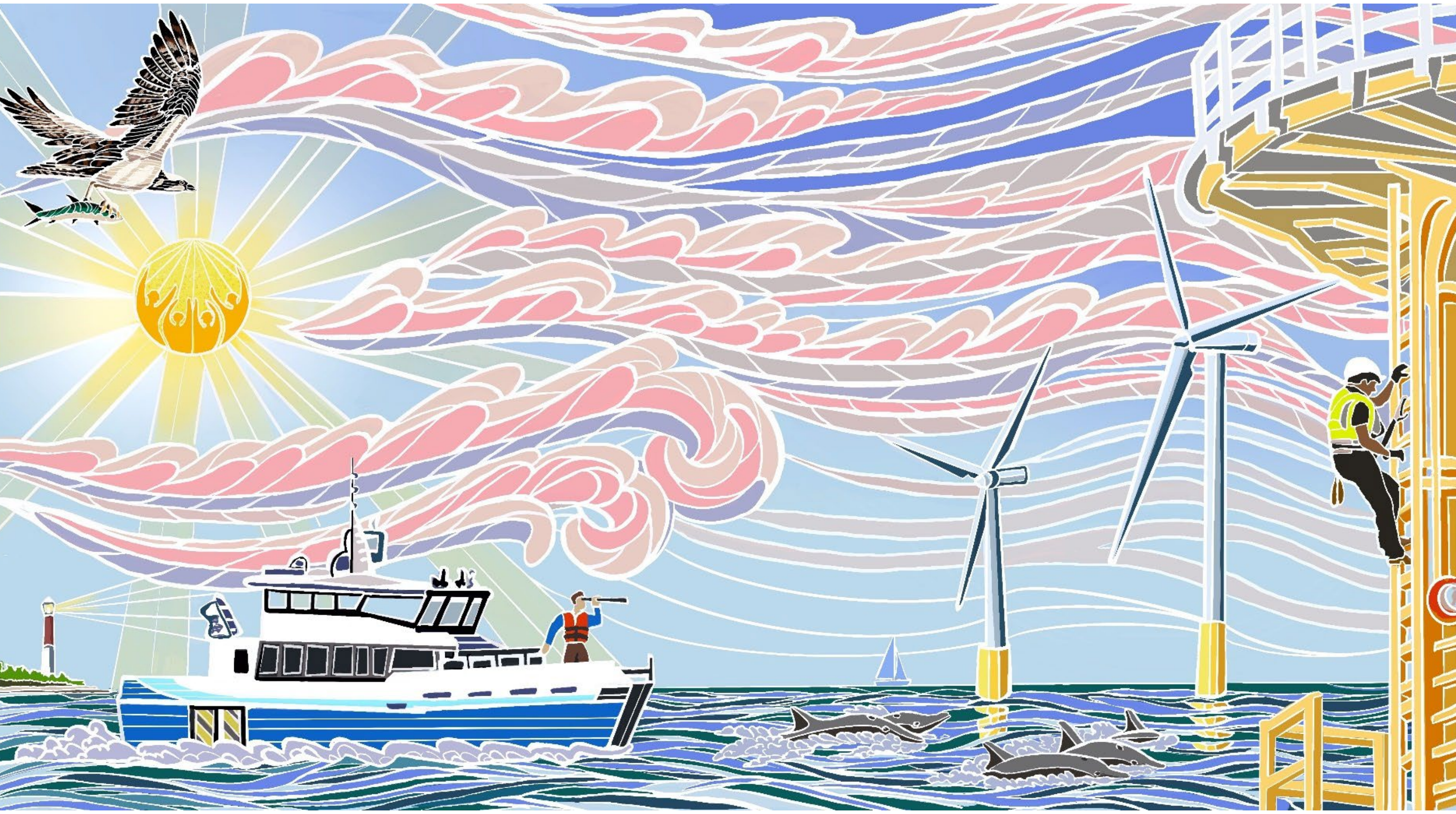

Appendix II-V

Onshore Noise Report

March 2024

Note: At the time of the initial development of this report, development of a substation and/or converter station at the Brook Road Site in Howell Township, New Jersey was considered. The Brook Road site is now expected to be prepared and developed as part of the State of New Jersey Board of Public Utility (BPU) State Agreement Approach 1.0 (SAA)1 to support the delivery of offshore wind energy onshore. In collaboration with the regional gird operator PJM Interconnection (PJM) NJBPU conducted a study that examined whether an integrated suite of open access transmission facilities designated to support the delivery of offshore wind energy onshore could best facilitate meeting New Jersey's expanded offshore wind goals. Under the SAA 1.0 Award all permitting for site preparation activities, including construction activities to provide a "fit for purpose" site, for an associated substation and/or converter station will be the responsibility of the BPU's SAA-awardee at the Brook Road Site. Therefore, impacts associated with site preparation have not been considered as part of the Project Design Envelope (PDE) of the Project. Discussion of the site has been retained as part of the study area in this report to demonstrate the completeness of Atlantic Shores' multi-year development efforts.

[1]New Jersey Board of Public Utilities Selects Offshore Wind Transmission Project Proposed by Mid-Atlantic Offshore Development and Jersey Central Power & Light Company in First in Nation State Agreement Approach Solicitation

ATLANTIC SHORES OFFSHORE WIND

ONSHORE NOISE REPORT

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September 22, 2023

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1.0 EXECUTIVE SUMMARY

This Onshore Noise Report was prepared by Epsilon Associates, Inc. (Epsilon) as part of the Construction & Operations Plan (COP) for Atlantic Shores Offshore Wind, LLC (Atlantic Shores). This report includes the results of baseline sound monitoring programs during which existing ambient sound levels were measured in the vicinity of all eight proposed onshore substations and/or converter stations. This report provides computer modeling analyses that predict future sound levels when the onshore substation and/or converter station will be operational, computer modeling of construction noise, and a comparison of predicted sound levels with applicable noise criteria.

The Atlantic Shores onshore substations and/or converter stations will be designed to comply with the applicable sound level limits and will include sound level mitigation as needed. Mitigation elements under consideration may include designs for the proposed onshore substation and/or converter station to include certified enclosures as well as natural barriers and landscaping at each point of interconnection (POI).

While temporary onshore construction noise may occur, Atlantic Shores is proposing to adhere to seasonal construction restrictions during the peak tourist season to minimize impacts. As much as practicable, no onshore construction in areas near the coast, including HDD at the landfall sites, will occur during the summer (generally from Memorial to Labor Day), subject to ongoing coordination with local authorities. Additionally, the daily hours of operation for onshore construction activities, including HDD, will be developed in accordance with municipal noise ordinances. Any work that needs to extend outside allowed construction hours will be discussed with local officials and waivers will be obtained if necessary. To further minimize the effects of construction noise, Atlantic Shores will maintain strong communication and public outreach with adjacent neighbors about the time and nature of construction activities.

2.0 INTRODUCTION

Atlantic Shores Offshore Wind, LLC (Atlantic Shores) is proposing to construct an offshore wind farm within the BOEM Lease Area OCS-A 0549 located on the Outer Continental Shelf. Energy from Atlantic Shores will be delivered to shore via 230-kV to 275-kV high voltage alternating current (HVAC) and/or 320-kV to 525-kV high voltage direct current (HVDC) export cables. The export cables will traverse federal and state waters to deliver energy from Atlantic Shores to one of seven potential landfall sites located in either Richmond or Kings County, NY, or Monmouth County, NJ.

From the landfall sites, new 230-kV to 525-kV HVAC or HVDC onshore interconnection cables will travel underground primarily along existing roadway, utility rights-of-way (ROWs), and/or along bike paths to up to four new onshore substation and/or converter station sites (up to two for each onshore point of interconnection (POI)), where transmission voltage will be stepped up or stepped down in preparation for interconnection with the electrical grid. At each onshore HVDC converter station, the current will be converted from DC to AC and the voltage will be stepped up or stepped down to match the electrical grid voltage. Onshore interconnection cables will continue from each of the new onshore substations and/or converter stations to the proposed POIs for connection into the electrical grid.

This Onshore Noise Report includes the following elements:

- Discussion of sound level limits and regulations
- Description of existing condition sound level measurement program
- Operational sound level modeling procedures and results
- Construction sound level modeling procedures and results
- Evaluation of modeling results to applicable regulations

3.0 PROJECT DESCRIPTION – ONSHORE FACILITIES

The Atlantic Shores Project (Project) will require up to four onshore substations and/or converter stations (up to two for each onshore POI). At each Project onshore substation and/or converter station site, transmission voltage will be stepped up or stepped down in preparation for interconnection with the electrical grid. The onshore substation and/or converter station design and specific equipment will depend on whether the transmission cables are HVAC or HVDC.

Atlantic Shores has identified potential landfall sites on the New Jersey and/or New York coastlines. From the landfall sites, onshore interconnection cables will travel underground along existing roadway or utility ROWs and/or along bike paths to proposed onshore substations and/or converter stations. From the proposed onshore substations and/or converter stations, onshore interconnection cables will continue to the proposed POIs at the existing Larrabee or Atlantic Substations in Monmouth County, New Jersey, the existing Fresh Kills or Goethals Substations in Richmond County, New York, or Gowanus Substation in Kings County, New York for interconnection to the electrical grid. Atlantic Shores has identified onshore substation and/or converter station sites on each of the potential Interconnection Cable Routes. Section 9 discusses the negligible onshore sound levels expected from offshore operations.

Existing noise conditions at each proposed onshore substation and/or converter station site are described in Sections 5 and 6. The onshore substation and/or converter station sites associated with each cable route are listed below. Potential noise levels will be modeled for each of these sites.

3.1 Larrabee Onshore Interconnection Cable Route and Substation and/or Converter Station

Along the Larrabee Onshore Interconnection Cable Route, there are three onshore substation and/or converter station sites under consideration all located in Monmouth County, NJ:

- Lanes Pond Road Site;
- Brook Roads Site;
- Randolph Road Site.

3.2 Atlantic Onshore Interconnection Cable Route and Substation and/or Converter Station

Along the Atlantic Onshore Interconnection Cable Route, there are two onshore substation and/or converter station sites under consideration all located in Monmouth County, NJ:

- Asbury Avenue Site
- Route 66 Site

3.3 Fresh Kills/Goethals Onshore Interconnection Cable Route and Substation and/or Converter Station

Along the Fresh Kills/Goethals Onshore Interconnection Cable Route, there are three onshore substation and/or converter station sites under consideration all located in Richmond County, NY:

- Arthur Kills Road Site;
- River Road Site;

3.4 Gowanus Onshore Interconnection Cable Route and Substation and/or Converter Station

The Gowanus Onshore Interconnection Cable Route has a single onshore substation and/or converter station site under consideration. The Sunset Industrial Park Site is located in Kings County, NY.

4.0 NOISE REGULATIONS

4.1 Federal Regulations

There are no federal community noise regulations applicable to operation and/or construction of onshore substations and/or converter stations.

4.2 State Regulations

4.2.1 New Jersey State Regulations

The State of New Jersey's Noise Control Act of 1971 authorized the NJ Department of Environmental Protection (DEP) to promulgate codes, rules, and regulations relating to the control and abatement of noise. The NJ DEP promulgated noise regulations to control noise from stationary commercial and industrial sources in 1974 pursuant to the Noise Control Act of 1971 (NJ DEP 7:29). Within the noise regulations, there are established broadband (A-weighted) limits as well as octave band level limits for daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) continuous noise sources. These limits are based on the land use categorization of the source and adjacent property and are summarized below in Table 4-1.

The Atlantic Shores onshore substations and/or converter stations fall under the category of "industrial facility." Based on these standards, the most stringent noise limits for off-site residences or commercial receptors due to noise from the onshore substation and/or converter station would be 65 dBA during the day, and 50 dBA at night. In addition, noise from impulsive (very short duration) noise sources is also regulated; impulsive noise sources occurring less than four times per hour must have levels less than 80 dBA. If they occur more often, they are considered to be continuous noise sources. However, impulsive noise is not applicable to the onshore substation and/or converter station. The noise from public roadways is specifically exempt from the noise level standards [7:29-1.4(a)(9)]. The sound level limits in Table 4-1 do not apply to construction noise which is regulated at the local level by allowing construction activity during specific hours and days of the week.

Table 4-1 New Jersey Sound Level Standards

Octave Band Center Frequency	Limit (dB) by Receptor		
	Residential/Day	Residential/Night	Commercial/ All Times
A-weighted (dBA)	**65**	**50**	**65**
31.5 Hz	96	86	96
63 Hz	82	71	82
125 Hz	74	61	74
250 Hz	67	53	67
500 Hz	63	48	63
1000 Hz	60	45	60
2000 Hz	57	42	57
4000 Hz	55	40	55
8000 Hz	53	38	53

4.2.2 New York State Regulations

Historically, noise impacts of a project have been evaluated in the Article VII process by the NYS Department of Public Service (DPS). Based on recent certificates issued by DPS, the sound from a substation and/or converter station is expected to meet the following conditions.

- Comply with a limit of 40 dBA L_{eq} (1-hour) at the outside of any non-participating residence from the substation and/or converter station equipment, and subject to the tonal penalties described below.
- Not produce any audible prominent tones, as defined under ANSI S12.9-2013/Part 3 Annex B at any non-participating residences existing as of the date of this Certificate. Should a prominent tone occur, the broadband overall (dBA) noise level at the evaluated position shall be increased by 5 dBA for evaluation of compliance with the 40 dBA limit.

These conditions effectively create a 35 dBA limit at a non-participating residence since some larger electrical components at substations and/or converter stations often have tonal sound signatures.

4.3 Local Regulations by Onshore Interconnection Cable Route and Substation and/or Converter Station

Municipalities sometimes have noise ordinances that are more stringent than the State regulations. Relevant local noise regulations for each municipality are described herein for each of the four proposed onshore interconnection cable routes and their respective substation and/or converter stations.

4.3.1 Larrabee (Monmouth and Ocean Counties, NJ)

The NJ Noise Control Act allows municipalities to adopt noise control ordinances that are more stringent than the State regulations. The sound level limits set by the NJ DEP apply statewide, but the NJ DEP does not investigate noise complaints. Noise complaints are handled at the county level by the Monmouth County Health Department, Environmental Health Program and by the Ocean County Health Department.

The Larrabee Onshore Interconnection Cable Route passes through 11 municipalities; Point Pleasant Borough, Lakewood Township, Brielle Borough, Brick Township, Sea Girt Borough, Neptune City Borough, Asbury Park City, Howell Township, Wall Township, Manasquan Borough, Neptune Township. The proposed locations of the onshore substation and/or converter station at the Lanes Pond Road Site, Brook Roads Site, and Randolph Road Site are all located within Howell Township. Relevant local noise regulations for each municipality are described below.

Point Pleasant Borough: The Revised General Ordinances of the Borough of Point Pleasant (1985), Section 3-1.9 limits hours of construction to 7:00 AM-6:00 PM weekdays and 9:00 AM-6:00 PM on Saturday unless tabulated sound levels within other parts of Section 3.1 of the Code can be met.

Lakewood Township: The Revised General Ordinances of the Township of Lakewood, 1999 Section BH16-6 indicates that construction between 7:00 AM-8:00 PM is exempt from the noise limits set forth by the Board of Health.

Brielle Borough: The Code of the Borough of Brielle, 1988 Section 3-1.9 limits hours of construction to 7:30 AM-6:00 PM weekdays and 9:30 AM-3:00 PM on Saturday.

Brick Township: Epsilon is not aware of any applicable noise regulations in this municipality and construction hour limitations could not be located.

Sea Girt Borough: Ordinance 891, Section 2 limits hours of construction to 8:00 AM-6:00 PM weekdays and 9:00 AM-5:00 PM on Saturday (Labor Day through June 30 only). Construction is prohibited on Sunday and legal holidays.

Neptune City Borough: The Code of the Borough of Neptune City Section 87 limits hours of construction to 7:00 AM-8:00 PM weekdays and 8:00 AM-8:00 PM on weekends and holidays.

Asbury Park City: The Code of the City of Asbury Park, 2015, Section 3-9.4 limits hours of construction to 8:00 AM-6:00 PM weekdays. Construction is prohibited from 8:00 PM Saturday night through 8:00 AM Monday morning and on legal holidays except for emergency efforts.

Howell Township: Chapter 208 Noise was adopted by the Township of Howell October 17, 2017. Howell Township adopted the same sound level limits as NJ DEP (Section 208-7). These were approved by the NJ DEP. Section 208-4.C exempts construction and demolition activities from the sound level limits. Section 208-9.C limits hours of construction to 7:00 AM-6:00 PM weekdays, and 9:00 AM-6:00 PM on weekends and federal holidays, unless such construction noise can meet the NJ DEP limits. All construction equipment shall be operated with a muffler and/or sound reduction device.

Wall Township: Ordinance No. 22-2014 adopted by the Township of Wall on October 22, 2014 amended Chapter 164 "Peace and Good Order." Section 164-2.4.b.2(a) limits hours of construction to 7:00 AM-6:00 PM weekdays and 7:00 AM-6:00 PM on Saturday. Construction is prohibited on Sunday and legal holidays.

Manasquan Borough: Section 3-28.3.e limits hours of construction to 8:00 AM-6:00 PM weekdays and 8:00 AM-6:00 PM on Saturday. Construction is prohibited on Sunday and legal holidays.

Neptune Township: The Revised General Ordinances of the Township of Neptune, 1993, Section 3-2 provides the following limitations for construction hours.

> *Heavy equipment or power equipment used for construction may not be used before 8:00 a.m. and after 7:00 p.m. Monday through Friday. Such activity shall not be allowed prior to 9:00 a.m. and after 4:00 p.m. on Saturdays between Memorial Day and Labor Day of each year. The balance of the year in this activity shall not be allowed before 8:00 a.m. and after 7:00 p.m. on Saturdays. Heavy equipment or power equipment used in construction may not be used all day on Sundays, Memorial Day, Labor Day and the 4th of July.*

4.3.2 Atlantic (Monmouth County, NJ)

The NJ Noise Control Act allows municipalities to adopt noise control ordinances that are more stringent than the State regulations. The sound level limits set by the NJ DEP apply statewide, but the NJ DEP does not investigate noise complaints. Noise complaints are handled at the county level by the Monmouth County Health Department, Environmental Health Program.

The Atlantic Onshore Interconnection Cable Route passes through five municipalities; Asbury Park City, Ocean Township, Tinton Falls Borough, Colts Neck Township, Neptune Township. The proposed onshore substation and/or converter station at the Asbury Ave Site is located within Tinton Falls Borough and the Route 66 Site is located within Neptune Township. Relevant local noise regulations for each municipality are described below.

<u>Asbury Park City:</u> *See* Section 4.3.1.

<u>Ocean Township:</u> The Revised General Ordinances of the Township of Ocean in the County of Monmouth (1965), prohibits construction from 7:00 PM on Friday through 8:00 AM on Saturday, from 7:00 PM on Saturday through 7:00 AM on Monday, from 7:00 PM through 7:00 AM on weekdays, and on Sundays.

<u>Tinton Falls Borough:</u> The Revised General Ordinances of the Borough of Tinton Falls, 1990, limits hours of construction to 7:00 AM-8:00 PM. The Ordinances do not provide quantitative sound level limits applicable to the proposed onshore substation and/or converter station.

<u>Colts Neck Township:</u> The Code of the Township of Colts Neck contains no applicable noise regulations and construction hour limitations could not be located.

<u>Neptune Township:</u> *See* Section 4.3.1. Additionally, the Ordinances do not provide quantitative sound level limits applicable to the proposed onshore substation and/or converter station.

4.3.3 Fresh Kills/Goethals (Richmond County, NY)

The Fresh Kills/Goethals Onshore Interconnection Cable Route passes through a single municipality; New York City. The proposed locations of the onshore substation and/or converter station at the Arthur Kill Road Site and the River Road Site are also located within New York City. Relevant local noise regulations are described below.

<u>New York City (Local Law No. 113):</u> The City of New York Local Law No. 113 (Noise Code of 2005) sets forth quantitative sound level limits for different types of noises. Laws potentially applicable to the onshore substation and/or converter station proposed for this project are the following:

> *§24-218 General prohibitions.*
> *(a) No person shall make, continue or cause or permit to be made or continued any unreasonable noise [, except that this section shall not apply to any sound from any source where the decibel level of such sound is within the limits prescribed by another section of*

this title and where there is compliance with all other applicable requirements of law with respect to such sound].

(b) Unreasonable noise shall include but shall not be limited to sound, attributable to any device, that exceeds the following prohibited noise levels:

(1) Sound, other than impulsive sound, attributable to the source, measured at a level of 7 dB(A) or more above the ambient sound level at or after 10:00 p.m. and before 7:00 a.m., as measured at any point within a receiving property or as measured at a distance of 15 feet or more from the source on a public right-of-way.

(2) Sound, other than impulsive sound, attributable to the source, measured at a level of 10 dB(A) or more above the ambient sound level at or after 7:00 a.m. and before 10:00 p.m., as measured at any point within a receiving property or as measured at a distance of 15 feet or more from the source on a public right-of-way.

(c) Notwithstanding the provisions of subdivision b of this section, where a particular sound source or device is subject to decibel level limits and requirements specifically prescribed for such source or device elsewhere in this code, the decibel level limits set forth in this section shall not apply to such sound source or device.

(d) The decibel level limits set forth in this section shall not apply to sound attributable to construction devices and activities.

§24-232 Allowable decibel levels-octave band measurement.

(a) No person shall cause or permit a sound source operating in connection with any commercial or business enterprise to exceed the decibel levels in the designated octave bands shown below as measured within a receiving property as specified therein.

Octave Band Frequency (Hz)	*Maximum Sound Pressure Levels (dB) as measured within a receiving property as specified below*	
	Residential receiving property for mixed use buildings and residential buildings (as measured within any room of the residential portion of the building with windows open, if possible).	*Commercial receiving property (as measured within any room containing offices within the building with windows open, if possible).*
31.5	*70*	*74*
63	*61*	*64*
125	*53*	*56*
250	*46*	*50*
500	*40*	*45*
1000	*36*	*41*
2000	*34*	*39*
4000	*33*	*38*
8000	*32*	*37*

(b) All sources that are within the A-scale limits prescribed by any other section of this code must also comply with the octave band decibel levels as specified herein. Compliance

with this section does not constitute a defense to violation of decibel limits set by any other section of this code.

(c) Measurements performed on residential property shall not be taken in non-living areas such as closets and crawlspaces.

(d) This section shall not apply to impulsive sound, music or construction devices or activities.

§24-227 Circulation devices.

(a) No person shall operate or permit to be operated a circulation device in such a manner as to create a sound level in excess of 42 dB(A) when measured inside a receiving property dwelling unit. The measurement shall be taken with the window or terrace door open at a point three feet from the open portion of the window or terrace door.

(b) On and after the effective date of this section, when a new circulation device is installed on any building lot or an existing device on any building lot is replaced, the cumulative sound from all circulation devices on such building lot owned or controlled by the owner or person in control of the new device being installed or the existing device being replaced shall not exceed 45 dB(A), when measured as specified in subdivision a of this section. For a period of two years after the effective date of this section, this subdivision shall not apply to the replacement of a circulation device that was installed on any building lot prior to the effective date of this section by a device of comparable capacity.

§24-228 Construction, exhausts and other devices.

(a) No person shall operate or use or cause to be operated or used a construction device or combination of devices in such a way as to create an unreasonable noise. For the purposes of this section unreasonable noise shall include but shall not be limited to sound that exceeds the following prohibited noise levels:

> *(1) Sound, other than impulsive sound, attributable to the source or sources, that exceeds 85 dB(A) as measured 50 or more feet from the source or sources at a point outside the property line where the source or sources are located or as measured 50 or more feet from the source or sources on a public right-of-way.*
>
> *(2) Impulsive sound, attributable to the source, that is 15 dB(A) or more above the ambient sound level as measured at any point within a receiving property or as measured at a distance of 15 feet or more from the source on a public right-of-way. Impulsive sound levels shall be measured in the A-weighting network with the sound level meter set to fast response. The ambient sound level shall be taken in the A-weighting network with the sound level meter set to slow response.*

(b) Where a particular sound source or device is subject to decibel level limits and requirements specifically prescribed for such source or device elsewhere in this code, such specific decibel limits shall apply to such device or source. However, if aggregate sound levels from a construction site exceed the limits set forth in this section, compliance with such specific decibel limits shall not be a defense in any proceeding relating to a violation of this section.

§24-228.1 Exhausts. No person shall cause or permit discharge into the open air of the exhaust of any device, including but not limited to any steam engine, diesel engine, internal combustion engine, power tools, compressors or turbine engine, so as to create an unreasonable noise. For the purposes of this section unreasonable noise shall include but shall not be limited to sound that exceeds the prohibited noise levels set forth in section 24-228.

Ambient sound is defined in the Noise Code by:

[the all-encompassing noise associated with a given environment, being usually a composite of sounds from many sources near and far] the sound level at a given location that exists as a result of the combined contribution in that location of all sound sources, excluding the contribution of a source or sources under investigation for violation of this code and excluding the contribution of extraneous sound sources. For purposes of the enforcement of this code, the ambient sound level of a given location may be determined based upon measurements taken at a comparable site (which includes but is not limited to comparable physical locations and time of day) in the nearby area.

A circulation device is defined in the Noise Code as "any device which circulates a gas or fluid, including but not limited to any air conditioner, pump, cooling tower, fan or blower."

New York City (City Environmental Quality Review): This Project is subject to The City Environmental Quality Review (CEQR) regulations. Chapter 19 of the CEQR regulations state:

410. Impact Thresholds
The selection of incremental values and absolute noise levels should be responsive to the nuisance levels of noise and critical time periods when nuisance levels are most acute. During daytime hours (between 7 AM and 10 PM), nuisance levels for noise are generally considered to be more than 45 dB(A) indoors and 70 to 75 dB(A) outdoors. Indoor activities are subject to task interference above this level, and 70 to 75 dB(A) is the level at which speed interference occurs outdoors. Typically building materials used in the past (including typical single-glazed windows) provide a minimum of approximately 20 dB(A) of noise attenuation from outdoor to indoor areas.

In view of these factors and for the purposes of determining a significant impact during daylight hours, it is reasonable to consider 65 dB(A) $L_{eq(1)}$ as an absolute noise level that should not be significantly exceeded. For example, if the No-Action noise level is 60 dB(A) $L_{eq(1)}$ or less, a 5 dB(A) $L_{eq(1)}$ or greater increase would be considered significant. If the No-Action noise level is 61 dB(A) $L_{eq(1)}$, the maximum incremental increase would be 4 dB(A), since an increase higher than this would result in a noise level higher than the 65 dB(A) $L_{eq(1)}$ threshold and is considered significant. Similarly, if the No-Action noise level is 62 dB(A) $L_{eq(1)}$ or more, a 3 dB(A) $L_{eq(1)}$ or greater change is considered significant.

Nighttime (between 10 PM and 7 AM) is a particularly critical time period relative to potential nuisance values for noise level increases. Therefore, irrespective of the total nighttime noise levels, an increase of 3 dB(A) L_{eq} is typically considered a significant impact during nighttime hours.

New York City (Zoning Resolution): The New York City Zoning Resolution applies to noise from industrial areas only. The onshore substation and/or converter station sites are located in industrially zoned areas, and the Zoning Resolution provides maximum permitted C-weighted octave band sound pressure levels. The limits are divided into three categories, M1, M2, and M3 corresponding to light, medium, and heavy industry uses, respectively. It should be noted that the Zoning Resolution performance standards have not been revised since 1961 and are presented in an old octave band format, which has not been in use for several decades. Instrumentation to measure per these specifications is no longer commercially available, however ANSI has issued a standard[1] which allows conversion of old octave bands to current sound level meters, which allows for measurement and assessment. The maximum permitted sound pressure levels are presented in the first table below. The sound levels in the M3 District column are relevant to the onshore substation and/or converter sites. The second table presents the "converted" octave bands into current octave band center frequencies and their respective M3 limits.[2]

Old Octave Band (Hz)	***Sound Pressure Level Limit (dBC) by District***		
	M1 District	***M2 District***	***M3 District***
20 to 75	79	79	80
75 to 150	74	75	75
150 to 300	66	68	70
300 to 600	59	62	64
600 to 1200	53	56	58
1200 to 2400	47	51	53
2400 to 4800	41	47	49
Above 4800	39	44	46

1 American National Standard Specification for Octave, Half-Octave, and Third-Octave Band Filter Sets. ANSI, S1.11-1966 (R1976).

2 Damien Bell, "Reinstatement of Article X in New York State: Siting and Licensing of Power Plants in New York City," presented at InterNoise 2012, New York, New York, August 2012.

Current Octave Band (Hz)	*M3 District Limit (dBC)*
63	79
125	74
250	69
500	63
1000	57
2000	52
4000	48
8000	45

4.3.4 Gowanus (Kings County, NY)

The Gowanus Interconnection Cable Route passes through a single municipality; New York City. The proposed location of the onshore substation and/or converter station at the Sunset Industrial Park Site is also located within New York City. Refer to Section 4.3.3.

5.0 BASELINE SOUND LEVEL MONITORING PROGRAM

To characterize the existing soundscape of the Project area, an ambient (baseline) monitoring program was conducted around the proposed onshore substations and/or converter stations in the winter of 2022/2023. This section outlines the structure of the ambient program.

Sound monitoring locations were selected to be representative of nearby residences in various directions from the projects in accordance with ANSI S12.9-1992/Part 2 (R2013). Thus, the selected locations are representative of potentially impacted receptors. Since some of the proposed sites are adjacent to one another, several measurement locations have been used to characterize the ambient sound levels at more than one site. The program was intended to measure total ambient sound in the area which includes all noise sources.

5.1 Proposed Onshore Substation and/or Converter Station – Lanes Pond Road Site

Short-term attended monitoring was conducted during both daytime and nighttime hours. Daytime measurements were generally conducted between 11:00 AM and 1:00 PM while nighttime measurements were made between 11:45 PM and 1:40 AM. The sound level meter measured and stored broadband (A-weighted) and one-third octave band sound level statistics. Measurements were made for 20 minutes at each location.

Figure 5-1 shows the measurement locations. The coordinates for the sound level measurement locations are listed in Table 5-1. Each sound level monitoring location is described in the following subsections.

Table 5-1 GPS Coordinates – Sound Level Measurement Locations—Lanes Pond Road Site

Location	Latitude	Longitude
A1 – Miller Road	40.1241460	-74.1954686
A2 – Waverly Place	40.1156276	-74.2002027
A3 – Lakewood Farmingdale Road	40.1228472	-74.1889495
A4 – Maxim Southard Road	40.1219604	-74.2093883

5.1.1 Location A1 – Miller Road

One programmable, attended sound level meter was placed on Miller Road near a pine tree farm. This location is surrounded by residences. The meter was placed approximately 20 feet (6 meters) south of the road and is representative of existing sound levels north of the Project Site and along Miller Road. Refer to Figure 5-2 for a photo of the monitoring setup.

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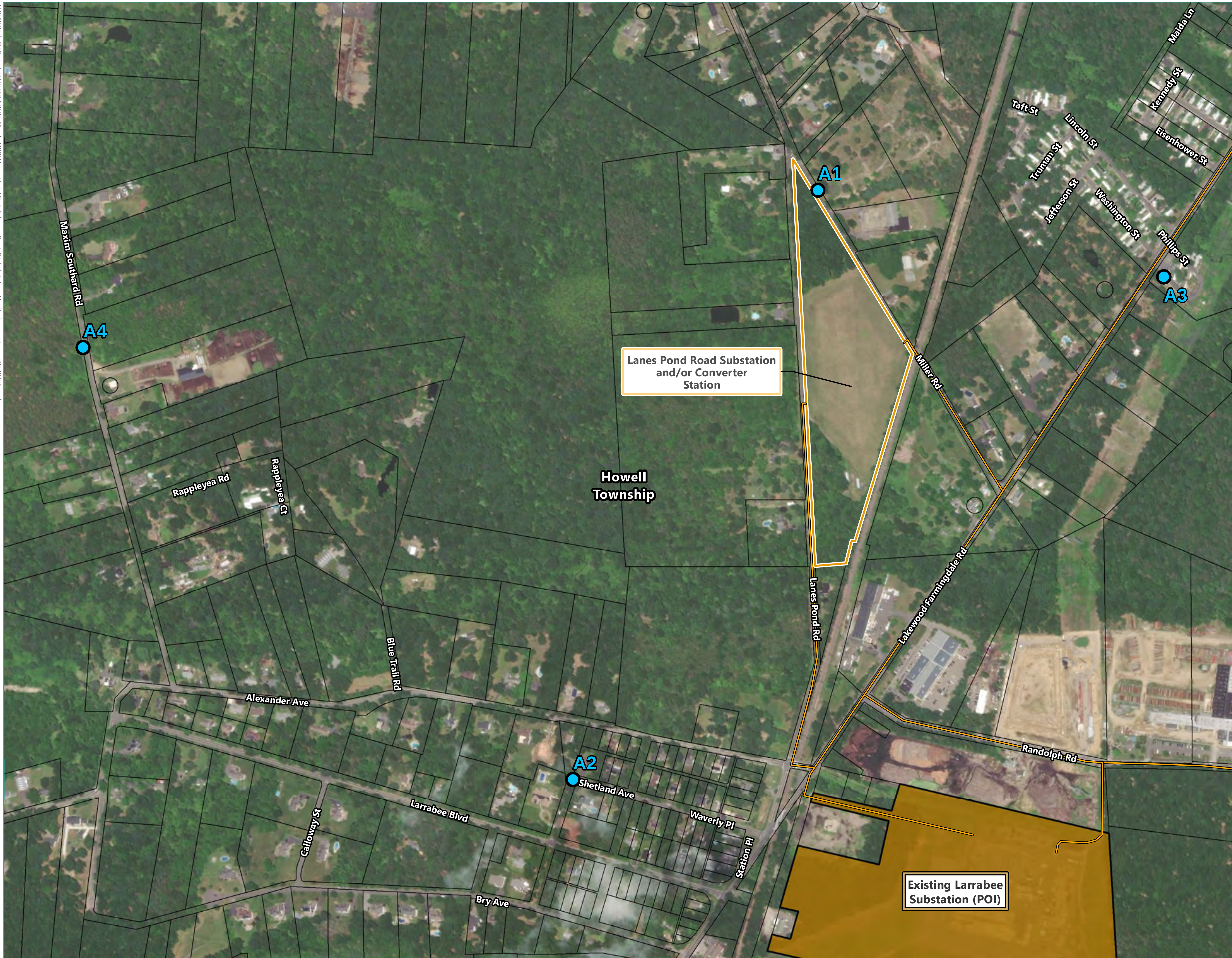
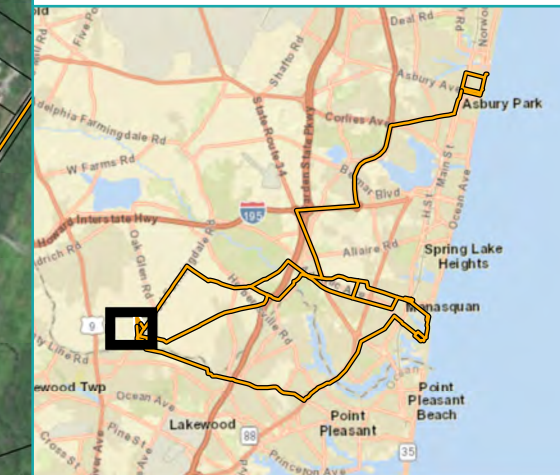


ATLANTIC SHORES offshore wind



0 125 250 500 Feet

0 50 100 Meters

N E S W

Map Projection: NAD 1983 UTM Zone 18N
Basemap: World Imagery, Esri

LEGEND

- Sound Monitoring Location
- Larrabee Onshore Interconnection Cable Route Option
- Potential Larrabee Substation and/or Converter Station
- Potential Larrabee Point of Interconnection (POI)
- Parcel Boundaries
- Municipal Boundaries

Figure 5-1

Baseline Monitoring Locations - Proposed Onshore Substation and/or Converter Station – Lanes Pond Road Site

Sound levels at this location were influenced by vehicular traffic on Miller Road, Lanes Pond Road, and Route 9, wind, birds, and occasional aircraft.

Daytime measurements were made at this location Monday December 19, 2022, beginning at 11:37 AM. Nighttime measurements were made at this location Monday December 19, 2022 beginning at 11:54 PM.

Figure 5-2 Location A1 – Miller Road

5.1.2 Location A2 – Waverly Place

One programmable, attended sound level meter was placed on the side of the road near #144 Waverly Place. This is a residential building and is surrounded by other residences. The meter is representative of existing sound levels in the southern area of the Project Site and along Waverly Place. Refer to Figure 5-3 for a photo of the monitoring setup. Sound levels at this location were influenced by traffic on Larrabee Boulevard, Waverly Place, Alexander Avenue, and Lakewood Farmingdale Road, leaf rustle, house pets, a car horn, and occasional aircraft.

Daytime measurements were made at this location Monday December 19, 2022, beginning at 12:04 PM. Nighttime measurements were made at this location Tuesday December 20, 2022 beginning at 12:49 AM.

Figure 5-3 Location A2 – Waverly Place

5.1.3 Location A3 – Lakewood Farmingdale Road

One programmable, attended sound level meter was placed on the side of the road near the Winding Brook Park Office building. This is an office building and is surrounded by a mobile home community. The meter was placed approximately 69 feet (21 meters) south of the road and is representative of existing sound levels in the eastern area of the Project Site and along Lakewood Farmingdale Road. Refer to Figure 5-4 for a photo of the monitoring setup. Sound levels at this location were influenced by vehicular traffic on Lakewood Farmingdale Road, wind, birds, and occasional aircraft.

Daytime measurements were made at this location Monday December 19, 2022 beginning at 12:40 PM. Nighttime measurements were made at this location Tuesday December 20, 2022 beginning at 1:18 AM.

Figure 5-4 Location A3 – Lakewood Farmingdale Road

5.1.4 Location A4 – Maxim Southard Road

One programmable, attended sound level meter was placed on the side of the road near #1064 Maxim Southard Road. This is a residential building and is surrounded by other residential buildings. The meter was placed approximately 16 feet (5 meters) south of the road and is representative of existing sound levels in the western area of the Project Site and along Maxim Southard Road. Refer to Figure 5-5 for a photo of the monitoring setup. Sound levels at this location were influenced by vehicular traffic on Maxim Southard Road, light wind, house pets, and occasional aircraft.

Daytime measurements were made at this location Monday December 19, 2022 beginning at 10:59 AM. Nighttime measurements were made at this location Tuesday December 20, 2022 beginning at 12:21 AM.

Figure 5-5 Location A4 – Maxim Southard Road

5.2 Proposed Onshore Substation and/or Converter Station – Randolph Road Site

Short-term attended monitoring was conducted during both daytime and nighttime hours at each location. Daytime measurements were generally conducted between 12:00 PM and 3:20 PM while nighttime measurements were made between 12:50 AM and 3:40 AM. The sound level meter measured and stored broadband (A-weighted) and one-third octave band sound level statistics. Measurements were made for 20 minutes at each location.

Figure 5-6 shows the measurement locations for the Randolph Road Site. The coordinates for the sound level measurement locations are listed in Table 5-2. Each sound level monitoring location is described in the following subsections.

Table 5-2 GPS Coordinates – Sound Level Measurement Locations — Randolph Road Site

Location	Latitude	Longitude
B1 – Waverly Place	40.1156276	-74.2002027
B2 – Lakewood Farmingdale Road	40.1228472	-74.1889495
B3 – Arosa Hill	40.1098071	-74.1903208
B4 – Porter Road	40.1194356	-74.1791970

5.2.1 Location B1 – Waverly Place

This is the same as Location A2 and is described in Section 5.1.2.

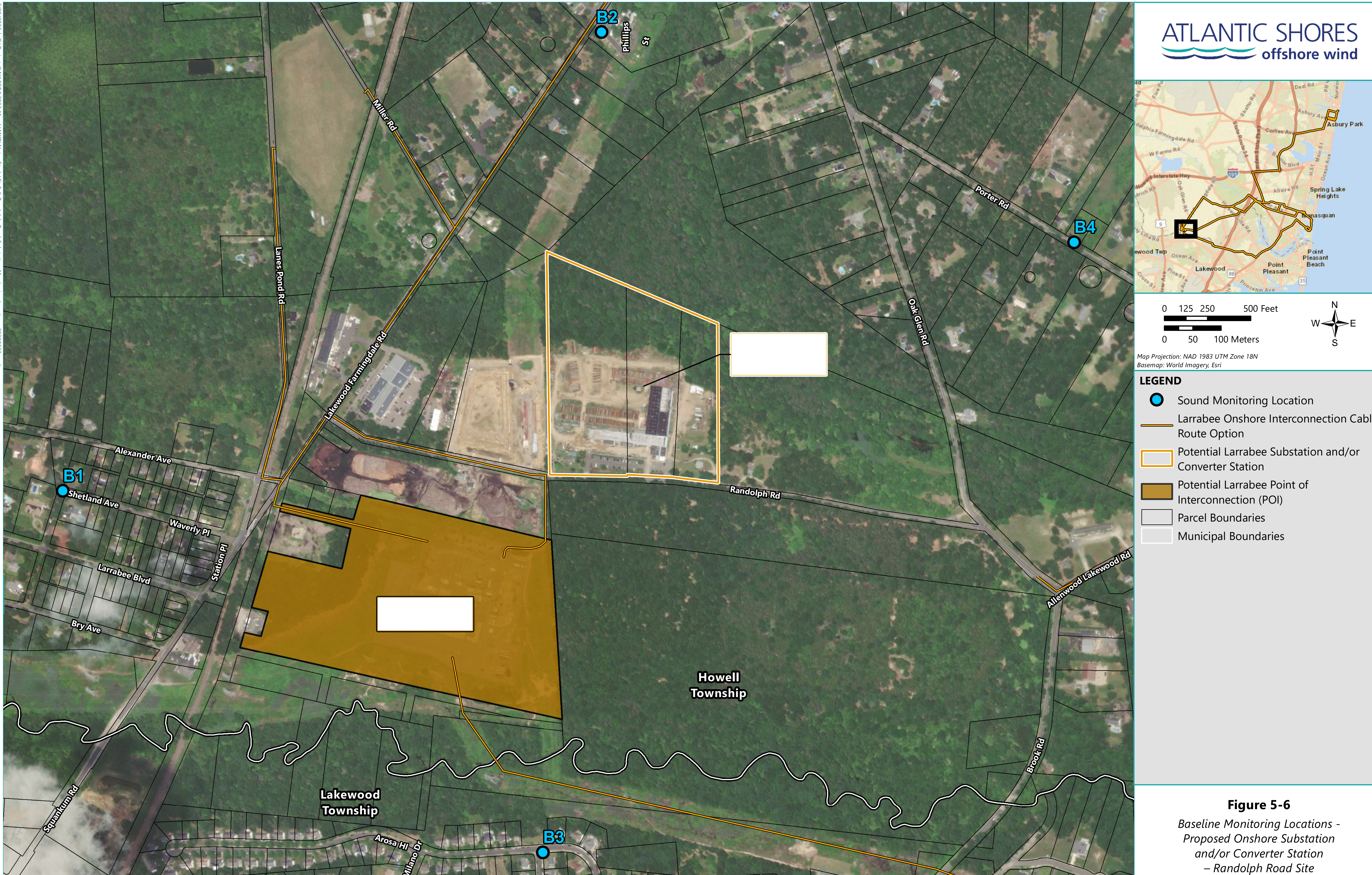
5.2.2 Location B2 – Lakewood Farmingdale Road

This is the same as Location A3 and is described in Section 5.1.3.

5.2.3 Location B3 – Arosa Hill

One programmable, attended sound level meter was placed at the corner of Engleberg Terrace and Arosa Hill near #43 Engleberg Terrace. This location is representative of existing sound levels in the southern area of the Project Site and along Arosa Hill. Refer to Figure 5-7 for a photo of the monitoring setup. Sound levels at this location were influenced by vehicular traffic along Arosa Hill and Engleberg Terrace, distant landscaping activity (daytime), electrical noise from the nearby JCP&L Howell Township substation (nighttime), backup alarms, and occasional aircraft.

Daytime measurements were made at this location Monday December 19, 2022 beginning at 1:57 PM. Nighttime measurements were made at this location Tuesday December 20, 2022 beginning at 3:20 AM.



ATLANTIC SHORES offshore wind

Figure 5-6

Baseline Monitoring Locations - Proposed Onshore Substation and/or Converter Station – Randolph Road Site

Figure 5-7 Location B3 – Arosa Hill

5.2.4 Location B4 – Porter Road

One programmable, attended sound level meter was placed on the side of the road near #55 Porter Road. The meter was placed approximately 16 feet (5 meters) south of the road and is representative of existing sound levels in the eastern area of the Project Site and along Porter Road. Refer to

Figure 5-8 for a photo of the monitoring setup. Sound levels at this location were influenced by vehicular traffic along Porter Road, distant landscaping activity (daytime), birds, and occasional aircraft.

Daytime measurements were made at this location Monday December 19, 2022 beginning at 3:00 PM. Nighttime measurements were made at this location Tuesday December 20, 2022 beginning at 1:53 AM.

Figure 5-8 Location B4 – Porter Road

5.3 Proposed Onshore Substation and/or Converter Station – Brook Road Site

Short-term attended monitoring was conducted during both daytime and nighttime hours. Daytime measurements were generally conducted between 1:30 PM and 3:20 PM while nighttime measurements were made between 1:50 AM and 3:40 AM. The sound level meter measured and stored broadband (A-weighted) and one-third octave band sound level statistics. Measurements were made for 20 minutes at each location.

Figure 5-9 shows the measurement locations. The coordinates for the sound level measurement locations are listed in Table 5-3. Each sound level monitoring location is described in the following subsections.

Table 5-3 GPS Coordinates – Sound Level Measurement Locations—Brook Road Site

Location	Latitude	Longitude
C1 – Porter Road	40.1194356	-74.1791970
C2 – Lakewood Allenwood Road	40.1142502	-74.1789036
C3 – Arosa Hill	40.1098071	-74.1903208
C4 – Carolina Street	40.1053344	-74.1803245

Figure 5-9

Baseline Monitoring Locations - Proposed Onshore Substation and/or Converter Station – Brook Road Site

5.3.1 Location C1 – Porter Road

This is the same as Location B4 and is described in Section B4.

5.3.2 Location C2 – Lakewood Allenwood Road

One programmable, attended sound level meter was placed on the side of the road near New Life Iglesia Cristiana. This is a church and is surrounded by residences and commercial buildings. The meter was placed approximately 20 feet (6 meters) south of the road and is representative of existing sound levels in the eastern area of the Project Site and along Lakewood-Allenwood Road. Refer to Figure 5-10 for a photo of the monitoring setup. Sound levels at this location were influenced by vehicular traffic on Lakewood-Allenwood Road, Oak Glen Road, and Brook Road, leaf rustle, and electrical lights at the church.

Daytime measurements were made at this location Monday December 19, 2022 beginning at 2:22 PM. Nighttime measurements were made at this location Tuesday December 20, 2022 beginning at 2:20 AM.

Figure 5-10 Location C2 – Lakewood Allenwood Road

5.3.3 Location C3 – Arosa Hill

This is the same as Location B3 and is described in Section B3.

5.3.4 Location C4 – Carolina Street

One programmable, attended sound level meter was placed on the side of the road near #1159 Carolina Street. This is a residential building and is surrounded by other residential buildings. This location is representative of existing sound levels in the southern area of the Project Site and along Carolina Street. Refer to Figure 5-11 for a photo of the monitoring setup. Sound levels at this location were influenced by vehicular traffic on Carolina Street and Route 526, distant landscaping, distant fire sirens, minor electrical hum, and occasional aircraft.

Daytime measurements were made at this location Monday December 19, 2022 beginning at 1:31 PM. Nighttime measurements were made at this location Tuesday December 20, 2022 beginning at 2:53 AM.

Figure 5-11 Location C4 – Carolina Street

5.4 Proposed Onshore Substation and/or Converter Station – Asbury Avenue Site

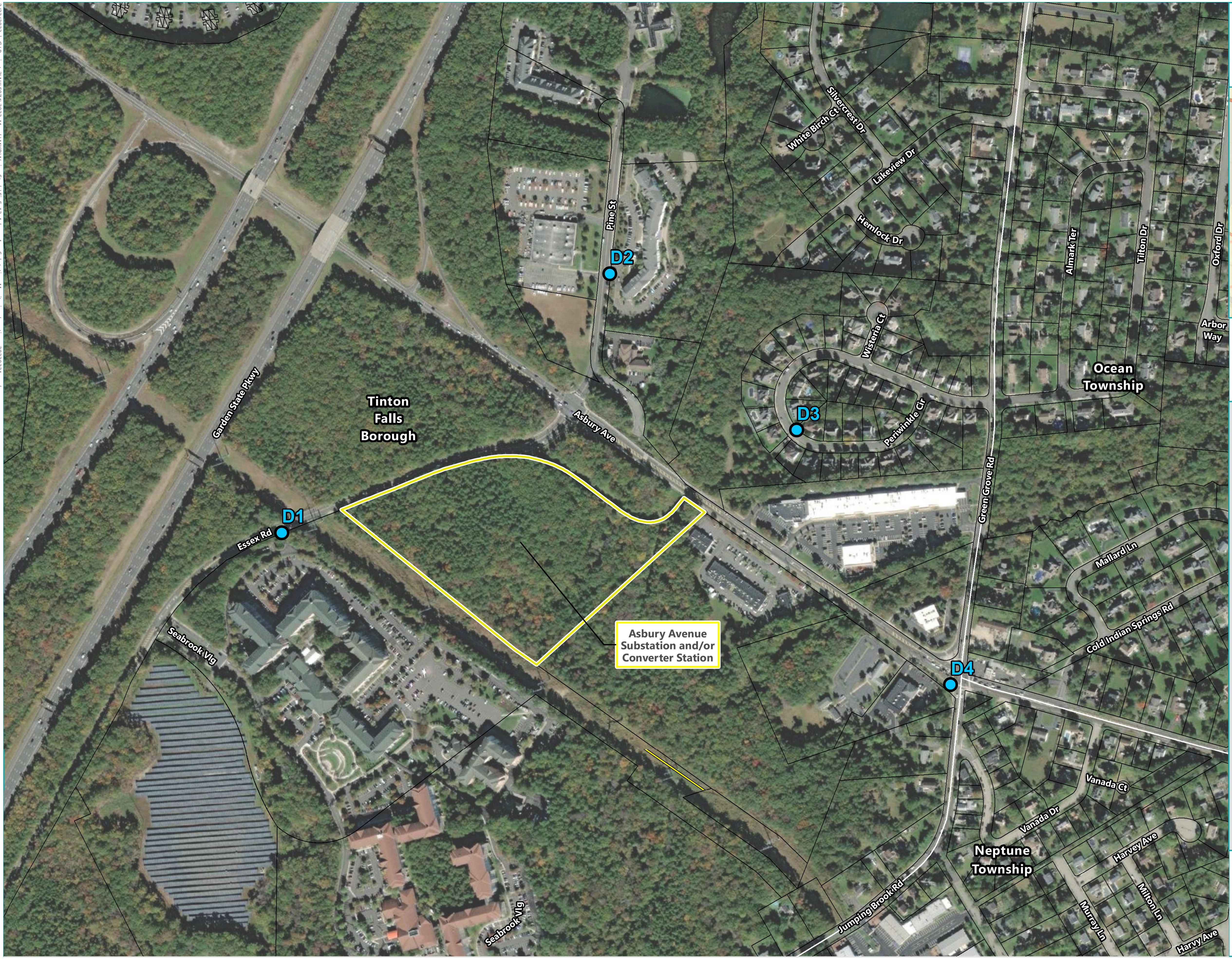
Short-term attended monitoring was conducted during both daytime and nighttime hours. Daytime measurements were generally conducted between 1:00 PM and 3:00 PM while nighttime measurements were made between 1:30 AM and 3:30 AM. The sound level meter measured and stored broadband (A-weighted) and one-third octave band sound level statistics. Measurements were made for 20 minutes at each location.

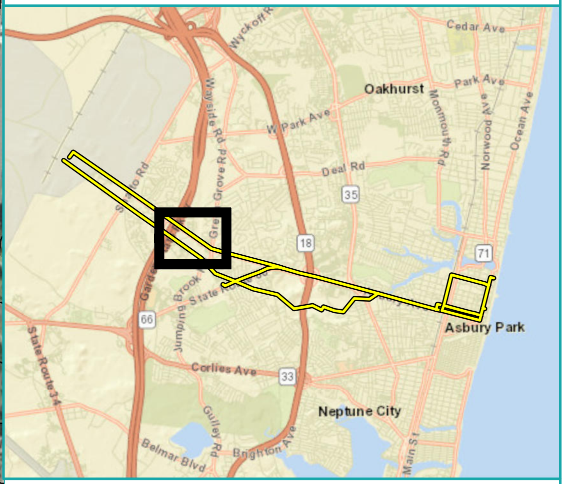
Figure 5-12 shows the measurement locations. The coordinates for the sound level measurement locations are listed in Table 5-4. Each sound level monitoring location is described in the following subsections.

Table 5-4 GPS Coordinates – Sound Level Measurement Locations—Asbury Avenue Site

Location	Latitude	Longitude
D1 – Essex Road	40.2361762	-74.0878071
D2 – Pine Street	40.2391786	-74.0827384
D3 – Periwinkle Circle	40.2373210	-74.0799003
D4 – Asbury Avenue	40.2343106	-74.0775802

ATLANTIC SHORES offshore wind





0 125 250 500 Feet
0 50 100 Meters
N W E S

Map Projection: NAD 1983 UTM Zone 18N
Basemap: World Imagery, Esri

LEGEND

- Sound Monitoring Location
- Atlantic Onshore Interconnection Cable Route Option
- Potential Atlantic Substation and/or Converter Station
- Parcel Boundaries
- Municipal Boundaries

Figure 5-12

Baseline Monitoring Locations - Proposed Onshore Substation and/or Converter Station – Asbury Avenue Site

5.4.1 Location D1 – Essex Road

One programmable, attended sound level meter was placed on the side of Essex Road near the Seabrook Senior Living Community. This location is representative of existing sound levels west of the Project Site and along Essex Road. Refer to Figure 5-13 for a photo of the monitoring setup. Sound levels at this location were influenced by traffic on Essex Road and the Garden State Parkway, wind, birds, and occasional aircraft.

Daytime measurements were made at this location Monday December 20, 2022 beginning at 2:32 PM. Nighttime measurements were made at this location Monday December 21, 2022 beginning at 3:03 AM.

Figure 5-13 Location D1 – Essex Road

5.4.2 Location D2 – Pine Street

One programmable, attended sound level meter was placed on the side of the road near the Meadow Brook Apartments. This is a residential building and is surrounded by other residences and commercial buildings. The sound levels are representative of existing ambient environment in the northern area of the Project Site and along Pine Street. Refer to Figure 5-14 for a photo of the monitoring setup. Sound levels at this location were influenced by traffic on Pine Street, Asbury Avenue, and the Garden State Parkway, leaf rustle, mechanical noise, and deer.

Daytime measurements were made at this location Monday December 20, 2022 beginning at 2:07 PM. Nighttime measurements were made at this location Tuesday December 21, 2022 beginning at 2:34 AM.

Figure 5-14 Location D2 – Pine Street

5.4.3 Location D3 – Periwinkle Circle

One programmable, attended sound level meter was placed on the side of the road near #64 Periwinkle Circle. This is a residential building and is surrounded by other residential buildings. This location is representative of existing sound levels in the eastern area of the Project Site and along Periwinkle Circle. Refer to Figure 5-15 for a photo of the monitoring setup. Sound levels at this location were influenced by traffic on Asbury Avenue and Periwinkle Circle, house pets, birds, deer, and occasional aircraft.

Daytime measurements were made at this location Monday December 20, 2022 beginning at 1:39 PM. Nighttime measurements were made at this location Tuesday December 21, 2022 beginning at 2:07 AM.

Figure 5-15 Location D3 – Periwinkle Circle

5.4.4 Location D4 – Asbury Avenue

One programmable, attended sound level meter was placed at the corner of Asbury Avenue and Green Grove Road. This area is surrounded by residential buildings and commercial buildings. This location is representative of existing sound levels in the eastern area of the Project Site and along Asbury Avenue. Refer to Figure 5-16 for a photo of the monitoring setup. Sound levels at this location were influenced by traffic on Asbury Avenue and Green Grove Road, wind, and mechanical noise at the nearby CVS store.

Daytime measurements were made at this location Monday December 20, 2022 beginning at 1:10 PM. Nighttime measurements were made at this location Tuesday December 21, 2022 beginning at 1:39 AM.

Figure 5-16 Location D4 – Asbury Avenue

5.5 Proposed Onshore Substation and/or Converter Station – Route 66 Site

Short-term attended monitoring was conducted during both daytime and nighttime hours. Daytime measurements were generally conducted between 11:40 AM and 1:30 PM while nighttime measurements were made between 12:10 AM and 2:00 AM. The sound level meter measured and stored broadband (A-weighted) and one-third octave band sound level statistics. Measurements were made for 20 minutes at each location.

Figure 5-17 shows the measurement locations. The coordinates for the sound level measurement locations are listed in Table 5-5. Each sound level monitoring location is described in the following subsections.

Table 5-5 GPS Coordinates – Sound Level Measurement Locations—Route 66 Site

Location	Latitude	Longitude
E1 – Jumping Brook Road	40.2198057	-74.0860643
E2 – Ruth Drive	40.2261306	-74.0718600
E3 – Princeton Avenue	40.2286730	-74.0748108
E4 – Asbury Avenue	40.2343106	-74.0775802

Figure 5-17

Baseline Monitoring Locations - Proposed Onshore Substation and/or Converter Station – Route 66 Site

5.5.1 Location E1 – Jumping Brook Road

One programmable, attended sound level meter was placed near Jumping Brook Road near The Waverly at Neptune. This location is surrounded by residential buildings and commercial buildings. The meter was placed approximately 20 feet (6 meters) from the road and is representative of existing sound levels south of the Project Site and along Jumping Brook Road. Refer to Figure 5-18 for a photo of the monitoring setup. Sound levels at this location were influenced by traffic on Jumping Brook Road, Waverly Avenue, and Route 66, electrical noise from the nearby Marriott Hotel, and occasional aircraft.

Daytime measurements were made at this location Monday December 20, 2022 beginning at 11:42 AM. Nighttime measurements were made at this location Monday December 21, 2022 beginning at 12:10 AM.

Figure 5-18 Location E1 – Jumping Brook Road

5.5.2 Location E2 – Ruth Drive

One programmable, attended sound level meter was placed on the side of the road near #916 Ruth Drive. This is a residential building and is surrounded by other residences. The meter is representative of existing sound levels in the eastern area of the Project Site and along Ruth Drive. Refer to Figure 5-19 for a photo of the monitoring setup. Sound levels at this location were influenced by traffic on Route 66, Ruth Drive, and Sunnyfield Terrace, leaf rustle, homeowner activity, birds, and occasional aircraft.

Daytime measurements were made at this location Monday December 20, 2022 beginning at 12:12 PM. Nighttime measurements were made at this location Tuesday December 21, 2022 beginning at 12:39 AM.

Figure 5-19 Location E2 – Ruth Drive

5.4.3 Location E3 – Princeton Avenue

One programmable, attended sound level meter was placed at the corner of Green Grove Road and Princeton Avenue near #1 Princeton Avenue. This is a residential building and is surrounded by other residential buildings. This location is representative of existing sound levels in the eastern area of the Project Site and along Princeton Avenue. Refer to Figure 5-20 for a photo of the monitoring setup. Sound levels at this location were influenced by traffic on Princeton Avenue, Green Grove Road, and Route 66, wind, birds, minor electrical noise, and occasional aircraft, and train horns.

Daytime measurements were made at this location Monday December 20, 2022 beginning at 12:40 PM. Nighttime measurements were made at this location Tuesday December 21, 2022 beginning at 1:05 AM.

Figure 5-20 Location E3 – Princeton Avenue

5.5.4 Location E4 – Asbury Avenue

This is the same as LocationD4 and is described in Section 5.4.4.

5.6 Proposed Onshore Substation and/or Converter Station – Arthur Kill Road Site

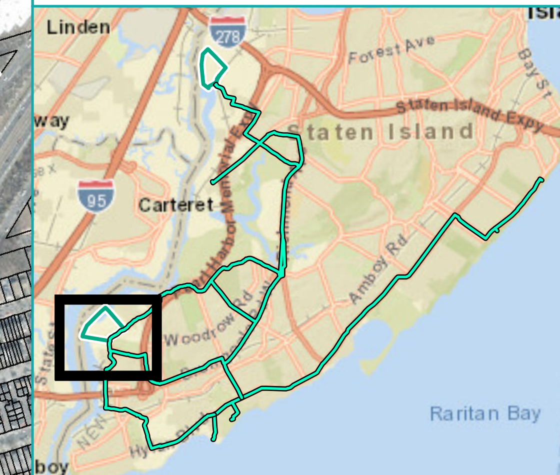
Short-term attended monitoring was conducted during both daytime and nighttime hours. Daytime measurements were generally conducted between 11:15 AM and 12:45 PM while nighttime measurements were made between 12:00 AM and 2:15 AM. The sound level meter measured and stored broadband (A-weighted) and one-third octave band sound level statistics. Measurements were made for 20 minutes at each location.

Figure 5-21 shows the measurement locations. The coordinates for the sound level measurement locations are listed in Table 5-6. Each sound level monitoring location is described in the following subsections.

Table 5-6 GPS Coordinates – Sound Level Measurement Locations—Arthur Kill Road Site

Location	Latitude	Longitude
F1 – Staten Island Skate Pavilion	40.5442640	-74.2329045
F2 – Arthur Kill Road	40.5400909	-74.2234826
F3 – Clay Pit Road	40.5327524	-74.2391253
F4 – Ferry Street	40.5433791	-74.2545265

ATLANTIC SHORES offshore wind



0 200 400 800 Feet
0 100 200 Meters

N W E S

Map Projection: NAD 1983 UTM Zone 18N
Basemap: World Imagery, Esri

LEGEND

- Sound Monitoring Location
- Goethals or Fresh Kills Onshore Interconnection Cable Route Option
- Potential Fresh Kills/Goethals Substation and/or Converter Station
- Parcel Boundaries
- Municipal Boundary
- County Boundary
- State Waters Boundary

Figure 5-21

Baseline Monitoring Locations - Proposed Onshore Substation and/or Converter Station – Arthur Kill Road Site

3/7/2023 | G:\Projects2\NJ\15974\2023_March\MXD\Noise_Study\Fig5-21_Arthur_Kill_Rd_Substation_Monitoring_Locations_20230221.mxd

5.6.1 Location F1 – Staten Island Skating Pavilion

One programmable, attended sound level meter was placed on Arthur Kill Road near the Staten Island Skating Pavilion. This location is surrounded by commercial and industrial facilities. The meter was placed approximately 20 feet (6 meters) south of the road and is representative of existing sound levels south of the Project Site and along Arthur Kill Road. Refer to Figure 5-22 for a photo of the monitoring setup.

Sound levels at this location were influenced by vehicular traffic on Arthur Kill Road, wind, vegetation rustle, mechanical noise, backup alarms, and occasional aircraft.

Daytime measurements were made at this location Wednesday February 1, 2023, beginning at 11:18 AM. Nighttime measurements were made at this location Thursday February 2, 2023 beginning at 12:07 AM.

Figure 5-22 Location F1 – Staten Island Skating Pavilion

5.6.2 Location F2 – Clay Pit Road

One programmable, attended sound level meter was placed on the side of the road near #176 Clay Pit Road. This is a residential building and is surrounded by other residences. The meter is representative of existing sound levels in the eastern area of the Project Site and along Clay Pit Road. Refer to Figure 5-23 for a photo of the monitoring setup. Sound levels at this location were influenced by traffic on West Shore Expressway, Veterans Road East, and Clay Pit Road, birds, and occasional aircraft.

Daytime measurements were made at this location Wednesday February 1, 2023, beginning at 12:03 PM. Nighttime measurements were made at this location Thursday February 2, 2023 beginning at 12:38 AM.

Figure 5-23 Location F2 – Clay Pit Road

5.6.3 Location F3 – Arthur Kill Road

One programmable, attended sound level meter was placed on the side of the road near the intersection of Kreischer Street and Arthur Kill Road. This location is adjacent to a residential community. The meter was placed approximately 20 feet (6 meters) south of the road and is representative of existing sound levels in the southern area of the Project Site and along Arthur Kill Road. Refer to Figure 5-24 for a photo of the monitoring setup. Sound levels at this location were influenced by vehicular traffic on Arthur Kill Road, Kreischer Street, and distant highway traffic, pedestrian traffic, wind, a flagpole, activity at MTA NYC, geese, car horns, backup alarms, and occasional aircraft.

Daytime measurements were made at this location Wednesday February 1, 2023 beginning at 11:25 AM. Nighttime measurements were made at this location Thursday February 2, 2023 beginning at 1:11 AM.

Figure 5-24 Location F3 – Arthur Kill Road

5.6.4 Location F4 – Ferry Street

One programmable, attended sound level meter was placed on the side of the road near #350 Ferry Street. This is a residential building and is surrounded by other residential buildings, a recreational park, and an industrial site. The meter was placed approximately 10 feet (3 meters) south of the road and is representative of existing sound levels in the western area of the Project Site and along Ferry Street. Refer to Figure 5-25 for a photo of the monitoring setup. Sound levels at this location were influenced by vehicular traffic on Ferry Street, Cliff Road, and I-95, sea gulls, industrial noise to the north and south, light wind, backup alarms, and occasional aircraft, and train horns.

Daytime measurements were made at this location Wednesday February 1, 2023 beginning at 12:19 PM. Nighttime measurements were made at this location Thursday February 2, 2023 beginning at 1:47 AM.

Figure 5-25 Location F4 – Ferry Street

5.7 Proposed Onshore Substation and/or Converter Station – River Road Site

Short-term attended monitoring was conducted during both daytime and nighttime hours. Daytime measurements were generally conducted between 12:00 PM and 1:15 PM while nighttime measurements were made between 12:00 AM and 1:00 AM. The sound level meter measured and stored broadband (A-weighted) and one-third octave band sound level statistics. Measurements were made for 20 minutes at each location.

Figure 5-26 shows the measurement locations. The coordinates for the sound level measurement locations are listed in Table 5-7. Each sound level monitoring location is described in the following subsections.

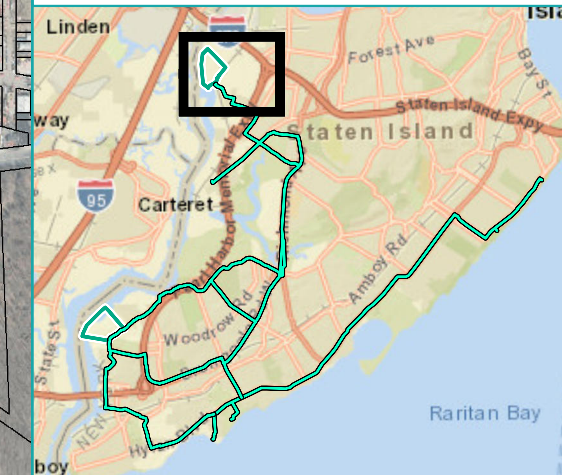
Table 5-7 GPS Coordinates – Sound Level Measurement Locations—River Road Site

Location	Latitude	Longitude
G1 – Geothals Road	40.6273608	-74.1802293
G2 – Glen Street	40.6140400	-74.1785030

5.7.1 Location G1 – Geothals Road

One programmable, attended sound level meter was placed on Geothals Road near A-B Row in the Goethals Community mobile home park. This location is surrounded by residences. The meter was placed approximately 10 feet (3 meters) north of the road and is representative of existing sound levels northeast of the Project Site and along Geothals Road. Refer to Figure 5-27 for a photo of the monitoring setup.

ATLANTIC SHORES offshore wind



0 200 400 800 Feet

0 100 200 Meters

N W E S

Map Projection: NAD 1983 UTM Zone 18N
Basemap: World Imagery, Esri

LEGEND

- Sound Monitoring
- Goethals or Fresh Kills Onshore Interconnection Cable Route Option
- Potential Fresh Kills/Goethals Substation and/or Converter Station
- Potential Fresh Kills/Goethals Point of Interconnection (POI)
- Parcel
- Municipal
- County
- State Waters

Figure 5-26

Baseline Monitoring Locations - Proposed Onshore Substation and/or Converter Station – River Road Site

Sound levels at this location were influenced by vehicular traffic on I-278 and Geothals Road North, birds, residential activity, occasional aircraft, and train horns.

Daytime measurements were made at this location Tuesday January 31, 2023, beginning at 12:07 PM. Nighttime measurements were made at this location Thursday February 2, 2023 beginning at 12:00 AM.

Figure 5-27 Location G1 – Geothals Road

5.7.2 Location G2 – Glen Street

One programmable, attended sound level meter was placed on the side of the road near the Hampton Inn & Suites. This is a commercial building with overnight residential use and is surrounded by other commercial and industrial facilities. The meter is representative of existing sound levels in the eastern area of the Project Site and along Glen Street. Refer to Figure 5-28 for a photo of the monitoring setup. Sound levels at this location were influenced by traffic on West Shore Expressway and Glen Street, wind through trees, pedestrian traffic, a car horn, and occasional aircraft.

Daytime measurements were made at this location Tuesday January 31, 2023, beginning at 12:44 PM. Nighttime measurements were made at this location Thursday February 2, 2023 beginning at 12:42 AM.

Figure 5-28 Location G2 – Glen Street

5.8 Proposed Onshore Substation and/or Converter Station – Sunset Industrial Park Site

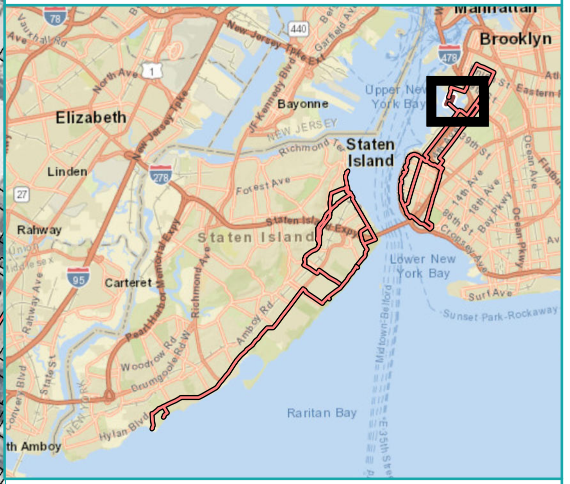
Short-term attended monitoring was conducted during both daytime and nighttime hours. Daytime measurements were generally conducted between 11:15 AM and 1:30 PM while nighttime measurements were made between 12:15 AM and 2:45 AM. The sound level meter measured and stored broadband (A-weighted) and one-third octave band sound level statistics. Measurements were made for 20 minutes at each location.

Figure 5-29 shows the measurement locations. The coordinates for the sound level measurement locations are listed in Table 5-8. Each sound level monitoring location is described in the following subsections.

Table 5-8 GPS Coordinates – Sound Level Measurement Locations—Sunset Industrial Park Site

Location	Latitude	Longitude
H1 – Columbia Street	40.6727678	-74.0087242
H2 – Lorraine Street	40.6736672	-74.0045523
H3 – 4th Avenue	40.6661425	-73.9924485
H4 – 25th Street	40.6603764	-73.9983655

ATLANTIC SHORES offshore wind



0 175 350 700 Feet

0 80 160 Meters

N W E S

Map Projection: NAD 1983 UTM Zone 18N
Basemap: World Imagery, Esri

LEGEND

- Sound Monitoring
- Gowanus Onshore Interconnection Cable Route Option
- Potential Gowanus Substation and/or Converter Station
- Potential Gowanus Point of Interconnection (POI)
- Parcel
- Municipal
- County
- State Waters

Figure 5-29

Baseline Monitoring Locations - Proposed Onshore Substation and/or Converter Station – Red Hook Site

5.8.1 Location H1 – Columbia Street

One programmable, attended sound level meter was placed on Columbia Street near the BASIS Independent Brooklyn Upper School. This is a commercial building surrounded by other commercial facilities. The meter was placed approximately 35 feet (11 meters) south of the road and is representative of existing sound levels north of the Project Site and along Columbia Street. Refer to Figure 5-30 for a photo of the monitoring setup.

Sound levels at this location were influenced by vehicular traffic on Columbia Street, Halleck Street, I-478, and I-278, pedestrian traffic, distant children, mechanical noise, distant sirens, distant backup alarms, distant construction activity, car horns, and occasional aircraft and helicopters.

Daytime measurements were made at this location Monday January 30, 2023, beginning at 10:42 AM. Nighttime measurements were made at this location Tuesday January 31, 2023 beginning at 12:22 AM.

Figure 5-30 Location H1 – Columbia Street

5.8.2 Location H2 – Lorraine Street

One programmable, attended sound level meter was placed on the side of the road near the intersection of Lorraine Street and Henry Street. This location is representative of nearby residential buildings and recreational areas. The meter is representative of existing sound levels in the northeastern area of the Project Site and along Lorraine Street. Refer to Figure 5-31 for a photo of the monitoring setup. Sound levels at this location were influenced by traffic on Lorraine Street, Henry Street, I-478, and I-278, birds, pedestrian traffic, residential activity, distant construction, backup alarms, window AC units, street drains, car horns, and occasional aircraft.

Daytime measurements were made at this location Monday January 30, 2023, beginning at 11:14 AM. Nighttime measurements were made at this location Tuesday January 31, 2023 beginning at 12:54 AM.

Figure 5-31 Location H2 – Lorraine Street

5.8.3 Location H3 – 4th Avenue

One programmable, attended sound level meter was placed on the sidewalk across the street from The Green Province Restaurant. This is a commercial building and is surrounded by residential buildings. The meter was placed approximately 30 feet (9 meters) west of the road and is representative of existing sound levels in the eastern area of the Project Site and along 4th Avenue. Refer to Figure 5-32 for a photo of the monitoring setup. Sound levels at this location were influenced by vehicular traffic on 4th Avenue, 16th Street, and Prospect Expressway, birds, car horns, distant sirens, crosswalk signals, mechanical noise, and occasional aircraft including helicopters.

Daytime measurements were made at this location Monday January 30, 2023 beginning at 12:26 PM. Nighttime measurements were made at this location Tuesday January 31, 2023 beginning at 2:22 AM.

Figure 5-32 Location H3 – 4th Avenue

5.8.4 Location H4 – 25th Street

One programmable, attended sound level meter was placed on the side of the road near CTown Supermarkets at the intersection of 25th Street and 4th Avenue. This is a commercial building and is surrounded by other commercial and residential buildings. The meter was placed approximately 35 feet (11 meters) west of the road and is representative of existing sound levels in the southeastern area of the Project Site and along 4th Avenue. Refer to Figure 5-33 for a photo of the monitoring setup. Sound levels at this location were influenced by vehicular traffic on 4th Avenue, 25th Street, and I-278, subway passbys, pedestrian traffic, birds, car horns, distant sirens, mechanical noise, backup alarms, and occasional aircraft.

Daytime measurements were made at this location Monday January 30, 2023 beginning at 1:01 PM. Nighttime measurements were made at this location Tuesday January 31, 2023 beginning at 1:45 AM.

Figure 5-33 Location H4 – 25th Street

5.9 Sound Level Measurement Instrumentation

Each of the monitoring locations utilized a Larson Davis (LD) model 831 sound level meter (SLM) to measure A-weighted (dBA) and one-third octave bands from 6.3 Hz to 10,000 Hz. Each instrument was equipped with a LD PRM831 preamplifier and a PCB 377C20 half-inch microphone. Each SLM used a manufacturer 3" wind screen to reduce wind-induced noise over the microphone. Each microphone was tripod-mounted at a height of approximately five feet (1.5 meters) above ground level in accordance with ANSI S12.9-1992/Part 2 (R2013).

The LD831s meet Type 1 ANSI/ASA S1.4 and IEC 61672 Class 1 standards for sound level meters and were calibrated and certified as accurate to standards set by the National Institute of Standards and Technology. The octave band filters for all instrumentation meet ANSI S1.11-2014 Part 1. These calibrations were conducted by an independent laboratory within 12 months of field placement and certificates of calibration are provided in Appendix A. All measurement equipment was calibrated in the field before and after the surveys with the manufacturer's acoustical calibrator which meets the standards of IEC 60942-2003 Class 1L and ANSI/ASA S1.40-2006 (R2020).

Meteorological observations were made during each sound level monitoring program using handheld instrumentation. For this project, a Kestrel 3000 was used to observe the local wind speed, relative humidity, and temperature.

6.0 BASELINE SOUND LEVEL MONITORING RESULTS

This section discusses the results from the detailed ambient (baseline) monitoring program outlined in the previous section. Specifically, the logic for data validity and sound level results for the monitoring locations are provided.

6.1 Data Formatting Overview

Monitoring periods in which the ground-level wind speeds were elevated (greater than 5 m/s) or precipitation occurred were excluded from the analysis per Method #1 in ANSI S12.18-1994.

During the summer months, insect noise can dominate sound levels especially in wooded, grassy, or wet areas. This insect noise can overwhelm other sources and sometimes result in a very different sound level than if the insects were not present, such as the winter season. This seasonal noise was removed from the ambient sound level measurements using a high-frequency natural sound (HFNS) filter applied to the measured one-third octave-band data from which a broadband sound level was calculated. This technique removes all sound energy above the 1,250 Hz frequency band which is primarily insect noise. The methodology for the filtration process is as specified in ANSI/ASA S12.100-2014 and the sound pressure levels presented in this report using this methodology are indicated as ANS-weighted levels (presented in dBA). This HFNS analysis provides an indication of what ambient sound levels may be in colder weather without the influence of insect noise. Appendix B contains a more detailed discussion of acoustic terminology used in this report.

The 20-minute measured steady-state (L_{90}) and equivalent (L_{eq}) A-weighted sound levels along with the calculated ANS-weighted L_{90} and L_{eq} sound levels for each onshore substation and/or converter station are summarized below in Table 6-1 through Table 6-58. In addition to broadband sound levels, the L_{90} octave-band data are also summarized in Table 6-1 through Table 6-58 for each onshore substation and/or converter station. The time in each table represents the start time of the 20-minute measurement.

6.2 Lanes Pond Road Site – Onshore Substation and/or Converter Station

Table 6-1 presents the measured sound levels from the Lanes Pond Road Site for the proposed onshore substation and/or converter station site.

Table 6-1 Sound Level Measurement Results — Lanes Pond Road Site

Loc.	Day/ Night	Start Time	LA_{eq} dBA	LA_{90} dBA	ANS-LA_{eq} dBA	ANS-LA_{90} dBA	L_{90} Sound Pressure Level (dB) by Octave-Band Center Frequency (Hz)								
							31.5	63	125	250	500	1k	2k	4k	8k
A1	Day	11:37 AM	68	47	67	46	52	50	48	44	42	41	36	32	27
A2	Day	12:04 PM	50	46	49	45	51	50	46	43	41	42	36	31	25
A3	Day	12:40 PM	65	48	63	46	53	52	48	43	42	44	39	32	25
A4	Day	10:59 AM	69	47	68	46	53	51	48	45	43	40	34	28	23
A1	Night	11:54 PM	59	32	58	32	45	43	37	32	30	25	15	12	12
A2	Night	12:49 AM	37	31	36	30	44	42	35	30	28	25	16	13	12
A3	Night	1:18 AM	49	31	47	31	44	43	38	31	28	24	15	11	11
A4	Night	12:21 AM	61	34	59	34	46	45	40	34	32	27	15	11	11

6.3 Randolph Road Site – Onshore Substation and/or Converter Station

Table 6-2 presents the measured sound levels from the Randolph Road Site for the proposed onshore substation and/or converter station site.

Table 6-2 Sound Level Measurement Results — Randolph Road Site

Loc.	Day/ Night	Start Time	LA_{eq} dBA	LA_{90} dBA	ANS-LA_{eq} dBA	ANS-LA_{90} dBA	L_{90} Sound Pressure Level (dB) by Octave-Band Center Frequency (Hz)								
							31.5	63	125	250	500	1k	2k	4k	8k
B1	Day	12:04 PM	50	46	49	45	51	50	46	43	41	42	36	31	25
B2	Day	12:40 PM	65	48	63	46	53	52	48	43	42	44	39	32	25
B3	Day	1:57 PM	59	47	58	46	53	52	50	45	43	41	35	29	22
B4	Day	3:00 PM	56	43	55	43	51	50	46	40	40	39	29	24	19
B1	Night	12:49 AM	37	31	36	30	44	42	35	30	28	25	16	13	12
B2	Night	1:18 AM	49	31	47	31	44	43	38	31	28	24	15	11	11
B3	Night	3:20 AM	36	34	36	34	44	43	39	33	32	25	19	14	12
B4	Night	1:53 AM	34	31	33	31	46	43	36	31	30	23	12	10	11

6.4 Brook Road Site – Onshore Substation and/or Converter Station

Table 6-3 presents the measured sound levels from the Brook Road Site for the proposed onshore substation and/or converter station site.

Table 6-3 Sound Level Measurement Results — Brook Road Site

Loc.	Day/ Night	Start Time	LA_{eq} dBA	LA_{90} dBA	ANS-LA_{eq} dBA	ANS-LA_{90} dBA	L_{90} Sound Pressure Level (dB) by Octave-Band Center Frequency (Hz)								
							31.5	63	125	250	500	1k	2k	4k	8k
C1	Day	3:00 PM	56	43	55	43	51	50	46	40	40	39	29	24	19
C2	Day	2:22 PM	67	54	66	52	57	57	55	50	47	50	45	37	30
C3	Day	1:57 PM	59	47	58	46	53	52	50	45	43	41	35	29	22
C4	Day	1:31 PM	55	52	54	51	55	55	53	48	46	48	42	30	22
C1	Night	1:53 AM	34	31	33	31	46	43	36	31	30	23	12	10	11
C2	Night	2:20 AM	49	33	48	32	45	44	38	30	31	26	19	11	11
C3	Night	3:20 AM	36	34	36	34	44	43	39	33	32	25	19	14	12
C4	Night	2:53 AM	40	36	39	35	43	41	50	30	29	24	17	13	11

6.5 Asbury Avenue Site – Onshore Substation and/or Converter Station

Table 6-4 presents the measured sound levels from the Asbury Avenue Site for the proposed onshore substation and/or converter station site.

Table 6-4 Sound Level Measurement Results — Asbury Avenue Site

Loc.	Day/ Night	Start Time	LA_{eq} dBA	LA_{90} dBA	ANS-LA_{eq} dBA	ANS-LA_{90} dBA	L_{90} Sound Pressure Level (dB) by Octave-Band Center Frequency (Hz)								
							31.5	63	125	250	500	1k	2k	4k	8k
D1	Day	2:32 PM	71	59	70	58	60	59	55	51	52	57	50	33	17
D2	Day	2:07 PM	59	52	58	52	59	57	54	51	47	50	40	26	19
D3	Day	1:39 PM	50	46	50	46	55	50	47	41	43	44	32	17	13
D4	Day	1:10 PM	69	62	67	61	63	62	60	56	55	59	53	44	34
D1	Night	3:03 AM	58	46	57	45	48	45	44	39	40	44	34	18	14
D2	Night	2:34 AM	49	44	49	43	50	50	46	41	38	41	33	22	15
D3	Night	2:07 AM	42	38	41	37	56	42	40	33	34	34	25	13	11
D4	Night	1:39 AM	55	39	54	39	46	45	44	36	36	35	27	20	12

6.6 Route 66 Site – Onshore Substation and/or Converter Station

Table 6-5 presents the measured sound levels from the Route 66 Site for the proposed onshore substation and/or converter station site.

Table 6-5 Sound Level Measurement Results — Route 66 Site

Loc.	Day/ Night	Start Time	LA_{eq} dBA	LA_{90} dBA	ANS-LA_{eq} dBA	ANS-LA_{90} dBA	L_{90} Sound Pressure Level (dB) by Octave-Band Center Frequency (Hz)								
							31.5	63	125	250	500	1k	2k	4k	8k
E1	Day	11:42 AM	70	55	69	54	60	60	57	52	49	52	44	31	21
E2	Day	12:12 PM	61	52	60	51	57	56	52	48	46	49	41	28	16
E3	Day	12:40 PM	67	46	65	45	54	52	48	43	41	43	33	20	14
E4	Day	1:10 PM	69	62	67	61	63	62	60	56	55	59	53	44	34
E1	Night	12:10 AM	58	45	58	45	50	52	51	43	42	41	31	19	13
E2	Night	12:39 AM	52	37	51	37	46	45	43	35	34	33	22	15	12
E3	Night	1:05 AM	56	37	54	37	45	45	42	35	33	32	21	15	12
E4	Night	1:39 AM	55	39	54	39	46	45	44	36	36	35	27	20	12

6.7 Arthur Kill Road Site – Onshore Substation and/or Converter Station

Table 6-6 presents the measured sound levels from the Arthur Kill Road Site for the proposed onshore substation and/or converter station site.

Table 6-6 Sound Level Measurement Results — Arthur Kill Road Site

Loc.	Day/ Night	Start Time	LA_{eq} dBA	LA_{90} dBA	ANS-LA_{eq} dBA	ANS-LA_{90} dBA	L_{90} Sound Pressure Level (dB) by Octave-Band Center Frequency (Hz)								
							31.5	63	125	250	500	1k	2k	4k	8k
F1	Day	11:18 AM	68	67	83	73	60	47	47	58	55	49	46	44	42
F2	Day	12:03 PM	67	66	78	70	66	63	61	64	66	65	59	56	59
F3	Day	11:25 AM	64	63	77	68	59	49	49	59	57	52	48	46	42
F4	Day	12:19 PM	59	58	72	63	51	44	44	58	56	52	46	42	38
F1	Night	12:07 AM	59	58	79	53	42	41	41	56	55	51	45	38	30
F2	Night	12:38 AM	62	61	74	66	59	52	51	57	59	55	47	45	50
F3	Night	1:11 AM	56	55	79	50	44	43	43	58	58	51	42	41	37
F4	Night	1:47 AM	47	47	58	49	46	45	45	57	56	56	47	40	34

6.8 River Road Site – Onshore Substation and/or Converter Station

Table 6-7 presents the measured sound levels from the River Road Site for the proposed onshore substation and/or converter station site.

Table 6-7 Sound Level Measurement Results — River Road Site

Loc.	Day/ Night	Start Time	LA_{eq} dBA	LA_{90} dBA	ANS-LA_{eq} dBA	ANS-LA_{90} dBA	L_{90} Sound Pressure Level (dB) by Octave-Band Center Frequency (Hz)								
							31.5	63	125	250	500	1k	2k	4k	8k
G1	Day	12:07 PM	76	74	89	79	73	70	69	69	69	67	65	63	67
G2	Day	12:44 PM	71	69	83	73	70	66	64	68	68	65	58	58	63
G1	Night	12:00 AM	69	67	81	72	67	62	61	63	65	61	57	54	59
G2	Night	12:42 AM	69	68	91	69	63	57	56	63	63	59	55	51	54

6.9 Sunset Industrial Park Site – Onshore Substation and/or Converter Station

Table 6-8 presents the measured sound levels from the Sunset Industrial Park Site for the proposed onshore substation and/or converter station site.

Table 6-8 Sound Level Measurement Results — Sunset Industrial Park Site

Loc.	Day/ Night	Start Time	LA_{eq} dBA	LA_{90} dBA	ANS-LA_{eq} dBA	ANS-LA_{90} dBA	L_{90} Sound Pressure Level (dB) by Octave-Band Center Frequency (Hz)								
							31.5	63	125	250	500	1k	2k	4k	8k
H1	Day	10:42 AM	63	62	79	66	58	52	51	63	61	57	52	47	46
H2	Day	11:14 AM	65	64	82	68	59	56	55	69	64	59	55	52	51
H3	Day	12:26 PM	70	69	84	73	67	63	63	67	66	63	60	59	60
H4	Day	1:01 PM	67	66	81	70	63	57	56	65	65	62	56	54	52
H1	Night	12:22 AM	54	52	70	54	46	45	44	59	58	53	47	42	38
H2	Night	12:54 AM	55	54	75	57	50	48	47	61	59	55	47	44	43
H3	Night	2:22 AM	61	60	78	64	58	54	53	59	58	55	52	50	51
H4	Night	1:45 AM	58	57	73	61	53	51	50	59	59	60	50	46	46

7.0 OPERATIONAL SOUND LEVELS

Sound level impacts from the electrical and mechanical equipment has been analyzed for all eight proposed onshore substation and/or converter station sites identified in Section 5; Lanes Pond Road Site, Randolph Road Site, Brook Road Site, Asbury Avenue Site, Route 66 Site, Arthur Kill Road Site, River Road Site, and Sunset Industrial Park Site. The details of the analyses are provided herein.

7.1 Overview and Noise Sources

Electricity generated by the Project will be delivered to shore via 230 kV to 525 kV HVAC and/or HVDC export cables. The onshore substation and/or converter station design and specific equipment will depend on whether the onshore interconnection cables are HVAC or HVDC. The proposed HVAC substation and/or converter station design includes up to four 450 MVA power transformers, four 200 MVA iron core shunt reactors, four harmonic filters, four 450 MVAr static synchronous compensators (STATCOMs), and a control building. The proposed HVDC onshore substation and/or converter station design includes one transformer system arranged in three single-phase 400 MVA transformers, a valve hall, and a switchgear building.

Given that there is a possibility that the proposed onshore substation and/or converter station may consist of a combined HVAC/HVDC configuration, sound level modeling was conservatively performed including the equipment from both designs.

Table 7-1 summarizes the onshore substation and/or converter station components in the combined HVAC/HVDC design along with the type or rating, quantity, and indication of whether the component is in the site yard or part of a STATCOM. Broadband sound power level ranges for each major piece of equipment were provided to Epsilon by Atlantic Shores. Sound modeling was initially performed using the highest sound power level to be conservative. These sound levels are identified in Table 7-1 as the "Base Case" sound levels. Other electrical and mechanical components of the onshore substation and/or converter station, either in the site yard, in the STATCOMs, or contained within site buildings, are assumed to be insignificant sources of sound and were excluded from the modeling, e.g., auxiliary transformers with sound power levels that are 10 dBA lower than the quietest piece of equipment included in the model.

Table 7-1 Onshore Substation and/or Converter Station Noise Sources

Component	Type/Rating	Qty.	HVAC or HVDC	Site Yard or STATCOM Component	"Base Case" Broadband Sound Power Level in dBA (per unit)
Power Transformer	450 MVA, 230/230kV	4	HVAC	Site Yard	105
VSR (Iron Core)	200 MVAr	4	HVAC	Site Yard	100
Harmonic Filter Reactor	Unknown	6	HVAC	Site Yard	95
Harmonic Filter Capacitor	Unknown	6	HVAC	Site Yard	90
Harmonic Filter Resistor	Unknown	6	HVAC	Site Yard	80
VSC Reactor (Air Core)	Unknown	6	HVAC	STATCOM	95
DRC Step-up Transformer	400 MVA	2	HVAC	STATCOM	108
Fan Bank	Unknown	6	HVAC	STATCOM	100
Valve Hall HVAC Unit	Unknown	2	HVAC	STATCOM	80
BARD Wall-mounted HVAC Unit	Unknown	8	HVAC	STATCOM	80
Power Transformer	400 MVA, 230/230kV	3	HVDC	Site Yard	85
Valve Cooling Tower	Unknown	1	HVDC	Site Yard	95

7.2 Cadna/A Sound Model and Methodology

Sound level impacts from the onshore substation and/or converter station electrical and mechanical equipment were analyzed using Cadna/A noise calculation software[3]. This predictive software uses the ISO 9613-2 international standard for sound propagation.[4] The Cadna/A software includes a refined set of computations accounting for local topography, ground attenuation, drop-off with distance, barrier shielding, diffraction around building edges, reflection off building façades, and atmospheric absorption of sound from multiple noise sources.

Inputs and significant parameters employed in the model are described below:

- **Project Layout:** A conceptual and general equipment arrangement drawing was provided by Atlantic Shores. The specific locations of the proposed electrical and mechanical equipment within each proposed onshore substation and/or converter station site were estimated by

3 DataKustik Corporation GmbH

4 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation,* International Standard ISO 9613-2:1996 (International Organization for Standardization, Geneva, Switzerland, 1996).

Epsilon. The sound modeling analyses presented herein are conservative in that they include both HVAC and HVDC sound-generating components.

- **Sensitive Receptors**: Sound levels were evaluated at site-specific modeling locations (discrete points) representing the closest residentially or commercially used property lines surrounding each New Jersey site. Residences were also included in the modeling for New York sites. The modeling locations include measurement locations presented in Section 5 and additional receptors based on a review of aerial imagery. All receptors were modeled at a height of 1.5 meters above ground level which is the approximate ear height of a typical standing observer.
- **Modeling Grid:** A modeling grid with 10-meter spacing was calculated in the vicinity of each proposed onshore substation and/or converter station site. The grids were modeled at a height of 1.5 meters above ground level for consistency with the discrete modeling points. This modeling grid allowed for the creation of sound level isopleths.
- **Terrain Elevation:** Elevation contours for the modeling domain, derived from a Coastal National Elevation Database (CoNED) product from the United States Geological Survey (USGS) at a 1-meter resolution, were imported into Cadna/A, which allowed for consideration of terrain shielding and differences in elevation between sources and receivers, where appropriate.
- **Source Sound Power Levels:** Broadband sound power level ranges for each major piece of equipment described in section 7.1 were provided to Epsilon. Sound modeling was initially performed using the highest sound power level in that range to be conservative ("base-case"). The sound power level of some equipment was reduced where necessary to reduce impacts at the noise-sensitive receptors. The Project is in the early design stage and octave band sound level data were not available for the equipment included in the model. Therefore, no octave band sound levels were modeled.
- **Meteorological Conditions:** A temperature of 10°C (50°F) and a relative humidity of 70% were assumed in the model to minimize atmospheric attenuation in the 500 Hz and 1,000 Hz octave bands where the human ear is most sensitive. As per ISO 9613-2, the modeling assumed favorable conditions for sound propagation, corresponding to a moderate, well-developed ground-based temperature inversion, as might occur on a calm, clear night or equivalently downwind propagation.
- **Ground Attenuation:** Spectral ground absorption was calculated using a global G-factor of 0.5 to represent a moderately reflective surface for 6 of the 8 sites. The two exceptions were the River Road site and the Sunset Industrial Park site which are surrounded more so by either hard ground or water, so these were modeled as hard ground, i.e., G = 0. The site parcel footprints of all sites were also modeled as hard ground.
- No additional attenuation due foliage, air turbulence, or wind shadow effects was considered in the model.

7.3 Lanes Pond Road Site Sound Modeling

7.3.1 Modeled Sound Power Levels

A tabular summary of the noise-controlled reference sound power level data for each noise source, as included in the model for the Lanes Pond Road onshore substation and/or converter station, is presented in Table 7-2. All modeled sources were assumed to be operating simultaneously and at these sound levels. Base-case sound levels are included in the table for reference purposes.

Table 7-2 Modeled Reference Sound Power Levels – Lanes Pond Road Site

Component	HVAC or HVDC	Site Yard or STATCOM Component	"Base Case" Broadband Sound Power Level	Noise Controlled Broadband Sound Power Level
			dBA	dBA
Power Transformer	HVAC	Site Yard	105	90
VSR (Iron Core) – 200 MVAr	HVAC	Site Yard	100	85
Harmonic Filter Reactor	HVAC	Site Yard	95	85
Harmonic Filter Capacitor	HVAC	Site Yard	90	80
Harmonic Filter Resistor	HVAC	Site Yard	80	80
VSC Reactor (Air Core)	HVAC	STATCOM	95	80
DRC Step-up Transformer	HVAC	STATCOM	108	95
Fan Bank	HVAC	STATCOM	100	95
Valve Hall HVAC Unit	HVAC	STATCOM	80	80
BARD Wall-mounted HVAC Unit	HVAC	STATCOM	80	80
Power Transformer	HVDC	Site Yard	85	85
Valve Cooling Tower	HVDC	Site Yard	95	95

7.3.2 Mitigation Measures

At the proposed onshore substation and/or converter station site, noise control features are needed to limit sound level impacts in the neighboring communities. In some cases, low-noise designs were used for some equipment, i.e., the maximum (base case) sound power level was not used in the model. The low-noise specifications are reflected in the mitigated reference sound power data provided in Table 7-2. The table lists both the unmitigated ("base case") and mitigated ("noise-controlled") sound power levels for each piece of equipment.

Sound level modeling also includes strategically placed sound barriers and firewalls of various lengths and heights. Sound barriers are designed solely to attenuate sound, whereas firewalls are typically constructed between two transformers but also attenuate sound. The barriers/firewalls are conceptual in design, and noise control features for the Project will be revisited once the final site is selected and the layout is refined. For purposes of modeling at this stage, the barriers/firewalls included in the noise model are as described in

Table 7-3. Once the final design is complete, the noise modeling will be finalized, and mitigation refined. Atlantic Shores is also considering designs for the proposed onshore substation and/or converter station that include equipment enclosures as well as natural barriers and landscaping.

Table 7-3 Modeled Sound Barrier Details – Lanes Pond Road Site

Description/Approximate Location	Height (feet)	Approximate Length (feet)
Firewalls (Qty. 4)	33	50
South barrier	10	70
East barrier	30	910
North barrier	15	230
Northeast barrier	20	180
West barrier	25	710

7.3.3 Predicted Operational Sound Levels

Broadband sound level modeling results at the 13 modeling receptors at the Lanes Pond Road Site are presented in Table 7-4. Both the base-case and noise-controlled (i.e., proposed) results are shown. Figure 7-1 shows noise-controlled sound contours from the operation of the onshore substation and/or converter station. The figure shows the 13 modeling locations and the on-site buildings included in the model. These buildings include a control building, four STATCOM buildings, one HVDC valve hall, and one HVDC switchgear building. The noise-controlled Project-only broadband sound levels range from 29 to 51 dBA at the 13 modeling locations. The highest sound level modeled at a residential property line is 49 dBA at receptors A6, A9, and A13 as shown in Figure 7-1.

Figure 7-1

Proposed Onshore Substation and/or Converter Station – Lanes Pond Road Site Sound Level Modeling Results Monmouth County, New Jersey

Table 7-4 Project-Only Sound Level Results – Lanes Pond Road Site

Receptor ID	Land Use	Modeled Project-Only L_{eq} Sound Level (dBA)	
		Base Case	Noise Controlled (Proposed)
A1	Commercial (Measurement Location)	63	49
A2	Residential (Measurement Location)	49	35
A3	Residential (Measurement Location)	49	36
A4	Residential (Measurement Location)	45	29
A5	Residential	68	48
A6	Residential	59	49
A7	Residential	62	47
A8	Residential	76	47
A9	Residential	58	49
A10	Residential	65	47
A11	Commercial	74	48
A12	Commercial	66	51
A13	Residential	59	49

7.4 Randolph Road Site Sound Modeling

7.4.1 Modeled Sound Power Levels

A tabular summary of the noise-controlled reference sound power level data for each noise source, as included in the model for the Randolph Road onshore substation and/or converter station, is presented in Table 7-. All modeled sources were assumed to be operating simultaneously and at these sound levels. Base-case sound levels are included in the table for reference purposes.

Table 7-5 Modeled Reference Sound Power Levels – Randolph Road Site

Component	HVAC or HVDC	Site Yard or STATCOM Component	"Base Case" Broadband Sound Power Level	Noise Controlled Broadband Sound Power Level
			dBA	dBA
Power Transformer	HVAC	Site Yard	105	90
VSR (Iron Core) – 200 MVAr	HVAC	Site Yard	100	85
Harmonic Filter Reactor	HVAC	Site Yard	95	85
Harmonic Filter Capacitor	HVAC	Site Yard	90	80
Harmonic Filter Resistor	HVAC	Site Yard	80	80
VSC Reactor (Air Core)	HVAC	STATCOM	95	80
DRC Step-up Transformer	HVAC	STATCOM	108	95
Fan Bank	HVAC	STATCOM	100	95
Valve Hall HVAC Unit	HVAC	STATCOM	80	80
BARD Wall-mounted HVAC Unit	HVAC	STATCOM	80	80
Power Transformer	HVDC	Site Yard	85	85
Valve Cooling Tower	HVDC	Site Yard	95	95

7.4.2 Mitigation Measures

At the proposed onshore substation and/or converter station site, noise control features are needed to limit sound level impacts in the neighboring communities. In some cases, low-noise designs were used for some equipment, i.e., the maximum (base case) sound power level was not used in the model. The low-noise specifications are reflected in the mitigated reference sound power data provided in Table 7-5. The table lists both the unmitigated ("base case") and mitigated ("noise-controlled") sound power levels for each piece of equipment.

Sound level modeling also includes strategically placed sound barriers and firewalls of various lengths and heights. Sound barriers are designed solely to attenuate sound, whereas firewalls are typically constructed between two transformers but also attenuate sound. The barriers/firewalls are conceptual in design, and noise control features for the Project will be revisited once the final site is selected and the layout is refined. For purposes of modeling at this stage, the barriers/firewalls included in the noise model are as described in Table 7-6. Once the final design is complete, the noise modeling will be finalized, and mitigation refined. Atlantic Shores is also considering designs for the proposed onshore substation and/or converter station that include equipment enclosures as well as natural barriers and landscaping.

Table 7-6 Modeled Sound Barrier Details – Randolph Road Site

Description/Approximate Location	Height (feet)	Approximate Length (feet)
Firewalls (Qty. 4)	33	50
East (long) barrier	25	330
East (short) barrier	20	60

7.4.3 *Predicted Operational Sound Levels*

Broadband sound level modeling results at the 9 modeling receptors at the Randolph Road Site are presented in Table 7-7. Both the base-case and noise-controlled (i.e., proposed) results are shown. Figure 7-2 shows noise-controlled sound contours from the operation of the onshore substation and/or converter station. The figure shows the 9 modeling locations and the on-site buildings included in the model. These buildings include a control building, four STATCOM buildings, one HVDC valve hall, and one HVDC switchgear building. The noise-controlled Project-only broadband sound levels range from 34 to 56 dBA at the 9 modeling locations. The highest sound level modeled at a residential property line is 50 dBA at receptor B9 as shown in Figure 7-2.

Table 7-7 Project-Only Sound Level Results – Randolph Road Site

Receptor ID	Land Use	Modeled Project-Only L_{eq} Sound Level (dBA)	
		Base Case	Noise Controlled (Proposed)
B1	Residential (Measurement Location)	46	34
B2	Residential (Measurement Location)	53	43
B3	Residential (Measurement Location)	47	35
B4	Residential (Measurement Location)	48	37
B5	Residential	56	49
B6	Commercial	68	56
B7	Commercial	64	50
B8	Residential	60	49
B9	Residential	60	50

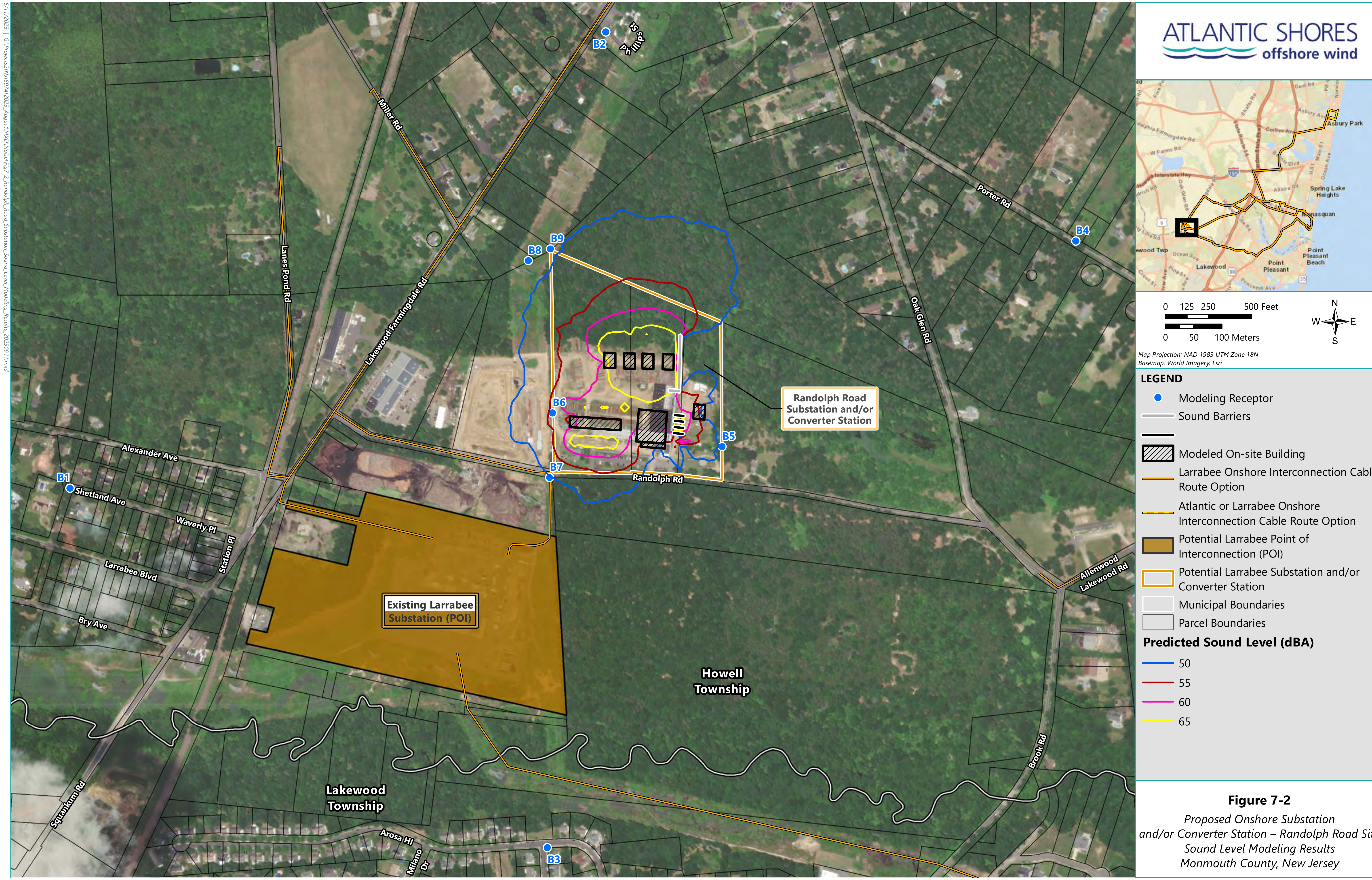


Figure 7-2

Proposed Onshore Substation and/or Converter Station – Randolph Road Site Sound Level Modeling Results Monmouth County, New Jersey

7.5 Brook Road Site Sound Modeling

7.5.1 Modeled Sound Power Levels

A tabular summary of the noise-controlled reference sound power level data for each noise source, as included in the model for the Brook Road onshore substation and/or converter station, is presented in Table 7-8. All modeled sources were assumed to be operating simultaneously and at these sound levels. Base-case sound levels are included in the table for reference purposes.

Table 7-8 Modeled Reference Sound Power Levels – Brook Road Site

Component	HVAC or HVDC	Site Yard or STATCOM Component	"Base Case" Broadband Sound Power Level	Noise Controlled Broadband Sound Power Level
			dBA	dBA
Power Transformer	HVAC	Site Yard	105	95
VSR (Iron Core) – 200 MVAr	HVAC	Site Yard	100	85
Harmonic Filter Reactor	HVAC	Site Yard	95	95
Harmonic Filter Capacitor	HVAC	Site Yard	90	90
Harmonic Filter Resistor	HVAC	Site Yard	80	80
VSC Reactor (Air Core)	HVAC	STATCOM	95	80
DRC Step-up Transformer	HVAC	STATCOM	108	95
Fan Bank	HVAC	STATCOM	100	95
Valve Hall HVAC Unit	HVAC	STATCOM	80	80
BARD Wall-mounted HVAC Unit	HVAC	STATCOM	80	80
Power Transformer	HVDC	Site Yard	85	85
Valve Cooling Tower	HVDC	Site Yard	95	95

7.5.2 Mitigation Measures

At the proposed onshore substation and/or converter station site, noise control features are needed to limit sound level impacts in the neighboring communities. In some cases, low-noise designs were used for some equipment, i.e., the maximum (base case) sound power level was not used in the model. The low-noise specifications are reflected in the mitigated reference sound power data provided in Table 7-8. The table lists both the unmitigated ("base case") and mitigated ("noise-controlled") sound power levels for each piece of equipment.

Sound level modeling also includes strategically placed sound barriers and firewalls of various lengths and heights. Sound barriers are designed solely to attenuate sound, whereas firewalls are typically constructed between two transformers but also attenuate sound. The barriers/firewalls are conceptual in design, and noise control features for the Project will be revisited once the final site is selected and the layout is refined. For purposes of modeling at this stage, the barriers/firewalls included in the noise model are as described in Table 7-9. Once the final design is complete, the noise modeling will be finalized, and mitigation refined. Atlantic Shores is also considering designs for the proposed onshore substation and/or converter station that include equipment enclosures as well as natural barriers and landscaping.

Table 7-9 Modeled Sound Barrier Details – Brook Road Site

Description/Approximate Location	Height (feet)	Approximate Length (feet)
Firewalls (Qty. 4)	33	50
Northern segment of large L-shaped wall	20	60
Eastern segment of large L-shaped wall	20	460
Northern segment of small L-shaped wall	25	70
Eastern segment of small L-shaped wall	25	150

7.5.2 Predicted Operational Sound Levels

Broadband sound level modeling results at the 12 modeling receptors at the Brook Road Site are presented in Table 7-10. Both the base-case and noise-controlled (i.e., proposed) results are shown. Figure 7-3 shows noise-controlled sound contours from the operation of the onshore substation and/or converter station. The figure shows the 12 modeling locations and the on-site buildings included in the model. These buildings include a control building, four STATCOM buildings, one HVDC valve hall, and one HVDC switchgear building. The noise-controlled Project-only broadband sound levels range from 36 to 58 dBA at the 12 modeling locations. The highest sound level modeled at a residential property line is 50 dBA at receptor C6 as shown in Figure 7-3.

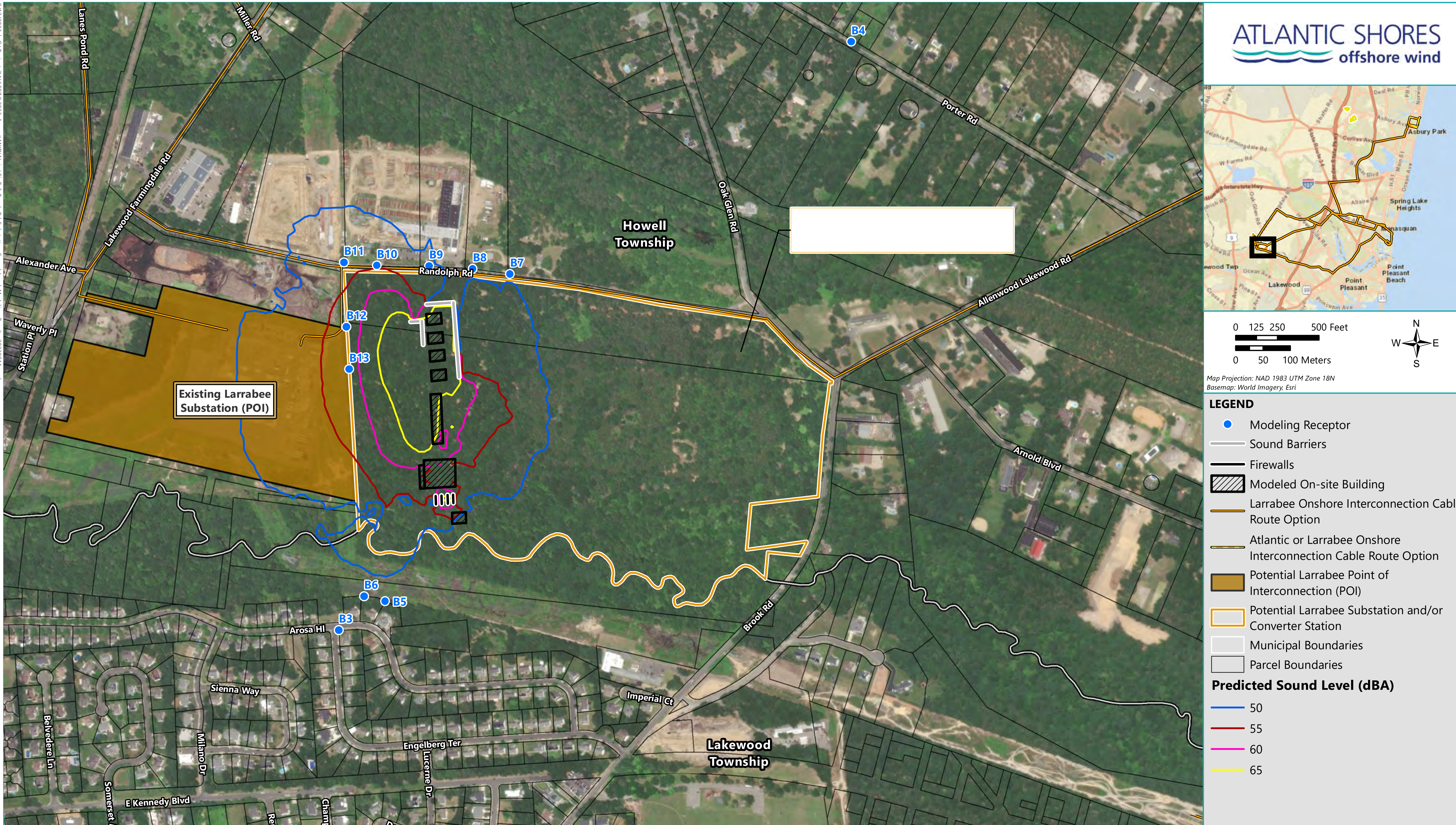


Figure 7-3

Proposed Onshore Substation and/or Converter Station – Brook Road Site Sound Level Modeling Results Monmouth County, New Jersey

Table 7-10 Project-Only Sound Level Results – Brook Road Site

Receptor ID	Land Use	Modeled Project-Only L_{eq} Sound Level (dBA)	
		Base Case	Noise Controlled (Proposed)
C1	Residential (Measurement Location)	47	36
C2	Residential (Measurement Location)	50	38
C3	Residential (Measurement Location)	53	47
C4	Residential (Measurement Location)	44	36
C5	Residential	54	49
C6	Residential	64	50
C7	Residential	64	49
C8	Commercial	64	52
C9	Commercial	60	55
C10	Commercial	59	53
C11	Commercial	62	57
C12	Commercial	63	58

7.6 Asbury Avenue Site Sound Modeling

7.6.1 Modeled Sound Power Levels

A tabular summary of the noise-controlled reference sound power level data for each noise source, as included in the model for the Asbury Avenue onshore substation and/or converter station, is presented in Table 7-11. All modeled sources were assumed to be operating simultaneously and at these sound levels. Base-case sound levels are included in the table for reference purposes.

Table 7-11 Modeled Reference Sound Power Levels – Asbury Avenue Road Site

Component	HVAC or HVDC	Site Yard or STATCOM Component	"Base Case" Broadband Sound Power Level	Noise Controlled Broadband Sound Power Level
			dBA	dBA
Power Transformer	HVAC	Site Yard	105	90
VSR (Iron Core) – 200 MVAr	HVAC	Site Yard	100	85
Harmonic Filter Reactor	HVAC	Site Yard	95	85
Harmonic Filter Capacitor	HVAC	Site Yard	90	80
Harmonic Filter Resistor	HVAC	Site Yard	80	80
VSC Reactor (Air Core)	HVAC	STATCOM	95	80
DRC Step-up Transformer	HVAC	STATCOM	108	95
Fan Bank	HVAC	STATCOM	100	95
Valve Hall HVAC Unit	HVAC	STATCOM	80	80
BARD Wall-mounted HVAC Unit	HVAC	STATCOM	80	80
Power Transformer	HVDC	Site Yard	85	85
Valve Cooling Tower	HVDC	Site Yard	95	95

7.6.2 Mitigation Measures

At the proposed onshore substation and/or converter station site, noise control features are needed to limit sound level impacts in the neighboring communities. In some cases, low-noise designs were used for some equipment, i.e., the maximum (base case) sound power level was not used in the model. The low-noise specifications are reflected in the mitigated reference sound power data provided in Table 7-11. The table lists both the unmitigated ("base case") and mitigated ("noise-controlled") sound power levels for each piece of equipment.

Sound level modeling also includes strategically placed sound barriers and firewalls of various lengths and heights. Sound barriers are designed solely to attenuate sound, whereas firewalls are typically constructed between two transformers but also attenuate sound. The barriers/firewalls are conceptual in design, and noise control features for the Project will be revisited once the final site is selected and the layout is refined. For purposes of modeling at this stage, the barriers/firewalls included in the noise model are as described in Table 7-12. Once the final design is complete, the noise modeling will be finalized, and mitigation refined. Atlantic Shores is also considering designs for the proposed onshore substation and/or converter station that include equipment enclosures as well as natural barriers and landscaping.

Table 7-12 Modeled Sound Barrier Details – Asbury Avenue Site

Description/Approximate Location	Height (feet)	Approximate Length (feet)
Firewalls (Qty. 4)	33	50
Southwest barrier	20	440
Northeast barrier	10	430
Northwest barrier	15	260
South barrier (L-shape)	20	260

7.6.3 Predicted Operational Sound Levels

Broadband sound level modeling results at the 11 modeling receptors at the Asbury Ave Site are presented in Table 7-13. Both the base-case and noise-controlled (i.e., proposed) results are shown. Figure 7-4 shows noise-controlled sound contours from the operation of the onshore substation and/or converter station. The figure shows the 11 modeling locations and the on-site buildings included in the model. These buildings include a control building, four STATCOM buildings, one HVDC valve hall, and one HVDC switchgear building. The noise-controlled Project-only broadband sound levels range from 42 to 55 dBA at the 11 modeling locations. The highest sound level modeled at a residential property line is 50 dBA at receptor D6 as shown in Figure 7-4.

Table 7-13 Project-Only Sound Level Results – Asbury Avenue Site

Receptor ID	Land Use	Modeled Project-Only L_{eq} Sound Level (dBA)	
		Base Case	Noise Controlled (Proposed)
D1	Residential (Measurement Location)	58	43
D2	Residential (Measurement Location)	58	47
D3	Residential (Measurement Location)	57	48
D4	Residential (Measurement Location)	52	42
D5	Residential	67	49
D6	Residential	59	50
D7	Commercial	63	55
D8	Commercial	60	50
D9	Residential	59	49
D10	Commercial	63	53
D11	Residential	60	49

ATLANTIC SHORES offshore wind

0 125 250 500 Feet

0 50 100 Meters

N W E S

Map Projection: NAD 1983 UTM Zone 18N
Basemap: World Imagery, Esri

LEGEND

- Modeling Receptor
- Atlantic Onshore Interconnection Cable Route Option
- Atlantic or Larrabee Onshore Interconnection Cable Route Option
- Sound Barriers
- Firewalls
- Potential Atlantic Substation and/or Converter Station
- Modeled On-site Building
- Municipal Boundaries
- Parcel Boundaries

Predicted Sound Level (dBA)

- 50
- 55
- 60
- 65

Figure 7-4

Proposed Onshore Substation and/or Converter Station – Asbury Avenue Site Sound Level Modeling Results Monmouth County, New Jersey

5/11/2023 | G:\Projects2\NJ\5974\2023_August\MXD\Noise\Fig7-4_Asbury_Ave_Substation_Sound_Level_Modeling_Results_20230911.mxd

7.7 Route 66 Site Sound Modeling

7.7.1 Modeled Sound Power Levels

A tabular summary of the noise-controlled reference sound power level data for each noise source, as included in the model for the Route 66 onshore substation and/or converter station, is presented in Table 7-14. All modeled sources were assumed to be operating simultaneously and at these sound levels. Base-case sound levels are included in the table for reference purposes.

Table 7-14 Modeled Reference Sound Power Levels – Route 66 Site

Component	HVAC or HVDC	Site Yard or STATCOM Component	"Base Case" Broadband Sound Power Level	Noise Controlled Broadband Sound Power Level
			dBA	dBA
Power Transformer	HVAC	Site Yard	105	92
VSR (Iron Core) – 200 MVAr	HVAC	Site Yard	100	90
Harmonic Filter Reactor	HVAC	Site Yard	95	80
Harmonic Filter Capacitor	HVAC	Site Yard	90	80
Harmonic Filter Resistor	HVAC	Site Yard	80	80
VSC Reactor (Air Core)	HVAC	STATCOM	95	80
DRC Step-up Transformer	HVAC	STATCOM	108	95
Fan Bank	HVAC	STATCOM	100	95
Valve Hall HVAC Unit	HVAC	STATCOM	80	80
BARD Wall-mounted HVAC Unit	HVAC	STATCOM	80	80
Power Transformer	HVDC	Site Yard	85	85
Valve Cooling Tower	HVDC	Site Yard	95	95

7.7.2 Mitigation Measures

At the proposed onshore substation and/or converter station site, noise control features are needed to limit sound level impacts in the neighboring communities. In some cases, low-noise designs were used for some equipment, i.e., the maximum (base case) sound power level was not used in the model. The low-noise specifications are reflected in the mitigated reference sound power data provided in Table 7-14. The table lists both the unmitigated ("base case") and mitigated ("noise-controlled") sound power levels for each piece of equipment.

Sound level modeling also includes firewalls. Firewalls are typically constructed between two transformers but also attenuate sound. The firewalls are conceptual in design, and noise control features for the Project will be revisited once the final site is selected and the layout is refined. For purposes of modeling at this stage, the firewalls included in the noise model are as described in Table 7-15. Once the final design is complete, the noise modeling will be finalized, and mitigation refined. Atlantic Shores is also considering designs for the proposed onshore substation and/or converter station that include equipment enclosures as well as natural barriers and landscaping.

Table 7-15 Modeled Sound Barrier Details – Route 66 Site

Description/Approximate Location	Height (feet)	Approximate Length (feet)
Firewalls (Qty. 4)	33	50

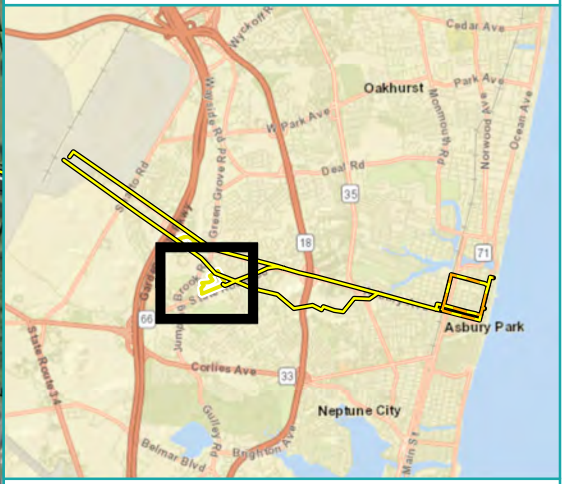
7.7.3 Predicted Operational Sound Levels

Broadband sound level modeling results at the 15 modeling receptors at the Route 66 Site are presented in Table 7-16. Both the base-case and noise-controlled (i.e., proposed) results are shown. Figure 7-5 shows noise-controlled sound contours from the operation of the onshore substation and/or converter station. The figure shows the 15 modeling locations and the on-site buildings included in the model. These buildings include a control building, four STATCOM buildings, one HVDC valve hall, and one HVDC switchgear building. The noise-controlled Project-only broadband sound levels range from 35 to 60 dBA at the 15 modeling locations. The highest sound level modeled at a residential property line is 50 dBA at receptor E8 as shown in Figure 7-5.

Table 7-16 Project-Only Sound Level Results – Route 66 Site

Receptor ID	Land Use	Modeled Project-Only L_{eq} Sound Level (dBA)	
		Base Case	Noise Controlled (Proposed)
E1	Residential (Measurement Location)	44	35
E2	Residential (Measurement Location)	51	41
E3	Residential (Measurement Location)	54	44
E4	Residential (Measurement Location)	49	39
E5	Commercial	71	60
E6	Commercial	60	50
E7	Commercial	62	53
E8	Residential	59	50
E9	Residential	56	46
E10	Residential	52	42
E11	Commercial	50	41
E12	Residential	56	45
E13	Residential	56	44
E14	Commercial	59	47
E15	Residential	55	44

ATLANTIC SHORES offshore wind



0 125 250 500 Feet

0 50 100 Meters

N W E S

Map Projection: NAD 1983 UTM Zone 18N
Basemap: World Imagery, Esri

LEGEND

- Modeling Receptor
- Sound
- Modeled On-site
- Atlantic Onshore Interconnection Cable Route Option
- Atlantic or Larrabee Onshore Interconnection Cable Route Option
- Potential Atlantic Substation and/or Converter Station
- Municipal
- Parcel

Predicted Sound Level

Figure 7-5

Proposed Onshore Substation and/or Converter Station – Route 66 Site Sound Level Modeling Results Monmouth County, New Jersey

7.8 Arthur Kill Road Site Sound Modeling

7.8.1 Modeled Sound Power Levels

A tabular summary of the noise-controlled reference sound power level data for each noise source, as included in the model for the Arthur Kill Road onshore substation and/or converter station, is presented in Table 7-17. All modeled sources were assumed to be operating simultaneously and at these sound levels. Base-case sound levels are included in the table for reference purposes.

Table 7-17 Modeled Reference Sound Power Levels – Arthur Kill Road Site

Component	HVAC or HVDC	Site Yard or STATCOM Component	"Base Case" Broadband Sound Power Level	Noise Controlled Broadband Sound Power Level
			dBA	dBA
Power Transformer	HVAC	Site Yard	105	90
VSR (Iron Core) – 200 MVAr	HVAC	Site Yard	100	85
Harmonic Filter Reactor	HVAC	Site Yard	95	85
Harmonic Filter Capacitor	HVAC	Site Yard	90	85
Harmonic Filter Resistor	HVAC	Site Yard	80	80
VSC Reactor (Air Core)	HVAC	STATCOM	95	80
DRC Step-up Transformer	HVAC	STATCOM	108	95
Fan Bank	HVAC	STATCOM	100	95
Valve Hall HVAC Unit	HVAC	STATCOM	80	80
BARD Wall-mounted HVAC Unit	HVAC	STATCOM	80	80
Power Transformer	HVDC	Site Yard	85	85
Valve Cooling Tower	HVDC	Site Yard	95	95

7.8.2 Mitigation Measures

At the proposed onshore substation and/or converter station site, noise control features are needed to limit sound level impacts in the neighboring communities. In some cases, low-noise designs were used for some equipment, i.e., the maximum (base case) sound power level was not used in the model. The low-noise specifications are reflected in the mitigated reference sound power data provided in Table 7-17. The table lists both the unmitigated ("base case") and mitigated ("noise-controlled") sound power levels for each piece of equipment.

Sound level modeling also includes strategically placed sound barriers and firewalls of various lengths and heights. Sound barriers are designed solely to attenuate sound, whereas firewalls are typically constructed between two transformers but also attenuate sound. The barriers/firewalls are conceptual in design, and noise control features for the Project will be revisited once the final site is selected and the layout is refined. For purposes of modeling at this stage, the barriers/firewalls included in the noise model are as described in Table 7-18. Once the final design is complete, the noise modeling will be finalized, and mitigation refined. Atlantic Shores is also considering designs for the proposed onshore substation and/or converter station that include equipment enclosures as well as natural barriers and landscaping.

Table 7-18 Modeled Sound Barrier Details – Arthur Kill Road Site

Description/Approximate Location	Height (feet)	Approximate Length (feet)
Firewalls (Qty. 4)	33	50
U-Shape Barrier Short West Segment	20	60
L-Shape Barrier South Segment	20	160
L-Shape Barrier East Segment	20	60
U-Shape Barrier South Segment (West portion)	20	460
U-Shape Barrier South Segment (East portion)	30	510
U-Shape Barrier Short East Segment	25	230

7.8.2 Predicted Operational Sound Levels

Broadband sound level modeling results at the 14 modeling receptors at the Arthur Kill Road Site location are presented in Table 7-19. Both the base-case and noise-controlled (i.e., proposed) results are shown. Figure 7-6 shows noise-controlled sound contours from the operation of the onshore substation and/or converter station. The figure shows the 14 modeling locations and the on-site buildings included in the model. These buildings include a control building, four STATCOM buildings, one HVDC valve hall, and one HVDC switchgear building. The noise-controlled Project-only broadband sound levels range from 24 to 44 dBA at the 14 modeling locations. The highest sound level modeled at a residence is 35 dBA at receptors F5 and F13 as shown in Figure 7-6.

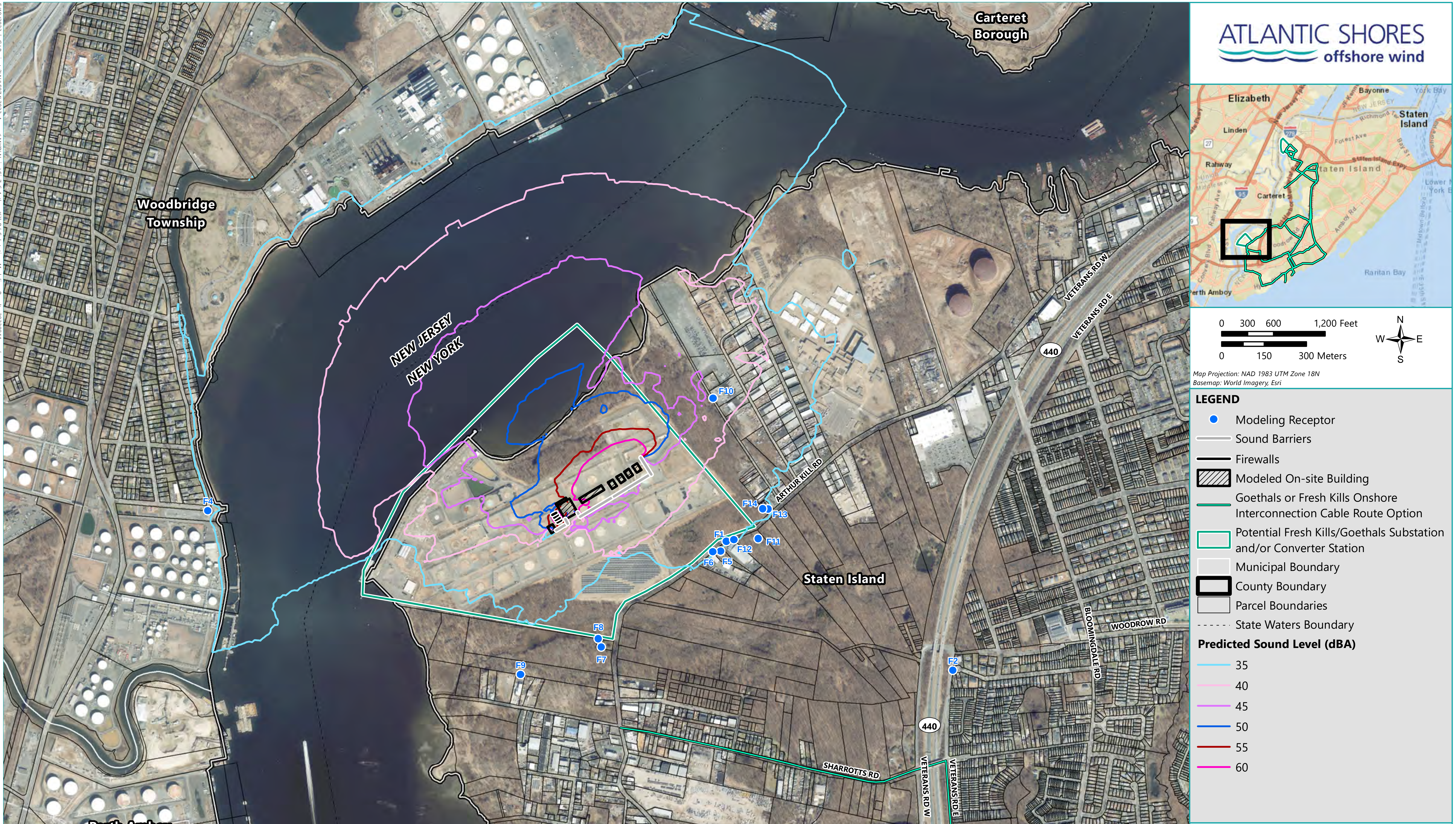


Figure 7-6

Proposed Onshore Substation and/or Converter Station – Arthur Kill Road Site Sound Level Modeling Results Richmond County, New York

Table 7-19 Project-Only Sound Level Results – Arthur Kill Road Site

Receptor ID	Land Use	Modeled Project-Only L_{eq} Sound Level (dBA)	
		Base Case	Noise Controlled (Proposed)
F1	Residential (Measurement Location)	55	35
F2	Residential (Measurement Location)	43	26
F3	Residential (Measurement Location)	37	24
F4	Residential (Measurement Location)	43	34
F5	Residence	54	35
F6	Residential PL	55	35
F7	Residence	47	32
F8	Residential PL	48	32
F9	Commercial	47	34
F10	Commercial	54	44
F11	Residence	53	34
F12	Residential PL	54	35
F13	Residence	53	35
F14	Residential PL	53	35

7.9 River Road Site Sound Modeling

7.9.1 Modeled Sound Power Levels

A tabular summary of the noise-controlled reference sound power level data for each noise source, as included in the model for the River Road onshore substation and/or converter station, is presented in Table 7-20. All modeled sources were assumed to be operating simultaneously and at these sound levels. Base-case sound levels are included in the table for reference purposes.

Table 7-20 Modeled Reference Sound Power Levels – River Road Site

Component	HVAC or HVDC	Site Yard or STATCOM Component	"Base Case" Broadband Sound Power Level	Noise Controlled Broadband Sound Power Level
			dBA	dBA
Power Transformer	HVAC	Site Yard	105	95
VSR (Iron Core) – 200 MVAr	HVAC	Site Yard	100	90
Harmonic Filter Reactor	HVAC	Site Yard	95	85
Harmonic Filter Capacitor	HVAC	Site Yard	90	85
Harmonic Filter Resistor	HVAC	Site Yard	80	80
VSC Reactor (Air Core)	HVAC	STATCOM	95	90
DRC Step-up Transformer	HVAC	STATCOM	108	98
Fan Bank	HVAC	STATCOM	100	95
Valve Hall HVAC Unit	HVAC	STATCOM	80	80
BARD Wall-mounted HVAC Unit	HVAC	STATCOM	80	80
Power Transformer	HVDC	Site Yard	85	85
Valve Cooling Tower	HVDC	Site Yard	95	95

7.9.2 Mitigation Measures

At the proposed onshore substation and/or converter station site, noise control features are needed to limit sound level impacts in the neighboring communities. In some cases, low-noise designs were used for some equipment, i.e., the maximum (base case) sound power level was not used in the model. The low-noise specifications are reflected in the mitigated reference sound power data provided in Table 7-20. The table lists both the unmitigated ("base case") and mitigated ("noise-controlled") sound power levels for each piece of equipment.

Sound level modeling also includes firewalls. Firewalls are typically constructed between two transformers but also attenuate sound. The firewalls are conceptual in design, and noise control features for the Project will be revisited once the final site is selected and the layout is refined. For purposes of modeling at this stage, the firewalls included in the noise model are as described in Table 7-21. Once the final design is complete, the noise modeling will be finalized, and mitigation refined. Atlantic Shores is also considering designs for the proposed onshore substation and/or converter station that include equipment enclosures as well as natural barriers and landscaping.

Table 7-21 Modeled Sound Barrier Details – River Road Site

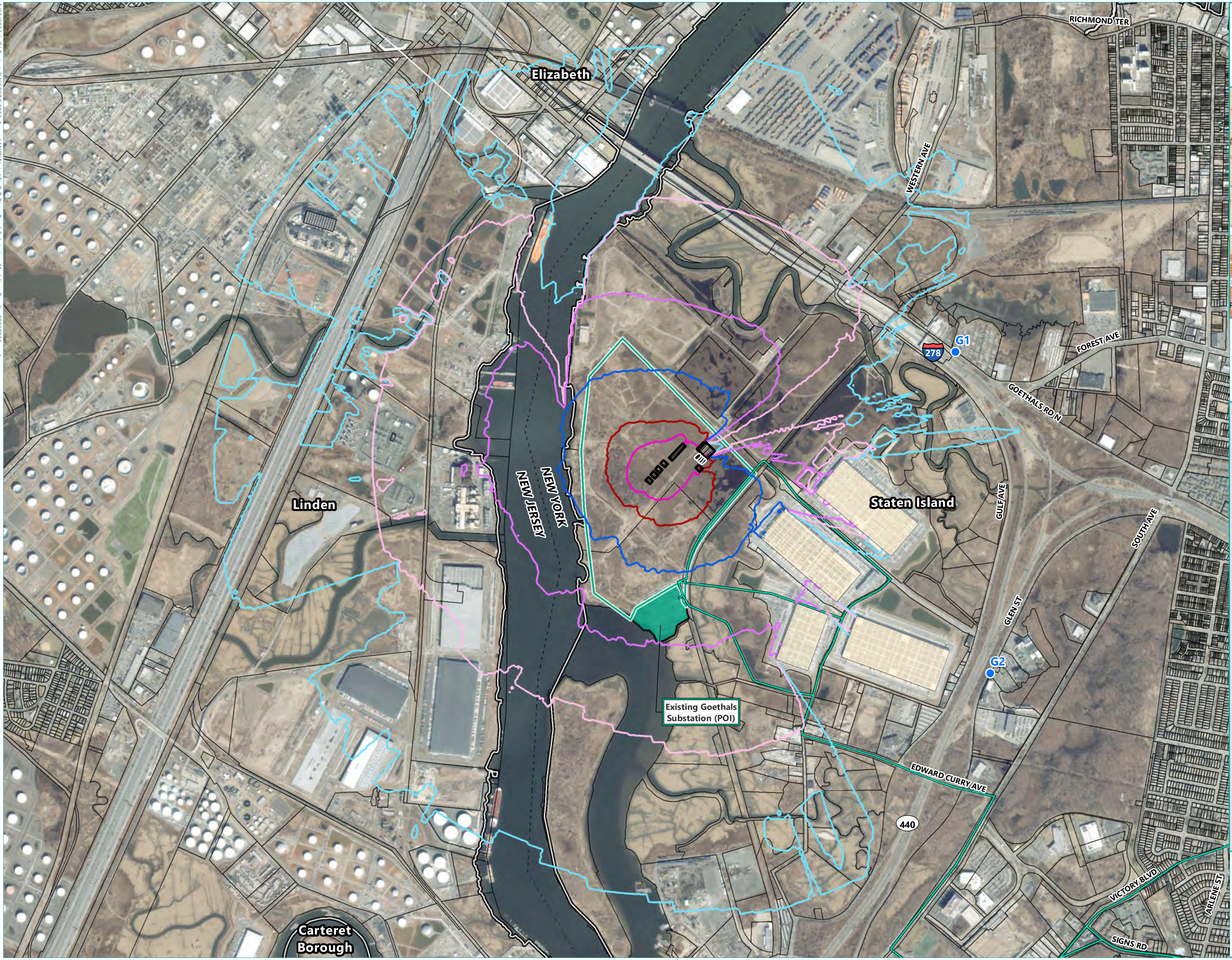
Description/Approximate Location	Height (feet)	Approximate Length (feet)
Firewalls (Qty. 4)	33	50

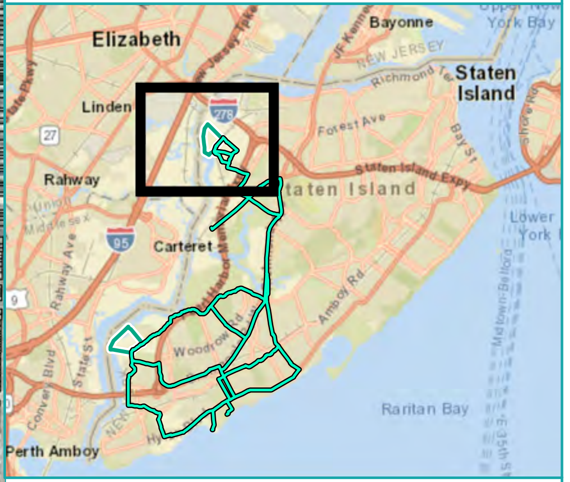
7.9.2 Predicted Operational Sound Levels

Broadband sound level modeling results at the 2 modeling receptors at the River Road Site location are presented in Table 7-22. Both the base-case and noise-controlled (i.e., proposed) results are shown. Figure 7-7 shows noise-controlled sound contours from the operation of the onshore substation and/or converter station. The figure shows the 2 modeling locations and the on-site buildings included in the model. These buildings include a control building, four STATCOM buildings, one HVDC valve hall, and one HVDC switchgear building. Four new large buildings southeast of the site were also included in the model as significant shielding of sound is expected. The noise-controlled Project-only broadband sound levels range from 27 to 31 dBA at the 2 modeling locations that are representative of the closest residences.

Table 7-22 Project-Only Sound Level Results – River Road Site

Receptor ID	Land Use	Modeled Project-Only L_{eq} Sound Level (dBA)	
		Base Case	Noise Controlled (Proposed)
G1	Residential (Measurement Location)	40	31
G2	Residential (Measurement Location)	45	27





0 400 800 1,600 Feet

0 200 400 Meters

N W E S

Map Projection: NAD 1983 UTM Zone 18N
Basemap: World Imagery, Esri

LEGEND

- Modeling Receptor
- Firewalls
- Modeled On-site Buildings
- Additional Buildings Included in the Model
- Goethals or Fresh Kills Onshore Interconnection Cable Route Option
- Potential Fresh Kills/Goethals Point of Interconnection (POI)
- Potential Fresh Kills/Goethals Substation and/or Converter Station
- Municipal Boundary
- County Boundary
- Parcel Boundaries
- State Waters Boundary

Predicted Sound Level

- 35
- 40
- 45
- 50
- 55
- 60

Figure 7-7

Proposed Onshore Substation and/or Converter Station – River Road Site Sound Level Modeling Results Richmond County, New York

7.10 Sunset Industrial Park Site Sound Modeling

7.10.1 Modeled Sound Power Levels

A tabular summary of the noise-controlled reference sound power level data for each noise source, as included in the model for the Sunset Industrial Park onshore substation and/or converter station, is presented in Table 7-23. All modeled sources were assumed to be operating simultaneously and at these sound levels. Base-case sound levels are included in the table for reference purposes.

Table 7-23 Modeled Reference Sound Power Levels – Sunset Industrial Park Site

Component	HVAC or HVDC	Site Yard or STATCOM Component	"Base Case" Broadband Sound Power Level	Noise Controlled Broadband Sound Power Level
			dBA	dBA
Power Transformer	HVAC	Site Yard	105	90
VSR (Iron Core) – 200 MVAr	HVAC	Site Yard	100	85
Harmonic Filter Reactor	HVAC	Site Yard	95	80
Harmonic Filter Capacitor	HVAC	Site Yard	90	80
Harmonic Filter Resistor	HVAC	Site Yard	80	80
VSC Reactor (Air Core)	HVAC	STATCOM	95	80
DRC Step-up Transformer	HVAC	STATCOM	108	95
Fan Bank	HVAC	STATCOM	100	95
Valve Hall HVAC Unit	HVAC	STATCOM	80	80
BARD Wall-mounted HVAC Unit	HVAC	STATCOM	80	80
Power Transformer	HVDC	Site Yard	85	85
Valve Cooling Tower	HVDC	Site Yard	95	95

7.10.2 Mitigation Measures

At the proposed onshore substation and/or converter station site, noise control features are needed to limit sound level impacts in the neighboring communities. In some cases, low-noise designs were used for some equipment, i.e., the maximum (base case) sound power level was not used in the model. The low-noise specifications are reflected in the mitigated reference sound power data provided in Table 7-23. The table lists both the unmitigated ("base case") and mitigated ("noise-controlled") sound power levels for each piece of equipment.

Sound level modeling also includes strategically placed sound barriers and firewalls of various lengths and heights. Sound barriers are designed solely to attenuate sound, whereas firewalls are typically constructed between two transformers but also attenuate sound. The barriers/firewalls are conceptual in design, and noise control features for the Project will be revisited once the final site is selected and the layout is refined. For purposes of modeling at this stage, the barriers/firewalls included in the noise model are as described in Table 7-24. Once the final design is complete, the noise modeling will be finalized, and mitigation refined. Atlantic Shores is also considering designs for the proposed onshore substation and/or converter station that include equipment enclosures as well as natural barriers and landscaping.

Table 7-24 Modeled Sound Barrier Details – Sunset Industrial Park Site

Description/Approximate Location	Height (feet)	Approximate Length (feet)	Absorptive?
Firewalls (Qty. 4)	33	50	No
Southeast Barrier Connecting 2 On-site Buildings	30	110	Yes, interior facade
Northeast Perimeter Barrier	40	930	Yes, interior façade
Northwest Perimeter Barrier	25	570	Yes, interior façade
Southwest Perimeter Barrier	40	390	Yes, interior façade
Southeast Barrier	40	60	Yes, interior façade
STATCOM Connector Barrier (Qty. 3)	30	60	Yes
STATCOM Rooftop Barrier (Qty. 3)	10 (on roof)	90	Yes
Internal Barrier (Qty. 3)	25	60	Yes
Internal Barrier	25	250	Yes

7.10.2 Predicted Operational Sound Levels

Broadband sound level modeling results at the 9 modeling receptors at the Sunset Industrial Park Site location are presented in Table 7-25. Both the base-case and noise-controlled (i.e., proposed) results are shown. Figure 7-8 shows noise-controlled sound contours from the operation of the onshore substation and/or converter station. The figure shows the 9 modeling locations and the on-site buildings included in the model. These buildings include a control building, four STATCOM buildings, one HVDC valve hall, and one HVDC switchgear building. The noise-controlled Project-only broadband sound levels range from 28 to 35 dBA at the 9 modeling locations. The highest sound level modeled at a residence is 35 dBA at receptors H6 and H8 as shown in Figure 7-8.

Figure 7-8

Proposed Onshore Substation and/or Converter Station Site – Sunset Industrial Park Sound Level Modeling Results Kings County, New York

Table 7-25 Project-Only Sound Level Results – Sunset Industrial Park Site

Receptor ID	Land Use	Modeled Project-Only L_{eq} Sound Level (dBA)	
		Base Case	Noise Controlled (Proposed)
H1	Residential (Measurement Location)	52	32
H2	Residential (Measurement Location)	52	34
H3	Residential (Measurement Location)	44	28
H4	Residential (Measurement Location)	50	32
H5	Residence	52	34
H6	Residence	53	35
H7	Residence	55	33
H8	Residence	48	35
H9	Residence	52	34

7.11 Sound Level Evaluation – New Jersey Sites

This section summarizes the operational modeling results (noise-controlled) from the onshore substation and/or converter station sites in New Jersey and compares them to the applicable NJ DEP daytime and nighttime A-weighted sound level limits. The onshore substation and/or converter station is expected to operate 24-hours per day; therefore, the nighttime sound level limits, which are more restrictive than daytime limits, must be met. As noted previously, the onshore substations and/or converter stations are in the early design stage and octave band sound level data were not available for the equipment included in the model. Therefore, octave band sound levels in the community could not be evaluated against the NJ DEP octave band limits.

7.11.1 Lanes Pond Road Site

Broadband sound level modeling results at the onshore substation and/or converter station Lanes Pond Road Site are compared to the applicable NJ DEP daytime and nighttime sound level limits. The results are presented in Table 7-26 and show compliance is expected at all locations.

Table 7-26 Project Sound Level Results Compared to Limits – Lanes Pond Road Site

Receptor ID	Land Use	Modeled Project-Only Sound Level	NJ DEP Sound Level Limit (Day)	NJ DEP Sound Level Limit (Night)
		dBA	dBA	dBA
A1	Commercial (Measurement Location)	49	65	65
A2	Residential (Measurement Location)	35	65	50
A3	Residential (Measurement Location)	36	65	50
A4	Residential (Measurement Location)	29	65	50
A5	Residential	48	65	50
A6	Residential	49	65	50
A7	Residential	47	65	50
A8	Residential	47	65	50
A9	Residential	49	65	50
A10	Residential	47	65	50
A11	Commercial	48	65	65
A12	Commercial	51	65	65
A13	Residential	49	65	50

7.11.2 Randolph Road Site

Broadband sound level modeling results at the onshore substation and/or converter station Randolph Road Site are compared to the applicable NJ DEP daytime and nighttime sound level limits. The results are presented in Table 7-27 and show compliance is expected at all locations.

Table 7-27 Project Sound Level Results Compared to Limits – Randolph Road Site

Receptor ID	Land Use	Modeled Project-Only Sound Level	NJ DEP Sound Level Limit (Day)	NJ DEP Sound Level Limit (Night)
		dBA	dBA	dBA
B1	Residential (Measurement Location)	34	65	50
B2	Residential (Measurement Location)	43	65	50
B3	Residential (Measurement Location)	35	65	50
B4	Residential (Measurement Location)	37	65	50
B5	Residential	49	65	50
B6	Commercial	56	65	65
B7	Commercial	50	65	65
B8	Residential	49	65	50
B9	Residential	50	65	50

7.11.3 Brook Road Site

Broadband sound level modeling results at the onshore substation and/or converter station Brook Road Site are compared to the applicable NJ DEP daytime and nighttime sound level limits. The results are presented in Table 7-28 and show compliance is expected at all locations.

Table 7-28 Project Sound Level Results Compared to Limits – Brook Road Site

Receptor ID	Land Use	Modeled Project-Only Sound Level	NJ DEP Sound Level Limit (Day)	NJ DEP Sound Level Limit (Night)
		dBA	dBA	dBA
C1	Residential (Measurement Location)	36	65	50
C2	Residential (Measurement Location)	38	65	50
C3	Residential (Measurement Location)	47	65	50
C4	Residential (Measurement Location)	36	65	50
C5	Residential	49	65	50
C6	Residential	50	65	50
C7	Residential	49	65	50
C8	Commercial	52	65	65
C9	Commercial	55	65	65
C10	Commercial	53	65	65
C11	Commercial	57	65	65
C12	Commercial	58	65	65

7.11.4 Asbury Avenue Site

Broadband sound level modeling results at the onshore substation and/or converter station Asbury Avenue Site are compared to the applicable NJ DEP daytime and nighttime sound level limits. The results are presented in Table 7-29 and show compliance is expected at all locations.

Table 7-29 Project Sound Level Results Compared to Limits – Asbury Avenue Site

Receptor ID	Land Use	Modeled Project-Only Sound Level	NJ DEP Sound Level Limit (Day)	NJ DEP Sound Level Limit (Night)
		dBA	dBA	dBA
D1	Residential (Measurement Location)	43	65	50
D2	Residential (Measurement Location)	47	65	50
D3	Residential (Measurement Location)	48	65	50
D4	Residential (Measurement Location)	42	65	50
D5	Residential	49	65	50
D6	Residential	50	65	50
D7	Commercial	55	65	65
D8	Commercial	50	65	65
D9	Residential	49	65	50
D10	Commercial	53	65	65
D11	Residential	49	65	50

7.11.5 Route 66 Site

Broadband sound level modeling results at the onshore substation and/or converter station Route 66 Site are compared to the applicable NJ DEP daytime and nighttime sound level limits. The results are presented in Table 7-30 and show compliance is expected at all locations.

Table 7-30 Project Sound Level Results Compared to Limits – Route 66 Site

Receptor ID	Land Use	Modeled Project-Only Sound Level	NJ DEP Sound Level Limit (Day)	NJ DEP Sound Level Limit (Night)
		dBA	dBA	dBA
E1	Residential (Measurement Location)	35	65	50
E2	Residential (Measurement Location)	41	65	50
E3	Residential (Measurement Location)	44	65	50
E4	Residential (Measurement Location)	39	65	50
E5	Commercial	60	65	65
E6	Commercial	50	65	65
E7	Commercial	53	65	65
E8	Residential	50	65	50
E9	Residential	46	65	50
E10	Residential	42	65	50
E11	Commercial	41	65	65
E12	Residential	45	65	50
E13	Residential	44	65	50
E14	Commercial	47	65	65
E15	Residential	44	65	50

7.12 Sound Level Evaluation – New York Sites

This section summarizes the operational sound modeling results (noise-controlled) from the onshore substation and/or converter station sites in New York and compares them to the applicable broadband sound level limits. The onshore substation and/or converter station will likely operate 24-hours per day; therefore, the nighttime sound level limits, which are more restrictive than daytime limits, must be met. As noted previously, the onshore substations and/or converter stations are in the early design stage and octave band sound level data were not available for the equipment included in the model. Therefore, octave band sound levels in the community could not be evaluated against octave band limits. The following limits are evaluated for all three sites in New York City:

1. New York State Department of Public Service – Broadband (dBA) sound limit for tonal sound of 35 dBA as measured at a residence. This is a Project-Only limit, so the noise-controlled sound levels from the modeling results presented in the previous sections are evaluated at the applicable residential receptors. This limit does not apply at property lines or at commercial receptors.

2. New York City Environmental Quality Review – Broadband (dBA) nighttime limit of 3 dBA increase over the ambient sound level. A sound level metric for ambient sound is not defined in the document. Therefore, the measured L_{eq} has been used in the evaluation for an apples-to-apples comparison. This limit applies outside residences.

3. New York City Local Law 113 Noise Code - Broadband (dBA) nighttime limit of 7 dBA over ambient. A sound level metric for ambient sound is not defined in the document, and this limit is less restrictive than the CEQR limit of 3 dBA even though the Noise Code applies anywhere on a residential property. As such, it is likely that if the CEQR limit is met at a residence, the Noise Code is also met. The increase over ambient is calculated in subsequent sections for all receptors included in the modeling which encompass both residences and residential property lines.

7.12.1 Arthur Kill Road Site

Broadband sound level modeling results at the onshore substation and/or converter station Arthur Kill Road Site are compared to the applicable nighttime sound level limits. The results are presented in Table 7-31 and show compliance is expected at all locations with the equipment and mitigation described in Section 7.8.

Table 7-31 Project Sound Level Results Compared to Limits – Arthur Kill Road Site

1	2	3	4	5	6	7	8	9
Rec. ID	Land Use	Modeled Project-Only Sound Level	NYS DPS Sound Level Limit[1]	Rep. Ambient Location[2]	Ambient Leq[3] Sound Level	Total Sound Level[4] (Project + Ambient)	Increase Over Ambient	Complies with State and Local Limits?[5]
		dBA	dBA		dBA	dBA	dBA	
F1	Residential (Msmt. Loc.)	35	35	F1	58	58	0	Yes
F2	Residential (Msmt. Loc.)	26	35	F2	61	61	0	Yes
F3	Residential (Msmt. Loc.)	24	35	F3	55	55	0	Yes
F4	Residential (Msmt. Loc.)	34	35	F4	47	47	0	Yes
F5	Residence	35	35	F1	58	58	0	Yes
F6	Residential PL	35	n/a	F1	58	58	0	Yes
F7	Residence	32	35	F1	58	58	0	Yes
F8	Residential PL	32	n/a	F1	58	58	0	Yes
F9	Commercial	34	n/a	F1	58	58	0	Yes
F10	Commercial	44	n/a	F1	58	58	0	Yes
F11	Residence	34	35	F1	58	58	0	Yes
F12	Residential PL	35	n/a	F1	58	58	0	Yes
F13	Residence	35	35	F1	58	58	0	Yes
F14	Residential PL	35	n/a	F1	58	58	0	Yes

Notes:
1. Assuming tonal sound from the site. Applies at residences only.
2. Refer to Section 5 for details of the ambient measurement locations.
3. Sound level metric for ambient is not defined in the CEQR or the Local Law 113 Noise Code. Leq selected for apples-to-apples comparison.
4. Logarithmic summation.
5. Confirms that the sound level in column 3 is less than or equal to the sound level in column 4 (NYS DPS evaluation) and that the value in column 8 is less than or equal to 3 dBA (CEQR evaluation) or 7 dBA (Local Law 113 Noise Code) as applicable.

7.12.2 River Road Site

Broadband sound level modeling results at the onshore substation and/or converter station River Road Site are compared to the applicable nighttime sound level limits. The results are presented in Table 7-32 and show compliance is expected at all locations with the equipment and mitigation described in Section 7.9.

Table 7-32 Project Sound Level Results Compared to Limits – River Road Site

1	2	3	4	5	6	7	8	9
Rec. ID	Land Use	Modeled Project-Only Sound Level	NYS DPS Sound Level Limit[1]	Rep. Ambient Location[2]	Ambient Leq[3] Sound Level	Total Sound Level[4] (Project + Ambient)	Increase Over Ambient	Complies with State and Local Limits?[5]
		dBA	dBA		dBA	dBA	dBA	
G1	Residential (Msmt. Loc.)	31	35	G1	67	67	0	Yes
G2	Residential (Msmt. Loc.)	27	35	G2	68	68	0	Yes

Notes:
1. Assuming tonal sound from the site. Applies at residences only.
2. Refer to Section 5 for details of the ambient measurement locations.
3. Sound level metric for ambient is not defined in the CEQR or the Local Law 113 Noise Code. Leq selected for apples-to-apples comparison.
4. Logarithmic summation.
5. Confirms that the sound level in column 3 is less than or equal to the sound level in column 4 (NYS DPS evaluation) and that the value in column 8 is less than or equal to 3 dBA (CEQR evaluation) or 7 dBA (Local Law 113 Noise Code) as applicable.

7.12.3 Sunset Industrial Park Site

Broadband sound level modeling results at the onshore substation and/or converter station Sunset Industrial Park Site are compared to the applicable nighttime sound level limits. The results are presented in Table 7-33 and show compliance is expected at all locations with the equipment and mitigation described in Section 7.10.

Table 7-33 Project Sound Level Results Compared to Limits – Sunset Industrial Park Site

1	2	3	4	5	6	7	8	9
Rec. ID	Land Use	Modeled Project-Only Sound Level	NYS DPS Sound Level Limit[1]	Rep. Ambient Location[2]	Ambient Leq[3] Sound Level	Total Sound Level[4] (Project + Ambient)	Increase Over Ambient	Complies with State and Local Limits?[5]
		dBA	dBA		dBA	dBA	dBA	
H1	Residential (Msmt. Loc.)	32	35	H1	52	52	0	Yes
H2	Residential (Msmt. Loc.)	34	35	H2	54	54	0	Yes
H3	Residential (Msmt. Loc.)	28	35	H3	60	60	0	Yes
H4	Residential (Msmt. Loc.)	32	35	H4	57	57	0	Yes
H5	Residence	34	35	H4	57	57	0	Yes
H6	Residence	35	35	H4	57	57	0	Yes
H7	Residence	33	35	H4	57	57	0	Yes
H8	Residence	35	35	H3	60	60	0	Yes
H9	Residence	34	35	H2	54	54	0	Yes

Notes:
1. Assuming tonal sound from the site. Applies at residences only.
2. Refer to Section 5 for details of the ambient measurement locations.
3. Sound level metric for ambient is not defined in the CEQR or the Local Law 113 Noise Code. Leq selected for apples-to-apples comparison.
4. Logarithmic summation.
5. Confirms that the sound level in column 3 is less than or equal to the sound level in column 4 (NYS DPS evaluation) and that the value in column 8 is less than or equal to 3 dBA (CEQR evaluation) or 7 dBA (Local Law 113 Noise Code) as applicable.

8.0 ONSHORE CONSTRUCTION NOISE

Onshore construction will be performed using standard construction equipment typical for onshore infrastructure projects such as the installation of new transmission lines. Onshore construction activities can be broken into three key components: the onshore substation and/or converter station, the onshore interconnection cables/duct bank, and the landfall site where the export cables transition from offshore to onshore.

Onshore substation and/or converter station construction will resemble typical construction at a power plant or mainland substation. Vehicles necessary for this construction can be expected to include excavators, concrete trucks, and backhoes. Typical grading equipment would be used for any clearing and grading needed at the sites, and the equipment would be delivered by large trucks and may include oversized-load deliveries. Installation of the equipment could also require the use of cranes and other support vehicles.

Installation of the onshore interconnection cables and concrete duct bank will require the use of typical construction equipment such as dump trucks, front-end loaders, concrete trucks, and excavators. The cable installation will also require construction vehicles that are more specifically designed for cable management such as winches and cable reel trucks.

The offshore-to-onshore export cable transition will be accomplished using horizontal directional drilling (HDD), a trenchless method that will avoid nearshore impacts as well as impacts directly along the shoreline. HDD, in comparison to trenching, also results in a deeper burial depth for cables in the nearshore environment, facilitating sufficient burial over the life of the Projects and decreasing the likelihood that cables will become exposed over time.

Construction hours will adhere to local ordinances, and Atlantic Shores anticipates that typical construction hours will extend between 7 am and 6 pm, depending on local noise ordinances. While Atlantic Shores is not anticipating significant nighttime work, any nighttime work deemed necessary will be requested through a waiver and coordinated with the local authorities.

8.1 Onshore Substations and/or Converter Stations

8.1.1 General Information

Activities involved in construction of each onshore substation and/or converter station will include:

- Land clearing and rough grading and fencing: The entire parcel may need to be disturbed during clearing and grading. Only a few trees currently exist on any given onshore substation and/or converter station parcel, and these will likely need to be removed.
- Trenching and excavation (for ground grid, equipment foundations, cable and conduit trenches/duct banks)
- Installation of equipment foundations
- Installation of onshore substation and/or converter station equipment

- Wiring and connections
- Final grading
- Commissioning
- Energization
- System testing

A crane may be used to erect equipment and poles, to set major onshore substation and/or converter station equipment (e.g., transformers, reactors, STATCOMs, harmonic filters, buswork, switchgear, breakers, switches, prefabricated buildings) onto foundations, and to move construction equipment (e.g., storage containers, offices, welders, generators, cable reels, cable pullers) around the site.

8.1.2 Onshore Substation and/or Converter Station Construction Sound Levels

At this point in the permitting phase, details of the precise quantity, location, and type of specific construction equipment are not yet known. However, a document[5] published by the U.S. Environmental Protection Agency (EPA) provides quantitative information on the five major phases of construction. These phases are shown below along with the reference sound level at 50 feet for each phase under full (maximum) operation. This reference sound level includes a specific mix of equipment typically used for the phase at construction sites in suburban residential areas and reflects an energy average sound level with all pertinent equipment present at the site. Maximum sound levels during these phases are listed in Table 8-1 at a reference distance of 50 feet.

5 "Noise From Construction Equipment and Operations, Building Equipment, and Home Appliances"; U.S. Environmental Protection Agency Office of Noise Abatement and Control; prepared by Bolt, Beranek, and Newman, December 31, 1971.

Table 8-2 lists expected sound levels at additional distances.

Table 8-1 Reference Sound Levels of Construction Equipment at 50 feet

Phase Number	Phase Description	Max. Sound Level (dBA) at 50 feet
1	Ground Clearing	84
2	Excavation	88
3	Foundations	88
4	Erection	79
5	Finishing	84

Table 8-2 Maximum Sound Levels of Construction Phases Extrapolated to Additional Distances

Phase Number	Phase Description	Sound Level (dBA) at Distance (ft)					
		25	50	100	250	500	1000
1	Ground Clearing	90	84	78	70	64	58
2	Excavation	94	88	82	74	68	62
3	Foundations	94	88	82	74	68	62
4	Erection	85	79	73	65	59	53
5	Finishing	90	84	78	70	64	58

In general, the sound levels from construction activities will be dominated by the loudest piece of equipment operating at the time. Therefore, at any given point in the work area, the loudest piece of equipment will be the most representative of the expected sound levels in that area. Construction equipment is generally not operated continuously at maximum load but runs with significant variation in power and usage. Actual received sound levels would fluctuate, depending on the construction activity, equipment type, and separation distances between source and receiver. Other factors such as terrain and obstacles such as buildings will act to further limit the impact of construction noise levels.

8.1.3 Proposed Larrabee Onshore Substation and/or Converter Station Construction Sound Level Impacts – Lanes Pond Site

An estimate of construction sound levels by phase at the four nearby ambient sound level measurement locations presented in Section 5 is provided in Table 8-3. For additional reference, residences are generally scattered around the Lanes Pond Site. Based on a review of aerial imagery, the closest residence is roughly 60 feet (18.3 m) to the Lanes Pond Site.

Table 8-3 Maximum Sound Levels of Construction Phases Extrapolated to the Lanes Pond Site Sound Monitoring Locations

Location	Approx. Dist. to Perimeter (ft)	Estimated Sound Level (dBA) by Construction Phase				
		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
A1	28	89	93	93	84	89
A2	1700	53	57	57	48	53
A3	1389	55	59	59	50	55
A4	3800	46	50	50	41	46

8.1.4 Proposed Larrabee Onshore Substation and/or Converter Station Construction Sound Level Impacts – Randolph Road Site

An estimate of construction sound levels by phase at the four nearby ambient sound level measurement locations presented in Section 5 is provided in Table 8-4. For additional reference, residences are generally scattered around the Randolph Road Site. Based on a review of aerial imagery, the closest residence is roughly 198 feet (60.4 m) to the Randolph Road Site.

Table 8-4 Maximum Sound Levels of Construction Phases Extrapolated to the Randolph Road Site Sound Monitoring Locations

Location	Approx. Dist. to Perimeter (ft)	Estimated Sound Level (dBA) by Construction Phase				
		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
B1	2829	49	53	53	44	49
B2	1310	56	60	60	51	56
B3	2190	51	55	55	46	51
B4	2120	51	55	55	46	51

8.1.5 Proposed Larrabee Onshore Substation and/or Converter Station Construction Sound Level Impacts – Brook Road Site

An estimate of construction sound levels by phase at the four nearby ambient sound level measurement locations presented in Section 5 is provided in Table 8-5. For additional reference, residences are generally scattered around the Brook Road Site. Based on a review of aerial imagery, the closest residence is roughly 130 feet (39.6 m) to the Brook Road Site.

Table 8-5 Maximum Sound Levels of Construction Phases Extrapolated to the Brook Road Site Sound Monitoring Locations

Location	Approx. Dist. To Perimeter (ft)	Estimated Sound Level (dBA) by Construction Phase				
		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
C1	1758	53	57	57	48	53
C2	262	70	74	74	65	70
C3	516	64	68	68	59	64
C4	1870	53	57	57	48	53

8.1.6 Proposed Atlantic Onshore Substation and/or Converter Station Construction Sound Level Impacts – Asbury Avenue Site

An estimate of construction sound levels by phase at the four nearby ambient sound level measurement locations presented in Section 5 is provided in Table 8-6. For additional reference, residences are generally scattered around the Asbury Avenue Site. Based on a review of aerial imagery, the closest residence is roughly 350 feet (106.7 m) to the Asbury Avenue Site.

Table 8-6 Maximum Sound Levels of Construction Phases Extrapolated to the Asbury Avenue Site Sound Monitoring Locations

Location	Approx. Dist. To Perimeter (ft)	Estimated Sound Level (dBA) by Construction Phase				
		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
D1	273	69	73	73	64	69
D2	852	59	63	63	54	59
D3	529	64	68	68	59	64
D4	1288	56	60	60	51	56

8.1.7 Proposed Atlantic Onshore Substation and/or Converter Station Construction Sound Level Impacts – Route 66 Site

An estimate of construction sound levels by phase at the four nearby ambient sound level measurement locations presented in Section 5 is provided in Table 8-7. For additional reference, residences are generally scattered around the Route 66 Site. Based on a review of aerial imagery, the closest residence is roughly 105 feet (32.0 m) to the Route 66 Site.

Table 8-7 Maximum Sound Levels of Construction Phases Extrapolated to the Route 66 Site Sound Monitoring Locations

Location	Approx. Dist. to Perimeter (ft)	Estimated Sound Level (dBA) by Construction Phase				
		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
E1	2445	50	54	54	45	50
E2	600	62	66	66	57	62
E3	43	85	89	89	80	85
E4	1779	53	57	57	48	53

8.1.8 Proposed Fresh Kills/Goethals Onshore Substation and/or Converter Station Construction Sound Level Impacts – Arthur Kill Road Site

An estimate of construction sound levels by phase at the four nearby ambient sound level measurement locations presented in Section 5 is provided in Table 8-8. For additional reference, residences are generally scattered around the Arthur Kill Road Site. Based on a review of aerial imagery, the closest residence is roughly 2080 feet (32.0 m) to the Arthur Kill Road Site.

Table 8-8 Maximum Sound Levels of Construction Phases Extrapolated to the Arthur Kill Road Site Sound Monitoring Locations

Location	Approx. Dist. to Perimeter (ft)	Estimated Sound Level (dBA) by Construction Phase				
		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
F1	55	83	87	87	78	83
F2	2845	49	53	53	44	49
F3	3105	48	52	52	43	48
F4	1932	52	56	56	47	52

8.1.9 Proposed Fresh Kills/Goethals Onshore Substation and/or Converter Station Construction Sound Level Impacts – River Road Site

An estimate of construction sound levels by phase at the two nearby ambient sound level measurement locations presented in Section 5 is provided in Table 8-9. For additional reference, residences are generally scattered around the River Road Site. Based on a review of aerial imagery, the closest residence is roughly 3557 feet (1084.2 m) to the River Road Site.

Table 8-9 Maximum Sound Levels of Construction Phases Extrapolated to the River Road Site Sound Monitoring Locations

Location	Approx. Dist. to Perimeter (ft)	Estimated Sound Level (dBA) by Construction Phase				
		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
G1	3543	47	51	51	42	47
G2	4702	45	49	49	40	45

8.1.10 Proposed Gowanus Onshore Substation and/or Converter Station Construction Sound Level Impacts – Sunset Industrial Park Site

An estimate of construction sound levels by phase at the four nearby ambient sound level measurement locations presented in Section 5 is provided in Table 8-10. For additional reference, residences are generally scattered around the Sunset Industrial Park Site. Based on a review of aerial imagery, the closest residence is roughly 720 feet (220.0 m) to the Sunset Industrial Park Site.

Table 8-10 Maximum Sound Levels of Construction Phases Extrapolated to the Sunset Industrial Park Site Sound Monitoring Locations

Location	Approx. Dist. to Perimeter (ft)	Estimated Sound Level (dBA) by Construction Phase				
		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
H1	2800	49	53	53	44	49
H2	2477	50	54	54	45	50
H3	1517	54	58	58	49	54
H4	1496	54	58	58	49	54

8.1.11 Onshore Substation and/or Converter Station Construction Mitigation

The following measures will be considered to reduce sound levels in the community during onshore substation and/or converter station construction:

- Atlantic Shores will adhere to the municipal noise control ordinances established for construction in each of the cities, towns, or boroughs in which the Projects' onshore facilities are located as much as practicable.
- Atlantic Shores will maintain strong communication and public outreach with adjacent neighbors.
- Atlantic Shores will consider replacing back-up alarms on trucks and equipment with strobes, as allowed within Occupational Safety and Health Administration regulations, to eliminate the potentially loud impulsive sound.
- Atlantic Shores will ensure that equipment is functioning properly and is equipped with mufflers and other noise-reducing features.
- Implementation of quieter construction equipment and methods, as feasible, such as smaller backhoes will be used.
- Implementation of path noise control measures such as portable enclosures for small equipment (e.g., jackhammers, saws) will be used.
- Construction activities will be conducted outside of the peak tourism season as much as practicable in coastal communities (generally Memorial Day to Labor Day).

8.2 Onshore Interconnection Cables

Regardless of the type of cable, the onshore interconnection cables will be contained within a buried concrete duct bank, with individual cables residing in conduits composed of high-density polyethylene (HDPE) or Polyvinyl Chloride (PVC). Onshore interconnection cables will typically require splices every 1,640 to 3,280 ft (500 to 1,000 m). At each splice location, a concrete splice vault will be installed.

Installation of the concrete duct bank for onshore interconnection cables will typically be accomplished via open trenching, although some specialty techniques are anticipated at unique features such as busy roadways and wetlands. During typical open trenching, the trench will be up to 14.8 ft (4.5 m) wide by 11.5 ft (3.5 m) deep. Typical cover over the buried duct bank (e.g., along roadway ROWs) will be approximately 3 ft (0.9 m), though maximum coverage over the top of the cable conduits could be up to 30 ft (9 m) in some specialty installation scenarios.

Specialty installation techniques are trenchless techniques that avoid surface disturbance and hence can avoid impacts to busy roadways, wetlands, or existing developments or features. These specialty techniques primarily include:

- Horizontal directional drilling (HDD): HDD is typically used to cross beneath relatively wide features such as interstate highways and water bodies. HDD commonly involves drilling a hole in an arc under the surface feature, then enlarging that hole and pulling either a large PVC or HDPE casing or several smaller PVC or HDPE pipes (in a bundle) back through the bore hole. More detail on HDD techniques is found in Section 8.3 below.

- Pipe jacking: In this method, a casing pipe originating in a jacking shaft is driven through the soil by powerful hydraulic jacks to excavate a tunnel that leads to a receiving shaft on the opposite side of the obstacle being avoided on the surface. This method results in a flexible, structural, watertight, and finished pipeline for installation of cables.
- Jack-and-bore: This trenchless crossing technique is used to install a casing beneath the surface feature being avoided. Relative to HDD, jack-and-bore is typically used for shorter crossings (less than approximately 200 ft [61 m]), such as those under streams or highways. A jack-and-bore is performed by excavating a bore pit and a receiving pit, located on opposite sides of the obstacle. Drilling and jacking activities are initiated from the bore pit, while the steel or concrete casing is driven into the receiving pit. As a borehole is drilled, the casing is pushed into the borehole. After the casing is in place, it is cleaned, and then smaller HDPE or PVC pipes are installed inside the casing.

Locations where these specialty techniques may be used will be determined upon route selection.

8.2.1 Onshore Interconnection Cables – Construction Sound Levels

Civil construction activities related to the onshore interconnection cables will consist generally of the following five principal noise-producing phases:

- Trench excavation
- Duct bank installation
- Manhole installation
- Backfill and Compaction
- Final pavement restoration

Each of these phases will be conducted in sequence at each location; it is possible that several phases of construction will be ongoing simultaneously along various sections of the onshore interconnection cable route.

The potential for noise impacts from Project construction is a function of the specific receptors along the route as well as the equipment used and proposed hours of operation. Construction is anticipated to occur during typical work hours (7:00 AM to 6:00 PM), though in specific instances at some locations, or at the request of any given municipality, the Projects may seek municipal approval to work at night. Nighttime work will be minimized and performed only on an as-needed basis, such as when crossing a busy road, and will be requested through a waiver and coordinated with each Town.

Onshore interconnection cable installation will periodically generate noise levels that are audible along the route, conductor-pulling sites, and staging and maintenance areas. Proposed construction equipment will be similar to that used during typical public works projects (e.g., road resurfacing, storm sewer installation, interconnection cable installation).

In general, sound levels from construction activities will be dominated by the loudest piece of equipment operating at the time. Therefore, at any given point along the onshore interconnection cable route, the loudest piece of equipment will be the most representative of the expected sound levels in that area. Maximum sound levels from typical equipment proposed during construction are listed in Table 8-11 at a reference distance of 50 feet (15.2 m).

Table 8-11 Reference Sound Levels of Construction Equipment at 50 feet

Equipment	Max. Sound Level (dBA) at 50 feet
Mobile Crane *(duct bank and manhole installation)*	85 (1)
Pavement Saw *(trench excavation)*	90 (1)
Asphalt Paver *(manhole installation, street restoration)*	85 (1)
Pneumatic Hammer *(trench excavation)*	85 (1)
Mounted Impact Hammer (Hoe Ram) *(trench excavation if ledge)*	90 (1)
Backhoe *(trench excavation)*	80 (1)
Dump Truck *(manhole installation, trench excavation)*	84 (1)
Generator *(cable pulling and splicing)*	82 (2)
Air Conditioning *(cable splicing)*	60 (at 3 feet) (2)

Source:

1. Thalheimer, E., "Construction Noise Control Program and Mitigation Strategy at the Central Artery/Tunnel Project", Noise Control Eng. Journal 48 (5), 2000 Sep-Oct.
2. US EPA, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances", prepared by Bolt, Beranek and Newman, Report No. NTID300.1, December 31, 1971.

Construction equipment proximity to noise-sensitive land uses will vary along the proposed onshore interconnection cable route. Because sound levels from a point source drop off due to geometric divergence (hemispherical spreading) at a rate of 6 dB per doubling of distance, the reference sound levels at 50 feet (15.2 m) in Table 8-12 will decrease by 6 dBA for locations 100 feet (30.5 m) back from the edge of construction. For example, maximum backhoe sound levels at 100 feet (30.5 m) would be expected to be approximately 74 dBA. In a more urbanized area, setbacks may be only 25 feet (7.6 m) from construction activity, thus increasing the sound levels from each piece of equipment by 6 dBA. Therefore, the same backhoe at 25 feet (7.6 m) would be expected to produce a maximum sound level of 86 dBA. To reiterate, the 80 dBA is the maximum expected backhoe sound level, while typical levels would be much lower. See Table 8-12 for more examples. The distance of residences to the onshore interconnection cable route construction varies along the route. In dense residential areas, e.g., closer to the coast, homes may be located as close as 50 feet (15.2 m) from the road. Farther inland, the residential areas become less densely populated allowing the homes to be farther offset from the road and are, on average, located farther away from the onshore interconnection cable routes. These homes can be up to thousands of feet from construction activity.

Table 8-12 Reference Sound Levels of Construction Equipment at Arbitrary Distances

Equipment	Sound Level [dBA] at Distance [ft]					
	25	50	100	250	500	1000
Mobile Crane (duct bank and manhole installation)	91	85	79	71	65	59
Pavement Saw (trench excavation)	96	90	84	76	70	64
Asphalt Paver (manhole installation, street restoration)	91	85	79	71	65	59
Pneumatic Hammer (trench excavation)	91	85	79	71	65	59
Mounted Impact Hammer (Hoe Ram) (trench excavation if ledge)	96	90	84	76	70	64
Backhoe (trench excavation)	86	80	74	66	60	54
Dump Truck (manhole installation, trench excavation)	90	84	78	70	64	58
Generator *(cable pulling and splicing)*	88	82	76	68	62	56
Air Conditioning *(cable splicing)*	42	36	30	22	< 20	< 20

Construction equipment is generally not operated continuously at maximum load, with significant variation in power and usage. Actual received sound levels would fluctuate depending on the construction activity, equipment type, and separation distances between source and receiver. Other factors, such as terrain and obstacles such as buildings, will act to further limit the impact of construction-period noise levels.

Trench excavation and manhole installation are typically the loudest phases of construction. Under normal trenching conditions (i.e., no ledge, no excessive underground utilities), the construction crews involved in trench excavation are expected to progress at an average rate of approximately 100 feet (30.5 m) to 200 feet (61 m) per day for an average duration of approximately seven days at any one location. If rock is encountered during construction, equipment such as a hoe ram will be used, which would temporarily increase noise levels.

In general, cable pulling and splicing phases are not expected to generate significant noise. Once adjacent cable sections are installed, they will be spliced together inside the manholes. Splicing high-voltage solid-dielectric transmission cable is a complex operation; splicing activities will not be continuous but will take place over four or five extended workdays at each manhole location. The splicing operation requires a splicing van and a generator, and an air conditioning unit may be used to control the moisture content in the manhole. A portable generator will provide electrical power for the splicing van and air conditioning unit and will be muffled to minimize noise; this technique has been used successfully in locations with sensitive receptors. Typically, the splicing van will be located at one manhole access cover while the air conditioner will be located near a second manhole access cover, and the generator will be located in a convenient area that does not restrict traffic movement around the work zone.

The electric generator and truck with ventilation fans will generate some noise when manholes are occupied; however, Atlantic Shores will make every practicable effort to limit noise disturbance from this source. If necessary, mitigation measures may include use of a low-noise/muffled generator, portable sound walls (temporary noise barriers) as needed, blocking the path of generators, and working with municipalities to coordinate work schedules.

8.2.2 Onshore Interconnection Cables Mitigation

In addition to the measures described in Section 8.1.11 for the onshore substation and/or converter station construction, Atlantic Shores is proposing to adhere to seasonal construction restrictions as much as practicable for certain portions of the onshore interconnection cable routes to avoid impacts during peak usage. To further minimize the effects of construction noise, Atlantic Shores will maintain strong communication and public outreach with adjacent neighbors.

8.3 Specialty Installation Techniques – Horizontal Directional Drilling

The offshore-to-onshore transition will be accomplished using HDD, a trenchless method that will avoid nearshore impacts as well as impacts directly along the shoreline. HDD, in comparison to trenching, also ensures a deeper burial depth for cables in the nearshore environment, decreasing the likelihood that cables will become exposed over time.

The landfall site HDD will consist of the following steps:

- Excavation of a pit at the landfall site: Each HDD path will originate or terminate in a pit excavated at the landfall site’s onshore staging area. This pit will also contain drilling fluids, consisting of water and natural clay.

- ♦ Drilling of pilot hole: An approximately 12.4-inch (315-mm) pilot hole will be drilled between the pit at the onshore staging area and the offshore HDD exit/entrance location in an arcing fashion beneath the shoreline and nearshore zone. If HDD is initiated onshore, when the pilot hole exits the seabed, the contractor may use water to carry drill cuttings back to the approach pit rather than drilling fluids in order to avoid release of clay to the water column (even though bentonite is a natural substance that poses little to no risk to the marine environment).

- Reaming and conduit insertion: The drill will be equipped with a larger cutter head that will enlarge the pilot hole in preparation for insertion of an HDPE or PVC conduit. The same drill head can pull the conduit through the enlarged bore hole.

- Cable insertion: Following installation of the conduit, the export cable will be inserted into the opening at the seabed and pulled through the conduit towards shore. The end of the conduit exposed on the seabed will then be buried, possibly by divers using hand-jets.

- Disposal of drill cuttings: Drilling the HDD trajectory will produce a mixture of drill cuttings from the bore hole, water, and bentonite clay (used to lubricate and cool the drill bit). This mixture will be collected on-site and filtered to separate solids from fluids. Drill cuttings and drill fluids are typically classified as clean fill, and it is anticipated they will be disposed of at an appropriate facility such as a local landfill, a gravel pit, or other facility permitted to take such material.

- Pull-back to transition vaults: Cables installed through the HDD conduit will be pulled into onshore transition vaults, where they will be split into separate onshore cables. The transition vaults at the landfall site will be approximately 11.5 ft wide by 46 ft long by 14.8 ft deep (3.5 m wide by 14 m long by 4.5 m deep). It is anticipated that the transition vaults will also include fiber optic splice boxes.

- Site restoration: The onshore HDD staging areas will be restored to be consistent with existing conditions, while the transition vaults will be entirely underground except for at-grade manhole covers.

At this point of permitting, exact details of the HDD operation are not yet known. For example, drilling may be done either from offshore to onshore or vice versa. If drilling proceeds offshore to onshore, a temporary offshore platform (i.e., jack-up barge) may be needed to support the HDD drilling rig. In order to estimate maximum sound levels for the community, this analysis assumed the loudest portion of HDD activity was onshore. Table 8-13 presents the three loudest sources typically found in an HDD operation and their estimated sound power levels. Sound level modeling was done at all landfall sites using the same software and standards discussed in Section 7.2. A gridded set of receptors were used to generate sound level contours of the HDD operation, and sound levels at the nearest residences were also included in the modeling.

Table 8-13 Reference Sound Power Levels of HDD Equipment

Equipment	Sound Power Level (dBA)
Excavator	117
Drill rig	117
Pump	109

8.3.1 HDD at the Monmouth Landfall Site

Figure 8-1 shows the approximate location of the HDD activity for the Monmouth Landfall Site. This same figure shows the sound level contours expected from HDD activity without taking into account any mitigation. Specific mitigation measures can be provided as the design advances (see Section 8.3.9). Table 8-14 below summarized the expected sound levels at several nearby residential receptors.

Table 8-14 Modeled Sound Levels from HDD Activity – Monmouth Landfall Site

Receptor	Sound Level (dBA)
9 Sea Girt Avenue	64
110 Seaside Place	63
10 Second Avenue	62
903 Ocean Avenue	61

8.3.2 HDD at the Kingsley Landfall Site

Figure 8-2 shows the approximate location of the HDD activity for the Kingsley Landfall Site. This same figure shows the sound level contours expected from HDD activity without taking into account any mitigation. Table 8-15 below summarized the expected sound levels at several nearby residential receptors.

Table 8-15 Modeled Sound Levels from HDD Activity – Kingsley Landfall Site

Receptor	Sound Level (dBA)
106-108 Second Avenue	74
203-205 Second Avenue	71
405 First Avenue	61
308 Fifth Avenue	60

8.3.3 HDD at the Asbury Landfall Site

Figure 8-3 shows the approximate location of the HDD activity for the Asbury Landfall Site. This same figure shows the sound level contours expected from HDD activity without taking into account any mitigation. Table 8-16 below summarized the expected sound levels at several nearby residential receptors.

Table 8-16 Modeled Sound Levels from HDD Activity – Asbury Landfall Site

Receptor	Sound Level (dBA)
1501 Ocean Avenue	71
209 Seventh Avenue	67
1408 Park Avenue	60
406 Deal Lake Drive	60

8.3.4 HDD at the Lemon Creek Landfall Site

Figure 8-4 shows the approximate location of the HDD activity for the Lemon Creek Landfall Site. This same figure shows the sound level contours expected from HDD activity without taking into account any mitigation. Table 8-17 below summarized the expected sound levels at several nearby residential receptors.

Table 8-17 Modeled Sound Levels from HDD Activity – Lemon Creek Landfall Site

Receptor	Sound Level (dBA)
509 Seguine Avenue	65
42 Purdy Place	64
575 Johnston Terrace	62
55 Van Wyck Avenue	60

8.3.5 HDD at the Wolfe's Pond Landfall Site

Figure 8-5 shows the approximate location of the HDD activity for the Wolfe's Pond Landfall Site. This same figure shows the sound level contours expected from HDD activity without taking into account any mitigation. Table 8-18 below summarized the expected sound levels at several nearby residential receptors.

Table 8-18 Modeled Sound Levels from HDD Activity – Wolfe's Pond Landfall Site

Receptor	Sound Level (dBA)
344 Holten Avenue	64
405 Cornellia Avenue	62
69 Wilbur Street	61
1 Case Avenue	61

8.3.6 HDD at the Midland Landfall Site

Figure 8-6 shows the approximate location of the HDD activity for the Midland Landfall Site. This same figure shows the sound level contours expected from HDD activity without taking into account any mitigation. Table 8-19 below summarized the expected sound levels at several nearby residential receptors.

Table 8-19 Modeled Sound Levels from HDD Activity – Midland Landfall Site

Receptor	Sound Level (dBA)
915 Father Capodanno Blvd	68
977 Father Capodanno Blvd	67
152 Baden Place	61
33 Iona Street	61

8.3.7 HDD at the South Beach Landfall Site

Figure 8-7 shows the approximate location of the HDD activity for the South Beach Landfall Site. This same figure shows the sound level contours expected from HDD activity without taking into account any mitigation. Table 8-20 below summarized the expected sound levels at several nearby residential receptors.

Table 8-20 Modeled Sound Levels from HDD Activity – South Beach Landfall Site

Receptor	Sound Level (dBA)
387 Father Capodanno Blvd	74
481 Father Capodanno Blvd	62
85 Mc Laughlin Street	61
14 Quincy Avenue	61

8.3.8 HDD at the Fort Hamilton Landfall Site

Figure 8-8 shows the approximate location of the HDD activity for the Fort Hamilton Landfall Site. This same figure shows the sound level contours expected from HDD activity without taking into account any mitigation. Table 8-21 below summarized the expected sound levels at several nearby residential receptors.

Table 8-21 Modeled Sound Levels from HDD Activity – Fort Hamilton Landfall Site

Receptor	Sound Level (dBA)
332 Sterling Drive	67
326 Sterling Drive	61
357 Doubleday Circle	61
345 Marshall Drive	61

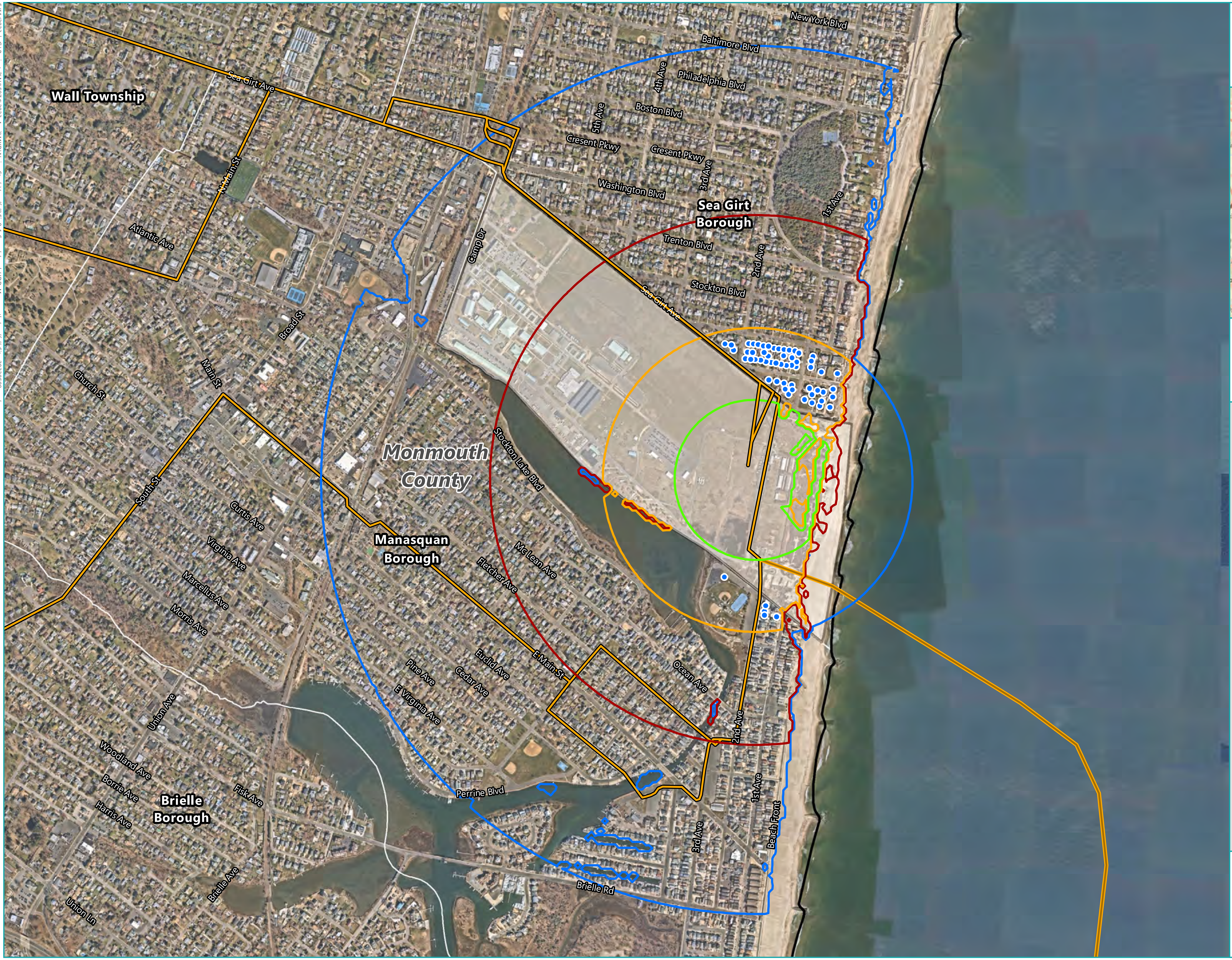
8.3.9 HDD Mitigation

Based on local permit requirements, Atlantic Shores expects that HDD activity will be seasonally restricted from Memorial to Labor Day as much as practicable. Atlantic Shores will work with municipal officials to finalize the construction schedule and hours, but the proposed HDD schedule is generally from 7:00 AM to 6:00 PM on Monday through Saturday (some municipalities do not allow work to start until 8:00 AM). Certain activities, such as conduit pull-in, cannot stop once they are started, so work may need to continue around the clock. Any work that needs to extend outside allowed construction hours will be discussed with local officials along with any necessary waivers.

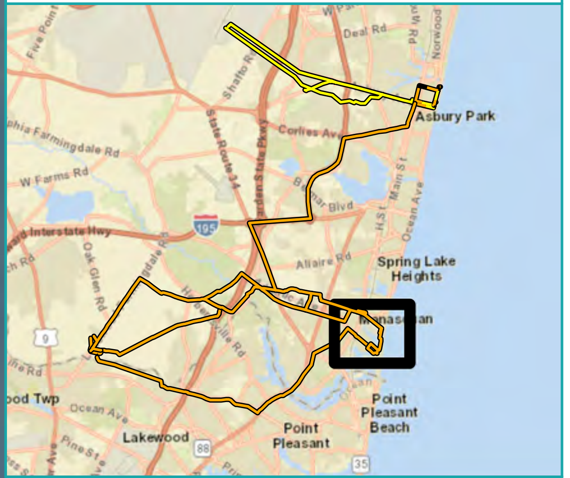
To further minimize the effects of HDD construction noise, Atlantic Shores will maintain strong communication and public outreach with adjacent neighbors. If necessary, mitigation measures may include use of a low-noise/muffled generator, portable sound walls (temporary noise barriers) as needed, blocking the path of equipment, and working with municipalities to coordinate work schedules.

8.4 Construction Noise Evaluation

While intermittent increases in noise levels are expected during construction activities, Atlantic Shores will make every reasonable effort to minimize noise impacts from construction. Specific mitigation measures for each onshore construction activity that may generate temporary noise are provided in Sections 8.1.11, 8.2.2, and 8.3.9. Atlantic Shores will plan construction activities based on the allowed hours of construction in each municipality.



ATLANTIC SHORES
offshore wind



0 250 500 1,000 Feet

0 100 200 Meters

N W E S

Map Projection: NAD 1983 UTM Zone 18N
Basemap: Nearmap Aerial Image, March 2023

LEGEND

- Receptors
- Larrabee Onshore Interconnection Cable Route Option
- Export Cable Alignment
- Monmouth Landfall Site Parcel
- Municipal Boundaries
- New Jersey County Boundaries

Predicted Sound Level (dBA)

- 50
- 55
- 60
- 65

Figure 8-1

Sound Levels During HDD – Monmouth Landfall Site Monmouth County, New Jersey

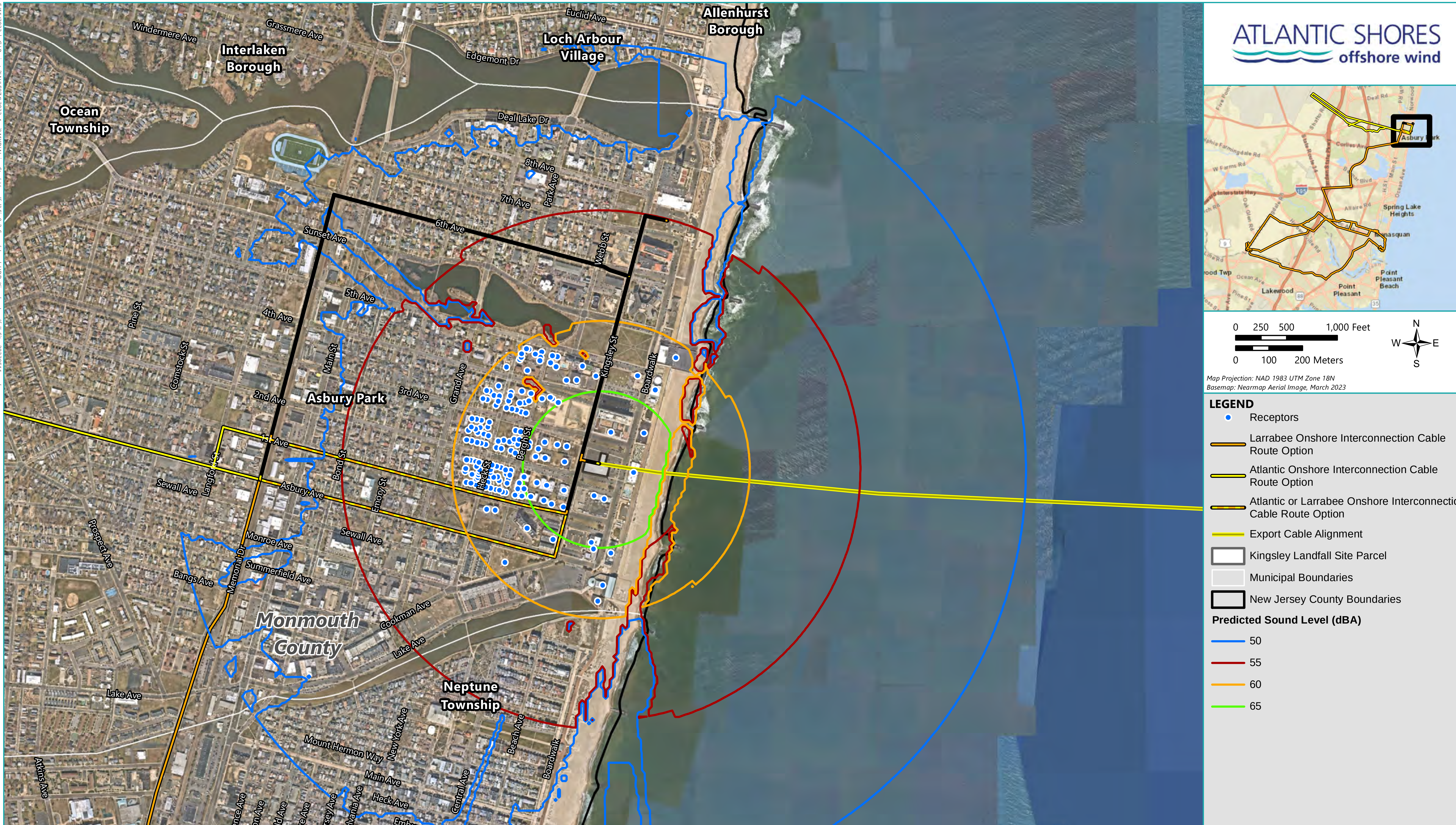


Figure 8-2

Sound Levels During HDD – Kingsley Landfall Site Monmouth County, New Jersey

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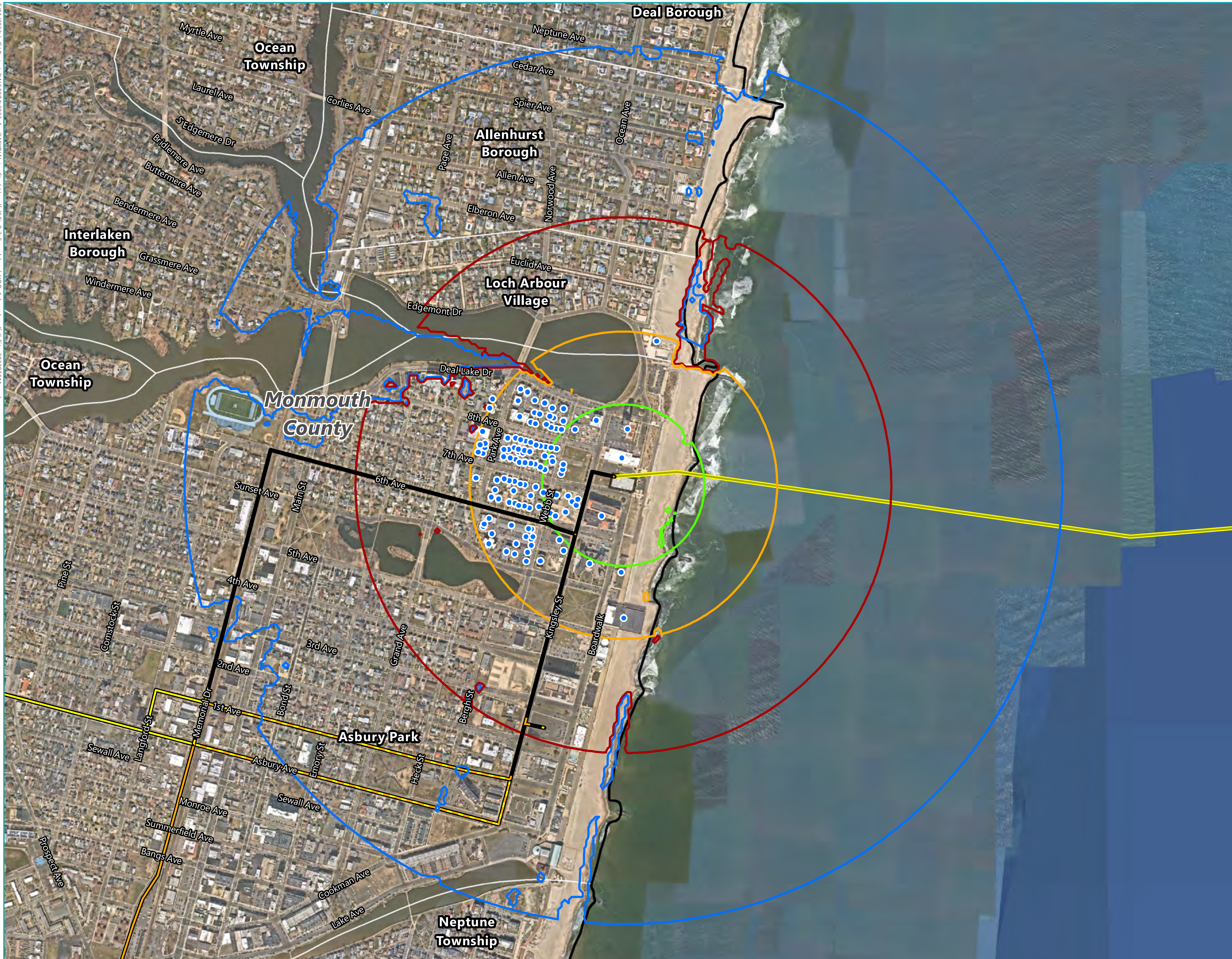
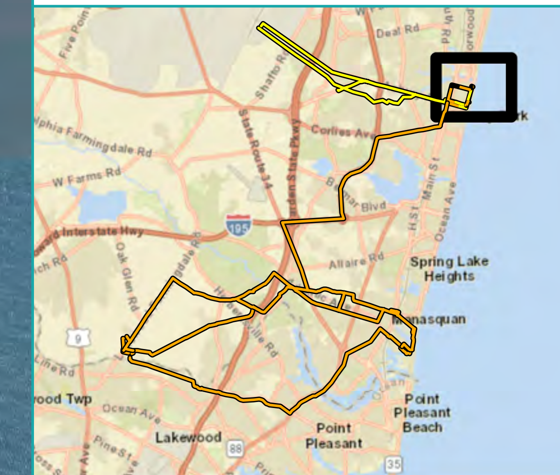


ATLANTIC SHORES
offshore wind



0 250 500 1,000 Feet

0 100 200 Meters

N
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S

Map Projection: NAD 1983 UTM Zone 18N
Basemap: Nearmap Aerial Image, March 2023

LEGEND

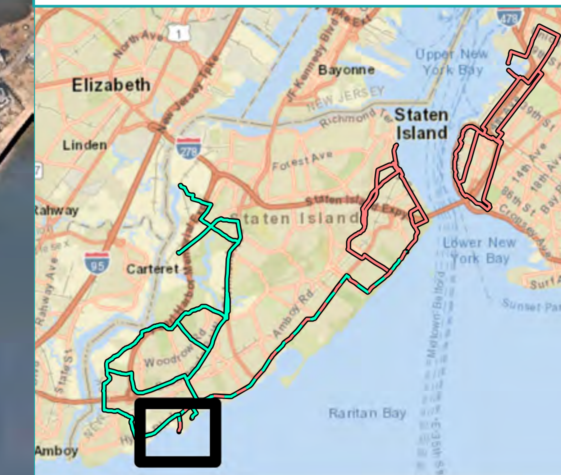
- Receptors
- Larrabee Onshore Interconnection Cable Route Option
- Atlantic Onshore Interconnection Cable Route Option
- Atlantic or Larrabee Onshore Interconnection Cable Route Option
- Export Cable Alignment
- Asbury Landfall Site Parcel
- Municipal Boundaries
- New Jersey County Boundaries

Predicted Sound Level (dBA)

- 50
- 55
- 60
- 65

Figure 8-3
Sound Levels During HDD –
Asbury Landfall Site
Monmouth County, New Jersey

ATLANTIC SHORES offshore wind



0 250 500 1,000 Feet

0 100 200 Meters

N W E S

Map Projection: NAD 1983 UTM Zone 18N
Basemap: Nearmap Aerial Image, March 2023

LEGEND

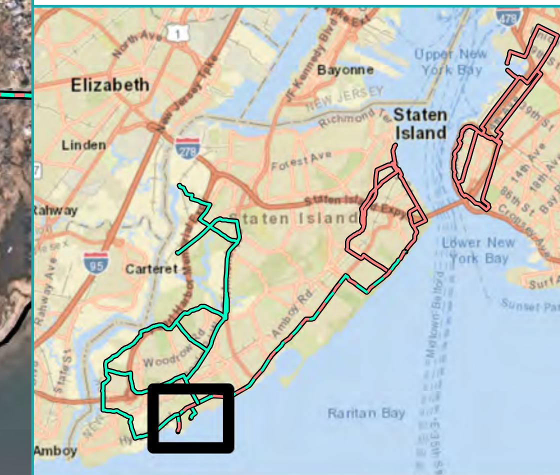
- Receptors
- Goethals or Fresh Kills Onshore Interconnection Cable Route Option
- Gowanus, Goethals or Fresh Kills Onshore Interconnection Cable Route Option
- Gowanus Onshore Interconnection Cable Route Option
- Export Cable Alignment
- Lemon Creek Landfall Parcel
- Municipal Boundaries
- New York County Boundaries

Predicted Sound Level (dBA)

- 50
- 55
- 60
- 65

Figure 8-4
Sound Levels During HDD –
Lemon Creek Landfall Site
Richmond County, New York

ATLANTIC SHORES offshore wind



0 250 500 1,000 Feet

0 100 200 Meters

N W E S

Map Projection: NAD 1983 UTM Zone 18N
Basemap: Nearmap Aerial Image, March 2023

LEGEND

- Receptors
- Goethals or Fresh Kills Onshore Interconnection Cable Route Option
- Gowanus, Goethals or Fresh Kills Onshore Interconnection Cable Route Option
- Gowanus Onshore Interconnection Cable Route Option
- Export Cable Alignment
- Wolfe's Pond Landfall Parcel
- Municipal Boundaries
- New York County Boundaries

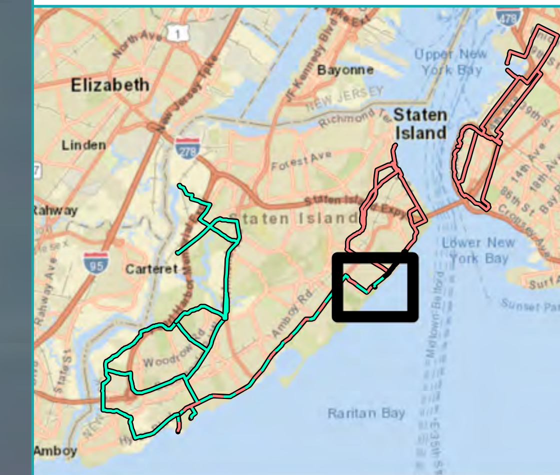
Predicted Sound Level (dBA)

- 50
- 55
- 60
- 65

Figure 8-5

Sound Levels During HDD –
Wolfe's Pond Landfall Site
Richmond County, New York

ATLANTIC SHORES offshore wind



0 250 500 1,000 Feet

0 100 200 Meters

N W E S

Map Projection: NAD 1983 UTM Zone 18N
Basemap: Nearmap Aerial Image, March 2023

LEGEND

- Receptors
- Goethals or Fresh Kills Onshore Interconnection Cable Route Option
- Gowanus, Goethals or Fresh Kills Onshore Interconnection Cable Route Option
- Gowanus Onshore Interconnection Cable Route Option
- Export Cable Alignment
- Midland Landfall Parcel
- Municipal Boundaries
- New York County Boundaries

Predicted Sound Level (dBA)

- 50
- 55
- 60
- 65

Figure 8-6

Sound Levels During HDD – Midland Landfall Site Richmond County, New York

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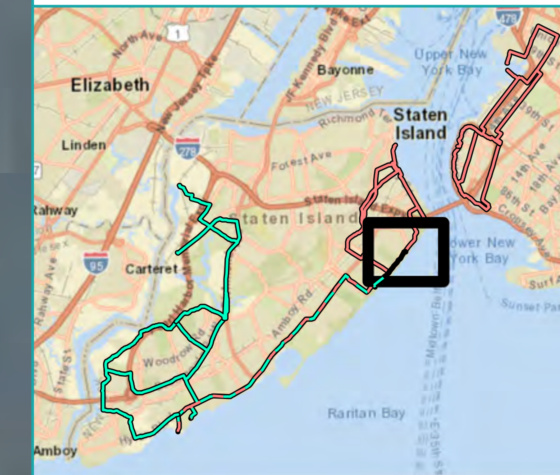
ATLANTIC SHORES offshore wind



0 250 500 1,000 Feet

0 100 200 Meters

N E S W

Map Projection: NAD 1983 UTM Zone 18N
Basemap: Nearmap Aerial Image, March 2023

LEGEND

- Receptors
- Goethals or Fresh Kills Onshore Interconnection Cable Route Option
- Gowanus, Goethals or Fresh Kills Onshore Interconnection Cable Route Option
- Gowanus Onshore Interconnection Cable Route Option
- Export Cable Alignment
- South Beach Landfall Parcel
- Municipal Boundaries
- New York County Boundaries

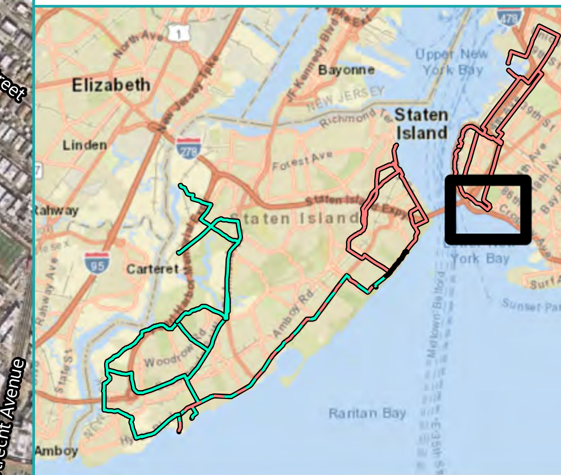
Predicted Sound Level (dBA)

- 50
- 55
- 60
- 65

Figure 8-7

Sound Levels During HDD –
South Beach Landfall Site
Richmond County, New York

ATLANTIC SHORES offshore wind



0 250 500 1,000 Feet

0 100 200 Meters

N W E S

Map Projection: NAD 1983 UTM Zone 18N
Basemap: Nearmap Aerial Image, March 2023

LEGEND

- Receptors
- Goethals or Fresh Kills Onshore Interconnection Cable Route Option
- Gowanus, Goethals or Fresh Kills Onshore Interconnection Cable Route Option
- Gowanus Onshore Interconnection Cable Route Option
- Export Cable Alignment
- Fort Hamilton Landfall Parcel
- Municipal Boundaries
- New York County Boundaries

Predicted Sound Level (dBA)

- 50
- 55
- 60
- 65

Figure 8-8
Sound Levels During HDD – Fort Hamilton Landfall Site Kings County, New York

9.0 ONSHORE NOISE FROM OFFSHORE ACTIVITIES

There will be sound generated from activities in the Atlantic Shores Offshore Project Area. However, at its closest point, the wind energy generation facility is approximately 8.4 miles (7.3 nautical miles [nm]) from the New Jersey coast and approximately 60 miles (52.1 nm) from the New York State coast. Due to the large distance, onshore noise from offshore activities will be negligible. Two examples of these activities are briefly described below.

Mariner Radio Activated Sound Signals (MRASS) will be located on corner towers/significant peripheral structures and perimeter structures of the wind farm. The MRASS are required to have an audible range of 2 nm but they may be louder. No sound level modeling was done for these sources due to their distance. It is possible that the MRASS may be heard on land under certain circumstances, but they would only be activated at certain times and thus any effect would be limited.

With respect to noise from operational wind turbine generators (WTGs), sounds of different frequencies are emitted by WTGs as they operate, related to both the aerodynamics of the turbine blades as they rotate and the mechanical sounds of the internal mechanism of the turbine. Noise levels near the WTGs will be audible but sound levels diminish rapidly with distance. At a distance of 1,000 ft (~300 m), the sound pressure is on the order of 50 dBA, a level lower than normal conversation.[6] In this case, operational noise from the offshore WTGs will not be audible onshore.

6 Wind Turbine-Related Noise: Current Knowledge and Research Needs. New York State Energy Research and Development Authority (NYSERDA), NYSERDA Report 13-14, June 2013.

10.0 CONCLUSIONS

A sound level impact assessment was completed for the Atlantic Shores proposed onshore substations and/or converter stations, onshore interconnection cable routes, and horizontal directional drilling activity associated with the proposed POIs.

An existing condition sound level measurement program was completed for each of the eight proposed onshore substation and/or converter station sites. Operational sound levels from the proposed onshore substation and/or converter station at each of the eight sites have been evaluated. Given the possibility that the onshore substation and/or converter station will consist of a combined HVAC/HVDC configuration, sound level modeling conservatively included the equipment from both designs.

There will also be temporary noise from construction of the onshore substation and/or converter station, onshore interconnection cables, and horizontal directional drilling. Atlantic Shores anticipates that construction hours will adhere to local ordinances to minimize potential effects of construction noise, and Atlantic Shores will work with municipal officials to finalize the construction schedule and hours.

In conclusion, operation of the Atlantic Shores onshore substation and/or converter station will be designed to comply with the relevant sound level limits and will include sound level mitigation as needed. No onshore construction in areas near the coast, including HDD at the landfall sites, will occur during the summer (generally from Memorial to Labor Day), subject to ongoing coordination with local authorities and as practicable. Additionally, the daily hours of operation for onshore construction activities, including HDD, will be developed in accordance with municipal noise ordinances. Any work that needs to extend outside allowed construction hours will be discussed with local officials and waivers will be obtained if necessary. To further minimize the effects of construction noise, Atlantic Shores will maintain strong communication and public outreach with adjacent neighbors about the time and nature of construction activities.

Appendix A

Certificates of Sound Level Instrument Calibration

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.48984

Instrument:	**Acoustical Calibrator**	*Date Calibrated:* **1/5/2023**	*Cal Due:* **1/5/2024**		
Model:	**CAL200**	*Status:*		**Received**	**Sent**
Manufacturer:	**Larson Davis**	*In tolerance:*		**X**	**X**
Serial number:	**13675**	*Out of tolerance:*			
Class (IEC 60942):	**1**	*See comments:*			
Barometer type:		*Contains non-accredited tests:* __Yes **X** No			
Barometer s/n:					
Customer:	**Epsilon Associates, Inc.**	*Address:*	**3 Mill & Main Place, Suite 250, Maynard, MA 01754**		
Tel/Fax:	**978-897-7100**				

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31052	Nov 7, 2022	Scantek, Inc./ NVLAP	Nov 7, 2023
DS-360-SRS	Function Generator	88077	Dec 21, 2022	ACR Env./ A2LA	Dec 21, 2024
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Mar 10, 2022	ACR Env. / A2LA	Mar 10, 2023
PTU300-Vaisala	EnvironmentalMonitor	P5011262	Sept 15, 2022	ACR Env./ A2LA	Sept 15, 2023
140-Norsonic	Real Time Analyzer	1406423	Nov 9, 2022	Scantek / NVLAP	Nov 9, 2023
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4134-Brüel&Kjær	Microphone	173368	Nov 7, 2022	Scantek, Inc. / NVLAP	Nov 7, 2023
1203-Norsonic	Preamplifier	14059	Mar 7, 2022	Scantek, Inc./ NVLAP	Mar 7, 2023

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Bailey Partoza	**Authorized signatory:**	William Gallagher
Signature		Signature	William D Gallagher
Date	1/5/23	Date	1/9/2023

Document stored as: Y:\Calibration Lab\Cal 2023\LDCAL200_13675_M2.doc

Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES[1] FROM STANDARDS REFERENCED IN PROCEDURES:	MET[2]	NOT MET	COMMENTS
Manufacturer specifications			
Manufacturer specifications: Sound pressure level	X		
Manufacturer specifications: Frequency	X		
Manufacturer specifications: Total harmonic distortion	X		
Current standards			
ANSI S1.40:2006 B.3 / IEC 60942: 2003 B.2 - Preliminary inspection	X		
ANSI S1.40:2006 B.4.4 / IEC 60942: 2003 B.3.4 - Sound pressure level	X		
ANSI S1.40:2006 A.5.4 / IEC 60942: 2003 A.4.4 - Sound pressure level stability	-	-	
ANSI S1.40:2006 B.4.5 / IEC 60942: 2003 B.3.5 - Frequency	X		
ANSI S1.40:2006 B.4.6 / IEC 60942: 2003 B.3.6 - Total harmonic distortion	X		

1 The results of this calibration apply only to the instrument type with serial number identified in this report.

2 The tests marked with (*) are not covered by the current NVLAP accreditation.

Main measured parameters [3]:

Measured[4]/Acceptable[5] Tone frequency (Hz):	Measured[4]/Acceptable[5] Total Harmonic Distortion (%):	Measured [4]/Acceptable Level[5] (dB):
1000.10 ± 1.0/1000.0 ± 10.0	0.34 ± 0.10/ < 3	94.21 ± 0.12/94.0 ± 0.4
1000.10 ± 1.0/1000.0 ± 10.0	0.37 ± 0.10/ < 3	114.20 ± 0.12/114.0 ± 0.4

3 The stated level is valid at measurement conditions.

4 The above expanded uncertainties for frequency and distortion are calculated with a coverage factor k=2; for level k=2.00

5 Acceptable parameters values are from the current standards

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
21.9 ± 1.0	100.18 ± 0.000	46.4 ± 2.0

Tests made with following attachments to instrument:

Calibrator ½" Adaptor Type:	
Other:	

Adjustments: Unit was not adjusted.
Comments: The instrument was tested and met all specifications found in the referenced procedures.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger. The measurement results are reported as Pass / Fail simple acceptance; measured values are in the tolerance interval.

Measured Data: in Acoustical Calibrator Test Report # 48984 of two pages.

Place of Calibration: Scantek, Inc.
6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.48475

Instrument:	**Acoustical Calibrator**	*Date Calibrated:* **8/11/2022** *Cal Due:* **8/11/2023**		
Model:	**CAL200**	*Status:*	**Received**	**Sent**
Manufacturer:	**Larson Davis**	*In tolerance:*	**X**	**X**
Serial number:	**2853**	*Out of tolerance:*		
Class (IEC 60942):	**1**	*See comments:*		
Barometer type:		*Contains non-accredited tests:* __**Yes** _X_ **No**		
Barometer s/n:				

Customer: **Epsilon Associates, Inc.**
Tel/Fax: **845-702-0251 /**
Address: **3 Mill & Main Place, Suite 250, Maynard, MA 01754**

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31052	Nov 8, 2021	Scantek, Inc./ NVLAP	Nov 8, 2022
DS-360-SRS	Function Generator	88077	Dec 3, 2020	ACR Env./ A2LA	Dec 3, 2022
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Mar 10, 2022	ACR Env. / A2LA	Mar 10, 2023
PTU300-Vaisala	EnvironmentalMonitor	P5011262	Sept 10, 2021	ACR Env./ A2LA	Sept 10, 2022
140-Norsonic	Real Time Analyzer	1406423	Nov 8, 2021	Scantek / NVLAP	Nov 8, 2022
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4134-Brüel&Kjær	Microphone	173368	Nov 8, 2021	Scantek, Inc. / NVLAP	Nov 8, 2022
1203-Norsonic	Preamplifier	14059	Mar 7, 2022	Scantek, Inc./ NVLAP	Mar 7, 2023

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Bailey Partoza	**Authorized signatory:**	William Gallagher
Signature		Signature	William D Gallagher
Date	8/11/22	Date	8/11/2022

Document stored as: Y:\Calibration Lab\Cal 2022\LDCAL200_2853_M2.doc

Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES[1] FROM STANDARDS REFERENCED IN PROCEDURES:	MET[2]	NOT MET	COMMENTS
Manufacturer specifications			
Manufacturer specifications: Sound pressure level	X		
Manufacturer specifications: Frequency	X		
Manufacturer specifications: Total harmonic distortion	X		
Current standards			
ANSI S1.40:2006 B.3 / IEC 60942: 2003 B.2 - Preliminary inspection	X		
ANSI S1.40:2006 B.4.4 / IEC 60942: 2003 B.3.4 - Sound pressure level	X		
ANSI S1.40:2006 A.5.4 / IEC 60942: 2003 A.4.4 - Sound pressure level stability	-	-	
ANSI S1.40:2006 B.4.5 / IEC 60942: 2003 B.3.5 - Frequency	X		
ANSI S1.40:2006 B.4.6 / IEC 60942: 2003 B.3.6 - Total harmonic distortion	X		

1 The results of this calibration apply only to the instrument type with serial number identified in this report.

2 The tests marked with (*) are not covered by the current NVLAP accreditation.

Main measured parameters [3]:

Measured[4]/Acceptable[5] Tone frequency (Hz):	Measured[4]/Acceptable[5] Total Harmonic Distortion (%):	Measured [4]/Acceptable Level[5] (dB):
1000.23 ± 1.0/1000.0 ± 10.0	0.34 ± 0.10/ < 3	94.11 ± 0.12/94.0 ± 0.4
1000.22 ± 1.0/1000.0 ± 10.0	0.37 ± 0.10/ < 3	114.10 ± 0.12/114.0 ± 0.4

3 The stated level is valid at measurement conditions.

4 The above expanded uncertainties for frequency and distortion are calculated with a coverage factor k=2; for level k=2.00

5 Acceptable parameters values are from the current standards

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.8 ± 1.0	100.17 ± 0.000	53.8 ± 2.0

Tests made with following attachments to instrument:

Calibrator ½" Adaptor Type:	
Other:	

Adjustments: Unit was not adjusted.
Comments: The instrument was tested and met all specifications found in the referenced procedures.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger. The measurement results are reported as Pass / Fail simple acceptance; measured values are in the tolerance interval.

Measured Data: in Acoustical Calibrator Test Report # 48475 of two pages.

Place of Calibration: Scantek, Inc.
6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

West Caldwell Calibration Laboratories Inc.

Certificate of Calibration

for

PRECISION INTEGRATING SOUND LEVEL METER

Manufactured by:	LARSON DAVIS
Model No:	831
Serial No:	0003751
Calibration Recall No:	32805

Submitted By:

Customer:	ANTHONY SAVINO JR.
Company:	EPSILON ASSOCIATES, INC
Address:	3 MILL & MAIN PLACE
	MAYNARD MA 01754

The subject instrument was calibrated to the indicated specification using standards traceable to the SI through the National Institute of Standards and Technology or to accepted values of natural physical constants. This document certifies that the instrument met the following specification upon its return to the submitter.

West Caldwell Calibration Laboratories Procedure No. 831 LARS

Upon receipt for Calibration, the instrument was found to be:

Within (X)

tolerance of the indicated specification. See attached Report of Calibration.
The information supplied certifies that the item listed above meets acceptance criteria under the decision rule: A=(L-(U95)), where A is the acceptance criteria, L is manufacturer specifications, and U95 is confidence level of 95% at k=2. The decision rule has been communicated and approved by customer during contract review. Measurements marked with (*) are not covered by the scope of current A2LA accreditation.

West Caldwell Calibration Laboratories' calibration control system meets the following requirements: ANSI/NCSL Z540-1, ISO 9001, and ISO 17025.

Note: With this Certificate, Report of Calibration is included.

Approved by:

James Zhu

Quality Manager

Calibration Date:	22-Feb-22
Certificate Issue Date:	23-Feb-22
Certificate No:	32805 - 1

QA Doc. #1051 Rev. 3.0 5/29/20

ISO/IEC 17025

West Caldwell Calibration Laboratories, Inc.

uncompromised calibration

1575 State Route 96, Victor, NY 14564, U.S.A.

A2LA ACCREDITED

Calibration Lab. Cert. # 1533.01

West Caldwell Calibration Laboratories Inc.

Certificate of Calibration

for

MICROPHONE

Manufactured by:	PCB PIEZOTRONICS
Model No:	377C20
Serial No:	162996
Calibration Recall No:	32805

Submitted By:

Customer:	ANTHONY SAVINO JR.
Company:	EPSILON ASSOCIATES, INC
Address:	3 MILL & MAIN PLACE
	MAYNARD MA 01754

The subject instrument was calibrated to the indicated specification using standards traceable to the SI through the National Institute of Standards and Technology or to accepted values of natural physical constants. This document certifies that the instrument met the following specification upon its return to the submitter.

West Caldwell Calibration Laboratories Procedure No. 377C20 PCB PI

Upon receipt for Calibration, the instrument was found to be:

Within (X)

tolerance of the indicated specification. See attached Report of Calibration.
The information supplied certifies that the item listed above meets acceptance criteria under the decision rule: A=(L-(U95)), where A is the acceptance criteria, L is manufacturer specifications, and U95 is confidence level of 95% at k=2. The decision rule has been communicated and approved by customer during contract review. Measurements marked with (*) are not covered by the scope of current A2LA accreditation.

West Caldwell Calibration Laboratories' calibration control system meets the following requirements: ANSI/NCSL Z540-1, ISO 9001, and ISO 17025.

Note: With this Certificate, Report of Calibration is included.

Approved by:

James Zhu
Quality Manager

Calibration Date:	22-Feb-22
Certificate Issue Date:	23-Feb-22
Certificate No:	32805 -3

QA Doc. #1051 Rev. 3.0 5/29/20

Certificate Page 1 of 1

ISO/IEC 17025

West Caldwell Calibration Laboratories, Inc.
uncompromised calibration
1575 State Route 96, Victor, NY 14564, U.S.A.

ACCREDITED
Calibration Lab. Cert. # 1533.01

West Caldwell Calibration Laboratories Inc.

Certificate of Calibration

for

PRECISON INTEGRATING SOUND LEVEL METER

Manufactured by:	LARSON DAVIS
Model No:	831
Serial No:	0003752
Calibration Recall No:	33497

Submitted By:

Customer:	ANTHONY SAVINO JR.
Company:	EPSILON ASSOCIATES, INC
Address:	3 MILL & MAIN PLACE
	MAYNARD MA 01754

The subject instrument was calibrated to the indicated specification using standards traceable to the SI through the National Institute of Standards and Technology or to accepted values of natural physical constants. This document certifies that the instrument met the following specification upon its return to the submitter.

West Caldwell Calibration Laboratories Procedure No. 831 LARS

Upon receipt for Calibration, the instrument was found to be:

Within (X)

tolerance of the indicated specification. See attached Report of Calibration.
The information supplied certifies that the item listed above meets acceptance criteria under the decision rule: A=(L-(U95)), where A is the acceptance criteria, L is manufacturer specifications, and U95 is confidence level of 95% at k=2. The decision rule has been communicated and approved by customer during contract review. Measurements marked with (*) are not covered by the scope of current A2LA accreditation.

West Caldwell Calibration Laboratories' calibration control system meets the following requirements: ANSI/NCSL Z540-1, ISO 9001, and ISO 17025.

Note: With this Certificate, Report of Calibration is included.

Approved by:

James Zhu

Quality Manager

Calibration Date:	10-Nov-22
Certificate Issue Date:	10-Nov-22
Certificate No:	33497 -11

QA Doc. #1051 Rev. 3.0 5/29/20

ISO/IEC 17025

ACCREDITED

West Caldwell Calibration Laboratories, Inc.
uncompromised calibration
1575 State Route 96, Victor, NY 14564, U.S.A.

Calibration Lab. Cert. # 1533.01

West Caldwell Calibration Laboratories Inc.

Certificate of Calibration

for

MICROPHONE

Manufactured by:	PCB PIEZOTRONICS
Model No:	377C20
Serial No:	165015
Calibration Recall No:	33497

Submitted By:

Customer:	ANTHONY SAVINO JR.	
Company:	EPSILON ASSOCIATES, INC	
Address:	3 MILL & MAIN PLACE	
	MAYNARD	MA 01754

The subject instrument was calibrated to the indicated specification using standards traceable to the SI through the National Institute of Standards and Technology or to accepted values of natural physical constants. This document certifies that the instrument met the following specification upon its return to the submitter.

West Caldwell Calibration Laboratories Procedure No. 377C20 PCB PI

Upon receipt for Calibration, the instrument was found to be:

Within (X)

tolerance of the indicated specification. See attached Report of Calibration.
The information supplied certifies that the item listed above meets acceptance criteria under the decision rule: A=(L-(U95)), where A is the acceptance criteria, L is manufacturer specifications, and U95 is confidence level of 95% at k=2. The decision rule has been communicated and approved by customer during contract review. Measurements marked with (*) are not covered by the scope of current A2LA accreditation.

West Caldwell Calibration Laboratories' calibration control system meets the following requirements: ANSI/NCSL Z540-1, ISO 9001, and ISO 17025.

Note: With this Certificate, Report of Calibration is included.

Approved by: JZ

James Zhu

Quality Manager

Calibration Date:	10-Nov-22
Certificate Issue Date:	10-Nov-22
Certificate No:	33497 -3

QA Doc. #1051 Rev. 3.0 5/29/20

ISO/IEC 17025

ACCREDITED

Calibration Lab. Cert. # 1533.01

West Caldwell Calibration Laboratories, Inc.

uncompromised calibration

1575 State Route 96, Victor, NY 14564, U.S.A.

Appendix B

Acoustical Terminology and Metrics

The unit of sound pressure is the decibel (dB). The decibel scale is logarithmic to accommodate the large dynamics of sound intensities to which the human ear is subjected. An inherent property of the logarithmic decibel scale is that the sound pressure levels of two separate sounds are not directly additive. For example, if a sound of 50 dB is added to another sound of 50 dB, the total is a 3-decibel increase (or 53 dB), not an arithmetic doubling to 100 dB. The human ear does not perceive changes in the sound pressure level as equal changes in loudness. Scientific research demonstrates that the following general relationships hold between sound level and human perception for two sound levels with the same or very similar frequency characteristics:

- 1 dB is the practically achievable limit of the accuracy of sound measurement systems and corresponds to an approximate 10 percent variation in sound pressure. A 1-dB increase or decrease is a non-perceptible change in sound.

- 3-dB increase or decrease is a doubling (or halving) of acoustic energy, and it corresponds to the threshold of perceptibility of change. In practice, a 3 dB change in environmental sound is at the margin of perceptibility to the average person[7].

- 5-dB increase or decrease is described as a perceptible change in sound level and is a discernible change in an outdoor environment.

- 10-dB increase or decrease is a tenfold increase or decrease in acoustic energy but is perceived as a doubling or halving in sound (i.e., the average person will judge a 10 dBA change in sound level to be twice or half as loud)[8].

Environmental sound is typically composed of acoustic energy across a wide range of frequencies, referred to as the frequency spectra; however, the human ear does not interpret the sound level from each frequency as equally loud. To compensate for the physical response of the human ear, the A-weighting filter is commonly used for describing environmental sound levels. The A-weighting filters the frequency spectrum of sound levels to correspond to the frequency response of the human ear (attenuating low and high frequency energy similar to the way people hear sound). Sound levels that are A-weighted to reflect human response are presented as “dBA”. The A-weighted sound level is the most widely accepted descriptor for community noise assessments. Unweighted sound levels are referred to as linear decibels and given in units of “dB” or “dBZ”.

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7 2009 ASHRAE Handbook – Fundamentals, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA, 2009.

8 Procedures for the Computation of Loudness of Steady Sounds, American National Standard, ANSI S3.4-2007, Annex A, NY.

Sound levels can be measured and presented in various formats. The most common sound metric used in community sound surveys is the equivalent sound level (L_{eq}). The L_{eq} level is the energy averaged, A-weighted sound pressure level that occurs over a given time period, i.e., the steady, continuous sound level which has the same acoustic energy as the time-varying sound levels over the same time period. The L_{eq} has been shown to provide both an effective and uniform method for comparing time-varying sound levels and is routinely employed.

Statistical levels help further characterize the sound environment. The percentile sound levels ($L_{\%}$) indicate the sound level exceeded for that percentage of the measurement period. The L_{90} level is commonly referred to as the residual sound level as it excludes short-term intrusive noise events, so it is effective in defining the quietest periods. The L_{90} is the statistical level that is the level exceeded during 90 percent of the measurement period. In comparison, the L_{10} is referred to as the intrusive level and is the sound level that is exceeded for 10 percent of the time during the measurement.

The L_{max} is the maximum sound level over a given time period. The L_{max} is typically due to discrete, identifiable events such as an airplane overflight, car or truck pass by, or a dog bark for example.

The noise metrics defined are broadband (i.e., inclusive of sound across the entire audible frequency spectrum). In addition to broadband, sound level data typically includes an analysis of the various frequency components of the sound spectrum to determine the potential for tonal characteristics and for use in identifying candidate noise mitigation measures. The unit of frequency is Hertz (Hz), measuring the cycles per second of the sound pressure waves, and typically the frequency analysis is presented in octave bands established by standard (ANSI S1.11-2014 Part 1).

A few additional terms are defined below.

ANS-weighted – A high-frequency natural sound (HFNS) filter applied to the measured one-third octave-band data to remove seasonal noise like insects. This technique removes all sound energy above the 1,250 Hertz frequency band. The methodology for the filtration process is specified in ANSI/ASA S12.100-2014 and the sound pressure levels presented using this methodology are indicated as ANS-weighted levels (presented in dBA).

G – The portion of ground that is considered porous as defined under ISO 9613-2. This is used as part of the ground attenuation calculation between the source and receiver. For example, a G-factor of 0.5 corresponds to “mixed ground” consisting of half hard and half porous ground cover. A G-factor of zero (0) corresponds to “hard ground” consisting of surfaces with low porosity including water, and a G of 1 represents all porous ground.

Infrasound – Sound in the frequencies below 20 Hz.

ISO 9613-2 – An international standard which specifies an engineering method for calculating the attenuation of sound during outdoor propagation in order to predict the levels of environmental noise at a distance from a variety of sources. The method predicts the equivalent continuous A-weighted sound level under meteorological conditions favorable to propagation from sources of known sound emission and is used throughout the United States and the world.

L_{DN} – the day-night average sound level, sometimes abbreviated as DNL, presented in dBA. The DNL is the 24-hour average sound level obtained by the logarithmic average of the average daytime sound level (L_D) and the average nighttime sound level (L_N) that incorporates a 10-decibel "penalty" to each nighttime-hour sound level. This penalty accounts for the greater sensitivity to sound events during nighttime hours. The L_D and L_N are both calculated using hourly equivalent sound levels ($L_{eq(h)}$). The Environmental Protection Agency defines daytime as the 15 hours from 7:00 AM to 10:00 PM and nighttime as the 9 hours from 10:00 PM to 7:00 AM.

Low frequency – Sound contained in the frequencies from 20 Hz to 200 Hz.

Octave bands – The International Standards Organization (ISO) has agreed upon "preferred" frequency bands for sound measurement and by agreement the octave band is the widest band for frequency analysis. The upper frequency limit of the octave band is approximately twice the lower frequency limit and each band is identified by its geometric mean called the band center frequency. The octave band center frequencies typically used for sound level analyses are 31.5, 63, 125, 250, 500, 1000, 2000, 4000, and 8000 Hz. When more detailed information about a noise is required, standardized one-third octave band analysis may be used.

Weighting – The sound level meter used to measure noise is a standardized instrument. [9] It contains "weighting networks" to adjust the frequency response of the instrument to approximate that of the human ear under various conditions. One network is the A-weighting network, which most closely approximates how the human ear responds to sound as a function of frequency, and is the accepted scale used for community sound level measurements. Sounds are frequently reported as detected with the A-weighting network of the sound level meter in dBA. A-weighted sound levels emphasize middle frequencies (i.e., middle pitched—around 1,000 Hertz sounds), and deemphasize lower and higher frequencies. The C-weighting network has a nearly flat response for frequencies between 63 Hz and 4000 Hz and is noted as dBC.

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[9] *American National Standard Electroacoustics Sound Level Meters*, ANSI S1.4-2014, published by the Standards Secretariat of the Acoustical Society of America, Melville, NY.