



HISTORIC PRESERVATION COMMISSION

Marc Elrich
County Executive

Sandra I. Heiler
Chairman

Date: September 25, 2020

MEMORANDUM

TO: Mitra Pedoeem
Department of Permitting Services

FROM: Dan Bruechert
Historic Preservation Section
Maryland-National Capital Park & Planning Commission

SUBJECT: Historic Area Work Permit # 925848 - Solar Panels

The Montgomery County Historic Preservation Commission (HPC) has reviewed the attached application for a Historic Area Work Permit (HAWP). This application was **approved** at the September 23, 2020 HPC meeting.

The HPC staff has reviewed and stamped the attached construction drawings.

THE BUILDING PERMIT FOR THIS PROJECT SHALL BE ISSUED CONDITIONAL UPON ADHERENCE TO THE ABOVE APPROVED HAWP CONDITIONS AND MAY REQUIRE APPROVAL BY DPS OR ANOTHER LOCAL OFFICE BEFORE WORK CAN BEGIN.

Applicant: Elliot Andalman
Address: 6 Montgomery Ave., Takoma Park

This HAWP approval is subject to the general condition that the applicant will obtain all other applicable Montgomery County or local government agency permits. After the issuance of these permits, the applicant must contact this Historic Preservation Office if any changes to the approved plan are made. Once work is complete the applicant will contact Dan Bruechert at 301.563.3400 or dan.bruechert@montgomeryplanning.org to schedule a follow-up site visit.



SOLAR PV SYSTEM: 3.6 kWp

ANDALMAN RESIDENCE 6 MONTGOMERY AVENUE TAKOMA PARK, MD UNITED STATES 20912

PROJECT INFORMATION

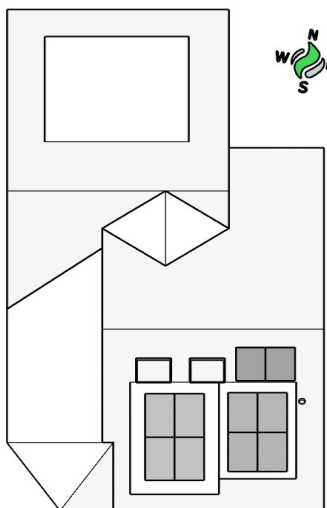
OWNER: ELLIOTT ANDALMAN
ADDRESS: 6 MONTGOMERY AVENUE
 TAKOMA PARK, MD UNITED STATES 20912

AHJ: MONTGOMERY
ADDRESS: 255 ROCKVILLE PIKE, 2ND FLOOR ROCKVILLE, MD 20850

ZONING: RESIDENTIAL
BUILDING CODE: IBC 2018
ELECTRICAL CODE: NEC 2017
ASCE VERSION: ASCE 7-16

SNOW LOAD: 30 PSF
WIND SPEED: 115 MPH
WIND EXPOSURE: B

DC RATING: 3.6 kW
AC RATING: 2.9 kW
RACKING: UNIRAC SM LIGHT RAIL
MODULE: (10) REC360AA
INVERTER: (10) IQ7PLUS-72-2-US



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PROJECT SCOPE

THIS PROJECT INVOLVES THE INSTALLATION OF (10) REC 360W SOLAR MODULES. THE SOLAR MODULES WILL BE RACKED USING A PRE-ENGINEERED RACKING SYSTEM. THE RACKED MODULES WILL BE ELECTRICALLY CONNECTED TO (10) ENPHASE DC TO AC POWER INVERTERS, AND INTERCONNECTED TO THE LOCAL UTILITY USING MEANS AND METHODS CONSISTENT WITH THE RULES ENFORCED BY THE LOCAL UTILITY AND PERMITTING JURISDICTION.

PROJECT ADDRESS:

ELLIOTT ANDALMAN
 6 MONTGOMERY AVENUE
 TAKOMA PARK, MD
 UNITED STATES 20912

CONTRACTOR INFO:

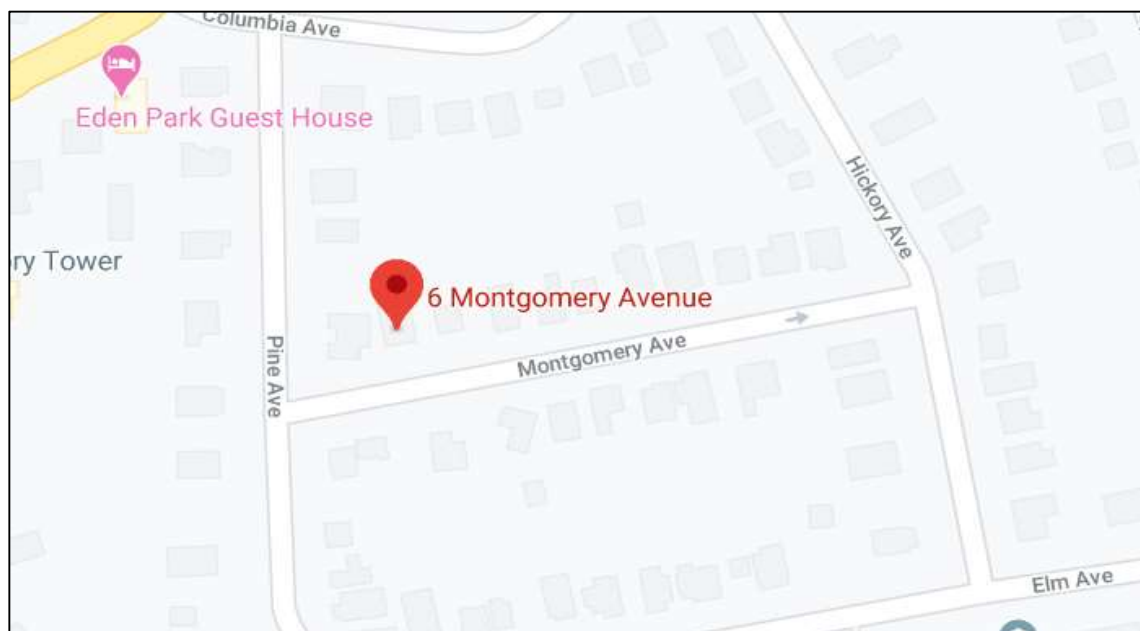


3600 COMMERCE DR
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 BALTIMORE, MD 21227
 (443) 955-0779

LICENSE NUMBER:

MHIC-30991

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	INVERTER DATASHEET
	RACKING DATASHEET
	ANCHOR DATASHEET



APPROVED
 Montgomery County
 Historic Preservation Commission

Sandra L. Heiler

REVIEW
 By Dan.Bruechert at 3:28 pm, Oct 09, 2020



Professional Certification: I hereby certify that these documents were prepared or approved by me and that I am a duly licensed professional engineer under the laws of the State of Maryland.
 License No.: 41308 Exp. Date: 01-06-2022
 STAMPED AND SIGNED FOR STRUCTURAL ONLY

DocuSigned by:
Scott Kirby
 8/18/2020
 CAD180010D814CD...

GENERAL NOTES

- THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (NEC) ARTICLE 690, ALL MANUFACTURERS'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION (AHJ).
- PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION TO REDUCE SHOCK HAZARD FOR EMERGENCY RESPONDERS IN ACCORDANCE WITH 690.12(A) THROUGH (D).
- THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM, AND THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE.
- ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE AND AS REQUIRED BY THE NEC AND AHJ.
- PV EQUIPMENT SHALL BE GROUNDED ACCORDING TO NEC 690.43 AND MINIMUM NEC TABLE 250.122.

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REV	DATE
IFC	8/25/2020

COVER

Z001

ROOF LABEL:	A	B	C
MATERIAL:	Architectual Comp. Shingle	Architectual Comp. Shingle	Architectual Comp. Shingle
PITCH:	45°	21°	32°
AZIMUTH:	170°	170°	170°
PRIMARY SUPPORT:	2x10 RAFTERS	2x8 RAFTERS	2x6 RAFTERS
PRIMARY SUPPORT SPACING:	16"	16"	24"
LEAST HORIZONTAL DIMENSION:	22'	13'	11'
MEAN HEIGHT:	25'	20'	20'
RACKING:	UNIRAC SM LIGHT RAIL	UNIRAC SM LIGHT RAIL	UNIRAC SM LIGHT RAIL
STANDOFF:	UNIRAC FLASHLOC	UNIRAC FLASHLOC	UNIRAC FLASHLOC

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- ALL SOLAR MODULES SUPPORTED BY ROOF ATTACHMENTS 48" O.C.

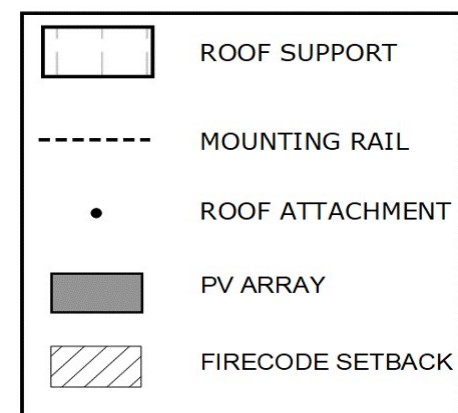
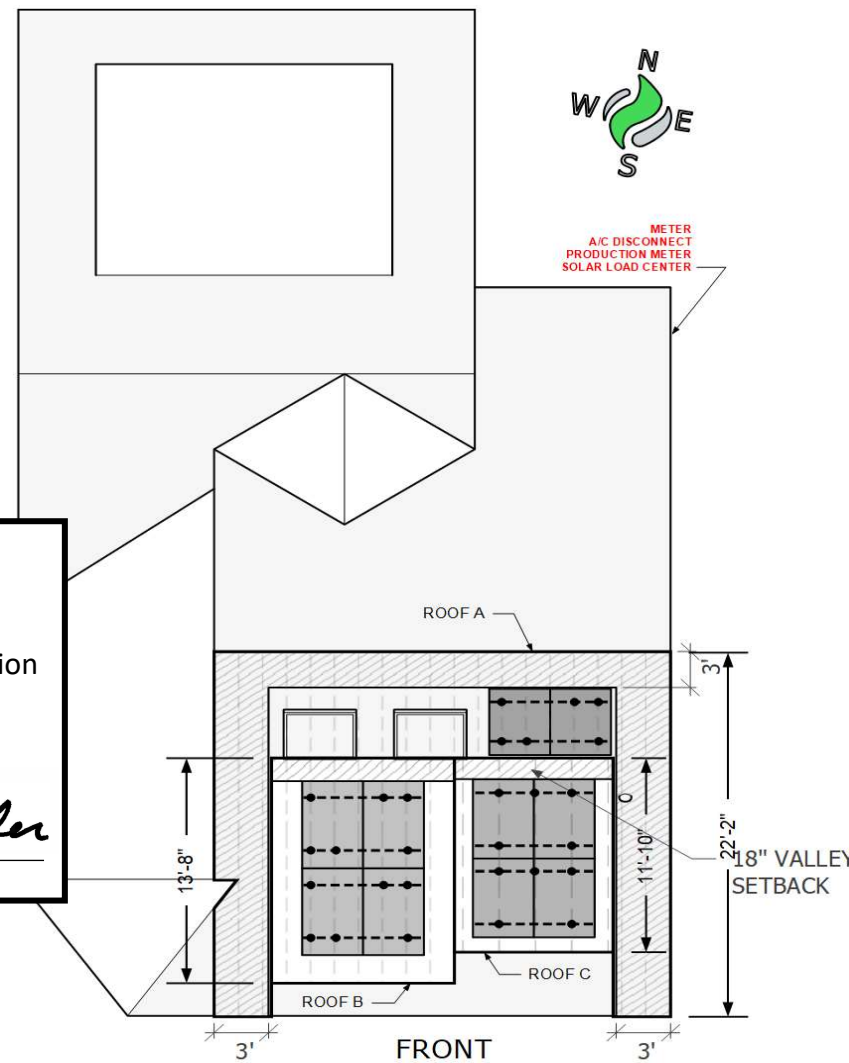
- SOLAR PHOTOVOLTAIC SYSTEM INSTALLED PARALLEL TO ROOF SURFACE

- SOLAR PHOTOVOLTAIC SYSTEM INSTALLED AT A MAXIMUM HEIGHT OF 6" ABOVE ROOF SURFACE

APPROVED
Montgomery County
Historic Preservation Commission
Sandra L. Heiler

REVIEWED
By Dan.Bruechert at 3:29 pm, Oct 09, 2020

DocuSigned by:



PROJECT ADDRESS:

ELLIOTT
ANDALMAN
6 MONTGOMERY AVENUE
TAKOMA PARK, MD
UNITED STATES 20912

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INSTALLATION NOTES

- 1) ALL RACKING SHALL BE INSTALLED PER MANUFACTUER SPECIFICATIONS
- 2) ALL ROOFING PENETRATIONS SHALL EMBED IN STRUCTURAL MEMBERS AND PROPER FLASHING SEALANT SHALL BE USED TO PROVIDE WATERTIGHT ASSEMBLY
- 3) WHEN POSSIBLE, ALL RACKING STANDOFFS WILL BE STAGGERED AMONGST THE ROOF SUPPORT MEMBERS
- 4) REFER TO PAGE S001 FOR MAXIMUM ALLOWABLE RAIL SPAN AND MODULE OVERHANG, AND ATTACHMENT DETAILS
- 5) ALL RACKING AND STRUCTURAL WORK FOR THIS PROJECT SHALL COMPLY WITH BUILDING CODE, IBC 2018 AND ASCE 7-16

REV	DATE
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ATTACHMENT &
SITE PLAN

A001

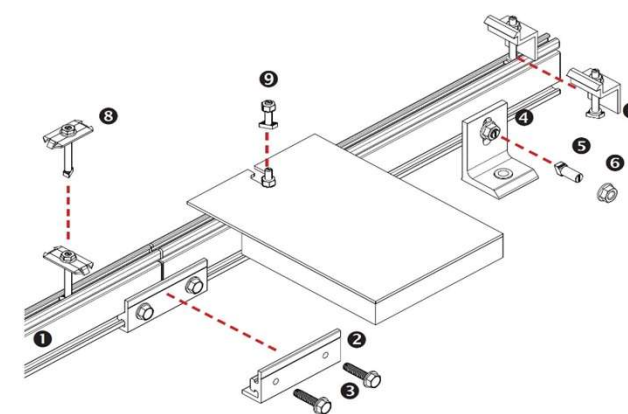
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MOUNTING SYSTEM PROPERTIES	
RACKING	UNIRAC SM LIGHT RAIL
STANDOFF	UNIRAC FLASHLOC
FASTENING DETAILS	SEE NOTE 3
MAX. RAIL SPAN	48"
MIN. FASTENER DEPTH	2.25"
MAX. RAIL CANTILEVER	16"
MAX. ARRAY HEIGHT	6"

SITE CONDITIONS	
WIND SPEED	115 MPH
SNOW LOAD	30 PSF
ROOF ZONE (TYP.)	3
BUILDING CODE	IBC 2018
ELECTRICAL CODE	NEC 2017
ASCE VERSION	ASCE 7-16

DEAD LOAD CALCULATION			
LOAD	QTY. OR LIN. FT.	WEIGHT PER (LB)	TOTAL LBS.
MODULES	10	43	430.00
M.L.E.'S	10	2.38	23.80
RACKING	71.9	0.81	58.22
STANDOFF	35	0.5	17.50
TOTAL ARRAY WEIGHT (LBS)			529.5
TOTAL ARRAY AREA (SQ.FT.)			188.2
DISTRIBUTED LOAD (PSF)			2.81

POINT LOAD CALCULATION	
TOTAL ARRAY WEIGHT (LBS)	529.52
TOTAL NUMBER OF STANDOFFS (TYP.)	35
POINT LOAD (LBS/STANDOFF)	15.13



- **RAIL:** Supports PV modules. Use row of modules. Aluminum extru mill, clear anodized, or dark anodiz
 - **RAIL SPLICE:** Non structural s aligns, and electrically bonds rail s single length of rail. Forms a rigid inches long, preassembled with bo Available in dark anodized or mill f
 - **L-FOOT:** Use to secure rails thro material to building structure. Refe tables or U-Builder for spacing.
 - **L-FOOT T-BOLT:** (3/8" x 3/4" or 1" L-foot to secure rail to L-foot. Stain Supplied with L-foot in combinatio nut, provides electrical bond between L
 - **SERRATED FLANGE NUT:** Use or to secure and bond rail to Lfoot. St Supplied with L-foot.
 - **MODULE ENDCLAMP:** Provides endclamp. Pre-assembled aluminu in clear or dark finish. Supplied wa and bolt upright for ease of assem
 - **MODULE MIDCLAMP:** Pre-as provides module to module and m Stainless steel clamp and T-bolt, or dark finish.
 - **MICROINVERTER MOUNTING BOI** bolt and nut attaches and bonds rail. Washer at base keeps bolt up assembly.
- NOTE - POSITION INDICATOR:** T-bc the hardware end corresponding t the T-Head.

Wrenches and Torque		
	Wrench Size	Recommended Torque (#-lbs)
1/4" Hardware ●●●	7/16"	*10
3/8" Hardware ●	9/16"	*30
#12 Hardware ●	5/16"	10

Torques are not designed for use with wood connectors
*w/Anti-Seize.

Anti-Seize*

Stainless steel hardware can seize up, a process called galling. To significantly reduce its likelihood:

1. Apply minimal lubricant to bolts, preferably Anti-Seize commonly found at auto parts stores
2. Shade hardware prior to installation, and
3. Avoid spinning stainless nuts onto bolts at high speed.

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PROJECT ADDRESS:

**ELLIOTT
ANDALMAN**
6 MONTGOMERY AVENUE
TAKOMA PARK, MD
UNITED STATES 20912

CONTRACTOR INFO:



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BALTIMORE, MD 21227
(443) 955-0779

LICENSE NUMBER:

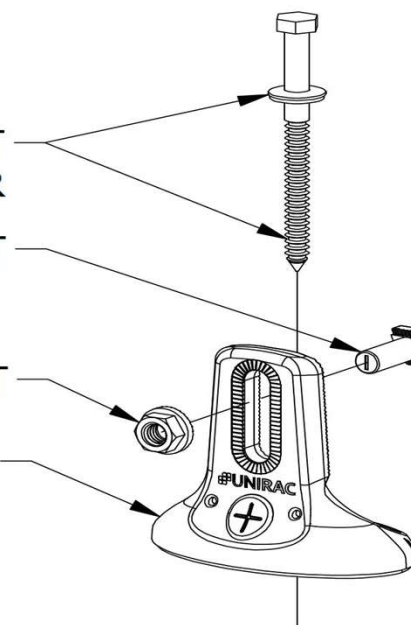
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SS LAG BOLT
W/ SS EPDM BONDED WASHER

SS SERRATED T-BOLT

SS SERRATED FLANGE NUT

FLASHLOC BASE
MILL OR DARK



APPROVED
Montgomery County
Historic Preservation Commission

Sandra J. Heiler

DocuSigned by:

REVIEWED

By Dan.Bruechert at 3:29 pm, Oct 09, 2020



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RACKING AND STRUCTURAL NOTES

- 1) ALL RACKING SHALL BE INSTALLED PER MANUFACTUER SPECIFICATIONS
- 2) M.L.E.'S = MODULE LEVEL ELECTRONICS (IE, POWER OPTIMIZERS, MICRO-INVERTERS, CABELS, ETC)
- 3) USE 5/16" X 4"HEX HEAD STAINLESS STEEL LAG SCREWS

4) ALL RACKING AND STRUCTURAL WORK FOR THIS PROJECT SHALL COMPLY WITH BUILDING CODE, IBC 2018 AND ASCE 7-16

REV	DATE
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**ASSEMBLY &
LOAD CALCS**

S001

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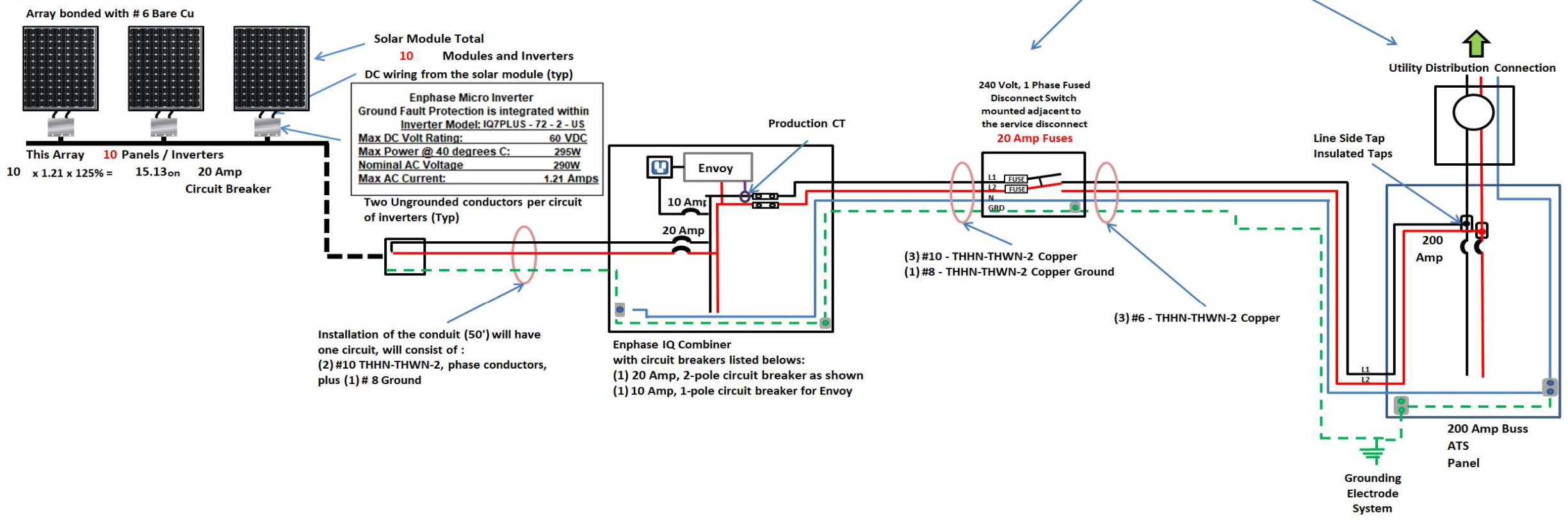
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When the AC utility source is removed from the inverter output circuits via any means, such as an AC breaker, AC disconnect or removal of the solar or main utility service meter, this equipment performs the rapid shutdown function per 690.12.

All conduit sizing will be in accordance to the NEC, Chapter #9

Elliott Andalman and Martha Bergmark
 6 Montgomery Avenue
 Takoma Park, MD 20912



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- ELECTRICAL NOTES**
- 1) ALL EQUIPMENT TO BE LISTED AND LABELED FOR ITS APPLICATION
 - 2) WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC110.26
 - 3) IF USED, PV POWER SOURCE BREAKER TO BE LOCATED AT BOTTOM OF BUS PER NEC690.64(b)(7)
 - 4) LISTING AGENCY NAME AND NUMBER TO BE INDICATED ON INVERTERS AND MODULES PER NEC110.3(b)
 - 5) AC COMBINER PANELS SHALL BE LABELED AS "INVERTER AC COMBINER PANEL"
 - 5) PV POWER SOURCE TO BE SUITABLE FOR BACKFEED PER NEC690.64(b)(5)

REV	DATE
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ELECTRICAL - LINE DIAGRAM

E001

Interconnection
Line Side Tap
Wire Size #10 AWG

WIRE SIZING CALCULATION
2011/2014 NEC Article 310

Full Load Amperage : 12.1
Source Voltage : 240
Length of Run (Feet) : 30
Load Duty : Continuous
Conductor Type : THWN-2
Conductor Material..... : Copper
Conductor Location : Dry or Wet
Conductor Insulation Temperature : 90 °C
Ambient Temperature : 26-30 °C = 78-86 °F
Terminal Temperature Rating : 60 °C
Circuit Type : Single Phase 2 Wire (2 phase conductors, or phase & neutral)
Qty. of Circuit Current-Carrying Conductors : 2
Conductor Requirement:
Full Load Amps : 12.1
Load Duty Multiplier : 1.25
Ambient Temp. Multiplier . : 1.15
Qty. Conductors Multiplier : 1.0

Required Conductor Ampacity: 17.39
Terminal Requirement:
Full Load Amps : 12.1
Load Duty Multiplier : 1.25

Required Terminal Ampacity : 15.13
Selected Conductor:
Conductor Ampacity : 40.0
Ambient Temp. Derate : 0.87
Qty. Conductors Derate ... : 1.0

Adjusted Ampacity : 34.8
SELECTED CONDUCTOR SIZE : 10 Awg
 $2 \times \text{Ohms/MilFt} \times \text{Length} \times \text{Amps} = 2 \times 1.24 \times 30 \times 17.39$
 $\text{VD} = \frac{\quad}{1000 \times \text{Qty Wires per Phase}} = \frac{\quad}{1000 \times 1} = 0.9$
Volts At Load Terminals..... : 239.1
Actual Percent Voltage Drop . : 0.38

Combiner to Array
Wire Length 50'
Wire Size #10 AWG

WIRE SIZING CALCULATION
2011/2014 NEC Article 310

Full Load Amperage : 12.1
Source Voltage : 240
Length of Run (Feet) : 50
Load Duty : Noncontinuous
Conductor Type : THWN-2
Conductor Material..... : Copper
Conductor Location : Dry or Wet
Conductor Insulation Temperature : 90 °C
Rooftop Installation: NEC 310.15(B)(3)(c)
Distance Above Roof : 23mm (7/8 inch) or greater above rooftop
Average Outside Temp : 90 Deg. F 32.2 Deg. C
Temperature Adder : 60 Deg. F 33 Deg. C

Adjusted Ambient Temperature ... : 150.0 Deg. F 65.2 Deg. C
Terminal Temperature Rating : 60 °C
Circuit Type : Single Phase 3 Wire (2 phase conductors & neutral)
Qty. of Circuit Current-Carrying Conductors : 2
Conductor Requirement:
Full Load Amps : 12.1
Load Duty Multiplier : 1.0
Ambient Temp. Multiplier . : 1.72
Qty. Conductors Multiplier : 1.0

Required Conductor Ampacity: 20.81
Terminal Requirement:
Full Load Amps : 12.1
Load Duty Multiplier : 1.0

Required Terminal Ampacity : 12.1
Selected Conductor:
Conductor Ampacity : 40.0
Ambient Temp. Derate : 0.58
Qty. Conductors Derate ... : 1.0

Adjusted Ampacity : 23.2
SELECTED CONDUCTOR SIZE : 10 Awg
 $2 \times \text{Ohms/MilFt} \times \text{Length} \times \text{Amps} = 2 \times 1.24 \times 50 \times 20.81$
 $\text{VD} = \frac{\quad}{1000 \times \text{Qty Wires per Phase}} = \frac{\quad}{1000 \times 1} = 1.5$
Volts At Load Terminals..... : 238.5
Actual Percent Voltage Drop . : 0.63

ELECTRICAL NOTES

- 1) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 90°C AND WET ENVIRONMENT, UNLESS OTHERWISE NOTED.
- 2) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- 3) MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER MANUFACTURER'S INSTRUCTION.

- 4) MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER GEC VIA WEEB LUG PER NEC690.4(c)

CALCULATION FOR PV BREAKER					
CALCULATION FOR MAIN PV BREAKER & CIRCUITS					
SYSTEM CURRENT:	1.21	x	10	=	12.1 A
DESIGN AMPERAGE:	12.1	x	125%	=	15.125 A
MAIN BUSS RATING:	200	x	120%	=	240 A
EXISTING MAIN BREAKER:				=	200 A
MAX SOLAR BREAKER:	240	-	200	=	40 A
CIRCUIT #1 =	10	x	1.21 x 125% =		15.13 A

FOR PERMITTING USE ONLY

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6 MONTGOMERY AVENUE
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ELECTRICAL - WIRE CALCS

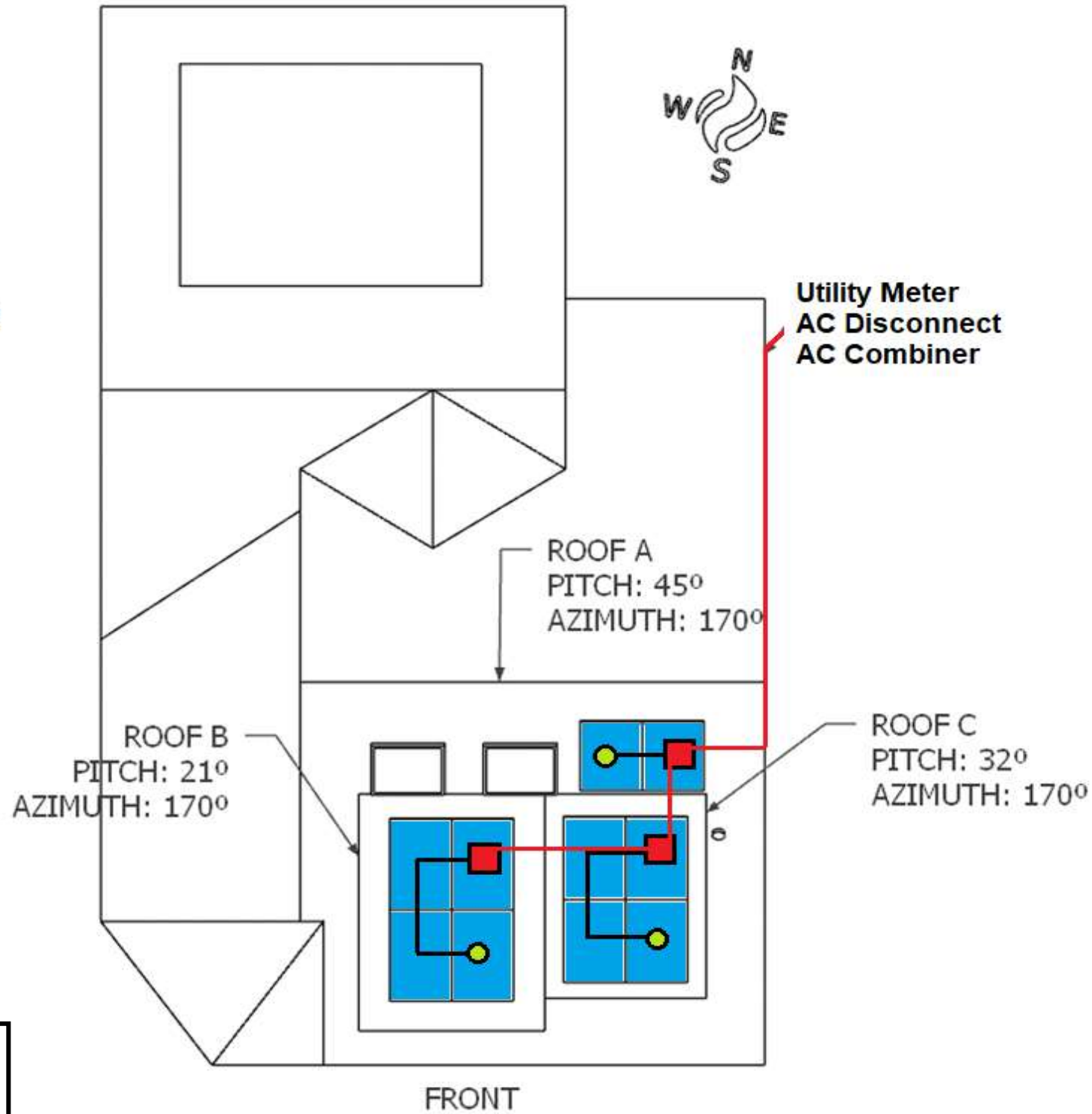
E002

APPROVED
Montgomery County
Historic Preservation Commission

Sandra L. Heiler

APPROVED

- Circuit 1 (10)
- Junction Box
- End Cap
- Trunk Cable
- Exterior Conduit



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STRING & CONDUIT LAYOUT

E003

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REVIEWED
By Dan.Bruechert at 3:29 pm, Oct 09, 2020

ELECTRICAL NOTES

SOLAR MODULE RATINGS		
REC 360 Specifications		
Length:	67.75	in
Width:	40	in
Thickness:	1.18	in
Weight:	43	lbs
I _{mp} :	9.55	A
V _{mp} :	37.7	V
V _{oc} :	44.3	V
I _{sc} :	10.16	A
OCPD:	25	A
P _{max} :	360	W
V _{max} :	1000	V
Temp. Coefficient:	-0.24	%V _{oc} /°C

INVERTER 1 RATINGS		
IQ7PLUS-72-2-US Specifications		
Max # Per String:	13	
I _{max} (ac):	1.21	A
V _{max} (dc):	60	V
P _{max} :	290	W
Nom. AC Voltage:	240	V
OCPD:	20	A
Weight (Optimizer):	2.38	lbs
I _{max} (Input):	15	A
P _{max} (dc) Input:	N/A	V

WARNING: PHOTOVOLTAIC POWER SOURCE

LABEL TO BE INSTALLED AT EXPOSED RACEWAYS, CABLE TRAYS, AND OTHER WIRING METHODS; SPACED AT MAXIMUM 10FT SECTION OR WHERE SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS. [NEC 690.31(G)]
LETTERS AT LEAST 3/8 INCH; WHITE ON RED BACKGROUND; REFLECTIVE [IFC 605.11.1.1]

PHOTOVOLTAIC DC DISCONNECT

LABEL TO BE INSTALLED AT EACH DC DISCONNECTING MEANS [NEC 690.13(B)]

PHOTOVOLTAIC AC DISCONNECT

LABEL TO BE INSTALLED AT EACH AC DISCONNECTING MEANS [NEC 690.13(B)]

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

LABEL TO BE INSTALLED AT RAPID SHUTDOWN SWITCH [NEC 690.56(C)]
LETTERS AT LEAST 3/8 INCH; WHITE ON RED BACKGROUND; REFLECTIVE [IFC 605.11.1.1]

SOLAR PV SYSTEM DISCONNECT

RATED AC OUTPUT CURRENT: 12.1 A
NOMINAL OPERATING AC VOLTAGE: 240 V

LABEL TO BE INSTALLED AT AN ACCESSIBLE LOCATION AT THE DISCONNECTING MEANS AS A POWER SOURCE [NEC 690.54]

WARNING

ELECTRICAL SHOCK HAZARD

DO NOT TOUCH TERMINALS! TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL TO BE INSTALLED AT EACH DISCONNECTING MEANS FOR PHOTOVOLTAIC EQUIPMENT [NEC 690.13 AND 690.15]

WARNING

ELECTRICAL SHOCK HAZARD

IF GROUND FAULT IS INDICATED NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

LABEL TO BE INSTALLED AT EACH DISCONNECTING MEANS FOR PHOTOVOLTAIC EQUIPMENT [NEC 690.13 AND 690.15]

WARNING

DUAL POWER SOURCE SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL TO BE INSTALLED ON EXTERIOR OF MAIN ELECTRICAL PANEL

WARNING

INVERTER OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL TO BE APPLIED TO THE DISTRIBUTION EQUIPMENT [NEC 690.64(B)(7)]

INTERACTIVE PHOTOVOLTAIC SYSTEM CONNECTED

LABEL TO BE INSTALLED AT UTILITY METER [NEC 690.56(B)]

SOLAR PV LOADCENTER
3.6 kW DC SOLAR ARRAY
240 VOLT AC SYSTEM

INSTALLED COMPONENTS
(10) REC 360W Modules
(10) IQ7PLUS-72-2-US Inverters

CIRCUIT CALCULATIONS

SYSTEM CURRENT: 1.21 x 10 = 12.1 A
DESIGN AMPERAGE: 12.1 x 125% = 15.125 A

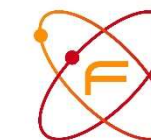
CIRCUIT #1 = 10 x 1.21 x 125% = 15.13

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EQUIP. RATINGS & SIGNAGE

E004

SIGNAGE NOTES

- 1) ALL PLAQUES AND LABELS SHALL HAVE A RED BACKGROUND (OR AS SHOWN HERE)
- 2) ALL LETTERING SHALL BE WHITE AND HAVE A MINIMUM HEIGHT OF 3/8" (OR AS SHOWN HERE)
- 3) FONT SHALL BE ARIAL (OR SIMILAR) AND ALL LETTERING SHALL BE CAPITALIZED
- 4) ALL PLAQUES AND LABELS SHALL BE OF A MATERIAL SUITABLE FOR THE ENVIRONMENT INSTALLED

APPROVED

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Sandra L. Heiler

REVIEWED

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