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PUBLIC UTILITIES COMMISSION

September 1, 2016

42 Weybosset Street
Providence
Rhode Island 02903
401 626.4839
401 753.6306 FAX

Luly E. Massaro, Clerk
RI Public Utilities Commission
89 Jefferson Blvd.
Warwick, RI 02888

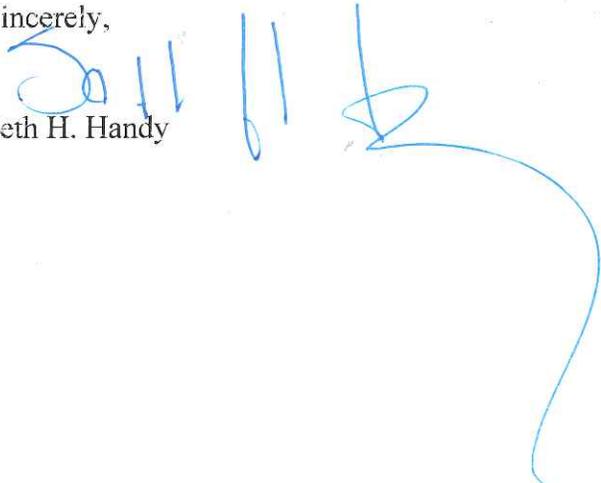
**Re: In Re: Joint Petition of ISM Solar Development, LLC and The Pascoag
Utility District**

Dear Ms. Massaro:

I have enclosed the original and nine copies of ISM's Response to the
PUC's First Set of Data Requests.

Thank you for your assistance with this filing.

Sincerely,


Seth H. Handy

Enc.

**STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
PUBLIC UTILITIES COMMISSION**

JOINT PETITION OF ISM SOLAR :
DEVELOPMENT, LLC, and : **DOCKET NO. 4636**
THE PASCOAG UTILITY DISTRICT :

**ISM SOLAR DEVELOPMENT, LLC'S REPLY TO
COMMISSION'S FIRST SET OF DATA REQUESTS
September 1, 2016**

COMM-1-1 If known, please identify the negotiated price and term of the agreement between Pascoag Utility District (Pascoag) and ISM Solar Development, LLC (ISM Solar). If the price and term are not known at this time, identify a date by when they will be determined.

Response: There is no agreement currently and there is no fixed date for determination.

COMM-1-2 In the event that Pascoag and ISM Solar cannot come to an agreement regarding price and term of the agreement, what is the proposed remedy.

Response: ISM Solar hopes to be able to reach an economic agreement with Pascoag or find another way to structure an agreement with Pascoag and/or National Grid that provides suitable economics for the development of this site. The current proposal to pay for two interconnections and sell .5MW of the project's output at \$.07/kWh is not economically viable. The project's quoted interconnection costs are far above those determined to be economic in the REG ceiling price model and the price of \$.07/kWh is far below the REG ceiling price, a price developed from a model designed to produce cost effective but sustainable economics for the development of solar projects of this size. If there is no flexibility on these matters, ISM may ask for the Commission's authorization to simply interconnect with National Grid as addressed in the feasibility study, since the boundaries of the service territories are not documented anywhere and National Grid has no objection to the interconnection sought in this Petition.

COMM-1-3 Provide a copy of the agreement between Pascoag and ISM Solar.

Response: There is no agreement currently.

COMM-1-4 Provide a copy of the agreement between ISM Solar and National Grid.

Response: There is no agreement currently beyond the interconnection feasibility and impact study agreements.

COMM-1-5 Please identify and specify what are “any costs for the interconnection” referred to in paragraph 2 of the Conclusion and Requested Relief section of the Petition.

Response: Pascoag has provided ISM Solar with an estimate (dated 07/26/2016) of \$121,345.52 for labor, transportation, and materials to interconnect to their electric power system. National Grid previously provided an estimate in the Feasibility Study dated 05/20/2015 of \$456,767. It was for a larger system; \$307,100 of that cost was for direct transfer trip, if required to prevent islanding (to be determined in the ISRDG).

COMM-1-6 Identify the property owner of the site where the 2MW solar system will be located.

Response: The property is owned by Rachel M. Sgaggero of 110 Black Star Road, Burrillville, RI 02839, and Benito J. Sgaggero and Rebecca K. Sgaggero, both of 145 Black Star Road, Burrillville, RI 02839.

COMM-1-7 Identify the property owner(s) whose property will be crossed or affected by the interconnection with National Grid’s and Pascoag’s facilities.

Response: No other properties will be crossed or affected.

COMM-1-8 Please describe any upgrades that will be required to either Pascoag’s or National Grid’s existing facilities to interconnect to either of these two utilities.

Response: See the Feasibility Study as it pertains to National Grid’s facilities. Pascoag will extend two phases down Lapham Farm Road and require similar protection equipment.

COMM-1-9 Please identify who will bear the cost of any upgrades required.

Response: ISM Solar will bear all appropriate costs of interconnection assessed to ISM Solar.

COMM-1-10 Please provide a detailed map or sketch of where the project is located in Pascoag’s service territory including the proposed areas of interconnection.

Response: See the enclosed site survey by DiPrete Engineering dated 05/29/2015. The interconnection to Narragansett Electric’s infrastructure would be on the northeast corner of the property near the pole labeled N.E.Co. 302. The

interconnection to Pascoag's service territory would also be at the northern boundary of the property on Lapham Farm Road.

COMM-1-11 In feet or miles, whichever is appropriate, identify the distance between the project location and Narragansett Electric's service territory.

Response: There is no clear, record indication of the location of Pascoag and National Grid's service territories in this location. That is presumably why National Grid approved the feasibility of interconnecting this project with its system and consents to interconnecting this project.

COMM-1-12 In feet or miles, whichever is appropriate, identify the distance between the project location and the proposed interconnection point on Narragansett Electric's infrastructure.

Response: Narragansett Electric's infrastructure is on the corner of the property on which this project will be located, approximately 200 feet from the project location.

COMM-1-13 Provide a copy of the Feasibility Study.

Response: The Feasibility Study is enclosed.

COMM-1-14 Please describe in detail how ISM Solar intends to connect to National Grid's Electric Power System.

Response: See Feasibility Study.

Pre-Application Report	Applicant:	ISM Solar Solutions, LLC		
	Pre-Application Request Date:	09/13/2014	Preparation Date:	09/25/2014
	Prepared by:	Andy Garsils	Revision # (if any):	0

I. Executive Summary:

- A. **Interconnection Application:** The Applicant (noted above), has submitted a request for a Pre-Application Report (Report) for the interconnection of a generation system (located at the proposed location(s) noted below) to the National Grid (Company) Electric Power System (EPS).
- B. **Pre-Application Process:** The proposed location was reviewed (as per the Standards for Interconnecting Distributed Generation referenced below) to: (1) determine the characteristics of the existing Company EPS near the proposed location(s), (2) identify the aggregate amount of other proposed and existing generation capacity connected to the nearby Company EPS, and (3) identify other potential system constraints or critical items that may impact the proposed generation system(s).
- C. **Further Inquiries:** All additional questions and comments related to this report should be directed to National Grid's Distributed Generation Services email account: Distributed.Generation@nationalgrid.com.

II. Proposed Location Information:

The proposed location information provided in the table below is based on the information provided by the Applicant (i.e. Interconnecting Customer) in the **Exhibit B** - Pre-Application Report Form, which has been attached to this Report.

Table of Proposed Location Information		Proposed kW(AC):	1,000	Phase:	three
Proposed Energy Source:	Solar	Existing Account (if applicable):			
Street Address:	600 Broncos Hwy				
City:	Burrillville	State:	RI	Zip Code:	02839
GPS (North):	41.941967,	GPS (West):	71.660855		

III. The Company's Electric Power System (EPS):

- A. As required by the Standards for Interconnecting Distributed Generation (referenced below), the Company must identify feeders within ¼ mile of the proposed interconnection site. Since many locations may not have any adequate feeders within ¼ mile, the Company may elect to provide information for the nearest adequate feeder(s) to the proposed location.

Table of Information for Nearest Feeder					
Feeder Number:	53-127W41	Radial or Network?	radial		
Substation:	Enasonville	Voltage at Substation:	13.8 kV		
Voltage (near location):	13.8 kV	Phase (near location):	three		
Distance to three-phase (if not within 1/4 mile of proposed location):					
DG on Feeder:	47 kW	Pending DG:	45 kW	Existing DG:	2 kW
<i>Included in total above:</i>		<i>Pending PV:</i>	45 kW	<i>Existing PV:</i>	2 kW

Table of Information for Second Nearest Feeder (if available)					
Feeder Number:		Radial or Network?			
Substation:		Voltage at Substation:			
Voltage (near location):		Phase (near location):			
Distance to three-phase (if not within 1/4 mile of proposed location):					
DG on Feeder:		Pending DG:		Existing DG:	
<i>Included in total above:</i>		<i>Pending PV:</i>		<i>Existing PV:</i>	

B. Other Known System Constraints:

1. Recent changes in the **Massachusetts net metering rules** may have further restrictions regarding the size of a distributed generation system that can be offered Net Metering Services on any one single parcel of land. Refer to: <http://www.env.state.ma.us/dpu/docs/electric/11-11/82412dpuord.pdf>

2. A conceptual grade cost estimate of the required system modifications will be determined during the System Impact Study (SIS). The cost for line extensions / re-conductoring of radial feeders can approach or exceed \$500,000/mile depending on the level of complexity. State and Federal taxes apply to payments for system modifications, including feeder line extensions. The Point of Interconnection, circuit characteristics, and/or other projects may affect feasibility of installing the proposed generation capacity on this circuit at the proposed location. Also, the available distributed generation capacity is open to other project proponents unless and until a complete application is received.

3. Additional system constraints particular to the proposed location (if applicable):

Three phase is present at / or adjacent to the site.

Approximate distance to three phase from site: n/a

There is no other three phase feeder available within 1/4 mile from the site.

IV. References:

A. National Grid's **Massachusetts Distributed Generation** Websites:

1. Commercial: http://www.nationalgridus.com/masselectric/business/energyeff/distributed_generation.asp

2. Residential: http://www.nationalgridus.com/masselectric/home/energyeff/distributed_generation.asp

B. National Grid's Nantucket Distributed Generation Websites:

1. Commercial: http://www.nationalgridus.com/nantucket/business/energyeff/distributed_generation.asp

2. Residential: http://www.nationalgridus.com/nantucket/home/energyeff/distributed_generation.asp

C. National Grid's Massachusetts Standards for Interconnecting Distributed Generation:

http://www.nationalgridus.com/non_html/Interconnect_stds_MA.pdf

D. Design Standards:

1. ESB 756 (Appendix C) - Requirements for Parallel Generation (Massachusetts):

http://www.nationalgridus.com/non_html/shared_constr_esb756.pdf

2. ESB 750 - Specifications for Electrical Installations:

http://www.nationalgridus.com/non_html/shared_constr_esb750.pdf

3. National Grid's Phone Line Installation Guide:

http://www.nationalgridus.com/non_html/Expedited%20Standard%20Interconnection/Phone%20Line%20Installation.pdf

E. Other Guidance Documents:

1. National Grid's Massachusetts Distributed Generation QuickGuide:

http://www.nationalgridus.com/non_html/MA_DG_Design_QuickGuide.pdf

2. National Grid's Witness Test Procedure Guideline:

http://www.nationalgridus.com/non_html/Expedited%20Standard%20Interconnection/NGrid%20Witness%20Test%20Guidelines%20Feb%202012.pdf

The Narragansett Electric Company
Standards for Connecting Distributed Generation

Exhibit E – Impact Study or ISRDG Agreement

This Agreement, dated June 16, 2015, is entered into by and between ISM Solar Burrillville, LLC (“Interconnecting Customer”) and the Company, for the purpose of setting forth the terms, conditions and costs for conducting an Impact Study relative to the Standard Process as defined in Section 1.0 and outlined in Section 3.0 of the Interconnection Tariff. This Impact Study pertains to Application Number 19238010 (the Interconnecting Customer’s application ID number).

1. The Interconnecting Customer agrees to provide, in a timely and complete manner, all additional information and technical data necessary for the Company to conduct the Impact Study not already provided in the Interconnecting Customer’s application.
2. All work pertaining to the Impact Study that is the subject of this Agreement will be approved and coordinated only through designated and authorized representatives of the Company and the Interconnecting Customer. Each party shall inform the other in writing of its designated and authorized representative, if different than what is in the application.
3. Where there are other potentially Affected Systems, and no single Party is in a position to prepare an Impact Study covering all potentially Affected Systems, the Company will coordinate but not be responsible for the timing of any additional studies required to determine the impact of the interconnection request on other potentially Affected Systems. The Interconnecting Customer will be directly responsible to the potentially Affected System operators for all costs of any additional studies required to evaluate the impact of the interconnection on the potentially Affected Systems. The Company will not proceed with this Impact Study without the Interconnecting Customer’s consent to have the other studies conducted.
4. If the Company determines, in accordance with Good Utility Practice, that the System Modifications to the Company EPS are not substantial, the Impact Study will determine the scope and cost of the modifications. If the Company determines, in accordance with Good Utility Practice, that the System Modifications to the Company EPS are substantial, the Impact Study will produce an estimate for the modification costs (within $\pm 25\%$) and a Detailed Study Agreement and its estimated cost.
5. Impact Study, together with any additional studies contemplated in Paragraph 3, shall form the basis for the Interconnecting Customer’s proposed use of the Company EPS and shall be furthermore utilized in obtaining necessary third-party approvals of any required facilities and requested distribution services. The Interconnecting Customer understands and acknowledges that any use of study results by the Interconnecting Customer or its agents, whether in preliminary or final form, prior to NEPOOL 18.4 approval, should such approval be required, is completely at the Interconnecting Customer’s risk.
6. The Impact Study fee of \$10,000.00 (except as noted below) is due in full prior to the execution of the Impact Study. For a Renewable Interconnecting Customer the ISRDG Study fee is as per Table 2 in Section 3.5 of the interconnection tariff.
7. Final Accounting. Upon request by the Interconnecting Customer, the Company within ninety (90) business days after completion of the construction and installation of the System Modifications described in an attached exhibit to the Interconnection Service Agreement, shall provide Interconnecting Customer with a final accounting report of any difference between (a) Interconnecting Customer’s cost responsibility under the Interconnection Service Agreement for the actual cost of such System Modifications, and (b) Interconnecting Customer’s previous aggregate payments to the Company for such System Modifications. To the extent that Interconnecting Customer’s cost responsibility in the Interconnection Service Agreement exceeds Interconnecting Customer’s previous aggregate payments, the Company shall invoice Interconnecting Customer and Interconnecting Customer shall make payment to the Company within forty-five (45) days. To the extent that

The Narragansett Electric Company
Standards for Connecting Distributed Generation

Interconnecting Customer's previous aggregate payments exceed Interconnecting Customer's cost responsibility under this agreement, the Company shall refund to Interconnecting Customer an amount equal to the difference within forty-five (45) days of the provision of such final accounting report.

8. In the event this Agreement is terminated for any reason, the Company shall refund to the Interconnecting Customer the portion of the above fee or any subsequent payment to the Company by the Interconnecting Customer that the Company did not expend or commit in performing its obligations under this Agreement. Payments for work performed shall not be subject to refunding except in accordance with Paragraph 11 below.
9. Nothing in this Agreement shall be interpreted to give the Interconnecting Customer immediate rights to wheel over or interconnect with the Company's EPS.
10. Except as precluded by the laws of the State of Rhode Island and the Providence Plantations, Interconnecting Customer and Company shall each indemnify, defend and hold the other, its directors, officers, employees and agents (including, but not limited to, affiliates and contractors and their employees), harmless from and against all liabilities, damages, losses, penalties, claims, demands, suits and proceedings of any nature whatsoever for personal injury (including death) or property damages to unaffiliated third parties that arise out of, or are in any manner connected with, the performance of this Agreement by that party, except to the extent that such injury or damages to unaffiliated third parties may be attributable to the negligence or willful misconduct of the party seeking indemnification.

Notwithstanding the foregoing, the Interconnecting Customer hereby waives recourse against the Company and its Affiliates for, and releases the Company and its Affiliates from, any and all liabilities arising from or attributable to incomplete, inaccurate, or otherwise faulty information supplied by the Interconnecting Customer. Moreover, with respect to an ISRDG provided to a Renewable Interconnecting Customer, the Company may not be held liable or responsible if the actual costs exceed the estimate as long as the estimate was provided in good faith and the interconnection was implemented prudently the Company.
11. If either party materially breaches any of its covenants hereunder, the other party may terminate this Agreement by serving notice of same on the other party to this Agreement.
12. This agreement shall be construed and governed in accordance with the laws of the State of Rhode Island and the Providence Plantations.
13. All amendments to this Agreement shall be in written form executed by both Parties.
14. The terms and conditions of this Agreement shall be binding on the successors and assigns of either Party.
15. This Agreement will remain in effect for a period of up to two years from its effective date.
16. This Agreement may be terminated under the following conditions.
 - a) The Parties agree in writing to terminate the Agreement.
 - b) The Interconnecting Customer may terminate this agreement at any time by providing written notice to Company.
 - c) The Company may terminate this Agreement if the Interconnecting Customer either: (1) has not paid the fee or, (2) has not responded to requests for further information in accordance with provisions in the Interconnection Tariff.

The Narragansett Electric Company
Standards for Connecting Distributed Generation

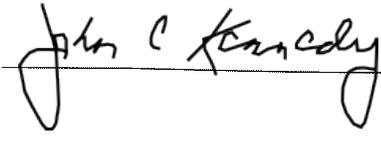
Interconnecting Customer:

Narragansett Electric Company d/b/a National Grid:

Name: Michael Lucini
Title: Program Mgr.
Date: 6/16/15

Name: John C. Kennedy
Title: Lead Technical Consultant
Date: June 16, 2015

Signature: 

Signature: 

Legend

NOT ALL ITEMS SHOWN WILL APPEAR ON THE SURVEY

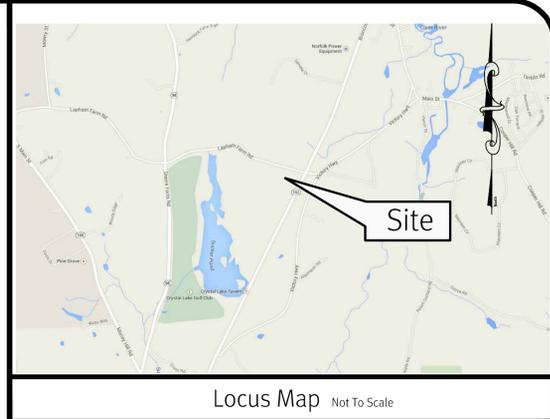
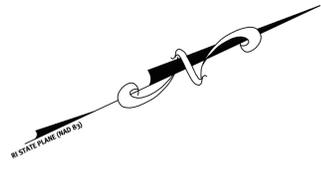
BUILDING		▲/△	NAIL FOUND/SET
ASPHALT		●/◎	DRILL HOLE FOUND/SET
AP	ASSESSOR'S PLAT	■/□	BOUND FOUND/SET
N/F	NOW OR FORMERLY	○	SIGN
(D)	DEED	⊙	BOLLARD
(M)	MEASURED	⊗	SOIL EVALUATION
(C)	CALCULATED	⊕	CATCH BASIN
(CA)	CHORD ANGLE	⊖	DOUBLE CATCH BASIN
HC	HANDICAPPED	⊙	DRAINAGE MANHOLE
	PROPERTY LINE	⊕	FLARED END SECTION
	ASSESSOR'S LINE	⊖	GUY POLE
	TREELINE	⊙	EMH ELECTRIC MANHOLE/HANDHOLE
	GUARDRAIL	⊕	UTILITY/POWER POLE
	FENCE	⊖	LIGHTPOST
	RETAINING WALL	⊙	SEWER/SEPTIC MANHOLE
	STONE WALL	⊕	SEWER VALVE
-2-	MINOR CONTOUR LINE	⊖	CLEANOUT
-10-	MAJOR CONTOUR LINE	⊕	HYDRANT
W	WATER LINE	⊖	IRRIGATION VALVE
S	SEWER LINE	⊕	WATER VALVE
SFM	SEWER FORCE MAIN	⊖	WELL
G	GAS LINE	⊕	MONITORING WELL
E	ELECTRIC LINE	⊖	UNKNOWN MANHOLE
OHW	OVERHEAD WIRES	⊕	GAS VALVE
D	DRAINAGE LINE	⊖	WETLAND FLAG
		⊕	BENCH MARK
		⊖	BUSH
		⊕	TREE

General Notes

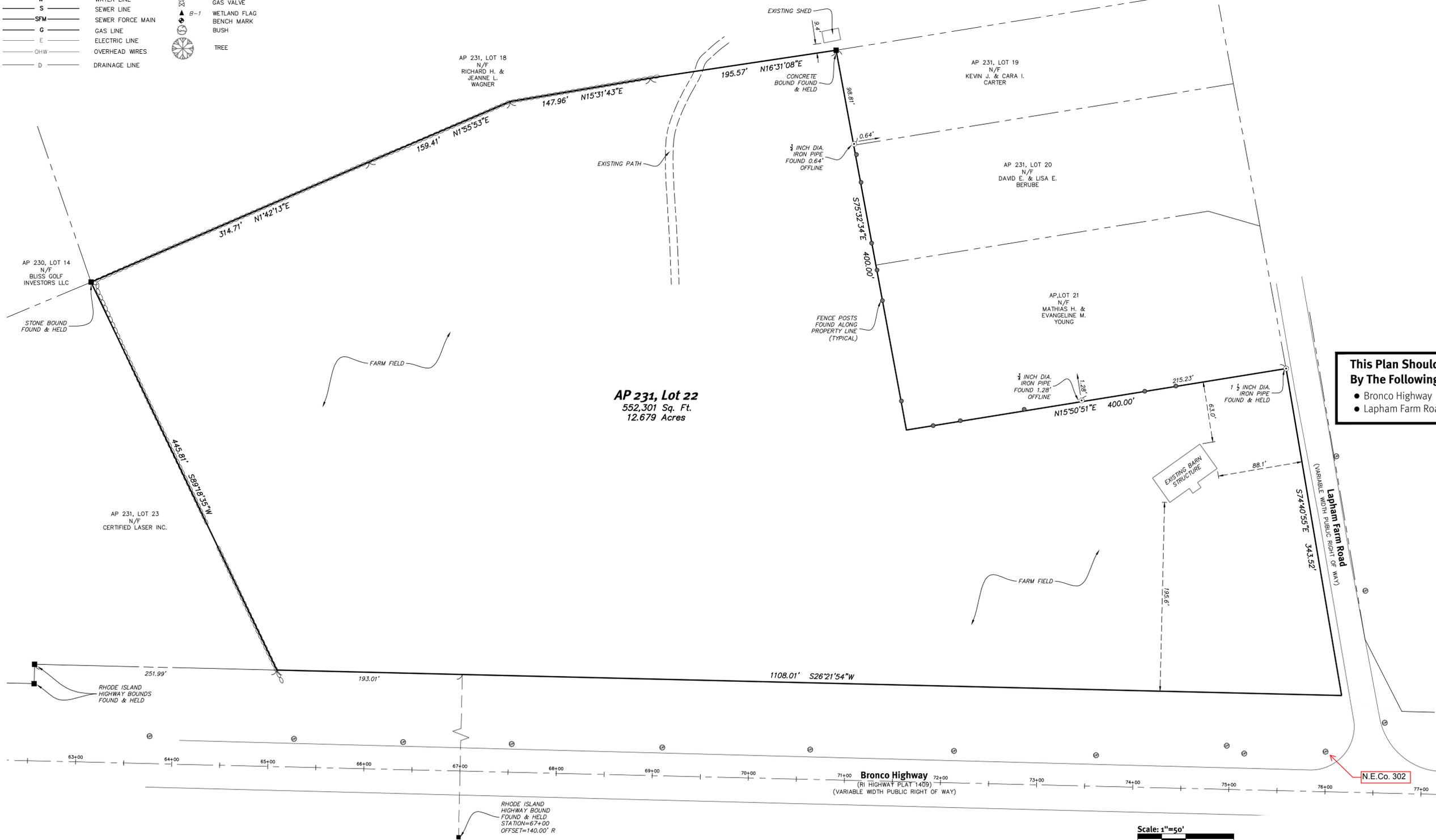
1. THE PARCEL IS FOUND ON ASSESSOR'S PLAT 231, LOT 22 IN THE TOWN OF BURRILLVILLE, PROVIDENCE COUNTY, RHODE ISLAND.
2. THE OWNER PER DEED BOOK 773, PAGE 187 IS BENITO J. & REBECCA K. SGAGGERO.
3. THE PARCEL IS LOCATED IN ZONE X PER FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP 44007C0135G, DATED MARCH 2, 2009.
4. THE PARCEL IS ZONED GC PER THE ASSESSOR'S ONLINE DATABASE. PLEASE CONTACT THE ZONING DEPARTMENT FOR ANY ADDITIONAL INFORMATION OR FOR A CERTIFICATE OF ZONING.
5. THERE WERE NO CEMETERIES, GRAVE SITES AND OR BURIAL GROUNDS OBSERVED WITHIN THE LIMITS OF THE SURVEY.
6. FIELD SURVEY PERFORMED BY DIPRETE ENGINEERING ON FEBRUARY 20 & 25 AND MAY 15, 2015.
7. ALL UNDERGROUND UTILITIES SHOWN ON THIS PLAN HAVE BEEN LOCATED FROM FIELD SURVEY OBSERVATIONS ONLY TOGETHER WITH EXISTING PLANS BY OTHERS. DIPRETE ENGINEERING IS NOT RESPONSIBLE FOR MISSING UNDERGROUND UTILITIES, EITHER IN SERVICE OR ABANDONED, NOT OBSERVED AT THE TIME OF THE SURVEY. (PLEASE CONTACT DIGSAFE 72 WORKING HOURS PRIOR TO ANY CONSTRUCTION AT 1-888-344-7233).
8. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT. DIPRETE ENGINEERING IS NOT RESPONSIBLE FOR ANY UNKNOWN OR UNRECORDED EASEMENTS, DEEDS OR CLAIMS THAT A TITLE REPORT WOULD DISCLOSE.

Plan References:

1. "PLAN OF SURVEY OF A PORTION OF PROPERTY IN BURRILLVILLE, R.I. FOR MARGARET S. SHEPARD" BY STANLEY ENGINEERING, INC. SCALE 1"=100' DATED OCTOBER, 1976. RECORDED IN TOWN OF BURRILLVILLE LAND EVIDENCE RECORDS PLAT BOOK 8 PAGE 48.
2. "DIVISION OF LAND OWNED BY ANTHONY J. DEPETRILLO BURRILLVILLE, RHODE ISLAND" DATED APRIL, 1982 REVISED SEPTEMBER 8, 1982 SCALE ONE INCH EQUALS ONE HUNDRED FEET. RECORDED IN TOWN OF BURRILLVILLE LAND EVIDENCE RECORDS PLAT BOOK 14 PAGE 16.
3. "FINAL MINOR SUBDIVISION MAP 230 LOT 14 PREPARED FOR STEERE FARM ASSOCIATES IN BURRILLVILLE, R.I." BY ANDREWS SURVEY & ENGINEERING, INC. SCALE 1"=100' DATED MAY 10, 2001. RECORDED IN TOWN OF BURRILLVILLE LAND EVIDENCE RECORDS PLAT BOOK 25 PAGE 3.
4. RIDOT EASEMENT PLAT NO. 1413.
5. RHODE ISLAND HIGHWAY PLAT NO. 1409.

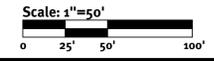


Locus Map Not To Scale



This Plan Should Be Indexed By The Following Streets:

- Bronco Highway
- Lapham Farm Road



Diprete Engineering
Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-941-6006 www.diprete-eng.com

Boston • Providence • Newport

MICHAEL E. GAVITT
5/29/15
PROFESSIONAL LAND SURVEYOR

Certification:
THIS SURVEY AND PLAN CONFORMS TO A CLASS 1 STANDARD AS ADOPTED BY THE RHODE ISLAND BOARD OF REGISTRATION FOR PROFESSIONAL LAND SURVEYORS.

NO.	DATE	DESCRIPTION	BY
1	5/29/15	Final Boundary	M.E.G.
2	3/6/15	Boundary Survey Plan	E.L.T.
3			
4			

Drawn By: E.L.T.

Boundary Survey Plan
600 Bronco Highway
Burrillville, Rhode Island

CLIENT
ISM Solar Burrillville
940 Waterman Avenue, East Providence, Rhode Island 02914

DE JOB NO: 2265-001 Copyright 2015 by Diprete Engineering Associates, Inc.

SHEET **1** OF 1

nationalgrid	ISM Solar Burrillville Solar, LLC 2,320kW Inverter Based Interconnection Project 600 Broncos Hwy, Burrillville RI 02839	RI- 19238010
	FEASIBILITY STUDY	
	Prepared by: Nicolae Gari	May 20th 2015
		TSES-NE Version 1.0

A. Executive Summary:

ISM Solar Burrillville Solar, LLC (Renewable Interconnecting Customer) has requested that a Feasibility Study be conducted by National Grid (the Company) under the Renewable Distributed Generation Review Process per R.I.P.U.C. No.2078 Standards for Connecting Distributed Generation and National Grid’s Electric System Bulletin (ESB) 756 Appendix D. **The installation and interconnection of a 2,320kW (AC) photovoltaic system to the Company’s electric power system (EPS) has been proposed by the Renewable Interconnecting Customer.** The facility is located adjacent to ‘600 Broncos Hwy’ location in ‘Burrillville RI 02839’. This review has been completed and has determined that this installation is **feasible but with certain modifications and additions to the Company’s local EPS** as well as to the Renewable Interconnecting Customer’s proposed installation. The Renewable Interconnecting Customer may request a follow-up Impact Study for Renewable Distributed Generation (ISR DG) in which case an executed ISR DG agreement and associated fee will be required.

B. The Company’s EPS:

The Company’s 13.8kV grounded radial distribution circuit, the 127W41, normally serves the area. This circuit is supplied by ‘271TR’ substation transformer from ‘Nasonville’ distribution substation.

i. Substation Information

- i. ‘271TR’ substation transformer from ‘Nasonville’ distribution substation supplies **four (4) 15kV class** distribution circuits.
- ii. The daytime peak load on ‘271TR’ substation transformer from ‘Nasonville’ distribution substation is **25.2MVA** over last year. The daytime minimum load recorded is **12.4MVA**.
- iii. Total aggregate generation interconnected/in-process to ‘271TR’ substation transformer from ‘Nasonville’ distribution substation is **2,463kW PV** including this project.
 - o In process: **2,406kW**.
 - o Interconnected: **57kW**.

ii. Feeder Information:

- i. The daytime average peak load on the **127W41** feeder is **6.6MVA** over last year. The daytime minimum load recorded is **3MVA**.
- ii. Total aggregate generation interconnected/in-process to **127W41** feeder is **2,381kW PV** including this project:
 - o In process: **2,329kW**.
 - o Interconnected: **52kW**.
- iii. The **127W41** feeder has **two (2) 600kVAr TC capacitors** installed outside the substation.
- iv. The **127W41** feeder has **two (2) pole top reclosers** installed outside the substation.
- v. The possibility of islanding will be determined by an **ISR DG**.

iii. Point of Interconnection (POI):

- i. **The Renewable Interconnecting Customer will be requesting a new primary metered service supplied by the 127W41 feeder.** Customer initiated a construction **Work Request #1916588** for a new primary metered service
- ii. **The 127W41 feeder is adjacent to the proposed location and it is available on Pole#302 from Broncos Hwy.**
- iii. For this interconnection the Renewable Interconnecting Customer has proposed to connect the new primary metered service on the primary side of a new customer owned service transformer.
 - o Please refer to [ESB 750](#) for service installation and primary meter pole installation requirements.
- iv. Based on the total size of the proposed generation and character of the electric source in the area, the POI will be determined during the Impact Study.
 - o The Company will install a load break, recloser and a primary metering assembly for this installation. Customer will be responsible for any required equipment beyond this point.
 - o For the typical installation of this type of system, please refer to the company’s [ESB 756 Appendix D Exhibit 7](#).

C. Renewable Interconnecting Customer's Proposed Small Generating Facility:

(Renewable Interconnecting Customer proposed design of the system is subject to change based on requirements in the ISRDG and also from the results of the Supplemental Review, if any.)

a. Description of proposed design/configuration:

The **3Φ 2,320kW** photovoltaic generating system proposed consists of:

- i. One hundred (100) UL 1741-2005/ IEEE1547 certified 3Φ 23.2kW 'Advanced Energy' model 'AE-3TL-23' inverters providing 480V output.**
- ii. Four (4) 800A, 3Φ, 4W, 35KA Panel-boards** with each combining the output service of twenty two (22) inverters described herein and enclosing the following electrical equipment:
 - **One (1) 800A/3P MCB**
 - **Twenty two (22) 35A/3P circuit load breakers** with each linked to the output service of a proposed inverter described herein.
 - **One (1) customer owned production meter, REC meter.**
 - **Three (3) 800:5 CT's** for the REC meter function.
- iii. One (1) 400A, 3Φ, 4W, 35KA Panel-board** combining the output service of twelve (12) inverters described herein and enclosing the following electrical equipment:
 - **One (1) 400A/3P MCB**
 - **Twelve (12) 35A/3P circuit load breakers** with each linked to the output service of a proposed inverter described herein.
 - **One (1) customer owned production meter, REC meter.**
 - **Three (3) 400:5 CT's** for the REC meter function.
- iv. Two (2) customer owned 3Φ 1,500kVA pad mounted interfacing transformers providing 13.8kV Grd'd Wye primary and 480V Grd'd Wye secondary with transformer impedance $Z = 5.75\% \pm 7.5\%$, combining the output service of all Panel-boards described herein.**
- v. Two (2) customer owned 1Φ, 5kVA Mini Power Center Transformers**, with each linked to the secondary 480V side of a proposed transformer linked to a **15A/2P circuit load breaker** enclosed in a customer owned Panel-board, with 480V primary and 120/240V secondary, and providing supply for a customer owned 40A, 120/240V, 40A/2P MCB, **Panel** linked to the PV system ancillary loads.
- vi. One (1) 15kV Class, 600A customer owned pad mounted switchgear** installed on the primary side of the proposed interfacing transformers and enclosing the following electrical equipment:
 - **One (1) 15kV, 600A, 12.5kA vacuum interrupter.**
 - **One (1) SEL 351A multifunctioning redundant relay** with trips to the above interrupting device.
 - **Three (3) 660:1 CT's** for primary fault detection.
 - **Three (3) 70:1 PT's** for the proposed multifunctioning redundant relay function.
 - **One (1) DC Power Source** for the multifunctioning redundant relay providing a minimum of 8 hours of battery backup.
 - **One (1) relay alarm contact** with 2 sec. time delay installed in parallel with a relay trip wiring.
- vii. One (1) 15kV, 600A, group operated air break (GOAB) disconnect switch** with utility lockable disconnect point installed on the customer owned riser pole.

b. Description of the proposed protection design:

- i. SEL 351A multifunctioning redundant relay** enclosed in the customer owned switchgear installed on the primary 13.8kV side on interfacing transformers encloses the following active redundant relays:
 - **27, 59 (x 2), 81U (x 2), 81O, 59N, 51C, 51CG.**

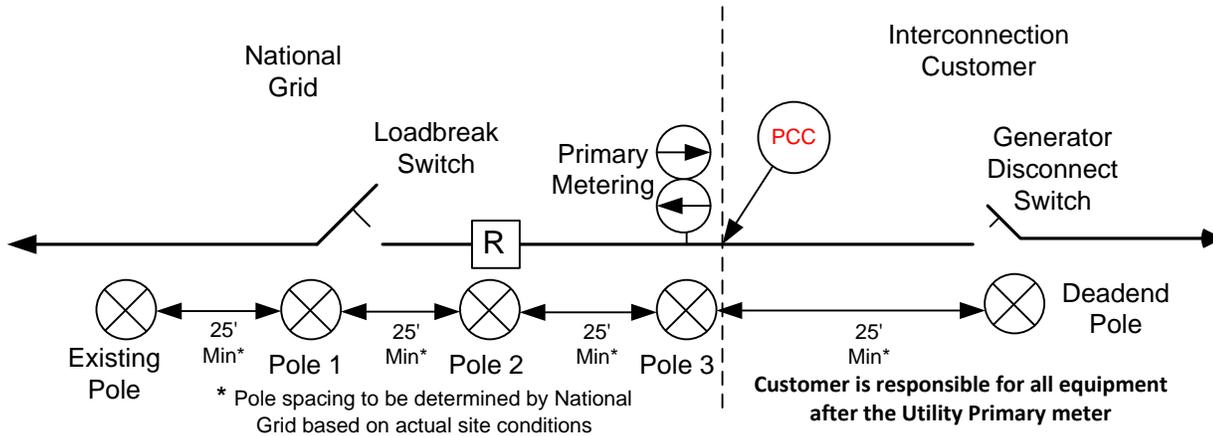
c. Description of the proposed grounding:

- i. The Grd'd Wye-Grd'd Wye proposed interfacing transformer will provide for effective grounding. However this interconnection proposal requires additional ground source.**
 - *Please check on section E.b.i. for Company's recommendations.*

D. System Modifications & Cost:

- i. On the customer's property, the 2,320kW photovoltaic system is proposed to be primary metered at 13.8kV. At the point of interconnection, there will be a load break switch, a recloser, and one (1) primary metering assembly, owned and maintained by National Grid.

Figure 1 National Grid EPS Modifications: Typical



Feasibility Study Grade Estimate ^{1,2}						
National Grid Work Item	Conceptual Cost not including Tax Liability				Associated Tax Liability Applied to capital	Total Customer Costs includes Tax Liability on Capital Portion
	Pre-Tax Total \$	Capital	O&M	Removal		
System Modifications					22.84%	Total \$
Point of Interconnection – pole mounted equipment (1) Load break, (1) Recloser, (1) Primary Metering Assembly.	\$120,000	\$108,000	\$12,000	\$0	\$24,667	\$144,667
Direct Transfer Trip * (if required to prevent islanding)	\$250,000	\$225,000	\$12,500	\$12,500	\$57,100	\$307,100
Coordination Study	\$2,500	\$0	\$2,500		\$0	\$2,500
Witness Testing	\$2,500	\$0	\$2,500	\$0	\$0	\$2,500
Totals	\$375,000	\$333,000	\$29,500	\$12,500	\$81,767	\$456,767

¹ Feasibility Study Grade estimates are provided in good faith and based on previous experience. They were developed with a generalized understanding of the project and based upon information both provided by the Interconnecting Customer in the interconnection application and collected by Company. They are prepared using historical cost data, data from similar projects, and other assumptions. Such estimates cannot be relied upon by the Interconnecting Customer for the purposes of holding the Company liable or responsible for its accuracy as long as the Company has provided the estimate in good faith

² The associated tax effect liability is the result of an IRS rule, which states that all costs for construction collected by National Grid, as well as the value of donated property, are considered taxable income. Current tax effect rate is 22.84% for Narragansett Electric Company, d/b/a National Grid, assets.

* If determined to be required by ISRDC

E. Requirements/Additional Interconnection Details:

- a. If the Renewable Interconnecting Customer chooses to request a follow-up ISRDG the Renewable Interconnecting Customer shall execute an ISRDG Agreement and send also submit the appropriate ISRDG Fee and continue on with the process all as outlined within R.I.P.U.C. No. 2078 Standards to Connect Distributed Generation and National Grid's [Electric Service Bulletin \(ESB\) 756 Appendix D](#).
- b. **Customer Revisions:**
The one line diagram must be revised and resubmitted reflecting the following changes:
- i. **ESB 756D 5.3.4 Neutral Stabilization and Grounding**
ESB 756D 5.5 Transformer
The proposed *Grd'd Wye - Grd'd Wye* interfacing transformer for this interconnection requires one (1) of the following grounding methods:
- **Installation of grounding transformer on the primary or secondary side of proposed interfacing transformer.**
 - **Usage of effectively grounded inverters.**
 - Under this method the Interconnecting Customer needs to provide documentation and technical sheets reflecting the usage of effectively grounded inverters.
- ii. **ESB 756 D 5.7.11.1 Company designated relays and customer settings**
ESB 756 D 5.7.1 Protection Requirement:
Please provide / tabulate the internal inverter relays on the one line diagram. Please refer to NPCC Directory 12 Standard when you complete the internal inverter relays settings. The UF set points should follow NPCC Directory 12 Curve requirements.
- c. **Screening Questions**
The answers to all screening questions from the interconnection standard are listed below:
1. Is the point of common coupling on a radial distribution system? **Yes.**
 2. Is the aggregate generating facility capacity on the circuit less than **7.5%** of the circuit annual peak Load? **No.**
 3. Does the Facility use a Listed Inverter (UL1741)? **Yes.**
 4. Is the Facility power rating ≤ 10 kW single-phase or ≤ 25 kW three-phase? **No.**
 5. Is the Service Type Screen met? Is the Facility Listed? **Yes, following installation of new service under the new construction Work Request #1916588.**
 6. Is the facility listed? **Yes**
 7. Is the starting voltage drop screen met? **N/A.**
 8. Is the fault current contribution screen met? **TBD.**
 9. Is the service configuration screen met? **Yes, following installation of new service under the new construction Work Request #1916588.**
 10. Is the transient stability screen met? **Yes.**

F. References:

- i. [ESB 750](#): Specifications for Electrical Installations
- ii. [ESB 751](#): General Requirements Above 600-volt Service (*under development*)
- iii. [ESB 756 Appendix D for Rhode Island](#): Requirements for Parallel Generation,
- iv. [R.I.P.U.C. No. 2078 Standards for Connecting Distributed Generation](#): The Narragansett Electric Company, d/b/a National Grid, Standards for Connecting Distributed Generation (RI SCDG)

G. Attachments

- ✓ National Grid EPS diagram and Interconnecting Customer's proposed design diagram(s) at the time of the review.

--(This is the end of the main document. Refer to any attachments below.

**National Grid EPS
RI-19238010
2,320kW AC PV**

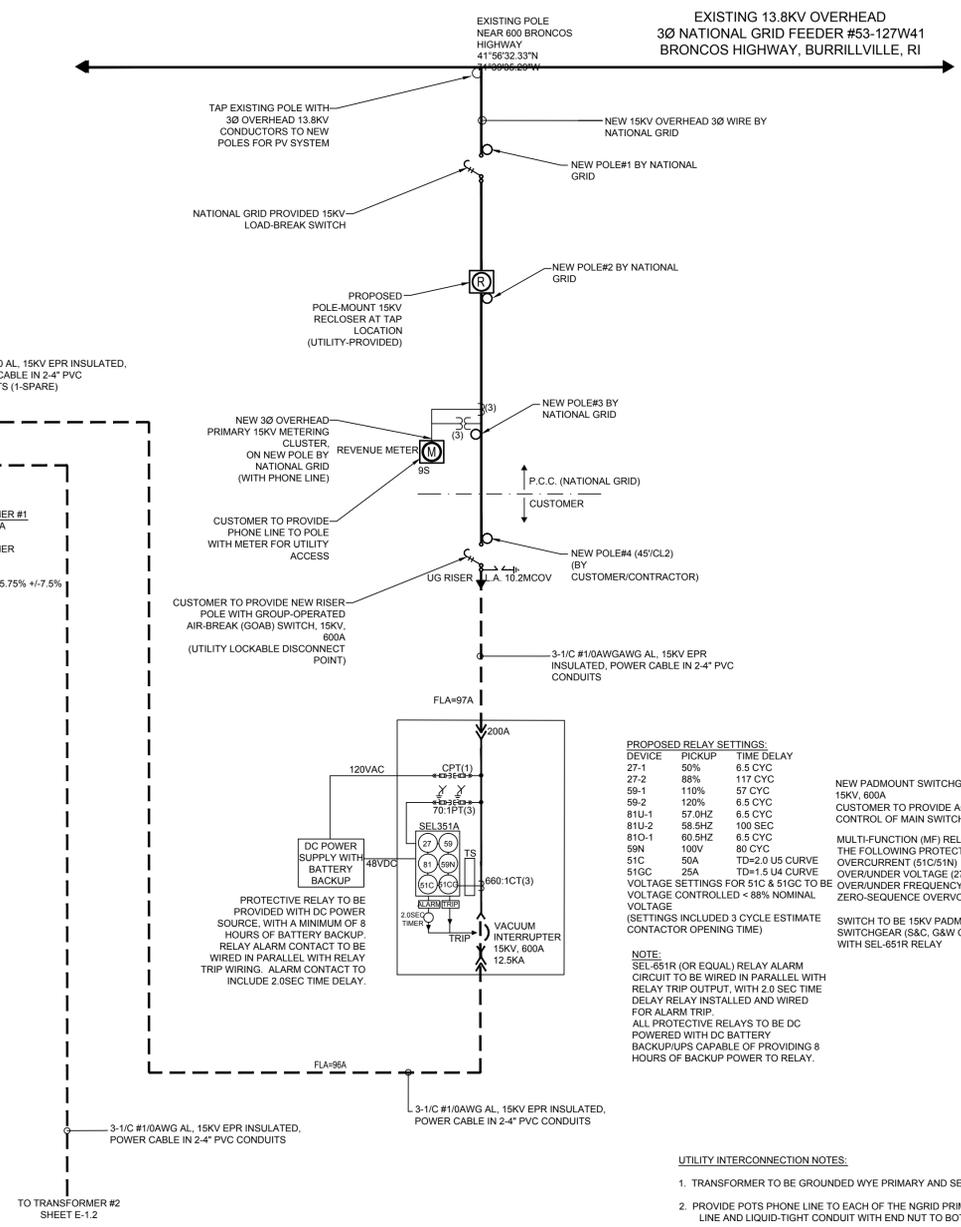
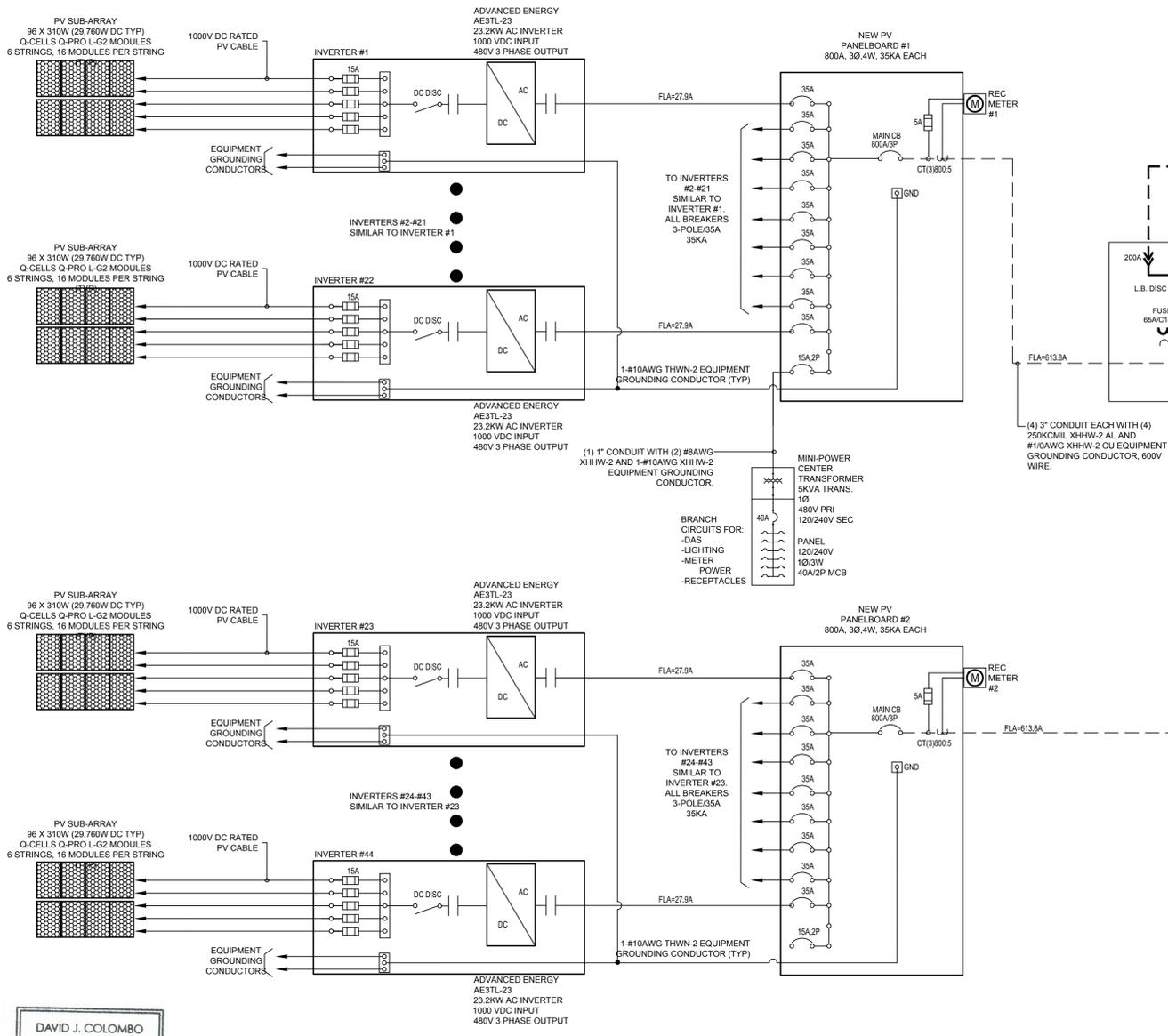
13.8kV three phase
'127W41' circuit.
'Nasonville' Substation

Approximate location of
Customer Proposed POI

Proposed PV
Array Location

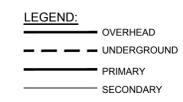
7.97kV single phase tap
to the main '127W41'
three phase circuit.





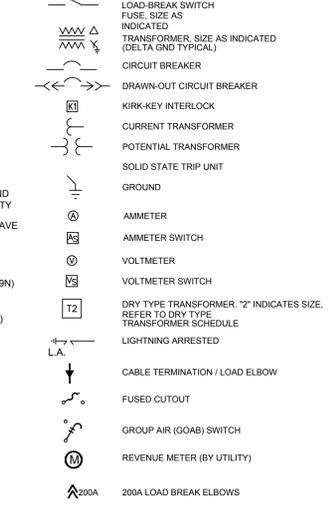
PV TOTAL SYSTEM SUMMARY

9,664 PV MODULES TOTAL
2,995.84 KW DC TOTAL
2,320.0 KW AC TOTAL
310W MODULES
16 MODULES PER STRING
604 STRINGS
100 X 23.2KW INVERTERS
1 X 1000KVA TRANSFORMER
1 X 1500KVA TRANSFORMER



DEVICE NO.	DESCRIPTION
27T	TIME UNDER VOLTAGE RELAY
27I	INSTANTANEOUS UNDER VOLTAGE RELAY
32F	FORWARD OVER POWER RELAY
32R	REVERSE POWER RELAY
46	NEGATIVE PHASE SEQUENCE OVERCURRENT RELAY
47	REVERSE PHASE VOLTAGE RELAY
50/51	INSTANTANEOUS / TIME OVERCURRENT RELAY
51N	GROUND OVERCURRENT RELAY
59I	INSTANTANEOUS OVERVOLTAGE RELAY
59T	TIME OVERVOLTAGE RELAY
60	VOLTAGE BALANCE RELAY
81/O	OVER FREQUENCY RELAY
81/U	UNDER FREQUENCY RELAY

ONE LINE POWER DIAGRAM



PROPOSED RELAY SETTINGS:

DEVICE	PICKUP	TIME DELAY
27-1	50%	6.5 CYC
27-2	88%	117 CYC
59-1	110%	57 CYC
59-2	120%	6.5 CYC
81U-1	57 OHZ	6.5 CYC
81U-2	58.5HZ	100 SEC
81O-1	60.5HZ	6.5 CYC
59N	100V	80 CYC
51C	50A	TD=2.0 US CURVE
51GC	25A	TD=1.5 U4 CURVE

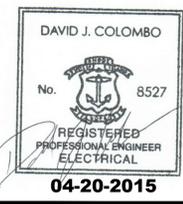
VOLTAGE SETTINGS FOR 51C & 51GC TO BE VOLTAGE CONTROLLED < 88% NOMINAL VOLTAGE

(SETTINGS INCLUDED 3 CYCLE ESTIMATE CONTACTOR OPENING TIME)

NOTE: SEL-651R (OR EQUAL) RELAY ALARM CIRCUIT TO BE WIRED IN PARALLEL WITH RELAY TRIP OUTPUT, WITH 2.0 SEC TIME DELAY RELAY INSTALLED AND WIRED FOR ALARM TRIP.

ALL PROTECTIVE RELAYS TO BE DC POWERED WITH DC BATTERY BACKUPS CAPABLE OF PROVIDING 8 HOURS OF BACKUP POWER TO RELAY.

- UTILITY INTERCONNECTION NOTES:**
- TRANSFORMER TO BE GROUNDED WYE PRIMARY AND SECONDARY.
 - PROVIDE POTS PHONE LINE TO EACH OF THE NGRID PRIMARY METERING CLUSTER. PROVIDE 3 FEET ADDITIONAL PHONE LINE AND LIQUID-TIGHT CONDUIT WITH END NUT TO BOTTOM OF METER SOCKET ON POLE.
 - PROTECTIVE RELAYS TO HAVE BATTERY BACKUP OR UPS FOR BACKUP.
 - PROTECTIVE RELAY ALARM CIRCUIT TO BE WIRED TO TRIP SWITCH FOR REDUNDANCY PER NATIONAL GRID REQUIREMENTS.



No.	DATE	DESCRIPTION
REVISIONS		

POWER ENGINEERS, LLC

37 Fox Den Road
 Kingston, MA 02364-2150
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 www.PowerEngineersLLC.com

Electrical Engineering, Power, Lighting,
 Technical Studies and Utility Consulting

PROJ. MANAGER:
 CHIEF DESIGNER:
 REVIEWED BY: DATE

SEAL

SCALE: HORIZ.: AS-NOTED
 VERT.:
 DATUM: HORIZ.:
 VERT.:
 GRAPHIC SCALE

ISM SOLAR SOLUTIONS, LLC
 940 WATERMAN AVENUE
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 (401) 435-7900
 WWW.ISMRI.COM

ISM SOLAR BURRILLVILLE
 600 BRONCOS HIGHWAY - PV PROJECT
 PROPOSED 2.3MW AC / 3.0MW DC ONE-LINE
 BURRILLVILLE RHODE ISLAND

PROJ. No.: 291B
 DATE: APRIL 2015

MV-1.1

SIZE: D REV: 0



No.	DATE	DESCRIPTION
0	3/12/2015	ISSUED FOR REVIEW
REVISIONS		

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PROJ. MANAGER:	
CHIEF DESIGNER:	
REVIEWED BY:	DATE

SEAL

SCALE: HORZ.: 1" = 50'-0"
 VERT.:
 DATUM: HORZ.:
 VERT.:
 50' 25' 0 50'
 GRAPHIC SCALE

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ISM SOLAR BURRILLVILLE
 600 BRONCOS HIGHWAY - PV PROJECT
 PROPOSED 2.3MW AC / 3.0MW DC SITE LAYOUT
 BURRILLVILLE RHODE ISLAND

PROJ. No.: 291B DATE: MARCH 2015
E-2
SIZE: D REV: 0

