves will be largely invisible to the public until this winter.

Focusing on the Bay Park microtunneling next. We will begin microtunneling shafts three and eight and we're going to begin installing the cutter soil mix in support of excavation in August and that will also be completed in the fall. Looking at 4,5 and 7, we're still just preparing the site and looking to start those supportive excavation activities in the fall. At shaft 9, we will be mobilizing there in the September timeframe with the excavation activities beginning sometime after that.

Just a couple of points at the bottom there. You know the site will be fenced so that they are secure and any of those microtunneling shafts that are constructed will be covered when they're not in use. There will be a safety cover so there's much less risk of anyone, even if they do get inside of the fence, having a chance of being injured as a result of those shafts existing. Something else to note is that all that

excavating material does need to be trucked off site so in the areas surrounding those shaft sites when we are done with the excavation there will be some increased truck traffic as we remove all that sand that's inside of those shafts.

The first slip lining begins in Freeport and is not on Sunrise Highway. That's an area that where the maintenance yard is and there's an access road that leads back to the Long Island Railroad. That's where we will begin, and we will go back to where the aqueduct comes back to Sunrise Highway. These are the projections for this fall and that will get us to the September-October timeframe and hopefully by then we'll have had an opportunity to reconnect with all those that are on this call to provide a better forecast of where we will be slip lining after the fall period.

We understand that there's going to be an impact to Sunrise Highway as it is an extremely busy thoroughfare. It's a significant concern of ours. We will have to work on having traffic control plans in place. There will be signage. We will be working to publicly message any closures that we're going to have. We will be maintaining three lanes of travel in each direction during the rush hour periods and providing all the signage to notify commuters and all of those traveling so that everyone is aware there will be lane closures and any impacts that may exist.

I want to take a moment to discuss safety. This project's safety is our utmost concern. Here you see a daily safety briefing where Western Bays is talking to all the employees on site discussing activities and best safety practices. We do follow all the OSHA guidelines and provide regular safety briefings to make sure that everyone's aware of their surroundings and environment. We're as safe as we possibly can be. Safety is not only a concern for the staff working on the project, but for the public as well. We want to make sure that we're communicating what's going on and given timing so there's a little bit less curiosity. I just want to emphasize that we are doing our best to maintain the safety of the public and the employees working on this project.

Here is the public outreach portion. At this point I'd like to turn it over to Travis Brennan. Travis is the Public Information Officer who represents Western Bays Constructors. He's going to talk through some of the public outreach efforts and engagement efforts that we maintain in order to keep public aware of what's going on and everything that we're doing associated with the Bay Park project. Travis, you'd like to take it from here.

Travis Brennan:
I would. Good morning, everyone. My name is Travis Brennan. I'm the Public Information Officer for Western Bays Constructors, the joint venture that's been tasked with building this project for the Western Bays and frankly, on Long Island. I think Andy did a great job at guiding everyone through the nuts and bolts of construction. When it comes to public outreach, before I get into the details of what we do to engage and inform the public, I want to take a moment to thank and acknowledge the fact that the NYS DEC and the state and the counties all recognize that the need for a robust community engagement community affairs program. Long Island, and specifically the South Shore, is saturated both with businesses and residents. This project was certainly needed, but they wanted to make sure that we engaged those stakeholders in a proactive way to make sure that everyone knew what was happening. I think that's a critical component to a successful construction project.

We can go to the next slide please. Just to overlay who we are and what my team does, I am Travis Brennan and Ginger Conforti works directly with me at our office in Lynbrook. She manages the program on a day-to-day basis. Some familiar faces to some of you may be Margo Cargill, our community

ambassador. She's local to the area. She's the current vice president of the Nassau Council of Chambers and former past president of the Uniondale Chamber of Commerce. Her role in the project and part of my team is to go out engage the public directly to try and come up with some creative ways to message and make sure that we are hitting the appropriate parties in order to come back to the project team and be a direct link in case there are some issues or in case we run into any challenges or consistent themes with people coming back to the project with questions or concerns. Those are reported directly to Ginger and myself and we have the ability to sit with the design team and also the construction team and pivot where needed. Gary Lewi is a consultant on the project representing Rubenstein and they're here primarily to make sure that our branding and messaging is hitting the right audiences and making sure that we're communicating with stakeholders in an effective manner. We really want to use Rubenstein and specifically Gary for his knowledge and for his expertise when it comes to Long Island and the challenges that we face.

Andy mentioned before that we have a number of ways in which we interact and engage. Some of those specifically are monthly and quarterly meetings we have had. I believe we've had 16 total virtual meetings to date, and we are very much looking forward to those meetings becoming in person meetings at our Community Information Center. Something else that's important is our push on social media. We do have a website and we do have a 24-seven hotline and we do have a dedicated email inbox where people can contact the project. We feel social media is a great way to engage the public and give them information in almost real time. We have just instituted this “Before You Go” campaign. If anybody goes to our Facebook page, you'll see that what we're doing is trying to give the general public exactly what I said before, proactive and consistent engagement. So that way, when they go to our Facebook page or they go to Sunrise Highway, they realize, “Oh, this is what I read about. This is what's happening. This is exactly what they told me was going to happen and here's how I mitigate that impact to my day.” The idea would be they knew what was happening. They knew what was coming and therefore they are less inclined to have an issue with this work being done. I mentioned the 24-seven hotline and email. Those are dedicated to my office as well as the owner. The goal is to make sure that there's a system to answer questions in an immediate capacity, but also be able to get back to the public with up to date information.

Andy mentioned design build, that is a challenge because the public wants to know what's going to happen well in advance. Unfortunately, with design build, 100% of the design progression cannot be complete before the project starts, so we engage throughout that entire process. We talk about what we expect to happen and about who we think is going to be impacted. We then go directly to those businesses and residences that are outside of the shaft and pit locations to make sure that they have direct access to the project or our community ambassador, but also at times directly to myself and/or Ginger depending on the nature of the concern and question. Something that's critical is that we are going to maintain access to all businesses along Sunrise Highway. Andy mentioned our protocols and our requirements to keep three lanes of traffic during peak periods. We are going to try to do a majority of our work overnight, but no doubt that we will impact some businesses along Sunrise. My job is to engage proactively with those businesses to make sure that we do a good job at telling them what to expect and also mitigate any impacts we have and potentially help them with any challenges that they face during our construction process. We mentioned the project website and social media push.

On this slide, you have those methods that I just referenced as far as how to get in touch with us. That's the number to our project hotline. That is our email which is a park conveyance@gmail.com. Our website BayParkadvanced.org and our Facebook at Bay Park Advance are all excellent ways in which you'll learn about what this project is, the reason for it and why we think it's so important for the

Western Bays and the South Shore of Long Island, but also what we're doing and where we're going to be. The idea is it's a snapshot of all of our activities, both former and what's to come. We're going to utilize and message as much as we can so that people can go there and get as much information as possible. Lastly, the Community Information Center. That's along Sunrise Highway in Rockville Center. That's going to be a place where we are going to welcome the public. Currently we are operating by appointment only, but we hope to change that soon. We want to bring people in and teach them and educate them about the project. We want to hold meetings and potentially bring in stakeholders to engage them directly. Hopefully, our monthly meetings will take place there. Our quarterly meetings might take a little longer, but we'd like to have that as a space that the public can utilize on a regular basis.

Before I kick it back to the host, I just want to say that we mentioned our public monthly meetings and our quarterly meetings. Our next quarterly meeting for the general public is on July 20th at 6:30pm. We hold monthly stakeholder meetings (three separate ones - one for elected officials, emergency services and their staff). Those are held on the last Tuesday of each month and then we invite the Civics and Chambers and various organizations to join us on the last Wednesday evening of the month, every month. We would encourage anybody that's on this call and any of the elected officials on this call to join us. We have seen a great representation from the elected officials and their staff at our meetings. We'd love to see more engagement from the Civics and Chambers, so that they can inform their stakeholders in their membership of what's to come. Finally, thank you wholeheartedly to the LIRPC for allowing us the time to come on and do this presentation.

John Cameron:
Thank you, Travis and Andy for excellent presentations. I think anybody involved knows that this is a very exciting and important project for all of Long Island.

Jeff Guillot:
I appreciate the explanation of how this works. It's a fascinating project. What are the critical failure points on the project? What are the things you're most concerned with that would be problematic if they happen?

Andy Fera:
One of the more critical issues is the condition of the Sunrise Highway aqueduct. The aqueduct was inspected about seven years ago now. It was found to be in very good condition, although there was only access to approximately 90% of the aqueduct, but there’s a segment of the aqueduct which is sort of an unknown. If it’s necessary to make any repairs to that piece of the steel pipe, there can be some service intervention that might have greater impacts to traffic. In all likelihood, barring a true disastrous scenario, we wouldn't be able to open up a work pit cover with a steel plate as we would a normal work pit. There are all sorts of engineering and construction solutions to that. Even as a potential problem, it's a very manageable situation.

Mayor Robert Kennedy:
This project is going right through my village of Freeport and although I've been on top of it, watching daily. I have a few questions that may take a while so if I could take your phone number I would like to call you offline.

Andy Fera:
Absolutely Mayor Kennedy.

Question:
Andy, I was wondering if you could walk us through the total cost of the project?
Andy Fera:
The total cost of the contract altogether is $439.4 million. Of that $439.4 million, there is a significant amount set aside for unforeseen allowances and contingency. The base price of the contract is $386 million, although the answer is that contingencies will be accessed throughout. So, we're looking at a "not to exceed" $439 million.

Question:
How many construction jobs are being created by the by the project?

Andy Fera:
At the peak of the project, we're looking at 150 to 200 people working on this project. That's at a given time so if you cascade that through the supply chain, you're looking at thousands. There is a project labor agreement for this project, which means that we use a union labor. The number that I'm estimating regionally is ultimately like 2,000-2,500 in terms of people that are employed at some point all the way through the supply chain and through the duration of the project.

Theresa Sanders:
Do you have any diversity and inclusion considerations on this project?

Andy Fera:
This project has MWBE goals and some of the funding being federal has DBE goals. There are also SDVOB goals.

Alan Belniak:
Just a quick reminder for those joining that there are two ways to ask questions or comments. You can use the raise hand button down below to raise your hand, then I can take you off mute to let you ask your question or share your comment. Alternatively, you can do what Chris Schubert has done from USGS which is use the Q&A feature. We'll start with the first one.

First, will dewatering be needed for the microtunneling shafts? If so, what are the anticipated amounts and potential impacts to adjacent surface and coastal waters?

Andy Fera:
There are two parts to that question so I will address them independently. When you construct a shaft and first put the concrete in, you make it watertight and then you excavate. It is well below the water table. It's sort of a one-time dewatering effort where you are pumping out that water. It's handled on a case by case basis, because it entirely depends on the quality and turbidity of that water. If the quality is acceptable and the turbidity is low, it could be discharged into a water body with minimal to no impact, if it's otherwise, it needs to be treated or hauled off site. So, there's not really a blanket statement that I can provide. The design team with Western Bays identifies that water and I work with the regulatory staff at DEC to find an acceptable and appropriate disposal location for that water. To date, we have dewatered some of the aqueduct that had water in it partially because of infiltration from groundwater. What we've found is that the samples of water have come back to be quite clean, and the turbidity is low and so we discharged to water bodies that are less sensitive and to storm sewers which are permitted to accept it. As we proceed down Sunrise Highway, there will be low sections which have

water, and the first step will be to sample and identify the condition of that water. After that, we will assess an appropriate means of disposal from that point. Thank you.

Alan Belniak:
Chris has a second question. Will any of the legacy kind of infrastructure like bronze valves be removed and preserved or displayed for posterity?

Andy Fera:
That is a great question. What I can answer is that the existing valves, the gate valves that are on this highway, are targeted to simply be removed. I don't believe there has been a discussion about displaying them, or purposefully distributing them although that is something that could be discussed moving forward. I'm not sure Western Bays has any defined purpose for that removed structure.

Travis Brennan:
Andy, if I could jump in there. I'm not sure who the gentleman is asking the question, but I think that it is a great suggestion. It can serve a purpose in our Community Information Center to explain where we were 100 years ago versus where we are today. As Andy said, there are no plans, but that doesn't mean that there can't be a new plan. I'll take the suggestion back to our teams that are out there building this project. I think we can hopefully come back to you with some creative ways to display or preserve some of the infrastructure right there.

Andy Fera:
Just as a point of magnitude to add to that, Western Bays went to remove one of the gate valves with the excavator that was shown in some of the photos, and it actually didn't have the lifting capability. It's estimated somewhere around 10,000-12,000 pounds for the gate. In terms of displaying them, the photos kind of dwarf the weight of that 72 inch steel gate valve. Things were made pretty heavy back in the day. It would be an interesting effort. If appropriate location site, I'm sure it's something that could be considered.

John Cameron:
I did notice that Adrienne Esposito had made a comment in the chat room that this project is worth every penny. I would just like to offer a personal comment. As somebody who grew up in Long Beach and swam, fished, and wakeboarded Reynolds Channel for many years, I believe this project is, environmentally, one of the most progressive and important projects that Long Island has seen in my lifetime. I want to salute again, the County, the State, and Western Bays and the design team. We wish them nothing but success. This is a transformative project for both the Western Bays and Nassau County. I hope by getting the Bay Park and Long Beach outfalls out of Reynolds Channel, this project could enable Hempstead Bay, which is the body of water which encompasses Reynold's Channel to possibly achieve its ultimate overall classification which is for shellfishing. Its highest and best usage is for shellfishing. The reality of shellfishing being possible in Hempstead Bay would be a major accomplishment for the government and for the community here in Nassau County. So again, I want to salute the team. Andy and Travis did an outstanding job today. We look forward to a completion of a successful project.

Dorian Dale:
My question has to do with the doubling of the outfall. That outfall is going to come out of Cedar Creek and I know my contemporary has talked about surfing down in the Reynolds Channel area. I surfed east of that outfall pipe that goes out three miles. It's going to be doubling the effluent that's going to be

distributed out three miles and the question is, under certain prevailing currents and storm events which can drive some of this effluent back to shore, what contingencies are there anticipating this issue in the event it happens?

Andy Fera:
We've looked at that increased flow and the short answer is that because of the mixing capabilities in the ocean, there isn't an impact by the time it gets from three miles offshore to the shore. It is diffused as it mixes and comes in. There is not an observed impact to the water quality by the time whatever amount of it reaches the shore because of the mixing and the currents.

Comment:
Well, I will respond very quickly to that. Although I really respected and appreciated your presentation, I grew up in the day when we had a preponderance of congealed oil coming ashore on a regular basis and it came from clearly many miles out. I'm not exactly as confident as you have expressed yourself to be with that net result. Under certain circumstances, it is a conceivable concern that maybe could be addressed with various other kinds of valuations.

Andy Fera:
What I would offer to that point is that effluent is treated water. What we're talking about is not oil based. There is simply a higher level of nitrogen which is part of the water quality itself. The nitrogen nutrient being in the water is largely in the form of ammonia. If for some reason there was an oil-based product in the effluent, which I don't know why it would be, you could observe something like that. If the current did pass that effluent in your direction, however, strictly speaking of wastewater effluent, and it's specifically wastewater effluent, that condition really wouldn't exist in any foreseeable condition.

Alan Belniak:
Thank you very much. The last comment is from the Citizens Campaign for the Environment. “It's worth noting that the effluent right now is going into Reynolds Channel and after 180 days, it also goes out to the ocean. So, either way, with this project, the effluent will be cleaner.”

That concludes the open Q&A.

John Cameron:
Thanks so much, Alan. Thanks again to both Andy and Travis. That was excellent. We'll look forward to further updates in the coming couple of years. Rich, I will turn it over to you.

Rich Guardino:
We have with us Professor Steve Raciti, who is an associate professor in the Department of Biology at Hofstra University. He is also Director of Graduate Studies in Biology and Urban Ecology and he will introduce his colleagues as well as part of the presentation.

PRESENTATION

Steve Raciti:
Thank you, Richard. I'm going to share my screen here to get started. Hopefully, everyone can see that clearly. Thank you all for joining us here today. I'm really excited to be speaking about the Hempstead Bay Water Quality Monitoring Program. (Note that Hempstead Bay is often referred to as the South

Shore Estuary Reserve and Western Bays, so I might use those two names interchangeably.) In this presentation, I'm going to be presenting on behalf of our larger project team from Hofstra University, Hofstra University's National Center for Suburban Studies, and also the Town of Hempstead Department of Conservation Waterways. This team includes Dr. James Brown of the Town of Hempstead, Dr. Antonio Marcel of Hofstra University, and a number of other players who we will mention a little bit later. I also want to point out that this work is being conducted in collaboration with the Long Island Regional Planning Council, and the New York State Department of Environmental Conservation. These two organizations have been instrumental in providing financial support for these monitoring efforts.

Here's a quick overview of my presentation for today. I'm going to start by talking about nitrogen pollution in the South Shore Estuary Reserve. I'm going to keep that brief because you are very aware of that problem. Next, I'm going to talk about Hempstead Bay and particularly, trends in water quality over time (1968 all the way to 2020). For the final part of the presentation, I'm going to segue into talking about our new effort to monitor atmospheric nitrogen deposition on Long Island and why that's so critically important. I'll conclude with some big picture remarks that summarize the presentation.

Let's start with something that you are well aware of, which is that nitrogen pollution is a major source of impairment to surface and groundwater on Long Island. When I talk about nitrogen today, and when other folks were talking about nitrogen today, they weren't talking about nitrogen gas in the atmosphere. That gas is largely on Earth. What we're talking about is reactive forms of nitrogen such as nitrate, ammonium, nitrogen oxides, and various organic forms of nitrogen. This reactive nitrogen is often a limiting nutrient for plants and algal growth. It's absolutely essential for life on the planet. We need nitrogen and it's not always the enemy, however, there have been a number of human contributions to the nitrogen cycle that have dramatically increased the amount of available nitrogen in the environment. These human contributions include stormwater runoff from the various impervious surfaces in our landscape such as buildings, roads, sidewalks, wastewater treatment plants, septic systems and leaking sewage infrastructure, and of course, all the fertilizer that gets used on lawns, gardens and farm fields. One piece of the puzzle that people don't often think about that I'm going to address quite a bit today is atmospheric sources of nitrogen deposition. Atmospheric nitrogen deposition comes from the various ways we use fossil fuels and vehicles, heating systems, and fossil fuel powered power plants. What I'm getting at today is that nitrogen is essential, but we often end up in a situation (for instance in Hempstead Bay) where we have too much of a good thing. This is leading to negative impacts on air quality, water quality, and tremendous damage to local ecosystems.

Nitrogen pollution from the many sources I mentioned earlier contributes to major surface water impairments in the South Shore Estuary and these impairments include algal blooms, whether that's phytoplankton or all the fish kills. Algal blooms lead to the release of toxins in the water and of course problems with hypoxic zones. These are low oxygen conditions that are hazardous to aquatic life. All this excess nitrogen pollution leads to habitat degradation. We have seen the degradation or loss of coastal wetlands that are seagrass beds and our benthic communities. One thing I often hear about from people in the public is it costs us money to fix this problem. To that, I say it's costing us money and value as a society right now, when we don't fix the problem. It turns out that addressing nitrogen pollution makes economic sense as the cost of nitrogen pollution to society is actually extraordinarily high. It's estimated at $210 billion a year in the United States. That's per year, not just a one-time, fixed cost. The cost that we bear as a result of nitrogen pollution includes declines in property values, tourism, quality of life in our coastal areas of Long Island and the loss of the economic vitality of our coastal communities. If we don't have clean water, we've lost the lifeblood of a lot of our communities on Long Island. It's imperative that we continue to work on water quality here on Long Island.

Speaking of water quality and before I move forward, I want to acknowledge the tremendous contributions of my colleagues at the Town of Hempstead and particularly the Town of Hempstead Department of Conservation Waterways who've been monitoring the waters of Hempstead Bay for more than five decades. The Town of Hempstead Marine Laboratory started in partnership with Hofstra University and I'm pleased that Hofstra University has continued to be involved in this effort since 1968. There have been more than 50 years of water quality monitoring and you can see in this map in the bottom right hand corner of my screen, which shows the various historic and current places we're monitoring water quality in the South Shore Estuary Reserve, that these sort of pink diamonds over here that represent Town of Hempstead sites are the vast majority of the monitoring sites that have occurred historically and that occur in the present within this area.

The Town of Hempstead has been the largest and by far most important source of water quality monitoring in this region. Unfortunately, in the summer of 2017, the Town of Hempstead Marine Lab was forced to close due to a number of things happening at once including budget constraints and discovery of black mold and other major issues in the building that were holdover from damage from Hurricane Sandy. There's this tremendous need to refurbish that building and unfortunately, with the closure of the lab, most of the water quality monitoring activities that I'm talking about today, were dramatically scaled back or ceased completely in the summer of 2017. This was a terrible time to stop monitoring as it was just before an enormous number of changes were set to happen in Hempstead Bay, including the Bay Park Conveyance Project that we talked about earlier.

In Fall 2019, with help from the Long Island Regional Planning Council and the New York State Department of Environmental Conservation, we created a renewed partnership for water quality monitoring that involves a partnership between Hofstra University, the Town of Hempstead, and the two agencies I mentioned earlier. This is our larger project team for our renewed Hempstead Bay water quality monitoring program. The team includes me, Dr. Raciti of Hofstra University, my colleague, Dr. James Brown of the Town of Hempstead Department of Conservation and Waterways, and faculty whose expertise spans a wide range of Hofstra University studies, from engineering to environmental chemistry, to geology, environment and sustainability. We have a ton of expertise on our team. I would also like to mention some of the other really important players in this work. These players include the students at Hofstra University, such as the master students who are working in my lab on this monitoring effort and the employees at the Town of Hempstead Department of Conservation and Waterways. Thank you for all your efforts.

As I said, there's an urgent need, or there has been an urgent need for this renewed monitoring program. There are major changes that have been happening in Hempstead Bay since we began our monitoring program in October 2019 and major changes continue to happen. There's the Living with the Bay Project, which is funded by the Governor's Office of Storm Recovery. This includes stormwater retrofits, retrofit drainage improvements, and restoration of marshes and dunes to help us with storm protection. There's the Long Island Shellfish Restoration Program and various bio-extraction projects. These projects are aiming to use the biota to remove nitrogen from the water. There's the sewering of houses and businesses in Point Lookout that is set to occur and of course, all those upgrades at the South Shore Water Reclamation Facility at Bay Park. I'm not going to go into detail about those because we just heard a great presentation about it, but one of the big things that's coming very soon is this Bay Park Conveyance Project, which is going to take this enormous load of treated wastewater effluent, which now currently ends up in Hempstead Bay and reroute it to an ocean outfall three miles offshore. That's going to lead to tremendous changes in the amount of nitrogen entering the system and

tremendous changes to the ecosystem, which we need to monitor over time if we're going to try to improve water quality via this project. It only makes sense that we monitor the results of our efforts to see how far we get and whether we're getting the improvements we are hoping for over time.

The big questions we have are: What were the baseline conditions prior to these projects? What is the impact of these infrastructure upgrades as they're taking place? And of course, what is water quality going to look like in the future? We could only answer those questions if we continuously monitor the water quality within this region.

So here's a brief scope of work for this renewed Hempstead Bay Water Quality Monitoring Program, which restarted in October of 2019. We have a number of water sampling stations in the three bays within the larger Hempstead Bay where we're measuring chlorophyll A, which tells us something about algae in the water, bacteria and other parameters. We have vertical profiles which are at deep water sites within the bays. Our water sampling is occurring monthly and our vertical profiles also occur monthly. This is where we take measurements from the surface all the way to depth so we can get an entire water columns worth of measurements and understand things such as dissolved oxygen, salinity, temperature and turbidity. We also have continuous automated monitoring stations that take measurements of key parameters at 12 minute intervals. So these measurement stations measure things such as dissolved oxygen, salinity, temperature, etc. Something that's brand new to this region is a program to measure atmospheric nitrogen deposition as part of this work. A lot of us don't think about atmosphere sources of nitrogen deposition much, but it turns out these sources are really important. If we look further east on Long Island, it's estimated that approximately 33% of nitrogen loading to the eastern bays comes from atmospheric sources whether that is indirectly (atmospheric nitrogen deposition falling on the land surface and ending up in the water) or directly by deposition to the bays themselves. In great South Bay, it's estimated that 42% of nitrogen loading comes from atmospheric sources and in Peconic Bay, it could be as much as 50% or more of total nitrogen loads based on past estimates.

Now let's talk about our own closer to home area over here which is Hempstead Bay. Nitrogen loading is happening in all three bays of the Hempstead Bay (West Bay, Middle, and East Bay) and the ranges are from 1% to 30%. The reason it's only 1% of the inputs to West Bay, is because the inputs in that area are currently dominated by the wastewater treatment plant outfalls. We expect that this number is going to be larger in the future. So if we want to understand how nitrogen pollution is changing over time, we really need to understand this really important content component, but there's a big question you should be asking yourself which is where do these nitrogen deposition estimates come from? If we're talking about between a third and half of our nitrogen inputs, we would hope that it comes from a really good trusted source and in some ways, it does come from a trusted source, but we're applying it possibly in an incorrect way. So where do these estimates come from? What you're looking at on the map over here is atmospheric nitrogen deposition measurement stations that are part of the national trends network. These are national sites that were meant to measure atmospheric nitrogen deposition at continental scales. We have exactly one place on Long Island where we're measuring wet deposition of nitrogen (nitrogen that comes out of the atmosphere as rainfall) and there are zero places where we're measuring dry deposition on Long Island. Instead, we get those estimates by taking averages from places like Northeastern Connecticut, a location near the Catskills, and rural Western New Jersey. So to take measurements that come from these either far off rural places or a single rural place on Long Island, and apply them to this highly developed island is questionable. It turns out that these monitoring networks, or these National Trends Network (NTN), were never designed to measure nitrogen deposition in urban and suburban areas. They were designed to measure long range continental scale

patterns of nitrogen deposition and these sites were purposely located far away from urban and suburban areas because that was considered noise in the data. They didn't want to know about that. They wanted to understand how big power plants in the Midwest were affecting movement of nitrogen to the Adirondacks or the Catskills mountains.

What I'm getting at here is that we have this useful resource, this National Trends Network and we're taking those data and applying it in a way that it was never meant to be applied. There are some important lessons that were learned from our work in Boston. My colleagues and I measured atmospheric nitrogen deposition across an urban to rural radius. You can imagine urban here, rural out here on Long Island. We found that atmosphere of nitrogen deposition was twice as high in urban and suburban areas compared to these rural sites where we were measuring it as part of this National Trends Network. That brought us an important question: How good are these estimates? We know nitrogen deposition is large, but are we underestimating it in the more developed parts of our landscape.

As part of this work, we created an atmospheric nitrogen deposition monitoring network within the Hempstead Bay watershed. This network includes 12 sites within southern Nassau County. At each of these sites we have six samplers which is a lot of replication. Three of these samplers are bulk collectors. These are like funnels underneath an open sky where they can capture rainwater and measure atmospheric nitrogen deposition from that wet source. We also have through fall collectors which are collectors that are underneath tree canopy. In that case, the surface of the leaves becomes a surface for capturing dry deposition. When it rains, we capture both wet deposition from the rainfall and dry deposition that's washed off the canopy. So those two things together give us wet deposition and total nitrogen deposition and by subtraction we can estimate dry deposition. Now the method we're using here involves ion exchange resin columns. You can think of Ion Exchange Resin (IER) columns as fancy filters that remove the nitrogen molecules from the water that passes through them kind of like a filter. They're chemically stable, so they can stay out in the field for six to eight weeks at a time and they're going to continuously measure and recapture that atmosphere of nitrogen that goes through them. We can bring them back to the lab, analyze them and understand what happened in that six to eight week window of time. I should note that all these sites that you see on the map over here are spatially distributed so that we can capture important trends, ie. capture emissions as they relate to on road emissions from vehicles, large point sources, such as power plants, differences in land cover and landuse across our study area and, of course, differences with proximity to New York City, which might itself be a source of nitrogen deposition to our area.

Summary number one discusses the Hempstead Bay Water Quality Monitoring Program. One of our major goals is to understand baseline water quality prior to all these big infrastructure upgrades, to monitor atmospheric nitrogen deposition which is something that we know is really important, but we don't have a good handle on just yet. We also look to have long term measurements over time, so we can understand the impacts of these big infrastructure projects so we can understand if policy changes are going to affect water quality, or changes in this in the severity of storms, or the frequency of storms, with climate change in order to learn how all these different factors lead to changes in water quality on Long Island over time. Another part of our mission is to analyze that historic record of those 50 years of data I mentioned earlier, and connect that historic data with our present monitoring data so we can understand where we've been in the past and where we're hopefully headed in the future.

With that, I want to talk about a publication we put out last year. This is our publication on water quality trends in Hempstead Bay, New York from 1968 to 2017. You guys can look for that report, which

was supported by the Long Island Regional Planning Council and the New York State Department of Environmental Conservation. In that report, we talked about trends and water quality over time. Something that I did not mention in great detail from that report (because we didn't have a lot of data to talk about) was that in some ways, that report left us on a cliffhanger. What you're looking at over here is nitrate data over time. One of the things we saw within this historic data is that there have been measurable improvements in water quality in terms of nutrients and in terms of bacterial loads over the past few decades. This is fantastic. But, one of the big questions we had left was, is water quality still improving as of 2017?

At the end of 2017, we have a rather high point on our graph for average nitrate loads in our system. But remember, this represents only a partial year of gap. So the big question, does water quality continue to improve? I would like to have the data that is between 2017 and 2019, but that data was lost. So instead, I'm going to have to keep you on the edge of your seat for a moment here while I talk about the types of water quality data that went into our new analysis, and then tell you the outcome of the story.

So the key water quality parameters that have been talked about today are nutrients, in particular nitrate, ammonia and phosphate. We are talking about nitrogen as a nutrient and phosphorus as a nutrient that leads to eutrophication, as well as other problems in our water bodies, and bacteria (total coliform counts) which are used to help us regulate the use of water bodies in the United States. The key time periods you guys need to think about here are the period from 1975 to June 2017. Those are data from the original Hempstead Bays, which again, ended somewhat abruptly in summer of 2017 and then there's this new time period from October 2019 to May 2021. Of course, as we collect more data, which represents our renewed Hempstead Bay water quality monitoring program, we collect current data.

Alright, are you still on the edge of your seats? What happened with nitrogen in Hempstead Bay after 2017? Did it go up? Did it go down? Are things continuing to improve? Fortunately, I have good news for you. We are looking at nitrate and micromoles per liter on our Y-axis and the year on our X-axis. This is showing median annual concentrations over time. You can see, we have a strong downward trend from about 1980 to the present. We can see our partial year of data here, which looked rather disturbing and also partial year data here from 2019. These points in red are partial years of data that are not really comparable to the rest of the points that they're not full annual cycles that include all the seasons. But we can see in 2020 when we did have a full complete year of data, this trend line continues.

So the good news is that it appears that our decline in nitrate continues over time and obviously, we need to collect more data over more years to really confirm that trend. It looks like all these improvements that we've been making are leading to improved water quality. The bad news is that these levels that you're looking at here are still very high. In fact, they are much higher than we would expect in a clean natural system of this type indicating that we still have some more work to do. Thankfully, we're doing that work as you can see from that previous presentation.

Now, here's ammonia and ammonium combined which is the other major constituent of nitrogen that we're measuring as part of our monitoring. Note that, once again, over the last couple decades, this is from 2000 to 2020, we see a general decline in ammonia concentrations and Hempstead Bay over time. Overall, it's a improving trendline and we hope to continue to see these concentrations lower in the future

The next nutrient I want to talk about is phosphorus, which we're measuring in the form of phosphate in our water. Phosphorus is another necessary nutrient that's essential for life, but too much of it can lead

to eutrophication. There are other problems. We can see that there's a general decline in phosphorus and phosphate over time from 1990 to the present and it looks like we seem to be continuing with that decline. But again, we need more data over time to really know if that trend line continues in the positive direction.

So we talked about nutrients. We have good news in that nutrient concentrations appear to be declining over time, including in our new time period from October 2019 to the present. The next important thing we need to talk about is bacterial load. What you're looking at here is total coliform bacteria. This is measured as number of colonies per 100 milliliters of water and we have a median annual total coliform count in Hempstead Bay from 1975 through the present. Once again, this is an indicator of potentially pathogenic bacteria in our waterways and this is used to regulate the safety of activities, both commercial and recreational activities. The good news is that there's been a general decrease in total coliform bacteria accounts over time, particularly from around the 1980s to the present and that trend appears to continue into the present day. I'm very happy to see that our new water quality monitoring network is capturing those changes over time and it's overall good news. Now, the bad news is that even though these numbers have been improving over time, there are still periodic instances of very high levels of total coliform counts, which can lead to closure of beaches, closure of areas for shellfishing, etc. We have more work to do on the bacteria side of the equation, but we are improving over time.

The summary of segment two of this talk is the overall trends in water quality from 1968 to 2021. We see that nutrients were very high in the early decades of these monitoring efforts, but those loads have been improving over time, particularly over the last two to three decades. The trend from 2019 to the present appears to be good and we appear to be continuing to move in the right direction. Similarly, for bacterial loads that were very high from 1968 through the mid 1980s which have seen a decline in recent decades, but once again, there's more work that we need to do due on that problem.

Now I want to talk about the third major portion of this talk, which is atmospheric nitrogen deposition on Long Island. I showed you that slide with estimates of how much nitrogen deposition was contributing towards total nitrogen loads in places like the Peconic Bay, the Eastern Bays, and elsewhere on Long Island. It turns out, it's a very large percentage. As part of our Hempstead Bay Water Quality Monitoring Program, we have a series of 12 monitoring sites within Southern Nassau County to help us understand this important input. While we're not specifically funded to do work beyond this area, the receiving lab with some internal funding at Hofstra University, (this is really unfunded work for the most part) have put out some short term low density network of monitoring sites elsewhere on Long Island. I want to emphasize that these are short term measurements and that we have greatly reduced temporal resolution. Temporal resolution is the frequency with which we can collect our data and analyze it. We have more points in southern Nassau County where we're taking measurements that we have in all of Eastern Long Island, which is 10 times the size. We're not even measuring both wet deposition and dry deposition separately, but only have through fall measurement sites at these locations. So, it really only represents a preliminary look at that gradient of nitrogen deposition from urban to rural sites, but we hope it provides some insights to help let us know what's going on across this area. Hopefully, it gives people some incentive to maybe realize we should be measuring this and monitoring this elsewhere on Long Island as well.

Now the first question we wanted to ask ourselves is whether or not the measurements we are collecting as part of this network are reasonable. We're using a different method than the US at that National Atmospheric Deposition Program (NADP) station here. We contacted the folks at the National

Atmospheric Deposition Program and they were excited to let us put our own monitoring equipment in line with their atmospheric monitoring so that we can have direct side by side comparisons. Remember that the NADP only measures wet deposition and our network also measures total deposition, so wet and dry together. So we actually have much more of the story than they do from that one site out there. The good news here is that there's been a good match over time in terms of trends in captured atmospheric nitrogen deposition over time so we can be confident that measurements are low. According to the NADP site for wet deposition, those measurements will be low in our own data.

So what does this map look like if we take each of our locations and we represent them with a point on the map that shows the magnitude of atmospheric nitrogen deposition? What you're looking at on this map over here is our sites. The larger the circle, the larger the amount of deposition we measure there, this is our NADP site out at Cedar Beach and these are our sites in southern Nassau County and our sort of temporary sites elsewhere on Long Island. The background of this map is impervious surface area. The areas represented in green are places where there's very little development (zero to 5%) and impervious surface areas that turn darker colors on this map are places with much more development. It's unsurprising that we have a gradient from more rural out east to more developed in western Long Island. If you look closely at this map, you can see that places where there's less development and less human influence have lower concentrations of atmospheric nitrogen deposition, and places that are closer to higher concentrations of development have higher deposition. It's great to take a look at that, but we wanted to quantify this further so that we can model it across the landscape.

Looking at this map on this chart over here, you see total nitrogen deposition across our sites relative to the impervious surface area within one kilometer of that site. This is an area that is clearly relatively rural. There's not a lot of development here. It's mostly forest. Here's an area that has a much higher density of development. We see that as impervious surface area increases.

Rich Guardino:
I'm sorry to have to interrupt you. We have a quorum now and we're going to lose some of our members at noon. If you don't mind, we'd like to take maybe five minutes to handle some of the business of the meeting so that we can get these votes completed and then we'll come back to the presentation.

Steve Raciti:
Absolutely. I'm going to leave you once again with a cliffhanger here … What's going on with nitrogen deposition on Long Island?

Rich Guardino:
Thank you. Theresa Sanders and Nancy Engelhardt have joined and we now have a quorum.

Adoption of the May 2021 minutes. All in favor.
All in Favor: So moved.

Rich Guardino:
Resolution 2021- 10 authorizes six grants totaling $15,000 to schools with top proposals awarded by the LIRPC for the 2021 STEAM Challenge. The challenge invited teams of students to develop and design projects for their school grounds which will either reduce the use of fertilizers, pesticides, and water consumption or devise methods to collect stormwater runoff from the school property. The 2021 STEAM challenge has concluded with 14 teams submitting proposals from seven schools. The selection

committee was assembled including representatives from the LIRPC, Nassau County Soil and Water Conservation District, Suffolk County Soil and Water Conservation District, South Shore Estuary Reserve and the Department of Environmental Conservation. At the high school level, the top proposals came from Calhoun and two from New Hyde Park Memorial. Top proposals from the middle school competition came from Sewanhaka and New Hyde Park Memorial. Grants in the amount of $2,500 will be awarded to each of the top six teams to implement their proposals.

Motion to Accept Resolution 2021-108: Barbara Donno
Seconded: Elizabeth Custodio
All in Favor: So moved.

Rich Guardino:
Resolution 2021-109 authorizes a contract extension agreement for an additional one year with a partnership of Hofstra University and the Town of Hempstead to continue water quality monitoring, analysis and reporting in the South Shore Estuary Reserve including Hempstead Bays. This will continue the contract through September 30, 2022 with costs not to exceed $183,000. In addition to the current water quality monitoring, they're going to add some additional sites and they will also be transferring all water quality data from the water quality monitoring program into the US Environmental Protection Agency's Water Quality Exchange database. Future water quality data will be submitted to the database. The program provides baseline data to evaluate changes in nutrient loads over the next decade. The Council is a recipient of a New York State Department of Environmental Conservation grant to support the program.

Motion to Accept Resolution 2020-109: Jeff Guillot
Seconded: Theresa Sanders
Recused: Jeff Kraut
All in Favor: So moved.

Rich Guardino:
Resolution 2021-110 approves the independent auditor's report performed by the Long Island Financial Management Service. LIFMS is a certified women owned business for the year 2020. The Council retained the firm in March of this year to perform an audit of the financial statements of the Council. The key findings of the audit are the auditor did not find any deficiencies in internal control that they considered to be material weaknesses. The results of their test disclose no instances of noncompliance or other matters that are required to report under government auditing standards. The Officers of the Council have met with staff to review the audit and they recommend the approval of the independent auditor's report for the year 2020.

Jeff Kraut:
We did review the audit with management. We spoke and discussed the management letter and there were no remarkable findings. We are in a very stable financial condition. Thanks to the relationships we've had with both counties and some of the key contracts that we've entered into for the studies, we're in a fiscally stable place. We as a committee recommend adoption of the acceptance of the audit to the full board.

Motion to Accept Resolution 2020-110: Jeff Kraut
Seconded: Nancy Engelhardt
All in Favor: So moved.

Rich Guardino:
That concludes the business section of the meeting. Steve, if you could complete your presentation. Thank you.

Steve Raciti:
Absolutely, I only have a few more slides. Thank you so much for your support of this work. It's incredibly important. I'm going to share my screen again and get back to our story. We're talking about atmospheric nitrogen deposition. We know this is a major source of nitrogen pollution to our watersheds, anywhere from 25% to possibly 50%+ of nitrogen loads to many of our water bodies on Long Island, with the exception of the Western Bay portion of Hempstead Bay simply because the large outfall that's there. This is a very important source and it's been poorly quantified because we haven't really been measuring it locally.

The first correlation I wanted to show you was that as impervious surface area increases (a measure for the amount of development in an area), total nitrogen deposition increases and the relationship is strong. We also looked at vehicle emissions. This map in the bottom right hand corner shows estimates of on road CO2 emissions meaning measures of the amount of vehicle exhaust emissions across Long Island. Once again, as those on road CO2 emissions increase, so does total nitrogen deposition across our study sites. A third factor I want to point out here is point sources. Point sources are places like power plants or other large facilities that release nitric oxide emissions into the atmosphere, some of which can become atmospheric nitrogen deposition locally. The map you're looking at here has circles that represent point sources and the larger the circle, the larger the impact. If we look within a 10 kilometer radius among each of our study sites and add up all the emissions from these point sources, we see that as total nitrogen oxide emissions increase, so does total nitrogen deposition.

The key thing I'm getting at here is, even though there's a lot of variability in our measurements of atmospheric nitrogen deposition across Long Island, that variability is not random. That variability is directly related to human activities and can be modeled so that we could estimate atmospheric nitrogen and nitrogen deposition across the island in the future. So many variables such as impervious surface area, distance to Highway, on road CO2 emissions, land use, and land cover point sources can be put into our deposition models. If we take every single pixel, if you will, on this landscape and apply that model for that location, we can get a rough estimate of what we predict nitrogen deposition would be. If we created those statistical models, we can take different regions that we care about, such as the South Shore Estuary Reserve that flows into the Western Bays over here and we can get an estimate of nitrogen deposition. The big question we need to answer here is whether or not the estimates we're getting from our monitoring network here are similar to the estimates that we would get by taking this number from our NADP station and applying it to the rest of Long Island because the vast majority of our estimates of nitrogen deposition are coming from this site. Alternatively, do we want to drive those deposition estimates from places in Connecticut, New Jersey, and the Catskills. As a reminder, here's the difference between these two areas and the satellite imagery. Our rural site at Cedar Beach is over here, far from any major Highways or major sources of development or major point sources and here's a little slice of the Town of Hempstead here. You can see that these two landscapes look dramatically different. There's a huge influence of urban and suburban development over here. So, the question is whether the measurements from this site over here can really be smeared over this area here and can they give us a good estimate of atmospheric nitrogen deposition. It turns out that this is a bad estimate for our local area. If we look at the measurements that we obtained nearer the NADP station out east where we

estimate wet deposition only, we see that deposition of about three kilograms of nitrogen per hectare per year. Whereas within our Hempstead monitoring network, we have an average deposition rate of almost seven kilograms of nitrogen per hectare per year. What this means is that we've probably been under estimating nitrogen inputs to this area because we've been taking measurements from our national atmospheric deposition network and our other national network sites and applying them to the more highly developed areas of Long Island.

The big takeaway for this last segment of the presentation, nitrogen deposition monitoring, is that atmospheric nitrogen deposition remains a major source of nitrogen pollution to Long Island and our current estimates may be inadequate. We really need to be measuring this locally across the island, not just at a single location out east These national monitoring sites do a good job of representing what they're supposed to represent, which is rural background estimates of deposition. They were never meant to measure deposition in highly developed areas.

Now, one of the big, big things I want you to be aware of is one of our big questions is whether this statistical surface you're looking at here for total nitrogen deposition is going to be reliable for Eastern Long Island. Remember, we've got a low density of sites there and the main answer I can give you is that more data are required. We don't have enough measurement points out here. These measurements are short term from and collected during the peak of the pandemic so they're not representative of general conditions. Agricultural areas, which are an important source of nitrogen pollution, are not represented at all in our network. We have a lot more work to do if we're going to be able to trust the estimates from our Eastern sites, but we have a very nice high density of sites in southern Nassau County where we can trust those estimates.

Finally, some big conclusions of all the work I mentioned today. The main takeaways are that there have been measurable improvements in the water quality indicators that we've looked at over recent decades. Nutrients and bacterial loads are both declining over time, but we still have more work to do because those loads are still a lot higher than we would like them to be in the Western Bays. There are big projects underway that are going to help us continue to move in that direction. Atmospheric nitrogen deposition in dense suburban and urban areas on Long Island is probably being under predicted right now, but the good news is that variability that we see among our study sites is not random. We can model atmospheric nitrogen deposition and get estimates for our study area. One of the things I also want to emphasize is that there's an urgent need to continue monitoring changes within Hempstead Bay. We have these major infrastructure upgrades that have been happening as we have been monitoring and that are going to continue to happen in the future, such as the Bay Park conveyance project. We need to understand what the immediate impact of those projects as well as their long-term impact over time. Finally, as wastewater treatment plant inputs decline, other inputs are going to become that much more important. They're going to be relatively larger. This is this situation. We spent an enormous amount of money upgrading wastewater treatment plants and we saw a big increase in water quality in Long Island Sound. Suddenly, we realized we're not done yet. There are still huge areas that go hypoxic every summer and now the vast majority of those nitrogen loads are nonpoint sources. That is to say, and I'm going to say this as an ecologist, when you have a big single pipe, that sort of an easy problem to deal with. It's expensive, but we know exactly where the problem is coming from and we have engineering solutions to deal with it. The harder problem to deal with is these diffuse nonpoint sources such as atmospheric nitrogen deposition, lawn, fertilizer, septic systems, etc. I know the folks who are working on that Bay Park project don't think of it as the easy part of the problem because it's a big project, but the problem is isolated to a single pipe, rather than a wide range of diffuse sources from a wide range of different stakeholders. We will likely have more work ahead of us in the future and

understanding these nonpoint sources such as atmospheric nitrogen deposition, is going to become even more important. With that, I'm going to take your questions.

Alan Belniak:
We do we have a hand raised and a text based question. This is from Citizens Campaign for the Environment. If the nitrogen loading is decreasing, then can we responsibly attribute it to the denitrification? Technology added to the Bay Park STP, which also contradicts the theory that there are high levels of nitrogen from atmosphere deposition.

Steve Raciti:
I will separate that into two very different questions here. One is can we attribute the decreases in nitrogen pollution that we're seeing in the most recent time period to changes in the wastewater treatment plants? I'd say with more data over time, we can be more confident that that those upgrades are making a difference in our landscape. Remember, we only have one full complete calendar year with all four seasons represented, but things appear to be moving in the right direction. We need to continue monitoring that over time.

The second part of your question, which is really more of a statement, is one that I want to dispel quickly. We have one source that we're decreasing which is good. Does it mean the other sources are not important? I spoke about Long Island Sound right? Long Island Sound has had a huge problem with nutrient pollution and hypoxia, especially in the warmer months of the year and a big difference has been made by dealing with wastewater treatment plants, but that problem is far from solved. Instead of having to deal with the single big pipes from these wastewater treatment plants, we have to deal with the fact that more than half of the remaining nitrogen loads to the Long Island Sound are from nonpoint sources where atmospheric nitrogen deposition is being the largest and possibly underestimated. So I think it's the exact opposite, as we do away with the big pipes, the nonpoint sources become that much more important for future continuation of improving water quality over time. So hopefully that answers your question.

Alan Belniak:
We do have a hand raised from Dorian Dale again. So Dorian, I'm going to send you a command to unmute your mic and when you do so the floor is yours.

Dorian Dale:
Thank you very much for your presentation. I must confess when I heard the percentages that you gave for the Great South Bay and Peconic Bays, my hair went on fire and I had to go scrambling to the Suffolk County Subwatershed Wastewater Plan to glean what the atmospheric deposition numbers were. Now I recall that you said that 42% in the Great South Bay came from atmospheric deposition and that it might be more for the western portion of the Great South Bay. In the eastern portion, the percentage that we came up with was 27% and then you put out a number of 56% for the Peconic Bay, and the number that we have is 40%. I'd like you to conceivably address that disparity.

Steve Raciti:
I'm going to share my screen over here. These are not my estimates. These are estimates that have been published in fairly recent times. You'll notice that the Eastern Bays estimate comes from a report from a Global Colleague, so 30% and 3% of nitrogen loads. The Great South Bay estimate is directly in the South Shore Estuary Reserve Comprehensive Management Plan that was published in 2018. The Peconic Bay numbers come from a report commissioned by the Peconic Bay Estuary Program by Lloyd published in

2014. There are additional numbers that are similarly high directly from the TMDL program documents. These are not my numbers and there may be more recent numbers that people are using, but I also think you need to understand that this is talking about the entire Peconic Bay. It's talking about both direct to the surface deposition combined with atmospheric deposition that ends up on the watershed and via pathways on the land surface which eventually ends up in the waterway. It's combining of direct and indirect and there may be updated numbers that I don't have represented here.

The main point I wanted to make here was it's a very large input, whether it's 25%, or 40%, or 50%. It's a large input, and it's largely being estimated using sites that are relatively far away from the part of Long Island where we need to be measuring. It's likely that the site at Cedar Beach that's measuring wet deposition is a much better estimate for the Peconic Bay area than it is for Western Long Island. Does that help answer your question?

Dorian Dale:
Yes, it does. I will say that the report that I cited was the 2019 Subwatershed Wastewater Plan that came out of Suffolk County in conjunction with CDM Smith, who also helped us do the Comprehensive Water Management Plan. I have to say, as a policy person and not so much a scientist, the figures in my head generally tend towards a pie chart and that pie chart, as it's been put together for the entirety of Suffolk County, predicated upon septic and cesspools as contributory factors which factored into the atmospheric number in terms of the actual portion of the pie being significantly smaller than the numbers that you cited.

Steve Raciti:
I want to point out that a lot of those pie charts that are published are only looking at flow from the watershed into the Peconic Bay. They're actually ignoring the direct to atmosphere portion, which is huge for the Peconic Bay, because it has such a large surface area. If you're looking at what's coming out of the watersheds, you're only looking at the indirect impact of atmospheric nitrogen deposition. Some portion of it falls on the landscape, and ends up in the waterways, but not all of it so those are two very different measurements than the total.

John Cameron:
I think we could probably use some more measurements out there so we can be more certain of our inputs. Dorian, maybe you could share that report with Steve also that we can try and reconcile and maybe update the data.

Thank you to Steve and to Hofstra University, as well as Dr. James Brown and the Town of Hempstead Conservation Waterways. The data you are gathering and the work you're doing is very important. The LIRPC and the DEC want to continue supporting your efforts. Advancing the state of science here on Long Island is very important as is recognizing how we prioritize our funding and how we address point/non-point sources to improve our environment on the Island. So again, thanks so much, Steve for a great presentation.

Steve Raciti:
Thank you for the support and for having us here today. We're excited to present our results.

CHAIRMAN'S REPORT

John Cameron:
Rich, as we are running late, I will forego my Chairman's report, but I would like to make one comment. For all those that are attending the meeting today, the Council is very attuned to what it needs to do to try and advance initiatives here on Long Island. We realize we have many challenges for sustainability. As such, in the fall we're going to be presenting some important meetings to discuss some of those challenges to our sustainability. We'll be having presentations on energy, on infrastructure financing, and on solid waste management. With the impending closure of the Brookhaven landfill, we need to try to avoid a looming garbage crisis. We also have issues with the quantity and quality of Long Island's drinking water supply. We have much to do and we look forward to again advancing the discussion. Rich, I'll turn it over to you for Executive Director's report.

EXECUTIVE DIRECTOR'S REPORT

Rich Guardino:
Thank you, John. Since our meeting has run over I will try to make this as brief as possible. On June 16, there was an award presentation at the Cutchogue East Elementary School. One of the top winners in the 2020 STEAM challenge for their design to reduce runoff and nitrogen pollution on school grounds that contaminates the local waters. We had with us the school Superintendent, Principal, teachers and all the students. Assemblywoman Jodi Giglio and Legislator Al Krupski also joined us for the presentation.

I also want to mention that the Suffolk County Water Authority held a panel discussion on the future of Suffolk County's water supply and our Chairman John Cameron served as a panelist. I think it was a great discussion and we certainly appreciate John continuing to volunteer his time.

Lastly, the Council sent a letter of support to the Kings Park Business District Sewer Project, which is critical to the revitalization of the district. That letter went to the Presiding Officer of the Suffolk County Legislature, Robert Calarco. All the members of the legislature were pleased and proud to be able to support that project.

John, that completes my report. Thank you.

John Cameron:
Thank you.

Motion to adjourn. So moved. All in favor.