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July 15<sup>th</sup>, 2018

## Transmittal

To: Melanie A. Bachman  
Staff Attorney/Acting Executive Director  
Connecticut Siting Council  
10 Franklin Square  
New Britain, CT 06051

Re: **PE 1137 WINDHAM SOLAR FACILITY – 2<sup>nd</sup> Amendment Interrogatories Submittal**

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Melanie-

Enclosed with this transmittal please find 15 copies of our responses to the Interrogatories received on July 27<sup>th</sup>, 2018 for the second solar facility amendment associated with PE 1137.

Sincerely,

A handwritten signature in black ink, appearing to read "Steven J. Broyer".

Steven J Broyer

Petition No. 1137  
Windham Solar LLC- Lebanon - Franklin, Connecticut

Second Amendment Interrogatories  
July 26, 2018

1. What is the status of the farmstead buildings on the property? Please indicate what buildings would be removed by Windham Solar. If buildings are to remain, what would they be used for?  
*The coop has been used for construction and material storage for the first 5 one-MW projects and will continue to be used for storage. The building was recently equipped with a complete security system, and we are exploring additional improvements to the roof of the structure due to leaks. Windham Solar intends to keep the structure for storage for this project.*  
*The single family home is vacant, the UST associated with the home has been removed. The single family home has been inspected for lead and asbestos, and is slated for tear down, for it's unimprovable.*  
*There is a garage structure with a 1BR apartment also on the site, that apartment has had a tenant for over 2 years, there are no plans on removing this structure, and we will continue to have a tenant on site.*
2. What is the proposed finish grade of both expansion areas?  
*Finish grade of the expansion areas will remain at existing grade. Grading will only occur where stormwater control measures need to be implemented. The existing slopes on the site do not need to be altered for the project's racking system.*
3. What is the maximum grade for the safe installation of the ballast mounts? Would an area of excavation be required under each mount to create a level surface?  
*The maximum grade for the racking ballast system is 15%. The soil below the ballast tubs is leveled (sometimes placed on a small gravel pad), and the racking is constructed aligned and assembled. The ballast tubs are then filled on site with concrete either by direct concrete truck fill, a concrete pump truck or a skid steer equipped with a pour bucket. A video of the installation method of the ballast racking system can be viewed in the following link. <https://player.vimeo.com/video/174226143> Specific construction methods for the site will be determined during the contractor selection, and their preferred method of construction.*
4. The Petition Amendment narrative states ballasts may be cast on-site. Indicate the location of the ballast mold area and concrete wash out station. Provide a design detail of the concrete wash out station.  
*Ballasts will be cast on site in one of the methods mentioned in the response to question #3. Attached as Exhibit A is the concrete wash out detail will be added to the plans. The projects SWCPC also addresses additional measures for Concrete Washout in section 11.4.*
5. Would the fence posts for the expanded fence perimeter be supported by concrete ballasts? If not, how would the posts be driven into the bedrock?  
*Fence posts where fence angles change, will be embedded in concrete as shown in the detail provided on page 4 of the civil construction documents. There is not "bedrock" on the site, however there is a large amount of subsurface cobble and stone that was encountered during the construction of the first five 1MW projects. Fence posts requiring concrete will be mechanically augured and backfilled with concrete. Fence posts which will be along a straight fence line, will be driven. If rock is encountered*

during either install method, posts would likely be shifted in the field, or additional excavation would occur to remove subsurface rocks and will then be backfilled and compacted with clean material.

6. Why is an interior chain-link fence necessary to separate the Phase 1 solar field area from the Phase 2 solar field area?

To adhere to the fencing requirements set forth by ISO-New England relating to interconnection. ISO-New England Planning Procedure PP5-1, Section 2 details when a Proposed Plan Application is necessary to be submitted by the interconnecting utility to ISO-NE prior to execution of an interconnection agreement. A separate fence means that the 1 MW Rutledge project is not considered part of the station of generators as the existing five 1MW generators, and thus the interconnecting utility was not required to submit a Proposed Plan application.

7. Site Plan Sheet 9 - Slope Stabilization - specifies the use of erosion control mat North American Green (NAG) SC 150. Due to the potential presence of DEEP listed species (wood turtle), could an all-natural fiber mat be specified for use at the site, such as NAG 150 BN or equivalent?

Yes. The plans will be revised to require an all-natural fiber mat.

8. Site Plan Sheet 9, the clearing/grubbing notes states extreme care shall be taken around existing trees to be saved. Where are the trees that would be saved during Phase 2 development?

This is a generic note that will be removed from the plans. Ultimately all trees, stumps, brush and debris within the seeding limits illustrated on sheet 6 of the landscaping plan will be removed.

9. Did Windham Solar consult with the respective Towns prior to filing of the Amendment with the Council? If so, what were the specific concerns and were these concerns addressed in the submittal?

The towns were notified by certified mail on July 12, 2018. Follow up email correspondence has also been sent to the town on August 8, 2018, inquiring for comment to the CSC prior to August 30<sup>th</sup>. The applicant did not seek formal approval from the town of Lebanon or Franklin given the CSC has jurisdiction.

Windham Solar submitted plans to the town of Lebanon's Inlands wetland commission for approval of the proposed grading and construction that will occur within the 100' upland review zone for the project on August 13, 2018.

The project expansion in the town of Franklin incorporated a 25' setback from the property line, which is consistent with the approvals granted in the 1<sup>st</sup> amendment of the facility in September 2017.

No activity will be performed within the town of Franklin's 50' upland wetland review area, so the project will not be submitted to their inland wetlands commission for construction.

10. What is the status of the interconnection agreement with Eversource for the Phase 2 Project expansion?

We have a fully executed interconnection agreement in place with Eversource. Eversource has ordered the transformer for the project, and are planning beginning their portion of construction in October of 2018. We're forecasting to energize the project in December 2018.

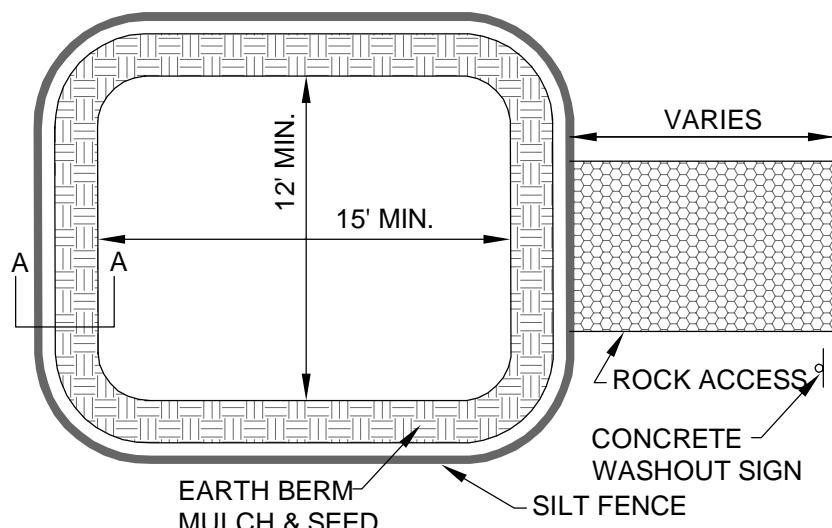
11. What is the output rating of the Phase 2 solar panels?

The solar panels for the project have been procured. They will be a mix of 370 and 375 Watt modules. A module cut sheet has been attached as Exhibit B. The total system size is currently under design to determine the full project DC output.

12. No new transformer/switchgear pads are shown on the Phase 2 site plans - would a modification of the existing transformer/switchgear equipment be required to accommodate the 1 MW expansion?

The transformer /switchgear pad has been identified in the AC loop drawings, not the civil construction drawings. Plans and details for the electrical system including the concrete pads have been attached as Exhibit C.

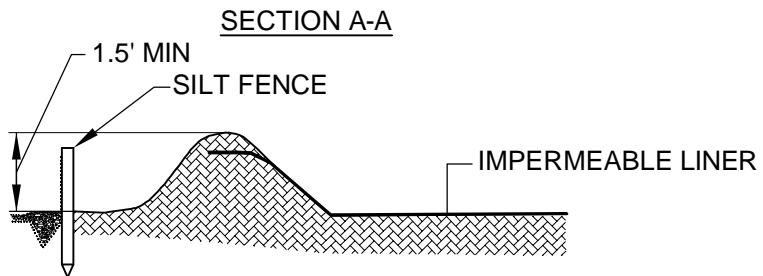
# EXHIBIT A



NOTE:

CONCRETE WASHOUT AREAS WILL HAVE AN IMPERMEABLE LINER TO PREVENT CONCRETE WASHOUT WATER FROM INFILTRATING/CONTACTING WITH SOIL. IMPERMEABLE LINER INCLUDES 10 MIL POLYLINER OR COMPACTED CLAY LINER. WASHOUT SYSTEMS CAN BE USED AS ALTERNATE WASHOUT AREAS.

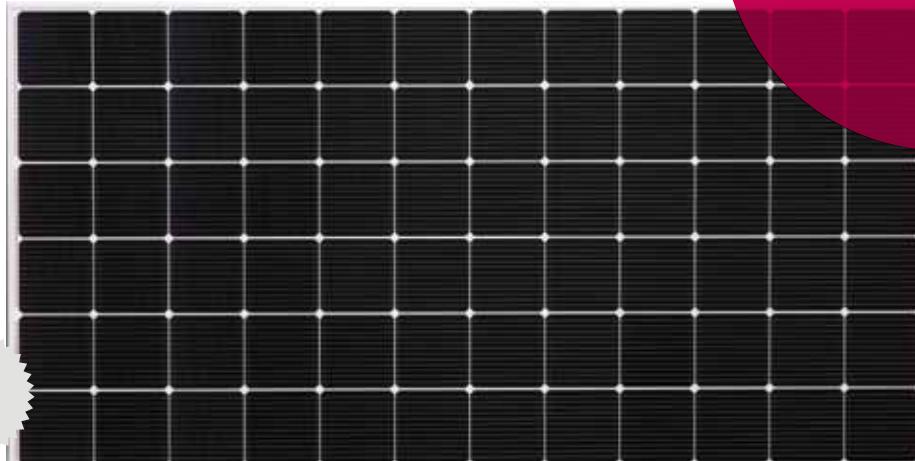
\*AN APPROVED ALTERNATE MAY BE USED\*



## CONCRETE WASHOUT AREA

# EXHIBIT B

Innovation for  
a Better Life



## LG NeON™ 2 72cell

LG375N2W-G4 | LG370N2W-G4 | LG365N2W-G4

### 72 cell

LG New module, NeON™ 2 72cell adopts Cello technology. Cello technology replaces 3 busbars with 12 thin wires to enhance power output and reliability. NeON™ 2 72cell demonstrates LG's efforts to increase customer's values beyond efficiency. It features enhanced warranty, durability and performance in a real environment.



#### Enhanced Performance Warranty

LG NeON™ 2 72cell has an enhanced performance warranty. The annual degradation has fallen from 0.7%/yr to 0.6%/yr. Even after 25 years, module guarantees 2.4% more output than the previous LG NeON™ modules.



#### Improved Product Warranty

As well as the enhanced performance warranty, LG has extended the product warranty of the LG NeON™ 2 72cell for an additional 2 years.



#### Better Performance on a Sunny Day

LG NeON™ 2 72cell now performs better on a sunny days thanks to its improved temperature coefficient.



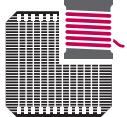
#### High Power Output

Compared with previous models, the LG NeON™ 2 72cell has been designed to significantly enhance its output efficiency, hereby making space management more efficient even in limited areas.



#### Double-Sided Cell Structure

The rear of the cell used in LG NeON™ 2 72cell will contribute to generation, just like the front; the light beam reflected from the rear of the module is reabsorbed to generate a great amount of additional power.



#### BOS (Balance Of System) Saving

LG NeON™ 2 72cell can reduce the total number of strings due to its high module efficiency resulting in a more cost effective and efficient solar power system.

#### About LG Electronics

LG Electronics is a global player who has been committed to expanding its capacity, based on solar energy business as its future growth engine. We embarked on a solar energy source research program in 1985, supported by LG Group's rich experience in semi-conductor, LCD, chemistry, and materials industry. We successfully released first Mono X® series to the market in 2010, which were exported to 32 countries in the following 2 years, thereafter. In 2013, NeON™ (previously known as Mono X® NeON) & 2015 NeON2 with CELLO technology won "Intersolar Award", which proved LG is the leader of innovation in the industry.

## Mechanical Properties

Cells	6 x 12
Cell Vendor	LG
Cell Type	Monocrystalline / N-type
Cell Dimensions	156.75 x 156.75 mm / 6 inches
# of Busbar	12 (Multi Wire Busbar)
Dimensions (L x W x H)	1960 x 1000 x 46 mm
Front Load	5400 Pa
Rear Load	2400 Pa
Weight	20.3 ± 0.5 kg
Connector Type	MC4
Junction Box	IP67 with 3 Bypass Diodes
Length of Cables	1200 mm x 2 ea
Glass	High Transmission Tempered Glass
Frame	Anodized Aluminum

## Certifications and Warranty

Certifications	IEC 61215, IEC 61730-1/-2 UL1703 IEC 61701 (Salt corrosion test)* IEC 62716 (Ammonia corrosion test)* ISO 9001
Module Fire Performance	Type 2 (UL1703)
Fire Rating (for CANADA)	Class C (ULC/ORD C1703)
Product Warranty	12 years
Output Warranty of Pmax	Linear warranty**

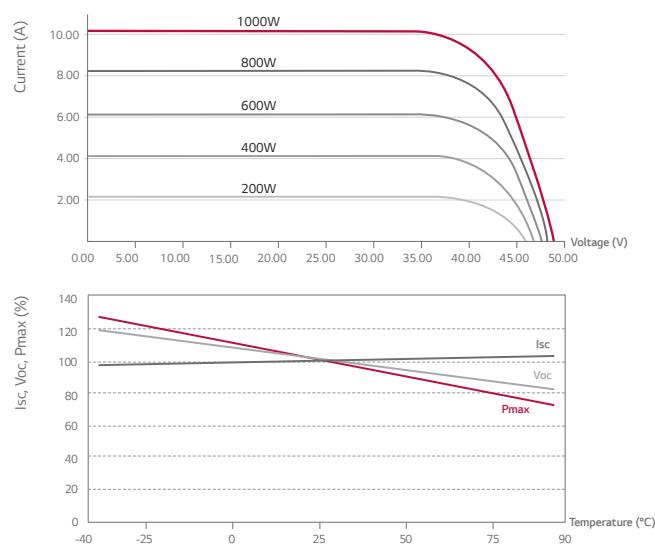
\* in progress

\*\*1) 1st year 98%, 2) After 2nd year: 0.6% annual degradation, 3) 83.6% for 25 years

## Temperature Characteristics

NOCT	45 ± 3 °C
Pmpp	-0.38 %/°C
Voc	-0.28 %/°C
Isc	0.03 %/°C

## Characteristic Curves



## Electrical Properties (STC \*)

Module Type	375W	370 W	365 W
MPP Voltage (Vmpp)	39.6	39.2	38.9
MPP Current (Impp)	9.50	9.44	9.39
Open Circuit Voltage (Voc)	48.3	48.0	47.7
Short Circuit Current (Isc)	10.04	9.98	9.92
Module Efficiency (%)	19.1	18.9	18.6
Operating Temperature (°C)	-40 ~ +90		
Maximum System Voltage (V)	1000		
Maximum Series Fuse Rating (A)	20		
Power Tolerance (%)	0 ~ +3		

\* STC (Standard Test Condition): Irradiance 1000 W/m<sup>2</sup>, Module Temperature 25 °C, AM 1.5

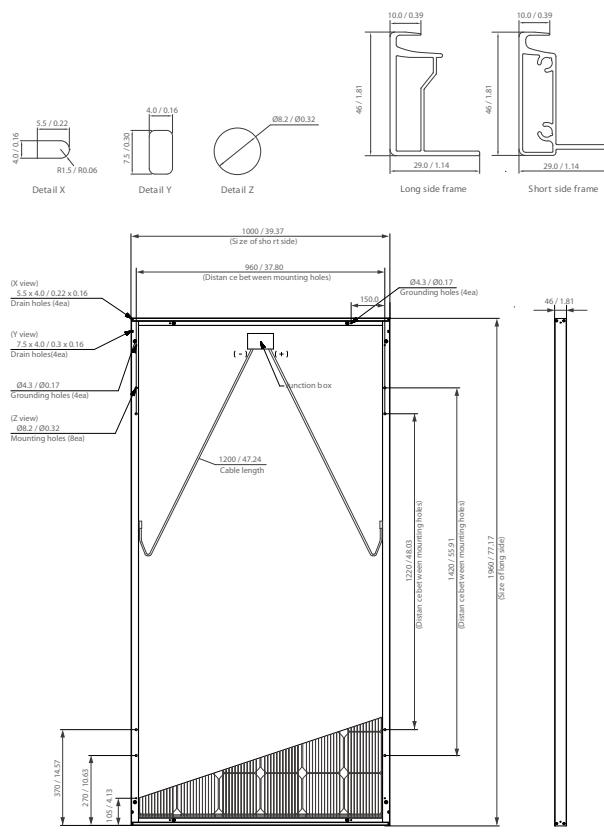
\* The nameplate power output is measured and determined by LG Electronics at its sole and absolute discretion.

## Electrical Properties (NOCT\*)

Module Type	375 W	370 W	365 W
Maximum Power (Pmax)	277	273	269
MPP Voltage (Vmpp)	36.6	36.3	36.0
MPP Current (Impp)	7.57	7.52	7.48
Open Circuit Voltage (Voc)	45.0	44.7	44.4
Short Circuit Current (Isc)	8.08	8.03	7.98

\* NOCT (Nominal Operating Cell Temperature): Irradiance 800 W/m<sup>2</sup>, ambient temperature 20 °C, wind speed 1 m/s

## Dimensions (mm/in)



\* The distance between the center of the mounting/grounding holes.

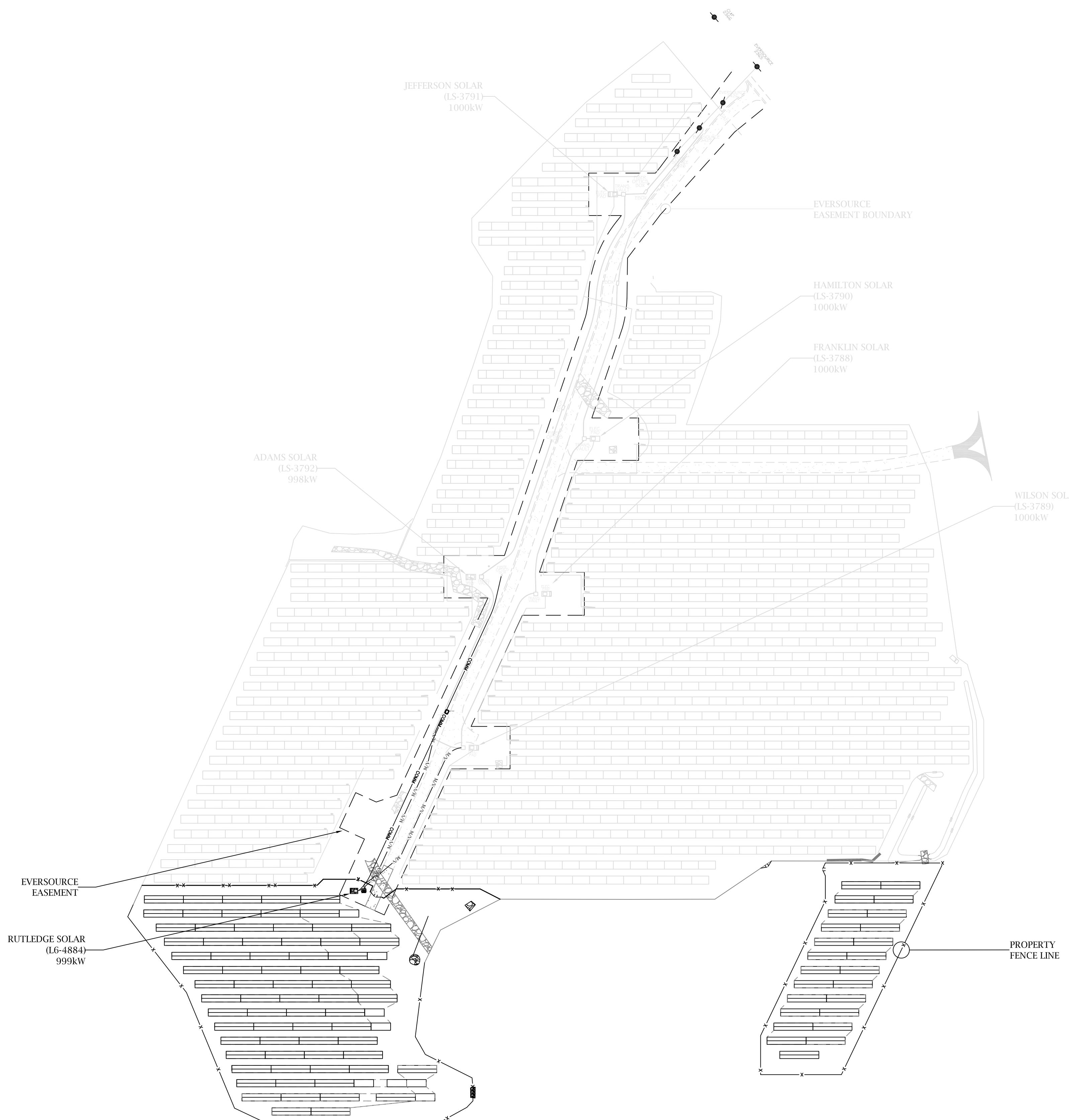
## EXHIBIT C

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DWG. No.

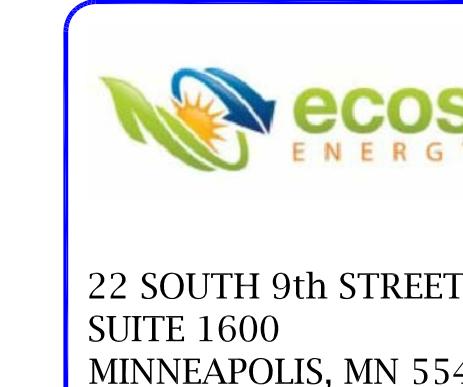
E.201

BY AMERICAN ELECTRICAL TESTING CO., INC.



## SITE PLAN LEGEND

- x— FENCE
- EVERSOURCE EASEMENT
- M/V— MV CONDUITS
- ROADWAY
- COMM— COMMUNICATIONS CONDUITS



ISSUED FOR CONSTRUCTION				SC	SC	CS	DM
REV.	DATE	REVISION DESCRIPTION	DRAWN BY	ENG'R BY	CHKD BY	APVD BY	
0	08-13-2018						

- CONCEPT
- INFORMATION ONLY
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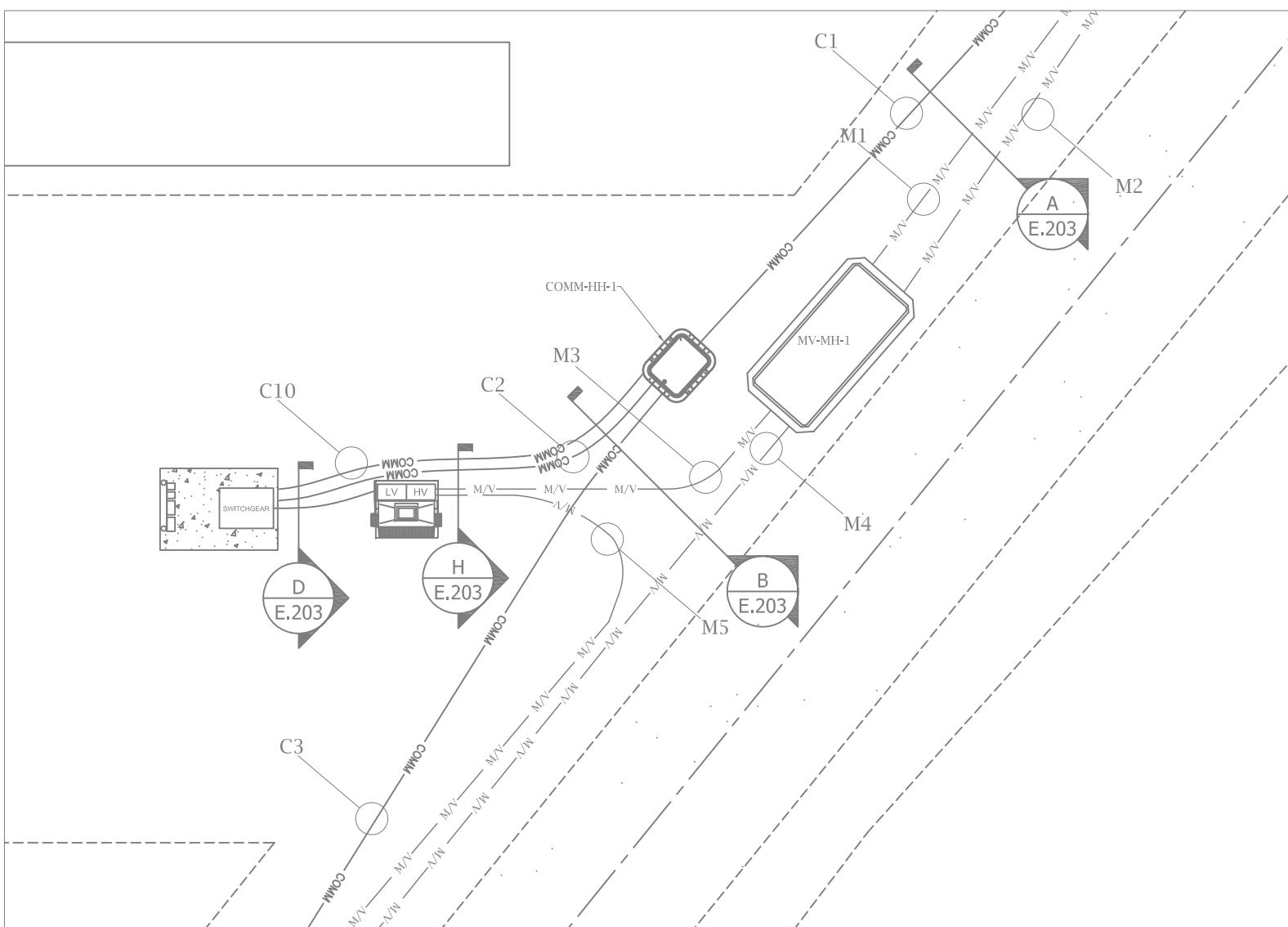
WINDHAM SOLAR - RUTLEDGE ARRAY  
43 WILLIAMS CROSSING ROAD, LEBANON CT 06249

SITE PLAN

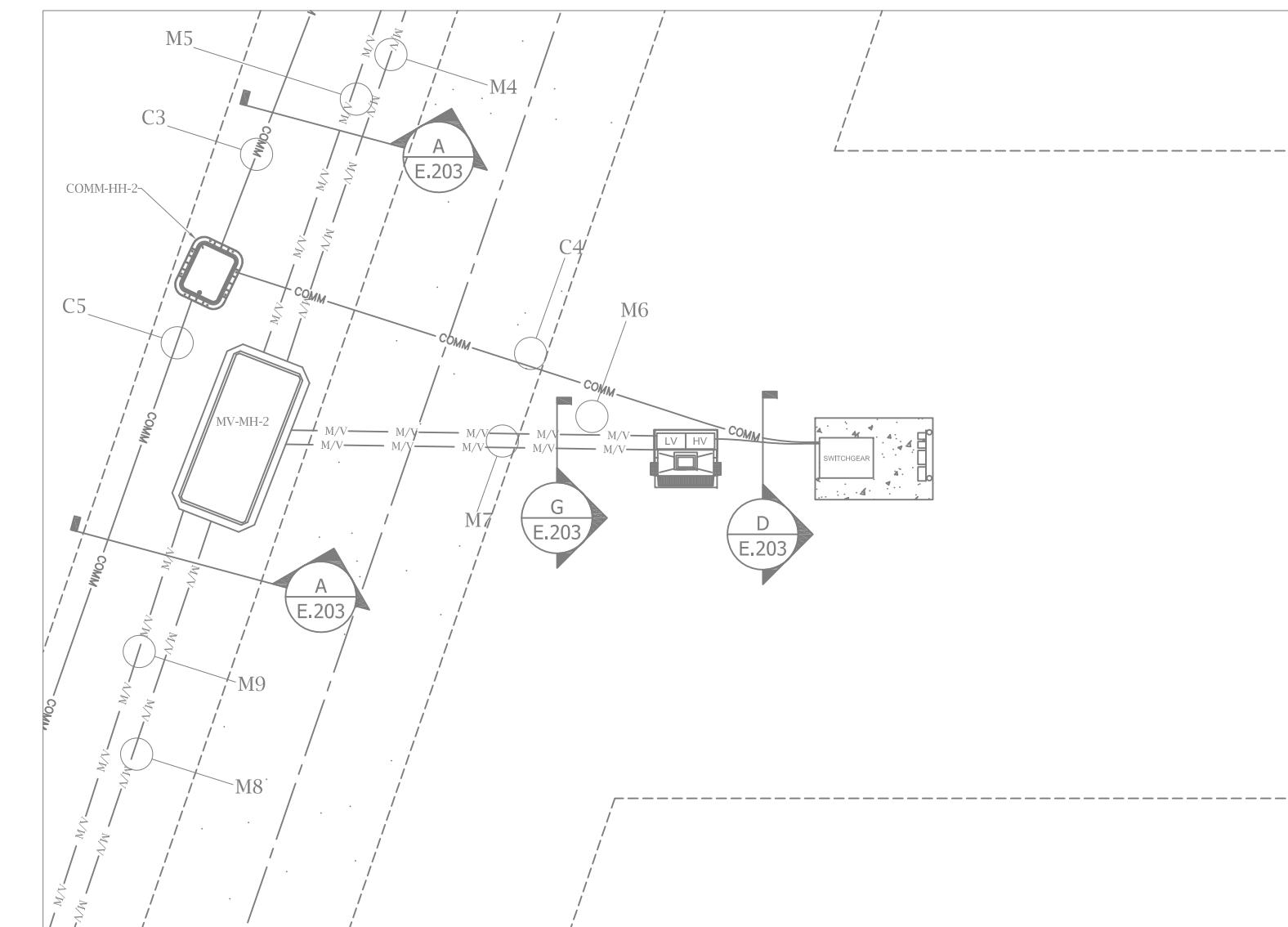
DWG. NO.	E.201
SCALE	1"=100'
SIZE	D
SHEET	1 of 1

ENGINEERING DIVISION  
25 FORBES BLVD., SUITE 1  
FOXBORO, MA 02035  
PHONE: 781-821-0121  
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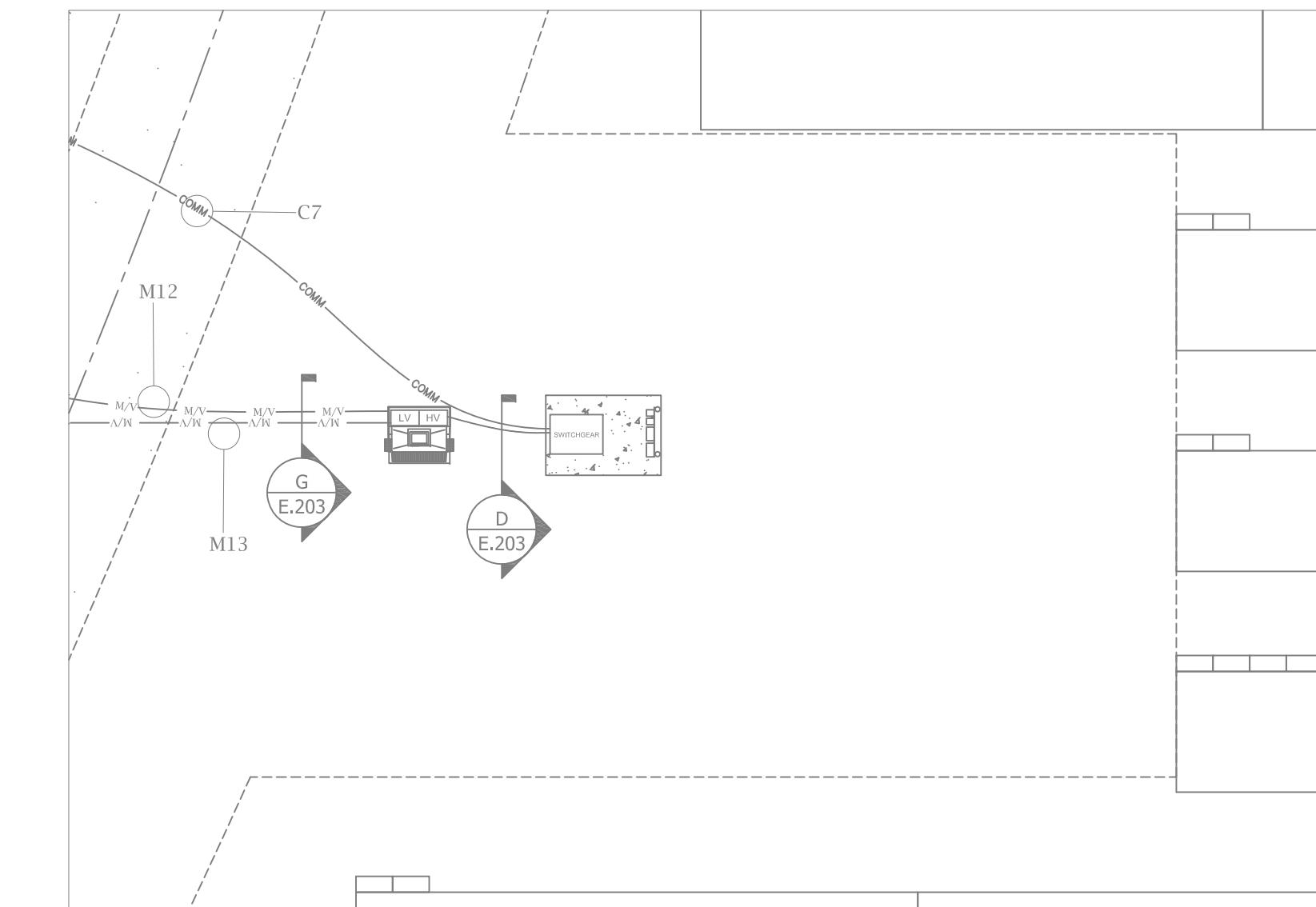
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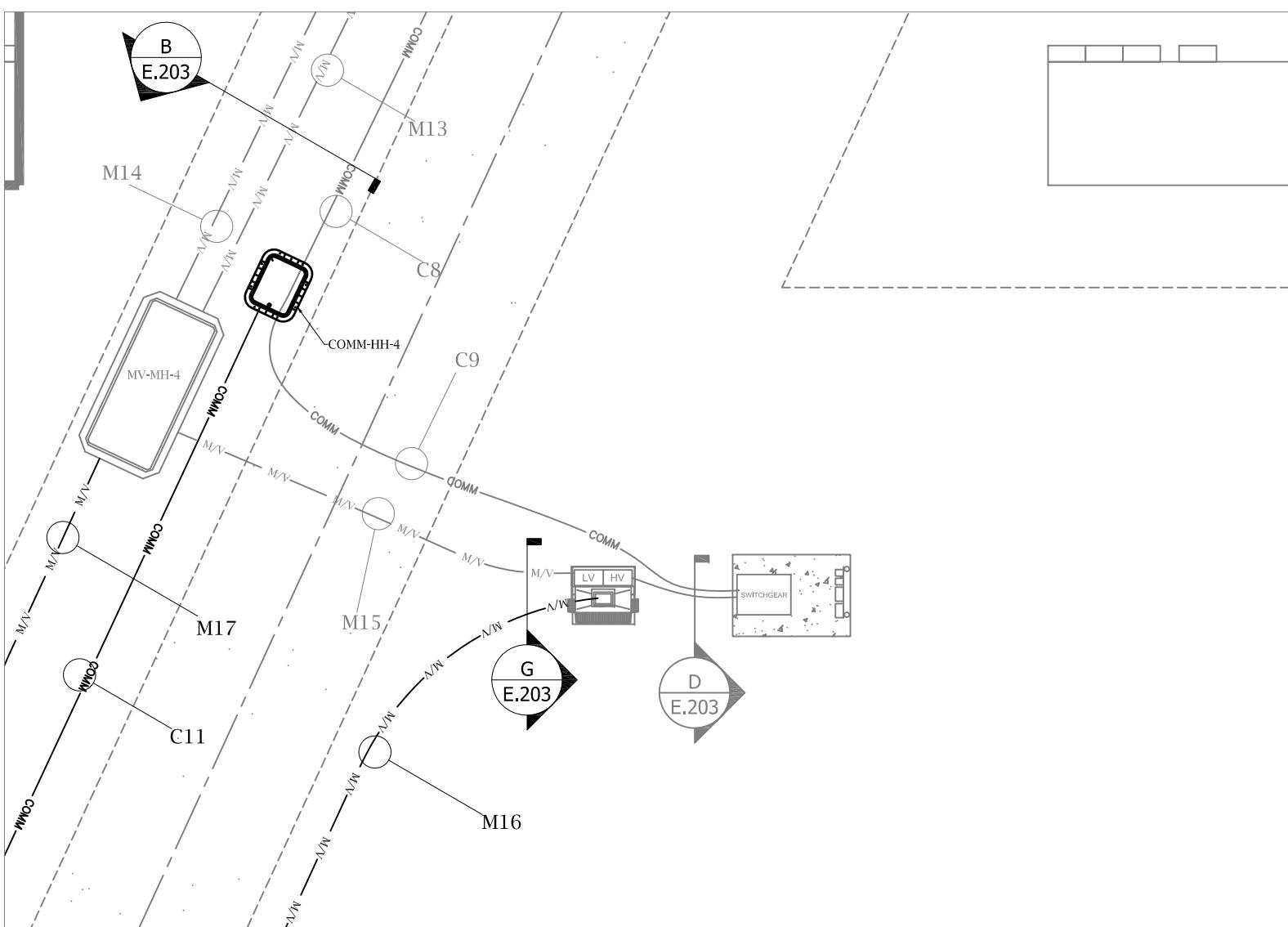
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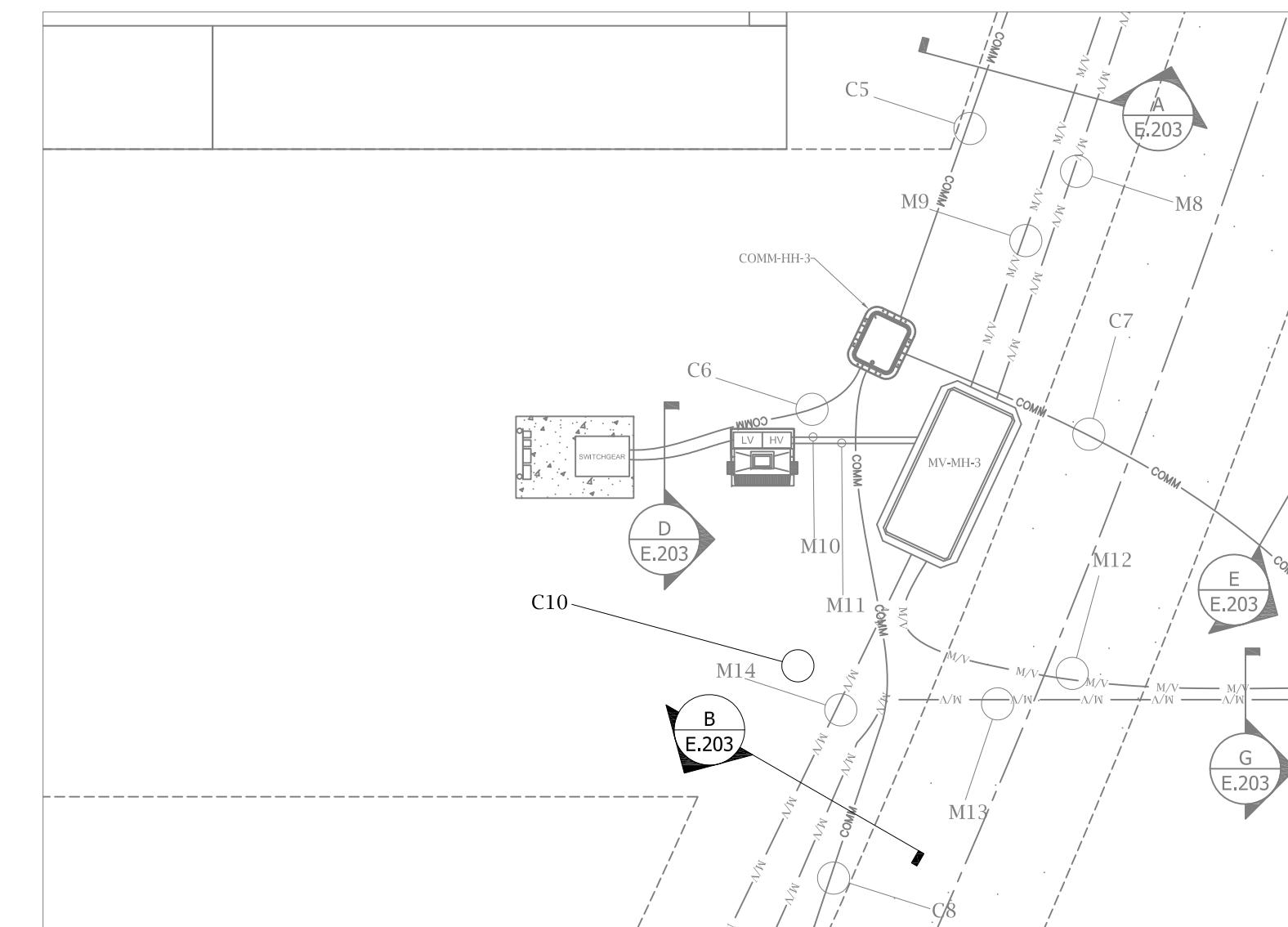
**HAMILTON SOLAR**  
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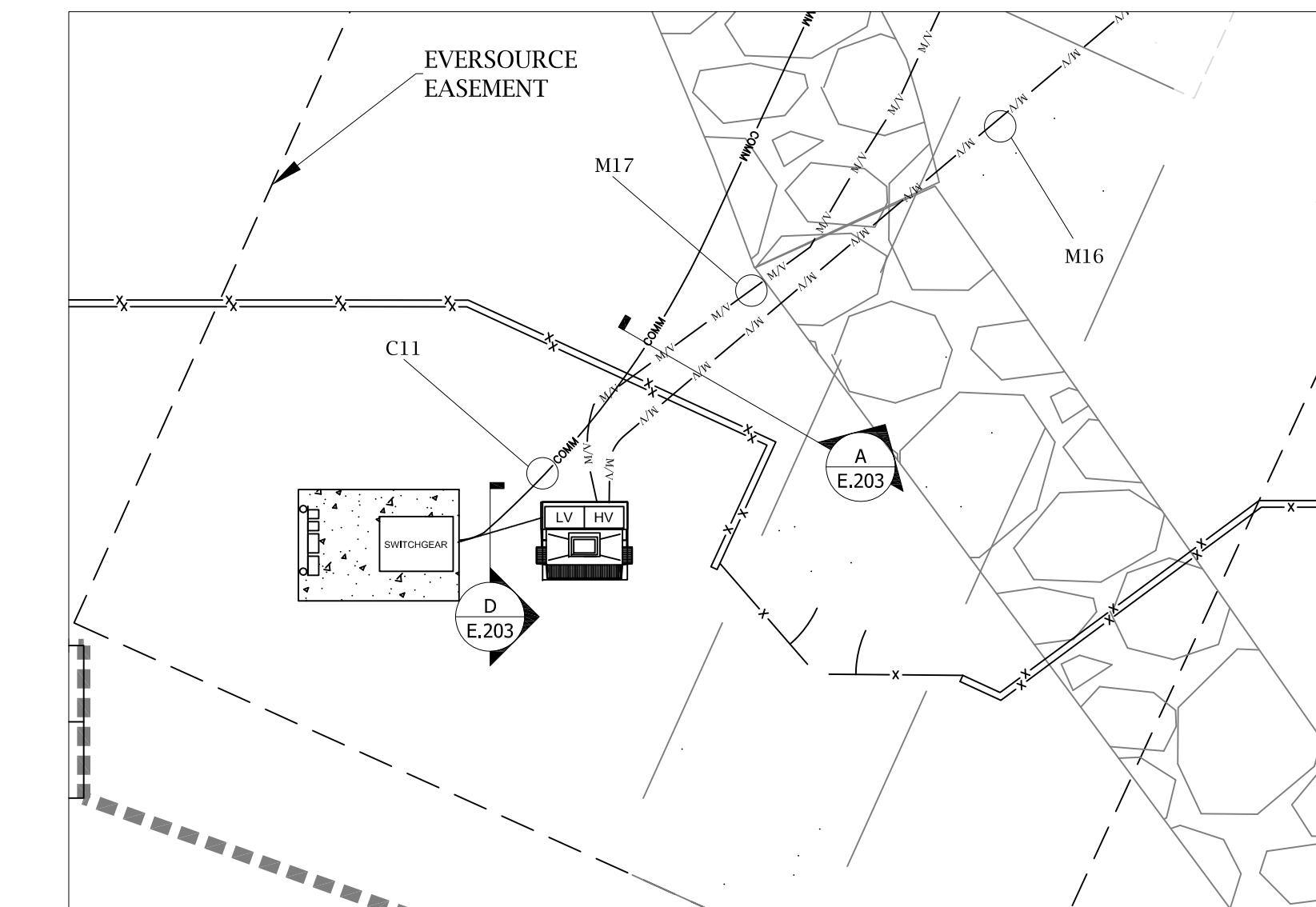
**FRANKLIN SOLAR**  
SCALE: NOT TO SCALE



**WILSON SOLAR**  
SCALE: NOT TO SCALE



**ADAMS SOLAR**  
SCALE: NOT TO SCALE



**RUTLEDGE SOLAR**  
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**NOTES:**

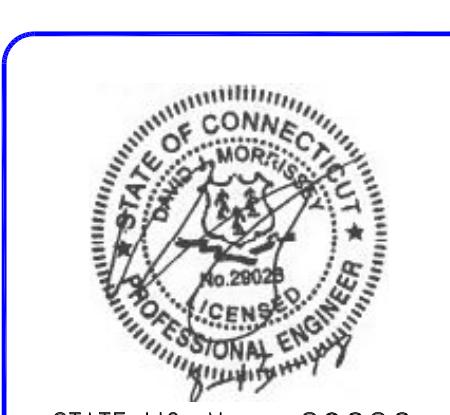
1. CONDUIT ROUTING IS DIAGRAMMATIC ONLY. ACTUAL FIELD ROUTING MAY VARY.



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STATE LIC. No. 29026



**WINDHAM SOLAR – RUTLEDGE ARRAY**  
43 WILLIAMS CROSSING ROAD, LEBANON CT 06249

**SITE PART PLANS**

DWG. NO.	E.202
SCALE	N.T.S.
SIZE	D
SHEET	1 of 1

1

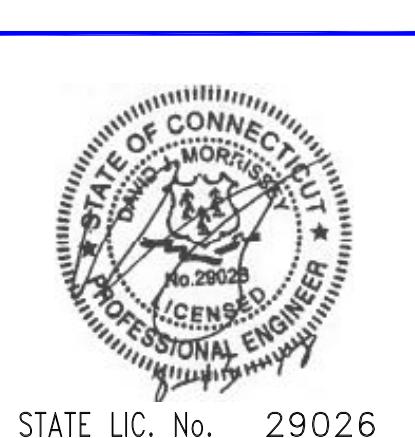
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The logo for American Electrical Testing is a white graphic on a dark blue background. At the top, the company name "AMERICAN ELECTRICAL TESTING" is written in a bold, sans-serif font. Below the text is a stylized white dove facing right. A small red five-pointed star is positioned on the dove's forehead. The dove's body is white, and its wing is partially visible on the left side of the frame.

WINDHAM SOLAR — RUTLEDGE ARRAY  
43 WILLIAMS CROSSING ROAD, LEBANON CT 06249

## MISCELLANEOUS UTILITY REQUIRED SPECIFICATIONS

S:

LOCATE FOUNDATION IN ACCORDANCE WITH THE ELECTRICAL EQUIPMENT ARRANGEMENT DRAWING.

PROVIDE 4" MINIMUM CLEAR COVER FOR #4 REBAR.

PROVIDE REINFORCING STEEL IN ACCORDANCE WITH ASTM A615.

PROVIDE FORMS THAT WILL PROVIDE A SMOOTH FORM FINISH TO THE CONCRETE AND ARE PROPERLY COATED TO PROVIDE QUICK FORM RELEASE WITHOUT DAMAGE TO THE CONCRETE.

PROVIDE CONCRETE MIX DESIGN MEETING 5,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS WHEN TESTED IN ACCORDANCE WITH ASTM C39.

PROVIDE CONCRETE WITH MAXIMUM WATER-CEMENT RATIO OF 0.40 AND AN AIR-ENTRAINMENT AGENT MEETING ASTM C260 WITH 6 TO 7 PERCENT AIR-ENTRAINMENT.

TO FACILITATE PLACEMENT PROVIDE MAXIMUM AGGREGATE SIZE OF  $\frac{1}{2}$ " IN ACCORDANCE WITH ASTM C33 AND UTILIZE A WATER REDUCING AGENT MEETING ASTM C494.

PROVIDE BROOM FINISH TO THE TOP SURFACE OF THE CONCRETE AND ENSURE PROPER POSITIVE DRAINAGE OF THE SURFACE.

PROVIDE MOIST CURING OF THE CONCRETE FOR AT LEAST THE FIRST 7 DAYS AFTER PLACEMENT.

PROVIDE ANCHORAGE FOR SWITCHGEAR IN ACCORDANCE WITH SWITCHGEAR MANUFACTURER'S RECOMMENDATIONS.

**TOP PLAN**

**SECTION A-A**

**SECTION B-B**

**SECTION C-C**

**PAD - PRECAST CONCRETE - THREE-PHASE TRANSFORMER  
500-2500 KVA-76" x 70" x 36"**

**ORIGINAL**  
1262176  
**APPROVED**  
371A02

**NORTHEAST UTILITIES**      **MATERIAL SPECIFICATION**      **SPC P-015**

ORIGINAL	PAD – PRECAST CONCRETE – THREE-PHASE TRANSFORMER		
122173	500–2500 KVA–76" x 70" x 36"		
APPROVED			
37102	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC P-015

b. DTR 33.217 - 600-VOLT CONNECTOR GUIDE - FOR NEMA PADS - THREE-PHASE PAD-MOUNT TRANSFORMERS  
 c. DTR 42.081 - LOCATION AND MECHANICAL PROTECTION REQUIREMENTS  
 d. DTR 44.221 - FAULT INDICATOR GUIDE - SOLID DIELECTRIC CABLES  
 e. DTR 56.509 - PRIMARY - SECONDARY AND TRANSFORMER GROUNDING  
 f. DSEM Section 14.21 - LOADING LIMITS - THREE-PHASE TRANSFORMERS  
 g. DSEM Section 07.30 - CONVENTIONAL UG LOOPS  
 h. DTR 56.221 - JACKETED PRIMARY CABLE - GROUNDING

6. The excavation for the pad shall be carried to a depth of 12 inches below the bottom of the pad. The bottom layer of backfill shall be compacted, clean gravel, free of foreign matter and construction debris, extending 12 inches beyond the circumference of the structure, and in accordance with Connecticut DOT Spec M.02.06 Grading "A"; or Massachusetts DPW Spec M1.03.0 Type b. The remaining backfill shall not contain ashes, cinders, shells, frozen material, loose debris, or stones larger than 2 inches in maximum dimension. It shall be placed in 6-inch layers and compacted with mechanical tampers to not less than 95 percent of the maximum dry density as determined by the standard compaction tests, AASHTO T180 or ASTM D698.

 NORTHEAST UTILITIES CONSTRUCTION STANDARD DTR 58.301

**SECTION A-A**

**Notes**

1. Install polymer concrete vault. Vault is rated for occasional vehicular traffic, however, do not install in roadway applications. Vault shall be used to splice one three-phase cable, maximum #4/0 Al.
2. The excavation shall be carried to a minimum depth of 6" below the bottom and 12" beyond the edge.
3. Install two 8' galvanized steel ground rods adjacent to the vault and ground per DTR 78.151. Provide #8 Cu bond for communications companies.
4. Select splices from DTR 33.501-502.
5. Install warning tape 12" above top of conduit.
6. Install schedule 40 PVC conduit, minimum 4" diameter. Install conduit plugs in spare conduits.

PROPERTY LINE

STREET TAKING LINE

EASEMENT

approx.15'

OPTIONAL SPARE CONDUIT

1/4" NYLON PULL LINE AND CONDUIT PLUGS  
TO BE SUPPLIED BY CONTRACTOR

CABLE TO BE GUT AND SPLICED IN EACH  
VAULT WHEN A NEW CUSTOMER OR  
ADDITIONAL LOAD IS CONNECTED.

NOTE 5

Provide two conduit stubs for future  
customer. Mark end of conduit with  
temporary deadend cap.

NOTE 2

**Notes**

1. Install two 3' x 6' polymer concrete vaults 24" apart. Install two conduit stubs with plugs and 1/4" nylon pull line for future use. When supplying new customer, loop cable in and out of transformer and splice at both vaults. Refer to DTR 51.601 for additional construction guidelines.
2. Maintain minimum 12" separation between conduits. Conduit shall be minimum 4" Schedule 40 PVC.
3. Gaps around conduit at knockout openings shall be sealed with cement mortar to prevent backfill from entering vault.
4. Seal conduit ends with foam spray SC 0413816, if necessary.
5. Install temporary deadend marker to identify end of conduit stub. Refer to DTR 54.118.
6. Select splices from DTR 33.501-502.
7. Install two galvanized steel ground rods, spaced minimum 8' apart, adjacent to each vault and ground cable in accordance with DTR 78.151. Provide #6 Cu bond for communications companies.

ORIGINAL 38206	VAULT - POLYMER CONCRETE - THREE-PHASE DIRECT-BURIED CONDUIT SYSTEM - FUTURE LOOPED TRANSFORMER OR EXTENSION		
APPROVED 38206 <i>TM</i>	NORTHEAST UTILITIES CONSTRUCTION STANDARD DTR 51.605		

## PROPERTY REQUIRED SPECIFICATIONS