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November 1, 2021

VIA EMAIL

Mark D. Marini, Secretary
Department of Public Utilities
One South Station, 5th Floor
Boston, MA 02110
mark.marini@state.ma.us

RE: Petition of the Town of Hull, acting by and through the Hull Municipal Light Plant, and the Hull Municipal Light Plant to Initiate an Investigation Pursuant to G. L. c.164, §76

Dear Secretary Marini:

Enclosed are copies of the following documents in portable document format (.pdf):

1. Appearance of Counsel – Nicholas J. Scobbo, Jr.;
2. Appearance of Counsel – Sherry L. Vaughn;
3. Petition of the Town of Hull, acting by and through the Hull Municipal Light Plant, and the Hull Municipal Light Plant (collectively, "Hull") to Initiate an Investigation Pursuant to G. L. C.164, §76 ("Petition");
4. Joint Direct Testimony of Philip E. Lemnios and Panos Tokadjian, on behalf of Hull, including Attachments 1-4 thereto;
5. Direct Testimony of Thomas E. Converse on behalf of Hull; and
6. Direct Testimony of Paul J. Hibbard, on behalf of Hull, including Attachment 1 thereto.

The Affidavit of Thomas E. Converse with respect to his Direct Testimony will be supplied shortly.

The Petition and supporting evidence and documents are filed with the Department of Public Utilities ("Department") pursuant to G. L. C.164, §76.

In the Petition, Hull requests the Department to open an investigation into the manner in which New England Power Company and Massachusetts Electric Company DBA National Grid maintain their electric lines and right of way serving the Town of Hull.

I would appreciate it if you would assign a docket number to the attached Petition.

Should you have any questions on the enclosed, please contact me.

Sincerely,

Nicholas J. Scobbo, Jr.

Enclosures

cc: Jonathan Goldberg, Chief Legal Counsel
jonathan.goldberg@state.ma.us
dpu.efiling@mass.gov

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Appearance of Counsel

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

IN THE MATTER OF A PETITION OF THE TOWN OF HULL, ACTING BY AND THROUGH THE HULL MUNICIPAL LIGHT PLANT, AND THE HULL MUNICIPAL LIGHT PLANT TO INITIATE AN INVESTIGATION PURSUANT TO G. L. c.164, §76 INTO THE MANNER IN WHICH NEW ENGLAND POWER COMPANY AND MASSACHUSETTS ELECTRIC COMPANY DBA NATIONAL GRID MAINTAIN THEIR ELECTRIC LINES AND RIGHT OF WAY SERVING THE TOWN OF HULL	D.P. U. No_____

APPEARANCE OF COUNSEL

In the above-entitled proceeding, I hereby appear for and on behalf of the Town of Hull, acting by and through the Hull Municipal Light Plant, and the Hull Municipal Light Plant.

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Dated: November 1, 2021

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

IN THE MATTER OF A PETITION OF THE TOWN OF HULL, ACTING BY AND THROUGH THE HULL MUNICIPAL LIGHT PLANT, AND THE HULL MUNICIPAL LIGHT PLANT TO INITIATE AN INVESTIGATION PURSUANT TO G. L. c.164, §76 INTO THE MANNER IN WHICH NEW ENGLAND POWER COMPANY AND MASSACHUSETTS ELECTRIC COMPANY DBA NATIONAL GRID MAINTAIN THEIR ELECTRIC LINES AND RIGHT OF WAY SERVING THE TOWN OF HULL	D.P. U. No_____

APPEARANCE OF COUNSEL

In the above-entitled proceeding, I hereby appear for and on behalf of the Town of Hull, acting by and through the Hull Municipal Light Plant, and the Hull Municipal Light Plant.

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Dated: November 1, 2021

Petition by the Town of Hull

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

IN THE MATTER OF A PETITION OF THE TOWN OF HULL, ACTING BY AND THROUGH THE HULL MUNICIPAL LIGHT PLANT, AND THE HULL MUNICIPAL LIGHT PLANT TO INITIATE AN INVESTIGATION PURSUANT TO G. L. c.164, §76 INTO THE MANNER IN WHICH NEW ENGLAND POWER COMPANY AND MASSACHUSETTS ELECTRIC COMPANY DBA NATIONAL GRID MAINTAIN THEIR ELECTRIC LINES AND RIGHT OF WAY SERVING THE TOWN OF HULL	D.P. U. No_____

PETITION OF THE TOWN OF HULL ACTING BY AND THROUGH THE HULL MUNICIPAL LIGHT PLANT AND THE HULL MUNICIPAL LIGHT PLANT TO INITIATE AN INVESTIGATION

The Town of Hull ("Hull"), acting by and through the Hull Municipal Light Plant, and the Hull Municipal Light Plant ("HMLP"), hereby petition the Department of Public Utilities ("Department") to exercise its general supervisory authority pursuant to G.L. c. 164, § 76 and, based on the direct evidence submitted with this Petition, initiate an investigation into the manner in which New England Power Company and Massachusetts Electric Company d/b/a National Grid (collectively, "National Grid") have maintained the condition of the two 23 kV electric lines, poles and related facilities and the associated right of way used to deliver electricity to the HMLP and ultimately the 10,000 residents of Hull.

A. INTRODUCTION

Since September 2014, Hull has experienced fifteen (15) outages lasting from fifteen (15) minutes up to forty-six and one half (46.5) hours all due to faults on the two 23kV electric lines and facilities that are the only means to provide electricity into Hull, which lines and facilities are all owned, operated, and maintained National Grid.

The direct testimony and evidence submitted by Hull and the HMLP in support of their Petition show that: (1) the unacceptable number and duration of the outages experienced by Hull over the last seven years: (a) adversely affect the 10,000 residents of Hull and the businesses and economy of Hull, and (b) compelled the HMLP to expend $3.1 million; and (2) National Grid has not owned, maintained, and operated its properties:

(a) consistent with the safety and convenience of the public; and

(b) in compliance with the provisions of law, orders, directions, and requirements of the Department.

The Department has more than ample evidence to exercise its general supervisory power and, after investigation, grant the relief sought by Hull and HMLP.

B. JURISDICTION

1. The Department has jurisdiction over the subject matter of this Petition pursuant to G. L. c. 164, §76.

C. PARTIES

2. Hull is a municipal corporation of the Commonwealth of Massachusetts. G.L. c. 40, §§1, 2.
3. HMLP is a Massachusetts municipal lighting plant, operating pursuant to relevant sections of G.L. c. 164 and is a department of Hull.
4. National Grid (USA) Inc. is a foreign corporation registered to do business in Massachusetts, with a principal office located at 25 Research Drive, Westborough, Massachusetts.
5. Massachusetts Electric Company ("MEC") is a Massachusetts corporation and a "Distribution Company" (as defined in G. L. c. 164, §1) with a principal office located at 40 Sylvan Road, Waltham, Massachusetts.
6. MEC has the exclusive right to provide electric service in its service territory, which includes the two 23 kV lines serving Hull. G.L. c. 164, §1B.

7. New England Power Company ("NEPCO") is a Massachusetts corporation and "Transmission Company" (as defined in G.L. c. 164, §1), with a principal office located at 40 Sylvan Road, Waltham, Massachusetts, which is permitted to transmit electricity over its transmission facilities by the Commonwealth of Massachusetts pursuant to G. L. c. 164, §§1, 71 and 72.

D. CONTRACTUAL PATH AND REQUIREMENTS

8. HMLP and NEPCO are parties to a Support Agreement dated as of July 1, 1996, a copy of which is Attachment Hull/HMLP-1 to the Joint Direct Testimony of Philip Lemnios and Panos Tokadjian (the "Support Agreement").
9. Pursuant to the Support Agreement, NEPCO is obligated to operate and maintain two 115 kV lines (508 and 502Y) in accordance with good utility practice.
10. The two NEPCO 115 kV transmission lines transmit power to the East Weymouth substation at which there are two transformers which step down the power to 23 kV.
11. The power is then transmitted over two 23 kV lines (and all necessary related facilities) that run approximately 5.14 miles from the East Weymouth substation to the Rockland Street substation in Hingham, Massachusetts, at which point the electricity is stepped down to 13.8 kV with the two lines continuing for approximately another 3,300 feet to the point of demarcation in Hull.
12. The 23 kV portion and the 13.8 kV portion and related facilities are known as Hull 1 and Hull 2 and are owned, operated, and maintained by MEC d/b/a National Grid.

13. HMLP and NEPCO d/b/a National Grid are parties to a Local Service Agreement dated effective July 1, 2006 and ending December 31, 2025, a copy of which is Attachment Hull/HMLP-2 to the Joint Direct Testimony of Philip Lemnios and Panos Tokadjian (the "LSA").
14. Pursuant to the LSA, NEPCO agrees to provide service over Hull 1 and Hull 2 in accordance with the provisions of the "Tariff" and the LSA. The Tariff is Schedule 21-NEP of the ISO-New England Inc. Transmission Markets and Services Tariff.
15. Schedule 21-NEP requires, among other things, that NEPCO (or MEC) shall design, own, and maintain the Hull 1 and Hull 2 facilities in accordance with good utility practice. *Schedule 21-NEP, §22.2.*

E. HULL 1 AND HULL 2

16. The corridor/right of way in which Hull 1 and Hull 2 are located is adjacent to very mature trees that are tall enough to damage or destroy Hull 1 and Hull 2 in the event the trees or the branches fall.
17. The overhead wire conductor for the 23 kV portions of Hull 1 and Hull 2 is not the kind of spacer cable or tree cable that would provide protection against damage or destruction from falling or impacting trees and branches.
18. The facilities comprising the 23 kV portions of Hull 1 and Hull 2 (wires, cross arms, fuses, etc.) are aged and not in good repair.
19. Repairs that have been performed on the 23 kV portions of Hull 1 and Hull 2 have been in the nature of "patch" work, which was performed quickly.
20. The faults on the 23kV portions of Hull 1 and Hull 2 have been caused by a lack of proper operation and maintenance.

21. Hull and HMLP have notified National Grid on repeated occasions of the issues with Hull 1 and Hull 2 and met with National Grid representatives to address the problems associated with the 23 kV portions of Hull 1 and Hull 2.

F. CONSEQUENCES OF THE HULL 1 and HULL 2 FAULTS

22. The frequent outages resulting from these faults on the 23 kV portions of Hull 1 and Hull 2 pose a significant risk to public health, safety, welfare, and convenience.
23. The frequent outages have been extremely disruptive to Hull and its 10,000 citizens.
24. In 2020 alone, there were six outages that exceeded over 61 hours of complete loss of electric service to Hull
25. All 10,000 Hull residents and every business in Hull lost power during the outages.
26. The faults on the 23 kV portions of Hull 1 and Hull 2 and the resulting outages significantly exceed the performance standards used by the Department to measure MEC's performance in its service territory as well as that of the electric utility industry more generally.
27. The operation and maintenance of the 23 kV portions of Hull 1 and Hull 2 are not consistent with good utility practice.
28. The cost to HMLP and its ratepayers of the outages from 2014 to date has totaled approximately $3.1 Million. This amount is comprised of:
    a. $745,000 for generators rented by HMLP for the winter of 2020/2021;
    b. $540,000 for generators rented by HMLP for the winter of 2021/2022 resulting in an 8.4% rate increase to the HMLP ratepayers to pay for the costs ;

c. $1,376,000 paid to National Grid for maintenance of the 115kV lines and Hull 1 and Hull 2; and

d. $400,000 for the cost of attorneys and experts to bring these matters to the Department and through Department investigation.

G. SUPPORTING EVIDENCE

30. In support of their Petition, Hull and HMLP hereby submit the Joint Testimony of Phillip E. Lemnios and Panos Tokadjian; the Direct Testimony of Thomas E. Converse, P.E. and the Direct Testimony of Paul J. Hibbard (together, the "Evidence").

31. Based on the Evidence, the Department has more than sufficient information upon which to rely to exercise its general supervisory power and grant the Petition and the relief sought by Hull and HMLP.

WHEREFORE, the Town of Hull, acting by and through the Hull Municipal Light Plant, and the Hull Municipal Light Plant respectfully request the Department of Public Utilities to:

A. Immediately initiate an investigation under G.L. c. 164, §76 regarding the manner in which MEC d/b/a National Grid has maintained Hull 1 and Hull 2 and the right of way (focusing on the 23 kV portions of Hull 1 and Hull 2).

B. Pursuant to the laws of the Commonwealth, contractual requirements and Department of Public Utilities' policies, rules, and regulations hold National Grid and its affiliates accountable for the outages sustained by the Hull and HMLP as a result of the faults experienced on Hull 1 and Hull 2.

C. Require NEPCO and MEC d/b/a National Grid to upgrade the facilities used to serve Hull at National Grid's own expense.

D. Order National Grid and/or its affiliates to reimburse HMLP $3.1 million to compensate HMLP and its ratepayers for the funds it had to expend to protect the residents and businesses of Hull from the numerous outages and resulting risks to public health and safety.

Respectfully submitted,

Town of Hull, acting by and through the Hull Municipal Light Plant, and the Hull Municipal Light Plant

By their attorneys,

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Sherry L. Vaughn,
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Dated: November 1, 2021

Tokadjian- Lemnios

Testimony with Affidavits

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

IN THE MATTER OF A PETITION OF THE TOWN OF HULL, ACTING BY AND THROUGH THE HULL MUNICIPAL LIGHT PLANT, AND THE HULL MUNICIPAL LIGHT PLANT TO INITIATE AN INVESTIGATION PURSUANT TO G. L. c.164, §76 INTO THE MANNER IN WHICH NEW ENGLAND POWER COMPANY AND MASSACHUSETTS ELECTRIC COMPANY DBA NATIONAL GRID MAINTAIN THEIR ELECTRIC LINES AND RIGHT OF WAY SERVING THE TOWN OF HULL	D.P. U. No_____

JOINT DIRECT TESTIMONY OF

PHILIP E. LEMNIOS AND PANOS TOKADJIAN

ON BEHALF OF THE

TOWN OF HULL AND THE HULL MUNICIPAL LIGHT PLANT

Dated: November, 2021

PART I: QUALIFICATIONS

Q. PLEASE STATE YOUR NAMES, CURRENT EMPLOYMENT AND BUSINESS ADDRESSES.

A. My name is Philip E. Lemnios. I am the Town Manager of the Town of Hull ("Hull"). My business address is Town Hall, 253 Atlantic Avenue, Hull, Massachusetts 02045.

My name is Panos Tokadjian. I am the Operations Manager for the Hull Municipal Light Plant ("HMLP"). My business address is HMLP, 15 Edgewater Road, Hull, Massachusetts 02045.

Q. ON WHOSE BEHALF ARE YOU APPEARING IN THIS PROCEEDING?

A. We both are appearing on behalf of Hull and HMLP.

Q. MR. LEMNIOS, WHAT IS YOUR EDUCATIONAL BACKGROUND?

A. I hold a Bachelor of Arts in Communications from the University of Massachusetts, a Master of Public Administration from the University of Southern California, and a Certificate of Special Studies in Administration and Management from Harvard University Extension School.

Q. MR. TOKADJIAN, WHAT IS YOUR EDUCATIONAL BACKGROUND?

A. I received a Bachelor of Science in Electrical Engineering Power Option from University of Massachusetts-Lowell.

Q. MR. LEMNIOS, PLEASE DESCRIBE YOUR RELEVANT PROFESSIONAL EXPERIENCE.

A. I have over 30 years of experience in local government management in Massachusetts. From 1989 to 1992, I served as Assistant to two Mayors of the City of Attleboro, Massachusetts. From 1992 to 2002, I was the Town Manager in Hull. From 2002 to 2007, I was the Town Administrator for the Town of Natick. I currently serve as the Town Manager in Hull, a position I have held since 2007. Since 2012, I have been the Chairperson of the Regional Dispatch Center for Hull and the Towns of Hingham, Cohasset, and Norwell.

As Town Manager, I am responsible for Hull's daily operations, which include responsibility for over 400 employees. I am responsible for the design, preparation, presentation, and implementation of Hull's annual budget. Also, I have overall responsibility for the management of the HMLP, which has 6,200 meters. I work closely with the HMLP Light Board to contain costs, cut utility rates, adhere to a diversified power supply taking into account a host of local, state, and national policies and plan for how HMLP operates in the current industry environment while improving system reliability.

Throughout my career, I have worked closely with Select Boards, Planning Boards, residents, local and State Development agencies and State and local elected and appointed officials. I have established strong working relationships with citizens, Chambers of Commerce, and numerous Boards and Committees of various towns.

I have collaborated with area communities to explore and create regional services in order to leverage resources for a more effective and efficient delivery of municipal services. In particular, I have worked with the leadership of the Towns of Hingham, Cohasset, and

Norwell to create the Commonwealth's first operating Regional Dispatch Center. I helped secure six million dollars in grant funding for construction and operation of the Regional Dispatch Center.

Q. MR. TOKADJIAN, PLEASE DESCRIBE YOUR RELEVANT PROFESSIONAL EXPERIENCE.

A. I have served as the Operations Manager of the HMLP since 2016. Prior to becoming Operations Manager, I served as the Assistant Operations Manager of the HMLP from September 2014 to 2016. Prior to working at the HMLP, I worked at the Hingham Municipal Lighting Plant from February 2000 to August 2014. There, I started in the position of Electrical Engineer and progressed to the position of Engineering Manager. From January of 1990 to February of 2000, I worked at the Concord Municipal Light Plant. While at the Concord Municipal Light Plant, I started as an engineering intern and progressed to the position of Electrical Engineer.

Q. MR. LEMNIOS, WHAT ARE YOUR DUTIES AND RESPONSIBILITIES AS HULL TOWN MANAGER?

A. As Town Manager for Hull, I am responsible for: the management of all Hull departments (excluding the School Department); all Hull funds (general fund and enterprise funds); providing support to the volunteer committee system; working with other levels of government (local, regional, state, and federal); and managing special projects for the Board of Selectmen. I oversee Hull's daily operations, advise, and administer the policies and procedures of the Board of Selectmen and enforce Hull's by-laws and actions passed at Town Meeting. My responsibilities include working with Hull senior management to coordinate the budget development process, submitting to the Board of Selectmen a proposed annual budget, including revenue and expenditure projections, for the upcoming

fiscal year. I am also responsible for: the continual review of policies and programs in an effort to provide improved municipal services, the coordination of activities leading up to the annual Hull Town Meeting, and a variety of other public hearings and forums.

Q. MR. TOKADJIAN, WHAT ARE YOUR DUTIES AND RESPONSIBILITIES AS OPERATIONS MANAGER OF HMLP?

A. As Operations Manager, I am responsible for all aspects of the day-to-day operation and management of the HMLP. I report directly to the Town Manager, Mr. Lemnios. As Operations Manager, I act in accordance with chapter 164, section 56 in the same manner as a General Manager of a municipal light plant. I have complete responsibility for the purchase, generation and distribution of electricity, the purchase of supplies, HMLP employment matters, the method, time, price, quantity and quality of the electric supply, the collection of bills, and the keeping of all accounts. Because HMLP is a member of the Massachusetts Municipal Wholesale Electric Company ("MMWEC"), I am responsible for HMLP's contractual relationships with MMWEC for MMWEC's services and participation in MMWEC projects involving Seabrook, Millstone Stony Brook and Project 2015A. Also, I work with MMWEC, which is HMLP's power supply portfolio manager, to secure the best possible power contracts and entitlements for the HMLP ratepayers, while balancing cost with HMLP's desire to be environmentally conscious.

Q. MR. LEMNIOS, HAVE YOU TESTIFIED PREVIOUSLY BEFORE THE DEPARTMENT OF PUBLIC UTILITES?

A. Yes. I have testified on several occasions regarding the provision of water service to Hull by several privately owned water companies that served Hull, Hingham, and Cohasset.

Q. MR. TOKADJIAN, HAVE TESTIFIED PREVIOUSLY BEFORE THE DEPARTMENT OF PUBLIC UTILITES?

A. No, I have not.

Q. MR. LEMNIOS, PLEASE OULINE THE JOINT TESTIIMONY.

A. Our Joint Testimony is divided into six (6) parts:

Part I: Qualifications

Part II: Joint Direct Testimony

Part III: Description of Hull and HMLP

Part IV: The Lines and Right of Way

Part V: The Faults and Outages Experienced

Part VI: Adverse Impacts of the Outages, Costs to Hull and Relief Sought

PART II: JOINT DIRECT TESTIMONY

Q. MR. LEMNIOS, PLEASE DESCRIBE THE PURPOSE OF YOUR JOINT TESTIMONY IN THIS PROCEEDING.

A. As explained in our testimony, over the past 7 years, there have been numerous faults on the electric lines serving Hull, which faults have caused an unacceptable number and duration of power outages in Hull.

The purpose of our joint testimony in this proceeding is to explain the need for an investigation by the Department of Public Utilities into: (1) the causes of the numerous unacceptable power outages experienced by Hull and HMLP over the past 7 years; (2) how New England Power Company and Massachusetts Electric Company d/b/a National Grid ("NGRID") maintain and operate both: (a) the electric lines, poles and related facilities

known as Hull 1 and Hull 2, and (b) the right of way in which those electric lines, poles and related facilities are located; (3) the unacceptable service level provided by NGRID for the transmission and distribution of electricity to Hull and HMLP over Hull 1 and Hull 2 ; and (4) the resultant unacceptable adverse effects on the public health, safety, welfare and convenience of HMLP's ratepayers and Hull's citizens and businesses from these power outages.

Finally, our joint testimony addresses the monetary and corrective action relief sought by Hull and the HMLP as a result of the requested investigation.

Q. MR. LEMNIOS, WHY SHOULD THE DEPARMENT OF PUBLIC UTILITES OPEN AN INVESTIGATION INTO THE CAUSES OF THE NUMEROUS POWER OUTAGES SUSTAINED BY HULL?

A. In my capacity of Town Manager for Hull, I have experienced firsthand the impact these inexcusable power outages have had on the citizens and ratepayers in Hull.

Hull's citizens are suffering needlessly. The economy of Hull is strained needlessly. The health, safety and welfare of Hull's citizens are placed in jeopardy needlessly. The ratepayers of HMLP expend funds for maintenance of the NGRID infrastructure needlessly. The HMLP ratepayers expend funds for temporary generators, attorneys, and experts needlessly. The employees of Hull expend time and effort addressing the safety aspects of outages needlessly. Moreover, the economic and psychic impact of these outages on the citizens of Hull is compounded because many of the outages have occurred during the pandemic.

Enough is enough. The problems need to be addressed, rectified and the HMLP ratepayers made whole by the Department of Public Utilities.

If these outages occurred within a city or town for NGRID retail customers, the Department of Public Utilities would have been inundated with complaints and the Department of Public Utilities would have addressed the complaints. As Town Manager, I am inundated with complaints. I have tried to address the problem with NGRID, but to no avail. NGRID has not corrected the situation despite repeated requests by Hull. Hull and the HMLP cannot solve the problems on their own. These avoidable outages are affecting not one retail NGRID customer, but an entire Massachusetts town and over 6,200 customers.

Hull and HMLP are therefore forced to expend public funds to compel NGRID to act in conformance with the privileges bestowed on NGRID by the Commonwealth as a public utility with the right to transmit and distribute electricity in the Commonwealth.

For all of these reasons and the reasons stated in our joint pre-filed direct testimony and the testimony of Hull's experts, the Department of Public Utilities must open an investigation that would yield a solution for Hull, the HMLP, the citizens of Hull and the ratepayers of the HMLP.

Q. MR. TOKADJIAN, PLEASE OUTLINE THE DIRECT TESTIMONY OF HULL AND HMLP FILED IN SUPPORT OF ITS PETITION.

A. In support of its petition to initiate an investigation, Hull and HMLP submit our joint direct testimony; the direct testimony of Thomas E. Converse, P.E., president of LIG Consultants, PC.; and the direct testimony of Paul J. Hibbard, a Principal at Analysis Group, Inc.

In his testimony, Mr. Converse addresses: (1) the condition of the NGRID lines/facilities and right of way used to serve Hull and the HMLP; (2) the standards applicable for the operation and maintenance of the NGRID lines serving Hull and the HMLP; and (3) the steps needed to be taken to increase the reliability of the NGRID line serving Hull and the HMLP.

Mr. Hibbard, in his testimony, addresses NGRID's performance with respect to the operation and maintenance of Hull 1 and Hull 2 relative to: (1) NGRID's obligations under its agreement with Hull; (2) NGRID's responsibilities and obligations as a regulated public utility in the Commonwealth of Massachusetts subject to the Massachusetts General Laws and the policies, regulations, and Orders of the Massachusetts Department of Public Utilities; and (3) NGRID's responsibilities as a transmission owner and operator subject to the reliability obligations and expectations of the New England System Operator ("ISO-NE"), the Northeast Power Coordinating Council ("NPCC"), and the North American Electric Reliability Corporation ("NERC").

Q. MR. TOKADJIAN, PLEASE SUMMARIZE THE PETITION OF HULL AND HMLP.

A. For the reasons stated in our joint testimony and the testimony of the other witnesses presented, Hull and HMLP show that the outages sustained by Hull and HMLP means that New England Power Company and Massachusetts Electric Company d/b/a NGRID fail to maintain Hull 1 and Hull 2 in accordance with good utility practice and standards adopted by the Department of Public Utilities.

PART III: HULL AND HMLP

Q. MR. LEMNIOS, PLEASE BRIEFLY DESCRIBE HULL.

A. Hull is a town located in Plymouth County, Massachusetts. It is located on the Nantasket Peninsula at the southern edge of Boston Harbor. Hull is bordered by Hingham Bay to the west, Massachusetts Bay to the north and east, and the towns of Cohasset and Hingham to the south.

As of the 2020 Census, Hull had a population of approximately 10,000 people. Hull has a variety of businesses, including numerous restaurants, insurance agencies, realtors, retail businesses and the Nantasket Beach Resort.

Q. MR. TOKADJIAN, PLEASE BRIEFLY DESCRIBE HMLP.

A. HMLP is a Massachusetts municipal light plant operating pursuant to General Laws chapter 164, sections 34 to 69A. It is a department of Hull. There currently are 11 individuals who work at HMLP.

As a municipal light plant, HMLP has the exclusive legal obligation to provide electric service to the residents and businesses of Hull. HMLP endeavors to provide such electric service in a safe, cost effective and reliable manner. In order for HMLP to fulfill its obligation, HMLP has in place sufficient facilities for the distribution of electricity to its customers. The problem is the delivery of electricity to HMLP by NGRID.

Q. MR. TOKADJIAN, PLEASE DESCRIBE HMLP'S CUSTOMER BASE AND POWER SALES.

A. HMLP is a load serving entity. It services approximately 6,200 residential and business customers. HMLP has approximately $8,700,000 in annual revenues. Because HMLP services all of Hull, with 6,200 total customers, if there is an outage due to faults on Hull 1 and Hull 2, all 10,000 residents of Hull are adversely affected.

Q. MR. TOKADJIAN, WHAT DO YOU MEAN BY "LOAD"?

A. "Load" is a term used to describe the demand customers put on an electric system for their use of electricity. HMLP's peak demand over the last 5 years has been 14.7 megawatts ("MW"). HMLP's total energy sales over this same time frame has been approximately 250,000 megawatt hours ("MWh"). As a member of the ISO-NE, HMLP has both capacity and energy requirements.

Q. MR. TOKADJIAN, HOW DOES HMLP SATISFY ITS LOAD REQUIREMENTS?

A. HMLP has contract rights and entitlements to purchase the capacity and energy it needs to meet is load requirements. Capacity is the ability to generate electricity. It is measured in megawatts. Energy is the amount of electricity used by consumers. Energy is measured in MWh.

MMWEC is HMLP's power supply portfolio manager. Hull, acting through the HMLP, is a member of MMWEC. I work with MMWEC to secure the contracts and entailments for both for capacity and energy requirements that both meet HMLP's load requirements and are advantageous for HMLP's ratepayers and HMLP's goals.

In addition to its contract rights, HMLP owns and maintains two (2) wind turbines having a combined capability of approximately 2.5 MWs, all of which provide electric energy exclusively in Hull.

PART IV: THE LINES AND RIGHT OF WAY

Q. MR. TOKADJIAN, HOW DOES ENERGY ACTUALLY GET DELIVERED TO HMLP?

A. Other than the energy derived from HMLP's wind turbines, the energy HMLP utilizes is transmitted over two 115 kV lines – 508 and 502Y – that are owned, operated, and maintained by New England Power Company d/b/a NGRID. After being stepped down to a lower voltage of 23 kV, that energy is then transmitted over two 23 kV lines owned by Massachusetts Electric Company d/b/a NGRID on double and single poles located on a right of way through the Town of Hingham to a substation operated by NGRID, where the voltage is further stepped down to 13.8 kV for distribution in Hull.

Q. MR. TOKADJIAN, PLEASE EXPALIN WHAT YOU MEAN BY HULL 1 AND HULL 2.

As used in our joint testimony. Hull 1 and Hull 2 are the two 23 kV lines (and all necessary related facilities) that run approximately 5.14 miles from the East Weymouth substation to the Rockland Street substation, at which point the electricity is stepped down to 13.8 kV with the two lines continuing for approximately another 3,300 feet to the point of demarcation in Hull. The 23 kV portion and the 13.8 kV portion and related facilities of Hull 1 and Hull 2 are owned, operated, and maintained by Massachusetts Electric Company d/b/a NGRID.

Q. MR. TOKADJIAN, DOES HMLP HAVE A CONTRACTUAL ARRANGEMENT IN PLACE FOR THIS DELIVERY OF ENERGY FROM NGRID ?

A. Yes. HMLP is party to a Support Agreement with New England Power Company ("NEPCO"). A copy of the Support Agreement is Attachment Hull/HMLP-1 to our Joint Testimony.

NEPCO d/b/a NGRID owns, operates, and maintains the two 115 kV lines 508 and 502Y and pursuant to the Support Agreement, NEPCO is obligated to maintain those 115 kV lines in accordance with good utility practice. Pursuant to the Support Agreement, HMLP pays NEPCO HMLP's *pro rata* share of NEPCO's costs associated with NEPCO's obligation to maintain and operate lines 508 and 502Y. The *pro rata* share of NEPCO cost paid by HMLP is based on HMLP's peak demand because a certain portion of the capacity on the 508 and 502Y 115kV lines is dedicated to HMLP's use.

HMLP also is party to a Local Service Agreement ("LSA") with NEPCO. A copy of the LSA is Attachment Hull/HMLP-2 to our Joint Testimony.

The service provided by NEPCO under the LSA is Local Network Service. Per the LSA, the delivery point to HMLP is at 13.8 kV on Hull 1 and Hull 2 at the Hingham/Hull town line.

The obligations imposed on NEPCO by the Support Agreement and the LSA are discussed more fully in the testimony of Mr. Hibbard.

Q. MR. TOKADJIAN, WHAT IS THE PHYSICAL PATH THAT THE DELIVERY OF THIS ENERGY FOLLOWS?

A. Hull 1 and Hull 2 travel from the low side of the East Weymouth 9 substation along and across a number of private properties before reaching the Hingham/Hull town line. The right of way for Hull 1 and Hull 2 is comprised of various easements that traverse private properties. A depiction of the path is Attachment Hull/HMLP-3 to our Joint Testimony.

PART V: FAULTS AND OUTAGES

Q. MR. TOKADJIAN, WHAT IS A FAULT IN TERMS OF ELECTRICAL EQUIPMENT?

A. Generally, a fault is an abnormal electric current. It is an imperfection in the electrical circuit which deflects current from the intended path and disturbs the current's normal flow. Essentially, a fault results in the loss of current and thus loss of electricity to service customers' loads. To a customer of HMLP a fault is an outage.

Q. MR. TOKADJIAN, HOW MANY FAULTS HAVE OCCURRED ON HULL 1 AND HULL 2?

A. Since September of 2014, there have been fifteen (15) faults on Hull 1 and Hull 2.

Q. MR. TOKADJIAN, HAVE ELECTRICAL OUTAGES IN HULL OCCURRED EACH TIME THERE HAS BEEN A FAULT ON HULL 1 OR HULL 2?

A. Yes.

Q. MR. TOKADJIAN, DOES EITHER HULL OR HMLP HAVE ANY RESPONSIBILITY FOR MAINTENANCE OF HULL 1, HULL 2 OR THE RIGHT OF WAY?

A. No, neither Hull nor HMLP bears any direct responsibility for the maintenance of the lines or the right of way. The condition, maintenance and operation of Hull 1 and Hull 2 are the responsibility of Massachusetts Electric Company d/b/a NGRID.

Q. MR. TOKADJIAN, HOW LONG HAVE THESE ELECTRICAL OUTAGES LASTED?

A. As shown in Attachment Hull/HMLP-4, the outages have been for varying lengths of time ranging from 15 minutes to 46.5 hours.

Q. MR. LEMNIOS WHAT EFFORTS HAVE BEEN UNDERTAKEN TO ACHIEVE A RESOLUTION WITH NEPCO OR MASSACHUSETTS ELECTRIC COMPANY REGARDING THE FAULTS AND OUTAGES?

A. Since 2015, Hull officials and State Representatives have met with NGRID representatives to urge NGRID to upgrade Hull 1 and Hull 2. HMLP has presented NGRID with information concerning the age of Hull 1 and Hull 2 and the fact that there are newer construction methods available that would reduce the number of outages. Hull 1 and Hull 2 run through heavily wooded areas both cross-country as well adjacent to roadways. In the event of a tree fall, NGRID will call in a tree services to help with removal. This adds time to any response. Newer, better facilities would help immensely and make Hull 1 and Hull 2 more resilient.

The Hull Selectmen have convened several meetings including joint meetings with the HMLP Light Board to discuss the outages. In 2018, Hull Selectmen, State Legislators, and staff met with NGRID representatives in Waltham to discuss the on-going outages and condition of the line. The NGRID representatives pledged to "do a better job" controlling outages. This has proven to be a hollow promise.

In addition, our Fire Chief, who also serves as Hull's Emergency Manager, and Mr. Tokadjian, have met or spoken with NGRID staff on many occasions over the last several years to both pre-plan for outages and to urge full replacement of the lines serving Hull.

Q. MR. LEMNIOS WHAT HAS BEEN THE RESULT OF THESE EFFORTS?

A. No resolution has been achieved. Outages continue. Unnecessary costs continue to be incurred by Hull and HMLP.

PART VI: ADVERSE IMPACTS OF THE OUTAGES, COSTS TO HULL AND RELIEF SOUGHT

Q. MR. LEMNIOS, WHAT HAS BEEN THE IMPACT OF THESE ELECTRICAL OUTAGES ON HULL?

A. When an outage occurs on Hull 1 and Hull 2, all the electrical service to Hull is interrupted. In 2020 alone there were six outages that exceeded over 61 hours of complete loss of electric service to Hull. Every business and homeowner in Hull lost power during those outages. Businesses have reported to me that they have lost thousands of dollars of sales and many restaurants have incurred substantial losses due to food spoilage.

During and after outages Hull town offices have been inundated with complaints and our public safety and Health Department staff experienced a high demand for services.

Due to the numerous outages in 2020, and especially in light of the continuance of the COVID 19 pandemic, HMLP investigated obtaining temporary generators to provide power to the residents and businesses of Hull in the event of another outage. The lack of reliability from the NGRID lines and NGRID's non-responsiveness to the concerns of Hull and HMLP make the likelihood of additional town-wide power outages a near certainty. If such an

outage were to occur this winter, while the emergency circumstances of COVID-19 remain, it would not be feasible for Hull to operate a shelter. Additionally, it would be difficult for residents to find alternate shelter outside of Hull.

Q. MR. LEMNIOS, WHAT STEPS HAS HMLP TAKEN TO PROTECT THE RESIDENTS AND BUSNESSES OF HULL FROM THE EFFECTS OF THE OUTAGES?

A. Based on HMLP's investigation, and in consultation with the Light Board, the Board of Selectmen, and the Fire Chief, HMLP rented five temporary generators from December 1, 2020 through March 31, 2021.

The total cost of those rental generators was $745,000.

In addition, on July 21, 2021, the HMLP Board voted to increase the rates 8.4 % to the HMLP ratepayers or approximately $540,000 to cover the cost of rental generators in Hull for the upcoming 2021/2022 winter. These generators are rented as precaution for outages during this winter.

That amounts to HMLP spending about $1,285,000 to rent generators to protect the citizens of Hull from outages caused by NGRID's Hull 1 and Hull 2 failures.

Q. HAS HMLP INCURRED ANY OTHER COSTS ASSOCAITIED WITH THE OUTAGES RESULTING FROM HULL 1 AND HULL 2?

A. Yes. As mentioned previously, HMLP makes annual payments to NGRID to cover the cost of maintenance of the 115 kV lines and Hull 1 and Hull 2. Since 2014, HMLP has paid NGRID $1,376,000 for maintenance of the facilities that serve Hull.

Thus, since 2014, HMLP has billed its ratepayers a total of approximately $ 1.4 million for maintenance of the NGRID lines that serve Hull and, in addition, approximately $1.3 million for renting temporary generators because the maintenance of the lines is wholly inadequate.

HMLP estimates that it will pay approximately $400,000 for attorneys and experts to bring these matters to a satisfactory conclusion before the Department of Public Utilities.

While it is a cost to the citizens of Hull, we have not estimated the value of the time spent by Hull and HMLP employees who are forced to deal with the consequences of these outages for which they have no responsibility. Finally, although just as real as the costs incurred by HMLP, we have not estimated the cost of the outages and inconveniences to the citizens of Hull.

Q. MR. LEMNIOS, WHAT IS THE RELIEF HULL AND HMLP SEEK AS A RESULT OF ITS PETITION?

A. 1. That the Department of Public Utilities immediately convene an investigation into the causes of the intolerable outages sustained by Hull and HMLP as described in the evidence filed in support of the Petition.

2. That the Department of Public Utilities, pursuant to the laws of the Commonwealth, contractual requirements and Department of Public Utilities' policies, hold NGRID and its affiliates accountable for the outages sustained by Hull and HMLP.

3. That the Department of Public Utilities compel NGRID and its affiliates to upgrade wires and related facilities, and to maintain Hull 1 and Hull 2 so as to eliminate the outages.

4. Order NGRID and/or its affiliates to reimburse HMLP and Hull in the amount of $ 3.1 million as fair compensate HMLP for the funds it had to expend to pay NGRID to maintain the facilities and to protect the residents of Hull from the outages.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

IN THE MATTER OF A PETITION OF THE TOWN OF HULL, ACTING BY AND THROUGH THE HULL MUNICIPAL LIGHT PLANT, AND THE HULL MUNICIPAL LIGHT PLANT TO INITIATE AN INVESTIGATION PURSUANT TO G. L. c.164, §76 INTO THE MANNER IN WHICH NEW ENGLAND POWER COMPANY AND MASSACHUSETTS ELECTRIC COMPANY DBA NATIONAL GRID MAINTAIN THEIR ELECTRIC LINES AND RIGHT OF WAY SERVING THE TOWN OF HULL	D.P. U. No_____

AFFIDAVIT OF PANOS TOKADJIAN

I, Panos Tokadjian, do attest and swear to the following:

1. I am the Operations Manager for the Hull Municipal Light Plant ("HMLP"). My business address is HMLP, 15 Edgewater Road, Hull, Massachusetts 02045.
2. I certify that those portions of the Joint Pre-filed Direct Testimony and Attachments of Philip E. Lemnios and Panos Tokadjian, which bear my name were prepared by me or under my direct supervision and control, and that the representations made in my direct testimony and the attachments thereto are true and accurate to the best of my knowledge.

Signed under the pains and penalties of perjury,

Panos Tokadjian

Dated: November 1, 2021

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

IN THE MATTER OF A PETITION OF THE TOWN OF HULL, ACTING BY AND THROUGH THE HULL MUNICIPAL LIGHT PLANT AND THE HULL MUNICIPAL LIGHT PLANT TO INITIATE AN INVESTIGATION PURSUANT TO G. L. c.164, §76 INTO THE MANNER IN WHICH NEW ENGLAND POWER COMPANY AND MASSACHUSETTS ELECTRIC COMPANY DBA NATIONAL GRID MAINTAIN THEIR ELECTRIC LINES AND RIGHT OF WAY SERVING THE TOWN OF HULL	D.P. U. No_____

AFFIDAVIT OF PHILIP E. LEMNIOS

I, Philip E. Lemnios, do attest and swear to the following:

1. I am the Town Manager of the Town of Hull ("Hull"). My business address is Town Hall, 253 Atlantic Avenue, Hull, Massachusetts 02045
2. I certify that those portions of the Joint Pre-filed Direct Testimony and Attachments of Philip E. Lemnios and Panos Tokadjian, as filed in this docket simultaneously with this Affidavit, which bear my name were prepared by me or under my direct supervision and control, and that the representations made in my direct testimony and the attachments thereto are true and accurate to the best of my knowledge.

Signed under the pains and penalties of perjury,

Philip E. Lemnios

Dated: November 1, 2021

Attachment 1

Docket No.: ER06-1345-000
Company: ISO New England
Service Agreement No.: 31
Under FERC El. Tariff No. 3
Filing Date: 8/8/06
Effective Date: 7/10/06

SERVICE AGREEMENT

BY AND BETWEEN

NEW ENGLAND POWER COMPANY

AND

HULL MUNICIPAL LIGHTING PLANT

LOCAL SERVICE AGREEMENT

This LOCAL SERVICE AGREEMENT, dated as of July 10, 2006,is entered into, by and between New England Power Company d/b/a National Grid ("Transmission Owner") and Hull Municipal Lighting Plant ("Transmission Customer").

PART I – General Terms and Conditions

1. Service Provided (Check applicable):

   X_ Local Network Service

   __ Local Point-To-Point Service
   __ Firm
   __ Non-Firm

   Regional Network Service customers must take either Local Network Service or Local Point-To-Point Service.

2. The Transmission Customer is an Eligible Customer under the Tariff and is a party to either a Market Participant Service Agreement or a Transmission Service Agreement.

3. The Transmission Customer has submitted a Completed Application and the required deposit, if applicable, for service under this Local Service Agreement and the Tariff.

4. The Transmission Customer agrees to supply information to the Transmission Owner that the Transmission Owner deems reasonably necessary in accordance with Schedule 21 and Good Utility Practice in order for it to receive the requested service.

5. The Transmission Owner agrees to provide and the Transmission Customer agrees to take and pay for service in accordance with the provisions of the Tariff and this Local Service Agreement.

6. Service may be subject to some combination of the charges detailed in Schedule 21 of the OATT. The appropriate charges will be determined in accordance with the terms and conditions of Schedule 21.

7. Any notice or request made to or by either party regarding this Local Service Agreement shall be made to the representative of the other party as indicated below.

Transmission Customer:
Hull Municipal Lighting Plant
Attention: Manager
15 Edgewater Road
Hull, MA 02045

Transmission Owner:
New England Power Company
Attention: Transmission Commercial Services
25 Research Drive
Westborough, MA 01582

8. The Tariff is incorporated herein and made a part hereof.

9. Nothing contained in this Local Service Agreement shall be construed as affecting in any way the right of the Transmission Owner to file with the Commission under Section 205 of the Federal Power Act and pursuant to the Commission's rules and regulations promulgated thereunder for a change in any rates, terms and conditions of this Local Service Agreement. Nothing contained in this Local Service Agreement shall be construed as affecting in any way the ability of the Transmission Customer to file with the Commission under Section 206 of the Federal Power Act and pursuant to the Commission's rules and regulations promulgated thereunder for a change in any rates, terms and conditions of this Local Service Agreement.

PART II – Local Network Service

1. The Transmission Customer has been determined by the Transmission Owner to have a Completed Application for Local Network Service under the Tariff.

2. Service shall commence on the later of: (1) July 10, 2006 or (2) the date on which construction of all interconnection equipment, any Direct Assignment Facilities and/or facility or Local Network Upgrades are completed, or (3) such other date as it is permitted to become effective by the Commission. Service shall terminate on December 31, 2025

3. Specifications for Local Network Service.

   a. Term of Service: See 2 above.

   b. List of Network Resources and Point(s) of Receipt:

   c. Description of capacity and energy to be transmitted:

d. Description of Local Network Load:

e. List of metering point(s) when they differ from Point(s) of Delivery:

Note: New England Power Company owns the meters at the Point of Delivery.

f. List of non-Network Resource(s), to the extent known:

g. Ancillary Services requested or proof of satisfactory arrangements for Ancillary Services:

The Transmission Customer has executed a Market Participant Service Agreement or a Transmission Service Agreement with ISO-New England, Inc.

h. Identity of Designated Agent:

Authority of Designated Agent:
Term of Designated Agent's authority:
Division of responsibilities and obligations between Transmission Customer and Designated Agent:

i. Interconnection facilities and associated equipment:

j. Project name:

k. Interconnecting Transmission Customer:

l. Location:

m. Transformer nameplate rating:

n. Interconnection point:

o. Additional facilities and/or associated equipment:

p. Service under this Local Service Agreement shall be subject to the following charges:

Any and all other applicable charges in accordance with the rates, terms and conditions of Schedule 21-NEP of the Tariff, including, without limitation:

- Transformer surcharge
- Meter surcharge

- Specific distribution surcharge

q. Additional terms and conditions:

i. List of Points of Delivery:
At 13.8kV, on the Hull 1 and 2 lines, at the Hingham/Hull town line

ii. Transmission Customer grants permission to Transmission Owner's engineering, distribution planning, transmission planning and T&D operations personnel to access any and all Transmission Customer RTU data which is telemetered to Transmission Owner's control room. Transmission Owner agrees not to share this data with its sales and marketing personnel.

iii. Transmission service over Transmission Owner's 115kV lines, 508 and 502Y, is provided under a separate support agreement and is not provided under this Local Service Agreement.

4. Planned work schedule.

Milestone (Activity)	Estimated Time Period For Completion (# of months)

5. Payment schedule and costs.
(Study grade estimate, +___% accuracy, year $s)

Milestone	Amount ($)

6. Policy and practices for protection requirements for new or modified load interconnections.

7. Insurance requirements.

PART III – Local Point-To-Point Service

1. The Transmission Customer has been determined by the Transmission Owner to have a Completed Application for Local Point-To-Point Service under the Tariff.

2. Service shall commence on the later of: (l) _____, or (2) the date on which construction of any Direct Assignment Facilities and/or Local Network Upgrades are completed, or (3) such other date as it is

permitted to become effective by the Commission. Service shall terminate on _____.

3. Non-firm Local Point-To-Point Service shall be provided by the Transmission Owner upon request by an authorized representative of the Transmission Customer.

4. Specifications for Local Point-To-Point Service.

   a. Term of Transaction:

   b. Description of capacity and energy to be transmitted by the Transmission Owner including the electric Control Area in which the transaction originates:

   c. Point(s) of Receipt:

   d. Delivering Party:

   e. Point(s) of Delivery:

   f. Receiving Party:

   g. Maximum amount of capacity and energy to be transmitted (Reserved Capacity):

   h. Designation of party(ies) subject to reciprocal service obligation:

   i. Name(s) of any intervening Control Areas providing transmission service:

   j. Service under this Local Service Agreement shall be subject to the following charges:

   k. Interconnection facilities and associated equipment:

   l. Project name:

   m. Interconnecting Transmission Customer:

   n. Location:

   o. Transformer nameplate rating:

   p. Interconnection point:

q. Additional facilities and/or associated equipment:

r. Additional terms and conditions:

5. Planned work schedule.

Milestone (Activity)	Estimated Time Period For Completion (# of months)

6. Payment schedule and costs.
(Study grade estimate, +__% accuracy, year $s)

Milestone	Amount ($)

7. Policy and practices for protection requirements for new or modified load interconnections.

8. Insurance requirements.

IN WITNESS WHEREOF, the Parties have caused this Local Service Agreement to be executed by their respective authorized officials.

Transmission Customer:

By:_____ _____ _____
Name Title Date

_____
Print Name

Transmission Owner:

By:_____ VP, Transmission Commercial Services _____
Name Title Date

Herbert Schrayshuen
Print Name

Attachment 2

ID 1168 32-1854
A

SUPPORT AGREEMENT
BETWEEN
NEW ENGLAND POWER COMPANY
AND
HULL MUNICIPAL LIGHTING PLANT

This agreement is dated as of July 1, 1996, and is between New England Power Company (NEP), and Hull Municipal Lighting Plant (Hull) collectively referred to as (the Parties).

WHEREAS, NEP and Hull have entered into a Tariff No. 4 System Transmission Service Agreement dated July 1, 1986 for non-PTF transmission service.

WHEREAS, NEP has filed a new Open Access Transmission Tariff in compliance under FERC's Order No. 888 to supersede NEP's Transmission Tariff No.4.

WHEREAS, Hull does not currently utilize NEP's entire transmission system at all times and therefore requests to separately support the NEP's 115 kV transmission lines No. 508 and 502Y.

NOW THEREFORE, the parties hereby agree to the following:

Article 1. NEP shall continue to own, operate and maintain the two 115 kV lines, No. 508 and No. 502Y, in accordance with good utility practice. These lines also provide transmission service to Massachusetts Electric Company and Hingham Municipal Light Plant.

Article 2. Hull will support its prorata share of the costs for the the No. 508 and the No. 502Y lines. The annual cost of service for the lines is described in Appendix A of this Agreement.

Article 3. Hull's 13.1percent prorata share of the cost of service for the lines is determined by dividing Hull's load by the annual peak load on the lines. Hull, Hingham Municipal Lighting Plant, or Massachusetts Electric Company may request in writing that the prorata sharing of the cost of service be reviewed. The prorata share review will look at the most recent calendar year peak loading on the line to establish new prorata percentages for each company.

Article 4. The monthly bill will be calculated as one twelveth of the annual charge times Hull's prorata share as described per Article 2. Billing will be based on the prior calendar year cost of service. Billing may be based on estimated cost when actual cost of service is not available. However, true-ups will apply to these estimates to reflect actual cost as soon as practical.

Article 5. Billing will be on a monthly basis. After the end of each calendar month, NEP will issue a bill for the prior month. If Hull's payment is not received, by NEP, within twenty (20) days of the date of rendering the bill (due date), an interest charge shall be added to the unpaid balance computed daily from the due date at an annual rate equal to two percent (2%) more than the then current prime rate of interest charged by the Bank of Boston. In the event the bill is disputed, interest shall accrue only on the unpaid amount finally determined to be due and payable.

Article 6. NEP reserves its right to assign this Agreement to its affiliate. Hull shall not assign this Agreement without prior written approval by or consent of NEP.

Article 7. This Agreement shall become effective on the date that the Federal Energy Regulatory Commission ("FERC") permits Tariff No. 4 to be superseded by NEP's Open Access Transmission Tariff.

Article 8. Any amendment to this Agreement shall be in writing. This Agreement may be terminated by either party upon a 60-day written notice to the other party.

Article 9. Transmission service to Hull through East Weymouth substation and Massachusetts Electric Company facilities is not provided for in this Agreement. Transmission over these facilities will be under NEP's Open Access Transmission Tariff.

Article 10. This Agreement does not provide Hull with integration service with other loads or resources. In the event Hull desires integration service with other loads or resources, NEP's Open Access Transmission Tariff is available to Hull and this Agreement may be terminated.

Article 11. To the extent that Hull's transactions utilize any other segments of NEP's transmission system other than 508 and 502Y circuits, Hull is required to secure with NEP arrangements for point-to-point transmission wheeling service.

Article 12. In no event shall NEP and its affiliates, and/or their officers, directors, employees, and agents, be liable whether in contract, warranty, tort, negligence, strict liability, or otherwise, for direct, special, indirect, incidental, consequential or any other damages, resulting from performance or nonperformance under this Agreement, provided, however, that with respect to direct damages, either party may be liable in the event that such liability results from negligence or willful misconduct of an officer, director, employee or agent.

NEW ENGLAND POWER COMPANY

_____

_____

Title

_____

Date

HULL MUNICIPAL LIGHTING PLANT

_____

_____

Title

_____

Date

APPENDIX A

Direct Assignment Facilities Charge Calculation

The Determination of the Direct Assignment Facilities Charge

The calculation shown below is based on the Transmission Plant and Expenses of New England Power Company.

The Annual Transmission Facilities Charge shall equal the sum of New England Power Company's (NEP's) (I) Return and Associated Income Tax, (II) Depreciation Expense, (III) Amortization of Loss on Reacquired Debt, (IV) General Plant Depreciation Expense (V) Municipal Taxes, (VI) Operation and Maintenance expense, and (VII) Administrative and General Expense.

I. Return and Associated Income Taxes shall equal the product of the Investment Base multiplied by the Cost of Capital Rate.

A. Investment Base

The Investment Base will be (i) Depreciable Investment, plus (ii) Land, plus (iii) Allocated General Plant, less (iv) Depreciation Reserve, less (v) Allocated General Depreciation Reserve, less (vi) Deferred Tax Reserve, plus (vii) Loss on Reacquired Debt, plus (viii) Materials and Supplies, plus (ix) Cash Working Capital, plus (x) prepayments.

(i) Depreciable Investment shall equal those items from (NEP's) continuing Property Record (CPR) which represent properly capitalizable direct and indirect investment associated with the Facility.

(ii) Land shall equal all investment in nondepreciable real estate or rights associated with the Facility.

(iii) Allocated General Plant shall equal a pro rata share of NEP's investment in General Plant. Allocated General Plant shall equal total General Plant multiplied by the Transmission Wages and Salaries Allocator. The Transmission Wages and Salaries Allocator shall be the ratio of NEP's transmission-related payroll of the affiliated Company's to NEP's total

operation and maintenance payroll, excluding administration and general payroll of the affiliated Company's, and further multiplied by the ratio of the investment in the facility to NEP's total transmission investment, less capitalized leases.

(iv) Depreciation Reserve shall equal the accumulated Depreciation Expense associated with the Facility.

(v) Allocated General Depreciation Reserve shall be NEP'S general depreciation reserve multiplied by the Transmission Wages and Salaries Allocator, specified in Subsection I.A. (iii) above.

(vi) Deferred Income Tax Reserve shall equal the average of the Reserve for Accumulated Deferred Taxes, calculated in accordance with the formula set below, at the end of the year and at the end of the prior year.

$$Ry = \sum_{n=1}^{n=y} [(TRn)(TDn - DEn) - Cn]$$

Where

Ry = Reserve for Accumulated Deferred Income Taxes associated with the facility at the end of year y.

TRn= Year -End composite tax rate applicable to NEP for the year n;

TDn= Tax Depreciation arising out of the Improvements for year n;

DEn= Depreciation Expense for the year n;

Cn= net installment subtracted from (or added to) the calculation for year n, if as a result of a change in the federal income tax rate applicable to NEP, there is a surplus (or deficiency) in the Deferred Income Tax Reserve, the amount of such surplus (or deficiency) shall be subtracted from (or added to) the annual carrying charge in equal annual installments over the remaining life of the Agreement beginning with the calendar year the new tax rate becomes effective.

Year n=the nth calendar year since the in-service date of the investment listed in Interconnection Service Agreement (the calendar year of such date being year 1).

For the purposes of this paragraph, tax depreciation on the investment shall be calculated using the most accelerated depreciation method allowable under applicable tax laws.

(vii) Loss on Reacquired Debt shall equal NEP's balance of Total Loss on Reacquired Debt excluding losses associated with pollution control bonds, multiplied by (i) NEP's Total Transmission Plant excluding capital leases to NEP's total plant excluding capital leases and pollution control debt (Loss on Reacquired Debt Allocator) further multiplied by (ii) the ratio of the investment in the facility plus allocated General Plant to NEP's total Transmission Plant excluding Capitol Losses.

(viii) Materials and Supplies shall equal the product of (i) the ratio of the Investment in the Facility to NEP's total transmission plant less capitalized leases and (ii) NEP's transmission plant materials and supplies.

(ix) Cash Working Capital shall be the sum of Operation and Maintenance Expense, and Administrative and General Expense multiplied by the ratio of 45 days to 360 days in accord with FERC Opinion No. 19-A dated February 21, 1979

(x) Prepayments shall equal NEP's balance of prepayments multiplied by the Transmission Wages and Salaries Allocator specified in subsection I.A.(iii) above.

B. Cost of Capital Rate

The Cost of Capital Rate will equal the sum of (I) NEP's Weighted Cost Rates of Capital plus (ii) the composite Federal and State Income Tax Rate.

(I) The Weighted Cost Rates of Capital will be calculated based upon the capital structure at the end of each year and will equal the sum of:

(a) the long-term debt component, which equals the product of (1) the actual dollar weighted average interest cost to maturity of NEP's long-term debt excluding pollution control bonds then outstanding and (2) the ratio that long-term debt is to NEP's total capital.

(b) the preferred stock component, which equals the product of (1) the actual weighted average cost to maturity of NEP's preferred

stock then outstanding and (2) the ratio that preferred stock is to NEP's total capital.

(c) the return on equity component, which equals the product of (1) 12.00% and (2) the ratio that common equity is to NEP's total capital.

(ii) The Federal and State Income Tax Rate shall equal

$$\frac{A \times T}{100 - T}$$

Where T is the average for the year of the composite Federal income tax rate and state income tax rate and A is the sum of the preferred stock component, and the return on equity component determined in (B) (I) (b) (c) above.

II. Depreciation Expense shall equal the depreciable investment in the Facility divided by the lessor of 40 years, or the term of the contract.

III. Loss on Reacquired Debt shall equal NEP's total amortization of Loss on Reacquired Debt excluding losses associated with pollution control bonds multiplied by (i) the Loss on Reacquired Debt Allocator specified in Subsection I(A)(VII) above, further multiplied by (ii) the ration of the investment in the facility plus Allocated General Plant, to NEP's Total Transmission Plant excluding capitol leases.

IV. General Plant Depreciation Expense shall equal NEP's total General Plant Depreciation Expense multiplied by the Transmission Wages and Salaries Allocator specified in Subsection I.A(iii) above.

V. Municipal Tax Expense shall equal the product of (i) the average annual ratios of investment in the Facility, plus allocated General Plant, plus Land, to NEP's total plant investment, less capitalized leases, plus property held for future use, and (ii) total municipal taxes charged to operations during the year.

VI. Operation and Maintenance Expense shall equal the product of (i) expenses charged to FERC Account Numbers 560 through 573, excluding Account Number 565 and (ii) the average annual ratios of investment in the Facility to NEP's total transmission plant less capitalized leases.

VII. Administrative and General Expenses shall equal the product of (i) expenses charged to FERC Account Numbers 920 through 935 plus payroll taxes, and (ii)

the Transmission Wages and Salaries Allocator specified in subsection I.A.(iii) above.

VIII. Miscellaneous Provisions

(A) In the event that the FERC accounts listed above are renumbered, renamed or otherwise modified, or if additional accounts are created covering operation and maintenance expense and/or Administrative and General Expense, sections (VI) and (VII) above shall be deemed amended to incorporate such renumbered, renamed, modified or additional accounts.

(B) Billings in accordance with this support agreement shall initially be based upon estimates calculated based on actual costs in the preceding year, such estimates being adjusted to actual as soon as practicable after such costs become know. The source of the data is to be NEP's FERC Form 1.

ATTACHMENT 3

Path of Electric Lines

For Hull Municipal Light Plant

Hull 1 and Hull 2 Overview from East Weymouth to Hull Landfill

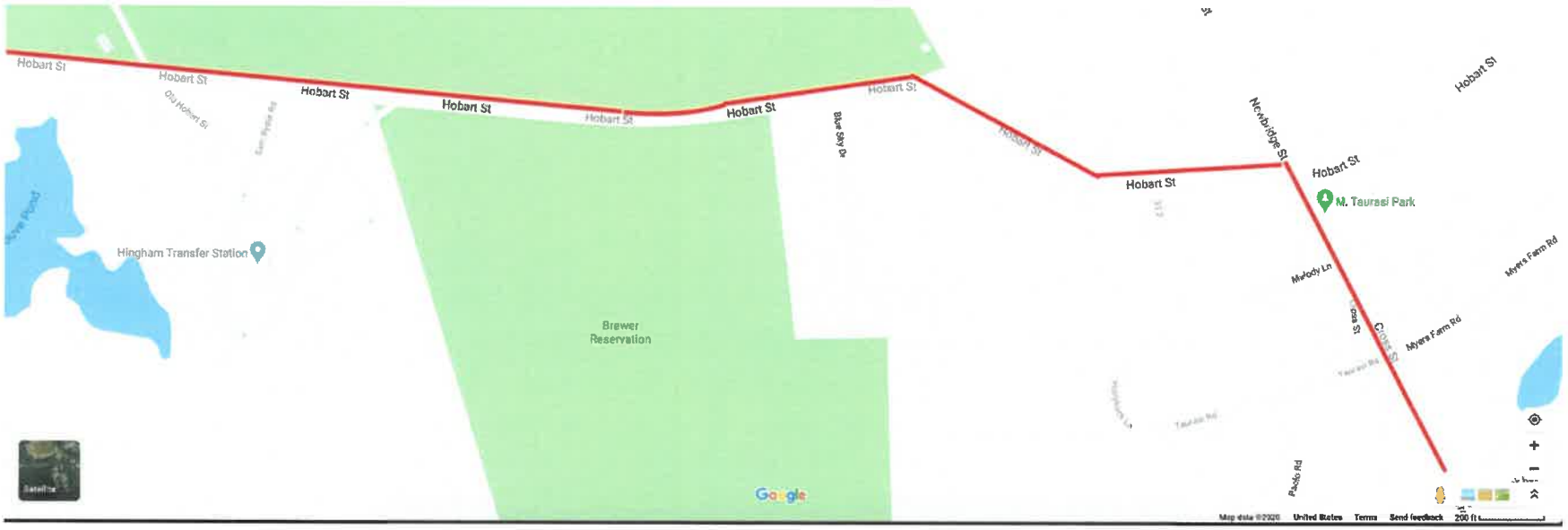
The Starting Substation

The pat starts at this Substation located at 1700 Commercial Street, East Weymouth.

The Path From the Substation

- The path starts at the substation at 1700 Commercial St, East Weymouth, and follows Commercial Street through Railroad tracks.
- The path then goes down French St, following the road, and into Hobart St.

From Hobart St to Cross St

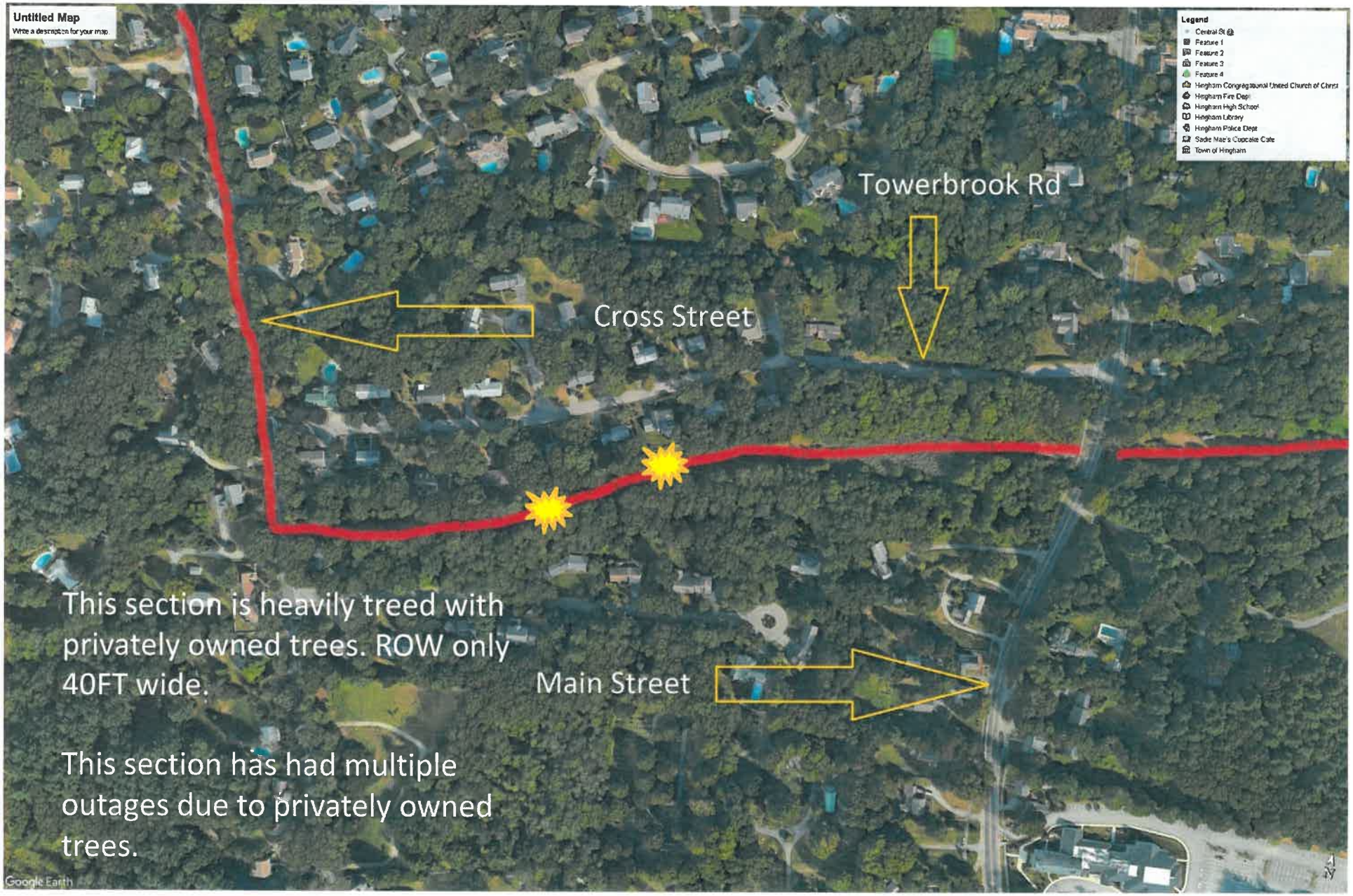


- The path follows Hobart St and goes south on Cross St. The whole time it is following the main road.

Cross St to Private Property

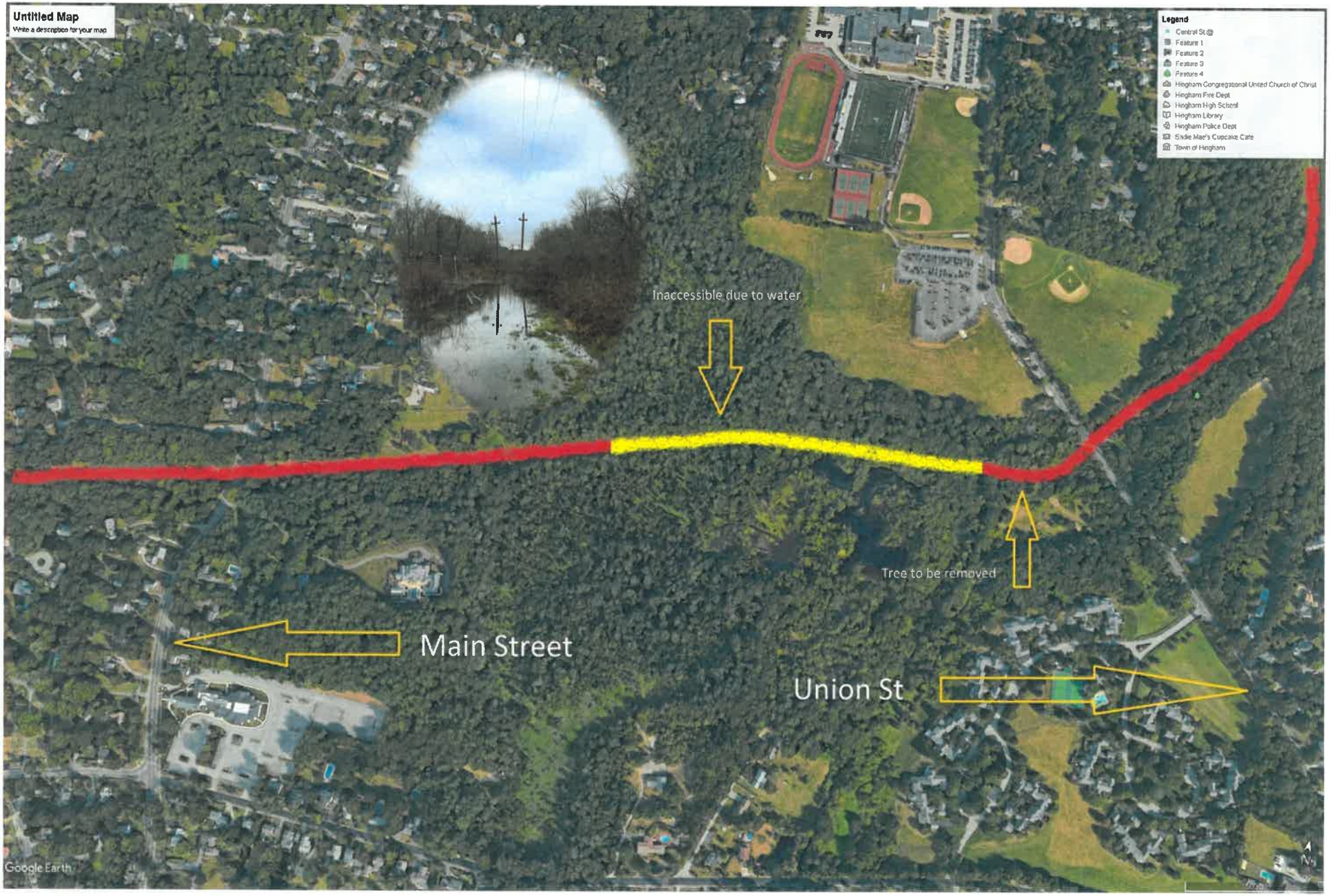
- This is the first time where the path crosses onto private property and where the problems with trees begin according to the next slide.

Cross Street to Main Street

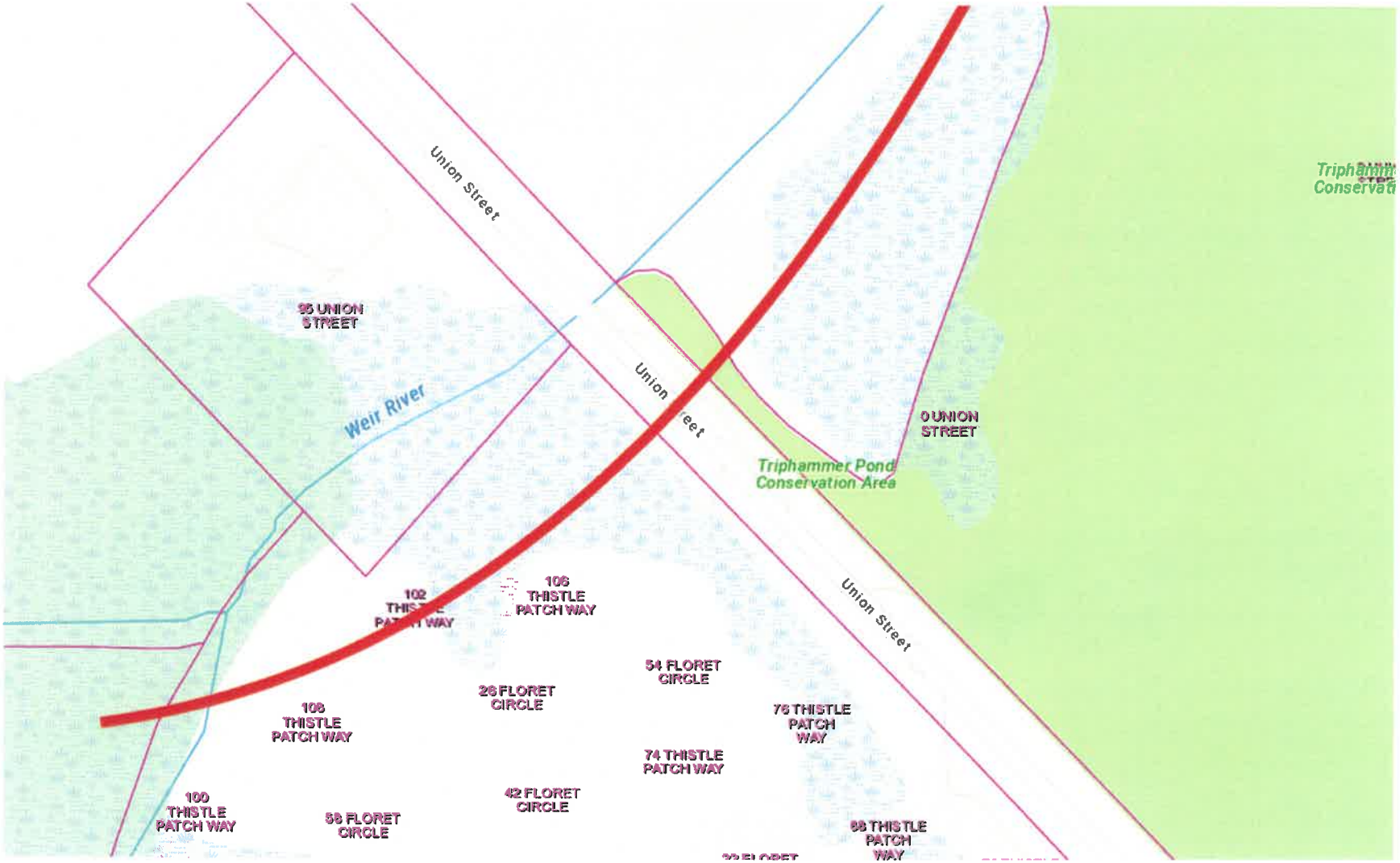


- The line goes through the following addresses:
  - 2, 4, 10, 12, 14, and 16 Woodbridge Road in Hingham, MA located in Plymouth County.
  - 549 Main St, Hingham, MA located in Plymouth County.

Main Street to Union Street

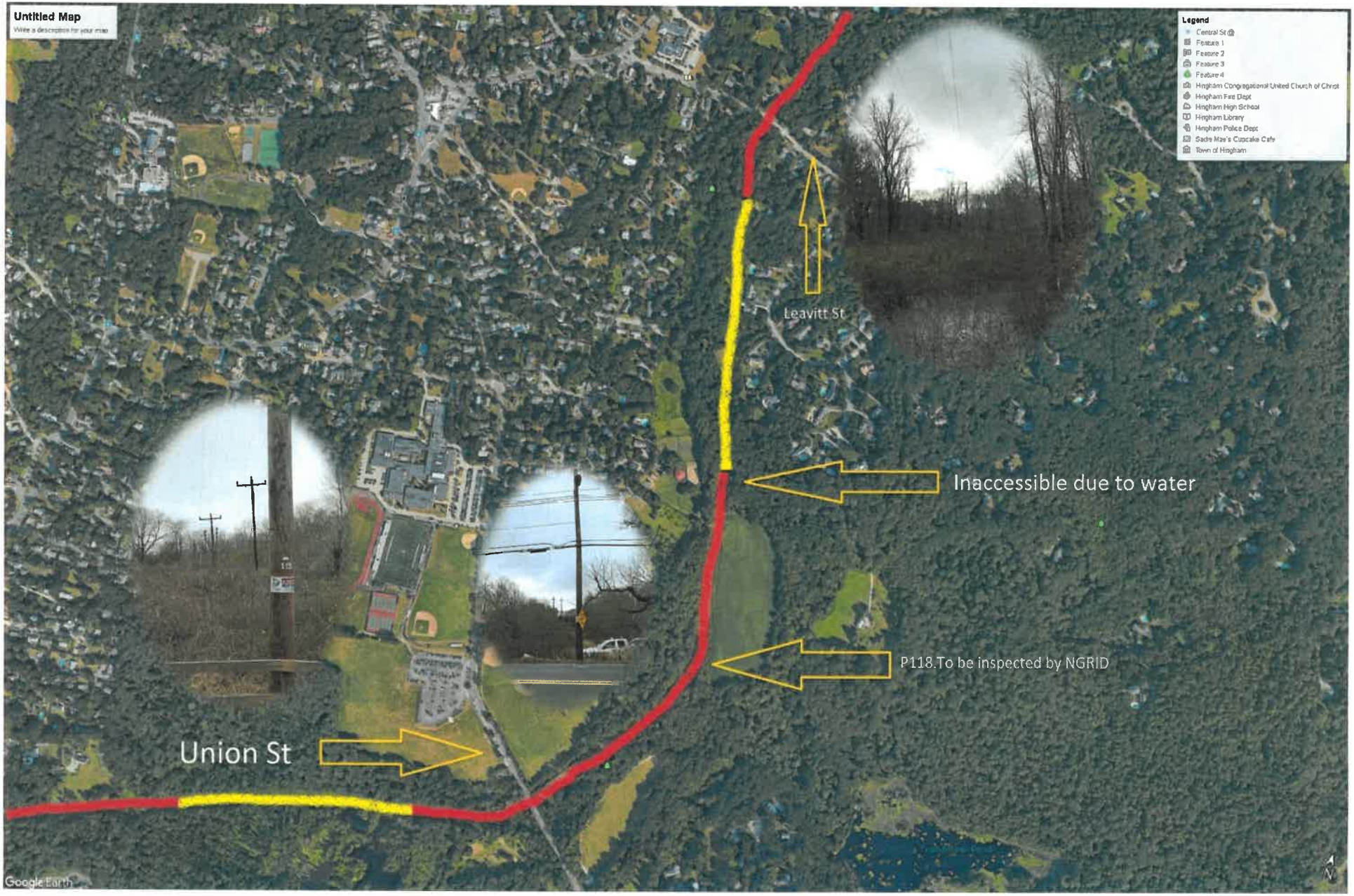


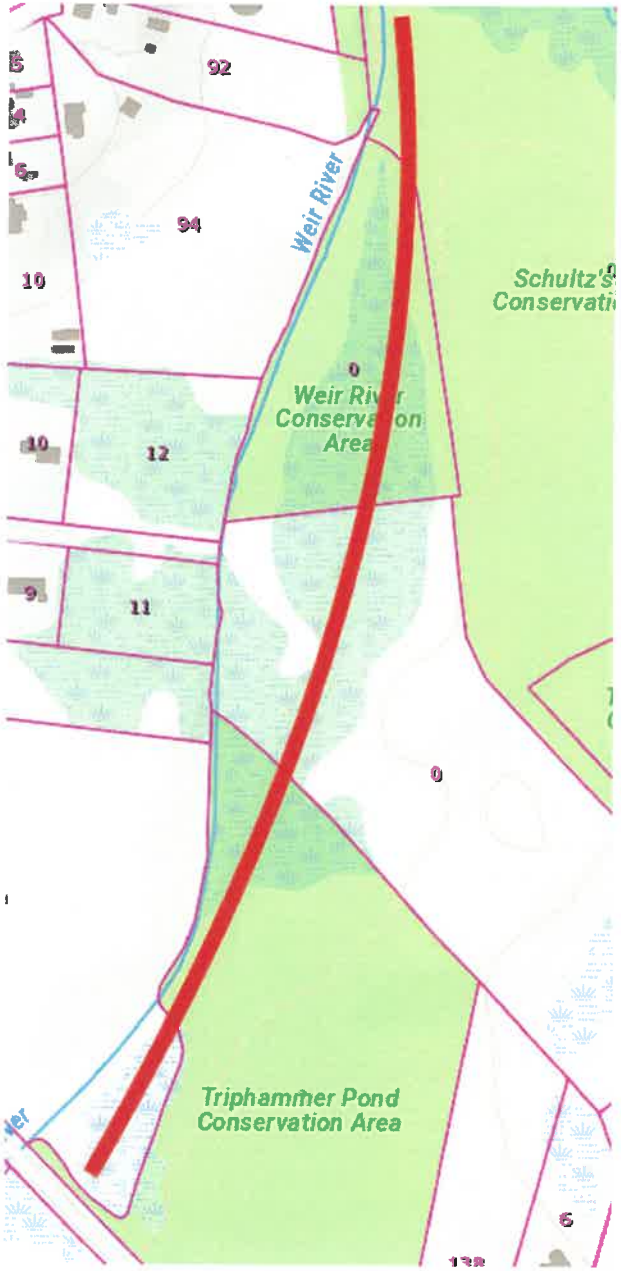
- The path then continues from 549 Main St to:
  - 556 and 550 Main St, Hingham, MA



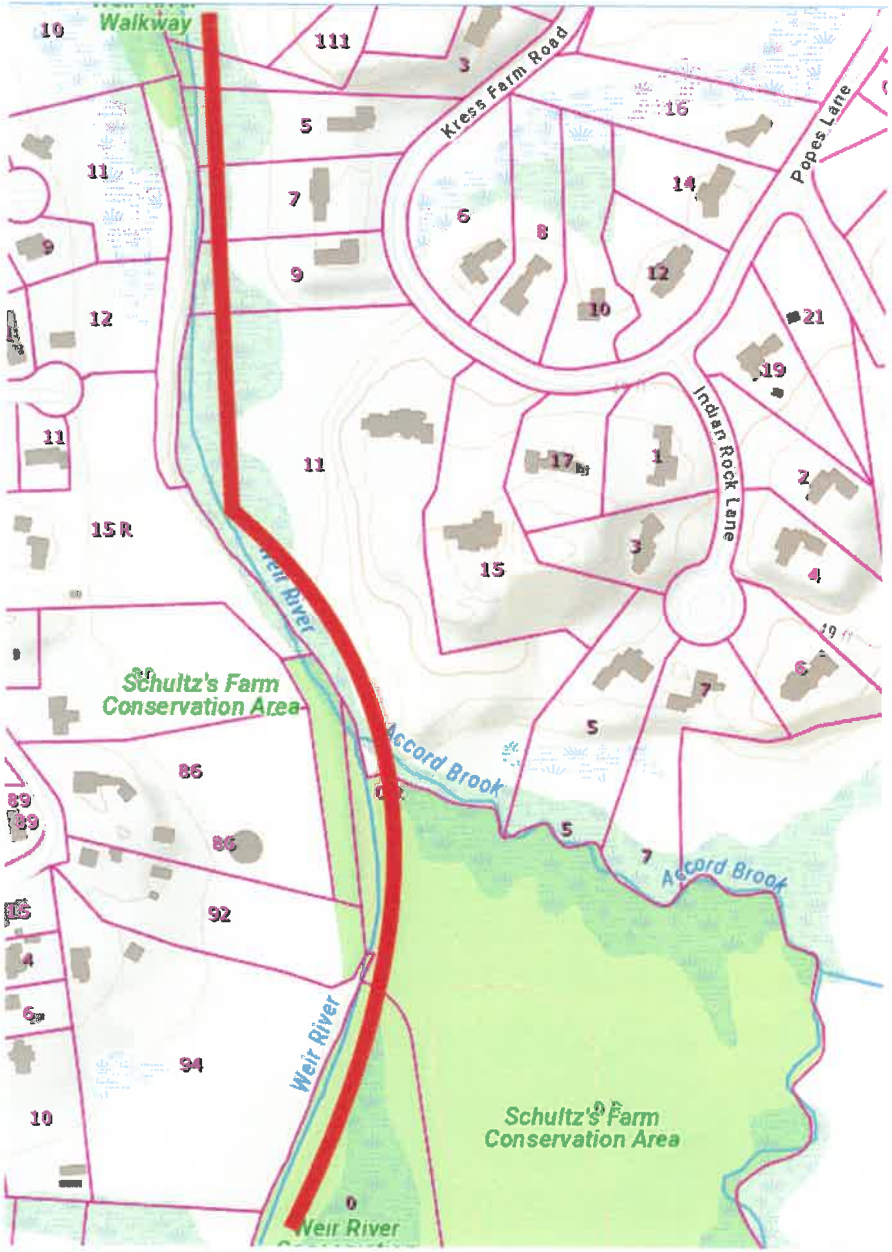
- The path then goes from 550 Main St to:
  - 108 and 102 Thistle Patch Way, Hingham, MA
  - 0 Union St, Hingham, MA

Union Street to Leavitt Street

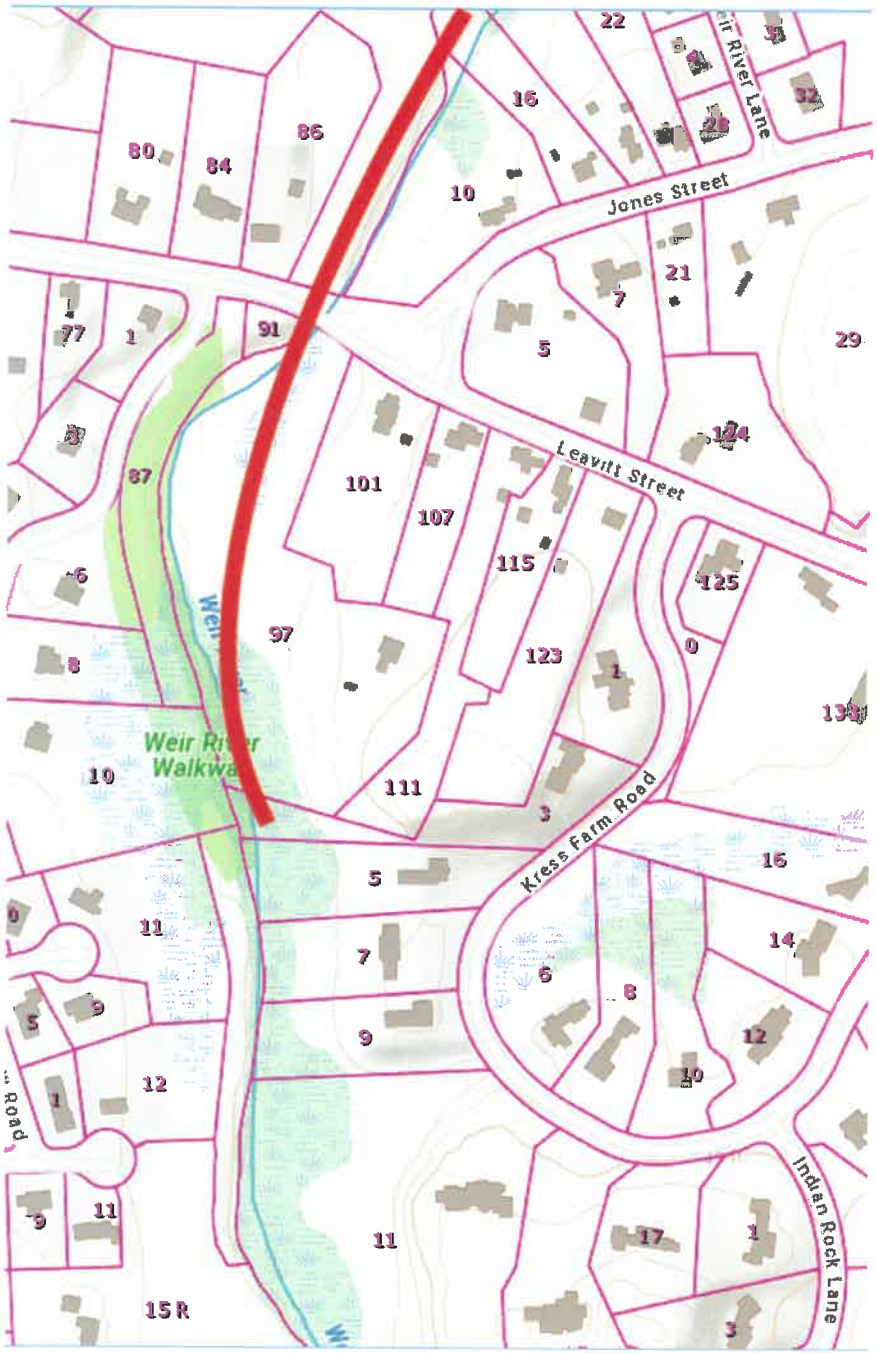




- The path goes up 0 Union St to:
  - 0 Triphammer Lane and
  - 0 Pleasant St

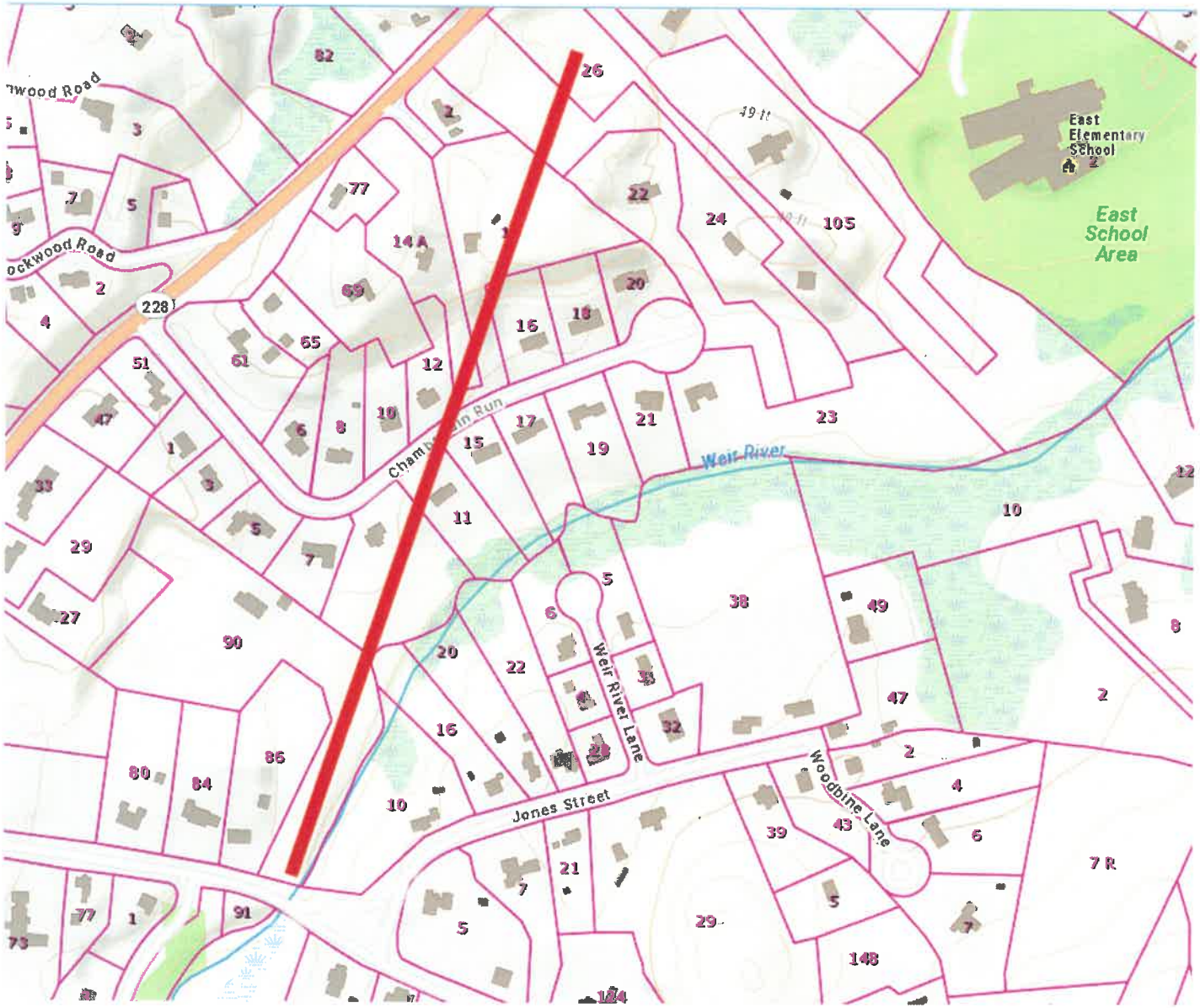


- The path continues from 0 Pleasant St to:
  - 11, 9, 7, 5, and 3 Kress Farm Rd



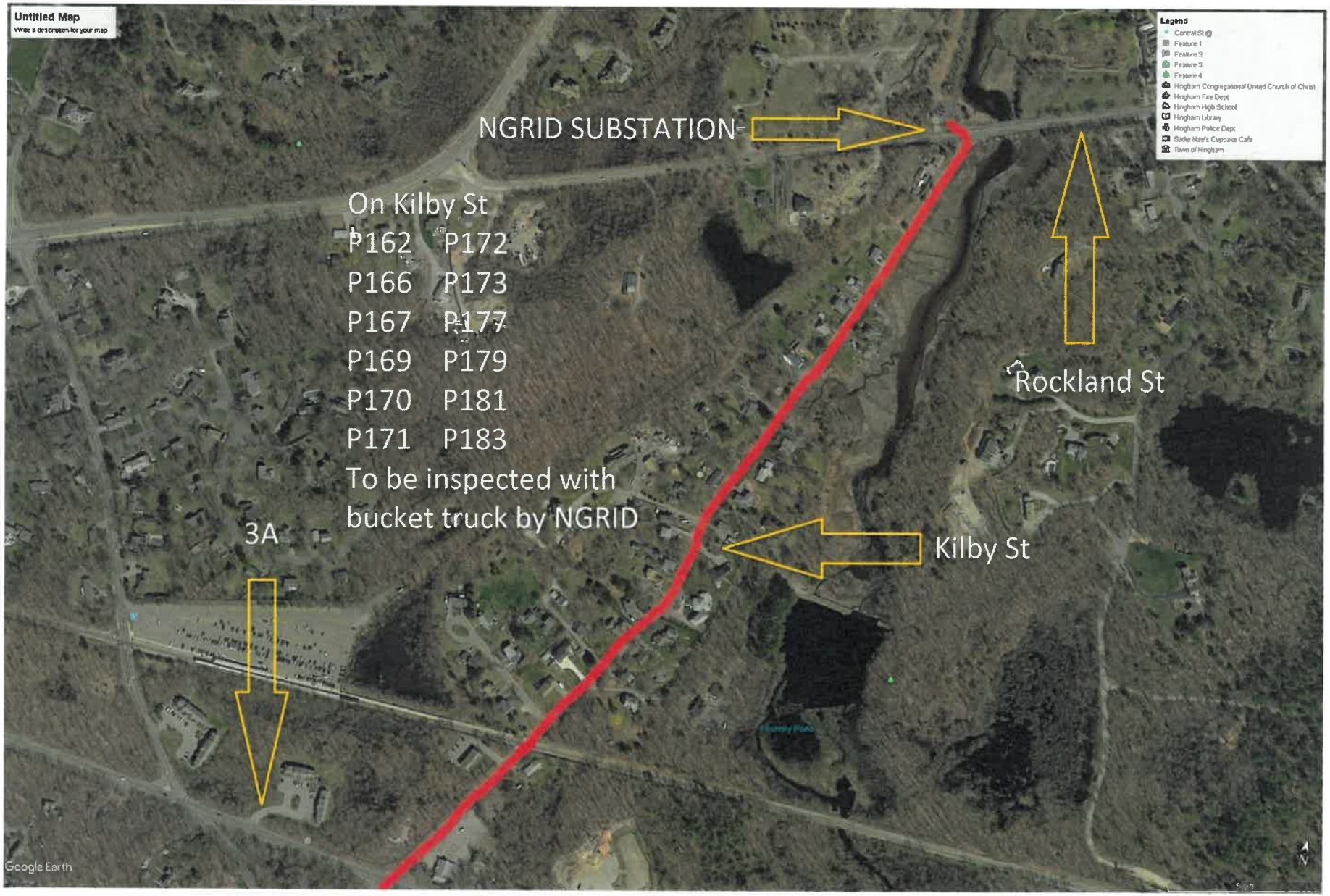
- The path continues from 3 Kress Farm road to:
  - 97 and 90 Leavitt St

- However, these properties were close together, so it could possible also run over:
  - 100 Leavitt St and
  - 10 and 16 Jones St



- The path then continues from 90 Leavitt St through:
- 9, 11, 14, 15, 24, and 26 Chamberlain Run

- The path then continues from 26 Chamberlain Run to:
- 105 and 111 East St.
- Then, it follows along East St. to Kilby St.



- This substation it located at 130 Rockland St, Hingham, MA.
- After it ends at the Substation, it simply follows the big plot of land (130 Rockland St) until the end of the path provided on slide 2.

ATTACHMENT 4

Re: HULL, DPU 21-139
Exhibit HULL____
Attachment Hull/HMLP-4
2 Pages
November 2021

List of outages on the National Grid lines Hull 1 and Hull 2

Town of Hull Municipal Lighting Plant

15 Edgewater Road Hull, Massachusetts 02045 Tel (781) 925-0051 FAX (781) 925-6125

PANOS TOKADJIAN
OPERATIONS MANAGER

Below is a list of outages on the National Grid lines Hull 1 and 2 since I started working here September of 2014. They are listed in reverse chronological order.

1. 10/7 /2020 6:17 p.m. – 10/8/2020 6:49 p.m., 24.5 hours: High winds brought two large trees down between Chamberlain Run and Leavitt Street in Hingham taking out both Hull 1 and 2. NGrid transmission crews responded and repaired the damage.

2. 8/18/2020, 11:00 am – 1:30 p.m. 2.5 hours. NGrid tree crews dropped a tree branch across both Hull 1 and 2 in Hingham. No damage was done.

3. 8/4/2020, 5:30 p.m. – 8::30 p.m., 3 hours: High winds caused Hull 1 and 2 wires to wrap around each other in Hingham, causing both lines to trip out. NGrid responded and unwrapped the wires to restore power back.

4. 4/13/2020 3:08 p.m. to 4/14/2020 3:22 am – 12.25 hours: Heavy wind storm Monday afternoon brought down a large tree on Hobart Street in Hingham and took down both lines. NGrid responded, repaired the damage, and restored power a little after 3 am the next morning.

5. 3/23/2020 9:20 p.m. to 3/24/2020 11:09 a.m. – 14 hours: Tree came down on Hobart Street in Hingham taking down both lines. NGrid tree crew needed a crane to remove the tree. Crane showed up at 8 am the next morning, and power was restored a little after 11 a.m.

6. 02/07/2020 – 5 hours: Tree branch came down on wires on Leavitt Street in Hingham tripping both lines. Crews cleared the branch and power was restored.

7. March 2018 – 19 hours: Tree came down in the right-of-way between Cross Street and Main Street in Hingham taking down both lines. NGrid crews responded, replaced a broken pole, rebuilt both lines, and restored power.

8. 3/2/2018, 7:00 p.m. to 3/4/2018 5:30 p.m. - 46.5 hours: A large tree came down in the NGrid right-of-way in Hingham that took out all6 wires of the two circuits. We located and reported the problem to NGrid by 9 p.m. on Friday. NGrid repair crews showed up on Saturday at 5 p.m., did some preparatory work, and started repair work on Sunday. Both lines were repaired and back to service by 5:30 p.m. Sunday night.

9. 10/31/2017, 12:15 am -5:30 p.m. - 19 hours: A large tree came down in the NGrid right-of-way in Hingham during a storm taking out both Hull 1 and 2. We found and reported the problem to NGrid by daylight. Their crews responded and restored power by 5:30 p.m.

10. 8/16/2015, 12:50 p.m.-2:50 p.m. - 2 hours: A tree branch fell on Hull 2 in Hingham. NGrid sent crews to repair and restore power to Line 2.

11. 7/27/2015, 1:32 p.m. - 1:50 p.m. - 15 minutes: NGrid contractors encountered a problem while working on the line upgrade project. They had to de-energize both Hull 1 and 2 to resolve the issue.

12. 7/16/2015, 10:40 p.m. to 7/17/2015, 3:15 p.m. - 4.5 hours: A large tree came down in the NGrid right-of-way in Hingham taking out both Hull 1 and 2. NGrid crews cleared the tree and restored power.

13. 6/19/2015, 2 p.m. - 2:15 p.m. - 15 minutes: NGrid contractor accidentally dropped one of the wires on Hull 2 causing it to trip.

14. 5/27/2015, 4 p.m. - 8:30 p.m. - 4.5 hours: NGrid contractor accidentally dropped a tree branch on Hull 2 while trying to clear the area they were planning to work of trees.

15. 12/30/2014, 9 a.m. - 7 p.m., 10 hours: Cross arm failed due to age, and dropped Hull 1 on Hull 2 at the intersection of Cross Street and Hobart Street in Hingham. NGrid crews had to replace the pole to restore power back to the town.

Converse

Testimony with Affidavits

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

IN THE MATTER OF A PETITION OF THE TOWN OF HULL, ACTING BY AND THROUGH THE HULL MUNICIPAL LIGHT PLANT, AND THE HULL MUNICIPAL LIGHT PLANT TO INITIATE AN INVESTIGATION PURSUANT TO G. L. c.164, §76 INTO THE MANNER IN WHICH NEW ENGLAND POWER COMPANY AND MASSACHUSETTS ELECTRIC COMPANY DBA NATIONAL GRID MAINTAIN THEIR ELECTRIC LINES AND RIGHT OF WAY SERVING THE TOWN OF HULL	D.P. U. No_____

DIRECT TESTIMONY OF

THOMAS E. CONVERSE, P.E.

ON BEHALF OF THE

TOWN OF HULL AND THE HULL MUNICIPAL LIGHT PLANT

Dated: November, 2021

PART I: QUALIFICATIONS

Q. PLEASE STATE YOUR NAME, CURRENT EMPLOYMENT AND BUSINESS ADDRESS.

A. My name is Thomas E. Converse. I am the Founder and President of LIG Consultants, P.C., as well as a Principal Engineer. My business address is LIG Consultants, P.C., ("LIG"). LIG's Main Office is 510 Chapman Street, Suite 202, Canton, Massachusetts 02021.

Q. ON WHOSE BEHALF ARE YOU APPEARING IN THIS PROCEEDING?

A. The Town of Hull ("Hull") and the Hull Municipal Light Plant ("HMLP").

Q. WHAT IS YOUR EDUCATIONAL BACKGROUND?

A. I hold a Bachelor of Science, Electrical Engineering in Power Engineering from Northeastern University of Massachusetts.

Q. PLEASE DESCRIBE YOUR RELEVANT PROFESSIONAL EXPERIENCE.

A. I founded LIG in January 2011 and have served as its President and a Principal Engineer since that time through the present. LIG is an energy consulting, project management, and engineering services firm.

From August 2005 to April 2011, I was the Executive Vice President of SourceOne. SourceOne is an energy consulting firm located in Boston, Massachusetts, which provides specialized energy management, engineering, and owner's representative services for commercial, industrial, and municipal energy concerns.

From August 2003 to August 2005, I was a Principal Engineer for Consulting Engineers Group Inc. in Hopedale, Massachusetts. Consulting Engineers Group Inc. was a consulting engineering firm, mainly focused on utility engineering.

From 1999 to 2003, I was the Director of Meter Operations for NSTAR, which is now known as Eversource.

From 1996 to 1999, I was the Director of Sales for Commonwealth Energy Systems, which is now part of Eversource

From 1986 to 1999, I was an Electrical Engineer for Commonwealth Electric, which was an operating company of Commonwealth Energy Systems.

Q. PLEASE DESCRIBE ELECTRICAL ENGINEERING.

A. Electrical Engineering is a discipline of engineering that concentrates on the design, development, testing, manufacture, and maintenance of electrical equipment. It is a broad field that spans industries, such as electrical components in personal technological devices to power generation. My focus is on power engineering.

Q. WHAT ARE YOUR DUTIES AND RESPONSIBILITIES AS PRESIDENT AND PRINICIPAL ENGINEER FOR LIG?

A. I run the day-to-day operations of LIG. In addition, I actively design and manage many projects for LIG. I work on projects both locally and nationally. I am licensed in over 20 states.

Q. HAVE YOU TESTIFIED PREVIOUSLY BEFORE THE DEPARTMENT OF PUBLIC UTILITES?

A. Yes. I have testified in DPU No. 08-01, which was NSTAR Electric Company's petition for approval to relocate a portion of two transmission lines in the City of Waltham and a petition for exemption from the zoning by-laws of Waltham to construct an electric substation and expand facilities at an existing substation. I testified on behalf of NSTAR. Also, I testified before the Energy Facilities Siting Board in EFSB 07-4/D.P.U. 07-35/07-36, which was the joint petition of Russell Biomass, LLC, and Western Massachusetts Electric Company for approval to construct a 115 kV transmission line, approximately 5.3 miles in length, and an associated 115 kV switching station, for the purpose of interconnecting a proposed 50-megawatt wood-burning generating facility in Russell, Massachusetts, with the regional electric grid in New England. I testified on behalf of the City of Westfield.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE ANY OTHER STATE OR FEDERAL REGULATORY BODIES?

A. I submitted an affidavit on behalf of the plaintiff in the Massachusetts Land Court matter *Cotuit Partners Limited Partnership v. Donald K. Emery*, MISC 366431 (July 25, 2008), which matter involved the meaning and validity of two easements. My affidavit addressed minimum width necessary to permit overhead electrical access and the relevant clearance requirements of the National Electric Safety Code.

PART II: DIRECT TESTIMONY

Q. PLEASE DESCRIBE THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING.

A. The purpose of my testimony in this proceeding is to address: (1) the age and condition of the electric lines, poles and related facilities known as Hull 1 and Hull 2; (2) the condition of the right of way for Hull 1 and Hull 2; (3) the standards applicable to the operating performance of Hull 1 and Hull 2; and (4) the steps that should be taken to increase the reliability of Hull 1 and Hull 2 to be at or above the reliability of comparative utilities in North America.

Q. HAVE YOU OBSERVED HULL 1 AND HULL 2 AND THE RIGHT OF WAY?

A. Yes. On January 6, 2021, I physically travelled the right of way and observed the Hull 1 and Hull 2 lines and poles for the entire length from East Weymouth Substation to the point of interconnection with HMLP, the Rockland Street 39 substation. I traveled the length of the lines with the exception of portions that traverse across marshy areas in which I could not get to by vehicle. Most of those sections were visible, but I could not approach the lines closely on that portion of the right of way. I focused my attention on the 23 kV portion of Hull 1 and Hull 2 which runs approximately a distance of 5.14 miles from the East Weymouth substation to the Rockland Street substation.

Q. HAVE YOU REVIEWED ANY DOCUMENTS ON WHICH YOU RELY TO PROVIDE YOUR TESTIMONY?

A. Yes. I have reviewed: (1) the Support Agreement between New England Power Company ("NEPCO") and HMLP; (2) Local Service Agreement between NEPCO and HMLP, effective July 1, 2006 and ending December 31, 2025 ("LSA"); (3) Schedule 21-NEP; (4) NEPCO 2018 FERC Form 1, p 426.1, l. 32 and 33; and (5) property records regarding easements/rights of way. In addition, I reviewed IEEE Standard 366-2012 (*the IEEE Guide for Electric Power Distribution Reliability Indices).*

Q. WHAT OBLIGATIONS ARE IMPOSED BY THE SUPPORT AGREEMENT?

A. Pursuant to the Support Agreement, NEPCO is required to own, operate, and maintain the two 115 kV lines 508 and 502Y in accordance with good utility practice. Mr. Tokadjian described the utilization of these lines for the delivery of electricity to HMLP.

Q. WHAT OBLIGATIONS ARE IMPOSED BY THE LSA?

A. As described by Mr. Tokadjian, the LSA relates to service to HMLP over Hull 1 and Hull 2. Under the LSA, NGRID agrees to provide service in accordance with the provisions of the "Tariff", which is Schedule 21-NEP, and the LSA. Schedule 21-NEP states that NEPCO (or Massachusetts Electric Company ("MECO")) shall construct the facilities at NEPCO's or MECO's expense and that they shall design, own, and maintain the facilities in accordance with "Good Utility Practice". *Schedule 21-NEP, §22.2.* The "Tariff" refers to the ISO-New England ("ISO-NE") Open Access Transmission Tariff ("OATT").

Q. WHAT IS "GOOD UTILITY PRACTICE" AS APPLIED TO THE OWNERSHIP, MAINTENANCE AND OPERATION OF HULL 1 AND HULL 2?

A. "Good Utility Practice" is defined in Schedule 1.01 to the OATT as:

> Any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods, and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the region.

Q. YOU INDICATED YOU REVIEWED INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS ("IEEE") STANDARD 366-20, WHY?

A. I reviewed this IEEE Standard because, as described in more detail later in my testimony, it provides methodologies to calculate the sustained interruption indices of a utility to compare utility performance for that distribution system. The results can then be compared to other utilities across North America to determine if that utility operates at the same or better reliability to its peer group. Being at or above that of the peer groups would be indicative of operating in a manner consistent with Good Utility Practice.

Q. PLEASE DESCRIBE THE LINES THAT DELIVER ENERGY TO HULL AND HMLP.

A. From the NGRID 115 kV transmission lines, the energy is transmitted over two 23 kV lines owned by Massachusetts Electric Company d/b/a NGRID on double and single poles located on a right of way through the Town of Hingham to a substation on the Hingham/Hull line operated by NGRID. There, the voltage is further stepped down to 13.8 kV and conveyed over the remaining portions of Hull 1 and Hull 2 to the line of demarcation in Hull.

My review focused on the 5.14 miles of 23 kV portion of Hull 1 and Hull 2, since that is where the faults described by Mr. Tokadjian occurred.

Those 23 kV lines are open wire construction. The lines are on the same poles for much of the right of way, but there are portions where Hull 1 and Hull 2 are on separate poles or share poles with the Town of Hingham.

Q. PLEASE DESCRIBE THE CONDITION OF THE 23 kV LINES THAT DELIVER ENERGY TO HULL AND HMLP.

A. The condition of the 23 kV lines is consistent with that of an older distribution line. While the 23 kV lines "transmit" electricity to Hull and HMLP and are subject to the Tariff, the voltage level is sub-transmission level. So, I describe them in my testimony as distribution lines. I define distribution level voltage here as less than 69 kV.

There are many splices on the lines along the right of way. This is indicative of conductor breaks over the years or insertion of additional wire to address a replacement or a relocated pole. Most of the pole line is along either town roadways or dedicated rights of way.

Q. DID YOU REVIEW THE OPERATING PERFORMANCE OF THE LINES?

A. Yes. I reviewed the operating performance of the lines dating back to 2014.

Q. WHAT WAS THE RESULT OF YOUR REVIEW?

A. My review shows that the distribution lines have sub-standard operating performance.

Q. ON WHAT DO YOU BASE THE CONCLUSION THAT THE LINES HAVE A SUB-STANDARD OPERATING PERFORMANCE?

A. My conclusion is based on a review of operating data compiled in accordance with the IEEE Std 1366-2012 from the *IEEE Guide for Electric Power Distribution Reliability Indices.*

Q. WHAT DOES THE RELEVANT PORTION OF IEEE STD 1366-2021 PROVIDE?

A. Section 3.2 of IEEE Std 1366-2012 provides the following formulas to calculate the sustained interruption indices used by the electric industry to compare utility performance for distribution systems across North America:

> **The System Average Interruption Frequency ("SAIFI")**, indicates how often the average customer experiences a sustained interruption over a predefined period of time.
>
> Mathematically, this is given below.
>
> SAIFI = The Sum of the Total Number of Customers Interrupted / Total Number of Customers Served.

In my analysis I used the total number of customers interrupted for all outages in a particular year/ the total customers impacted. Since these lines feed ALL HMLP customers, the total number of customers is the total number of customers in Hull, which is 6,200. Consequently, every interruption event impacted 6,200 customers.

For example in the year 2020, there were six outages that impacted ALL HMLP customers.

6*6,200/6,200 = 6 Outages. This means during the year 2020, the average customer had 6 outages, or a SAIFI number of 6.

The System Average Interruption Duration ("SAIDI") indicates the total duration of interruption for the average customer during a predefined period of time. In our analysis we used a year as the predefined time period.

SAIDI = The Sum of the Total Number of Customers Interrupted/Total Number of Customers Served.

In 2020 there were six outages with durations of: 24.5 hours, 2.5 hours, 3 hours, 12.25 hours, 14 hours and 5 hours.

(24.5+2.5+3+12.25+14+5)*6200/6,200=61.25 Hours or 3,675 minutes.

This means that in 2020, the average outage duration for HMLP customers was 61.25 Hours (3,675 minutes). SAIDI = 3,675 minutes.

The Customer Average Interruption Duration Index ("CAIDI") represents the average time required to restore service.

CAIDI = The sum of Customer Minutes of Interruption/Total Number of Customers Interrupted.

NOTE: Since ALL Customers are interrupted during a Hull 1 and Hull 2 outage, CAIDI=SAIDI.

Table 1 to shows calculations for the years under discussion.

TABLE 1

YEAR	SAIFI	SAIDI (CAIDI)	Comments
2020	6	3,657	
2019			No outages
2018	2	3,930	
2017	1	1,140	
2015	4	570	
2014	1	600	
Average	2.33	1,649	Straight line average

Q. DID YOU MEASURE YOUR FINDINGS AGAINST ANY BENCHMARKS?

A. Yes. Documents we have from the MECO 2016 Service Quality Benchmark data in D.P.U. 16-08 show that MECO had the following average from 1996 through 2005:

SAIFI – 1.254 and SAIDI – 114.32.

Also, a 2018 report from the American Public Power Association ("APPA") shows that the 2017 average reliability of its members was:

SAIFI – 0.99 and SAIDI – 60.02

Q. HOW DO THE HULL 1 AND HULL 2 DISTRIBUTION LINES FARE IN COMPARISON TO THESE BENCHMARKS?

A. As can be seen from the numbers in Table 1, the recorded results from Hull 1 and Hull 2 are orders of magnitude worse than MECO historical numbers and of average reliability from APPA members.

Q. WHAT IS YOUR OPINION WITH RESPECT TO THE MAINTENANCE OF THE DISTRIBUTION LINES?

A. My opinion is that the 23 kV lines serving Hull and HMLP - Hull 1 and Hull 2 - have not been designed or operated in compliance with applicable standards.

There is a direct correlation between the design and operation of the 23 kV portions of Hull 1 and Hull 2 and the outages which have occurred. The numbers show that Hull 1 and Hull 2 have a much higher incidence of outages than industry average, and the duration exceeds that of the industry.

Consequently, the operation of the 23 kV portion of Hull 1 and Hull 2 falls below that which would constitute "good business practices, reliability, safety and expedition" and what would be "acceptable practices, methods, or acts generally accepted in the region", which are the requirements to meet the standard of Good Utility Practice.

Q. BASED ON YOUR EXPERIENCE AND OBSERVATIONS, DO YOU HAVE ANY RECOMMENDATIONS AS TO HOW THE 23 kV PORTION OF HULL 1 AND HULL 2 COULD BE BROUGHT INTO COMPLIANCE WITH APPLICABLE STANDARDS AND GOOD UTILITY PRACTICE?

A. Yes. The following recommendations more likely than not would improve the operating performance of the 23 kV portion of Hull 1 and Hull 2:

1. Develop and implement a plan to replace the overhead open wire conductor with spacer cable or tree cable for the 23 kV lines. NGRID does this often on wire line upgrades that are in heavily treed areas. These types of cables are much more resilient to tree contact and stay energized while the tree contact portions of the line can be cleared.

2. Consider and implement a plan to trim the trees adjacent to the right of way to minimize mature trees that could land on the wires and cause an outage.

3. Develop a "Fast Response Team" that can be dispatched quickly to restore power to these lines. There should be a team at NGRID that understands that these lines impact 6,200 customers. If the line is put in a queue for outage dispatch with other distribution lines, the SAIDI numbers will continue to be high.

Q. PLEASE DESCRIBE THE CONDITION OF THE POLES TO WHICH THE 23 kV LINES ARE AFFIXED.

A. Most of the poles appeared to be in acceptable condition, with test holes evident in some poles to assess for condition. Some poles are joint Hingham Municipal Light Department and NGRID poles. Most of the roadway poles are off the road in an acceptable manner, however, there are some locations which are susceptible to damage from vehicular traffic damage.

Q. WHAT IS YOUR OPINION WITH RESPECT TO THE POLES SUPPORTING THE 23 kV PORTION OF HULL 1 AND HULL 2?

A. In general, the poles are acceptable for the design in place. However, if the wire design was changed to accommodate spacer or tree cable construction, modifications would likely be required to the existing poles to insure they are adequately designed for the new conductor design.

Q. PLEASE DESCRIBE THE CONDITION OF THE HULL 1 AND HULL 2 RIGHT OF WAY.

A. Most of the right of way is sufficiently clear of vegetation. However, trees immediately adjacent to the right of way are very mature, and due to the height of many of those trees,

in the event they fall, they are tall enough to fall right across both 23 kV circuit lines and take the entire line out, which will render the Hull and HMLP completely without power.

Q. WHAT IS YOUR OPINION WITH RESPECT TO THE MAINTENANCE OF THE RIGHT OF WAY?

A. With the exception of the mature trees which are outside the right of way but can impact the line, the right of way was in acceptable condition and in a condition consistent with that of being kept clear consistent with Good Utility Practice.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

Hibbard

Testimony with Affidavits

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

IN THE MATTER OF A PETITION OF THE TOWN OF HULL, ACTING BY AND THROUGH THE HULL MUNICIPAL LIGHT PLANT, AND THE HULL MUNICIPAL LIGHT PLANT TO INITIATE AN INVESTIGATION PURSUANT TO G. L. C.164, §76 INTO THE MANNER IN WHICH NEW ENGLAND POWER COMPANY AND MASSACHUSETTS ELECTRIC COMPANY DBA NATIONAL GRID MAINTAIN THEIR ELECTRIC LINES AND RIGHT OF WAY SERVING THE TOWN OF HULL	D.P. U. No_____

DIRECT TESTIMONY OF

PAUL J. HIBBARD

ON BEHALF OF THE

TOWN OF HULL AND THE HULL MUNICIPAL LIGHT PLANT

Dated: November, 2021

I. QUALIFICATIONS

1. Q. PLEASE STATE YOUR NAME, CURRENT EMPLOYMENT, AND BUSINESS ADDRESS.

A. My name is Paul J. Hibbard. I am a Principal at Analysis Group, Inc. ("AGI"), an economic, finance and strategy consulting firm headquartered in Boston, Massachusetts, where I work on energy and environmental economic and policy consulting. My business address is 111 Huntington Avenue, 14th Floor, Boston, Massachusetts 02199.

2. Q. ON WHOSE BEHALF ARE YOU APPEARING IN THIS PROCEEDING?

A. I am appearing on behalf of the Town of Hull ("Hull") and the Hull Municipal Light Plant ("HMLP").

3. Q. PLEASE DESCRIBE YOUR BACKGROUND AND EXPERIENCE.

A. I have been with AGI for approximately fifteen years, since 2003. First, from 2003 to April 2007, and most recently, from August 2010 to the present. In between, from April 2007 to June 2010, I served as Chairman of the Massachusetts Department of Public Utilities ("Department"). While Chairman, I also served as a member of the Massachusetts Energy Facilities Siting Board, the New England Governors' Conference Power Planning Committee, and the NARUC Electricity Committee and Procurement Work Group. I also served as State Manager for the New England States Committee on Electricity and as

Treasurer to the Executive Committee of the 41-state Eastern Interconnect States' Planning Council.

I previously worked in energy and environmental consulting with Lexecon, Inc. from 2000 to 2003. Prior to working with Lexecon, I worked in state energy and environmental agencies for almost ten years. From 1998 to 2000, I worked for the Massachusetts Department of Environmental Protection on the development and administration of air quality regulations, State Implementation Plans and emission control programs for the electric industry with a focus on criteria pollutants and carbon dioxide ("CO_2"), as well as various policy issues related to controlling pollutants from electric power generators within the Commonwealth of Massachusetts. From 1991 to 1998, I worked in the Electric Power Division of the Department on cases related to the setting of utility rates, restructuring of the electric industry in Massachusetts and New England, quantification of environmental externalities, integrated resource planning, energy efficiency, utility compliance with state and federal emission control requirements, regional electricity market structure development, and coordination with other states on electricity and gas policy issues through the staff subcommittee of the New England Conference of Public Utility Commissioners.

I hold an M.S. in Energy and Resources from the University of California, Berkeley, and a B.S. in Physics from the University of Massachusetts at Amherst. My curriculum vitae, list of prior testimony, and list of publications are included as Attachment 1to my testimony.

4. Q. HAVE YOU TESTIFIED PREVIOUSLY BEFORE THE MASSACHUSETTS DEPARTMENT OF PUBLIC UTILITIES?

A. Yes. I provided testimony before the Department on behalf of the Massachusetts Municipal Wholesale Electric Company on March 3, 2021 in DPU 21-29. I also provided testimony before the Department on behalf of the Massachusetts Department of Energy Resources in DPU 13-07, May 31, 2013.

II. DIRECT TESTIMONY OVERVIEW

5. Q. PLEASE DESCRIBE THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING.

A. The HMLP and Hull (together, "Hull") have filed a petition with the Department for an investigation into the manner in which New England Power Company and Massachusetts Electric Company d/b/a NGRID maintain and operate the electric lines known as Hull 1 and Hull 2, and the right of way through which those lines travel. Hull contends that the manner in which the 23 kV portion of Hull 1 and Hull 2 and, to a more limited extent, the right of way are maintained and operated is inconsistent with the public interest, has resulted in frequent outages of extended duration, and has adversely affected the safety and convenience of the residents and businesses of Hull.

The purpose of my testimony in this proceeding is to review NGRID's performance with respect to operation and maintenance of the 23 kV portion of Hull 1 and Hull 2 relative to (1) its obligations under its agreements with Hull, (2) its responsibilities and obligations as a regulated public utility in the

Commonwealth of Massachusetts subject to the Massachusetts General Laws and the policies, regulations, and Orders of the Department, and (3) its responsibilities as a transmission owner and operator subject to the reliability obligations and expectations of the New England System Operator ("ISO-NE"), the Northeast Power Coordinating Council ("NPCC"), and the North American Electric Reliability Corporation ("NERC"). I consider the duration and frequency of outages due solely to the loss of Hull 1 and/or Hull 2 as reported by Hull's witness Thomas E. Converse ("Converse Testimony") and evaluate whether the reliability performance of these lines is consistent with NGRID's obligation to meet the standard of Good Utility Practice.

6. Q. PLEASE PROVIDE A SUMMARY OF YOUR CONCLUSIONS.

A. The Department has general supervisory authority over the conditions of NGRID's (and other utilities') property to ensure in part that utility property – such as transmission and distribution system infrastructure – is appropriately operated and maintained for the *safety and convenience of the public.*[1] In my view, utility system reliability is vital for the health and safety of the Commonwealth's citizens and support of the state's economy. Failure by any utility to discharge its reliability obligations is against the public interest and warrants investigation and action by the Department.

As a former Commissioner of the Department, I believe this is the perspective the Department should apply in its consideration of Hull's petition, because the

1 G.L. c. 164, § 76, emphasis added.

entire town of Hull – its citizens, emergency services, health care facilities, public safety operations, educational services, etc. – are universally and deeply affected by outages of Hull 1 and Hull 2,[2] property owned and operated by NGRID.

Based on review of the facts and data relevant to this matter, I believe the Department should have serious doubts as to whether NGRID is meeting its public service obligations, and/or is operating and maintaining the condition of these lines in a manner consistent with "Good Utility Practice." The frequency and duration of outages to *all of* Hull in recent years, due entirely to failure of NGRID's infrastructure serving Hull (the 23 kV portion of Hull 1 and Hull 2), is sufficient on its face to warrant close scrutiny and investigation by the Department given the grave public health, safety, and economic implications of poor reliability performance.

"Good Utility Practice" is a frequently used and time-tested standard that pervades NGRID's contracts, agreements, and responsibilities as a regulated utility, an ISO-NE market participant, an owner of FERC-jurisdictional transmission infrastructure, and a Massachusetts retail distribution company. Under the Support Agreement and associated ISO-NE Schedule 21 between NGRID and Hull regarding Hull 1 and Hull 2, and consistent with its obligations as a transmission-owning entity in New England, NGRID must operate and maintain this infrastructure in a manner consistent with Good Utility Practice.

In this testimony, I discuss the reliability performance of the 23 kV portion of

2 In this direct testimony, the use of the words "Hull 1 and Hull 2" refers to the 23 kV portion of those facilities, as described in the Converse Testimony and Lemnios/Tokadjian Testimony.

Hull 1 and Hull 2 (as presented and discussed in the Converse Testimony and the Joint Testimony of Philip E. Lemnios and Panos Tokadjian ("Lemnios/Tokadjian Testimony")) relative to the Department's expectations for electric utility reliability performance, and relative to NGRID's performance in its own distribution service territory.

Based on my review of this information and data, I conclude that NGRID's reliability performance with respect to the condition, operations and maintenance of Hull 1 and Hull 2 is poor at best, and likely inconsistent with the standard of Good Utility Practice.[3]

As a former Commissioner, I can understand that the Commission may be reluctant to act on a matter that relates to the citizens and businesses of a town not within NGRID's service territory. Yet in this case, because Hull is on a peninsula and Hull 1 and Hull 2 are the only path for power to serve the town, it is impossible to ignore (1) the broader obligation of NGRID to ensure its actions do not harm the safety and convenience of the general public, and (2) the fundamentally interconnected nature of the electric system in Massachusetts, part of a regionally-integrated system that serves *all* citizens and businesses in the Commonwealth. The actions of any electric company with transmission and distribution property (and associated responsibilities for reliable service) in Massachusetts can affect the reliability of electric service in neighboring

3 I understand that many of the specific legislated and regulated reliability performance standards (and associated penalty structures) of National Grid administered by the Department are in reference to the reliability of electric service to the retail customers of NGRID within their service territory. Nevertheless, the Department-administered reliability performance standards and metrics are a reasonable and appropriate measure of comparison to evaluate whether and how NGRID's operation and maintenance of all of its property in the Commonwealth is properly discharged for the safety and convenience of the public.

companies' service territories. In this instance, this is directly and clearly the case, since virtually all of Hull's electric service depends on the condition and reliable operation and maintenance of NGRID's Hull 1 and Hull 2, and associated rights of way.

In consideration of these factors, I recommend that the Department act swiftly on Hull's request and take actions to ensure that the reliability of electric service to Hull's residents and businesses is not further degraded due to continued extended outages on Hull 1 and Hull 2.

7. Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. In Section III, I present my views on the importance of reliability, on the responsibilities and authorities of NGRID and the Department to ensure reliability for all residents and businesses in the Commonwealth, and on the ability of the Department to take action in response to the petition of Hull in this matter.

I also provide background on the standard of Good Utility Practice, which is an explicit responsibility of NGRID with respect to operation and maintenance of its property as an interconnected electricity provider in Massachusetts and New England.

In Section IV, I summarize the facts presented in this case in the Converse and Lemnios/Tokadjian Testimonies related to outages on the Hull 1 and Hull 2 lines, and discuss the reliability performance of these lines relative to the standard of Good Utility Practice and compared to the reliability performance standards mandated by the Massachusetts legislature and administered by the Department

for NGRID service to retail customers.

Finally, in Section V I present my observations and opinions related to the performance of NGRID with respect to Hull 1 and Hull 2, and what actions the Department can and should take in this matter.

III. RELIABILITY, DEPARTMENT AND NGRID AUTHORITIES AND RESPONSIBILITIES, AND GOOD UTILITY PRACTICE

8. Q. AS A FORMER DEPARTMENT COMMISSIONER IN MASSACHUSETTS, DO YOU BELIEVE THAT THE DEPARTMENT HAS AN OPPORTUNITY AND/OR RESPONSIBILITY TO ACT IN RESPONSE TO THE PETITION OF HULL?

A. Yes, I do. As noted in the Lemnios/Tokadjian Testimony, HMLP is a municipal light plant largely not subject to regulation by the Department. In particular, the Department does not oversee the reliability of service provided by HMLP to its customers in Hull and does not impose reliability performance standards on the operations of the HMLP. Nevertheless, there are at least five reasons why I believe it is appropriate and necessary for the Department to act in this matter:[4]

(1) The single most important application of the Department's general supervisory authority over regulated utilities is the provision of safe and reliable service to the Commonwealth's residents and businesses;

4 Please note that I am not a lawyer and am not offering my perspective in this testimony as a legal conclusion. My perspective derives from my experience as a staff person and former Commissioner at the Department, my understanding of the purpose and nature of the Department's statutory responsibilities and authorities, my review as a Commissioner and an industry expert of various contracts, agreements, and industry documents (including those subject to the Department's review and others that are not) that apply the standard of Good Utility Practice in the electric industry context, and my viewpoint on the primacy of maintaining safe and reliable electric service in the Commonwealth of Massachusetts.

(2) The Department's responsibility to oversee utility property and actions vis-à-vis reliability in Massachusetts is not limited to impacts only within the utility's service territory, rather it encompasses the impacts to the Commonwealth's citizens if the utility property is not maintained and operated responsibly;

(3) The reliability impacts at issue in this matter are specifically and exclusively due to the conditions, operation and maintenance of NGRID property over which the Department has full jurisdiction – Hull 1 and Hull 2;

(4) NGRID's broader reliability responsibilities are evidenced in their participation in the tightly integrated regional power grid, and as a signatory to the various ISO-NE documents that govern NGRID's participation in the regional market and bulk power system operations as a market participant and transmission owner; and

(5) NGRID is obligated to meet reliability standards under the Support Agreement and the Local Service Agreement and associated Schedule 21 with Hull.

9. Q. **WHAT, IN YOUR VIEW, IS THE SINGLE MOST EXPANSIVE AND IMPORTANT ASPECT OF THE DEPARTMENT'S SUPERVISORY AUTHORITY OVER REGULATED ELECTRIC UTILITIES IN MASSACHUSETTS.**

A. The single most important responsibility of electric utilities – and thus the single most important application of the Department's general supervisory authority over regulated electric utilities – is the provision of safe and reliable electric service to the Commonwealth's residents and businesses. It is difficult to

overstate how important this responsibility is, as evidenced by (1) the impacts of power outages on human health and safety, the provision of critical emergency services, and economic activity; (2) the specific attention to power system reliability in the laws passed by the Massachusetts Legislature; (3) the wide array of regulations and Orders of the Department that focus specifically and continuously on reliability performance; and (4) the comprehensive set of reliability plans and protocols in place at each utility in the Commonwealth.

To some extent, citizens take reliability for granted. But as the Department is well aware, reliability does not come automatically or easily. While relatively infrequent, short-duration outages may be inevitable and, for many, not more than a temporary inconvenience, longer-term and/or more frequent outages quickly introduce major health and safety risks, can interrupt the provision of critical protection, medical, and educational services, and disrupt the commercial operations of large and small businesses with significant economic impacts.

Under G.L. c. 164, § 76, the Department has broad supervisory authority over utility adherence to state laws and Department regulations, and more generally over the manner in which electric utilities provide electric service in Massachusetts.[5] At the very least, this supervisory authority requires the Department investigate and be informed about the condition and operation of all properties owned by the utilities and how their use affects the safety and convenience of the general public.

5 D.P.U. 94-158, at 41.

10. Q. SHOULD THE DEPARTMENT'S EXERCISE OF ITS GENERAL SUPERVISORY AUTHORITY OVER A UTILITY WITH RESPECT TO POWER SYSTEM RELIABILITY BE LIMITED *ONLY* TO THOSE IMPACTS WITHIN A COMPANY'S SERVICE TERRITORY?

A. No. The impact of an electric utility's investments in and operation and maintenance of its property within its service territory on its retail customers should be – and clearly is – a primary focus of the Department's Orders and regulations regarding the reliability of electric service. However, in my view it is not and should not be limited to this. The Department's general supervisory authority under Section 76 is focused on the safety and convenience of *the public*, not specifically the company's ratepayers. Moreover, it is a feature of the fully integrated and interconnected power system in New England that the condition and operation of electric utility property in Massachusetts affects the reliability of electric service both within and outside a utility's retail service territory. While retail service territory borders may provide a logical boundary for routine review of utility reliability performance, Department oversight authority must extend when necessary to any and all reliability impacts of company property and operations within the Commonwealth, and not just the safety and convenience of those members of the public that are within the company's retail service territory. The Department's general supervisory authority and specific oversight of power system reliability performance should be exercised with the broader public interest in mind, with an eye towards the reliability impact of company actions on *all* citizens and businesses in the Commonwealth.

11. Q. ARE THE RELIABILITY CONCERNS RAISED BY HULL RELATED TO THE CONDITION, OPERATIONS, AND MAINTENANCE OF ELECTRIC LINES OWNED AND OPERATED BY THE HMLP?

A. No, they are not. The reliability issues raised by Hull are not HMLP reliability performance issues – they are tied to the condition, operations, and maintenance of NGRID property in the state (i.e., Hull 1 and Hull 2). As noted earlier, the electric grid is a tightly interconnected system – company investments in and operation of their property have reliability implications that extend beyond the borders of their service territories. Yet in this case the frequent and long-duration outages experience in Hull in recent years (described in the Converse and Lemnios/Tokadjian Testimonies) have nothing to do with Hull's electric infrastructure. Nor are they only incidental to the occurrence of events in NGRID's (or any other neighboring electric company's) service territory. They are *directly and exclusively* related to the operation of Hull 1 and Hull 2, whose only purpose is to deliver electricity to the town of Hull under the Support Agreement and the Local Service Agreement and associated Schedule 21.

Thus, Hull 1 and Hull 2 are NGRID property located in the Commonwealth whose condition, operation and maintenance are having a direct impact on the reliability of electric service to the general public in the Commonwealth of Massachusetts. In this case, the affected public is the approximately 10,000 residents and businesses in the Town of Hull.

12. Q. ARE NGRID'S RESPONSIBILITIES TO MAINTAIN RELIABLE POWER SYSTEM OPERATIONS LIMITED TO THE SUPPORT AGREEMENT,

LOCAL SERVICE AGREEMENT SCHEDULE 21, AND THE LAWS AND REGULATIONS OF MASSACHUSETTS AND THE DEPARTMENT?

A. No, they are not. NGRID is one of many transmission owner/operators that participate in operation of the tightly interconnected New England bulk power system. As a transmission owner, NGRID is a signatory to the ISO-NE Participant's Agreement ("PA") and the Transmission Operating Agreement ("TOA"). NGRID is required to plan for, maintain, and operate its system in a manner consistent with the requirements of the TOA and the Open Access Transmission Tariff ("OATT" or "Tariff"), comply with reliability standards and requirements of the Northeast Power Coordinating Council ("NPCC") and the North American Electric Reliability Corporation ("NERC"), and generally operate and maintain its system under all of these agreements in accordance with the standard of Good Utility Practice.

13. Q. **PLEASE SUMMARIZE, IN RELEVANT PART, NGRID'S RESPONSIBILITIES UNDER THE LOCAL SERVICE AGREEMENT WITH HULL RELATED TO HULL 1 AND HULL 2.**

A. The operation of and charges for service on Hull 1 and Hull 2 are described in the Local Service Agreement between NGRID and Hull for Local Network Service pursuant to Schedule 21 of the OATT ("Local Service Agreement"). The Local Service Agreement states that "[t]he Transmission Customer agrees to supply information to the Transmission Owner that the Transmission Owner deems reasonably necessary in accordance with Schedule 21 and Good Utility Practice in

order for it to receive the requested service," and that "[t]he Transmission Owner agrees to provide and the Transmission Customer agrees to take and pay for service in accordance with the provisions of the Tariff and this Local Service Agreement." (Local Service Agreement, §§ I.4 & I.5).) Schedule 21 of the OATT for New England Power Company describes the terms and conditions of local network service, and delineates the responsibilities of the customer and the transmission provider. "Good Utility Practice" is used to describe performance expectations throughout the document. For example, Section 22.2 describes general conditions of the agreement, noting "…NEP or its New England Affiliate shall design, own, and maintain the facilities", and "... NEP shall use, or specify that the Transmission Customer's selected contractor use, standard equipment customarily employed by NEP or its New England Affiliate for its own system in accordance with Good Utility Practice in making the final interconnection." (Schedule 21-NEP, §22.2.)

14. Q. YOU HAVE MENTIONED THE STANDARD OF "GOOD UTILITY PRACTICE" AS USED IN THE LOCAL SERVICE AGREEMENT AND AS REQUIRED OF NGRID AS A TRANSMISSION OWNER IN PLANNING FOR, OPERATING, AND MAINTAINING ITS TRANSMISSION PROPERTY. COULD YOU PLEASE DESCRIBE WHAT IS MEANT BY "GOOD UTILITY PRACTICE"?

A. "Good Utility Practice" is a common, well-defined standard incorporated in electricity system contracts, agreements, and obligations, including contracts periodically subject to review by the Department and other state and federal

agencies, and in the explicit reliability-based obligations of utilities as members of regional and federal reliability organizations and councils.

In its 2004 Policy Statement, FERC presented its views on the use and interpretation of the Good Utility Practice standard, noting that "...the Commission interprets the term "Good Utility Practice" to include compliance with NERC reliability standards or more stringent regional reliability council standards. Accordingly, public utilities that own, control or operate Commission-jurisdictional transmission systems should operate their systems in accordance with Good Utility Practice as set forth in the Commission's pro forma OATT, including complying with NERC reliability standards."[6] FERC Order No. 888 defined "Good Utility Practice" in section 1.14 of its pro forma OATT as follows: "Any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the region."

This interpretation and definition of Good Utility Practice follows through to this day in the various NERC, NPCC, and ISO-NE documents that govern

6 107 FERC ¶ 61,052, page 9.

participation by and obligations of utilities, and the same definition thus flows through to Schedule 21 of the OATT and the use of the term in the context of the Local Network Service provided by NGRID to Hull under the Agreement. Specifically, Good Utility Practice is defined in the ISO-NE Market and Services Tariff (Definitions) in a nearly identical way, and that definition carries through to all ISO-NE documents to which NGRID is a signatory or participant (e.g., the PA and TOA):

""Good Utility Practice" shall mean any of the practices, methods, and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods, and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not limited to a single, optimum practice method or act to the exclusion of others, but rather is intended to include all acceptable practices, methods, or acts generally accepted in the region."

Section 3.06 of the TOA and Section II.15.2 of the OATT connect the standard of Good Utility Practice directly to the condition, operation and maintenance of bulk power system infrastructure in New England, including equipment that is designated "pool transmission facilities" for regional network service, and more generally all transmission facilities and associated reliability infrastructure.

Specifically, the OATT and the TOA establish various Participating Transmission Owner ("PTO") responsibilities related to the maintenance of

reliability in a manner consistent with Good Utility Practice: "From and after the Operations Date, each PTO shall, in accordance with Good Utility Practice … direct, physically operate, repair, and maintain its Transmission Facilities and Local Control Centers in accordance with this Agreement, applicable Law, and applicable Operating Procedures…"

Accordingly, the Good Utility Practice standard is a common, well-understood standard that is a critical element of utility obligations to plan for, develop, maintain, and operate power system infrastructure and associated equipment and rights of way to achieve and maintain the expected level of power system reliability. As a standard, it is not a highest or best-in-class performance expectation, but rather a level of reliability performance that utilities are expected to routinely achieve in serving customers. A failure to maintain reliability to customers to a level consistent with established standards of reliability or the reliability performance of most utilities facing similar conditions may be considered a failure to meet the Good Utility Practice standard in developing, operating and maintaining power system property.

IV. RELIABILITY IMPACT ON HULL

10. Q. HAVE YOU REVIEWED INFORMATION AND DATA ON THE RELIABILITY PERFORMANCE OF HULL 1 AND HULL 2?

A. Yes. I have reviewed the Converse Testimony related to the condition of, and the frequency and duration of outages on, Hull 1 and Hull 2, relative to reliability

standards and NGRID performance. I have also reviewed relevant portions related to outages and system reliability in the Lemnios/Tokadjian Testimony.

15. Q. IN YOUR VIEW, IS IT APPROPRIATE TO COMPARE NGRID'S RETAIL CUSTOMER RELIABILITY PERFORMANCE TO OUTAGE DATA FOR THE HULL 1 AND HULL 2 LINES?

A. Yes. Of course, I realize that HMLP is neither a regulated investor-owned utility nor a retail customer of NGRID, and thus the Department's reliability performance standards are not applicable to the condition and operation and maintenance of distribution system infrastructure owned and operated by HMLP. Yet I believe the reliability standards and NGRID's retail service performance are a useful and appropriate metric of comparison for the Department to evaluate the performance of NGRID with respect to property it owns and operates for service to Hull, and to answer two key questions in this matter: (1) Is NGRID adhering to a standard of Good Utility Practice – as required via the Local Service Agreement/Schedule 21 and as a PTO in the regional bulk power network – in its investment in and operation and maintenance of property in Massachusetts, even if that property is used to serve customers in another town? (2) Are the outages due to failures of Hull 1 and Hull 2 that affect approximately 10,000 Massachusetts citizens and businesses sufficient to warrant action by the Department to protect the public interest?

The comparison of performance based on outages is not different than what regularly occurs with the Department's review of various reliability metrics for the regulated utilities. NGRID has many circuits that serve various levels of

electricity demand within its retail service territory and reviews the performance of circuits serving levels of demand or populations less than that served via Hull 1 and Hull 2. The Department evaluates NGRID's reliability performance both on an aggregate basis and with reference to a comparison of individual circuits, requiring particular attention to "poor performing circuits."[7] Poor performing circuits are identified without reference to the size or location of load served, meaning the Department is comparing the same metrics across a wide range of circuit types and sizes.

Consequently, putting NGRID's performance with respect to Hull 1 and Hull 2 into proper context via comparison to NGRID's expectations of reliability performance and measurement of historical performance is an appropriate approach in this matter. Importantly, I am not recommending that the Department include the Hull 1 and Hull 2 circuit in its regular assessment of NGRID's reliability performance, or in the development and implementation of NGRID performance standards. Rather, I am suggesting that this comparison is a reasonable and appropriate basis and set of reliability metrics for evaluating the magnitude of reliability failures due to the condition, operation and maintenance of Hull 1 and Hull 2, and considering the merits of the petition submitted by Hull in this matter.

7 See, e.g., DPU 12-120-D, Investigation by the Department of Public Utilities on its own motion regarding the service quality guidelines established in Service Quality Standards for Electric Distribution Companies and Local Gas Distribution Companies, D.T.E. 99-84 (2001) and amended in Service Quality Standards for Electric Distribution Companies and Local Gas Distribution Companies, p. 20.

16. Q. PLEASE SUMMARIZE THE ANALYSIS AND FINDINGS IN THE CONVERSE TESTIMONY.

A. Mr. Converse reviews the recent outage rates in Hull due solely to failures on Hull 1 and Hull 2 relative to NGRID's performance in its own service territory, and observes that the outage rates and durations are well out of the norm relative to NGRID's service territory performance, and out of the norm of the performance of the electric utility industry more generally.[8] Considering the most recent year for which reliability performance has been reported, Mr. Converse found that the reliability performance of the NGRID property serving Hull – i.e., Hull 1 and Hull 2 – is worse than NGRID and industry reliability performance *by far*.[9] For example, Mr. Converse reports SAIFI and SAIDI average values for NGRID's Massachusetts service territory of 1.254 and 114.32, respectively, compared to values for Hull due to outages on Hull 1 and Hull 2 in 2020 of 6 (SAIFI) and 3,675 (SAIDI).[10] Mr. Converse concludes that based on his review of Hull 1 and Hull 2 and associated rights of way, and the realized reliability performance of that NGRID property relative to their service territory performance, NGRID has not met the standard of Good Utility Practice with respect to the condition and operation of Hull 1 and Hull 2.

8 Converse Testimony, page 12.

9 Converse Testimony, page 12.

10 Mr. Converse also reports multi-year average values for members of the American Public Power Association of 0.99 (SAIFI) and 60.02 (SAIDI). Converse Testimony, pages 10-12.

11. Q. WHAT WOULD BE THE LIKELY RESPONSE IF THE HULL 1 AND HULL 2 CORRIDER WERE A CIRCUIT WITHIN NGRID'S RETAIL SERVICE TERRITORY?

A. Based on Mr. Converse's analysis, if the Hull 1 and Hull 2 lines were included in NGRID's reliability performance assessment, NGRID's performance with respect to the reliability metrics would likely be worse. Moreover, it is possible that the Hull 1 and Hull 2 lines would in particular fail to meet the circuit-specific benchmarks CKAIDI and/or CKAIFI.[11] As a result, it is possible that NGRID would face penalties, and potentially requirements to expedite actions to address and improve upon the reliability performance of the Hull 1 and Hull 2 "circuit." By way of example, in NGRID's 2015 annual service quality report filed with the Department, NGRID reported failure to meet its CKAIFI metric due to a single circuit being in the top 5 percent of poor performing circuits for three years in a row, resulting in poor performing circuit penalties totaling approximately $3.4 million.[12]

Notably, while NGRID has reported penalties for property dedicated to serving their own retail customers, the performance levels leading to these results

11 CKAIDI stands for the Circuit Average Interruption Duration Index, and CKAIFI stands for the Circuit Average Interruption Frequency Index.

12 See DPU 16-SQ-10 through D.P.U. 16-SQ-14, Department of Public Utilities review of the 2015 Service Quality Reports of the Electric Distribution Companies, filed pursuant to Service Quality Standards for Electric Distribution Companies and Local Gas Distribution Companies, D.T.E. 04-116-B (2006) and D.T.E. 04-116-C (2007), p. 2, and National Grid, D.P.U 16-SQ-11; Massachusetts Electric Company d/b/a National Grid, cover letter to the NGRID 2015 Service Quality Report, March 1, 2016, p. 2.

represent a level of performance that is far better than that experienced in the Town of Hull, due solely to outages on Hull 1 and Hull 2.

17. Q. DO YOU BELIEVE THAT NGRID'S INVESTMENT IN AND OPERATION/MAINTENANCE OF HULL 1 AND HULL 2 SHOULD BE VIEWED AS MEETING THE GOOD UTILITY PRACTICE STANDARD?

A. No, I do not. The magnitude *and* frequency of outages in Hull in the recent past as reported in the Converse Testimony, due solely to the unexpected loss of Hull 1 and/or Hull 2, appear excessive and damaging to the 10,000 residents and businesses of an entire Massachusetts community. By this measure, NGRID has failed to meet reasonably acceptable reliability performance expectations relative to the critical infrastructure that it owns and operates, and that the Town of Hull is completely dependent on to maintain reliability for every single resident and business in the town.

The reasons for the outages, as described in the Converse Testimony, appear to relate to both the condition and type of infrastructure and the preventive maintenance and practices of NGRID over recent years.[13] The duration of some of the recent outages also calls into question NGRID's performance in terms of how quickly power was restored after outages on this "circuit."

The sheer impact of these outages, particularly relative to NGRID's performance in its own service territory, raises a host of critical questions for the Department to review related to NGRID's reliability performance and the

13 Converse Testimony, pages 8-9, 12-13.

incentives built into the service quality standards. What is behind this worse-than-average performance? Has NGRID invested sufficient time and resources to maintain, repair, and upgrade the infrastructure and rights of way of Hull 1 and Hull 2, particularly relative to other circuits and transmission/distribution system infrastructure owned by NGRID in Massachusetts? Is NGRID appropriately following emergency response and outage restoration procedures when events occur along the Hull 1/Hull 2 circuit? Has NGRID been appropriately responsive to the attempts by Hull to work with NGRID to resolve the poor performance, as discussed in the Lemnios/Tokadjian Testimony?[14] Do the measurement and penalty/incentive structures in the Department's service quality standards create any bias for NGRID to prioritize outage restoration within its own service territory and the maintenance and upgrade of property serving its own retail customers at the expense of the entire Town of Hull?

As noted above in Section III, Good Utility Practice is defined or described consistently across regulatory decisions and in various agreements. The standard of Good Utility Practice does not seek out the lowest common denominator – the performance expectation is that of "…a significant portion of the electric utility industry during the relevant time period…" The management obligation is "…the exercise of reasonable judgment" and actions that are "consistent with good business practices, reliability, safety and expedition."

The frequency and duration of outages in Hull reported in the Converse Testimony associated with the condition, operation and maintenance of NGRID's

14 Lemnios/Tokadjian Testimony, pages 15-16.

property serving Hull cannot represent a level of performance of a "significant portion" of the electric industry, in Massachusetts, regionally, or nationally. The fact that these outages affect an entire town – including emergency service, health care, educational and public safety operations, and the business community – means the Department should not find that NGRID's performance with respect to this property is "consistent with good business practices, reliability, safety and expedition."

18. **Q. AS A FORMER COMMISSIONER, HOW DO YOU THINK THE DEPARTMENT SHOULD ACT IN RESPONSE TO THE PETITION OF HULL?**

A. At a minimum, there are important questions that must be answered with respect to the condition, operation and maintenance of NGRID's property that serves Hull. In my view, in order to protect the public interest, the Department has the right, if not the obligation, to investigate the root causes of excessive outages and delayed restoration on NGRID's property that affects an entire community in the Commonwealth.

If based on this investigation the Department finds that NGRID's performance fails to meet the reliability standards expected and required of NGRID in its own retail service territory, the Department can look to how it enforces these service quality standards within NGRID's own service territory to determine the appropriate actions to take with respect to its performance on Hull 1 and Hull 2, including by way of example, penalties or fines (and/or compensation to HMLP), expedited action to maintain and upgrade the Hull 1 and Hull 2 equipment and

rights of way, the establishment of specific service quality and emergency restoration requirements vis-à-vis Hull 1 and Hull 2, and any other actions the Department deems appropriate, such as the compensation Hull seeks, in light of economic, health and safety impacts of outages in the Town of Hull.

V. CONCLUSION

12. Q. PLEASE PROVIDE A SUMMARY OF THE CONCLUSIONS YOU DRAW WITH RESPECT TO THE PETITION OF HULL IN THIS MATTER.

A. Power system reliability is vital for the health and safety of the Commonwealth's citizens and support of the state's economy. Failure by any utility to discharge its reliability obligations is a violation of the public interest and warrants investigation and action by the Department. In this testimony, I discuss the reliability performance of Hull 1 and Hull 2 relative to the Department's standards for electric utility reliability performance, and relative to NGRID's own performance in its distribution service territory. Based on my review of this information and data, I conclude that NGRID's reliability performance with respect to the condition, operations and maintenance of Hull 1 and Hull 2 is poor at best, and likely inconsistent with the standard of Good Utility Practice.

As a former Commissioner, I can understand that the Commission may have some reluctance to act on a matter that relates to the citizens and businesses of a town not within NGRID's service territory. Yet in this case, because Hull 1 and Hull 2 are the only path for power into Hull and 10,000 Massachusetts citizens are affected, it is impossible to ignore: (1) the broader obligation of NGRID to ensure its actions do not harm the safety and convenience of the general public; (2) the

fundamentally interconnected nature of the electric system in Massachusetts and New England; and (3) the public health, safety and economic risks borne by the Town of Hull due solely to the condition, operation and maintenance of NGRID property in Massachusetts.

In consideration of these factors, I recommend that the Department act swiftly on Hull's request, take actions immediately to ensure the reliability of electric service to Hull's residents and businesses, and take any other actions that the Commission deems appropriate, including compensation to Hull, based upon its investigation in this matter.

13. Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

IN THE MATTER OF A PETITION OF THE TOWN OF HULL, ACTING BY AND THROUGH THE HULL MUNICIPAL LIGHT PLANT, AND THE HULL MUNICIPAL LIGHT PLANT TO INITIATE AN INVESTIGATION PURSUANT TO G. L. c.164, §76 INTO THE MANNER IN WHICH NEW ENGLAND POWER COMPANY AND MASSACHUSETTS ELECTRIC COMPANY DBA NATIONAL GRID MAINTAIN THEIR ELECTRIC LINES AND RIGHT OF WAY SERVING THE TOWN OF HULL	D.P. U. No_____

AFFIDAVIT OF PAUL J. HIBBARD

I, Paul J. Hibbard, do attest and swear to the following:

1. I am a Principal at Analysis Group, Inc. ("AGI"), an economic, finance and strategy consulting firm headquartered in Boston, Massachusetts, where I work on energy and environmental economic and policy consulting. My business address is 111 Huntington Avenue, 14th Floor, Boston, Massachusetts 02199.
2. I certify that the Pre-filed Direct Testimony and Attachment of Paul J. Hibbard, as filed in this docket, were prepared by me or under my direct supervision and control, and that the representations made in my direct testimony and the attachment thereto are true and accurate to the best of my knowledge.

Signed under the pains and penalties of perjury,

Paul J. Hibbard

Dated: November 1, 2021

Attachment 1
Curriculum Vitae & Testimony

Paul J. Hibbard
Principal

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111 Huntington Ave.
Fourteenth Floor
Boston, MA 02199

EDUCATION

Ph.D. program (coursework), Nuclear Engineering, University of California, Berkeley

M.S. in Energy and Resources, University of California, Berkeley
Thesis: Safety and Environmental Hazards of Nuclear Reactor Designs

B.S. in Physics, University of Massachusetts, Amherst

PROFESSIONAL EXPERIENCE

2010 - Present Analysis Group, Inc., Boston, MA
Principal
Vice President

2007 - 2010 MA Department of Public Utilities, Boston, MA
Chairman
Member, Energy Facilities Siting Board
Manager, New England States Committee on Electricity
Treasurer, Executive Committee, Eastern Interconnect States' Planning Council
Representative, New England Governors' Conference Power Planning Committee
Member, NARUC Electricity Committee, Procurement Work Group

2003 - 2007 Analysis Group, Inc., Boston, MA
Vice President
Manager ('03 – '05)

2000 - 2003 Lexecon Inc., Cambridge, MA
Senior Consultant
Consultant ('00 – '02)

1998 - 2000 Massachusetts Department of Environmental Protection, Boston, MA
Environmental Analyst

1991 - 1998 Massachusetts Department of Public Utilities, Boston, MA
Senior Analyst, Electric Power Division

1988 - 1991 University of California, Berkeley, CA
Research Assistant, Safety/Environmental Factors in Nuclear Designs

TESTIMONY IN THE LAST FOUR YEARS

Direct Testimony of Paul J. Hibbard before the Commonwealth of Massachusetts Department of Public Utilities on behalf of the Massachusetts Municipal Wholesale Electric Company in Docket No. D.P.U. 21-29, February 2021.

Rebuttal Testimony of Paul J. Hibbard before the Pennsylvania Public Utility Commission on behalf of PECO Energy Company – Gas Division, Docket No. R-2020-3018929, January 19, 2021.

Testimony of Paul J. Hibbard before Commonwealth Edison on issues associated with a request for a certificate of public convenience and necessity by NextEra related to the proposed acquisition of the transmission assets of Rochelle Municipal Utilities (2020).

Rebuttal Testimony on Reopening of Paul J. Hibbard before the Illinois Commerce Commission on Behalf of Commonwealth Edison, Docket No. 18-0843, May 31, 2019.

Pre-filed Testimony of Paul J. Hibbard before the Connecticut Siting Council on behalf of NTE Connecticut LLC, Docket No. 470, January 18, 2019.

Direct and rebuttal testimonies of Paul J. Hibbard before the New Hampshire public Utility Commission on the need for and economic and environmental impacts of proposed Liberty Utilities Granite Bridge pipeline and LNG project (2019).

Post-Settlement Testimony of Paul J. Hibbard before the Maryland Public Service Commission on behalf of The Applicants, Case No. 9449, January 5, 2018.

Rebuttal and post-settlement testimonies of Paul J. Hibbard before District of Columbia and Maryland public service commissions on the potential environmental impacts of the proposed merger between AltaGas and WGL Holdings (2017-2018).

Rebuttal Testimony of Paul J. Hibbard before the Public Service Commission of the District of Columbia on behalf of AtlaGas, Formal Case No. 1142, October 27, 2017.

Testimony of Paul J. Hibbard before Vermont Gas on the prudence of Vermont Gas' decisions and investments with respect to the Addison natural gas project (2017).

Rebuttal Testimony of Paul J. Hibbard before the State of Vermont Public Service Board on behalf of Vermont Gas Systems Inc., Docket Nos. 8698 and 8710, September 26, 2016.

Affidavit of Paul J. Hibbard before the Federal Energy Regulatory Commission, Docket No. ER16-1751-000, May 20, 2016.

PUBLICATIONS AUTHORED IN THE LAST TEN YEARS

Paul J.Hibbard, Todd Schatzki, Charles Wu, Christopher Lopp, Matthew Lind, Kiernan McInerney and Stephanie Villarreal, *Independent Consultant Study to Establish New York ICAP Demand Curve Parameters for the 2021/2022 through 2024/2025 Capability Years – Final Report,* September 9, 2020.

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Pavel G. Darling and Paul J. Hibbard, *Economic Impact of Stimulus Investment in Advanced Energy, 2020.*

Paul J. Hibbard, Charles Wu, Hannah Krovetz, Tyler Farrell and Jessica Landry, *Climate Change Impact and Resilience Study – Phase II: An Assessment of Climate Change Impacts on Power System Reliability in New York State,* 2020.

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Susan F. Tierny and Paul J. Hibbard, *Clean Energy in New York State: The Role and Economic Impacts of a Carbon Price in NYISO's Wholesale Electricity Markets,* October 2019.

Susan F. Tierney, Paul J. Hibbard with Benjamin Dalzell, Grace Howland, Jonathan Baker, Tom Beckford, Sarah Centanni, Asie Makarova, and Scott Ario, *Vehicle Fuel-Economy and Air Pollution Standards: A Literature Review of the Rebound Effect,* June 28, 2018.

Paul J. Hibbard, Susan F. Tierney, and Pavel G. Darling, *An Expanding Carbon Cap-and-trade Regime? A Decade of Experience with RGGI Charts a Path Forward,* The Electricity Journal, June 2018.

Paul J. Hibbard., Susan F. Tierney, Pavel G. Darling, and Sarah Cullinan, *The Economic Impacts of the Regional Greenhouse Gas Initiative on Nine Northeast and Mid-Atlantic States*, review of RGGI's third three-year compliance period (2015–2017), April 2018.

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Susan F. Tierney, Paul J. Hibbard and Ellery Berk, *RGGI and CO2 Emissions Trading Under the Clean Power Plan: Options for Trading Among Generating Units in RGGI and Other States*, July 12, 2016.

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Paul J. Hibbard, *Net Metering in the Commonwealth of Massachusetts: A Framework for Evaluation*, May 2015.

Paul Hibbard, Todd Schatzki, Craig Aubuchon, and Charles Wu, *NYISO Capacity Market: Evaluation of Options*, Report for the New York Independent System Operator, May 2015.

Paul J. Hibbard and Andrea M. Okie, *Ohio's Electricity Future: Assessment of Context and Options*, Report of Advanced Energy Economy, April 2015.

Susan Tierney, Paul Hibbard, and Craig Aubuchon, *Electric System Reliability and EPA's Clean Power Plan: The Case of PJM*, Report for the Energy Foundation, March 16, 2015.

Susan Tierney, Paul Hibbard, and Craig Aubuchon, *Electric System Reliability and EPA's Clean Power Plan: Tools and Practices*, Report for the Energy Foundation, February, 2015.

Andrea M. Okie, Paul J. Hibbard, and Susan F. Tierney, *Tools States Can Utilize for Managing Compliance Costs and the Distribution of Economic Benefits to Consumers under EPA's Clean Power Plan*, Electricity Forum, February 2015.

Paul J. Hibbard, Katherine A. Franklin, and Andrea M. Okie, *The Economic Potential of Energy Efficiency*, Report for the Environmental Defense Fund, December 2014.

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Hibbard, Paul J., Susan F. Tierney, and Pavel G. Darling, *Economic Impact of the Green Communities Act in the Commonwealth of Massachusetts: Review of the Impacts of the First Six Years*," March 4 2014.

Paul J. Hibbard and Andrea Okie, *Crediting Greenhouse Gas Emission Reductions from Energy Efficiency Investments: Recommended Framework for Proposed Guidance on Quantifying Energy Savings and Emission Reductions in Section 111(d) State Plans Implementing the Carbon Pollution Standards for Existing Power Plants*, Report for Environmental Defense Fund, March 2014.

Hibbard, Paul, Steve Carpenter, Pavel Darling, Margaret Reilly, and Susan Tierney, *Project Vigilance: Functional Feasibility Study for the Installation of Ambri Energy Storage Batteries at Joint Base Cape Cod*, Report for demonstration project under the MassInnovate Program of the Massachusetts Clean Energy Center, February 2014.

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