Portable LNG Vaporization Project

Old Mill Lane, Portsmouth, RI

PREPARED FOR

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Introduction

The Narragansett Electric Company d/b/a National Grid (the "Company" or "TNEC")[1] submits this Siting Report in support of its request for a license from the Rhode Island Energy Facility Siting Board ("EFSB") for the use of liquified natural gas ("LNG") portable equipment at Old Mill Lane, Portsmouth (the "Project"). The Company is responsible for distributing natural gas to residents and businesses on Aquidneck Island which includes approximately 12,500 residential customers and 1,800 business customers located in Middletown, Newport, and Portsmouth. The natural gas distribution infrastructure on Aquidneck Island is fed by the Algonquin Gas Transmission, LLC's ("AGT") Northeastern interstate natural gas transmission pipeline that extends east from New Jersey to Massachusetts.

The Project need is twofold. First, the Project is needed immediately to address the existing gap between the natural gas demand and the available natural gas capacity to Aquidneck Island on extremely cold days. The Project is also needed to address capacity vulnerability from unexpected upstream disruptions that would limit the flow of natural gas from the interstate pipeline.

The duration that the Project will be needed remains open as the Company is reviewing other infrastructure and non-infrastructure options. At this time, the Project is the only viable option for providing additional natural gas supply to the Aquidneck Island natural gas distribution system to address the existing gap between available capacity and peak demand. The Company is currently engaged in an analysis of long-term solutions to address this need. This Project will be needed

1 TNEC, a subsidiary of National Grid USA, is an electricity distribution and transmission company serving approximately 465,000 customers in 38 Rhode Island communities. TNEC is also a natural gas distribution company with approximately 270,000 customers in Rhode Island. National Grid USA is a public utility holding company. Other subsidiaries of National Grid USA include operating companies such as New England Power Company, Massachusetts Electric Company, Nantucket Electric Company, and Niagara Mohawk Power Corporation (collectively with TNEC, "National Grid Companies"), as well as National Grid USA Service Company, Inc. ("National Grid") which provides services such as engineering, facilities construction and accounting for National Grid Companies.

on a recurring seasonal basis until the preferred long-term solution is identified and in service.

This Siting Report has been prepared under the direction of Faye Brown, National Grid Project Manager for the Project. Numerous employees of National Grid, including planners, engineers, and legal personnel contributed to the Siting Report. The description of the affected natural and social environments, and impact analyses were prepared by Vanasse Hangen Brustlin, Inc. ("VHB") and other consultants to National Grid.

This Siting Report has been prepared in support of an application to the EFSB and for submission with applications to other state and local agencies required for the Project. This Siting Report has been prepared in accordance with the Rule 1.6 of the EFSB Rules of Practice and Procedure ("EFSB Rules") to provide information on the potential impacts of the Project. This Siting Report details the Project, discusses the alternatives to the Project which were considered and evaluated, describes the specific natural and social features within the Study Area (as defined in Section 5.1), discusses potential impacts, presents a mitigation plan for potential impacts associated with the Project, and describes permit requirements.

The purpose and need for the Project are detailed in Section 2 of this Siting Report. Section 3 provides a detailed description of the site and each component of the Project, and also discusses the mobilization of the equipment, safety and public health considerations, community outreach, estimated Project costs, and Project schedule. An evaluation of alternatives to the Project, together with reasons for the rejection of each alternative, is presented in Section 4. A detailed description of environmental and social characteristics within and immediately surrounding the proposed Project is included as Sections 5 and 6, respectively. Section 7 of this Siting Report identifies the impacts of the Project on the natural and social environments within the Study Area. Section 8 summarizes proposed mitigation measures which when implemented will effectively offset impacts associated with the Project. Finally, Section 9 lists the federal, state, and local government agencies which may exercise licensing authority and from which the Company may be required to obtain approvals prior to constructing the Project.

2

Purpose and Need

2.1 Introduction

Roughly 270,000 residents and businesses across the state rely on the Company to provide them with safe, reliable, and affordable energy, especially to meet their heating needs during the coldest months of winter. In order to fulfill its obligation to provide reliable service to its gas customers across Rhode Island, the Company must meet customers' gas demand during the coldest year (referred to as the "design year") and on the coldest day and hour (respectively referred to as the "design day" and "design hour") that the Company forecasts to occur with a given probability.

The Company forecasts peak gas demand during these design conditions to ensure that it can reliably meet customers' needs. To meet these needs, the Company must have sufficient natural gas capacity and supply. In Rhode Island, the Company's gas capacity portfolio consists entirely of interstate pipeline, LNG inventory and underground storage.[2] Capacity refers to the Company's ability to transport its natural gas supply to Rhode Island via the interstate pipeline to meet customers' peak demand—i.e., to have the throughput needed to meet peak demand. Gas

2 The Company has capacity entitlements on multiple upstream pipelines that allow for the delivery of gas to its city gates in Rhode Island. The Company has four city gate, also known as take station, interconnects with Tennessee Gas Pipeline (TGP): Pawtucket/Cumberland, Lincoln, Smithfield, and Cranston. TGP is a pipeline system that transports natural gas from Louisiana, the Gulf of Mexico and South Texas to the Northeast section of the United States, including New York City and Boston. Additionally, the Company has ten city gate interconnects with AGT: Dey Street, Westerly, East Providence, Portsmouth, Tiverton, Burrillville, Barrington, Bristol/Warren, Cumberland, and Crary Street. The Company's transportation contracts provide access to domestic production fields, as well as liquid trading points that afford the Company a level of operational flexibility to ensure the least-cost dispatch and reliable delivery of gas supplies.

The Company's underground storage assets provide the Company with the ability to meet winter-season loads, while avoiding the expense of adding 365-day long-haul transportation capacity. By using long-haul capacity to fill storage, the Company is able to use those resources at a higher load factor. Underground storage supplies also allow the Company to serve peak-period requirements with off-peak priced gas supplies.

supply refers to the actual natural gas volumes needed to meet customer demand, which the Company accesses via the natural gas capacity.

As summarized below, the Company performs demand forecast and planning analyses to identify the need for supplemental gas supply to Aquidneck Island during the winter months.

2.2 Planning Process

The Company's gas-resource planning process is designed to demonstrate that it has a reliable resource portfolio to meet the combined forecasted needs of the Company's Rhode Island customers at the least-cost. The planning process includes the Gas Demand Forecast, the Gas Resource Portfolio planning, and Synergi Gas® Planning Studies. The Gas Demand Forecast is the customer load requirements for a design year and design day. The Gas Resource Portfolio planning is designed to meet those requirements in the most reliable and least-cost manner possible. The Synergi Gas® Planning Studies simulates the gas distribution system to ensure that it meets the design day requirements, converted to the 5% design peak hour.

2.2.1 Gas Demand Forecast

The Company employs a comprehensive methodology for forecasting customer gas demand using a series of econometric models to determine the annual growth expected for Residential Heating, Residential Non-Heating, Commercial, and Industrial markets. To determine the projected energy demand growth over the forecast period, the econometric models use economic, demographic, and historical and forecasted energy price data along with weather data. The Company uses this forecast of total energy demand to decide whether changes are needed to any incremental demand reduction policies and programs. For the purposes of addressing the gas capacity needs on Aquidneck Island, the Company downscaled the Rhode Island system-wide long-term gas demand forecast to develop a forecast specific to Aquidneck Island.[3]

When looking at natural gas demand, supply, capacity, and different alternatives, it is important to compare them on an "apples to apples" basis. Natural gas demand and capacity are expressed in terms of units of energy, measured in dekatherms (Dth),

3 As explained in Section III.G of the long-range plan, the Company develops a spatial gas demand forecast at the zip code level. The zip code-level forecast enables the Company to build gas network reinforcements to address gas demand growth where it is happening. For example, in the case of Aquidneck Island, the zip code-level forecast helps the Company to determine what the projected gas demand growth is in the towns of Portsmouth, Middletown and Newport. However, this zip code-level forecast only looks at design hour demand and does not provide the 365-day, daily gas demand forecast required to ensure that solutions can address not just the design hour need but also the design year need. For this reason, the Company downscaled its Rhode Island system-level long-term gas demand forecast to create a forecast specific to Aquidneck Island. See the Company's Gas Long-Range Resource and Requirements Plan for the Forecast Period 2020/21 to 2024/25 (filed 6/30/20), available in Docket No. 5043 before the Rhode Island Public Utilities Commission at http://www.ripuc.ri.gov/eventsactions/docket/5043page.html.

that are available during the coldest periods for which the Company plans, when it expects customers' gas demand to be highest, measured in Dth/day or Dth/hour.

The Company plans its gas supply resource portfolio and its gas distribution network to the "design year;" the "design day;" and the "design hour."[4] Natural gas utilities define these design standards in terms of heating degree days (HDD).[5] In Rhode Island, the Company defines the design year as 6,250 HDD with a probability of occurrence of 1 in 37.47 years, and its design day is defined as 68 HDD (-3 degrees Fahrenheit) with a probability of occurrence of 1 in 58.92 years. The design hour planning standard represents a 5% peak-hour factor (i.e., the peak hour requirement represents 1/20th of the peak day requirement).

Within the design day, the Company must ensure that there is enough capacity during peak hours when maximum demand for natural gas occurs, as customers are heating their homes and businesses, cooking, and using gas for hot water heating. If customers used the same volume of gas each hour, it would be sufficient to look at the daily demand and divide by 24 (hours) to ensure the system could provide that amount of gas each hour. The reality is that customers tend to use more gas in the early morning hours, typically 6 – 10 a.m., and again in the evening from 4 – 8 p.m. To ensure that the Company can provide the gas needed by customers during those time periods, the Company looks at its gas capacity needs during the design hour (i.e., the hour on the design day with the highest demand). Based on the intraday variation in customers' demand for natural gas, the Company uses a design hour planning standard equal to 5% (i.e., 1/20th) of the design day natural gas demand.

2.2.2 Gas Resource Portfolio Planning

The Company maintains a natural gas resource portfolio that is delivered via pipeline transportation and it also utilizes peaking resources (e.g., portable LNG) to meet customer requirements on the forecasted design hour, design day, design year, and normal year including a mid-winter cold snap. Pipeline transportation is available year-round, but on a design day the Company expects that approximately 70% of customer requirements will be met with supplies delivered via these interstate transmission pipelines while the remaining 30% will be met with supplies vaporized from the Company's portable LNG supply resources.

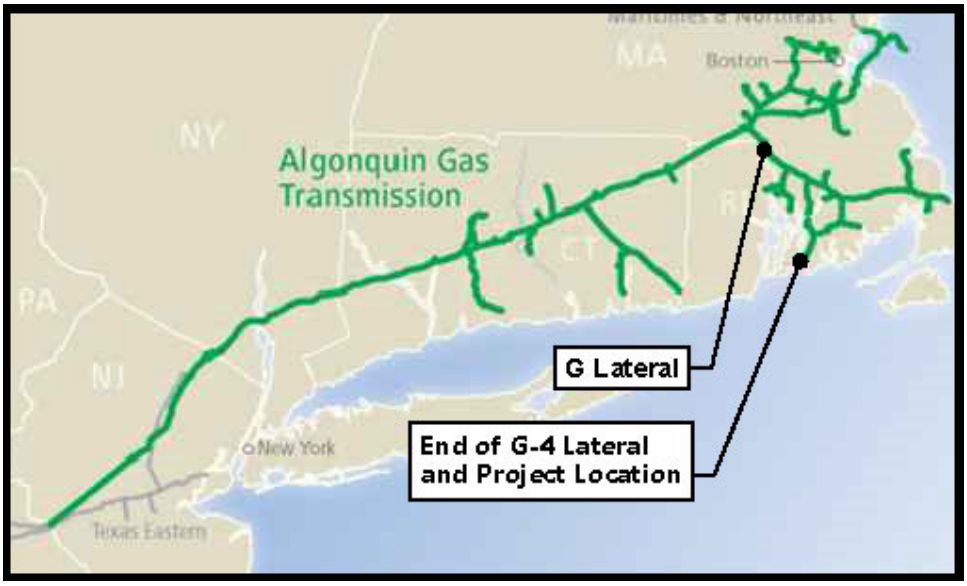
AGT owns and operates a Northeastern interstate natural gas transmission pipeline that extends from New Jersey up into Massachusetts. The AGT G-system is a lateral that branches off the AGT mainline in southern Massachusetts. Aquidneck Island is

4 The Company also evaluates its supply/capacity portfolio under a cold snap weather scenario. For the cold snap weather scenario, the Company uses a 14-day cold snap occurring in the coldest 14-day period of the Company's normal year by evaluating weather data over a long-term horizon (for the Company's Long-Range Resource and Requirements Plan submitted in June 2020, this period was 1977/78 to 2016/17). The Company uses the results of the cold snap scenario to test the adequacy of natural gas storage inventories and refill requirements.

5 A heating degree day compares the mean outdoor temperature recorded for a location over a 24-hour period to a standard temperature, 65° Fahrenheit in the United States. The lower the outside temperature, the higher the number of heating degree days. For example, a day with a mean temperature of 40°F has 25 HDD. Two such cold days in a row have a total of 50 HDD for the two-day period. See "Units and Calculators Explained: Degree Days," U.S. Energy Information Administration, available at https://www.eia.gov/energyexplained/units-and-calculators/degree-days.php.

served by the G-4 lateral off the AGT G-system via AGT's single 6-inch main crossing the Sakonnet River.

Graphic 1 Algonquin Gas Transmission Line



The Company's transportation contracts with AGT provide for deliveries of up to 22,089 Dth per day and up to 1,045 Dth per hour to Aquidneck Island via the single Portsmouth take station on the Island. To the extent that customer requirements exceed these limits, the Company presently relies upon portable LNG supply injected into the distribution system at the Old Mill Lane location. The Old Mill Lane portable LNG is described in more detail below; however, it can provide up to 650 Dth per hour of gas supply capacity based on the capacity of the LNG vaporization equipment that has been deployed there.

2.2.3 Hydraulic Modelling Planning Studies

The Company uses Synergi Gas® modeling software to simulate natural gas transmission and distribution systems. This hydraulic modeling software identifies, predicts, and helps the Company address its operational challenges, enabling day-to-day efficiency of gas distribution and transmission networks. Synergi Gas® software provides the results needed to make design, planning, and operating decisions using robust equations.

Once the design day send-out requirement is established, the Company converts this send-out to a peak hour based on a 5% peak-hour factor (i.e., the peak hour requirement represents 1/20th of the peak day requirement). The Company then applies the peak-hour requirement to its Synergi Gas® network analysis modeling software by means of growth factors generated from the spatial (i.e., zip code) forecast. The resulting peak-hour Synergi Gas® models are used to perform various analyses necessary for distribution system operations (e.g., regulator pressure settings, LNG requirements) and capital planning.

In addition to design day peak hour model, the Company performs a peak hour temperature Synergi Gas® network analysis that models 5°F increments starting from 65°F down to the design day temperature (-3°F). The peak hour temperature Synergi Gas® network analysis models are used to analyze system operations during days that are warmer than design day temperatures. For Aquidneck Island, the peak hour temperature Synergi Gas® network analysis models are used to calculate the portable LNG requirement for the winter season and to analyze supply vulnerability for the design day.

2.3 Need

Based on the analyses described above, the Company identified the immediate need to address capacity constraints and capacity vulnerability.

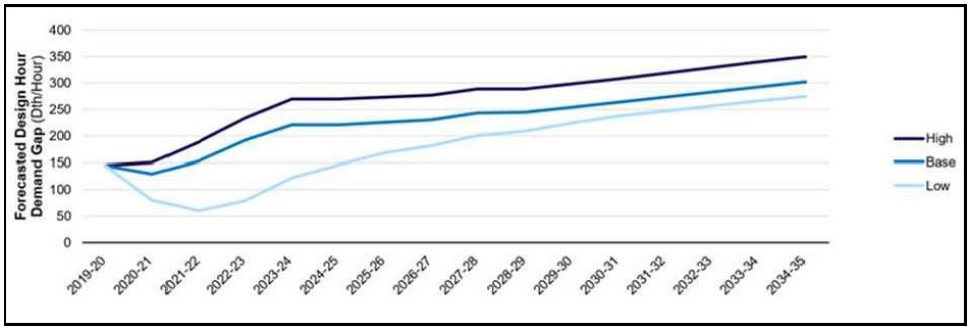
2.3.1 Capacity Constraint

The Company can only count on having access to a certain maximum capacity of natural gas from AGT at the Portsmouth take station on Aquidneck Island (up to 22,089 Dth/day and up to 1,045 Dth/hour), and this maximum capacity alone cannot currently meet Aquidneck Island's projected design day or design hour demand. The projected natural gas demand growth for Aquidneck Island described below will only exacerbate this gap between the projected peak gas demand on the Island and the AGT pipeline capacity on which the Company can rely:

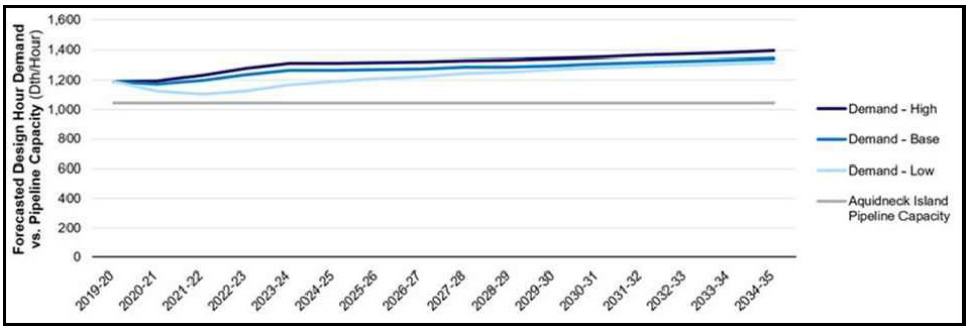
- For winter 2020-2021, the design day gap between projected Aquidneck Island gas demand and the available capacity on the AGT pipeline at the Portsmouth take station is 1,385 Dth/day (6% of the available pipeline capacity at the Portsmouth take station). The Company's long-term gas demand forecast projects that the design day gap will grow to 4,847 Dth/day (22% of current pipeline capacity available at the Portsmouth take station) by winter 2034-2035.
- For winter 2020-2021, the design hour gap was 129 Dth/hour (12% of the available pipeline capacity at the Portsmouth take station). The Company's long-term gas demand forecast projects that the design hour gap will grow to 302 Dth/hour (29% of the available pipeline capacity at the Portsmouth take station) by winter 2034-2035 (see Graphic 2 and Graphic 3).[6]

6 The differences in percentages between design day and design hour gaps relative to available AGT capacity are because design hour demand is 5% of design day demand, but the maximum hourly capacity on which the Company can count from AGT at Portsmouth is only 4.7% of the maximum daily capacity.

Graphic 2 Forecasted Design Hour Demand vs. Available Pipeline Gas Capacity for Aquidneck Island



Graphic 3 Forecasted Gap Between Design Hour Demand and Available Pipeline Gas Capacity for Aquidneck Island



The current gap between available firm pipeline capacity for Aquidneck Island and the peak gas demand on the Island is not a result of recent growth in customer demand. Rather, changes in AGT operating practices effectively limited the pipeline capacity that the Company can count on during periods of extreme cold. Specifically, under the Company's contracts with AGT, the calculated hourly flow limits are either 1/24th or 6% of the Maximum Daily Quantity (MDQ) – i.e., the maximum quantity of gas that can be delivered to the Company from the pipeline in a 24-hour period. Historically, AGT had not required the Company to manage hourly takes to fall within the calculated hourly flow limits so long as the Company did not exceed the MDQ. That meant that the Company had the operational flexibility to balance its natural gas deliveries across its multiple take stations on the AGT system, so long as the total remained within the MDQ limits. This flexibility allowed the Company to meet the peak demand needs on Aquidneck Island. However, on January 29, 2019, after AGT experienced a period of high hourly demand on its G system, AGT notified the Company (and all AGT customers served by AGT's G Lateral) that during peak periods it would exercise its tariff authority to require local distribution companies, including the Company, to limit their hourly takes to calculated hourly flow limits at each take station. For Aquidneck Island, the limits are 22,089 Dth/day and 1,045 Dth/hour, which are less than the Company historically has planned to have gas

capacity for use on Aquidneck Island.[7] As such, the Company now makes its planning decisions to prepare for the potential interruption of operational flexibility by AGT.

This gas capacity/demand gap materialized "overnight" with a change in AGT practice and created a new need to plan for reduced gas capacity available at the Portsmouth take station. The portable LNG operations at the Old Mill Lane facility in Portsmouth addresses this capacity/demand gap.

2.3.2 Capacity Vulnerability

Even with the Company planning for the lower capacity at the Portsmouth take station, the Company's ability to meet customer requirements is also vulnerable to an interruption to pipeline gas supply. Although interstate pipelines remain a highly reliable means of transporting natural gas, the Company has observed disruptions to the natural gas system as a result of compressor failures, ruptures, and unplanned outages. The Company has exposure to such issues, but Aquidneck Island is particularly vulnerable given its location at the "end of a pipe" on the AGT G-system. See Graphic 1. The Portsmouth take station that serves Aquidneck Island is at the end of the AGT G-4 lateral, which is itself supplied by the G lateral on AGT. This lateral-off-a-lateral configuration downstream of various interconnects and take stations results in greater risk of interruption for customers on Aquidneck Island if there is a pipeline disruption, even if the disruption is well upstream of Portsmouth. In addition, the Portsmouth take station is connected to the AGT pipeline system via a single 6-inch main crossing the Sakonnet River. This creates the risk of a single point of failure. While this is by no means unique in terms of National Grid's gas network, a long-term solution that would mitigate this single-point-of-failure risk would provide an ancillary benefit in addition to addressing the vulnerability to upstream capacity disruptions.

The Company analyzed different levels of reductions of AGT pipeline throughput of 25%, 50%, 75%, and 100% of the maximum available capacity of 1,045 Dth/hour. Table 2-1 shows how Old Mill Lane portable LNG provides sufficient capacity presently to largely avoid customer service interruptions even in the face of the loss of nearly 50% of the expected gas capacity from AGT at Portsmouth during extremely cold conditions (i.e., design day conditions of 68 HDD, -3 degrees Fahrenheit). Even with loss of 100% of AGT capacity due to a disruption, Old Mill Lane LNG could support the majority of customers on Aquidneck Island. As demand is projected to grow over time, for any given level of AGT capacity disruption, expected customer service interruptions would grow. This analysis is meant to be

7 AGT's ability to impose the limits is provided for in AGT's tariff approved by the Federal Energy Regulatory Commission (FERC). The January 29, 2019 notice expired on April 1, 2019, and due to the overall mild winter of 2019/20 AGT did not reissue it. The Company, however, is not aware of any material improvements to AGT's system that would ameliorate the conditions that prompted the warning in 2019. Thus, the Company reasonably expects that AGT may issue a similar notice in the future. AGT may even issue such orders without first issuing another warning should extreme cold temperatures or system issues arise.

indicative of the magnitude of customer service interruptions and not a definitive analysis.[8]

Table 2-1 Estimated Customer Service Interruptions in a Contingency Event (AGT Disruption) under Design Day Conditions with Old Mill Lane Portable LNG in Service

% Reduction in Capacity Available from AGT during Design Day (68 HDD) Conditions	Estimated % of Customers with Service Interrupted with Loss of AGT Capacity
	Old Mill Lane Portable LNG
	2020/21
0%	0%
25%	0%
50%	1%
75%	24%
100%	44%

2.4 Conclusion

The capacity constraint and capacity vulnerability on the Company's system creates the immediate need for the Company to mobilize portable LNG operations on Aquidneck Island on a seasonal basis or in response to a supply interruption. The Project will address the projected peak-hour hour usage on Aquidneck Island over and above the AGT capacity on which the Company can plan to have available at the Portsmouth take station. The Project will also serve as a contingency in the event of upstream disruptions affecting pipeline deliveries into Portsmouth.

8 This analysis looks at distributions systems on the Island that could be shut down relatively quickly; it did not look at targeted prioritization of large customers for load-shedding in a contingency event. For the purposes of this study, Company updated an initial customer service interruption analysis done in 2019 for upstream issues that reduce pipeline gas deliveries into Portsmouth as well as for the loss of the Old Mill Lane portable LNG operations. The original analysis evaluated interrupting service to a combination of large-use customers, individual distribution systems, or areas/zones of the low-pressure system in Newport. Regarding the Newport low-pressure system, three zones of approximately 4,000, 1,500, and 1,100 customers were identified based on 16 existing distribution valves that have been confirmed for availability/operability.

3

Project Description and Proposed Action

3.1 Description of Project

3.1.1 Property

The Project is mobilized on a 5-acre (217,800 square feet) parcel located on Old Mill Lane in Portsmouth, Rhode Island (the "Property"). See Figure 3-1. The Project occupies approximately 30,000 square feet of the Property and will be referred to as the "Project Site". The Property is owned in fee by the Company and is located adjacent to where the distribution system connects to the transmission line that supplies Aquidneck Island. The Property is also the former propane tank site that provided peaking capability for the Aquidneck Island natural gas distribution system until Providence Gas expanded its pipeline supply capability on the Algonquin pipeline in the late 1980's. The propane tanks were removed in 2014 and the Property remained vacant until the Spring of 2018.

The history of LNG at the Property began in 2001 when it was used for seasonal peak-shaving during the winter of 2001-2002. This site was needed while the permitting process was being completed for the Navy Yard LNG site. The Property was used again in 2018 to backup up the natural gas supply during the inspection of the transmission pipeline supplying the Island. The next mobilization was in January of 2019 following a loss of pressure on the interstate supply line to Aquidneck Island. For the last two winters, the Property has supported the winter LNG operations which serve the dual function of providing peak shaving and as a backup to the natural gas supply in event of a supply disruption.

The permanent changes to the Property include the installation of lights on utility poles, the gas riser/manifold, and the fence and gate along Old Mill Lane. During the most recent mobilization, shades were added to the lights to reduce the amount of light leaving the property. A pole-mounted transformer was also installed prior to the last mobilization as a sound mitigation measure that allowed the generator to be replaced with local electric service. In addition, during the operation a heavy-duty wind-resistant privacy screen is added to the fence. The Company is also considering a few additional improvements to the Property including installing new gate and fence to provide additional visual screening from Old Mill Lane and adding landscaping along Old Mill Lane.

3.1.2 Equipment

The Project utilizes the following seasonal equipment: portable vaporizers, portable booster pumps, portable storage tanks, portable generator, and a mobile office (the "Equipment"). The site is secured by an existing fence and gate along Old Mill Lane and temporary fence around the perimeter of the Project Site. See Figure 3-2. The permanent and temporary chain link fences are approximately six (6) feet tall. The seasonal mobilization typically takes two weeks and begins in November with the mowing of vegetation, installation of composite construction mats that provide a stable work surface, and installation of the temporary fence around the perimeter of the Equipment set up. Once the initial setup is completed, the Equipment is delivered, together with an office trailer, portable lavatory, and portable diesel-powered redundant generator. Full time security is present while Equipment is present on site. Additionally, National Grid personnel are present full time when the Equipment is operational.[9] Currently, one representative of the owner of the vaporization equipment (Stabilis) is also scheduled to be on site whenever the Equipment is being used.

The Equipment is expected to be fully operational on December 1 and taken out of service by April 1. Demobilization takes approximately two weeks and is expected to be completed by the end of April. Once the Equipment and temporary fencing are removed from the Property, the area is reseeded, stabilized with blown straw mulch, and the Project Site is allowed to return to its natural state.

National Grid has contracted with an equipment rental and support services vendor, Stabilis, who will be responsible for providing and operating the portable LNG storage and vaporization Equipment at Old Mill Lane during the seasonal operation for the Winter of 2021-2022.

In an "average" year, the Old Mill Lane facility would not be used, and even in a design year the facility might only be used a few days each winter, with limited (if any) trucking traffic.[10]

9 "Operational" means that Project is fueled and ready to immediately respond to a loss of service from the transmission system.

10 The Company did not need to use the Project to offset natural gas demand on Aquidneck Island during the winter of 2019-2020 and 2020-2021

3.1.3 Mobilization Sequence

As previously discussed, the operational set up of the portable LNG facility will be seasonal. The mobilization sequence will proceed as follows:

- **Establishment of Controls.** Existing utilities will be marked. Erosion and sediment control measures will be installed per a soil erosion and sediment control plan (SESC) that the Company, with input from local agencies and contractor, will prepare. The SESC will address in detail staging, materials delivery, and other considerations associated with mobilization including relevant environmental protection issues.
- **Worksite Preparation.** Vegetation mowing and minor tree trimming may be required to facilitate safe placement of Equipment. Equipment locations will be staked on the ground or marked on the Property.
- **Mobilization and Operation of Seasonal Equipment.** Composite construction matting will be temporarily placed to allow for a stable work surface for LNG Equipment to reside. A crushed stone transition ramp is installed between Old Mill Lane and the construction matting to allow for LNG Equipment to be driven onto the site. Secondary containment will be installed around the perimeter of the Equipment. Additional, temporary containment will be used during LNG refueling.
- **Demobilization.** Equipment staged for the seasonal operational set up will be removed off site by utilizing low bed trailers and log trucks for construction mats.
- **Restoration.** Matted areas will be allowed to naturally revegetate and supplemented with a seed mix. All exposed soils will be stabilized with a blown straw mulch following mat removal.

Photographs of the Project Site are provided as Figure 3-3 through 3-5.

3.2 Safety and Public Health Considerations

3.2.1 Safety Record

National Grid owns and operates a fleet of permanent and portable LNG facilities varying in size and complexity, of which one portable and three permanent facilities are located in Rhode Island. National Grid is committed to the safe operation of all these assets. The LNG facilities have been designed, constructed, and upgraded, to meet or exceed government and industry standards. These facilities utilize advanced technology and are monitored by qualified and experienced professionals. Regular maintenance and inspections are also performed to ensure the safety of the public and our employees.

The Company has maintained an excellent LNG safety track record over the years, attributable to several factors. First, the industry as a whole has an excellent safety record because it is continuously evolving both technically and operationally to

ensure safe and secure operations. Technical and operational advances include everything from the engineering of LNG facilities, to operational procedures, to technical competency of personnel. Second, the risks and hazards associated with LNG are well understood allowing safeguards and mitigations to be incorporated into technology and operations. Third, rigorous standards, codes and regulations which govern the LNG industry and the Company are in place to prevent incidents from occurring and to reduce or mitigate the impacts of incidents if they do occur. Finally, as described in Section 3.2.3, the Company implements a robust and industry-leading process safety program, as well as emergency planning and prevention programs. The Company strives to maintain a perfect safety record and is committed to ensuring the security of its LNG facilities to prevent unauthorized access and breaches. The Company has made significant operational and financial commitments to ensure that it succeeds.

The seasonal, portable LNG facility at Old Mill Lane is supported by expert firms specializing in portable LNG transportation and operation. The Company also staffs the facility with qualified and experienced internal personnel who oversee the facility and its operation. The Company personnel carefully monitor and regulate operating parameters, including gas flows, temperatures, and pressures, and maintain constant communication with the Company's regional Gas Control Center. The Company personnel are assisted by contracted professional security officers to maintain constant site security throughout the duration of the seasonal mobilization.

3.2.2 Federal and State Rules Governing Mobile LNG Vaporization

The Pipeline and Hazardous Materials Safety Administration (PHMSA) has exclusive authority to establish and enforce safety regulations for onshore LNG facilities like the portable LNG facility at Portsmouth. Facilities connected to intrastate gas transmission pipelines or gas distribution systems are typically inspected for compliance to federal safety regulations by a State agency through an agreement with PHMSA. The DPUC is the Rhode Island state agency with jurisdictional authority to inspect the Portsmouth portable LNG facility.

PHMSA LNG safety regulations are codified in Title 49 C.F.R. Part 193. 49 CFR §193.2013 identifies documents incorporated by reference, partly or wholly, in Part 193 which are enforceable under federal regulations. This includes the National Fire Protection Association (NFPA) 59A, 2001 edition – *Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG)*. 49 CFR §193.2019 addresses mobile and seasonal LNG facilities, and exempts such facilities from requirements of Part 193 if, like the portable LNG facility at Portsmouth, they are in compliance with applicable sections of NFPA 59A, 2001 edition.

3.2.3 Safety Process and Guidelines

The Company performed multiple process safety reviews to identify, quantify and manage risks to employees as well as to members of the public in the nearby areas

of this site. These reviews included facility siting assessments to understand and reduce the potential risk associated with the Old Mill Lane location, which is near a public road. It also included process hazard analyses of the injection station's design to understand and reduce the potential risks that could occur during the unloading and injection process.

3.2.4 Vendor Selection Process and Safety Records

The Company selects the Project vendor through a Request for Proposals (RFP) process. The RFP includes exhibits to inform bidders of the Company's policies and procedures with which successful bidders must comply. In addition, the Company utilizes ISNetworld to pre-qualify all service providers by obtaining regulatory performance and Company specific documentation. ISNetworld's team of safety, health, environmental and insurance professionals reviews all service provider information and assigns a grade based on the Company's grading criteria. The Company requires bidders to subscribe to and receive an acceptable rating or higher from ISNetworld for their health, safety and environmental oversight and review for the duration of the Agreement resulting from this RFP.

The Company's Safety, Procurement and Risk organizations review the information provided by bidders to ISNetworld and in the RFP exhibits and evaluate each bidder's compliance with the Company's Safety, Procurement and Risk policies. Only those bidders in compliance with such policies shall be considered. Bidders may also include information regarding experience and qualifications that will enhance the success of the Project through design, engineering and construction associated with the Scope of Work.

3.2.5 Coordination and Training with Local Officials and Emergency Responders

The Company has made a concerted effort to coordinate with and train local officials and emergency responders. The Company has developed a response plan to an LNG incident at the Portsmouth (Old Mill Lane) facility as documented in the Rhode Island Gas Emergency Response Plan. This plan includes comprehensive Emergency Procedures and evacuation procedures developed in coordination with the local fire department and based on rigorous process safety evaluations and calculations. The Company has and will continue to be fully integrated with local police, fire, and town administration officials for all operations conducted at Old Mill Lane, Portsmouth. Engagements with local municipalities include emergency management and town council meetings which have primarily focused on operational activities and safety measures. More extensive engagements with police and fire departments include first responder site visits and familiarization; LNG fire-fighting training; incident impact analysis (to enable community safety planning); and operational notifications such as LNG delivery schedules and truck routing. A log of community and residential engagements since 2018 can be found in Appendix A.

3.3 Reliability

Portable LNG has historically been viewed as a contingency operation to augment baseload supply or capacity in the event of an unplanned shortage, or in support of planned pipeline maintenance operations that pose a risk or require interruption of supply to the Company. As a contingency, this capacity option is reliable, and National Grid has a demonstrated history of successful deployments of portable LNG operations across its service territory. These operations have been successful in both short-term and longer-term applications ensuring customer reliability during off-peak and peak periods of demand. Portable solutions are most viable to support contingency and peaking options for supply capacity–i.e., to be available to support firm gas demand during the coldest winter periods. Additionally, in certain applications, portable facilities can support emergency operations. However, staffing levels and availability of real estate must be carefully planned to site any long-term portable pipeline operation.

Inherent with this option is the necessity to procure LNG supply upstream of the Company's system and transport the supply to the portable LNG site. The transportation could be impacted by multiple events (e.g., road/bridge closures due to automobile accidents or construction, high winds, and inclement weather) with the risk of a customer service interruption if supply cannot be delivered on-time to meet the demand. The portable LNG Equipment deployed at Old Mill Lane considers those risks, and the operation includes on site storage to mitigate the transportation risks associated with inclement weather and other transportation impacts allowing greater flexibility of operations. The National Grid operations team works from a multi-day forecast that provides the transportation vendor an ability to pre-position vehicles ahead of any impending cold or inclement weather. Additionally, National Grid has previously conducted quantitative risk assessments for similar transportation operations and as a result has incorporated additional procedures and controls including regular audits of LNG transportation with our vendors.

3.4 Stakeholder Engagement

3.4.1 Aquidneck Island Long-Term Capacity Study Engagement

In September 2020, National Grid published its Aquidneck Island Long-Term Gas Capacity Study outlining the gas supply challenges and constraints facing Aquidneck Island. The study proposed four potential long-term energy solution portfolios along with an anticipated timeframe of need for portable LNG associated with each solution. The goal of the study was to help inform the communities and gather feedback from a variety of key stakeholders on a preferred pathway forward, which included continuing LNG operations at Old Mill Lane.

Although not inclusive of all engagements, the key stakeholder engagements that were conducted between September 2020 and December of 2020 are listed in the

table below. Note that these engagements included a public Open House and website that provided formal feedback options.

State/Local Leader/Regulatory Briefings on Proposed Report Options	Key Division (DPUC) Personnel, Aquidneck Island Town Administrators, OER, Gov's office, Key Legislators, and Navy	Sept 1-11
Aquidneck Advisory Group (AAG)	AAG Members – Division, OER, Aquidneck Island Town Administrators, Aquidneck Island Economic Development Groups, Newport Chamber	Sept 14
SRP Technical Working Group Meeting	System Reliability Procurement TWG Members – Acadia Center, NE Clean Energy Council, Green Energy Consumers Alliance	Sept 23
Aquidneck Island Webpage – site to view full study, feedback form, survey, and Open House info	Viewable to Public	Sept 23
Social Media and On-Bill Messaging	AI Facebook Accounts and Aquidneck Island Customer Bills	Started Oct 1
Legislator Briefing	Aquidneck Island Senators and Representatives	Oct 8
AI Energy Matters Open House – Open to Public	Members of Public, Town Officials, and Legislators	Oct 14
Conservation Law Foundation	CLF Leadership	Oct 23
Customer Advocacy Groups	Center for Justice	Oct 23
Portsmouth Town Council Meeting	Portsmouth Council and Public	Oct 26
Middletown Town Council Meeting	Middletown Council and Public	Oct 27
Newport Town Council Meeting	Newport Council and Public	Nov 12
Reminder for Feedback Email to all AI Gas Customers	13,000+ Aquidneck Island Gas Customers	Nov 20

As a result of the outlined stakeholder engagement, National Grid received feedback from our customers and community leaders about their priorities for the energy future of Aquidneck Island. In January 2021, National Grid held briefings with key stakeholder groups to summarize the findings of feedback. The Company's approach included seeking approval for the temporary use (for next 4-5 winters) of LNG at Old Mill Lane while advancing a more permanent path forward that harnesses the momentum of the clean energy future, ensures reliability, and recognizes the importance of customer choice.

3.4.2 Abutting Property Owner Engagement

Numerous residential meetings, forums, and engagements have been conducted regarding operations at Old Mill Lane, Portsmouth, with anticipated engagements forthcoming as required to address impacts (sound/lighting) and safety concerns from nearby residential owners. A log of community and residential engagements since 2018 can be found in Appendix A.

In recognition of feedback from area residents, several site enhancements have already been made to mitigate sound and lighting impacts (with positive feedback already received on enhancements from abutting residences). These site enhancements are listed below.

- Electrical transformer installation to reduce generator noise, fuel deliveries, and emissions;
- Light shields on all overhead lighting to reduce light pollution;
- Heavy duty, wind-resistant privacy screen on fencing to reduce visibility;
- Improved berm design and vehicle protection barriers for enhanced site safety;
- Vapor recovery system to reduce blowing down vessels to atmosphere for reduced noise and emissions; and
- Adjust boiler settings to limit evening noises.

3.5 Costs (O&M and Estimated Project)

Annual operation and maintenance activities for portable LNG operations includes internal labor and vendor equipment and labor to support standby coverage from December 1st through March 31st and operation for each cold weather event. In addition, the Company incurs internal labor costs and vendor costs to support operations and maintenance associated with maintaining the Property when the Equipment is not on the Property. Based on the current plan to contract with a vendor for use and operation the Equipment, the Company anticipates future annual operation and maintenance costs to be approximately $1.5M.

The Company incurred capital and operational investments for engineering and design, development, material procurement, site preparation, including interconnecting to the distribution system, testing and commissioning. The Company incurred approximately $2.9M to date. The Company estimates future investment of $1M for siting, which includes the potential construction of mitigation options.

3.6 Project Schedule

The Company requires the Equipment to resolve the capacity constraint need until a long-term solution is selected. If the long-term solution selected does not mitigate this single-point-of-failure risk addressing the vulnerability to upstream capacity disruptions, the Company requires the Equipment to resolve the vulnerability need at 45 HDD (20°F) conditions or colder. As discussed in previous sections, the set-up schedule would begin each year in November and be removed from the site in April. For emergency responses, the Equipment would be mobilized to the Property as quickly as possible and remain until it is no longer needed.

4

Alternatives to the Proposed Action

4.1 Introduction

This section describes the alternatives that were identified to address the immediate need for peak shaving during the winter months on Aquidneck Island and the need for an emergency backup LNG vaporization site that is capable of supplying the entire distribution system in the event the supply line to the Island is compromised. Due to the short timeline to meet peak-shaving need, the alternatives were limited to ones that could be immediately mobilized. The peak shaving alternatives are described in Section 4.2. Section 4.3 reviews the alternative locations for emergency vaporizing LNG to supply the Island.

4.2 Peak Shaving Alternatives

The Company's location assessment for the Equipment was guided by the following criteria:

- Ownership and/or control of the site (favoring sites owned by the Company or currently for sale);
- Accessibility for the equipment and delivery trucks; parcel size;
- Electrical supply (sought to reduce reliance on generators to minimize impact on neighbors);
- Phone service (reliable communications to/from Gas Control required); and
- Ability to deliver LNG into the 99 pounds per square inch ("psig") system.

The last criterion is the most critical since connecting into the 99 psig system is the only way to support the Aquidneck Island distribution system in the event that supply from the transmission line is constrained or lost. For the purpose of this analysis the no-build and non-infrastructure alternatives are also included.

4.2.1 No-Build and Non-Infrastructure Alternatives

The No-Build Alternative does not respond to the immediate issue of providing peak shaving to offset natural gas demand on a peak day. In addition, this alternative does not allow the Company to meet its regulatory obligation to provide safe and reliable service. While there would be no capital expense associated with this alternative, this alternative would leave the Aquidneck Island natural gas distribution system at risk of an outage on a peak day and/or due to a capacity constraint.

As part of its No-Build Alternative analysis, the Company considered the impacts of energy efficiency on the Project's need. However, while the Company's many energy efficiency programs will help its customers manage their energy costs, they are not, on their own, an acceptable alternative to the Project. The gas energy efficiency programs are designed to reduce annual natural gas consumption but are not specifically designed to reduce peak demand. In addition, such measures could not be implemented to meet the immediate need.

The Company currently offers non-infrastructure alternatives which are two gas demand response pilots. Under the terms of these pilots, Commercial & Industrial (C&I) customers can receive financial incentives for curtailing gas usage during peak periods. These reductions are typically delivered through deferring the utilization of gas for use in industrial processes, through adjusting thermostat settings during peak periods, or through temporarily switching to alternative heating sources. Presently, two customers on Aquidneck Island participate in the gas Extended Demand Response pilot, contributing 640 Dth/day of demand reduction by changing to a backup fuel (oil) to reduce demand over the course of the gas day. An additional two customers participate in a Peak-Period Demand Response program, in which the facilities reduce demand during the peak morning hours (6AM-9AM) without the use of backup fuels. Despite the reduction during the Peak Period, these facilities typically do not produce a reduction in terms of total gas day consumption due to pre- and post-event heating.

For all these reasons, the No-Build and Non-Infrastructure Alternatives failed to satisfy the need.

4.2.2 Navy Yard Alternative

The Naval Station received an EFSB license to operate as a permanent LNG transfer station in September 2001. The Company currently has site control through a lease with the Navy that expires September 2026 and the site is configured to connect to the 99 psig system. In addition, the vaporizer equipment is permanently installed. This site meets most of the criteria for locating the Project; however, the U.S. Navy is restricting access to the Naval Station facility to the point that it would be

impossible for the Company to depend on this site. Specifically, the Navy limits the Company's access to certain hours of the day and it restricts the number of truck deliveries allowed per day.[11] These limitations are inconsistent with the need for short-notice access for multiple LNG delivery trucks in the event of an interruption of the natural gas supply to Aquidneck Island. Moreover, the site is not available in the long-term because the U.S. Navy has indicated that it does not intend to renew the Company's lease due to its own plans for use of the site.

The Company had to reject the Naval Station site as the location for the Project because the use limitations and future availability make it impossible for the Company to address the need.

4.2.3 Old Mill Lane (Preferred Option)

The Property is the preferred location for the Project. It is owned in fee by the Company, located adjacent to where the distribution system connects to the transmission line that supplies Aquidneck Island, and located at the beginning of the Aquidneck Island 99 psig system. In addition, the site offers reliable electrical supply and telephone service, is accessible to LNG trucks, has sufficient size for this temporary use, and it is not subject to the access limitations.

4.2.4 Conclusion on Peak Shaving Alternatives

For the reasons summarized in the previous sections, the Company concluded that mobilizing the equipment at the Property was the only viable solution that met the immediacy required to provide the backup support needed for the Aquidneck Island distribution system while a permanent solution is evaluated, engineered, permitted, and constructed.

4.3 Emergency Backup Alternatives

As noted in Section 2, the emergency backup need is unrelated to the seasonal peak shaving activities that are required to support the natural gas supply to the Island. The emergency backup location is needed in the event of a real or potential loss of supply to the Island. In such a situation the site will be temporarily mobilized until the transmission pipeline is back in service. This need is only likely to occur on limited basis such as during the inspection or repair of the natural gas transmission pipeline. The emergency backup location must be able to supply the entire natural gas distribution system on Aquidneck Island.

4.3.1 No Build Alternative

The No-Build Alternative means that the Company would not have a viable location to provide backup supply to the local distribution system in the event of a potential or scheduled constraint to the supply line serving the island. Short of removing the

11 The Company was unsuccessful in obtaining an amendment to its lease which would ease some of these restrictions.

need for natural gas on Aquidneck Island, the no-build alternative would leave the natural gas distribution at risk in the event the transmission supply to the island is taken offline. For this reason, the Company rejected the No-Build Alternative.

4.3.2 Non-Infrastructure Alternative

The Non-Infrastructure Alternative may reduce the need through more efficient appliances or by switching customers to heat pumps. However, a non-infrastructure solution will not completely remove the need for the natural gas distribution system, so it was rejected by the Company.

4.3.3 Use of Permanent Peak-Shaving Solution

The Company is investigating peak-shaving alternatives and, if constructed, it is possible that a different site could be used to serve as an emergency backup to natural gas distribution system on Aquidneck Island. The ability for such a facility to serve in this capacity is one of factors of the alternative analysis for the peak-shaving alternatives that are under consideration. However, as of now there are no other viable peak-shaving sites immediately available.

4.3.4 Old Mill Lane (Preferred Option)

Based on studies, Old Mill Lane is the only viable location where the Company has site control and proximity to the natural gas distribution system that would allow a LNG vaporization system to supply the entire island during an outage. In addition, the site offers reliable electrical supply and telephone service, is accessible to LNG trucks, has sufficient size for this use, and it is not subject to the access limitations applicable to the Naval Station. When necessary, the site would be mobilized in a manner that is similar to the current winter mobilizations. Assuming that the transmission pipeline is not in need of repair or replacement, this mobilization is likely to occur for one month every seven years as a backup to the natural gas supply during the inspection of the transmission pipeline. However, there is the chance that the site could be needed for longer durations in the event of a prolonged outage.

4.3.5 Conclusion on Project Alternatives

For the reasons summarized in the previous subsections, the Company concluded that the Property is the only viable solution for an emergency backup location.

5

Description of Affected Natural Environment

This section of the Siting Report describes the existing natural environment that may be affected by the proposed Project, both within and surrounding the proposed seasonal portable LNG operation. This section includes a detailed description of all environmental characteristics within and immediately surrounding the proposed Project. The following section describes the specific natural features which have been assessed for the evaluation of impacts and the preparation of a mitigation plan. Information pertaining to existing site conditions has been obtained through available published resource information, the Rhode Island Geographic Information System (RIGIS) database, various state and local agencies, and field investigations of the Project Site.

5.1 Project Study Area

A Project Study Area was established to accurately assess the existing environment within and immediately surrounding the Project Site. The Project Study Area (or Study Area) consists of a half-mile radius centered on the proposed seasonal Portable LNG Operation Property (Project Site) in Middletown, Rhode Island (refer to Figure 5-1). The boundaries of this Study Area were selected to allow for a detailed inventory of existing conditions within and adjacent to the Project Site.

5.1.1 Climate and Weather

Rhode Island has a moist continental climate with four distinct seasons. Its weather is tempered by sea winds, particularly in the Seaboard Lowland, which has a more moderate climate than the rest of New England. Aquidneck Island in particular enjoys a moderate climate due to its close proximity to the Narragansett Bay and

influence from the Gulf Stream which helps to minimize extreme temperatures (City of Newport, 2017). Although the Bay has a modifying effect, temperatures in Rhode Island tend to fluctuate by large ranges both daily and annually. The mean annual temperature of Rhode Island's coastal areas, such as Aquidneck Island, is 51 degrees Fahrenheit, with an average minimum temperature of 30 degrees Fahrenheit and an average maximum temperature of approximately 70 degrees Fahrenheit (Runkle et al. 2017, City of Newport, 2017). Rhode Island is characterized by an even distribution of precipitation throughout the year with an annual average of 42 to 46 inches over most of the state, with approximately 20 inches of that total attributed to snowfall in the coastal Narragansett Bay regions (Runkle et al. 2017). Rhode Island experiences a considerable diversity of weather over the short term and long term scale (Runkle et al. 2017).

Climate change has had measurable effects in the state. According to the 2017 NOAA Rhode Island Climate Change Report and the 2012 Rhode Island Climate Change Commission Report, the average air temperature in Rhode Island has increased by three degrees Fahrenheit over the last century and the water temperature at the surface of Narragansett Bay has risen by four degrees Fahrenheit since the 1960s. Climate change has also resulted in an increased frequency of rainfall events that lead to flooding and longer periods of hot, dry weather that lead to drought and strain the state's water resources. These climate effects have begun to impact the local economy; farmers experience less predictable rainfall which translates to uncertain crop yields while the fishing industry has been forced to adapt to a change in fish species composition from cold-water, bottom-dwelling (benthic) species to warm-water, water-column (pelagic) species. Rhode Island will continue to experience warmer temperatures, more extreme weather events such as intense precipitation and flooding, and sea level rise (Runkle et al. 2017, Rhode Island Climate Change Commission, 2012).

5.2 Geology

5.2.1 Bedrock Geology

The Study Area is located within the Seaboard Lowland section of the New England physiographic province. Bedrock in the Study Area primarily consists of the Narragansett Bay Group – Rhode Island Formation (Pennsylvanian Age). This group consists of meta-sandstone, meta-conglomerate, schist, carbonaceous schist, and graphite (Hermes et al., 1994). This formation is part of the Esmond-Dedham Subterrane Narragansett Bay Group – deposited upon older rocks of both West Bay and East Bay parts of the Esmond-Dedham subterrane (Hermes et al. 1994).

The primary rock type in this area is arenite, a "clean" sandstone that is well-sorted, contains little or no matrix material, and has a relatively simple mineralogic composition; specifically, a pure or nearly pure, chemically cemented sandstone containing less than 10 percent argillaceous matrix (Hermes et al. 1994).

5.2.2 Surficial Geology

The present landscape of Aquidneck Island, as with much of the northeastern United States, was shaped by the repeated advance and retreat of glaciers since the beginning of the Pleistocene epoch between 2.5 and 3 million years ago (Raposa and Schwartz, 2009). The last glacial period to affect the Study Area was the Wisconsin ice sheet, approximately 10,000 to 12,000 years ago (Raposa and Schwartz, 2009). The surficial geology in the Study Area is generally derived from the action of the advancing ice sheet overriding the landscape.

Glacial till deposits were formed as the glacial front advanced and overrode the landscape. This process would reshape the landform, grinding down hills and depositing material in valleys creating the streamlined elongate hills with axes oriented along the direction of glacier travel known as "drumlins". The Study Area is generally centered along the axis of a drumlin. The material deposited by this process is classified as glacial till and consists of a mix of separates sized from boulders and stones down to sand, silt, and clay. The form of glacial till found in the Study Area is lodgement till. Lodgement till was deposited directly under the glacier as it advanced and ablation till was deposited from material atop and within the ice as it melted. Lodgement till is the dominant surficial deposit in the Study Area and is characterized by a dense, slowly permeable layer two or three feet below the ground surface locally known as "hardpan". The glacial till deposits present in the Study Area are typically capped by windblown deposits of silt or silt and fine sand.

Very small areas of alluvial sediment and organic deposits are also found with the Study Area. Alluvial soils form in Holocene-age stream sediments. Organic deposits occupy portions of larger wetland systems.

5.2.3 Geological Hazards

Rhode Island is located in a region of the North American plate and falls within seismic zone 2A with 10-14 percent ground acceleration, which translates to a "moderate" seismic hazard (Petersen et al. 2008; US Seismic Zone Map). This means that people may experience moderate intensity shaking that can lead to slight damage during an earthquake event (FEMA Earthquake Hazard maps). There are no significant geologic fault lines in Rhode Island or New England, and the U.S. Geological Survey (USGS) Earthquake Hazards Program identifies all of Rhode Island as occurring in a low seismic risk area (<2 percent peak ground acceleration). Earthquakes that occur in the northeast, which is considered an intraplate area, do not meet the assumptions of the plate tectonic theory since there is no obvious relationship between earthquake occurrence and fault lines in intraplate areas (Kafka, 2014).

A commonly accepted explanation for the occurrence of earthquakes in the northeast is that "ancient zones of weakness" are being reactivated by the present stress field (Kafka, 2014). This theory hypothesizes that pre-existing faults and other geologic features formed during ancient geological episodes persist today and that earthquakes occur when present-day stress is released along these zones of

weakness (Kafka, 2014). Earthquakes occur infrequently in Rhode Island and surrounding New England and therefore present a minimal risk for the design life of the Project.

5.2.4 Sand and Gravel Mining

There are no quarries or regulated mining facilities located in the Study Area, likely due to the unsuitable surficial geology of the area.

5.3 Soils

Detailed information concerning the physical properties, classification, agricultural suitability, and erodibility of soils in the vicinity of the Study Area are presented in this section. Descriptions of soil types identified within the Study Area were obtained from the Natural Resources Conservation Service (NRCS) Web Soil Survey[1], the Soil Survey of Rhode Island (Rector, 1981), and from on-site investigations conducted by VHB. The Soil Survey delineates map units that may consist of one or more soil series and/or miscellaneous non-soil areas that are closely and continuously associated on the landscape. In addition to the named series, map units include specific phase information that describes the texture and stoniness of the soil surface and the slope class. A total of six named soil series and one great group (Udorthents) have been mapped within the Study Area. Table 5-1 lists the acreages and selected characteristics of the 10 soil map units found within the Study Area. A map unit consists of one or more named series along with other unnamed inclusions. Further information on map unit composition can be obtained from Web Soil Survey. Figure 5-2 depicts soil classes grouped by erodibility hazard and presence soils that are classified as hydric.

Table 5-1 Soil Phases within Study Area

Soil Map Unit Symbol	Soil Phase	Acres	Drainage Class	Percent Slope
CeC	Canton and Charlton-fine sandy loams, very rocky	5.38	wd	3 to 15
Ma	Mansfield mucky silt loam	62.46	vpd	0 to 3
NeA	Newport silt loam	99.11	wd	0 to 3
NeB	Newport silt loam	133.83	wd	3 to 8
NeC	Newport silt loam	13.94	wd	8 to 15
NfB	Newport very stony silt loam	14.24	wd	3 to 8
PmA	Pittstown silt loam	73.4	mwd	0 to 3
PmB	Pittstown silt loam	93.52	mwd	3 to 8
Se	Stissing silt loam	143.55	pd	0 to 3
UD	Udorthents	6.42	mwd to ed	0 to 15

Notes: ed – excessively drained; pd – poorly drained (hydric in part); wd – well drained; vpd – very poorly drained (hydric); mwd – moderately well drained; 8-15 percent slope – highly erodible; swed – somewhat excessively drained

Source: Web Soil Survey (Soil Survey Staff NRCS) Accessed: February 2021 website: http://websoilsurvey.sc.egov.usda.gov/

5.3.1 Soil Series

The soil series detailed in the following subsections have been identified within the Study Area. The classification follows that published in the Soil Survey of Rhode Island (Rector, 1981).

5.3.2 Canton and Charlton Series

The Canton series is classified as coarse-loamy over sandy or sandy skeletal, mixed, mesic Typic Dystrudepts (National Cooperative Soil Survey, 2010). These well drained soils formed in glacial till derived mainly from schist and gneiss. The similar Charlton series is classified as coarse-loamy, mixed, mesic Typic Dystrudepts (National Cooperative Soil Survey, 2010). These soils were also formed in glacial till derived mainly from schist and gneiss. Charlton soils have a finer textured substratum than Canton soils. Because these series are similar they are together in a single map unit known as an association.

5.3.3 Mansfield Series

The Mansfield series consists of very poorly drained loamy soils formed in dense till. These soils are moderately deep to a densic contact and very deep to bedrock. They are nearly level soils in depressions and drainageways of uplands. The soils have a water table near or above the surface most of the year. Permeability is moderately rapid or moderate in the surface layer and subsoil and slow or very slow in the substratum.

5.3.4 Newport Series

The Newport series consists of well drained loamy soils formed in lodgement till derived mainly from dark sandstone, conglomerate, argillite, and phyllite. The soils are very deep to bedrock and moderately deep to a densic contact. They are nearly level through moderately steep soils on till plains, low ridges, hills, and drumlins.

5.3.5 Pittstown Series

The Pittstown series consists of moderately well drained soils formed in lodgement till derived mainly from slate, phyllite, shale, and schist. These soils are very deep to bedrock and moderately deep to a densic contact. They are nearly level through moderately steep soils on uplands. Slope ranges from 0 through 25 percent. Saturated hydraulic conductivity is moderately high or high in the mineral solum and moderately low or moderately high in the substratum.

5.3.6 Stissing Series

The Stissing series consists of poorly drained soils formed in dense till derived principally from dark phyllite, slate, shale, and schist. These soils are very deep to bedrock and shallow to a densic contact. They are nearly level to strongly sloping

soils on glaciated uplands. Slope ranges from 0 to 15 percent. Saturated hydraulic conductivity is moderately high or high in the solum and moderately low or moderately high in the dense substratum.

5.3.7 Udorthents Series

Udorthents are moderately well drained to excessively drained soils that have been cut, filled, or otherwise altered typically by human activity. The areas have had more than two feet of the upper part of the original soil removed or have more than two feet of fill on top of the original soil. Udorthents are extremely variable in texture. These soils can occur in a variety of surficial geologic setting including made land.

5.3.8 Prime Farmland Soils

Prime farmland, as defined by the United States Department of Agriculture (USDA), is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce a sustained high yield of crops when it is treated and managed using acceptable farming methods.

Rhode Island recognizes 35 prime farmland soils (USDA, 2012). Prime farmland soils can be used for cropland, pastureland, rangeland, forestland, or other land. Urbanized land and water are exempt from consideration as prime farmland. The proposed Study Area will cross 4 prime farmland soil units as listed in Table 5-2. Within the Study Area, prime farmland soils exist on land occupied by commercial, institutional, recreational, agricultural, and residential land use, cleared ROW, forestland, and roads.

Table 5-2 USDA Prime Farmland Soils within the Study Area

Soil Map Unit Symbol	Name	Percent Slope
NeA	Newport silt loam	0 to 3
NeB	Newport silt loam	3 to 8
PmA	Pittstown silt loam	0 to 3
PmB	Pittstown silt loam	3 to 8

Source: Web Soil Survey (Soil Survey Staff NRCS) Accessed: February 2021 Soil Data Mart (USDA NRCS website: http://websoilsurvey.sc.egov.usda.gov/)

5.3.9 Farmland of Statewide Importance

Farmland of statewide importance is land that is designated by the Rhode Island Department of Administration Division of Planning to be of statewide importance for the production of food, feed, fiber, forage, and oilseed crops (USDA, 2012). Generally, farmlands of statewide importance include those lands that do not meet the requirements to be considered prime farmland, yet they economically produce high crop yields when treated and managed with modern farming methods. Some may produce as high a yield as prime farmland if conditions are favorable.

In order to extend the additional protection of state regulation to prime farmland, the State of Rhode Island has expanded its definition of farmland of statewide importance to include all prime farmland areas. Therefore, in Rhode Island, all USDA-designated prime farmland soils are also farmland of statewide importance.

Table 5-3 lists soil units designated as farmland soils of statewide importance that are found within the Study Area. The Study Area encompasses the following farm properties: The Local Patch, and Plane View Nursery.

Table 5-3 Farmland Soils of Statewide Importance within the Study Area

Soil Map Unit Symbol	Phase	Percent Slope
NeA	Newport silt loam	0 to 3
NeB	Newport silt loam	3 to 8
NeC	Newport silt loam	8 to 15
PmA	Pittstown silt loam	0 to 3
PmB	Pittstown silt loam	3 to 8
Se	Stissing silt loam	0 to 3

Source: Web Soil Survey (Soil Survey Staff NRCS) Accessed: February 2021 Soil Data Mart (USDA NRCS website: http://websoilsurvey.sc.egov.usda.gov/)

5.3.10 Potentially Erosive Soils

The erodibility of a soil is dependent upon the slope of the land occupied by the soil and the texture of the soil. NRCS has characterized soil map units as “highly erodible”, “potentially highly erodible”, or “not highly erodible” due to sheet and rill erosion (USDA, 1993). This determination is done by using the Universal Soil Loss Equation (USLE). The USLE relates the effects of rainfall, soil characteristics, and the length and steepness of slope to the soil’s tolerable sheet and rill erosion rate .

Soils are given an erodibility factor (K), which is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values in Rhode Island range from 0.10 to 0.64 and vary throughout the depth of the soil profile with changes in soil texture. Very poorly drained soils and certain floodplain soils usually occupy areas with little or no slope. Therefore, these soils are not subject to erosion under normal conditions and are not given an erodibility factor. Soil map units described as strongly sloping or rolling may include areas with slopes greater than eight percent and soil map units with moderate erosion hazard are listed in Table 5-4.

Table 5-4 Soil Mapping Units with Potential Steep Slopes within the Study Area

Soil Map Unit Symbol	Soil Phase	Percent Slope	Erodibility Hazard	Surface K Values
CeC	Canton and Charlton-fine sandy loam, very rocky	3 to 15	Phel	0.17-0.24
NeB	Newport silt loam	3 to 8	Phel	0.24
NeC	Newport silt loam	8 to 15	Hel	0.24
PmB	Pittstown silt loam	3 to 8	Phel	0.24

Source: Web Soil Survey (Soil Survey Staff NRCS) Accessed: February 2021 Soil Data Mart (USDA NRCS website: http://websoilsurvey.sc.egov.usda.gov/)

Hel Highly Erodible

Phel Potentially Highly Erodible

[1] Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Accessed [October 31, 2014].

5.4 Surface Water

The Study Area lies within the Narragansett Bay drainage basin of Rhode Island. A drainage basin is the area of land that drains water, sediment, and dissolved materials to a common outlet at some point along a stream channel (Dunne and Leopold, 1978), and is synonymous with watershed. Narragansett Bay extends approximately 45 kilometers (km) from north to south and 18 km at its widest point from west to east (Chinman and Nixon, 1985). The Narragansett Bay watershed is composed of nine subwatersheds and only one is located within the Study Area, the Sakonnet River subwatershed (Raposa and Schwartz, 2009). The bodies of water that are located within these watersheds are Little Creek, Unnamed Tributary to the Sakonnet River, and five (5) small unnamed open water areas/ponds. The Narragansett Bay Basin flows east into Rhode Island and Block Island sounds, and ultimately the Atlantic Ocean.

The waters of the State of Rhode Island (meaning all surface water and groundwater of the State) are assigned a Use Class which is defined by the most sensitive uses which it is intended to protect. Waters are classified according to specific physical, chemical, and biological criteria which establish parameters of minimum water quality necessary to support the water Use Classification. The water quality classification of the major surface waters within the Study Area are identified in the descriptions of the water courses that follow. Classification use of all water courses within the Study Area are presented in Table 5-5.

The Study Area is drained by waterways which generally flow to the north and southeast into the Sakonnet River. Figure 5-3 depicts surface waters within the Study Area.

Pursuant to the requirements of Section 305(b) of the Federal Clean Water Act, waterbodies which are determined to be not supporting their designated uses in whole or in part are considered impaired, and placed on the Clean Water Act, Section 303(d) List of Impaired Waters or have a total maximum daily load (TMDL)

assessment where they are prioritized and scheduled for restoration. The causes of impairment are those pollutants or other stressors that contribute to the actual or threatened impairment of designated uses in a waterbody. Causes include chemical contaminants, physical parameters, and biological parameters. Sources of impairment are not determined until a TMDL assessment is conducted on a water body. Little Creek was assessed and included in the 2018 -2020 Integrated Report Lists, it was found to be impaired, having Enterococcus bacteria. None of the other water bodies within the Study Area were assessed for impairments (Table 5-6; EPA, 2014; RIDEM 2015).

Table 5-5 Surface Water Resources within the Study Area

Water Body Name	Town	Use Classification	Approximate Location
Little Creek	Portsmouth and Middletown	B	Flows south from Little Creek Pond to Sakonnet River
Unnamed Tributary to the Sakonnet River	Portsmouth	A	Flows north from unnamed pond to the Sakonnet River

Classification

AA: Designated as a source of public drinking water supply (PDWS) or as a tributary waters within a public drinking water supply watershed, for primary and secondary contact recreational activities and for fish and wildlife habitat. These waters shall have excellent aesthetic value.

A: Primary and secondary contact recreational activities and for fish and wildlife habitat. Suitable for compatible industrial processes and cooling, hydropower, aquacultural uses, navigation, and irrigation and other agricultural uses. These waters shall have excellent aesthetic value.

B: Fish and wildlife habitat and primary and secondary contact recreational activities. Suitable for compatible industrial processes and cooling, hydropower, aquacultural uses, navigation, and irrigation and other agricultural uses. These waters shall have good aesthetic value.

Source: RIDEM, Water Quality Regulations (December 2010); RIDEM Appendix A. 2018 Index of Waterbodies and Category Listing.

Table 5-6 Surface Water Resource Categories within the Study Area

Water Body Name	Impairment	Category
Little Creek	Impaired for Primary Contact Recreation, Secondary Contact Recreation, Reason: Enterococcus	5
Unnamed Tributary to the Sakonnet River	Not assessed	3

Category Explanation:

Category 3 Insufficient or no data and information are available to determine if any designated use is attained or impaired. Waterbodies will be placed in this Category where the data or information to support an attainment determination for all uses are not sufficient, consistent with the requirements of the CALM. In general, these uses and waterbodies are considered Not Assessed.

Category 4 Impaired or threatened for one or more designated uses but does not require development of a TMDL. (Three subcategories):

A. TMDL has been completed. Waterbodies will be placed in this subcategory once all TMDLs for the waterbody have been developed and approved by EPA.

B. Other pollution control requirements are reasonably expected to result in attainment of the water quality standard in the near future. Waterbodies will be placed in this subcategory where other pollution control requirements are stringent enough to attain applicable water quality standards.
C. Impairment is not caused by a pollutant. Waterbodies will be placed in this subcategory if pollution (e.g., flow) rather than a pollutant causes the impairment.

Category 5: Impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL. This Category constitutes the 303(d) List of waters impaired or threatened by a pollutant(s) for which one or more TMDL(s) are needed.

Source: EPA Watershed Assessment, Tracking, & Environmental Results, 2012 http://ofmpub.epa.gov/tmdl_waters10/attains_state.control?p_state=RI&p_cycle=2012&p_report_type=

Source: RIDEM Integrated Water Quality Monitoring and Assessment Reporting, 2021 http://www.dem.ri.gov/programs/water/quality/surface-water/integrated-water-quality-monitoring.php#:~:text=Category%205%20%2D%20Impaired%20or%20threatened,TMDL(s)%20are%20needed.

5.4.1 Little Creek

Little Creek is a 3.1 mile state-designated Class B watercourse that flows southerly from Little Creek Pond through Portsmouth to Sakonnet River, a tidal waterway located east of Portsmouth, Rhode Island (RIDEM, 2021). As of the 2021 303(d) List of Impaired Waters, Little Creek has been listed for an impairment of *Enterococcus*. A TMDL is scheduled for *Enterococcus* in Little Creek and will be created in 2030. Little Creek is not impaired for fish and wildlife habitat. The waterbody is currently listed as Category 5 because the required TMDL has not been completed. This waterbody has not been assessed for fish consumption or public drinking water supply.

5.4.2 Unnamed Tributary to the Sakonnet River

The Unnamed Tributary to Sakonnet River is a state-designated Class A waterway located in Portsmouth, Rhode Island. The Brook runs north of an Unnamed Pond east of Wapping Road to the Sakonnet River. The Unnamed Tributary to Sakonnet River has no official Category Classification because it is not a state-registered water body, however, due to its lack of classification and water quality, for this report's purposes it may be considered a Category 3 waterbody.

5.4.3 Unnamed Small Waterbodies

There are a number of small open water resources throughout the Study Area, and the following list describes five (5) unnamed waterbodies that appear to meet the definition of a pond.

Open water area 1 is located 170 feet north of Old Mill Lane and 175 feet east of Little Creek. The basin encompasses 6,969 square feet.. Open water area 2 is located 425 feet north of Old Mill Lane and 415 feet west of Prince Henry Ave. The basin encompasses 9,757 square feet. Open water area 3 is the starting point of an Unnamed Tributary to the Sakonnet River. It is located 944 feet west of Wapping Road and 1,299 feet north of Old Mill Lane. The basin encompasses 10,036 square feet. Open water area 4 is 530 feet south of Peckham Ave. and 622.5 feet west of Bartlett Rd. The basin encompasses 6,133 square feet. Open water area 5 is 611 feet

west of Wapping Road and 330 feet northeast of Peckham Lane. The basin encompasses 7,248 square feet.

These Open water areas have no official Category Classification because they are not state-registered water bodies, however, due to lack of classification and water quality, for this report's purposes they may be considered Category 3 waterbodies.

5.4.4 Floodplain

Special Flood Hazard Areas are areas that are subject to inundation by the one percent annual chance flood. Based on available FEMA Flood Insurance Rate Mapping for the towns of Portsmouth[1] and Middletown[2] portions of the Study Area lie within Zone X .2% Annual Chance Flood Hazard, including areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile. The .2% Annual Chance Flood Zone is located at Cotton Swamp, north of Old Mill Lane in Portsmouth, with the unnamed tributary to Sakonnet River running through it. The remainder of the Study Area is designated as Zone X (Areas determined to be outside the 0.2% annual chance floodplain) and no one percent annual chance flood hazard area is mapped by FEMA.

It is recognized that, by definition provided in the RIDEM Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act (RIDEM 2014) , a floodplain is the land area adjacent to a river, stream, or other body of flowing water that is, on average likely to be covered with flood waters resulting from a one percent annual chance flood event. In the event that these floodplains are not mapped by FEMA then a registered Professional Engineer may be enlisted to determine the base flood elevation. Therefore, while there are no FEMA-mapped Flood Zones within the Study Area, there are two streams; Little Creek and unnamed tributary to the Sakonnet River whose riparian areas are expected to include a floodplain function.

5.4.5 Surface Water Protection Areas

Drinking water supplies are designated as Special Resource Protection Waters (SRPW; RIDEM, 2006). This designation offers protection under Tier 2 ½ of the Rhode Island Antidegradation provisions as part of Rule 18 of the Rhode Island Water Quality Regulations (GL Ch. 46-12, 42-17.1, 42-35) based on the Federal Antidegradation Policy requirements (40 CFR 131.12) (RIDEM, 2006). The Tier 2 ½ designation requires that there shall be no measurable degradation of the existing water quality necessary to protect the characteristic(s) which cause the waterbody to be designated as an SRPW and adopted under the authority of Chapter 46-12, 42-17.1 and 42-35 of the General Laws of Rhode Island, as amended (RIDEM, 2006). There are no drinking water reservoirs located within the Study Area. Portsmouth and Middletown have each designated their own watershed protection areas described in the following sections.

5.4.5.1 Portsmouth Watershed Protection District

The Study Area is not located within Portsmouth's Watershed Protection District.

5.4.5.2 Middletown Watershed Protection District

The Watershed Protection Districts in the Town of Middletown are divided into two zones and it appears that the Study Area is not located within either of these zones.

5.5 Groundwater

Groundwater resources within the Study Area are depicted in Figures 5-3. The presence and availability of groundwater resources is a direct function of the geologic deposits in the Study Area. The entire Study Area is classified as GA (RIDEM, 2020). These groundwater resources are presumed suitable for public drinking water use without prior treatment; however, these resources have a lower potential yield and quality than that of the highest state classification, GAA. The GA class is subject to the same groundwater quality standards and preventative action limits for organic and inorganic chemicals, microbiological substances, and radionuclides as the GAA classification. A portion of the western half of the Study Area is within a Non- Community Wellhead Protection Area (NCWHPA), or the portion of an aquifer through which groundwater moves to a well. A Non-Community well regularly serves at least 25 people at least 60 days of the year. The Project Site is not within this NCWHPA.

The neighborhood surrounding the Project Site is serviced by municipal water, however some of the properties in the area have private well systems. The direct abutters to the project along Old Mill Lane are serviced be municipal water.

There are no sole source aquifers located within the Study Area.

5.6 Vegetation

The Study Area contains a variety of upland vegetative cover types typical of southern New England. These types include oak/pine forest, shrubland, agricultural fields, and managed lawn. This section of the ER focuses on upland communities. Wetland communities are discussed in Section 5.8 of this ER.

5.6.1 Oak Forest Associations

Forested cover types within the Study Area are typically dominated by oaks and maples with or without a white pine (*Pinus strobus*) component. Although these woodlands may appear similar throughout the Study Area, differences in the structure and composition of species in these forests may occur. Soil drainage class, position on the landscape, and slope aspect are important factors in determining the plant associations present at a particular site.

The forests on well-drained and moderately well drained acidic soils are typically composed of red oak, black oak and/or scarlet oak (*Quercus rubra*, *Q. velutina*, and/or *Q. coccinea*). White oak (*Q. alba*) is a common component, but rarely dominant. Other common associates, especially in moister sites, include black birch (*Betula lenta*), black gum (*Nyssa sylvatica*), red maple (*Acer rubrum*) and sassafras (*Sassafras albidum*). Occasionally pitch pine (*Pinus rigida*) or white pine may be encountered. Unless thinned, crown closure is generally greater than 75 percent.

The shrub layer on drier sites is typically dominated by member of the blueberry family including huckleberry (*Gaylussacia baccata*), mountain laurel (*Kalmia latifolia*), and lowbush blueberries (*Vaccinium pallidum and V. angustifolium*). Wild sarsaparilla (*Aralia nudicaulis*), greenbrier (*Smilax rotundifolia*), and hay-scented fern (*Dennstaedia punctilobula*) are common components of the herbaceous stratum (Enser and Lundgren, 2006).

5.6.2 Old Field Community

Upland vegetation within the Study Area is typically representative of an old field successional community. Old field communities are established through the process of natural succession from cleared land to mature forest. Within the Study Area, these areas may support a mix of herbs, forbs and shrubs depending on the frequency of vegetation management. Common herbs include Canada and rough-stemmed goldenrod (*Solidago canadensis* and *S. rugosa*), Alleghany blackberry (*Rubus allegheniensis*), mullein (*Verbascum thapsus*), grass-leaved goldenrod (*Euthamia graminifolia*), tansy (*Tanacetum vulgare*), and wormwood (*Artemisia vulgaris*). A notable component of the old field within the Study Area iii is common figwort (*Scrophularia nodosa*). This non-native European species has naturalized to Rhode Island (Gould et al. 1998) and appears very similar to the state-threatened eastern figwort (*S. marilandica*), but eastern figwort was not observed in the Study Area.

5.6.3 Upland Shrub Communities

The Project Site has been managed to remove trees as they interfere with safe operation of Transfer Station equipment. Shrubs dominate portions of the Study Area where succession of old field are located and where management has resulted in tree sapling removal. Thickets of multiflora rose (*Rosa multiflora*) and Allegheny blackberry are common. Other shrubs commonly found within the managed portions of the Study Area include autumn olive (*Elaeagnus umbellata*), black cherry (*Prunus serotina*), bebb willow (*Salix bebbiana*), and gray birch (*Betula populifolia*).

Abandoned farmland also progresses through a shrub dominated stage before succeeding to forest cover. These areas are located within the larger Study Area and are dominated by a mix of trembling and big tooth aspen (*Populus tremula* and *P. grandidentata*), black cherry, gray birch, and bayberry (*Myrica pensylvanica*) often intermixed with multiflora rose and autumn olive. The understory in these densely stocked stands is weakly developed and often includes poison ivy (*Toxicodendron*

radicans), sensitive fern (*Onoclea sensibilis*), and wild geranium (*Geranium maculatum*).

5.6.4 Managed Lawn/Grass

Portions of the Project Site are adjacent to managed residential lawn. Typically, these areas consist of a continuous grass cover which may include Kentucky bluegrass (*Poa pratensis*), red fescue (*Festuca rubra*), clover (*Trifolium* sp.), and plantains (*Plantago* sp.). Ornamental shrubs may also be located within these areas.

5.6.5 Agricultural Areas

Agricultural land managed in corn and row crops are encountered in the Study Area. Large fields are managed in corn, hay, or potatoes with smaller fields in other various vegetables crops. These fields are tilled between plantings and are often provided a cover crop such as winter rye to reduce soil loss during intercrop periods.

Pasture and hayfields are also present in the Study Area and are typically managed in European cool season grasses such as timothy (*Phleum pratense*), orchard grass (*Dactylis glomerata*), sweet vernal grass (*Anthoxanthum ordoratum*), clover (*Trifolium* spp.) and several weed species.

5.7 Wetlands

Wetlands have been identified as resources potentially providing ecological functions and societal values. Wetlands are characterized by three criteria including the (i) presence of undrained hydric soils, (ii) a prevalence (>50 percent) of hydrophytic vegetation, and (iii) wetland hydrology, soils that are saturated near the surface or flooded by shallow water during at least a portion of the growing season.

5.7.1 Study Area Wetlands

State-regulated freshwater wetlands have been identified and delineated adjacent to the Project Site. Figure 5-3 depicts wetlands field delineated adjacent to the Project Site and those wetland resource areas mapped in the wetlands shapefile [1] from the RIGIS website within the Study Area. Field methodology for the delineation of State-regulated resource areas was based upon vegetative composition, presence of hydric soils, and evidence of wetland hydrology. Based on the provisions of the Rhode Island Fresh Water Wetlands Act and the RIDEM Freshwater Wetland Rules, State-regulated freshwater wetlands include swamps, marshes, bogs, forested or shrub wetlands, emergent plant communities and other areas dominated by wetland vegetation with evidence of wetland hydrology. Swamps are defined as wetlands dominated by woody species and are three acres in size, or greater. Marshes are wetlands dominated by emergent species and are one acre or greater in size. Emergent wetlands communities are areas similar to marshes in vegetation composition; however, they are less than one acre in size. Forested and shrub

wetlands are also dominated by woody species, similar to swamps, but do not meet the three-acre size criteria.

The upland area within 50 feet of the edge of a swamp, marsh, or bog is regulated as the 50-foot Perimeter Wetland under the RIDEM Freshwater Wetland Rules. Emergent wetland communities, forested wetlands, and shrub wetlands do not merit a 50-foot Perimeter Wetland.

In addition to these vegetated wetland communities, Rhode Island also regulates activities in and around streams and open water bodies, which include Rivers, Ponds, and Areas Subject to Storm Flowage (ASSF). A River is any perennial stream indicated as a blue line on a USGS 7.5-minute series topographic map. If the River or stream is less than 10 feet wide, the area within 100 feet of each bank is regulated as 100-foot Riverbank Wetland. If the River or stream is greater than 10 feet wide, the area within 200 feet of each bank is regulated as 200-foot Riverbank Wetland.

A Pond is an area of open standing or slow moving water present for six or more months during the year and at least one-quarter acre in size. Ponds have a 50-foot Perimeter Wetland associated with the boundary. An ASSF is defined as any body of flowing water as identified by a scoured channel or change in vegetative composition or density that conveys storm runoff into or out of a wetland.

Wetland vegetation community types and their dominant plant species located within the existing Project ROW are described below.

5.7.2 Ponds

There are five unnamed small ponds within the Study Area.

5.7.3 Swamp

Swamps are defined as areas at least three acres in size, dominated by woody vegetation, where groundwater is at or near the ground surface for a significant part of the growing season. A 50-foot Perimeter Wetland is applied to Swamps regardless of whether they support forest or shrub cover types.

Dominant species in Swamps with shrub cover include sweet pepperbush (*Clethra alnifolia*), highbush blueberry (*Vaccinium corymbosum*), winterberry (*Ilex verticillata*), and swamp azalea. Other species located in these swamps include arrowwood (*Viburnum dentatum*), Bebb willow, alder (*Alnus* sp.), and silky dogwood (*Cornus amomum*). Drier portions of Shrub Swamps are often densely overgrown with wild grape (*Vitus labrusca*) and greenbrier. Common species in the herbaceous layer include cinnamon fern (*Osmunda cinnamomea*), sensitive fern, poison ivy, and dewberry (*Rubus hispidus*). Shrub Swamp generally occurs in areas where wetlands are in the managed ROW and trees are periodically removed.

A Wooded Swamp, identified as Cotton Swamp, is present within the Study Area north of Old Mill Lane. A Wooded Swamp abuts the Project Site to the west and south, this Swamp gradually transitions to Marsh (described below). Dominant

canopy species in Wooded Swamps within the Study Area include red maple, willow (*Salix* sp.), black gum, American elm (*Ulmus americana*) and swamp white oak (*Quercus bicolor*). Winterberry, highbush blueberry, arrowwood, and spicebush (*Lindera benzoin*) are common shrubs associated with these forests. Skunk cabbage, cinnamon fern, false hellebore (*Veratrum viride*), and royal fern (*Osmunda regalis*) are common in the herb stratum.

5.7.4 Marsh

Marshes are wetlands at least one acre in size where water is generally above the surface of the substrate and where the vegetation is dominated by emergent herbaceous species. A Marsh associated with Little Creek is located south of the Project Site. Marsh vegetation is typically dominated by broad-leaved cattail (*Typha latifolia*) and common reed (*Phragmites australis*) with lesser amounts of buttonbush (*Cephalanthus occidentalis*), marsh fern (*Thelypteris palustris*), woolgrass (*Scirpus cyperinus*), and purple loosestrife (*Lythrum salicaria*).

5.7.5 Rivers

There are no rivers located within the Study Area.

5.7.6 Stream/Intermittent Stream

Streams located within the Study Area include Little Creek and an unnamed tributary to the Sakonnet River. Streams and intermittent streams are flowing bodies of water or watercourses that are not rivers which flow long enough each year to develop and maintain a defined channel. Streams often are associated with the headwaters of named Rivers and tributaries with downstream confluences. Further descriptions of these watercourses are provided in Section 6.5 of this ER.

5.7.7 Emergent Plant Community

Emergent plant communities within the Study Area are associated with areas that are mowed with sufficient frequency to control the establishment of woody vegetation. Within the Study Area they include pastures and lawns. Common species associated with these areas include rough-stemmed goldenrod, New England aster (*Symphotrichum novae-angliae*), Joe-Pye weed (*Eupatoriadelphus maculatus*), sensitive fern, soft rush, and reed canary grass (*Phalaris arundinacea*).

5.7.8 Shrub/Forested Wetland

Wetlands that are not Swamps or Marshes and are dominated by woody vegetation are classified as either Shrub Wetlands or Forested Wetlands. In the Study Area, Shrub Wetlands often include highbush blueberry, sweet pepper bush, arrowwood, multiflora rose, winterberry, and elderberry (*Sambucus canadensis*). Associated herbaceous species may include skunk cabbage, cinnamon fern, and jewelweed (*Impatiens capensis*).

Forested wetlands are located within the Study Area where most shrub wetlands are also present. Vegetation includes red maple, American elm, and black gum with an understory generally consisting of vegetation mentioned previously in the shrub wetland.

5.7.9 Floodplain

A floodplain is the land area adjacent to a river or stream or other body of flowing water that is, on the average, likely to be covered with flood waters resulting from a one percent annual chance flooding event. These regulated floodplain areas include areas mapped by FEMA, as well as un-mapped floodplain.[12] The Study Area does not have any FEMA mapped 100 year floodplain, however, it is expected that the riparian areas of Little Creek and the unnamed tributary to the Sakonnet River will have a minor floodplain function.

5.7.10 Area Subject to Storm Flowage

ASSFs are channel areas and water courses which carry storm, surface, groundwater discharge or drainage waters out of, into, and/or connect freshwater wetlands or coastal wetlands. ASSFs are recognized by evidence of scouring and/or a marked change in vegetative density and/or composition. An ASSF is located within the Study Area between the Project Site and the Portsmouth Take Station to the east.

5.8 Wildlife

The wildlife species present within the Study Area vary according to the habitat resources present. The suitability of a habitat for a particular species is influenced by its setting (inland, terrestrial, wetland/deep water, etc.) along with current and historic land management practices which affect the floristic composition and structure of the vegetation cover types present. The proposed Project Study Area includes work in or proximate to 11 different habitats that are identified in New England Wildlife: Habitat, Natural History and Distribution (DeGraaf and Yamasaki, 2001). Habitat resources are variable across the Study Area.

The Project Site is removed from coastal habitats. The Study Area encompasses woodlands, farmlands residential housing developments palustrine wetlands, streams, and small open water areas. The Property is subject to routine vegetation management to maintain a grass/forbes dominated cover type so the pipe connections do not become overgrown.

An overall list of wildlife species expected to occur within the Study Area has been compiled based upon the major habitats present. This list relies on the species geographical distribution data provided by DeGraaf and Yamasaki (2001) and August et al. (2001) with information on certain amphibians and reptiles

12 University of Rhode Island Environmental Data Center. 1993. Wetlands Shapfile as interpreted from 1988 aerial photography; Cowardin 16 classification scheme.

supplemented by Amphibians and Reptiles of Connecticut and Adjacent Regions by Klemens (1993). It should be noted that individual species may not occur in any given part of the Study Area even if apparently suitable habitat is present.

Table 5-7 provides a list of vertebrates (amphibian, reptiles, birds, and mammals) with the potential to occupy specific habitats in the Project Study Area. Species observed in the field are annotated in this table. Observations include direct visual identification of the animal, its tracks or scat, or in the case of birds and frogs by vocalizations.

Table 5-7 Expected and Observed Wildlife Species within the Study Area

	Terrestrial Habitats									Aquatic Habitats					Other	
	Oak/Pine Forest	Shrub/Old Field	Ag. Field	Grass Field	Lawn Fairway	Red Maple Swamp	Wet Meadow	Shallow Marsh	Shrub Swamp	Pond	Lake	Stream	River	Riparian	Debris Pile	Structure
AMPHIBIANS AND REPTILES																
Spotted Salamander	X					X	X	X	X	X				X		
Northern Redback Salamander	X	X													X	
Four-toed Salamander	X					X	X	X	X			X			X	
Northern Two-Lined Salamander	X											X		X		
American Toad	X	X	X	X		X	X	X	X	X	X			X		
Northern Spring Peeper	X					X	X	X	X	X				X		
Gray Treefrog	X					X	X	X	X	X	X			X		
American Bullfrog								X	X	O	X	X	X	X		
Green Frog						X	X	X	X	X	X	X	X	x		
Northern Leopard Frog [rare]						X	X	X	X					X		
Pickerel Frog	X			X		X	X	X		X	X	X		X		
Common Snapping Turtle	X	X	X	X				X	X	X	X	X	X	X		
Spotted Turtle	X	X	X	X		X	X	X	X	X		X		X		
Wood Turtle	X	X	X	X		X	X	X	X	X	X	X	X	X		
Eastern Box Turtle	X	X		X		X	X	X	X			X		X		

	Terrestrial Habitats									Aquatic Habitats					Other	
	Oak/Pine Forest	Shrub/Old Field	Ag. Field	Grass Field	Lawn Fairway	Red Maple Swamp	Wet Meadow	Shallow Marsh	Shrub Swamp	Pond	Lake	Stream	River	Riparian	Debris Pile	Structure
Painted Turtle						X	X	X	X	X	X	X	X	X		
Common Musk Turtle		X		X			X	X	X	X	X	X	X	X		
Northern Water Snake							X	X	X	X	X	X	X	X		X
Northern Red-bellied Snake	X	X				X			X						X	X
Northern Brown Snake	X	X		X		X	X	X	X	X	X	X		X	X	X
Common Garter Snake	X	X		X		X	X	X	X	X		X		X	X	X
Ribbon Snake	X					X	X	X	X	X		X		X		
Eastern Hognose Snake	X	X	X	X		X		X						X	X	X
Northern Ringneck Snake	X					X									X	X
Northern Black Racer	X	X		X		X		X	X					X	X	X
Eastern Smooth Green Snake	X	X		X		X	X	X	X						X	
Eastern Milk Snake	X	X		X		X									X	X
BIRDS																
Double-crested Cormorant[B]										X	X		X	X		
Least Bittern[B] (Rare)								X	X							
Great Blue Heron[B]	X					X	X	X	X	X	X	X	X	X		

	Terrestrial Habitats									Aquatic Habitats					Other	
	Oak/Pine Forest	Shrub/Old Field	Ag. Field	Grass Field	Lawn Fairway	Red Maple Swamp	Wet Meadow	Shallow Marsh	Shrub Swamp	Pond	Lake	Stream	River	Riparian	Debris Pile	Structure
Great Egret[B]										X	X					
Snowy Egret[B]																
Little Blue Heron[B]																
Green Heron[B]	X					X	X	X	X	X	X	X	X	X		
Black-crowned Night Heron[B]								X	X	X						
Yellow-crowned Night Heron[B]								X	X	X						
Glossy Ibis[B]				X			X	X	X							
Turkey Vulture[B]	X	O	X	X												
Canada Goose[B]			X	X	O		X	X		O		X	O	X		
Mute Swan[B]			X	X			X	X	X	O	X	X	X			
Wood Duck[B]	X							X	X	X	X	X	X	X		
American Widgeon[M]								X		X						
American Black Duck[B]							X	X	X	X	X	X	X	X		
Mallard[B]			X	X			X	X	X	O	X	X	X	X		
Canvasback[M]																
Ring-necked Duck[M]								X	X	X	X	X	X	X		
Bufflehead[M]											X	X	X			
Common Goldeneye[M]										X	X	X	X			
Common Merganser[M]	X									X	X	X	X	X		
Osprey[B]										X	X	X	X			X

	Terrestrial Habitats									Aquatic Habitats					Other	
	Oak/Pine Forest	Shrub/Old Field	Ag. Field	Grass Field	Lawn Fairway	Red Maple Swamp	Wet Meadow	Shallow Marsh	Shrub Swamp	Pond	Lake	Stream	River	Riparian	Debris Pile	Structure
Bald Eagle[M]											X					
Northern Harrier[M]																
Sharp-shinned Hawk[M]	X												X			
Cooper's Hawk[B] (Rare)	O	O		X												
Northern Goshawk[B] (Rare)	X	X		X												
Red-shouldered Hawk[B]	X								X					X		
Broad-winged Hawk[B]	X			X												
Red-tailed Hawk[B]	O	X	X	X					X							
Rough-legged Hawk[M]		X	X	X			X	X	X							
American Kestrel[B]	X	X	X	X			X	X								
Peregrine Falcon[M]		X	X	X	X		X	X	X				X	X		
Ring-necked Pheasant[B]		X	X	X												
Ruffed Grouse[B]	X	X														
Wild Turkey[B]	X	X	X	X												
Northern Bobwhite[B] (Rare)	X	X	X	X												
Virginia Rail[B]								X								
Sora[B] (Rare)							X	X	X	X						

	Terrestrial Habitats									Aquatic Habitats					Other	
	Oak/Pine Forest	Shrub/Old Field	Ag. Field	Grass Field	Lawn Fairway	Red Maple Swamp	Wet Meadow	Shallow Marsh	Shrub Swamp	Pond	Lake	Stream	River	Riparian	Debris Pile	Structure
Killdeer[B]			X	O			X							X		
Willet[B]																
Spotted Sandpiper[B]				X						X	X	X	X	X		
Wilson's (Common) Snipe[M]		X					X	X	X					X		
American Woodcock[B]	X	O	X				X		X					X		
Ring-billed Gull[B]																
Herring Gull[B]										O	X		X			
Common Tern[B]											X					
Rock Pigeon[B]			X	X												X
Mourning Dove[B]	X	O	O	O												O
Black-billed Cuckoo[B]	X	X							x							
Yellow-billed Cuckoo[B]	X	X														
Barn Owl[B (Rare)]			X	X												X
Eastern Screech-Owl[B]	X	X		X			X	X						X		
Great Horned Owl[B]	X	X	X	X			X	X	x					X		
Long-eared Owl[B]	X	X	X	X			X	X								
Short-eared Owl[M]			X	X			X	X								
Northern Saw-whet Owl[B (Rare)]	X			X										X		

	Terrestrial Habitats									Aquatic Habitats					Other	
	Oak/Pine Forest	Shrub/Old Field	Ag. Field	Grass Field	Lawn Fairway	Red Maple Swamp	Wet Meadow	Shallow Marsh	Shrub Swamp	Pond	Lake	Stream	River	Riparian	Debris Pile	Structure
Common Nighthawk [B (Rare)]	X	X	X	X			X							X		X
Whip-poor-will[B]	X	X		X												
Chimney Swift[B]		X	X	X			X									X
Ruby-throated Hummingbird[B]	X	X				X			X							
Belted Kingfisher[B]										X	X	X	X	X		
Red-bellied Woodpecker[B]	X													X		
Downy Woodpecker[B]	O	O				X								X		
Hairy Woodpecker[B]	X					X								X		
Northern Flicker[B]	X	X	X	O		X									X	X
Eastern Wood-Pewee[B]	O	X				X			O					X		
Acadian Flycatcher[B (Rare)]	X					X								X		
Willow Flycatcher[B]	X	X				X			X							
Least Flycatcher[B]	X					X								X		
Eastern Phoebe[B]	O	X		X		X			O							X
Great Crested Flycatcher[B]	X	X				X										
Eastern Kingbird[B]	X	X		X		X	X	X	O				O	O		
Northern Shrike[M]	X	X		X		X	X	X								
White-eyed Vireo[B]	X	X				X			X					X		

	Terrestrial Habitats									Aquatic Habitats					Other	
	Oak/Pine Forest	Shrub/Old Field	Ag. Field	Grass Field	Lawn Fairway	Red Maple Swamp	Wet Meadow	Shallow Marsh	Shrub Swamp	Pond	Lake	Stream	River	Riparian	Debris Pile	Structure
Warbling Vireo[B]	O	O				X								X		
Red-eyed Vireo[B]	O					X								X		
Blue Jay[B]	O	O		O		X								O		
American Crow[B]	O	O	X	X		X										
Fish Crow[B] (Rare)								X		X	X	X	X	X		
Horned Lark [B] (Rare)			X	X												
Purple Martin[B]		X	X	X			X	X		X	X	X	X	X		X
Tree Swallow[B]	X	X	X	X		X	X	X	X	X	X	X	X	X		
Northern Rough-winged Swallow[B]	X	X	X	X			X	X		X		X	O	O		
Bank Swallow[B]	X	X	X	X			X	X		X		X	X	X		
Barn Swallow[B]	X			X			O	O		O		X	X	X		X
Black-capped Chickadee[B]	O	O				X			O					X		
Tufted Titmouse[B]	O	O				X			O					X		
Red-breasted Nuthatch[B] (Rare)	X					X										
White-breasted Nuthatch[B]	O	O				X								X		
Brown Creeper[B]	X					X								X		
Carolina Wren[B]	O	O				O		O	O					X		
House Wren[B]	O	O		O		X			O					X		X
Winter Wren[M]	X					X			X					X		
Marsh Wren[B]								X	X							
Golden-crowned Kinglet[B] (Rare)	X					X										

	Terrestrial Habitats									Aquatic Habitats					Other	
	Oak/Pine Forest	Shrub/Old Field	Ag. Field	Grass Field	Lawn Fairway	Red Maple Swamp	Wet Meadow	Shallow Marsh	Shrub Swamp	Pond	Lake	Stream	River	Riparian	Debris Pile	Structure
Ruby-crowned Kinglet[M]	X					X										
Blue-gray Gnatcatcher[B]	O	O				X			O							
Eastern Bluebird[B]	O	O		X		X			O							X
Veery[B]	X					X								X		
Hermit Thrush[B]	X	X				X			X							
Wood Thrush[B]	X					X								X		
American Robin[B]	O	O	X	X		X			O					X		
Gray Catbird[B]	O	O		O		X			O					X		
Northern Mockingbird[B]	O	O							O							
Brown Thrasher[B]	X	X												X		
European Starling[B]	O	O	X	O										X		X
Cedar Waxwing[B]	X	O				X			O		O			X		
Blue-winged Warbler[B]	X	X		X					X							
Nashville Warbler[B] (Rare)	X								X							
Yellow Warbler[B]	X	O				X			O					X		
Chestnut-sided Warbler[B]		X				X			X							
Yellow-rumped Warbler[M]		X				X			X					X		
Black-throated Green Warbler[B]	X					X										
Pine Warbler[B]	X															

	Terrestrial Habitats									Aquatic Habitats					Other	
	Oak/Pine Forest	Shrub/Old Field	Ag. Field	Grass Field	Lawn Fairway	Red Maple Swamp	Wet Meadow	Shallow Marsh	Shrub Swamp	Pond	Lake	Stream	River	Riparian	Debris Pile	Structure
Prairie Warbler[B]	X	O														
Black–and-white Warbler[B]	X					X								X		
American Redstart[B]	X					X			O					X		
Worm-eating Warbler[B]	X															
Ovenbird[B]	X					X										
Northern Waterthrush[B]	X					X			X							
Common Yellowthroat[B]	X	X				X	X	X	X	X				X		
Canada Warbler[B]	X					X			X					X		
Scarlet Tanager[B]	O															
Eastern Towhee[B]	O	O				X										
American Tree Sparrow[M]	X	X		X			X	X	X					X		
Chipping Sparrow[B]	X		X	X												
Field Sparrow[B]		O	X	O												
Vesper Sparrow[M]		X	X	X	X		X									
Savannah Sparrow[B]			X	X			X	X								
Grasshopper Sparrow[B (Rare)]			X	X												
Fox Sparrow[M]	X	X														
Song Sparrow[B]	O	O	X	O		X	O	X	O					X		
Swamp Sparrow[B]							X	X	X	X				X		

	Terrestrial Habitats									Aquatic Habitats					Other	
	Oak/Pine Forest	Shrub/Old Field	Ag. Field	Grass Field	Lawn Fairway	Red Maple Swamp	Wet Meadow	Shallow Marsh	Shrub Swamp	Pond	Lake	Stream	River	Riparian	Debris Pile	Structure
White-throated Sparrow[B (Rare)]	X	O		X		X								X		
Dark-eyed Junco [B (Rare)]	X			X												
Lapland Longspur[M]			X	X												
Snow Bunting[M]			X	X			X	X								
Northern Cardinal[B]	O	O				X			O					X		
Rose-breasted Grosbeak[B]	O	O				O			O					O		
Indigo Bunting[B]	X	X		X										X		
Bobolink[B]				X			X	X								
Red-winged Blackbird[B]			X	O		X	X	O	O	O				X		
Eastern Meadowlark[B]			X	X						X						
Rusty Blackbird[M]						X								X		
Common Grackle[B]	X		X	X		X	X	O	O		X			X		O
Brown-headed Cowbird[B]	O	O	X	O		O		X						X		
Orchard Oriole[B] (Rare)	X					X								X		
Baltimore Oriole[B]	O	O				O			O					X		
Pine Grosbeak[M]	X		X													
Purple Finch[B]	X	X				X										
House Finch[B]	X															O

	Terrestrial Habitats									Aquatic Habitats					Other	
	Oak/Pine Forest	Shrub/Old Field	Ag. Field	Grass Field	Lawn Fairway	Red Maple Swamp	Wet Meadow	Shallow Marsh	Shrub Swamp	Pond	Lake	Stream	River	Riparian	Debris Pile	Structure
Common Redpoll[M]	X	X	X	X				X	X							
Pine Siskin[M]	X	X		X		X			X					X		
American Goldfinch[B]	O	O	X	O		X	O	O	O					X		
Evening Grosbeak[M]	X					X								X		
House Sparrow[P]		O	O	O												O
MAMMALS																
Virginia Opossum	X	X	X	X		X	X	X	X					X	X	
Masked Shrew	X	X		X		X	X	X	X					X		
Northern Short-tailed Shrew	X	X		X		X	X	X	X					X		
Eastern Mole	X	X	X	X	X	X										
Star-nosed Mole						X	X	X	X	X	X	X	X	X		
Little Brown Myotis	X	X	X	X		X	X	X	X	X	X	X	X	X		X
Northern Myotis	X	X	X	X		X	X	X	X	X	X	X	X	X		X
Silver-haired Bat[M]	X	X	X	X		X	X	X	X	X	X	X	X	X		
Eastern Pipistrelle[B]	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Big Brown Bat[B]	X	X	X	X		X	X	X	X	X	X	X	X	X		X
Red Bat[B]	X	X	X	X		X	X	X	X	X	X	X	X	X		
Hoary Bat[M]	X	X	X	X		X	X	X	X	X	X	X	X	X		
Eastern Cottontail[B]	X	O		X			X	X	O					X	X	

	Terrestrial Habitats									Aquatic Habitats					Other	
	Oak/Pine Forest	Shrub/Old Field	Ag. Field	Grass Field	Lawn Fairway	Red Maple Swamp	Wet Meadow	Shallow Marsh	Shrub Swamp	Pond	Lake	Stream	River	Riparian	Debris Pile	Structure
Snowshoe Hare[B]	X	X						X	X					X		
Eastern Chipmunk[B]	O	O		X												
Woodchuck[B]	X	X	X	X											X	
Gray Squirrel[B]	X					X								X		
Red Squirrel[B]	X					X										
Southern Flying Squirrel[B]	X					X										
White-footed Mouse[B]	X	X		X		X	X		X					X	X	X
Southern Red-backed Vole[B]	X	O	X	X		X			X					X		
Meadow Vole[B]	X	X		X		X	X	X	X					X		
Woodland Vole[B]	X	X		X		X										
Muskrat[B]							O	X	X	X	X	X	X	X		
Southern Bog Lemming[B] (Rare)	X	X		X		X	X	X						X		
Norway Rat[B]		X	X	X		X									X	X
House Mouse[B]		X	X	X		X									X	X
Meadow Jumping Mouse[B]	X	X		X		X	X	X	X					X		
Coyote[B]	X	X		X		X	X	X	X					X	X	
Red Fox[B]	X	X	X	X		X	X	X	X					X	X	
Gray Fox[B]	X	X				X	X	X	X					X	X	
Raccoon[B]	X	X	X	X		X	X	X	X					O	X	
Ermine[B] (Rare)	X	X	X	X		X		X	X					X	X	X
Long-tailed Weasel[B]	X	X	X	X		X	X	X	X					X		X

	Terrestrial Habitats									Aquatic Habitats					Other	
	Oak/Pine Forest	Shrub/Old Field	Ag. Field	Grass Field	Lawn Fairway	Red Maple Swamp	Wet Meadow	Shallow Marsh	Shrub Swamp	Pond	Lake	Stream	River	Riparian	Debris Pile	Structure
Mink[B]	X					X	X	X	X	X	X	X	X	X		
Striped Skunk[B]	X	X	X	X		X	X	X	O					X	X	X
River Otter[B]	X							X	X	X	X	X	X	X		
Bobcat	X	X				X	X		X							
White-tailed Deer[B]	O	O	X	X	X	X	X	X	O					X		

Legend: X = expected to occur O = observed by VHB Summer of 2020 and Spring of 2021 B = breeding in Rhode Island M = migrant/visitor

5.9 Fisheries

The RIDEM Division of Fish and Wildlife conducted fish surveys in Rhode Island's streams and ponds between 1993 and 2002. No water bodies within the Study Area were surveyed however, Lawton Valley Reservoir was surveyed by RIDEM and is located 5 miles northwest of the Project Site. The primary means of sampling were electrofishing units via boat. A typical warm water fish assemblage was identified in the sampling: largemouth bass (*Micropetrus salmoides*), chain pickerel (*Esox niger*), pumpkinseed (Lepomis gibbosus), bluegill (*Lepomis macrochirus*), brown bullhead (*Ameiurus nebulosus*), white perch (*Morone americana*), yellow perch (*Perca flavescens*), American eel (*Anguilla rostrata*), and golden shiner (*Notemigonus crysoleucas*). Similar assemblages are expected to occur in some of the unnamed ponds within the Study Area.

A segment of Little Creek, a first order headwater tributary stream flows southward through the Study Area in Portsmouth and Middletown. An unnamed tributary to the Sakonnet River flows northeast through the Study Area in Portsmouth. These streams have suffered severe scour evidenced by their deep channel incision and undermined banks. Summer flows in the waterbodies are expected to be too small to support permanent fish populations.

Little Creek and open water within the Study Area support fish populations that require warm water habitat such as pumpkinseed, goldfish (non-native), inland silversides, golden shiner, white perch, yellow perch, and banded killifish. American eel may occur in Little Creek and the unnamed tributary to the Sakonnet River. This species is catadromous meaning they will migrate from freshwater to oceans in order to spawn.

5.10 Rare and Endangered Species

The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPAC) system was queried on February 19, 2021 to determine if any federally listed or proposed, threatened and endangered species protected under the Federal Endangered Species Act are located within the Study Area. This query resulted in the identification of the northern long-eared bat (*Myotis septentrionalis*), a federally threatened species. The Study Area may host suitable habitat for the northern long-eared bat which roosts singly or in colonies within live and dead trees (USFWS, 2015a).

In April 2015 the USFWS listed the northern long-eared bat as a threatened species under the federal Endangered Species Act (ESA) due to severe population declines that have been caused by white nose syndrome.

As aforementioned, trees are a critical aspect of the northern long-eared bats' summer roosting habitat and are used by the bats to rear their pups (USFWS, 2015a). According to the final 4(d) Rule for the Northern Long-eared Bat

(USFWS, 2016), the work within the existing Company owned property at the Take Station and LNG site is considered to be exempt from ESA prohibitions. As an extra precaution, the U.S. Fish and Wildlife Service IPAC tool was used on February 19, 2021 to determine vulnerability of the northern long-eared bat to the proposed Project. A verification letter was received that determined the Project "may affect the northern long-eared bat; however, any take that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o)." Charlie Brown with the Rhode Island Division of Fish and Wildlife was consulted on March 1, 2021 to determine if any r northern long-eared bat hibernacula was at or within 0.25 miles of the Project Site. An e-mail received from Mr. Brown on March 2, 2021 confirmed that there are no hibernacula at or within 0.25 miles of the Project Site.

The Rhode Island Natural Heritage Program (RINHP) database hosted on the RIDEM Environmental Resource Mapping website identifies one Natural Heritage Program polygon that covers nearly all of the Study Area. VHB requested information concerning this polygon from Paul Jordan, the Supervising Geographic Information System Specialist from RIDEM, and received his reply on February 13, 2021. Mr. Jordan indicated that the two species represented within the polygon are northern leopard frog (*Lithobates pipiens*) and the marsh wren (*Cistothorus palustris*). The northern leopard frog is a small (roughly 7cm long) frog with bright green or copper skin and round or oval brown spots haloed in iridescent greenish-yellow. They are found only in Newport and Bristol counties and are considered a species of state concern in Rhode Island (Enser, 2007) (RIDEM, 2021). The marsh wren is a small round bodied wren with rusty brown coloring and black and white streaks down its back (Kroodsma and Verner 2020). This migratory species breeds in the eastern and northern regions of the United States within freshwater or saltwater marshes (Kroodsma and Verner 2020). Northern leopard frog and marsh wren may occupy habitat within the Study Area.

Animals listed as State Endangered are protected under the provisions of the Rhode Island State Endangered Species Act, Title 20 of the General Laws of the State of Rhode Island. This law states, in part (20-37-3): "No person shall buy, sell, offer for sale, store, transport, import, export, or otherwise traffic in any animal or plant or any part of any animal or plant whether living or dead, processed, manufactured, preserved or raw (if) such animal or plant has been declared to be an endangered species by either the United States secretaries of the Interior or Commerce or the Director of the Rhode Island Department of Environmental Management" (Enser, 2007).

The northern leopard frog and marsh wren have also been assigned a global rank that reflects their rarity and vulnerability to extinction throughout the world. Global ranks were originally developed by the Nature Conservancy and are used by all Natural Heritage Programs as a standardized method of determining the status of each species throughout its range. Both animals share the same global ranking of G5, indicating that they are demonstrably secure throughout their range, though they may be rare in some parts.

5.11 Air Quality

The National Ambient Air Quality Standards (NAAQS) were established by the Federal Clean Air Act Amendments (CAAA) and are designed to protect both public health and welfare (EPA NAAQS). Air quality analyses for projects that may impact motor vehicular traffic are required to evaluate their impact on ozone (O3) and carbon monoxide (CO).

Rhode Island developed a State Implementation Plan (SIP) in 1982 to comply with the 1977 CAAA requirements for O3 and CO. While three pollutants, CO, Nitrogen Oxide (NOx), and Volatile Organic Compounds (VOCs), play a role in O3 formation, the Environmental Protection Agency (EPA) determined in 1980 that SIPs must require the reduction of VOCs as the most effective strategy to achieve the O3 standard. The 1990 CAAA requires states to update their SIPs to evaluate the impact of reducing all three pollutants.

The State of Rhode Island is required by the CAAA to attain the NAAQS "as expeditiously as practicable." In March 2003, the RIDEM submitted the "Rhode Island Attainment Plan for the One-Hour National Ambient Air Quality Standard" to the EPA as a revision to the SIP (RIDEM Office of Air Resources, 2003). The plan demonstrated that Rhode Island would attain the one-hour ozone standard by 2007 (RIDEM Office of Air Resources, 2003). In the Attainment Plan, Rhode Island agreed to submit to EPA by December 31, 2004 a mid-course review demonstrating that Rhode Island remained on track to attain the one-hour standard by 2007 (RIDEM Office of Air Resources, 2003). In December 2004 the RIDEM submitted the "Mid-Course Review of the Rhode Island Attainment Plan for the One-Hour Ozone National Ambient Air Quality Standard" to the EPA which demonstrated that Rhode Island was still on track to attain the one-hour standard by 2007 (RIDEM Office of Air, 2004).

The EPA revoked the one-hour standard as of June 15, 2005 and subsequent planning and emissions reduction efforts were required to focus on achieving the more stringent 8-hour standard (EPA, Green Book).

In April 2008 the RIDEM submitted the "Revision of the Rhode Island State Implementation Plan to Address Interstate Transport of Pollutants Affecting Attainment and Maintenance of the 8-Hour Ozone and Fine Particulate Matter (PM2.5) National Ambient Air Quality Standards" to the EPA as a revision to the State's SIP (RIDEM, 2008). The plan demonstrated that emissions from Rhode Island sources do not contribute significantly to downwind ozone attainment and will not prevent downwind areas from attaining the NAAQS by their required attainment dates (RIDEM, 2008). Based on the findings in this ER, it not anticipated that the proposed Project would have a significant effect on the air quality of downwind areas.

6

Description of Affected Social Environment

The EFSB Rules require a detailed description of all social and environmental characteristics of the proposed site including the land uses within and proximate to the Project Site, visual resources in the vicinity of the Project, and the public roadway systems in the area. The proposed Project is located at an existing gas utility facility in the Town of Portsmouth, Rhode Island, and TNEC's rights to the Project Site are by fee ownership. The Property is on the Portsmouth and Middletown Town Line so the Study Area also includes the Town of Middletown which is also included as a Host Community.

As per Sections 45-22.2-2 et seq. of the Rhode Island General Laws, Rhode Island Comprehensive Planning and Land Use Act, all cities and towns are required to adopt and periodically update Local Comprehensive Land Use Plans. In compliance with these requirements, Middletown adopted its Comprehensive Plan Update in November 2015. Portsmouth remains in the process of updating its Plan for 2020; therefore, the Portsmouth Plan (2002) was reviewed for this section and supplemented with current information where available.

6.1 Population Trends

The total population within the Host Communities has decreased steadily between 1990 and 2010 as shown in Table 6-1. The Town of Middletown is projected to continue this downward trend through 2040 while the population of Portsmouth is expected to stay relatively stable through 2040 (Table 6-2). The Host Communities can be characterized as being a mix of suburban and rural areas with a 2010 population that accounted for 3.19 percent of the total State population (Table 6-1).

Table 6-1 Population Trends, 1990-2010

Area	2000	2010	2019	Change 2000-2010 Absolute	Change 2000-2010 Percent	Change 2010-2019 Absolute	Change 2010-2019 Percent
State of Rhode Island	1,048,319	1,052,567	1,059,36	4,248	0.40%	6,794	0.60%
Portsmouth	17,149	17,389	17,226	240	1.40%	163	(1.00 %)
Middletown	17,334	16,150	15,888	(1,184)	(6.83%)	(262)	(1.6%)
Host Community Total	**34,483**	**33,539**	**33,114**	**(944)**	**(2.74%)**	**(425)**	**(1.27%)**
Percent of State Population	**3.29%**	**3.19%**	**3.13%**				

Notes: ( ) Negative Source: U.S. Census Quick Facts Data (2019) R.I. Department of Labor and Training, Labor Market Information Census Data 2000-2010. U.S. Department of Commerce. 1990 Census of Population: Social and Economic Characteristics of Rhode Island

According to the Rhode Island Statewide Planning population projects, the population of Middletown is projected to decrease by 9.70 percent (1,565 people) between 2010 and 2020 and Portsmouth's population is projected to remain stable with a population increase of 0.06 percent (11 people; Rhode Island Division of Planning, 2013). By 2040 Middletown's population is expected to drop by 24.94 percent from 2010 levels (4,029 people) and Portsmouth's population is expected to modestly increase from 2010 levels by 2.32 percent (403 people; Rhode Island Division of Planning, 2013).

Table 6-2 Population Projections, 2010-2040

Area	2010	2020	2030	2040	Change 2020-2030 Absolute	Change 2020-2030 Percent	Change 2030-2040 Absolute	Change 2030-2040 Percent
State of Rhode Island	1,052,567	1,049,177	1,070,677	1,070,104	(3,390)	(0.32%)	(573)	(0.05%)
Portsmouth	17,389	17,378	17,773	17,792	(11)	(0.06%)	19	0.11%
Middletown	16,150	14,585	13,460	12,121	(1,565)	(9.69%)	(1,339)	(9.95%)
Host Community Total	**33,539**	**31,963**	**31,233**	**29,913**	**(730)**	**(2.28%)**	**(1,302)**	**(4.17%)**
Percent of State Population	**3.19%**	**3.05%**	**2.92%**	**2.8%**				

Notes: ( ) Negative Source: Rhode Island Division of Planning, Rhode Island Statewide Planning Program. Rhode Island Population Projections 2010-2040.

6.2 Employment Overview and Labor Force

Recent population growth, urbanization, and a substantial commuter-based population have produced greater demands for and a wider selection of trades and services. According to the Rhode Island Economic Development Corporation (RIEDC), Rhode Island as a whole has enormous growth potential in the health and

life science industry due to the emerging biotechnology companies. The financial services sector is extremely important to Rhode Island employing over 32,000 individuals. Many manufacturers that invest in technologies and workforce training to compete in the global market have corporate or divisional headquarters in Rhode Island. Labor force and employment trends are shown in Table 6-3.

Table 6-3 Labor Force and Employment Estimates, 1990-2015

2020	State	Portsmouth	Middletown
Labor Force	542,723	8,626	7,807
Resident Employment	500,701	7,986	7,168
Resident Unemployment	42,022	640	639
Unemployment Rate	7.7%	7.4%	8.2%
2015 (October)			
Labor Force	553,119	8,842	8,020
Resident Employment	527,394	8,485	7,709
Resident Unemployment	25,725	357	317
Unemployment Rate	4.7%	4.0%	3.9%
2010			
Labor Force	566,704	8,991	8,107
Resident Employment	503,216	8,113	7,327
Resident Unemployment	63,488	878	780
Unemployment Rate	11.2%	9.8%	9.6%
2000			
Labor Force	543,561	9,215	8,509
Resident Employment	521,313	8,909	8,198
Resident Unemployment	22,248	306	311
Unemployment Rate	4.1%	3.3%	3.7%
1990			
Labor Force	525,361	8,863	8,335
Resident Employment	492,002	8,390	7,872
Resident Unemployment	33,359	473	463
Unemployment Rate	6.3%	5.3	5.6%
Total Employment Changes 1990-2020	17,362	(237)	(528)

Source: Rhode Island Department of Labor and Training, Portsmouth Labor Force Statistics, Not Seasonally Adjusted, 2020. https://dlt.ri.gov/lmi/datacenter/laus.php

Rhode Island Department of Labor and Training, Labor Force Statistics, Not Seasonally Adjusted, 1976-October 2015 http://www.dlt.ri.gov/lmi/laus/state/seas.htm

Rhode Island Department of Labor and Training, Portsmouth Labor Force Statistics, Not Seasonally Adjusted, 1990-October 2015. http://www.dlt.ri.gov/lmi/laus/town/portsmouth.htm

Historically, the leading employment sectors in the Host Communities have been manufacturing and arts, entertainment, and recreation. Recently, however, there has been a general shift from manufacturing employment to the retail, health care, and social services, and government sectors.

Currently, professional and technical services, manufacturing, retail trade, and health and social services, sectors are the largest source of employment in the Host Communities (see Table 6-4).

Table 6-4 Employment by Industry, 2010, 2015, and 2020

	Portsmouth			Middletown			% of Total
	2010	2015	2020	2010	2015	2020	2020
Agricultural, Forestry, Fishing and Hunting	42	32	44	72	21	69	0.76
Mining	*	*	0	*	*	*	0
Utilities	*	*	*	*	*	*	0
Construction	269	279	355	340	370	475	5.60
Manufacturing	1,851	1,490	1,398	302	410	411	12.20
Wholesale Trade	106	92	114	151	147	89	1.37
Retail Trade	494	460	532	1,540	1,427	1,237	11.93
Transportation and Warehousing	75	96	38	104	154	44	0.55
Information	67	68	41	284	243	101	0.96
Finance, Insurance, Real Estate, and Rental and Leasing	177	186	238	706	659	648	5.97
Professional and Technical Services	162	148	147	2,062	2,093	2,466	17.62
Management of Companies & Enterprises	*	2	4	279	317	499	3.39
Administrative Support & Waste Mgmt.	190	150	209	183	131	251	3.10
Government	629	700	729	776	615	591	8.90
Educational Services		286	246	270	*	213	3.09
Other services (except public administration)	183	176	150	472	458	254	2.72
Arts, entertainment, & recreation	779	47	136	210	105	84	1.48
Accommodation & Food Services	434	389	276	1,552	1,365	990	8.54
Armed forces	291	N/A	N/A	N/A	N/A	N/A	0
Unclassified Establishments	*	*	*		0	0	0
Health care & social services	504	852	772	1,564	1,371	980	11.81
Total	**5,574**	**5,467**	**5,429**	**10,924**	**10,148**	**9,402**	**100.00%**

Notes: * Some data not available to avoid revealing data of a specific employer
Source: Rhode Island Department of Labor and Training: Quarterly Census of Employment and Wages, City and Town Report – First Quarter 2015. http://www.dlt.ri.gov/lmi/es202/town.htm
Rhode Island Department of Labor and Training: Census of Employment & Wages, City and Town Summary – 2010 Annual http://www.dlt.ri.gov/lmi/pdf/town10ann.pdf
Rhode Island Department of Labor and Training: Quarterly Census of Employment and Wages, City and Town Report – Second Quarter 2020.
https://dlt.ri.gov/documents/pdf/lmi/town202q.pdf

The Project is not expected to have any measurable impacts on jobs in Newport County. Nor is it expected to impact the state's Gross Domestic Product (GDP).

6.3 Land Use

This section describes existing and future land use within the Study Area and addresses those features which might be affected by the Project.

6.3.1 Study Area Land Use

As depicted in Figure 6-1, several dominant land uses are present within the Study Area. While the Site Property primarily falls within agriculture and brushland areas, other land uses within the Study Area include residential, forest, open space, recreation, commercial, institutional, and wetland areas.

Residential use in the Town of Portsmouth is dominated by single family homes; these tend to be built tightly together in the northern section of Portsmouth, but the southern portions where the Study Area is located are less dense (Town of Portsmouth, 2002). Most Portsmouth residential development in the Study Area is low density with lots sized at greater than 2 acres (Town of Portsmouth, 2002). The Study Area also covers portions of eastern Middletown which is less developed than other parts of the town. Within the Middletown portion of the Study Area, the residential development is mainly low density residential.

Other developed land uses within the Study Area in Portsmouth include one small area of commercial use (engineering building). The northwest border of the Study Area in Middletown includes the Fraternal Order of Police Lodge 21 located off Mitchells Lane, Middletown.

Table 6-5 Study Area Land Use

2021 Land Use Type (2021)	Percentage of Study Area
Brushland (shrub and brush areas, reforestation)	11.5
Commercial (sale of products and services)	0.6
Agricultural (Orchards, Tillable Lane, Fields)	34
Mixed Forest	13.9
Developed Recreation (all recreation)	6.4
Residential (low to high density)	30.9
Open Space	1.6

2021 Land Use Type (2021)	Percentage of Study Area
Institutions (schools, hospitals, churches, etc.)	0.4
Water	0.4
Wetland	0.2

Educational and Institutional facilities located within the Study Area include the Silveira Kindergarten & Nursery School located at 143 Peckham Lane in Middletown. The School is located on the far western side of the Study Area, approximately 2,000 feet west of the Project Site.

Residential use in the Town of Middletown is largely composed of single-family dwellings (57 percent of the housing stock; Town of Middletown, 2014). The central portion of Middletown, where the Study Area is located, is primarily zoned for medium to medium-high density residential, with lots ranging from one-eighth of an acre to one full acre (Town of Middletown, 2014). Other land uses within the Study Area in Middletown include conservation area and agricultural land (Town of Middletown, 2014).

The Study Area also encompasses several large areas of open space and agricultural land, detailed below in Section 6.3.3.

6.3.2 Open Space and Recreation

Much of the southeast and south-central portions of Portsmouth are classified as agricultural land or open space, and as of 2012 approximately 6,484 acres of land on Portsmouth's mainland (excluding the islands) are classified as open space, which amounts to 36 percent of the town's land (Aquidneck Island Planning Commission, 2012). Middletown has approximately 4,732 acres of land that is classified as open space or recreational land, which accounts for approximately 49 percent of Middletown's total area. There are several areas of open space and recreational area present within the Study Area and most of it has been conserved through the cooperation of Aquidneck Land Trust and landowners. Aquidneck Land Trust is a local non-profit dedicated to conserving land on Aquidneck Island.

In Portsmouth there are two areas off Indian Avenue and Swan Drive, totaling less than 5 acres, that is classified as Vacant Land (RIGIS Land Use, 2011). A third location in Portsmouth, totaling approximately 2.2 acres, off Old Mill Land is classified as Idle Agriculture (abandoned fields and orchards) (RIGIS Land Use, 2011).

In the northwestern portion of the Study Area, is the Newport National Golf Club, of which approximately 48.5 acres is located in Middletown (Middletown, 2021), and approximately 133 acres is located in Portsmouth (Portsmouth, 2021).

6.3.3 Local Conservation Land

A corridor of high value/high vulnerability habitat runs west and south of the Project Site (RIDEM Environmental Resource Mapper, 2021). This resource is classified as

containing one or more of the following: flood plain forest, hemlock/hardwood forest, northern hardwood forest, pitch pine/barrens, mud flat, inland sand barren, salt marsh, wet meadow, coastal streams, tidal marsh, rocky shore, sand flat, sea level fen, brackish sub-aquatic beds, brackish marsh, and Atlantic white cedar swamp.

6.3.3.1 Rocky Brook Orchard (Middletown)

Rocky Brook Orchard is located at 997 Wapping Road, largely in Middletown is located approximately 1,200 feet northwest of the Project Site.

6.3.3.2 Harrison Farm (Middletown)

The 2.8-acre Harrison Farm is located on the west side of Little Creek Road. Aquidneck Land Trust helped to establish a conservation easement for the farmland which buffers Little Creek (Aquidneck Land Trust, 2021). This property is located approximately .44 miles southwest of the Project Site.

6.3.3.3 Idle Hour Farm (Middletown)

The 16.5-acre Idle Hour Farm is an equestrian facility located on the north side of Fayal Lane. The Aquidneck Land Trust helped to establish a conservation easement for the farmland which includes agricultural fields and wetlands associated with Little Creek. This property is located approximately .38 miles west of the Project Site.

6.3.3.4 Mitchell Land (Middletown)

Mitchell Land consists of 19 acres of forest, shrubland and wetland associated with Paradise Brook (a designated drinking water supply) (RIDEM 2020). The land was put into a conservation easement by the Aquidneck Island Land Trust and is held for habitat protection. The property is located approximately .49 miles west of the Project Site.

6.3.3.5 Newport National Golf Club (Portsmouth/Middletown)

The Newport National Golf Club includes 308.73 acres of maintained lawn, grassland, shrubland, wetland and forest on which the Aquidneck Island Land Trust has a conservation easement for habitat protection. Roughly five miles of the Sakonnet Greenway Trail, a public walking path, runs along the course perimeter. This property is located approximately .3 miles northwest of the Project Site.

6.3.3.6 Reposa Square (Portsmouth)

Reposa Square includes 1.3 acres of Conservation land designated for cluster open space within a residential subdivision. This property is located approximately .4 miles east of the Project Site.

6.3.3.7 Swan Farm (Portsmouth)

The 138.31 acres of agricultural fields and woodland in Swan Farm were put into a Conservation Easement in 2008 by the Aquidneck Island Land Trust. Swan Farm is the largest un-fragmented forest on Aquidneck Island and contains a number of habitat types including vernal pools, meadows, forest, and wetland (Aquidneck Land Trust, 2021). This property is located approximately 550 feet north of the Project Site.

6.3.4 Compatibility with Future Land Use Planning

In order to assess future land use, the town undertook an analysis of current and future zoning. Typically, towns and cities manage future growth through zoning regulations which provide a degree of control over a community. The Study Area is zoned residential and open space.

The most current future land use plan developed by the Town of Portsmouth is from 2002 (Town of Portsmouth, 2002). According to this plan, the Study Area will contain low density residential, open space, and low-medium density residential future land uses. These predicted uses are consistent with the present use of the Study Area.

The current land use of the Study Area in Middletown consists of conservation/open space, non-urban developed, and Prime Farmland (Town of Middletown, 2014). The Middletown land use plan for 2025 predicts that these uses will change only slightly within the Study Area: some of the existing medium-density residential areas will change over to conservation and farmland.

A review of Portsmouth's Comprehensive Plan (2002) contains limited discussion of electrical utilities. There is a provision in the implementation of the economic development strategy (Economic Development Element, Section VI Subsection F) to plan for utilities and services development to improve the reliability of electrical power and meet the requirements of targeted businesses (Town of Portsmouth, 2002).

Middletown's Comprehensive Plan (2014) calls for the development of an economic policy that will "invest in critical infrastructure necessary to develop a robust and diversified economy." The policy calls for an action item concerning the development of a comprehensive assessment of projected infrastructure needs, including electrical, versus the available resources and capabilities.

Based on the Towns' similar interests in improving the reliability of natural gas infrastructure/reliability to businesses and residents, the implementation of the Project will help the towns to achieve this shared objective.

6.4 Visual Resources

The visual quality of a place is determined by the perceived aesthetic value of the available views, as influenced by topography, vegetation, and land use. The Study Area for this Project was defined as the area within a .5-mile radius of the Project

Site on Old Mill Lane. Aquidneck Island is a relatively narrow landform that rises, from the Sakonnet River on the east and Narragansett Bay on the west, to an elevated central ridge that runs in a north-south direction. The topography in the Study Area is variable and includes level benches or terraces, saddles and valleys, and sloped ridges and hillsides. Elevations within the Study Area range from 75 to 150 feet above mean sea level.

Land use in the Study Area is dominated by low density residential development and open/forested/agriculture space. The residential homes along Old Mill Lane in Portsmouth are individual single-family homes that range in age. The houses on the south side of Old Mill Lane, aside from a few farm properties, were built during the 1970s. The north side of Old Mill Lane near the Project Site but on the opposite side of the street is dotted with homes from the 1990s that are situated on larger lots. There are no major highways within the Study Area. The main roads that traverse the Study Area are Wapping Road, Old Mill Lane, and Peckham Avenue.

Large areas of open agricultural land are scattered throughout the Study Area (primarily within the northern and western portions). These agricultural areas offer more open, long-distance views of the surrounding landscape. An approximately 70 acre forest occurs within the northeast part of the Study Area, and two smaller forest areas occur on either side of Peckham Avenue. Vegetation in forested areas is dominated by deciduous trees and includes both mature and successional stands. Where forest vegetation occurs in larger, more intact blocks, it provides a strong sense of enclosure and screening along roadways and around residential areas. Small ponds, wetlands, and streams are scattered throughout the Study Area, but are typically obscured from direct view by woody vegetation.

A number of resources/sites that could be considered visually sensitive occur within the Study Area. These resources include historic sites, areas designated as scenic by RIDEM, and conservation/open space areas. The only state-designated scenic area within the Study Area is Mitchell's Lane, classified as excellent agricultural area with views across fields (RI Landscape Inventory, 1990). Specific viewer groups within the Study Area include local residents, through-travelers, and visitors.

6.5 Noise

Noise is defined as unwanted or excessive sound. Sound becomes unwanted when it interferes with normal activities such as sleep, work, or recreation. Sound (noise) is described in terms of loudness, frequency, and duration. Loudness is the sound pressure level measured on a logarithmic scale in units of decibels (dB). For community noise impact assessment, sound level frequency characteristics are based upon human hearing, using an A weighted [dB(A)] frequency filter. The A weighted filter is used because it approximates the way humans hear sound. Sound levels are made up of individual components called octave band frequencies. The dB(A) sound levels are weighted to focus on the octave band frequencies that humans hear best. A pure tone condition can occur when a sound can be distinctly heard as a single pitch or set of single pitches. Generally, a 1 or 2 dB(A) increase is not perceptible to

the average person. A 3 dB(A) increase is a doubling of acoustic energy but is just barely perceptible to the human ear. A 10 dB(A) increase is a tenfold increase in acoustic energy but is perceived as a doubling in loudness to the average person.

Table 6-6 presents a list of common outdoor and indoor sound levels. The duration characteristics of sound account for the time varying nature of sound sources.

Table 6-6 Typical Sound Pressure Levels Associated with Common Noise Sources

Sound Pressure Level (dBA)	Subjective Evaluation	Environment	
		Outdoor	Indoor
140	Deafening	Jet aircraft at 75 ft	
130	Threshold of pain	Jet aircraft takeoff at 300 ft	
120	Threshold of feeling	Elevated train	Rock band concert
110	Extremely Loud	Jet flyover at 1000 ft	Inside propeller plane
100	Very Loud	Motorcycle at 25 ft, auto horn at 10 ft, crowd noise at football game	
90	Very Loud	Propeller plane flyover at 1000 ft, noisy urban street	Full symphony or band, food blender, noisy factory
80	Moderately Loud	Diesel truck (40 mph) at 50 ft	Inside auto at high speed, garbage disposal, dishwasher
70	Loud	B-757 cabin during flight	Close conversation, vacuum cleaner, electric typewriter
60	Moderate	Air-conditioner condenser at 15 ft, near highway traffic	General office
50	Quiet		Private office
40	Quiet	Farm field with light breeze, birdcalls, soft stereo music in residence	Bedroom, average residence (without television and stereo)
30	Very quiet	Quiet residential neighborhood	
20	Very Quiet	Rustling leaves	Quiet theater, whisper
10	Just audible		Human breathing
0	Threshold of hearing		

Source: Adapted from Architectural Acoustics, M. David Egan, 1988 and Architectural Graphic Standards, Ramsey and Sleeper, 1994.

6.5.1 Facility

A noise study was carried out to evaluate sound levels in the residential area that abuts the Property. The noise study included a noise monitoring program to establish existing sound levels, calculations of Project-related sound levels at the nearby sensitive receptor locations, and determination of compliance with the applicable noise impact criteria.

6.5.2 Noise Impact Criteria

The State of Rhode Island does not have regulations that set community noise exposure criteria or abatement measurements. Instead, noise abatement criteria are instituted by the municipalities of Rhode Island. The Project is located in Portsmouth, but the Property is also on the town line with Middletown. Both towns have developed noise impact criteria as follows:

Table 6-7 Town of Portsmouth Sound Limit, dB(A)

Receiving Land Use	Time	Sound Limit
Residential and open space	7 AM to 10 PM	65
	10 PM to 7 AM	55
Commercial and waterfront	At all times	75
Light and heavy industrial	At all times	75
Public water	At all times	75

Source: Table I: Maximum Permissible Sound Levels by Receiving Land Use, Code of the Town of Portsmouth, Rhode Island, Chapter 257-7.

Table 6-8 Town of Middletown Sound Limit, dB(A)

Receiving Land Use	Time	Sound Limit
Residential and open space	7 AM to 10 PM	65
	10 PM to 7 AM	55
Business (general, office, limited)	At all times	75
Light industrial	At all times	75
Industrial park	At all times	75
Municipal	At all times	75
Public Water	At all times	65
Noise sensitive areas	7 AM to 10 PM	65
	10 PM to 7 AM	55

Source: Maximum Permissible Sound Levels By Receiving Land Use, Town of Middletown, Rhode Island Code of Ordinances, Section 130.80 (A).

6.6 Cultural Resources

TNEC's cultural resource consultant, The Public Archaeology Laboratory, Inc. (PAL), reviewed the proposed seasonal LNG facility on Old Mill Lane in Portsmouth, RI and determined that the Project Site is in the midst of existing natural gas pipeline infrastructure and has been subject to previous ground disturbances. PAL recommends that the Project Site has no/low archaeological sensitivity and no further cultural resource investigations are recommended. PAL previously reviewed the Project Site as part of an assessment conducted for Algonquin Gas Transmission, LLC as part of their 2011 Integrity Management Program along the G-2 System

natural gas pipeline. Algonquin used workspace that conforms with the proposed Project Site. On February 14, 2011, PAL submitted correspondence to the Rhode Island Historical Preservation & Heritage Commission (RIHPHC), recommending that the then-proposed project would not affect historic properties, and the RIHPHC responded on February 25, 2011, concurring with PAL's assessment.

6.7 Transportation/Traffic

The transportation needs of the Study Area are served by a network of local town roads (Table 6-9). The Project Site will be located on and accessed by local road Old Mill Lane.

Table 6-9 Road Names

Road Name	Town
Old Mill Lane	Portsmouth and Middletown
Wapping Road	Portsmouth and Middletown
Indian Avenue	Portsmouth and Middletown
Peckham Avenue	Middletown
Vaucluse Avenue	Middletown

7

Impact Analysis

This chapter presents an analysis of the potential impacts of the Project on existing environmental and social conditions within the Study Area. As with any project, potential adverse impacts can be associated with the mobilization/demobilization or operation of the proposed seasonal portable LNG operation. These impacts have been minimized by the careful location of the facility and by the adoption of numerous mitigation practices.

This Project will be constructed in a manner that minimizes the potential for adverse environmental impacts. A monitoring program will be conducted by TNEC to ensure that the Project is constructed in compliance with all relevant licenses and permits and applicable federal, state, and local laws and regulations. Design and mobilization mitigation measures will ensure that related environmental impacts are minimized.

In case of an emergency in which the Project would need to mobilize outside of its expected winter seasonal use, the Project mobilization/demobilization and operation would occur similar to the winter operation. Following completion of the emergency use, the site would be restored and revegetated to minimize effect to any transient wildlife species and the abutting wetland.

7.1 Geology

The Project will have negligible impact on the bedrock and surficial geologic resources of the Property. The Study Area consists of lodgement till with pockets of glaciofluvial deposits and organic deposits associated with wetland areas. The transportation, mobilization and operation of the seasonal portable LNG operation will not require excavation, and therefore will not negatively affect the bedrock or surficial geology at the Site.

7.2 Soils

Activities which expose unprotected soils have the potential to increase natural erosion and sedimentation rates. Soil compaction and decreased infiltration rates may result from equipment operations. The Project does not include substantial grading activities, as the proposed seasonal portable LNG operation is built on construction mats outside of the growing season. When needed, standard National Grid construction techniques and BMPs such as the installation of compost filter sock, the re-establishment of vegetation and dust control measures, will be employed to minimize any short- or long-term effects due to mobilization activity. These devices will be inspected by the environmental monitor frequently during the mobilization, operation, and demobilization phases of the Project and supplemented, repaired or replaced when needed. National Grid will develop and implement a Soil Erosion and Sediment Control (SESC) Plan which will detail BMPs and inspection protocols.

7.3 Surface Water

Any impact of the Project upon surface watercourses will be minor and temporary. Mobilization/demobilization activities temporarily increase risks for erosion and sedimentation that may temporarily degrade existing water quality; however, appropriate BMPs will be implemented and maintained to effectively control sediment. In addition, the crossing of rivers and streams will not be required for this Project.

The nearest surface water feature to the Project Site is Little Creek, flowing south of the Site. Access to the LNG equipment locations will not impact this watercourse as access to the Project Site is from Old Mill Lane.

Potential impacts to surface waters if sediment transport is not controlled include increased sedimentation (locally and downstream) and subsequent alterations of benthic substrates, decreases in primary production and dissolved oxygen concentrations, releases of toxic substances and/or nutrients from sediments, and destruction of benthic invertebrates. Limited soil disturbance/exposure and deployment of erosion and sedimentation controls when needed will effectively minimize the potential for this situation to occur. The implementation and maintenance of erosion and sedimentation control BMPs will limit the levels of Project related sedimentation and will minimize adverse impacts to surface waters.

7.3.1 Water Quality

The primary potential impact to water quality from any major construction project is the increase in turbidity of surface waters in the vicinity of construction resulting from soil erosion and sedimentation from the disturbed site. A second potential impact is the spillage of petroleum or other chemical products near waterways. Transportation, mobilization, and operation of the proposed portable LNG operation

will not significantly disturb on-site soils and or surface water. Furthermore, equipment will not be refueled or maintained near surface water resources. Therefore, it is anticipated that any adverse impacts to water resources resulting from the proposed portable LNG operation will be negligible.

An SESC Plan will be designed and implemented which will confine sediment within the immediate Project Site and minimize impacts to downstream areas.

7.3.2 Hydrology

Some minor, temporary impacts to surface drainage can be expected during the mobilization and operation of the proposed seasonal portable LNG operation. These impacts will be associated with installation of the construction matting. The staging of this equipment will not permanently alter the topography within the Site and the area will be restored to its pre-project condition annually.

The hydrology of surface waters will not be significantly affected during or after staging of equipment since stream crossings are avoided. A slightly higher rate of storm water runoff may result from the construction matting which would otherwise be vegetation functioning to absorb some of the precipitation and slow the rate of runoff. These impacts will be short-term because vegetative cover will reestablish each spring.

7.3.3 Floodplain

Based on available FEMA Flood Insurance Rate Mapping for the towns of Portsmouth[13] and Middletown[14], the Project occurs within Zone X (Areas determined to be outside the 0.2% annual chance floodplain). There are no SFHA located within the Project Site. It is recognized that by definitions provided in the RIDEM Freshwater Wetland Rules, all rivers, streams, and intermittent streams have one percent annual chance flood though they may not be mapped by FEMA.

The Project will not result in a discharge of fill to mapped SFHAs.

7.4 Groundwater

As discussed below, any impact of the Project upon groundwater resources will be minor.

7.4.1 Proposed Project

Potential impacts to groundwater resources within the Project Site as a result of staging activity will be negligible. Vehicles used for the placement of LNG Equipment will be properly maintained and operated to reduce the chances of spill occurrences

13 Town of Portsmouth, Map No. 445405 0082 J, Panel 82 of 226, revised September 4, 2013 Town of Portsmouth, Map No. 445405 0092 H, Panel 92 of 226, effective April 5, 2010.

14 Town of Middletown, Map No. 445401 0092 H, Panel 92 of 226, effective April 5, 2010.

of petroleum products. Refueling of the backup generator will be conducted on the mats which are in an upland area. Spill containment and prevention devices (i.e., absorbent pads, clean up rags, five-gallon containers, absorbent material, etc.) are required to be located on site at all times. The Company performs regular inspections and maintenance of its LNG equipment. The normal operation and maintenance of the proposed seasonal portable LNG operation will pose no threat to groundwater resources.

Portable emergency generator is refueled with diesel and DEF as needed. Spill kit is maintained onsite in case of a spill. Portable generator is checked once per operating shift (3 times daily) for leaks.

7.4.2 LNG Tank Filling

LNG is unloaded via transport truck and trailer into storage vessels as required. Advanced notice is given to Portsmouth and Middletown Fire Departments for the transport schedules and planned delivery route. Transport trailer is positioned onsite next to storage vessels for the transfer by spotters. Once truck and trailer are positioned, a temporary containment system is placed around the rear manifold section of the trailer to accommodate a 10-minute spill, as per NFPA 59A, 2001, Section 2.2.2.2. This temporary containment system is additional to the impounding area berm surrounding all staged storage vessels to contain a 100% volumetric spill from the total LNG stored onsite as per NFPA 59A, 2001, Section 2.2.2. A truck unloading job brief is performed with all involved personnel before unloading commences, consistent with company and department policy. LNG unloading operation is continuously attended and monitored during the entire transfer.

7.5 Wetlands

The Project will result in temporary impacts to state-regulated 50-foot Perimeter Wetland. Impacts within the Project Site are limited to regular mowing of the grass field throughout the growing season. In the fall construction mats are installed to establish the proposed seasonal portable LNG operation which are then removed prior to the start of the following spring growing season. The grassed field vegetative cover reestablishes each spring. Following the winter operation, disturbed areas in the vicinity of the proposed seasonal portable LNG operation will be seeded and mulched as appropriate. Implementation of erosion and sediment control BMPs will minimize impacts to wetlands from the LNG operation.

7.6 Wildlife

During (de)mobilization and operation, displacement of wildlife on and surrounding the Project Site may occur due to activity associated with the facility. Wildlife currently utilizing the Study Area may be affected by the Project. Larger, more mobile species, such as eastern white-tailed deer or red fox, will continue to be

restricted from the Project Site due to the perimeter fencing. Some bird species may be temporarily displaced.

Smaller and less mobile animals such as small mammals, reptiles, and amphibians may be affected during vegetation mowing. The species affected during the mobilization and operation of the LNG Site are expected to be limited in number. Effects will be localized to the immediate equipment area. However, this is anticipated to be a temporary impact as it is anticipated that existing wildlife utilization patterns will resume, and population sizes recover following the seasonal operation of the Project.

Impacts to sensitive habitats of rare, threatened, or endangered species will be avoided through careful project planning which avoids operations during the active seasons of these species, and coordination with the RIDEM. Impacts to rare, threatened, or endangered species will be considered as part of any RIDEM Freshwater Wetlands permitting that may be required for the Project.

7.7 Social and Economic Impacts

7.7.1 Social Impacts

The Project will enable TNEC to continue to provide reliable natural gas services to homes, business, and industry throughout Aquidneck Island. The proposed Project does not require, nor will it lead to residential or business displacement. Temporary (de)mobilization and operation impacts, primarily related to traffic and equipment operation, are expected to be minor and the Project will not adversely impact the overall social and economic condition of the Study Area. As described in Section 4.0, the LNG facility will be located entirely within the TNEC-owned property at Old Mill Lane that has historically served the natural gas needs of Aquidneck Island. Therefore, the Project will not require the acquisition of property or disrupt orderly planned development, thus avoiding adverse impacts.

In order to minimize social impacts, TNEC has engaged in outreach as described in Section 3.4.2. TNEC will also appoint an Ombudsman to serve as a contact for abutters during the (de)mobilization and operation phases of the Project.

7.7.2 Population

The Project will maintain the existing natural gas service reliability to the population growth trends throughout Aquidneck Island. It also will maintain the system's ability to reliably serve residential, commercial, and industrial developments planned for the future.

7.7.3 Employment

The Project is not expected to have any impact on local employment.

7.7.4 Economic

By meeting the current and projected demands for natural gas in the area, the Project will support the state's effort to stimulate additional growth and economic activity in the region.

7.8 Land Use and Recreation

The following discussion addresses the compatibility of the proposed seasonal portable LNG operation with various land uses in the Study Area.

7.8.1 Land Use

Land use impacts can be separated into short-term and long-term impacts. Short-term land use impacts may occur during the mobilization phase of the proposed Project. Impacts associated with the mobilization phase of the Project will be temporary and the parcel will be vacant in the remaining months. TNEC will provide notification of the intended plan and schedule to affected abutters so that the effect of any temporary disruptions may be minimized.

The Project is proposed entirely within an existing parcel which is already occupied by gas line connections in coordination with the adjacent Take Station property. From 1963 until 1991 the site was used to house propane which was injected into the pipeline to bolster supply shortfalls. For the Winter of 2001-2002, a portable LNG vaporization facility was operated at the site. The site was used for staging of pipeline maintenance operations until 2018 when TNEC once again began to use the site as a portable LNG vaporization facility. Considering the longstanding use of the site for gas operations, the continuation of existing seasonal LNG operations within the existing TNEC-owned parcel will be consistent with the established land use, therefore it will not present long-term land use impacts.

7.8.2 Residential

Residential areas are located in proximity to the Project Site. Temporary impacts to these residences may occur during periods of mobilization and demobilization in the form of increased traffic. During operation, there may be visual and noise impacts. Existing vegetation will continue to provide visual screening of the facilities from residences to the sides and rear of the Property.

Because the Project will occupy areas dedicated to use for utilities, the Project will not displace any existing residential uses, nor will it adversely affect any future development proposals.

7.8.3 Agriculture

Although agricultural uses occur within the Study Area, agricultural uses do not occur on the Property or abutting properties. Therefore, impacts to agricultural uses will not occur as a result of the proposed Project.

7.8.4 Educational Institutions

The Silveira Kindergarten & Nursery School located at 143 Peckham Lane in Middletown is located approximately 2,000 feet west of the Project Site. No impacts to this facility are expected during operation of the seasonal LNG facility.

7.8.5 Commercial and Industrial

The proposed Project Site is not adjacent to any commercial or industrial areas. Normal business operations will not be adversely affected by the Project. No displacement of business will result from the Project.

7.8.6 Recreation

The Project will not displace or interfere with any existing recreational uses.

7.8.7 Consistency with Local Planning

The proposed Project was evaluated for consistency with the Comprehensive Plans in Portsmouth and Middletown. These Comprehensive Plan describes each municipality's planning goals and objectives regarding future development and growth. As documented in the Purpose and Need section of this Siting Report, there is a clear need for improving the natural gas distribution reliability to the area.

The Project will be consistent with these Comprehensive Plans because the proposed Project will not alter existing land use patterns. Moreover, the Project will enable each communities planning initiatives by ensuring an adequate supply of gas to support the growth and development envisioned by the Comprehensive Plans of the communities.

7.9 Visual Resources

A desktop study was performed to analyze the potential visibility and visual impact of the Project. Within a half-mile radius visual Study Area, landscape similarity zones (LSZ's) were defined based on the USGS National Land Cover Data set and field review. LSZ's are areas of similar landscape/aesthetic character based on patterns of landform, vegetation, water resources, land use, and user activity. This effort resulted in the definition of two final LSZs, including the following: 1) Rural Residential/Agricultural, and 2) Forest. VHB also identified typical viewer groups and visually sensitive resources within the visual Study Area. Viewer groups include local residents, through-travelers, and visitors. Visually sensitive resources include historic

sites, state-designated scenic areas, state conservation areas, designated open space.

The combined effect of vegetation (forest areas, street trees, and yard vegetation) throughout the Study Area screen (or partially screen) views of the Project.

7.10 Noise

7.10.1 Existing Sound Levels

The existing sound levels were measured using a Type 1 sound analyzer (Larson Davis model LD831C sound level meter/real-time analyzer). Measurements were conducted during a typical weekday for 24 hours at the northeast corner of the Property. The measured sound level data under existing conditions included noise from the abutting take station, local roadway activities, and wildlife activities. The existing sound levels without the facility were found to be typical of a suburban area and that they do not exceed either town's daytime or nighttime standards residential noise criteria.

7.10.2 Project Sound Levels and Conclusion

The noise analysis calculated the potential sound levels at the Project assuming full operation of the equipment necessary to vaporize. The sound levels generated by the equipment range from 65 dB(A) to 97 dB(A). These sound levels exceed the Portsmouth's and Middletown's sound limit of 55 dB(A) for the residential zoned areas during the nighttime period and are therefore not in compliance with their noise ordinances.

7.11 Transportation

The project related traffic will be intermittent, temporary, and will cease once mobilization and decommissioning of the Project is completed. The addition of this traffic for the limited periods of time is not expected to result in any additional congestion or change in operating conditions along any of the roadways within the Study Area. During mobilization it is expected there will be approximately a dozen truck movements needed to locate equipment and matting. If the facility remains operational at maximum peak load for a 24-hour period, then approximately 17 LNG tanker trucks would be needed to refill the storage tanks.

TNEC's contractor will coordinate closely with Portsmouth to develop acceptable traffic management for mobilization and decommissioning of the facility if needed.

Given the seasonal nature of the proposed portable LNG operation, the site will not generate any vehicular traffic between May and October other than for periodic site inspection and vegetation maintenance. Further, no long-term impacts to existing

traffic patterns or volumes are anticipated following completion of the annual mobilization and de-mobilization.

7.12 Cultural Resources

Based on previous field investigations, including sensitivity assessments and subsurface archaeological investigation, TNEC's cultural resource consultant recommended the Project Site has no/low archeological sensitivity and no further cultural resource investigations were recommended. PAL previously reviewed the Project Site as part of an assessment conducted for Algonquin Gas Transmission, LLC. Algonquin used workspace that conforms with the proposed Project Site. On February 14, 2011, PAL submitted correspondence to the RIHPHC, recommending that the then-proposed project would not affect historic properties, and the RIHPHC responded on February 25, 2011, concurring with PAL's assessment. RIHPHC concluded that the then proposed project would not affect historical properties, and the RIHPHC concurred with PALs assessment. Therefore, since the scope of the temporary portable LNG operation requires little subsurface disturbance, it will have no effect on any significant archeological resources (those listed on, or eligible for listing on the National Register of Historical Places).

7.13 Project Impacts

7.13.1 Air Quality

There are no expected exposed soils associated with this work as the equipment is arranged on construction matting which is removed before the start of the growing season. No fugitive dust emissions are expected from the Project. In addition, no earth will be moved or disturbed during the seasonal operation. Therefore, any impacts from fugitive dust particles will be negligible.

Air quality will not be significantly affected by mobilization and operation of the Project. Emissions produced by the operation of machinery needed to stage and remove the equipment (nitrogen oxides, sulfur oxides, carbon monoxide, and particulate matter) are short-term and not generally considered significant. No further regulatory follow up or permitting is required.

As part of the operation, an emergency generator will be installed at the Project Site. Air permitting will be required for this to operate and will result in a de minimus change to air quality.

7.13.2 Operation Impacts

In part, air quality is a function of area wide emissions of ozone precursors (carbon monoxide, nitrogen oxide, and volatile organic compounds) from the change in daily traffic volumes along lengths of area roadways. The Project will not change traffic and emissions parameters, nor affect the travel characteristics of the vehicles

traveling in Portsmouth and Middletown, Rhode Island. Therefore, the mobile source emissions will not be changed due to the proposed Project.

Liquified Natural Gas (LNG) is cleaner burning than other fossil fuels and produces negligible amounts of sulfur, mercury, and particulates. The burning of natural gas will produce nitrogen oxides (NOx), which are precursors to smog, but at lower levels than gasoline and diesel (USCUSA). Natural gas is mainly methane, a greenhouse gas, however leaks from storage tanks and pipelines are infrequent (EIA) and TNEC will continue to take steps to prevent LNG leaks within the Portsmouth facility.

7.13.3 Safety and Public Health

The proposed facility will be designed, built, and maintained in accordance with the standards and codes as described in Section 3.4, which are designed to protect public health and safety.

The Company has taken measures to prevent the public from entering the Project Site. The proposed seasonal portable LNG operation is locked and enclosed with chain link fence topped with barbed wire to prevent unauthorized entry. Following mobilization of the facility, the perimeter will be clearly marked with warning signs to alert the public to potential hazards if climbed or entered. Further, while the Equipment is present on-site, the Company hires security to be on-site 24-hours a day. And while the Equipment is operational, Company personnel are also on-site.

Although LNG is defined as hazardous by USDOT, there is minimal risk of general public exposure as described in Section 3.4. The equipment is installed and maintained by trained technical staff and they are checked for integrity during inspections by National Grid personnel.

8

Mitigation Measures

8.1 Introduction

The seasonal portable LNG operation is proposed at a Site adjacent to the Portsmouth Take Station and on a property that has historically been used and operated as part of Aquidneck Islands gas utility infrastructure since 1963. Mitigation measures will effectively minimize Project impacts on the natural and social environment associated with each phase of the Project. Many of these measures are standard proven procedures that National Grid incorporates in all projects. Others are site specific measures designed to meet the needs of this particular Project. These measures are described in the following sections.

8.2 Mobilization and Operation Phases

The Company has incorporated design measures to reduce the impacts associated with the mobilization and operation phases of the seasonal portable LNG operation. Functionally these design measures are the same and remain in use during both the mobilization and operation phases of the Project and include alignment, design, and use of an existing gas utility property, which has results in the avoidance and minimization of most residential and wetland impacts, and soil disturbance. Further, a wetland mitigation plan, which includes the implementation of BMPs (i.e., temporary construction mats, where needed compost or wood chip mulch filter sock, vegetation management, etc.) during and following mobilization, to minimize impacts associated with the proposed Project, will be filed with the RIDEM as part of a Request for Regulatory Applicability application for the Project. Additional mitigation measures include; supervision and inspection of activities within resource areas by an Environmental Monitor and minimization of disturbed areas. The following sections detail the various measures that will be implemented in the mobilization

and operation phases of the Project to reduce impacts to the natural and social environment.

8.3 Mitigation of Natural Resource Impacts

A number of environmental considerations were evaluated for the mobilization phase, including; wetlands, rare species, water quality and water supply protection, land use, subsurface contamination, and floodplain. Essential long-term impacts to wildlife are not anticipated. Vehicle and equipment traffic will be limited to the existing roadways in the Study Area. Long-term mitigation efforts will include minimizing permanent wetland disturbance and maintaining wetland functions following mobilization.

Overall, the proposed mitigation plan has been designed to minimize impacts to environmental resources resulting from the proposed Project.

The Project does not include grading activities, as the Proposed seasonal portable LNG operation is built on construction mats outside of the growing season. These construction mats also displace equipment loads by spreading out the vehicle weight over a larger surface area thus minimizing compaction of on-site soils. When needed, standard National Grid construction techniques and BMPs such as the installation of compost filter sock, the re-establishment of vegetation and dust control measures, will be employed to minimize any short- or long-term effects due to Project activities. These devices will be inspected by the environmental monitor frequently and supplemented, repaired or replaced when needed. TNEC will develop and implement a Soil Erosion and Sediment Control (SESC) Plan which will detail BMPs and inspection protocols.

The proposed seasonal portable LNG operation will be installed within property that has historically housed and been operated as part of Aquidneck Islands gas utility infrastructure, and no permanent impacts to wetlands or water bodies are anticipated. The Company's objective is to minimize the potential for erosion and sedimentation impact during mobilization and to effectively restore any disturbed areas. The Company will meet these objectives by implementing the erosion and sediment control measures described in this section. In general, the measures are designed to minimize erosion and sedimentation by:

- Proposing no soil exposure and use of construction mats;
- Installing and maintaining erosion and sediment control measures during mobilization if needed;
- Establishing vegetation where required as soon as possible following demobilization; and
- Maintaining erosion and sediment controls as necessary until final stabilization is achieved and final inspections completed.

8.3.1 Wetlands

The Project will have no direct impacts to adjacent wetlands but will involve work in the buffer zone of an on-site wetland area.

The proposed Project does not require any filling or clearing of wetlands or crossing of waterways.

Activities in close proximity to wetlands will be managed to avoid indirect impacts related to erosion and sedimentation. The Company is committed to ensuring that indirect impacts are avoided and minimized, and as such a SESC Plan will be prepared for the Project that will specify implementation of erosion control measures, including:

- Environmental monitoring of the Project to ensure compliance with the SESC Plan and all other environmental permits.
- Placement of erosion and sedimentation controls such as CFS, at appropriate locations if needed.
- Temporary erosion control barriers will be inspected on a daily basis in areas of active mobilization or equipment operation, on a weekly basis in areas with no construction or equipment operation, and within 24 hours of a storm event that is 0.25 inches or greater.
- Procedures for refueling and lubricating equipment will be established to ensure safety and spill prevention. In all cases, secondary containment, spill containment gear, and absorption materials will be maintained for immediate use in the event of any inadvertent spills or leaks.

8.3.2 Rare Species

Given that the Project will operate only during the winter months, outside of the active season for both identified rare species (leopard frog and marsh wren), will not involve soil disturbance and grass cover is reestablished at the beginning of the growing season, the Project is not expected to result in any impacts on rare species or rare species habitat. Therefore, no additional associated mitigation measures are proposed.

8.3.3 Water Quality and Water Quality Supply Protection

The Project does not anticipate any mobilization or operational impacts related to water quality or water supplies. The following best practices mitigate against any water quality impacts:

- Equipment used for the placement of LNG equipment will be properly maintained and operated to reduce the chances of spill occurrences of petroleum products.
- Refueling of equipment on site is limited to the emergency generator which will be conducted in upland areas.

- The portable generator is checked once per operating shift (3 times daily) for leaks.
- Refueling equipment will be required to carry spill containment and prevention devices (i.e., absorbent pads, clean up rags, five-gallon containers, absorbent material, etc.) at all times.
- TNEC performs regular inspections and maintenance of its LNG equipment.

The normal operation and maintenance of the proposed seasonal portable LNG operation will pose no threat to groundwater resources.

8.3.4 Land Use

Given that the Project Site is within an existing TNEC property that has historically housed and been operated as part of Aquidneck Islands gas utility infrastructure, and tree clearing is not anticipated the Project will have no permanent effect on existing land uses, no associated mitigation measures are proposed.

8.3.5 Subsurface Contamination

Subsurface contamination is not known to be present on the Project Site. The Project Site and vehicles will be equipped with spill kits. As noted in Section 8.2.2 secondary containment, spill containment gear, and absorption materials will be maintained for immediate use in the event of any inadvertent spills or leaks.

8.3.6 Floodplain

The Project Site is not located within FEMA mapped floodplain, and therefore, no associated mitigation measures are proposed.

8.3.7 Supervision and Monitoring

During the mobilization and operation process, an Environmental Monitor will be retained to perform periodic inspections. The primary responsibility of the monitor will be to oversee mobilization and operation activities including the installation and maintenance of erosion and sedimentation controls, on a routine basis to ensure compliance with federal and state permit requirements, and the Company's policies. The Environmental Monitor will be a trained environmental scientist responsible for supervising mobilization activities relative to environmental issues. The Environmental Monitor will be experienced in the erosion control techniques described in this Siting Report and will have an understanding of wetland resources that require protection.

During periods of prolonged precipitation, the monitor will inspect all locations to confirm that the environmental controls are functioning properly. In addition to retaining the services of an Environmental Monitor, the contractor will be required to designate an individual to be responsible for the daily inspection and upkeep of environmental controls. This person will also be responsible for providing direction

to the other members of the crew regarding matters of wetland access and appropriate work methods. Additionally, all Project personnel will be briefed on Project environmental compliance issues and obligations prior to the start of mobilization. Regular project progress meetings will provide the opportunity to reinforce the contractor's awareness of these issues.

8.3.8 Mitigation of Social Resource Impacts

In addition to avoiding and minimizing impacts to the natural environment within the Property, several design practices have been incorporated to minimize or avoid impacts to the surrounding social environment. To minimize impacts, the proposed LNG equipment will be installed within the portions of the Project Site that previously operated as a gas facility. Vegetation trimming will be limited to those areas around the perimeter of the facility and the existing landscaping plantings will be left as is or enhanced to provide a visual buffer between residences and the Project. The portion of fence abutting Old Mill Lane is affixed with a green colored screen in order to obscure facility equipment from neighboring properties. Additionally, a new fence may be installed in order to create a more attractive visual for neighbors to screen the facility.

The Company has engaged and will continue to engage in community outreach to advise abutters and others of Project plans.

Traffic management, cultural resources, open space and conservation land, noise, and visual features were considered with respect to existing conditions and potential Project-related impacts.

8.3.9 Traffic Management

Given that the Project is only operational in the winter and proposed on private property the Company does not expect any traffic-related impacts. None the less the Company will continue to coordinate with the town regarding police details and other appropriate traffic management measures.

8.3.10 Cultural Resources

The Project is within an area that has been assessed by PAL as having no/low archaeological sensitivity and will therefore have no effect on archaeological resources. The Project is in the vicinity of several recorded historic architectural properties and crosses an historic district that is eligible for listing in the National Register. However, the Project will have no effect on those historic architectural properties and no related mitigation is proposed.

8.3.11 Open Space, Conservation, and Recreational Areas

The Project will have no impacts to protected and recreational open space. Therefore, no associated mitigation measures are proposed.

8.3.12 Visual Impact

The eastern, southern, and western sides of the Site are not readily visible by the public and the existing tree and shrub vegetation acting as natural screening on those sides of the Property will be not be disturbed.

In response to meetings with neighbors, the Company has attempted to mitigate visual impacts by installing screening on the fence during the winter operation and by planting shrubs along the frontage of Old Mill Lane to provide vegetative screening during the remainder of the year. The Company is exploring further improvements to the appearance of the Property.

Light shields are installed on the existing overhead pole mounted lights to reduce stray light casting into neighboring properties. To further reduce stray light, site lighting was reduced to only one overhead pole light for routine standby operations. Low level auxiliary trailer lighting and office trailer lighting was utilized whenever possible to reduce operating additional overhead pole lighting.

Outside of the mobilization and operation period, the Project Site will have negligible visual impacts because the Property will remain in a vegetated condition during the growing season.

8.3.13 Noise Mitigation

With respect to noise, the operation is seasonal and, therefore, the Equipment is present only between the months of November and April. Temporary noise impacts will occur during mobilization of the Project. Typical work hours for delivery of the mats and equipment will be between 7:00 a.m. to 5:00 p.m. Monday through Friday. The Company will follow the same work hours for the decommissioning of the Project.

Once the site is mobilized and in operation, the facility would only need to be fully operational during peak days, which may or may not occur, however, some noise is generated to maintain the site in standby mode. Some of the industrial equipment required for portable LNG operation can generate varying range and volume of noise depending on the process taking place. Typical noise generated at the site can stem from blower fans, process burners, pressure venting, and diesel engine-driven electric backup generators. While some of this noise is inherent to the operation of the various equipment and can't always be entirely eliminated, there are opportunities for incremental reductions in noise from the various processes which lead to a reduction in the total noise from the site.

Due to the location of the facility and its proximity to neighboring residential properties, the company has taken several steps and approaches to minimize equipment-related noise disturbances. These mitigative approaches include a combination of modified operating strategies to reduce the frequency and duration of certain equipment operation without impacting operability and reliability of the site, and physical equipment & system modifications which help eliminate certain noise-generating processes.

The Company ordered a noise analysis that was calculated based on the full operation of the Project which only occurs during when the site is vaporizing LNG. The sound levels generated during full operation exceed Portsmouth's sound limit of 55 dB(A) for the residential zoned areas during the nighttime period. The Company has made certain upgrades to the equipment, including installing a vapor recovery system to help mitigate against the noise. In addition, the Company modified the operation of the facility when it is in standby to reduce noise by limiting the equipment cycling during evening and early morning hours.

8.4 Post-Demobilization Phase

Following the demobilization, the Company uses standard and site-specific mitigation measures to minimize the impacts of the Project on the natural and social environment. These measures include revegetation and stabilization of disturbed soils, vegetation management practices and vegetation screening maintenance in sensitive areas. The Company will implement the following standard and site-specific mitigation measures for the proposed Project.

8.4.1 Mitigation of Natural Resource Impacts

After emergency use or seasonal use of the facility, restoration efforts, including seeding of disturbed areas and stabilization with blown straw mulch, will be completed following removal of the construction mats where needed. Project debris will be removed from the Project site and disposed of at an appropriate landfill. Pre-existing drainage patterns, will be restored to their former condition, where appropriate. The grass cover will reestablish each spring and will be monitored until at least 75-percent of vegetation is achieved.

8.4.2 Mitigation of Social Resource Impacts

Vegetation in the shoulder of the road will be restored or enhanced, and plans will be reviewed by authorized officials; no trees will be removed, and landscape plantings will be suitably restored or enhanced.

Old Mill Lane will be checked by a supervisor to ensure the area is properly swept and restored if needed.

9

Permit Requirements

TNEC must obtain permits under the following state, local and federal statutes and regulations prior to the mobilization of the Project.

9.1 State Permits

9.1.1 EFSB License

The Project will require a license to construct a major energy facility from the EFSB pursuant to Rhode Island General Laws (R.I.G.L.) Section 42-98-1 et seq.

9.1.2 RIDEM Freshwater Wetlands Permit

The Project may require a freshwater wetlands permit from RIDEM pursuant to R.I.G.L. Section 2-1-18 et seq. for alteration of freshwater wetlands in connection with the mobilization/demobilization and operation of the Project.

9.1.3 RIDEM General Permit for an Emergency Generator

Pursuant to the provisions of the Air Pollution Control Regulations Part 9, a general permit for an emergency generator will be applied for from the RIDEM Office of Air Resources.

9.2 Local Permits

A special use permit from the Portsmouth Zoning Board of Review will be required for the use of the Equipment at the Property. Portsmouth Zoning Ordinance, Article V, Section B.

Section 257-7 of the Code of the Town of Portsmouth provides the maximum permissible sound levels by receiving land uses. A sound variance from the Portsmouth Town Council will be required for the operation of the Project.

10

Conclusion

This Siting Report presents a comprehensive overview of the Project, including the existing natural and social environment, potential impacts, and the measures that will be implemented to avoid, minimize, or mitigate these impacts.

Based on the analysis presented herein, there are no significant impacts associated with the Project. The implementation of appropriate BMPs and mitigation measures during the Project will avoid or minimize the mobilization/demobilization and operation phase impacts to environmental resources and the social environment

APPENDIX A – Summary of Communications

The following is a summary of the communication with the Municipalities and residents during our portable LNG setup at Old Mill Lane, Portsmouth.

2018—Old Mill Lane

- Notified and met with Portsmouth and Middletown to provide a review of the need for the Old Mill Lane setup, due to Enbridge maintenance/pigging operation (We just notified the Newport Fire Chief and did not meet with them)
- Since the setup is in Portsmouth the remainder of the outreach was focused in Portsmouth (there was no request from Middletown to attend a Town Council meeting, open house or provide further outreach)
- Sent letters to abutters within 200'-400' of the property in Portsmouth and Middletown – distance was based on zoning and discussion with Portsmouth Town Administrator
- Presented at a Portsmouth Town Council meeting
- Held an Open House at the Portsmouth Town Hall
- Met with Portsmouth DPW, Town Administrator, Solicitor, Fire and Police Chief to review the detailed/finalized plan.
- Received Portsmouth Zoning approval for LNG Operation at Old Mill Lane (April 3, 2018)
- Conducted tours of the setup/site with Portsmouth and Middletown Fire Chiefs
- Continued communication post setup for removing equipment and maintain property/landscape/fence.

2019—Old Mill Lane

- 5/17/19: NGRID call with Portsmouth, Middletown, and Newport Municipal Administrators/Manager – Future of energy solution on Aquidneck Island
- 6/6/19: Division/OER – Old Mill Lane site visit

- 6/17/19: Aquidneck Island Advisory Group Meeting – I (Portsmouth, Middletown and Newport Municipal Administrators/Manager attended)
- 6/24/19: NGRID meeting with Portsmouth, Middletown, and Newport Municipal Administrators/Manager – action item from Advisory Group Meeting I where Administrators requested additional information.
- 8/29/19: Received confirmation from Portsmouth Town Administrator that a new zoning certificate is not required (and later confirmed on 9/19/19 to be valid through 2023).
- 9/16/19: Advisory Group Meeting – II (Portsmouth, Middletown and Newport Municipal Administrators/Manager attended)
- 10/11/19: OML meeting with Portsmouth Town Officials (Admin, Fire, Police, DPW) and LNG Team – reviewed site setup schedule and communication plan. An open house was discussed but determined not needed based on 2018 results.
- 10/28/19: NGRID attended Portsmouth Town Council Meeting – Winter Operations at OML
- 10/28/19: Mailed Portsmouth & Middletown Abutter Letters/FAQs for OML
- 11/01/19: 12/01/19 – Setup OML
- 12/06/19: OML site visit with Portsmouth and Middletown Fire departments – printed NGRID emergency procedures were provided at this time to both Municipal Fire Departments, followed by email/electronic copies (12/18/19)
- 12/09/19: Received Middletown Resident (A) questions/concerns
- 12/12/19: Received Middletown Resident (A) questions/concerns
- 12/16/19: Advisory Group Meeting – III (Portsmouth, Middletown and Newport Municipal Administrators/Manager attended)
- 12/16/19: Meeting with Middletown Fire and concerned Resident (A) regarding OML.

2020—Old Mill Lane

- 1/02/20: Meeting with Portsmouth, Middletown, and Newport Fire Chiefs – review emergency response – Portsmouth Fire Chief requested various scenarios with evacuation distances.
- 1/16/20: Received Middletown Resident (A) update request.
- 1/16/20: Meeting with Portsmouth and Middletown Fire to review hazard distance scenarios.
- 1/21/20: Scenarios emailed to Portsmouth and Middletown Fire Chiefs
- 2/10/2020: NGRID Mailed additional letters/FAQs to expanded abutter radius (radius/increase was provided by both Portsmouth and Middletown Fire after their review of scenarios) – same letter that was mailed in the Fall 2019.
- 2/12/2020: Received request to contact Portsmouth resident (B). Follow-up call/meeting took place end of February.

- 2/26/2020: Old Mill Lane site visit with Municipal and State Officials
- March 2020: Public Open House scheduled but postponed due to COVID. Due to COVID, most meetings and discussions were further deferred to Fall.
- 9/14/2020: Advisory Group Meeting – IV (Portsmouth, Middletown and Newport Municipal Administrators/Manager attended)
- 10/08/2020: Old Mill Lane Abutter Notifications/FAQ's sent.
- 10/14/2020: Aquidneck Island Open House (Public, State and Town officials attended) - https://www.nationalgridus.com/aquidneck-long-term-gas-capacity-study
- 10/20/2020: Portsmouth Town Administrator, Police, and Fire meeting regarding winter operations at Old Mill Lane
- 10/27/2020: Portsmouth Town Council Meeting
- 10/28/2020: Middletown Town Council Meeting
- 11/04/2020: LNG Firefighting School, sponsored by NG – Portsmouth and Middletown (4 attendees)
- 11/12/2020: Newport Town Council Meeting (1 of 2)
- 11/18/2020: Newport Town Council Meeting (2 of 2)
- 11/30/2020: LNG Firefighting School, sponsored by NG – Portsmouth, Middletown, and Newport FD's (25 attendees).
- 12/4/2020: Old Mill Lane Site Tour and Training – Portsmouth and Middletown Fire Departments
- 12/15/2020: Old Mill Lane Site Tour and Training – Portsmouth Fire Department
- 12/21/2020: Old Mill Lane Site Tour and Training – Middletown Fire Department
- 12/22/2020: Old Mill Lane Site Tour and Training – Middletown Fire Department

2021—Old Mill Lane

- 01/04/2021: Division site visit
- 01/15/2021: Division and OER January Gas Reliability Meeting
- 01/19/2021: Aquidneck Solution Overview RI Legislators Briefing
- 01/20/2021: SRP Technical Working Group 2021, January - AI Update: Findings and Next Steps
- 01/21/2021: Site visit with Portsmouth Resident (B)
- 01/22/2021: Aquidneck Advisory Group meeting IV - National Grid Update and Next Steps for a Long-Term Energy Solution

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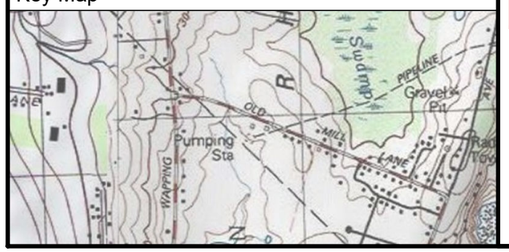
Key Map



Project Location

Town Line

Portable LNG Vaporization Project
Old Mill Lane
Portsmouth, Rhode Island

Site Location Map
Figure 3-1

0 1,000 2,000
Feet

nationalgrid
vhb

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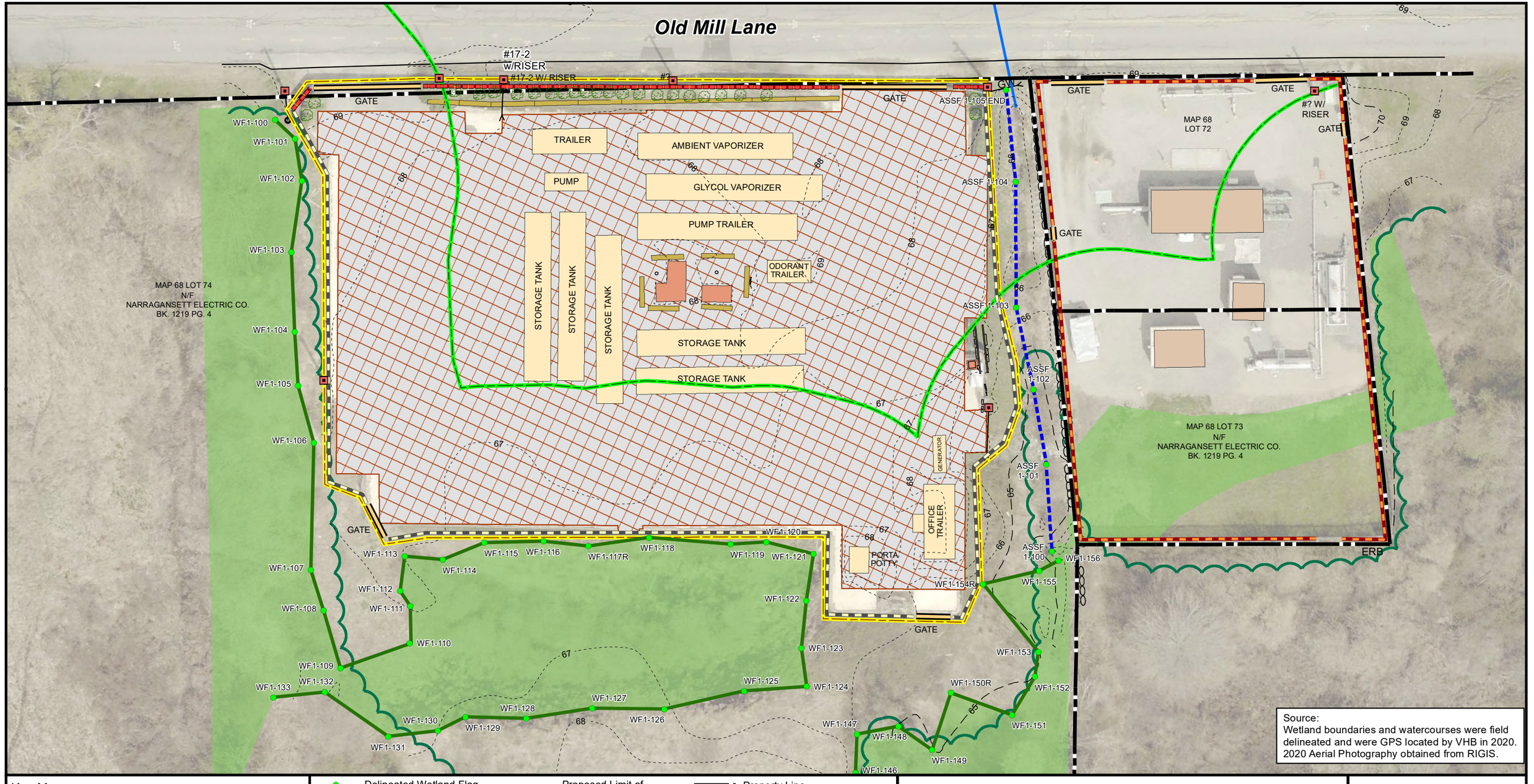

Key Map

- Delineated Wetland Flag
- Delineated Wetland Edge
- Delineated Area Subject to Storm Flowage (ASSF)
- 50-Foot Perimeter Wetland
- Swamp
- Existing Lansdcape Shrub
- Existing Utility Pole
- Existing Gate
- Existing Permanent Fence
- Existing Temporary Fence
- Proposed Limit of Disturbance
- Existing Chain Link Fence to be Replaced
- Existing Building
- Existing Pad
- Existing Concrete Barrier
- Seasonal Construction Mats
- Existing Trailer
- Property Line
- Existing Edge of Pavement
- Existing Ground Contour (Major)
- Existing Ground Contour (Minor)
- Existing Tree Line

Portable LNG Vaporization Project
Old Mill Lane
Portsmouth, Rhode Island

Site Plan
Figure 3-2

0 15 30
Feet

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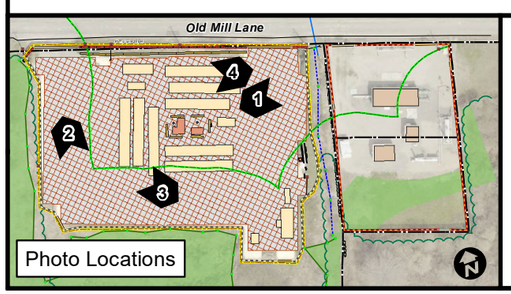
\\vhb\gis\proj\Providence\73195.00\Project\Siting Report\FIG 3-3 Project Photos (Aug 9, 2020).mxd

Photo 1 - View of Site Looking Southwest

Photo 2 - View of Site Looking Northwest

Photo 3 - View of Site Looking Southeast

Photo 4 - View of Site Looking East



Portable LNG Vaporization Project
Old Mill Lane
Portsmouth, Rhode Island

Figure 3-3
Project Photographs
(Taken Aug. 9, 2020)

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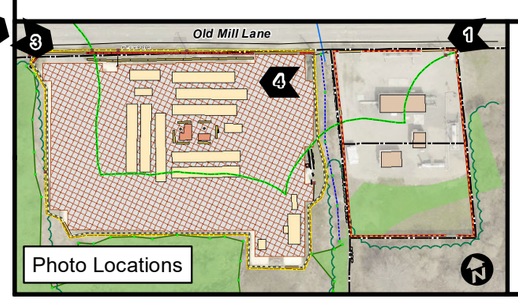
\\vhb\gis\proj\Providence\73195.00\Project\Siting Report\FIG 3-4A Project Photos (Winter 2021).mxd

Photo 1 - View of Site Frontage Looking West

Photo 2 - View of Site Frontage Looking East

Photo 3 - View of Site Frontage Looking East

Photo 4 - View of Site Looking West



Portable LNG Vaporization Project
Old Mill Lane
Portsmouth, Rhode Island

Figure 3-4A
Project Photographs
(Taken Feb. 24, 2021)

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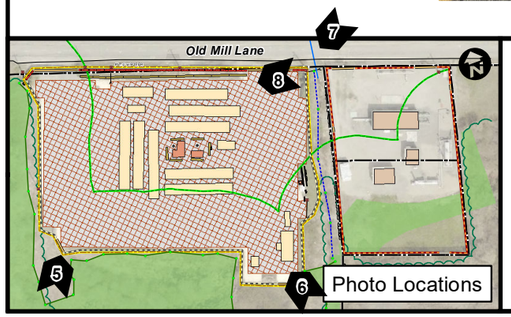
\\vhb\gis\proj\Providence\73195.00\Project\Siting Report\FIG 3-4B Project Photos (Winter 2021).mxd

Photo 5 - View of Southwestern Corner of the Site Looking Northeast

Photo 6 - View of the Southeastern corner of the Site Looking Northwest

Photo 7 - View of Site Looking Southwest

Photo 8 - View of Site Looking West



Portable LNG Vaporization Project
Old Mill Lane
Portsmouth, Rhode Island

Figure 3-4B
Project Photographs
(Taken Feb. 24, 2021)

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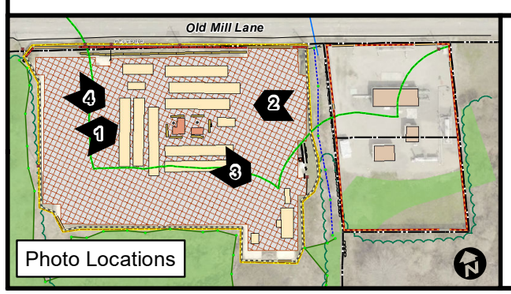
\\vhb\gis\proj\Providence\73195.00\Project\Siting Report\FIG 3-5 Project Photos (Spring 2021).mxd

Photo 1 - View of Site Looking Northeast

Photo 2 - View of Site Looking West

Photo 3 - View of Site Looking Southeast

Photo 4 - View of Site Looking Southeast

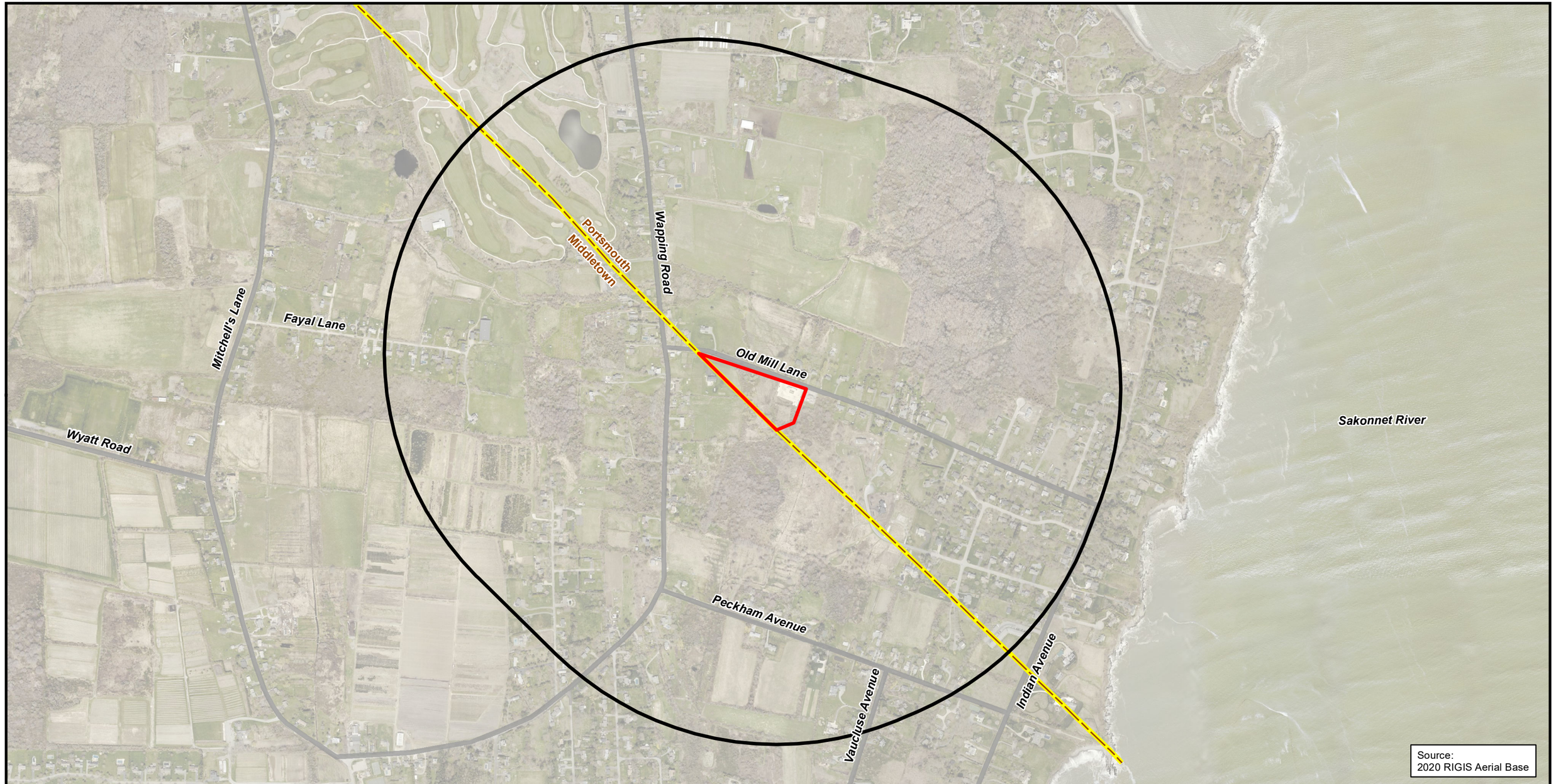


Portable LNG Vaporization Project
Old Mill Lane
Portsmouth, Rhode Island

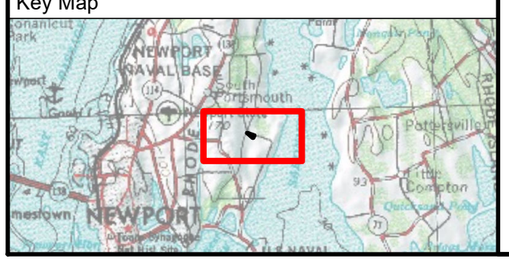
Figure 3-5
Project Photographs
Spring 2021 (Post Demobilization)
(Taken April 26 & 29, 2021)

nationalgrid
vhb

\\vhb\gis\proj\Providence\73195.00\Project\Siting Report\FIG 5-1 Base Plan (73195).mxd



Key Map



Site Property

Limits of Study Area

Town Line

Portable LNG Vaporization Project
Old Mill Lane
Portsmouth, Rhode Island

Base Map
Figure 5-1

0 400 800
Feet

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\\vhb\gis\proj\Providence\73195.00\Project\Siting Report\FIG 5-2 Soils (73195).mxd

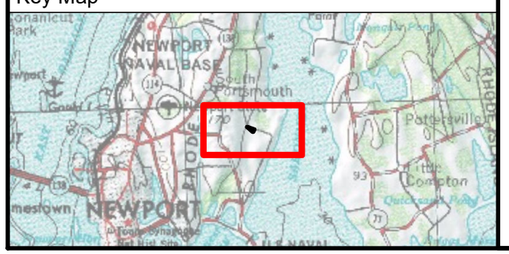
Note:
The entire Study Areas has a groundwater classification of GA

NeA
W
NeB
Se
NeB
NeA
NeB
Se
NeB
Se
Se
Ma
NeA
UD
PmA
PmB
PmA
PmA
PmB
PmA
PmB
PmA
Ma
CeC
Se
PmB
NeB
NfB
PmA
PmA
Ma
NeB
PmA
NeC
PmB
PmB
NeB
NeA
NeC

Portsmouth Middletown
Wapping Road
Old Mill Lane
Mitchell's Lane
Fayal Lane
Wyatt Road
Peckham Avenue
Vaucluse Avenue
Indian Avenue
Sakonnet River

Source:
2020 RIGIS Aerial Base

Key Map



Site Property
Limits of Study Area
Town Line

Soil Types

CeC	NeB	PmA	UD	
Ma	NeC	PmB	W	
NeA	NfB	Se		

Portable LNG Vaporization Project
Old Mill Lane
Portsmouth, Rhode Island

Soils Map
Figure 5-2

0 400 800
Feet

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\\vhb\gis\proj\Providence\73195.00\Project\Siting Report\FIG 5-4 Wetlands (73195).mxd

Wapping Road
Portsmouth
Middletown
Little Creek
Mitchell's Lane
Fayal Lane
Old Mill Lane
Wyatt Road
Sakonnet River
Peckham Avenue
Vaucluse Avenue
Indian Avenue

Source:
2020 RIGIS Aerial Base

Key Map

Site Property
Limits of Study Area
Town Line
Wetlands
Rivers/Streams
Non-Community Well Head Protection Area

Portable LNG Vaporization Project
Old Mill Lane
Portsmouth, Rhode Island

Wetlands Map
Figure 5-3

0 400 800
Feet

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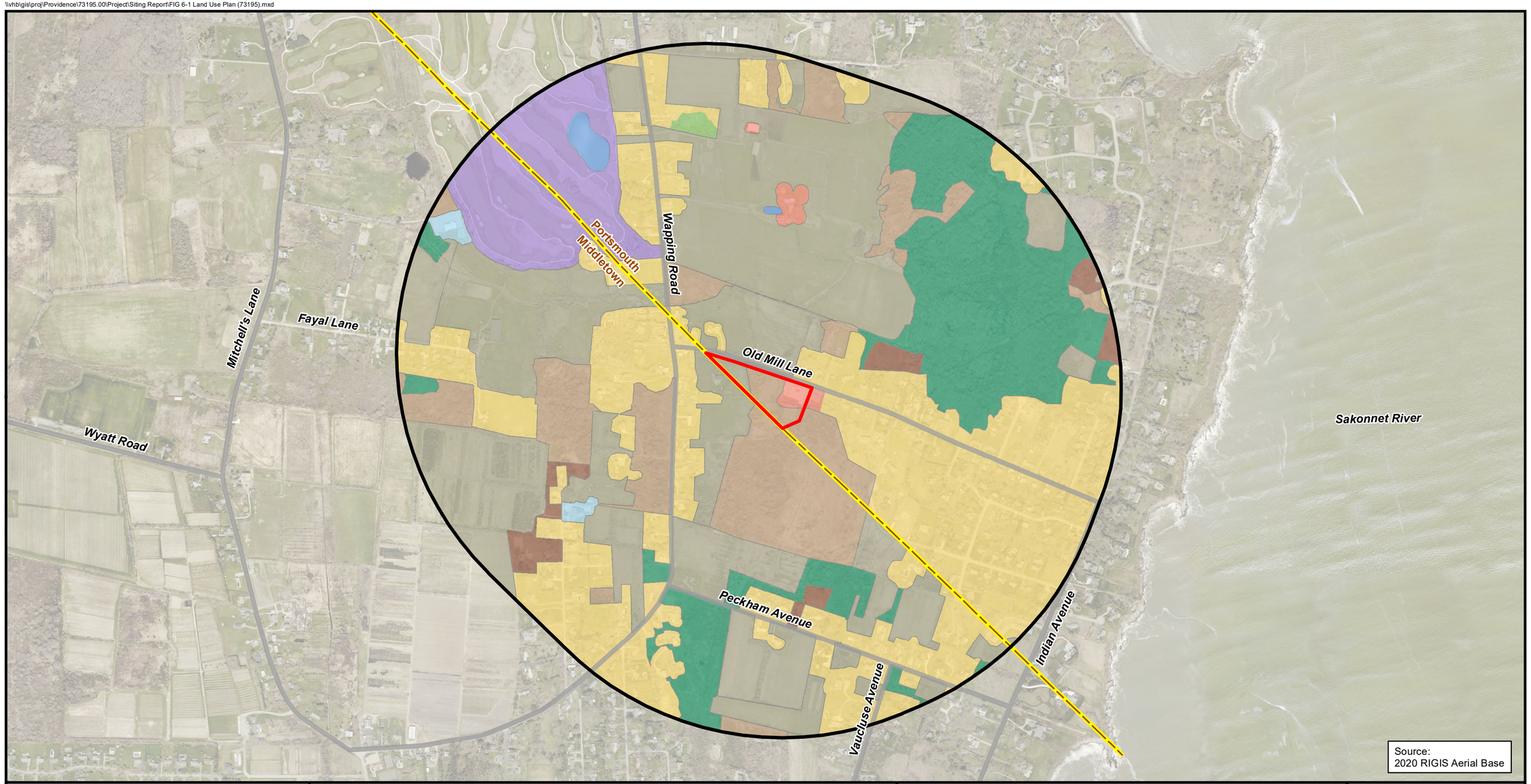
\\vhb\gis\proj\Providence\73195.00\Project\Siting Report\FIG 6-1 Land Use Plan (73195).mxd



Key Map

Site Property

Limits of Study Area

Land Use Categories

- Commercial
- Agricultural
- Brushland
- Commercial
- Forest
- Institutional
- Open Space
- Recreation
- Residential
- Water
- Wetland

Portable LNG Vaporization Project
Old Mill Lane
Portsmouth, Rhode Island

Land Use Map
Figure 6-1

0 400 800
Feet

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