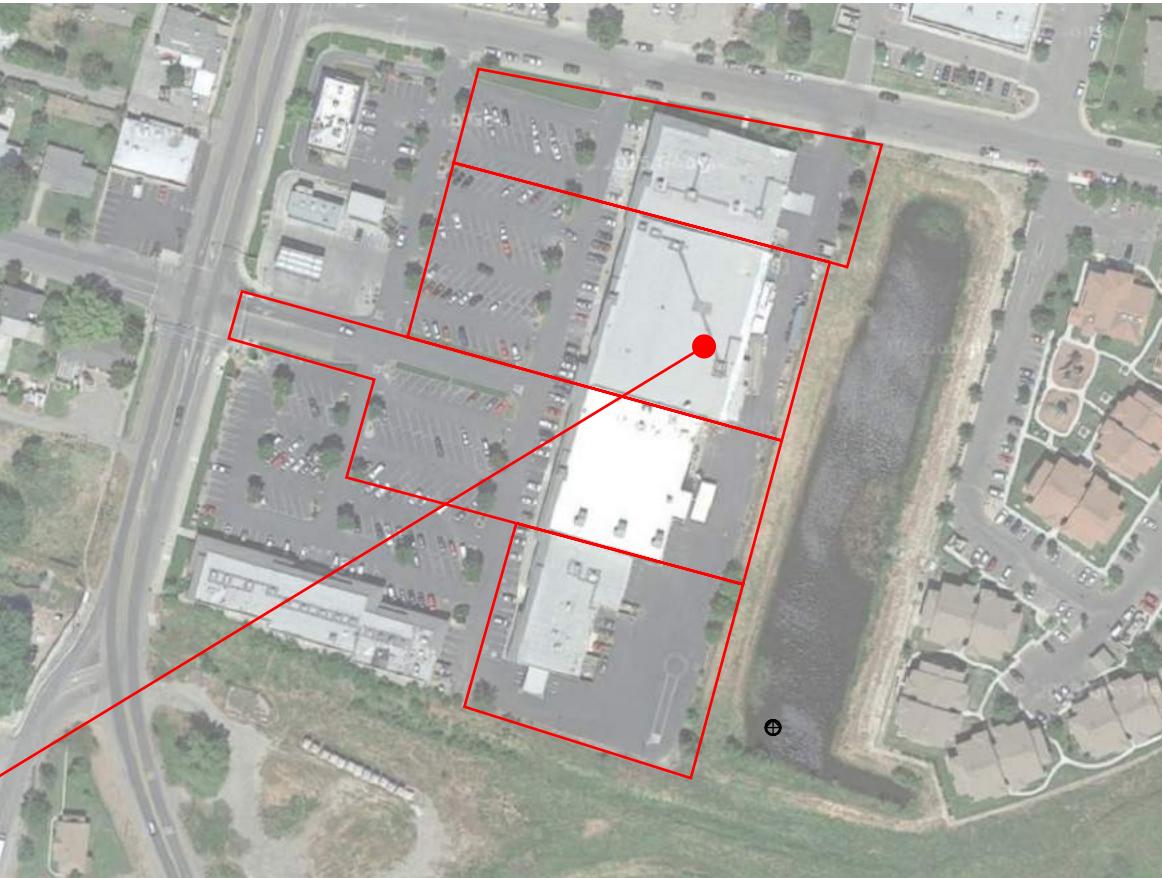
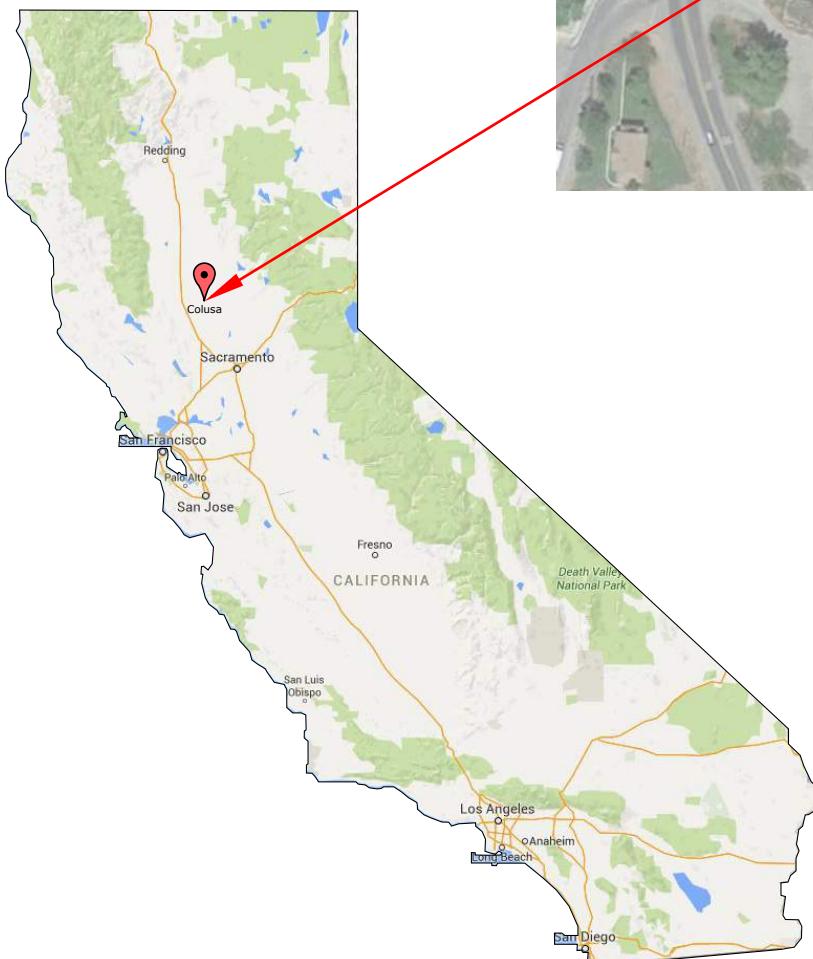


SOLAR PHOTOVOLTAIC SYSTEM

NORTH STATE GROCERY

COLUSA, CA



SITE INFORMATION

Site Latitude	39° 12'
Occupancy Group	II
Zoning District	M-U-B
Flood Zone	X
Exposure Category	C

SYSTEM SPECIFICATIONS

Cold Design Temperature	23° F
Max Operating Temperature	131° F
Total # of Inverters	14
Total # of Modules	1,716
TOTAL DC SYSTEM SIZE	497.64 kW DC
Nominal AC Output Power	467 kW AC

GENERAL CONTRACTOR

BRIGHT POWER INC
DBA BPi
PO BOX 10637
NAPA, CA 94581
info@bpi-power.com
PHONE: (707) 252-9990
FAX: (707) 252-9992
WWW.BPI-POWER.COM
LICENSE NUMBER 930054
LICENSE CLASSIFICATION: A, C10

PROPERTY OWNER

GREGORY PARTNERS, L.P.
ATTN: JON SNYDER
P.O. BOX 1018
RANCHO MURIETA, CA 95683

ELECTRICAL ENGINEER

HIMANSHU BHARTIYA, ME, EE, FPE, LEED AP
SACRAMENTO ENGINEERING CONSULTANTS
10555 OLD PLACERVILLE ROAD
SACRAMENTO, CA 95827
himanshu@saceng.com
PHONE: (916) 368-4468 ext. 105
FAX: (916) 368-4490

STRUCTURAL ENGINEER

JESSYCA COCHRAN, PE
JVC ENGINEERING
303 POST ST
NAPA, CA 94559
jvcstructural@yahoo.com
PHONE: (805) 801-9915

SCOPE OF WORK

THE PROJECT IS TO INSTALL A NEW PHOTOVOLTAIC SYSTEM.
ALL CONSTRUCTION SHALL COMPLY WITH THE CODES ADOPTED BY THE CITY
OF COLUSA, CA AS DESCRIBED IN COLUSA, CA MUNICIPAL CODE SEC. 6
ARTICLE II INCLUDING BUT NOT LIMITED TO 2013 CEC & 2013 CBC.

THE SYSTEM CONSISTS OF ROOF MOUNT FIXED TILT SOLAR ARRAYS, FLUSH
MOUNT ON SOLAR SUPPORT STRUCTURES, AND ASSOCIATED POWER
CONDITIONING EQUIPMENT.

THE SYSTEM WILL BE INTERCONNECTED TO AND WILL BE OPERATING IN
PARALLEL WITH THE ELECTRICAL UTILITY GRID PER THE REQUIREMENTS OF
PG&E AND THE 2013 CEC.

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PV0.4B	MODULE LAYOUT OVERVIEW
PV0.5A	ROOF ARRAY DIMENSIONS & INVERTER FOOTPRINTS
PV0.5B	ROOF ARRAY DIMENSIONS & INVERTER FOOTPRINTS
PV0.5C	SOLAR STRUCTURE STRING DIAGRAM & INVERTER FOOTPRINTS
PV0.1	ARRAY PLAN
PV1.1	ARRAY PLAN
PV1.2	ARRAY PLAN
PV1.3	ARRAY PLAN
PV1.4	ARRAY PLAN
PV1.5	ARRAY PLAN
PV1.6	METER-AREA PLAN
PV2.1A	SINGLE-LINE DIAGRAM
PV2.1B	SINGLE-LINE DIAGRAM
PV3.1	PV DETAILS
PV4.1	PV SIGNAGE
S0.1	GENERAL STRUCTURAL NOTES
S2.1	STRUCTURES 1, 2, 3 - FOUNDATION & FRAMING PLAN
S2.2	STRUCTURES 4 - FOUNDATION & FRAMING PLAN
S2.3	STRUCTURES 5 - FOUNDATION & FRAMING PLAN
S2.4	STRUCTURES 6 - FOUNDATION & FRAMING PLAN
S3.1	DETAILS
S4.0	ROOF RACKING DETAIL

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COLUSA, CA 95932
APN: 002-120-011

PVO
TITLE SHEET



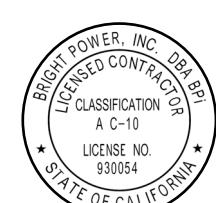
DATE: 6-14-16
BY: JB
JOB NO.: C15-700.1

BPi	PO BOX 10637
	NAPA, CA 94581
	PH: (707)-252-9990

GENERAL NOTES		8.	REFILL AND RESTORE THE WORK AS DIRECTED, DURING CONSTRUCTION AND PRIOR TO PROJECT COMPLETION, TO MAINTAIN ACCEPTABLE SURFACE CONDITIONS.	17.	ALL CONSTRUCTION AND MATERIAL DELIVERY VEHICLES SHALL USE THE <u>SITE CLEARING NOTES (IF APPLICABLE)</u>				
1. ALL CONSTRUCTION SHALL COMPLY WITH THE CODES ADOPTED BY THE CITY OF COLUSA, CA AS DESCRIBED IN COLUSA, CA MUNICIPAL CODE SEC. 6 ARTICLE II INCLUDING BUT NOT LIMITED TO 2013 CEC & 2013 CBC.		9.	ALL ADDITIONAL MATERIALS REQUIRED SHALL BE FURNISHED WITHOUT ADDITIONAL COST TO THE OWNER.		DESIGNATED ACCESS AND HAUL ROUTE(S) TO THE CONSTRUCTION SITE. ANY DEVIATION IN ROUTE(S) SHALL BE SUBJECT TO OWNER'S APPROVAL. THE ROUTE(S) SHALL BE MONITORED DURING THE PROJECT FOR ANY DAMAGE AND DEBRIS ATTRIBUTABLE TO THE PROJECT VEHICLES. ALL DAMAGE AND DEBRIS AS A RESULT OF THE PROJECT SHALL BE REPAIRED TO EXISTING STANDARDS.	1.	PROTECT FROM DAMAGE AND PRESERVE TREES, SHRUBS, AND OTHER PLANTS OUTSIDE THE LIMITS OF WORK AND WITHIN THE LIMIT OF THE WORK WHICH ARE DESIGNATED TO REMAIN UNDISTURBED.		
2. BEFORE INITIATING ANY WORK, THE CONTRACTOR SHALL NOTIFY ENGINEER OF RECORDS OF ANY DISCREPANCIES IDENTIFIED ON EXISTING CONDITIONS, STRUCTURE, ELECTRICAL, ETC.		10.	UNLESS SHOWN OR SPECIFIED OTHERWISE, ALL CONSTRUCTION AND MATERIALS SHALL COMPLY WITH THE LATEST EDITION OF THE IBC, AND ANY OTHER CODES, REQUIREMENTS OR STANDARDS REQUIRED BY THE INSPECTING AGENCY AND AUTHORITIES HAVING JURISDICTION (AHJ).	18.	CONDUCT OPERATION ENTIRELY WITHIN THE PROJECT AREAS INDICATED IN THESE DRAWINGS.	2.	REMOVE OBSTRUCTIONS, TREES, SHRUBS, GRASS AND OTHER VEGETATION TO PERMIT INSTALLATION OF NEW CONSTRUCTION. REMOVAL INCLUDES DIGGING OUT STUMPS AND OBSTRUCTIONS AND GRUBBING ROOTS.		
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAFETY PRECAUTIONS, OSHA REQUIREMENTS AND SAFETY MEASUREMENTS ON SITE.		11.	ANY WORK BEGUN PRIOR TO ATTAINING APPROVAL AND SIGNATURES OF AHJ WILL BE AT CONTRACTOR'S RISK, AND WILL ONLY BE ALLOWED IF PRE-APPROVED BY PROJECT OWNER.	19.	WHERE ANY WORK IS BEING DONE IN AN OFF-SITE EASEMENT, NOTIFY THE PROPERTY OWNER TWO WORKING DAYS PRIOR TO COMMENCING WORK WITHIN SAID EASEMENT.	3.	FILL DEPRESSIONS CAUSED BY CLEARING AND GRUBBING OPERATIONS WITH SOIL MATERIAL APPROVED BY OWNER, UNLESS FURTHER EXCAVATION OR EARTHWORK IS INDICATED.		
4. CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL EQUIPMENT AND FOLLOWING ALL MANUFACTURER'S OR ENGINEER'S DIRECTIONS AND INSTRUCTIONS.		12.	COORDINATE OPERATIONS WITH ALL REQUIRED MATERIALS TESTING SERVICES AS REQUIRED BY THESE DRAWINGS. EACH PHASE OF CONSTRUCTION SHALL BE TESTED AND APPROVED BY AHJ AS REQUIRED PRIOR TO PROCEEDING TO SUBSEQUENT PHASES.	20.	DO NOT DISPOSE OF CHLORINATED OR OTHER CHEMICALLY TREATED OR POLLUTED WATER INTO ANY DRAINAGE SYSTEM OR TO AREA SOILS.	4.	STRIP TOPSOIL WHERE REQUIRED. STOCKPILE IN AREA APPROVED BY OWNER.		
5. CONTRACTOR IS ADVISED THAT ALL DRAWINGS, COMPONENT MANUALS, ESPECIALLY INVERTER MANUALS, ARE TO BE READ AND UNDERSTOOD PRIOR TO INSTALLATION OR ENERGIZING OF ANY EQUIPMENT.		13.	NOTIFY ALL UTILITY COMPANIES INVOLVED IN THE DEVELOPMENT PRIOR TO BEGINNING OF WORK.		ELECTRICAL NOTES	5.	WITH OWNER'S APPROVAL, REMOVE EXISTING ABOVE AND BELOW GRADE IMPROVEMENTS AS INDICATED AND AS NECESSARY TO FACILITATE NEW CONSTRUCTION.		
6. CONTRACTOR IS RESPONSIBLE FOR SELECTING AND PURCHASING EQUIPMENT THAT WILL LAST THE LIFETIME OF THE PV SYSTEM; ALL ENCLOSURES, CONDUITS, STRAPS, PAINTED METAL SURFACES, CONCRETE, GROUNDING EQUIPMENT AND OTHER EQUIPMENT AND OTHER PRODUCTS SHALL BE SELECTED TO LAST THE LIFECYCLE OF THE PHOTOVOLTAIC SYSTEM.		14.	COMPLY WITH ALL CURRENTLY APPLICABLE SAFETY LAWS OF ALL JURISDICTIONAL BODIES. PROVIDE AND MAINTAIN ALL BARRICADES, SAFETY DEVICES, AND CONTROL OF TRAFFIC WITHIN AND AROUND THE CONSTRUCTION AREA. FOR ALL TRENCH EXCAVATION 5 FEET OR MORE IN DEPTH, OBTAIN PERMITS PRIOR TO BEGINNING ANY EXCAVATION.	1.	SOLAR MODULES ARE ENERGIZED WHEN EXPOSED TO LIGHT. THE LINE AND LOAD TERMINALS ON THE DC DISCONNECTS MAY BE ENERGIZED IN THE OPEN POSITION. SWITCH IS TO BE LABELED TO COMPLY WITH ARTICLE 690.17 OF THE NEC.	6.	DISPOSE OF REMOVED TREES, BRUSH, STUMPS, ROOTS AND ORGANIC DEBRIS IN A LEGAL MANNER OFF THE SITE.		
7. WHENEVER ANY SURFACE IMPROVEMENTS SUCH AS PAVEMENT, CURBING, PEDESTRIAN WALKS, FENCING, OR TURFING HAVE BEEN REMOVED, DAMAGED, OR OTHERWISE DISTURBED BY THE CONTRACTOR'S OPERATIONS; THEY SHALL BE REPAIRED OR REPLACED TO THE PRE-EXISTING CONDITION. THE REPAIRS ARE TO MEET THE OWNER'S SATISFACTION.		15.	Maintain continuous temporary traffic barricades, with operable flashing devices, spaced at intervals of not to exceed 50 feet whenever the work area is adjacent to an existing traffic lane and there is a pavement cut, trench, or ditch which is over 2 inches in depth, or if the traffic lane used by vehicles is not paved. If the cut, trench or ditch is more than 10 feet from a traffic lane, then the barricade spacing may be greater, provided that it does not exceed 200 feet.	3.	CONTRACTOR SHALL PERFORM INITIAL HARDWARE CHECKS AND PV/WIRING CONDUCTIVITY CHECKS PRIOR TO TERMINATING ANY WIRES.	1.	RECORD DRAWINGS		
		16.	CONTRACTOR AGREES THAT, IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONTRACTOR SHALL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF THE CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY.	5.	THE ELECTRICAL CONTRACTOR IS REQUIRED TO USE PERMANENTLY COLOR CODED INSULATION AND PROVIDE A COLOR CODE TO IDENTIFY DC AND AC CIRCUITS AND IN ACCORDANCE WITH NEC.	2.	KEEP UP-TO-DATE AND ACCURATE A COMPLETE RECORD SET OF PRINTS FOR THE CONTRACT DRAWINGS SHOWING EVERY CHANGE FROM THE ORIGINAL DRAWINGS MADE DURING THE COURSE OF CONSTRUCTION INCLUDING FINAL LOCATION, ELEVATION, SIZES, MATERIALS, AND DESCRIPTION OF ALL WORK.		
		17.	ALL PG&E-REQUIRED EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH CURRENT PG&E GREENBOOK STANDARDS.	6.	IN EVERY PULL BOX, TERMINAL BOX, AND AT ALL PLACES WHERE WIRES MAY NOT BE READILY IDENTIFIED BY NAMEPLATE MARKINGS ON THE EQUIPMENT TO WHICH THEY CONNECT, IDENTIFY EACH CIRCUIT WITH A PLASTIC LABEL OR TAG FOR NUMBER, POLARITY, OR PHASE.		RECORDS SHALL BE "REDLINED" ON A SET OF CONSTRUCTION PLAN DRAWINGS AT THE SITE. A COMPLETE SET OF CORRECTED AND COMPLETED RECORD DRAWING PRINTS SHALL BE SUBMITTED TO OWNER PRIOR TO SUBSTANTIAL COMPLETION AT SITE.		

PV MODULE INFO	MFG	ET Solar
Model	STC Rating	ET-M660290WB/WW 290W
Vmp	290 W	290 W
Imp	32.12 V	32.12 V
Voc	9.03 A	9.03 A
Isc	39.68 V	39.68 V
Voc temp. coeff.	9.59 A	9.59 A
Isc temp. coeff.	-0.31 %/°C	-0.31 %/°C
		0.02 %/°C

	ROOFS		SOLAR SUPPORT STRUCTURES							
Inverters	Inverter #1-#2	Inverter #3	Inverter #4	Inverter #5-#6	Inverter #7-#8	Inverter #9-#10	Inverter #11-#12	Inverter #13	Inverter #14	
Manufacturer	Solectria	Solectria	Solectria	Solectria	Solectria	Solectria	Solectria	Solectria	Solectria	Solectria
Model	PVI-28TL	PVI-28TL	PVI-36TL	PVI-36TL	PVI-36TL	PVI-36TL	PVI-36TL	PVI-23TL	PVI-36TL	
Voltage AC	480	480	480	480	480	480	480	480	480	480
Nominal AC Output Power	28 kW	28 kW	36 kW	36 kW	36 kW	36 kW	36 kW	23 kW	36 kW	
CEC efficiency	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%
Number of Strings/inverter	5	5	6	6	6	6	6	3	6	
Number of Panels/string	22	22	22	22	22	22	22	22	22	
Number of Panels/inverter	110	110	132	132	132	132	132	66	132	
STC DC subsystem size	63.80 kW	31.90 kW	38.28 kW	76.56 kW	76.56 kW	76.56 kW	76.56 kW	19.14 kW	38.28 kW	
PV Module Azimuth	196°	196°	196°	196°	196°	196°	196°	196°	196°	
PV Module Tilt	10°	10°	10°	5°	5°	5°	5°	5°	5°	
Racking MFG	Renusol	Renusol	Renusol	Skyline	Skyline	Skyline	Skyline	Skyline	Skyline	
Array Location	AutoZone	South Roof	Building 2	Structure 1	Structure 2	Structure 3	Structure 4	Structure 5	Structure 6	



NSG1-COLUSA
1017 BRIDGE ST
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APN: 002-120-011

PVO.1
PROJECT DETAILS

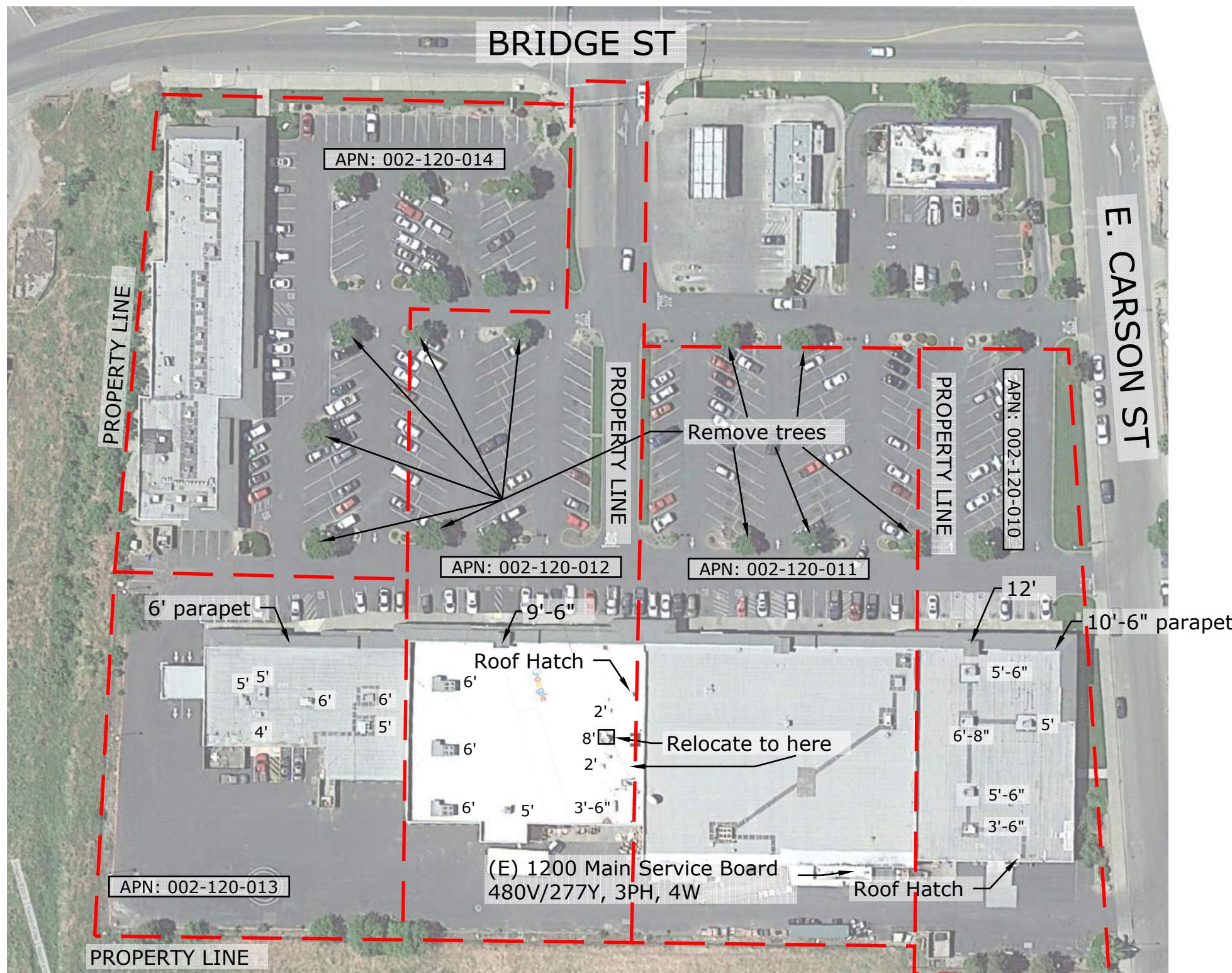
DATE: 6-14-16

BY: JB

JOB NO.: C15-700.1

BPI
PO BOX 10637
NAPA, CA 94581
PH: (707)-252-9990

Zoning District:	M-U-B
Front Setbacks:	5'
Side & Rear Setbacks:	5'



Scale: 1" = 80'

00 80 160



NSG1-COLUSA

1017 BRIDGE ST
COLUSA, CA 95932
APN: 002-120-011

PV0.2
PLOT PLAN

DATE: 6-14-16

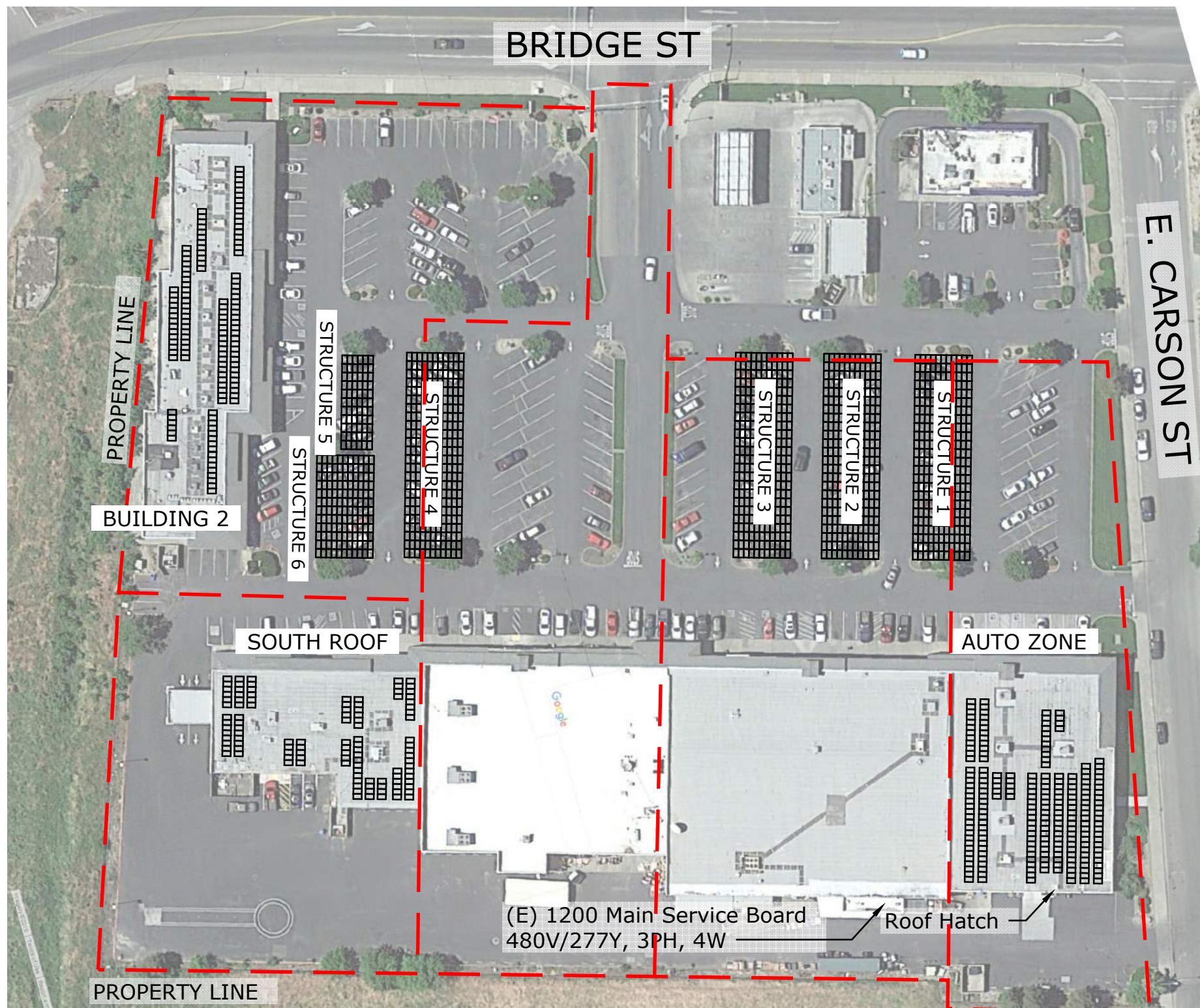
BY: JB

JOB NO.: C15-700.1

BPI
PO BOX 10637
NAPA, CA 94581
PH: (707)-252-9990



Zoning District:	M-U-B
Front Setbacks:	5'
Side & Rear Setbacks:	5'



Scale: 1" = 80'

00 80 160



NSG1-COLUSA
1017 BRIDGE ST
COLUSA, CA 95632
APN: 002-120-011

PV0.3
PV SITE PLAN

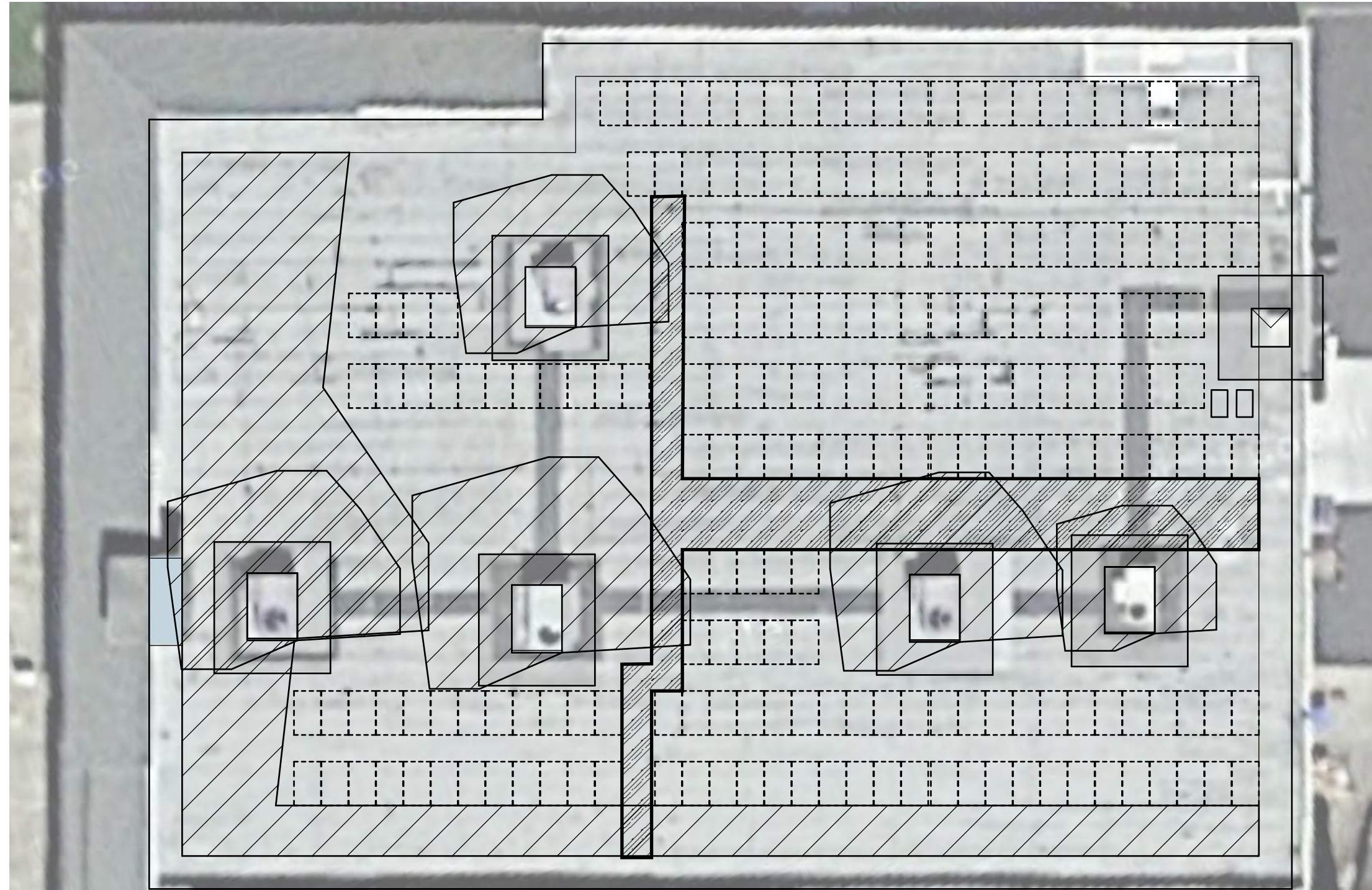
DATE: 6-14-16

BY: JB

JOB NO.: C15-700.1

BPi
PO BOX 10637
NAPA, CA 94581
PH: (707)-252-9990





□ : Shading Setback
□ : 4' Equipment Access Perimeter
□ : Fire Access Walkways

NSG1-COLUSA
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COLUSA, CA 95932
APN: 002-120-011

PVO.4A
MODULE LAYOUT
OVERVIEW
DATE: 6-14-16
BY: JB
JOB NO.: C15-700.1



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NAPA, CA 94581
PH: (707)-252-9990

BY

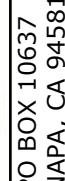
-  : Shading Setback
-  : 4' Equipment Access Perimeter
-  : Fire Access Walkways



NSG1-COLUSA
1017 BRIDGE ST
COLUSA, CA 95932
APN: 002-120-011

PVO.4B
MODULE LAYOUT
OVERVIEW

DATE: 6-14-16
BY: JB
JOB NO.: C15-700.1



BPi

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NAPA, CA 94581
PH: (707)-252-9990

REV. NO REV. DATE

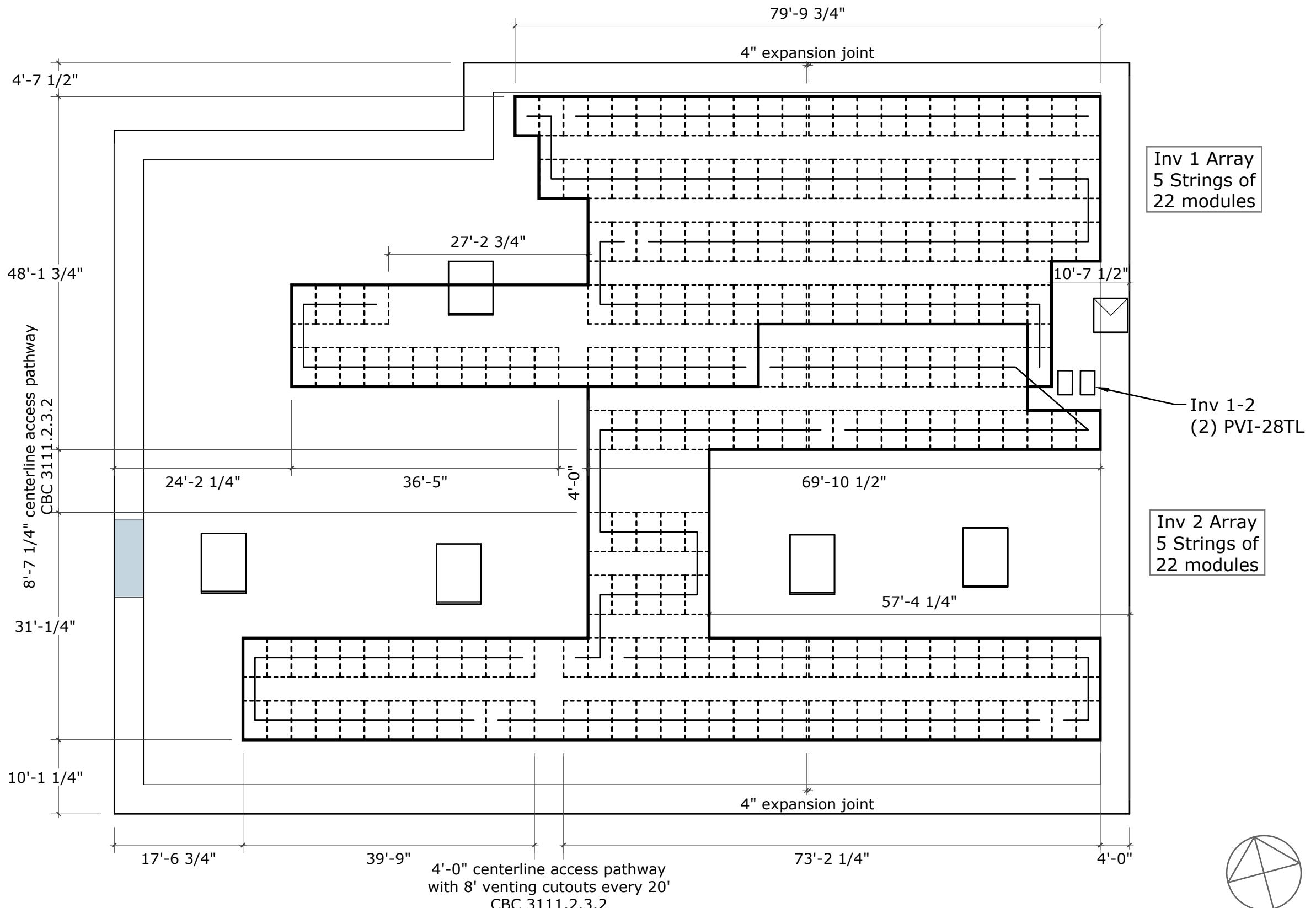
BY

Roof Array Configuration:

2 Solectria PVI-28TL Inverters

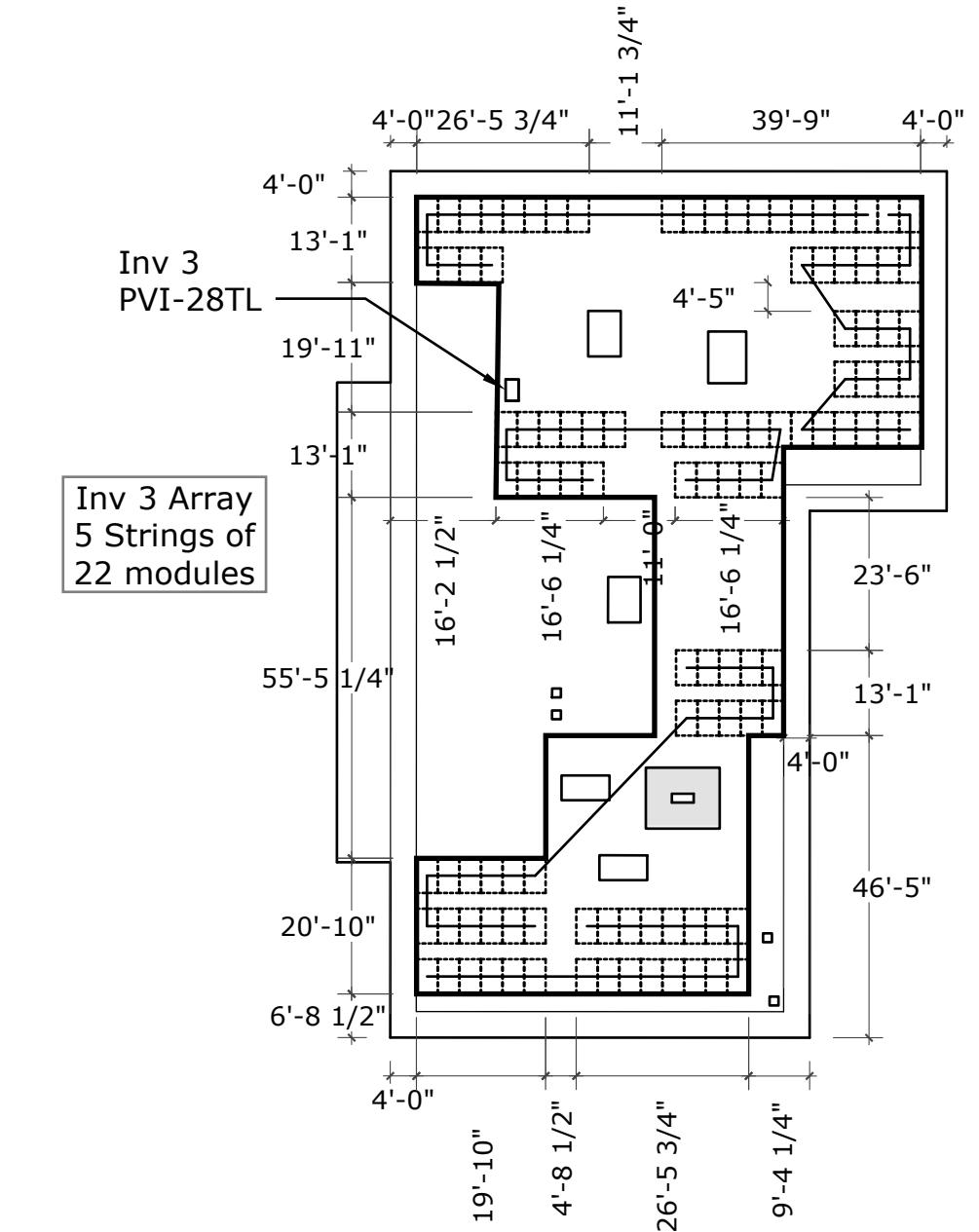
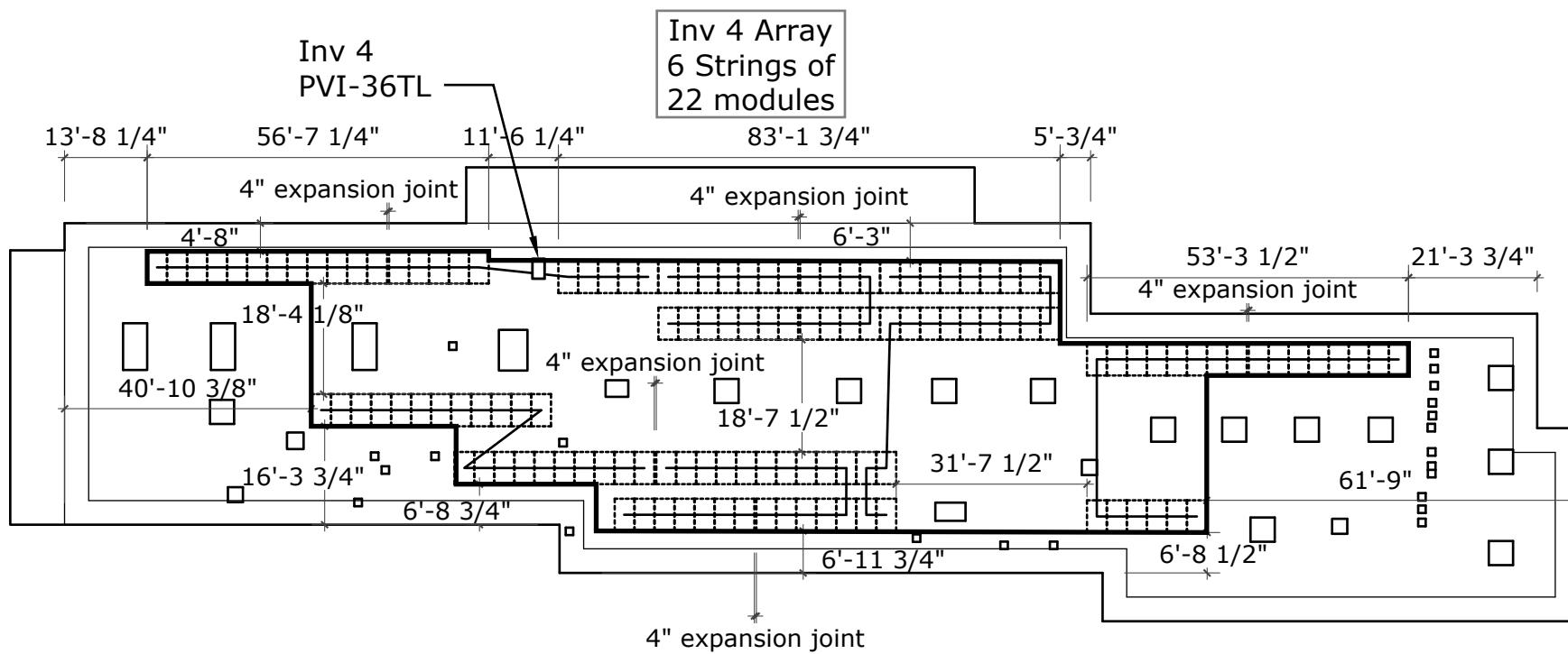
220 ET Solar ET-M660290WB/WW 290W Modules

63.80 kW DC System Size



Roof Array Configuration:

1 Solectria PVI-36TL Inverter
1 Solectria PVI-28TL Inverter
242 ET Solar ET-M660290WB/WW 290W Modules
70.18 kW DC System Size



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APN: 002-120-0-1

PVO.5B
ROOF ARRAY
DIMENSIONS &
INVERTER
FOOTPRINTS

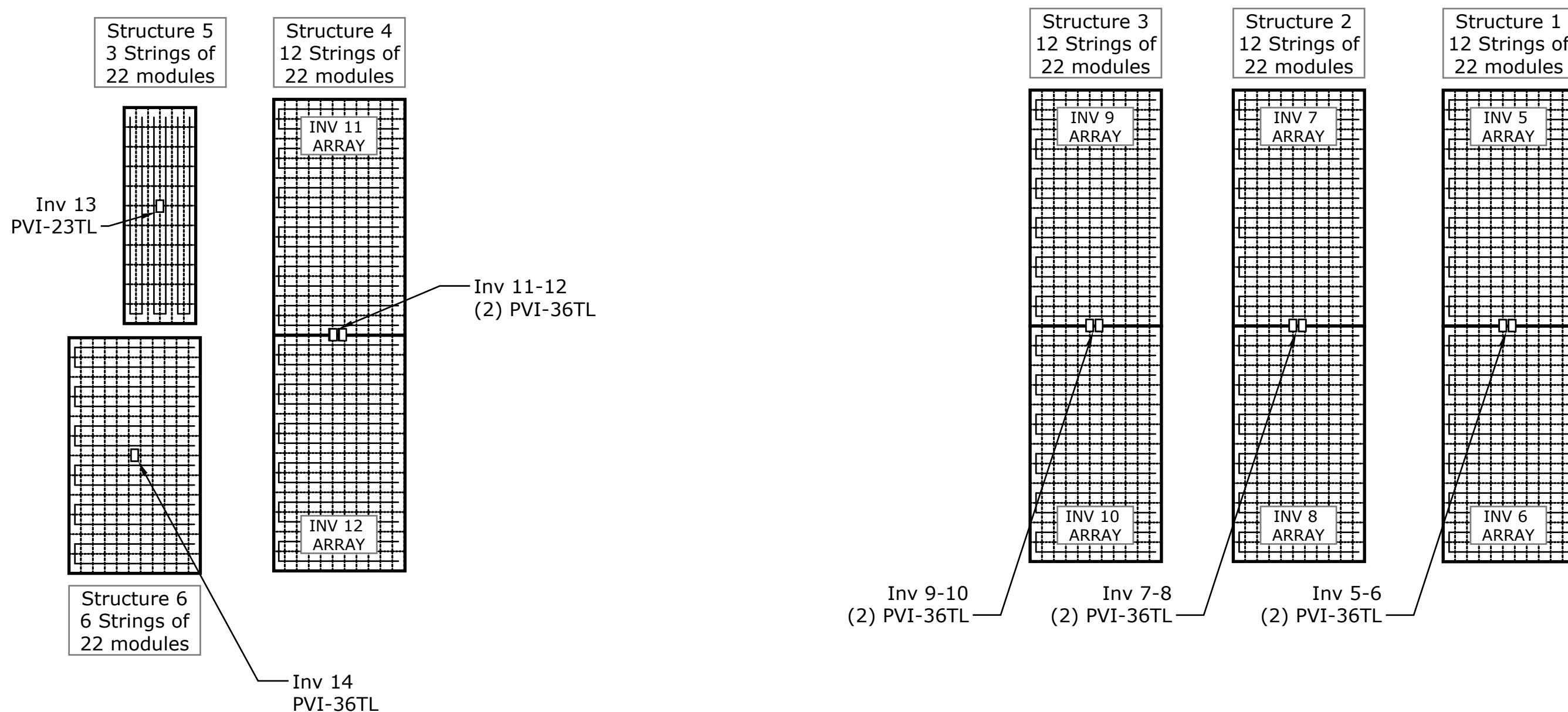
Solar Structure Array Configuration:

9 Solectria PVI-36TL Inverters

1 Solectria PVI-23TL Inverter

1,254 ET Solar ET-M660290WB/WW 290W Modules

363.66 kW DC System Size



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PV0.5C
SOLAR STRUCTURE
STRINGING
DIAGRAM &
INVERTER
FOOTPRINTS

BRIGHT POWER, INC. DBA BP
LICENCED CONTRACTOR
CLASSIFICATION
A C-10
LICENSE NO.
930054

DATE: 6-14-16
BY: JB

JOB NO.: C15-700.1

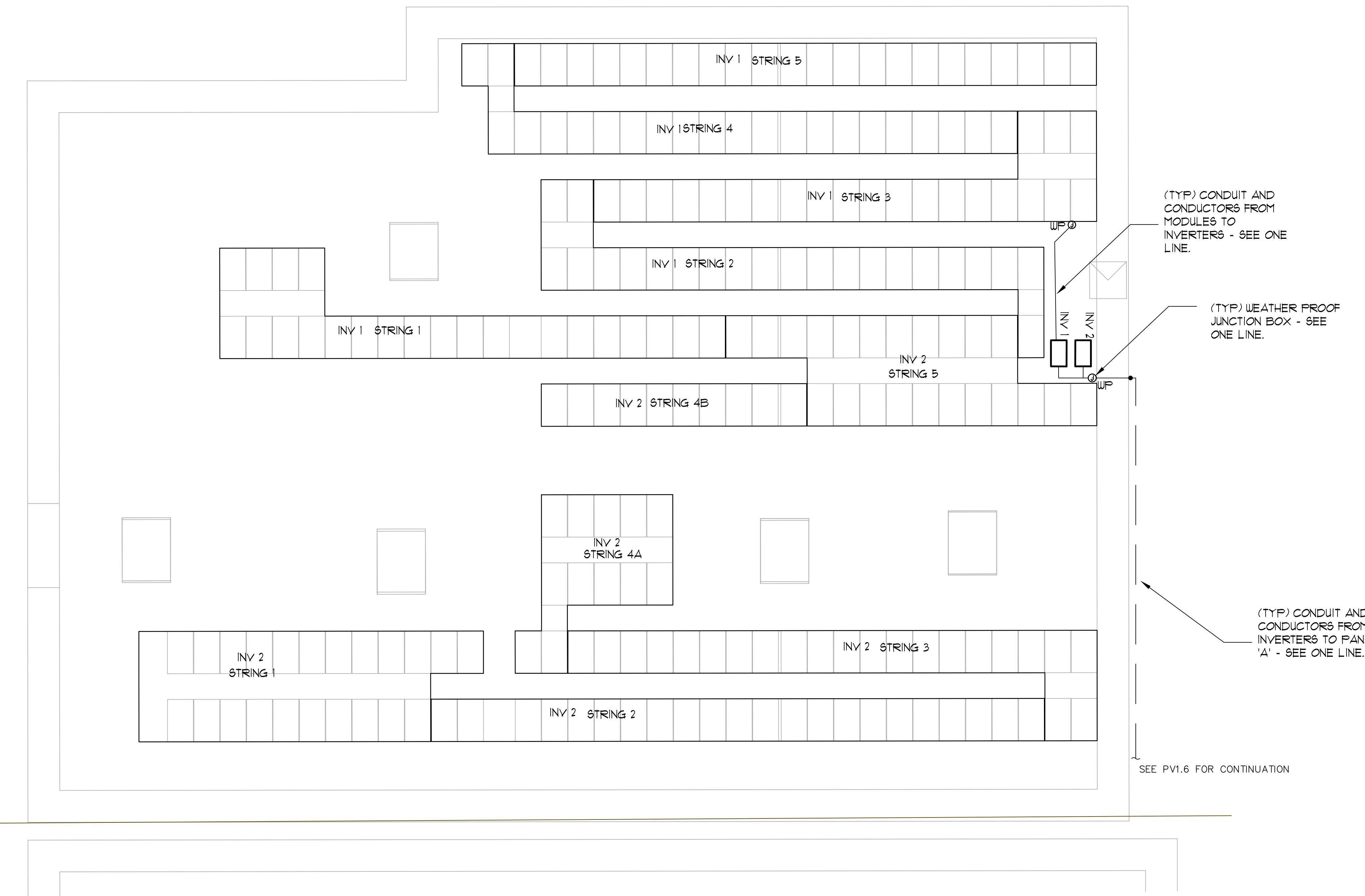




220 ROOF MOUNTED SOLAR PHOTOVOLTAIC PANELS. SEE
STRUCTURAL SUBMITTALS FOR MOUNTING. SEE PV2.1 FOR
ELECTRICAL CONNECTIONS.

ROOF ARRAY CONFIGURATION:
2 SOLECTRIA PVI-28TL INVERTERS
220 ET SOLAR ET-M660290WB/WW 290W MODULES
63.80 KW DC SYSTEM SIZE

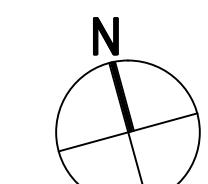
P_{MAX} = 290 WATTS
I_{SC} = 9.59A
I_{MP} = 9.03A
V_{MP} = 32.12 VDC
V_{OC} = 39.68 VDC



AUTOZONE ROOF ARRAY PHOTOVOLTAIC PLAN

SCALE: 1/8"=1'-0"

1
PV1.1



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COLUSA, CA 95932
APN: 002-120-011

ARRAY PLAN

PV1.1

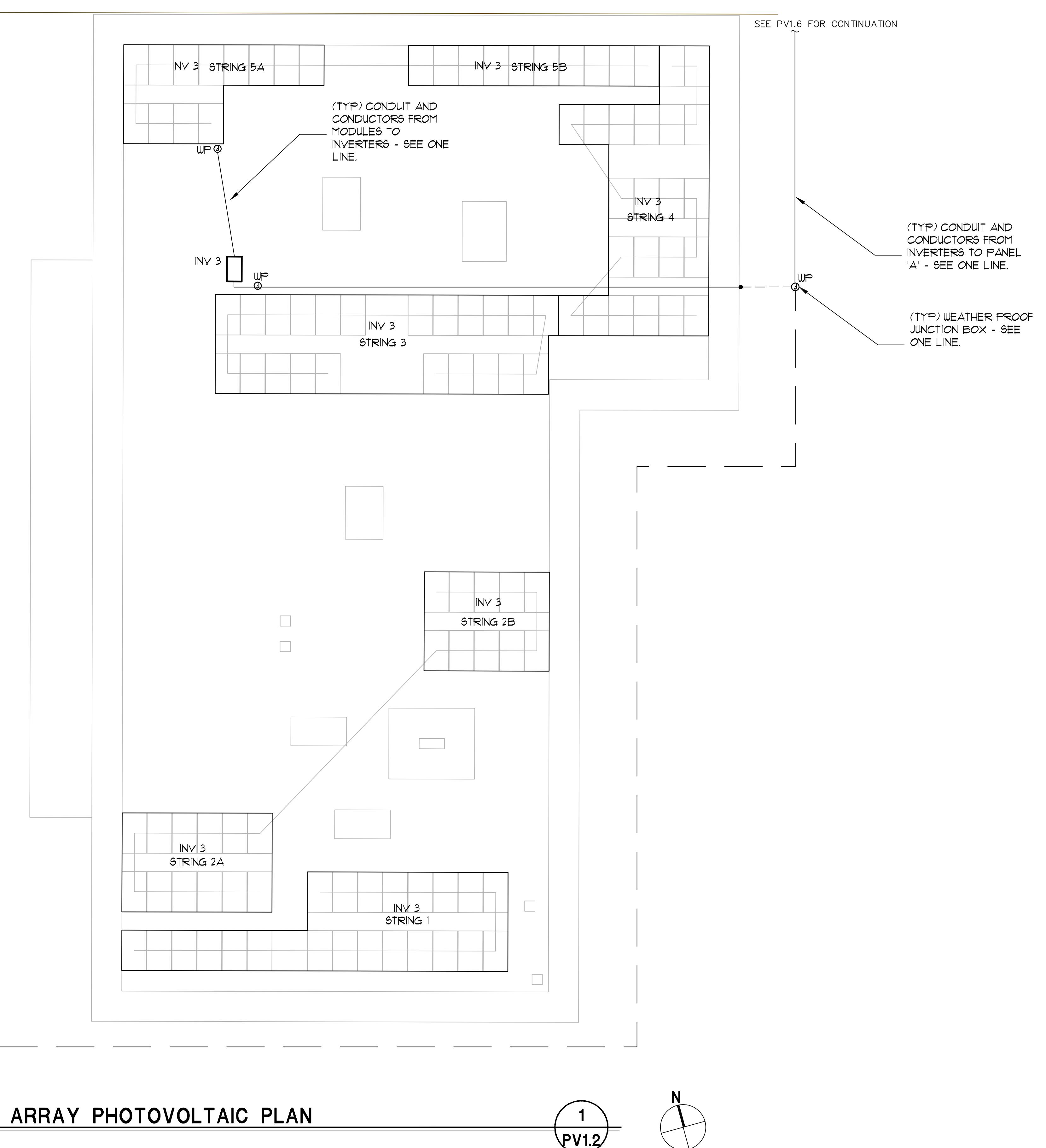
Journal of Oral Rehabilitation 2003; 30: 103–109

JOB NO : 16550

110 ROOF MOUNTED SOLAR PHOTOVOLTAIC PANELS - SEE
STRUCTURAL SUBMITTALS FOR MOUNTING. SEE PV1.1 FOR
ELECTRICAL CONNECTIONS.

ROOF ARRAY CONFIGURATION:
1 SOLECTRIA PVI-28TL INVERTERS
110 ET SOLAR ET-M660290UB/UW 290W MODULES
31.90 KW DC SYSTEM SIZE

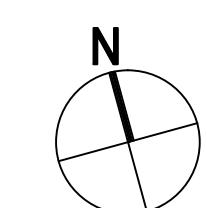
P_{MAX} = 290 WATTS
I_{SC} = 9.99A
I_{MP} = 9.02A
V_{MP} = 32.12 Vdc
V_{OC} = 39.68 Vdc



SOUTH ROOF ARRAY PHOTOVOLTAIC PLAN

SCALE: 1/8"=1'-0"

1
PV1.2



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1017 BRIDGE ST
COLUSA, CA 95932
APN: 002-120-011



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PH: (707) 252-9990

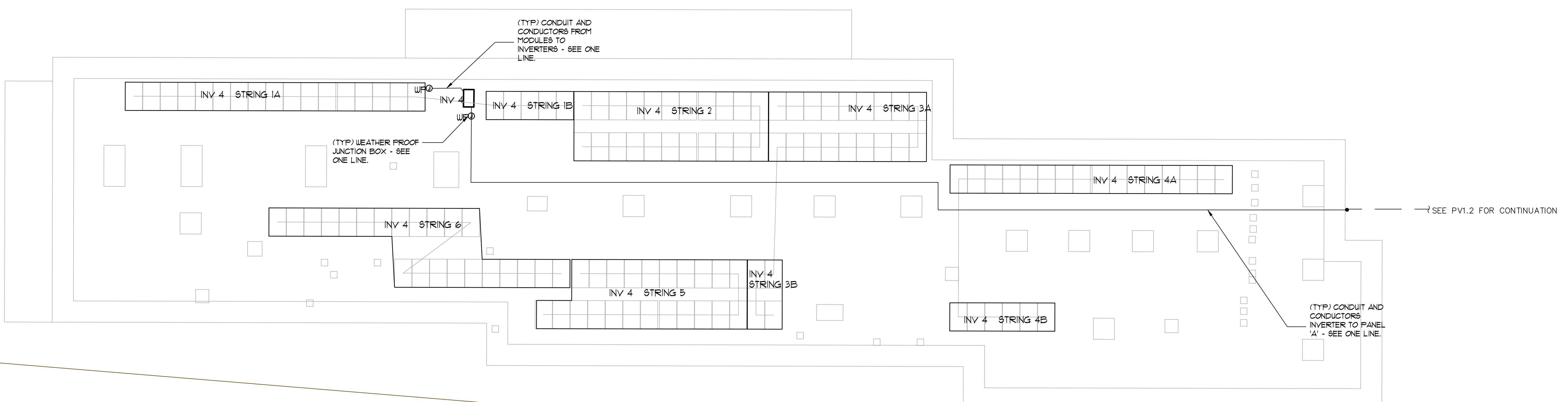
BY

PV1.2	DATE: JUNE 2016
JOB NO.: 16550	

132 ROOF MOUNTED SOLAR PHOTOVOLTAIC PANELS. SEE
STRUCTURAL SUBMITTALS FOR MOUNTING. SEE PV2.1 FOR
ELECTRICAL CONNECTIONS.

ROOF ARRAY CONFIGURATION:
1 SOLECTRIA PV1-36TL INVERTERS
132 ET SOLAR ET-M660290UB/UW 290W MODULES
38.28 KW DC SYSTEM SIZE

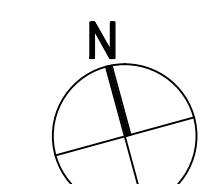
P_{MAX} = 290 WATTS
I_{SC} = 9.59A
I_{MP} = 9.03A
V_{MP} = 32.12 VDC
V_{OC} = 39.68 VDC



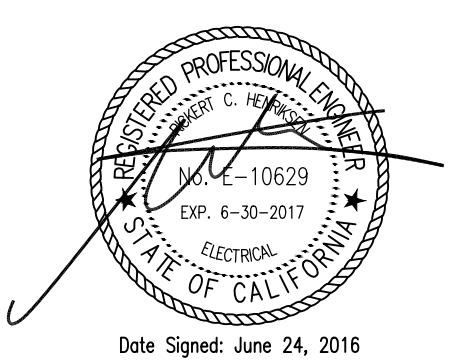
BUILDING 2 ROOF ARRAY PHOTOVOLTAIC PLAN

SCALE: 1/10"-1'-0"

1
PV1.3



SACRAMENTO
ENGINEERING
SERVICES, INC.
10555 Old Pacific Blvd
Sacramento, CA 95827-2263
Phone: (916)588-4428
Fax: (916)588-4490
www.soe.org
Job No. 16550



NSG1-COLUSA
1017 BRIDGE ST
COLUSA, CA 95932
APN: 002-120-011
ARRAY
PLAN

PV1.3

DATE: JUNE 2016

JOB NO.: 16550

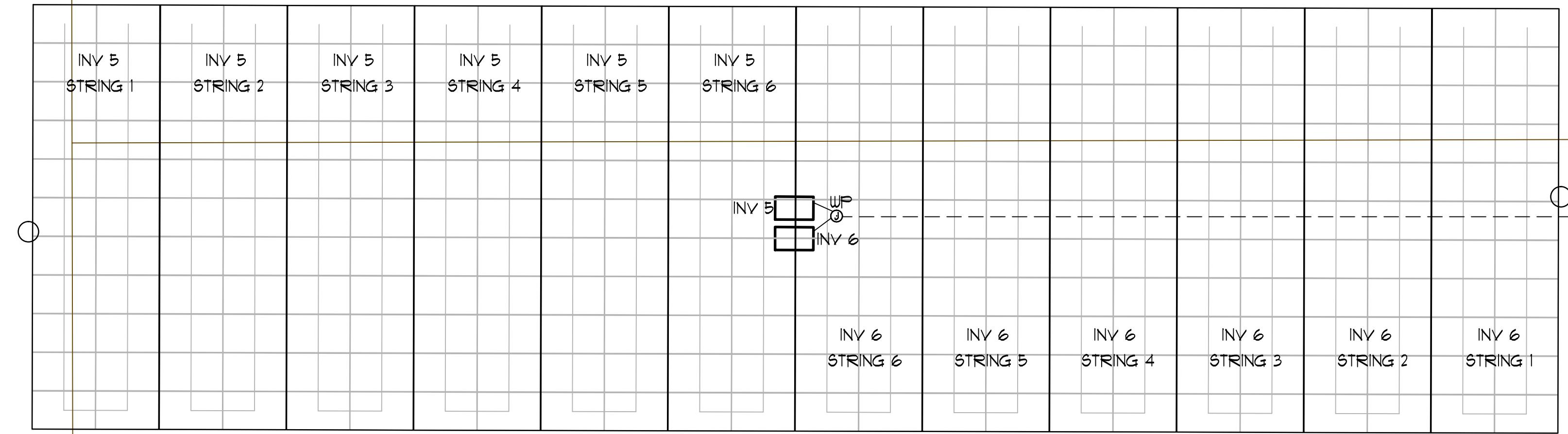
BPI	△	△	△	△	△	△	△
PO BOX 10637 NAPA, CA 94581 PH: (707) 252-9990							
REV. NO.							
REV. DATE							

792 ROOF MOUNTED SOLAR PHOTOVOLTAIC PANELS SEE
STRUCTURAL SUBMITTALS FOR MOUNTING. SEE PV1.1 FOR
ELECTRICAL CONNECTIONS.

ROOF ARRAY CONFIGURATION:
6 SOLECTRIA PVI-36TL INVERTERS
792 ET SOLAR ET-M60290UB/UW 290W MODULES
229.68 KW DC SYSTEM SIZE

P_{MAX} = 290 WATTS
I_{SC} = 9.99A
I_{MP} = 9.02A
V_{MP} = 32.12 Vdc
V_{OC} = 39.68 Vdc

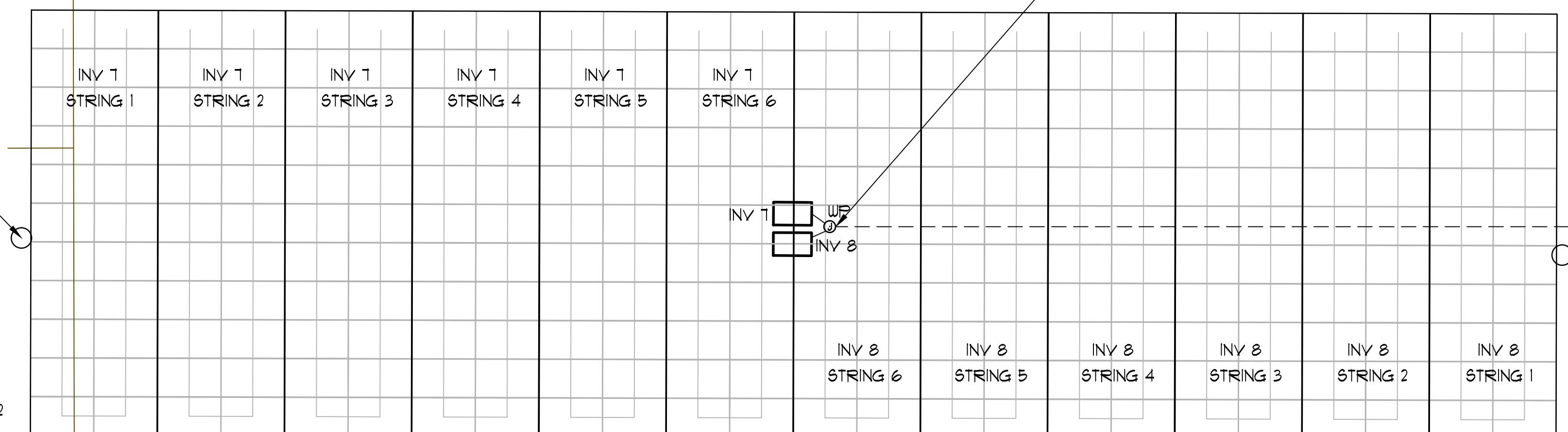
STRUCTURE 1



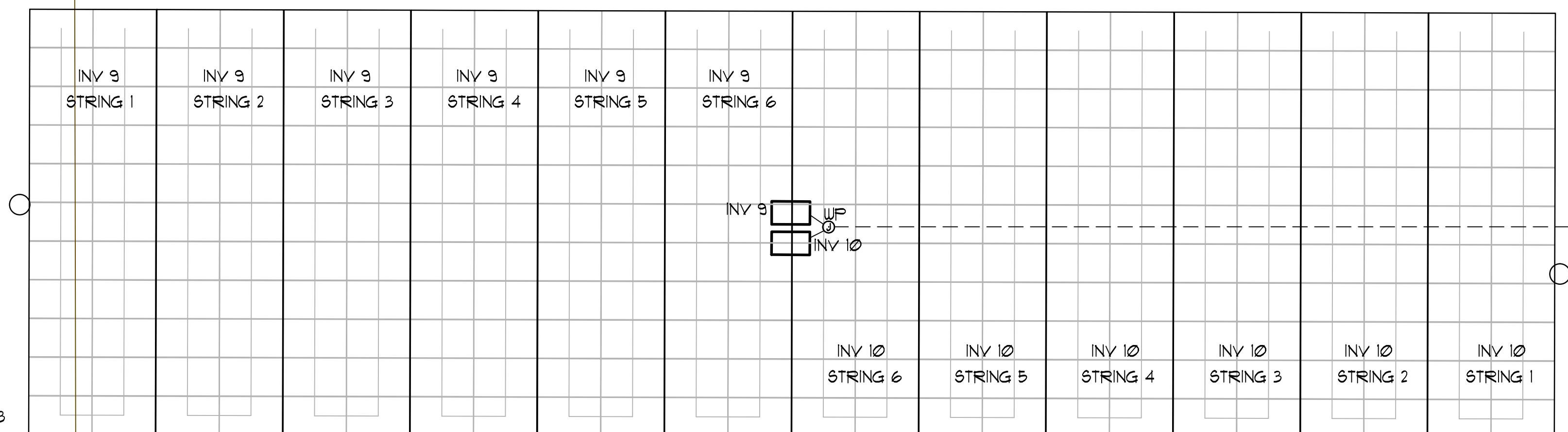
SEE PV1.6 FOR CONTINUATION

(TYP) 8" X 2'-0" DEEP GROUND ROD FOR USE AS GROUNDING
ELECTRODE FOR ARRAY GROUNDING. PROVIDE #6 CU
GROUNDING ELECTRODE CONDUCTOR FROM ARRAYS TO GROUND
ROD.

STRUCTURE 2



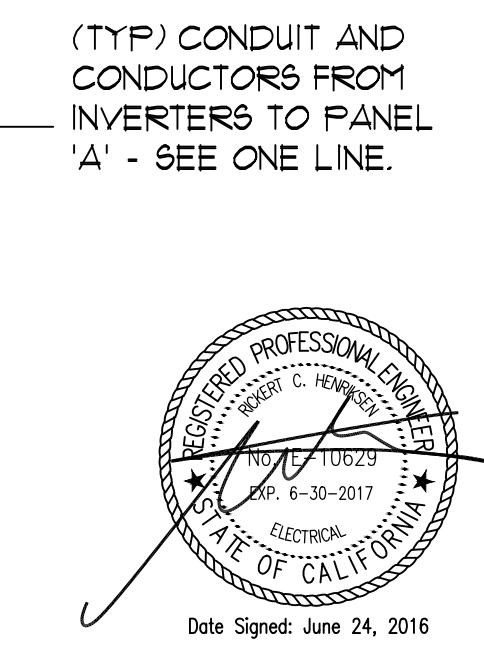
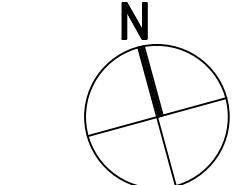
STRUCTURE 3



STRUCTURE 4, 5, & 6 ROOF ARRAY PHOTOVOLTAIC PLAN

SCALE: 1/8"-1'-0"

1
PV1.4



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APN: 002-120-011

ARRAY
PLAN

PV1.4

DATE: JUNE 2016

JOB NO.: 16550

BY

REV. NO. REV. DATE



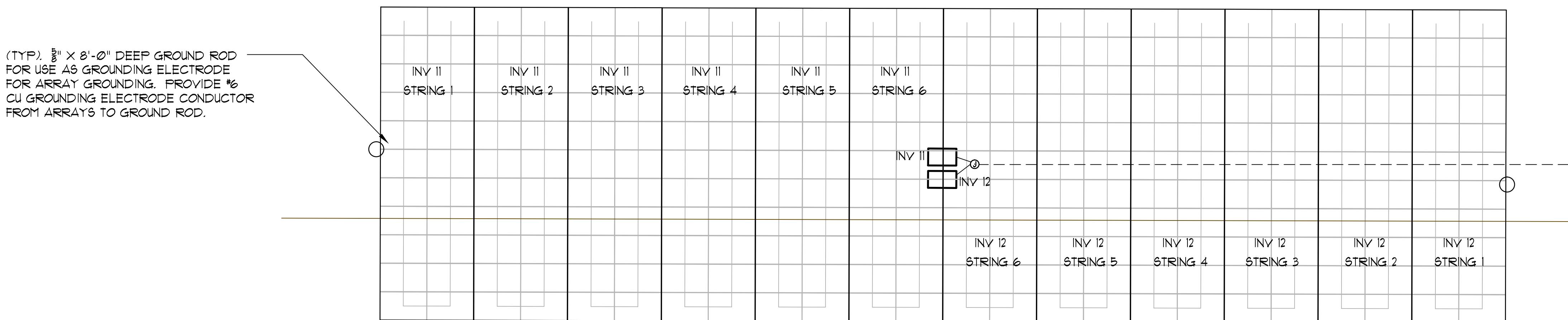
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PH: (707) 252-9990

462 ROOF MOUNTED SOLAR PHOTOVOLTAIC PANELS. SEE
STRUCTURAL SUBMITTALS FOR MOUNTING. SEE PY2.1 FOR
ELECTRICAL CONNECTIONS.

ROOF ARRAY CONFIGURATION:
3 SOLECTRIA PVI-36TL INVERTERS
1 SOLECTRIA PVI-23TL INVERTER
462 ET SOLAR ET-M660290WB/WW 290W MODULES
133.98 KW DC SYSTEM SIZE

$$\begin{aligned}P_{MAX} &= 290 \text{ WATTS} \\I_{SC} &= 9.59A \\I_{MP} &= 9.03A \\V_{MP} &= 32.12 VDC \\V_{OC} &= 39.68 VDC\end{aligned}$$

STRUCTURE 4



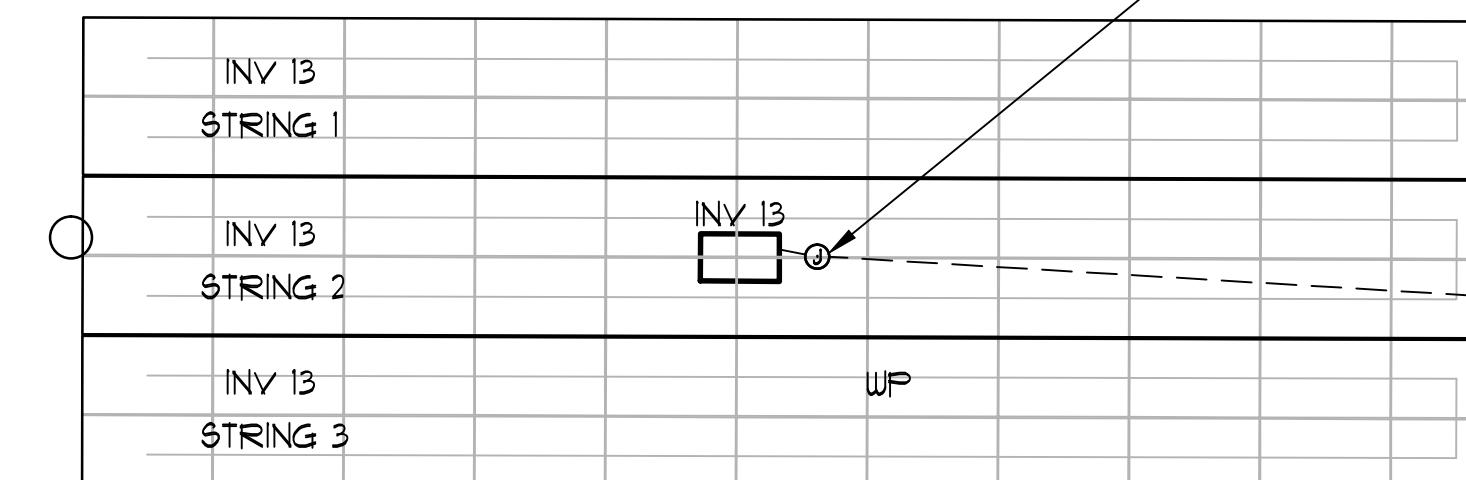
(TYP) CONDUIT AND
CONDUCTORS FROM
INVERTERS TO PANEL
A' - SEE ONE LINE.



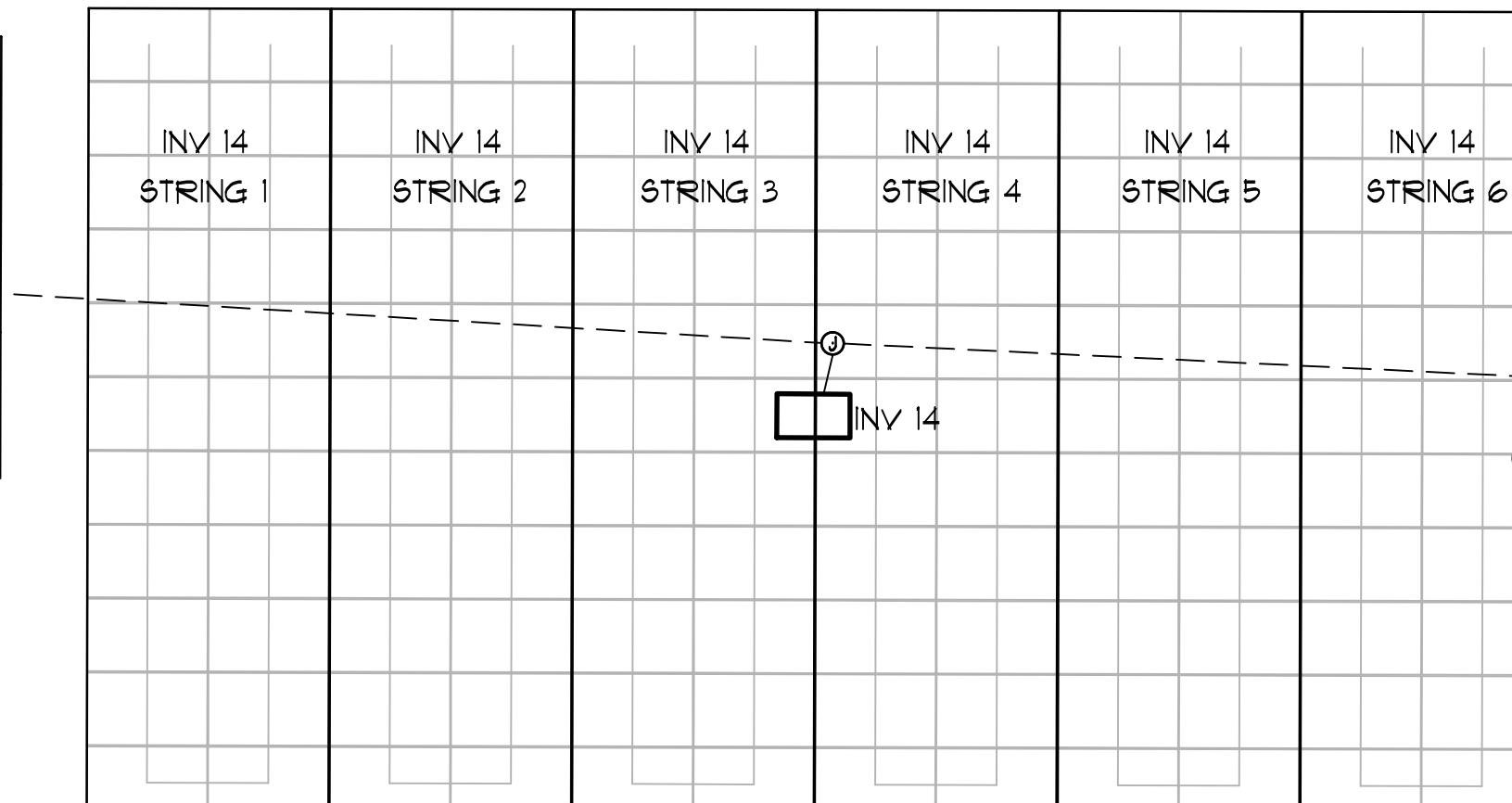
REV. NO. DATE

(TYP) WEATHER PROOF JUNCTION BOX - SEE ONE LINE.

STRUCTURE



STRUCTURE 6

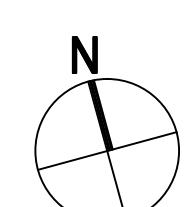


SEE PV1.6 FOR CONTINUATION

STRUCTURE 4. 5. & 6 ROOF ARRAY PHOTOVOLTAIC PLAN

SCALE: 1/8"=1'

1
PV1.5



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ARRAY PLAN

PV1-5

DATE: JUNE 2016

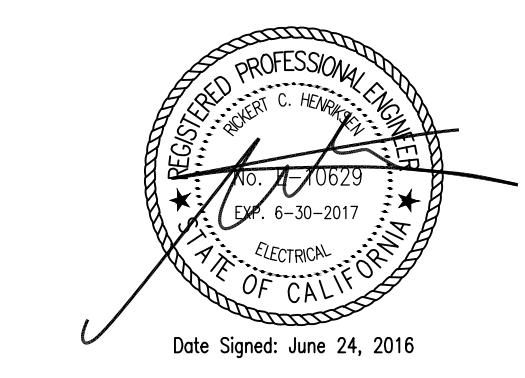
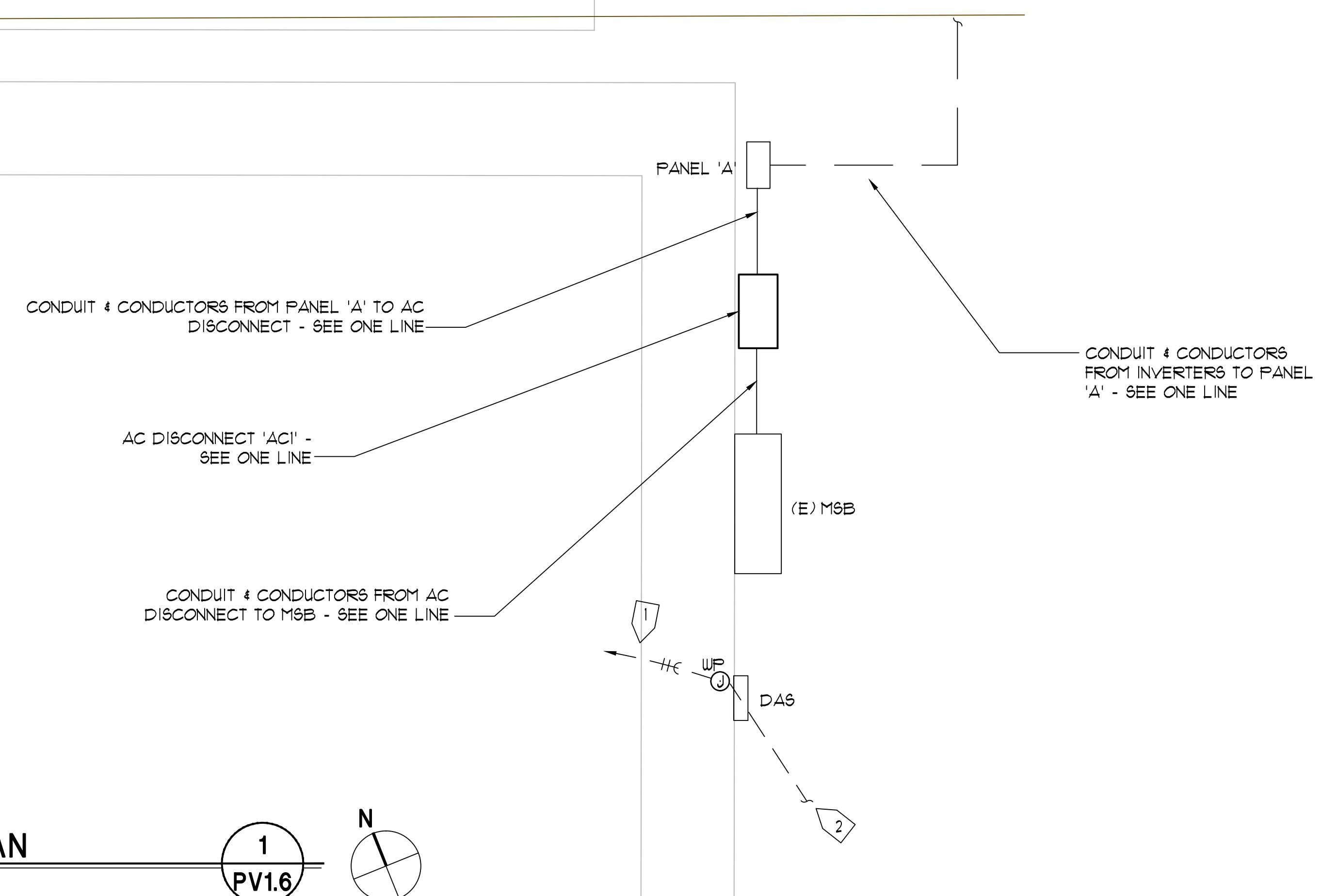
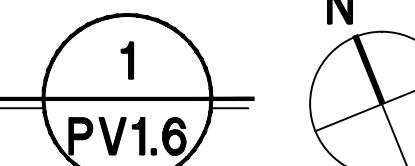
JOB NO : 16550

NUMBERED NOTES

- [1] (2) #10 G IN $\frac{3}{4}$ "C. TO NEAREST PANEL. PROVIDE 20A/IP BREAKER IN EXISTING PANEL, AND CONNECT DAS CIRCUIT TO NEW BREAKER.
- [2] (1) 1" DATA CONDUIT TO DATA CONNECTION POINT - SEE ONE LINE. FIELD ROUTE. ALTERNATELY, WIRELESS CONNECTION MAY BE PROVIDED.

METER AREA PLAN

SCALE: 1/4"=1'-0"



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METER-AREA
PLAN

PV1.6

DATE: JUNE 2016

JOB NO.: 16550

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Array Configuration:
 10 SOLECTRIA PVI-36TL INVERTERS
 3 SOLECTRIA PVI-28TL INVERTERS
 1 SOLECTRIA PVI-23TL INVERTER
 INVERTER 1-3: 5 STRINGS OF 22 MODULES
 INVERTER 4-12 & 14: 6 STRINGS OF 22 MODULES
 INVERTER 13: 3 STRINGS OF 22 MODULES
 1716 ET SOLAR ET-M660290WB/WW 290W MODULES TOTAL, 33 STRINGS
 TOTAL
 Note: For specifications of solar equipment see attached cut sheets.

INTERCONNECTION STANDARDS COMPLIANCE

The Inverters listed have been tested and listed by Underwriters Laboratories to be in compliance with UL1741 Statistic Inverters And Charge Controllers For Use In Photovoltaic Power Systems, as well as IEEE-929-2000 Recommended Practice For Utility Interface Of Photovoltaic (PV) Systems.

IEEE-929-2000 provides guidance regarding equipment and function necessary to ensure compatible operation of photovoltaic systems which are connected in parallel with the electric utility. UL 1741 is the standard applied by Underwriters Laboratory to the Inverter to verify it meets the recommendations of IEEE-929-2000.

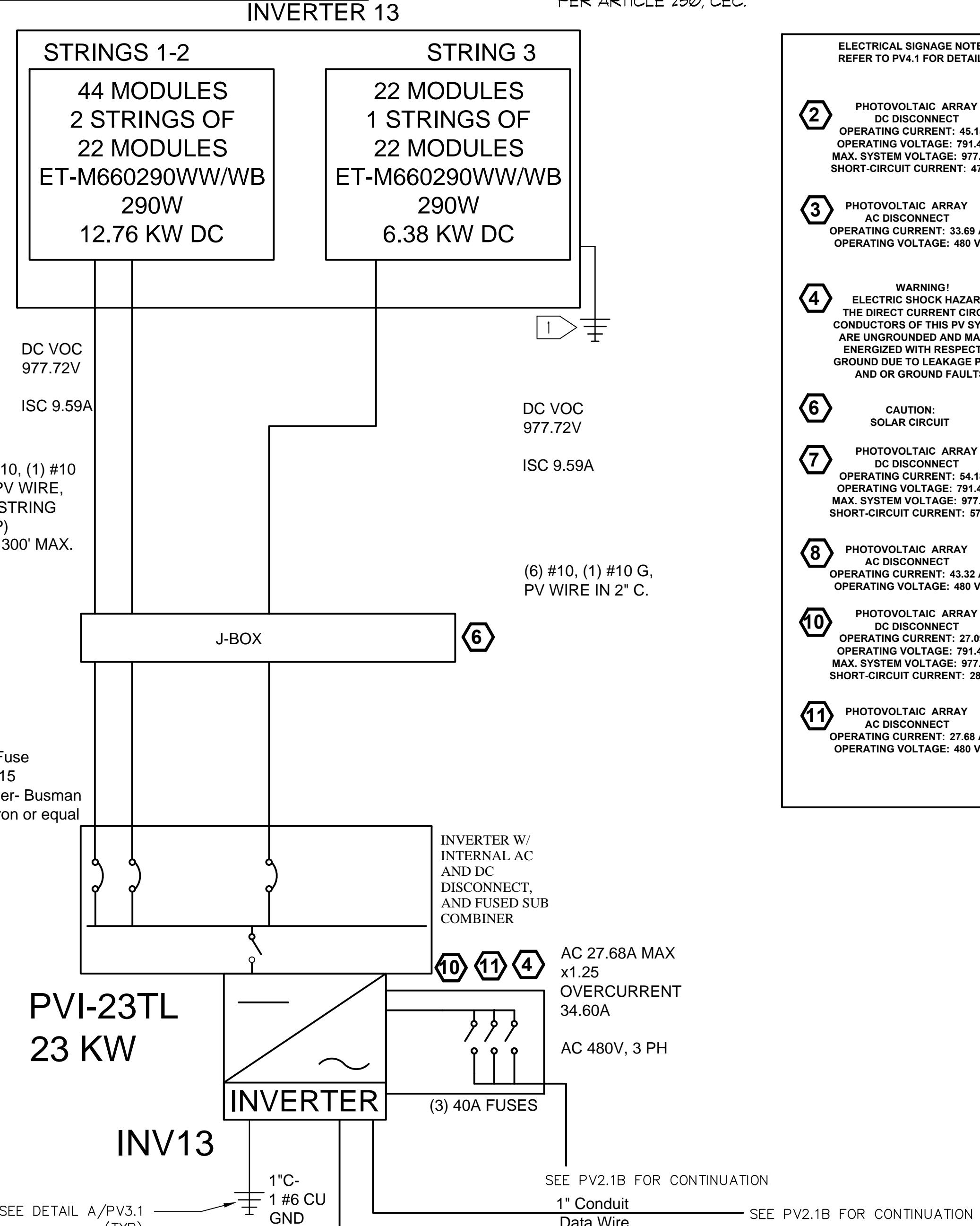
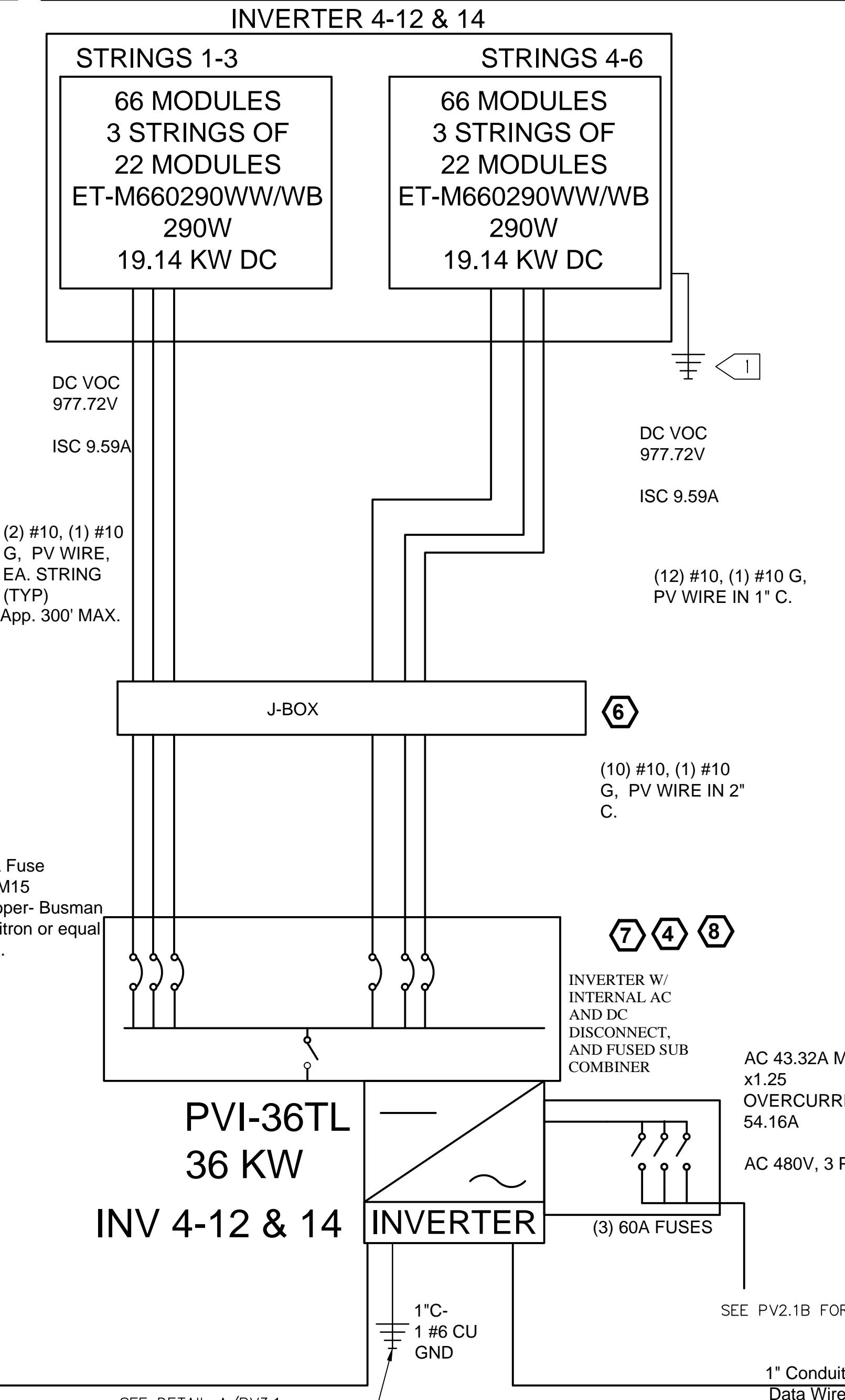
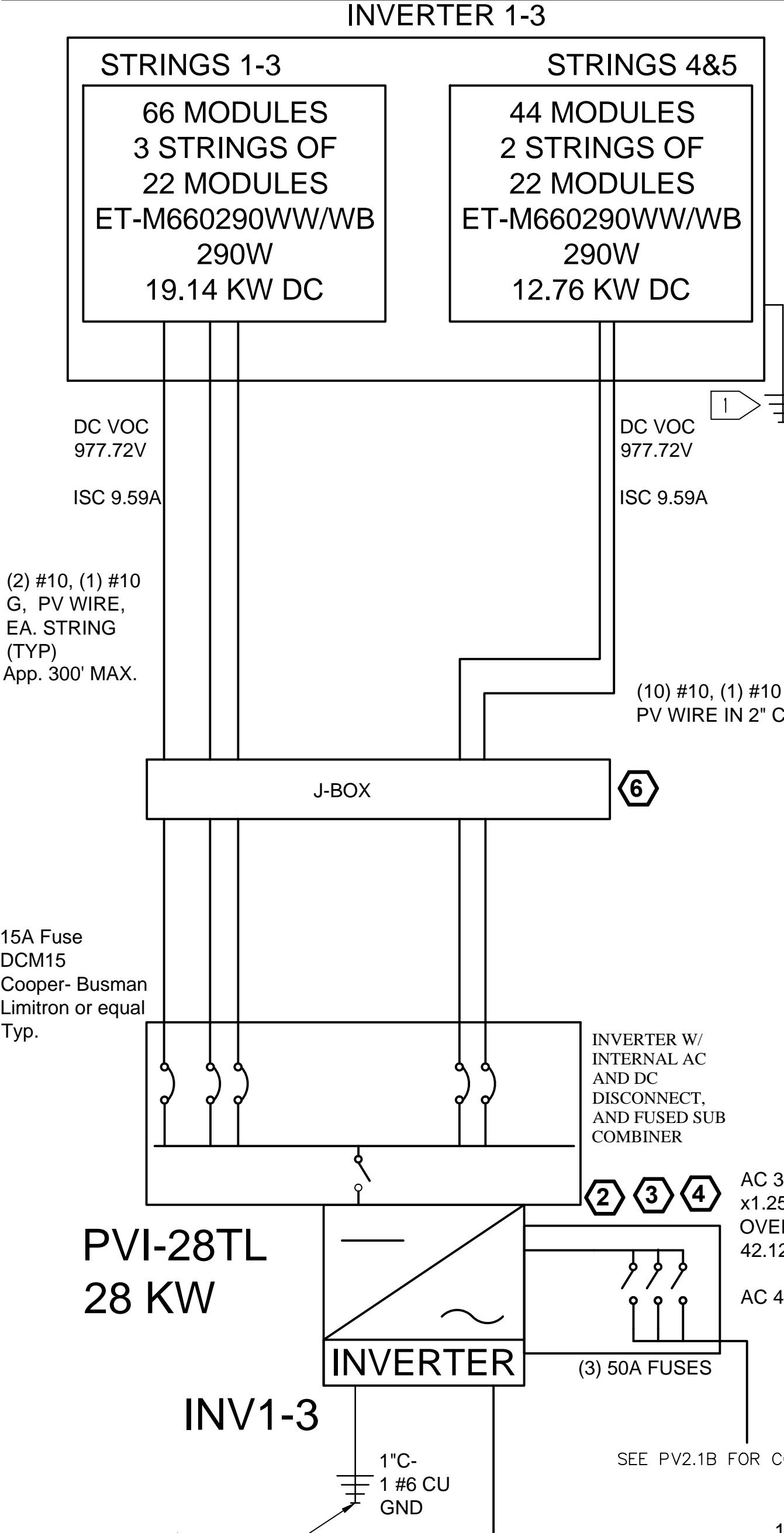
Refer to both documents for details of these Recommendations and test procedures.

AC Disconnect is accessible, and lockable.

Single line diagrammatic only actual layout determined by existing conditions.
 All hazardous transmission lines to be labeled:
 "CAUTION-Electrical Hazard"

NUMBERED NOTES

① PROVIDE #6 CU GROUNDING ELECTRODE CONDUCTOR FROM ARRAYS TO BUILDING GROUND, PER ARTICLE 250 CEC.



- ELECTRICAL SIGNAGE NOTES REFER TO PV4.1 FOR DETAILS
- ② PHOTOVOLTAIC ARRAY DC DISCONNECT OPERATING CURRENT: 45.15 A OPERATING VOLTAGE: 791.44 V MAX. SYSTEM VOLTAGE: 977.72 V SHORT-CIRCUIT CURRENT: 47.95A
 - ③ PHOTOVOLTAIC ARRAY AC DISCONNECT OPERATING CURRENT: 33.69 A OPERATING VOLTAGE: 480 V
 - ④ WARNING! ELECTRIC SHOCK HAZARD. THE DIRECT CURRENT CIRCUIT CONNECTIONS ARE UNGROUNDED AND MAY BE ENERGIZED WITH RESPECT TO GROUND DUE TO LEAKAGE PATHS AND OR GROUND FAULTS.
 - ⑥ CAUTION: SOLAR CIRCUIT
 - ⑦ PHOTOVOLTAIC ARRAY DC DISCONNECT OPERATING CURRENT: 54.48 A OPERATING VOLTAGE: 791.44 V MAX. SYSTEM VOLTAGE: 977.72 V SHORT-CIRCUIT CURRENT: 57.54 A
 - ⑧ PHOTOVOLTAIC ARRAY AC DISCONNECT OPERATING CURRENT: 43.32 A OPERATING VOLTAGE: 480 V
 - ⑩ PHOTOVOLTAIC ARRAY DC DISCONNECT OPERATING CURRENT: 27.68 A OPERATING VOLTAGE: 791.44 V MAX. SYSTEM VOLTAGE: 977.72 V SHORT-CIRCUIT CURRENT: 28.77 A
 - ⑪ PHOTOVOLTAIC ARRAY AC DISCONNECT OPERATING CURRENT: 27.68 A OPERATING VOLTAGE: 480 V

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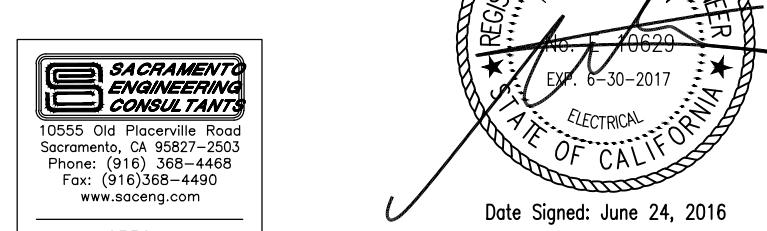
SINGLE-LINE
DIAGRAM

PV2.1A

DATE: JUNE 2016

JOB NO.: 16550

**1716 ET SOLAR
ET-M660290WB/WW
290W MODULES
497.64 kW DC Power**



Module Model		ET SOLAR ET-M660290WB/WW 290W	Modules per string	22	Voltage Correction Factor	1.12 (Table A)
String output					Corrected String Output	
Module Max Power	290W					
Maximum Power Voltage (V _{PMAX})	32.12 V	706.64 V			791.44 V	
Maximum Power Current (I _{PMAX})	9.03 A	9.03 A			9.03 A	
Open-circuit voltage (V _{oc})	39.68 V	872.96 V			977.72 V (Not to Exceed 1000V)	
Short-circuit current (I _{sc})	9.59 A	9.59 A			9.59 A	
Fuse Size	15A					

Table A (NEC 690.7)		
Celsius	Fahrenheit	Factor
14 to 10	58 to 50	1.06
9 to 5	49 to 41	1.08
4 to 0	40 to 32	1.1
(-1 to -5)	31 to 23	1.12
(-6 to -10)	22 to 14	1.14

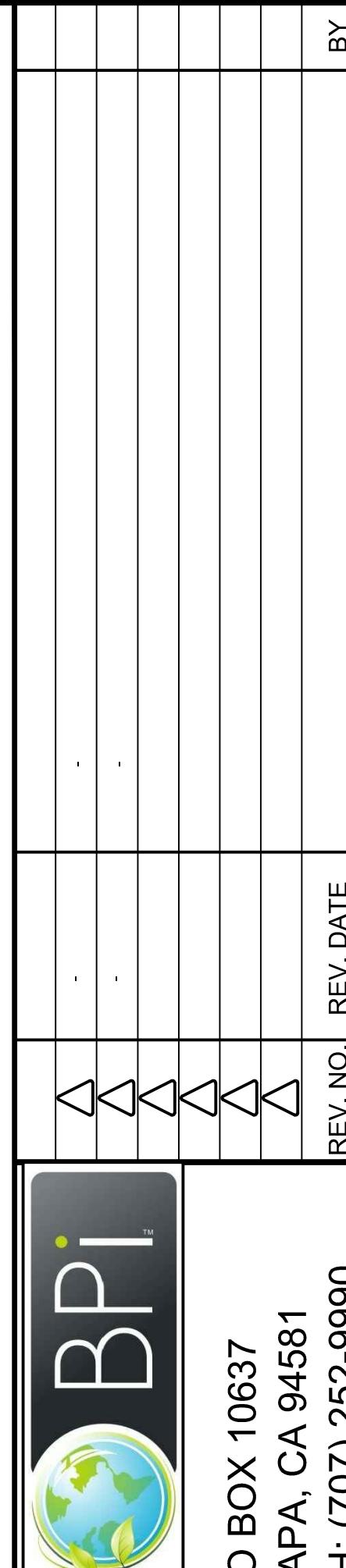
INV #1-3 CALCULATIONS			
MPPT#	# OF STRINGS	# OF PANELS	KW
1	3	66	19.14
2	2	44	12.76
TOTAL	5	110	31.90

INV #4-12 & 14 CALCULATIONS			
MPPT#	# OF STRINGS	# OF PANELS	KW
1	3	66	19.14
2	3	66	19.14
TOTAL	6	132	38.28

INV #13 CALCULATIONS			
MPPT#	# OF STRINGS	# OF PANELS	KW
1	2	44	12.76
2	1	22	6.38
TOTAL	3	66	19.14



Date Signed: June 24, 2016



Array Configuration:
 10 SOLECTRIA PVI-36TL INVERTERS
 3 SOLECTRIA PVI-28TL INVERTERS
 1 SOLECTRIA PVI-23TL INVERTER
 INVERTER 1-3: 5 STRINGS OF 22 MODULES
 INVERTER 4-12 & 14: 6 STRINGS OF 22 MODULES
 INVERTER 13: 3 STRINGS OF 22 MODULES
 1716 ET SOLAR ET-M660290WB/WW 290W MODULES TOTAL, 33 STRINGS
 TOTAL
 Note: For specifications of solar equipment see attached cut sheets.

1716 ET SOLAR ET-M660290WB/WW 290W MODULES 497.64 kW DC Power

INTERCONNECTION STANDARDS COMPLIANCE

The Inverters listed have been tested and listed by Underwriters Laboratories to be in compliance with UL1741 Statistic Inverters And Charge Controllers For Use In Photovoltaic Power Systems, as well as IEEE-929-2000 Recommended Practice For Utility Interface Of Photovoltaic (PV) Systems.

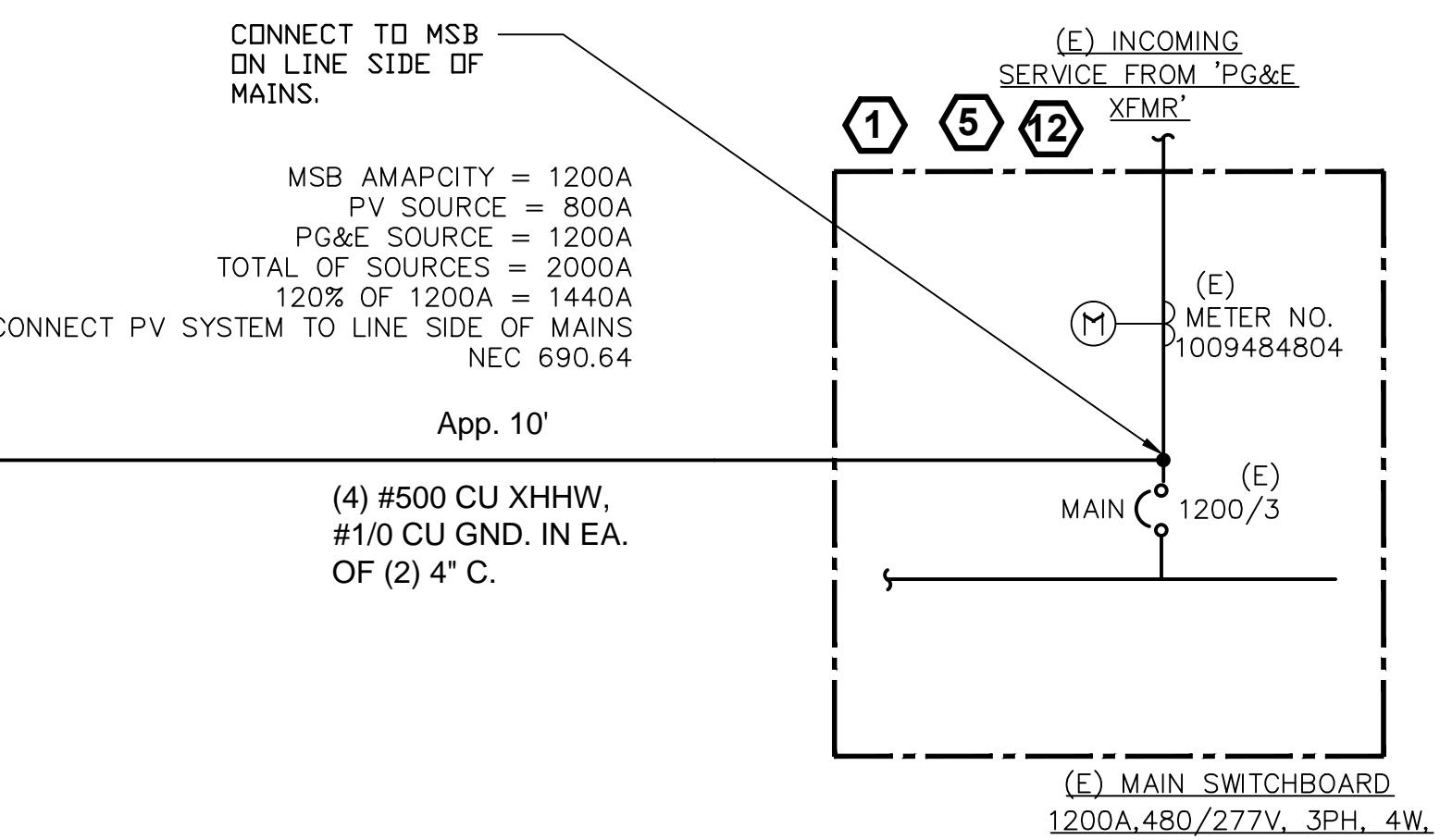
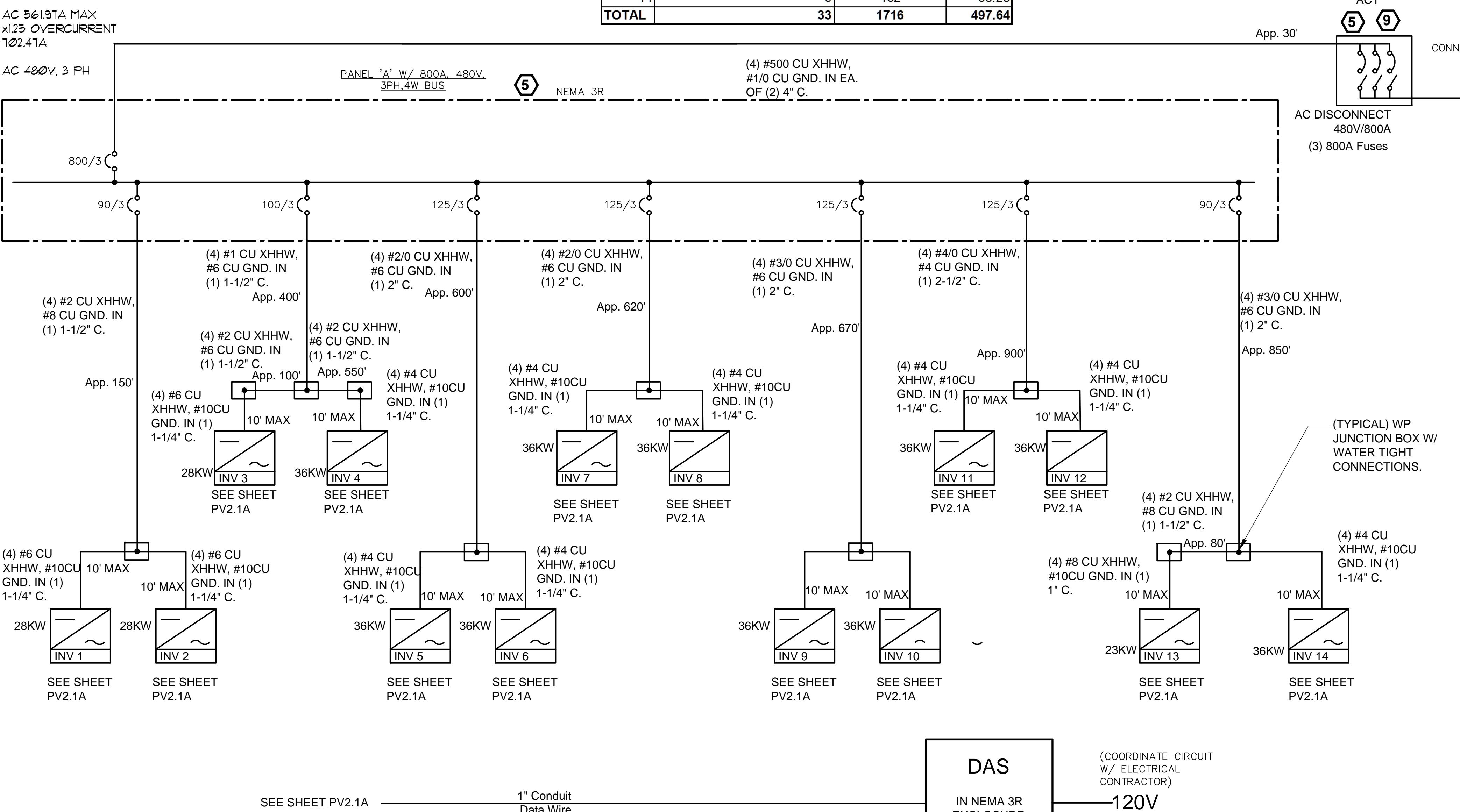
IEEE-929-2000 provides guidance regarding equipment and function necessary to ensure compatible operation of photovoltaic systems which are connected in parallel with the electric utility. UL 1741 is the standard applied by Underwriters Laboratory to the Inverter to verify it meets the recommendations of IEEE-929-2000.

AC Disconnect is accessible, and lockable.

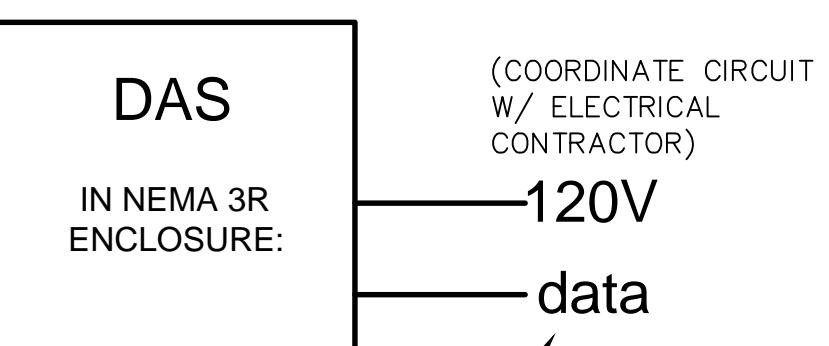
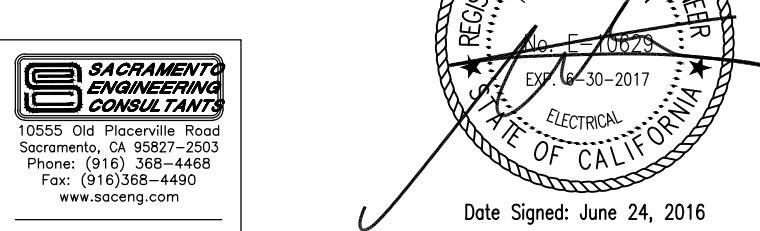
Refer to both documents for details of these Recommendations and test procedures.

Single line diagrammatic only actual layout determined by existing conditions.
 All hazardous transmission lines to be labeled:
 "CAUTION-Electrical Hazard"

TOTAL SYSTEM CALCULATIONS			
INV#	# OF STRINGS	# OF PANELS	KW
1	5	110	31.90
2	5	110	31.90
3	5	110	31.90
4	6	132	38.28
5	6	132	38.28
6	6	132	38.28
7	6	132	38.28
8	6	132	38.28
9	6	132	38.28
10	6	132	38.28
11	6	132	38.28
12	6	132	38.28
13	3	66	19.14
14	6	132	38.28
TOTAL	33	1716	497.64



- ELECTRICAL SIGNAGE NOTES
REFER TO PV4.1 FOR DETAILS
- (1) WARNING: 2 SOURCES OF POWER,
2ND SOURCE IS PHOTOVOLTAIC
SYSTEM
 - (5) WARNING!
ELECTRIC SHOCK HAZARD.
DO NOT TOUCH TERMINALS.
TERMINALS ON BOTH THE LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION.
 - (9) PHOTOVOLTAIC ARRAY
AC DISCONNECT
OPERATING CURRENT: 561.97 A
OPERATING VOLTAGE: 480 V
 - (12) CAUTION: SOLAR SYSTEM
CONNECTED



PROVIDE AND INSTALL
FULLY TERMINATED CAT.
6 NETWORK JACK/CABLE
AT DAS EQUIPMENT



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APN: 002-120-011

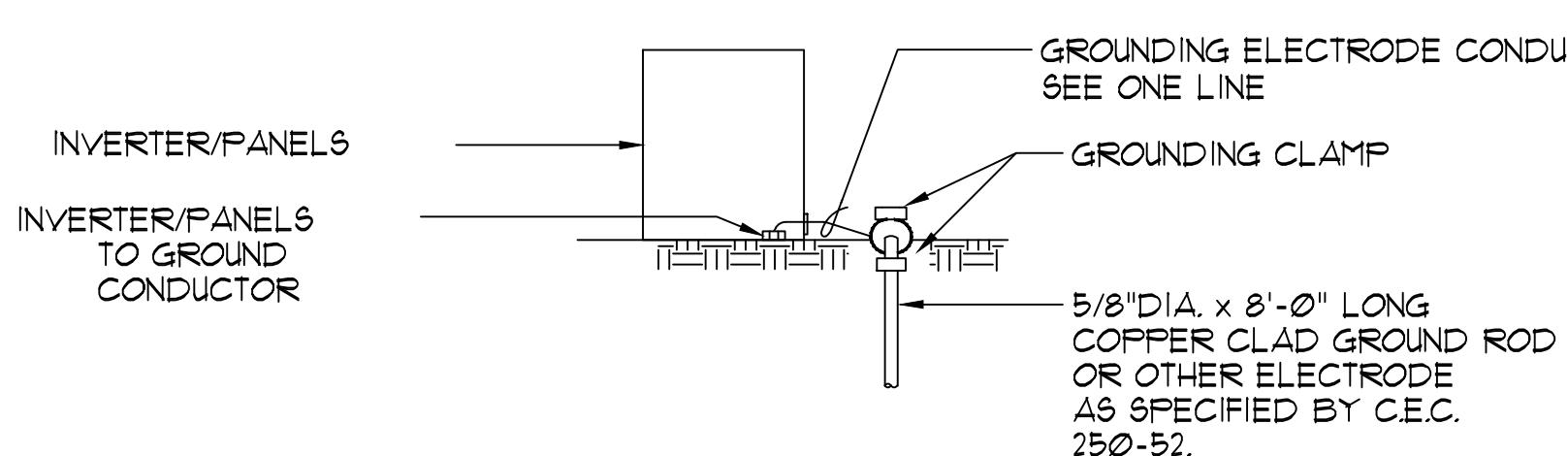
SINGLE-LINE
DIAGRAM

PV2.1B

DATE: JUNE 2016

JOB NO.: 16550

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REV. NO. REV. DATE



NOTES:

1. SIZE OF CONDUCTORS SHALL COMPLY WITH C.E.C. 250-94
2. BOND TO SEPARATE CONDUCTORS FROM INVERTER TO METAL BUILDING FRAME IF POSSIBLE (C.E.C. 250-68).
3. GROUND TO METAL WATER PIPE EMBEDDED AT LEAST 10'-0" INTO THE SOIL IF AVAILABLE (C.E.C. 250-68).
4. CHECK RESISTANCE TO GROUND. IF RESISTANCE EXCEEDS 25 OHMS, INSTALL ADDITIONAL GROUND RODS WITH CONDUCTORS AS SHOWN SEPARATED AT LEAST 6'-0" UNTIL RESISTANCE IS REDUCED TO 25 OHMS OR LESS (C.E.C. 250-52). PROVIDE THIRD PARTY GROUND RESISTANCE TEST.
5. PROVIDE GAS AND WATER BOND (IF APPLICABLE).

GROUNDING ELECTRODE DETAIL

SCALE: NONE

A

PV3.1

VOLTAGE DROP CALCULATOR									
JOB NAME: NSG1-COLUSA JOB #: 16550					ENTER FOR		NOTES		
					AL IN AIR	CU IN PVC	CU IN EMT	CB = COMBINER BOX	
ARRAY	CONSTANT	DISTANCE	RUNS	WIRE	I	VOLTS	PHASE	VD	% V.D.
TYP STR 22 MODS	5	300	1	#10	9.03	1.21	791.44	1	8.56
36 KW INV 4-12,14	3	10	1	#4	43.32	0.31	480	3	0.23
28 KW INV 1,2,3	3	10	1	#6	33.69	0.49	480	3	0.29
23 KW INV 13	3	10	1	#8	27.68	0.78	480	3	0.37
INV 1,2	3	30	1	#2	67.39	0.2	480	3	0.70
INV 1,2	2	120	1	#2	67.39	0.19	480	3	2.66
INV 3	3	50	1	#2	33.69	0.2	480	3	0.58
INV 3	2	50	1	#2	33.69	0.19	480	3	0.55
INV 4	3	200	1	#2	43.32	0.2	480	3	3.00
INV 4	2	350	1	#2	43.32	0.19	480	3	4.98
INV 3,4	2	400	1	#1	77.02	0.15	480	3	7.99
INV 5,6	2	600	1	#2/0	86.64	0.1	480	3	8.99
INV 7,8	2	620	1	#2/0	86.64	0.1	480	3	9.29
INV 9,10	2	670	1	#3/0	86.64	0.077	480	3	7.73
INV 11,12	2	900	1	#4/0	86.64	0.062	480	3	8.36
INV 13	2	80	1	#2	27.68	0.19	480	3	0.73
INV 13,14	2	850	1	#3/0	71.00	0.077	480	3	8.04
PANEL 'A'	3	30	2	#500	561.97	0.029	480	3	0.42
DISC	3	10	2	#500	561.97	0.029	480	3	0.14
MAX VOLTAGE DROP IN SINGLE RUN (%)									
TOTAL VOLTAGE DROP (A/C + D/C) %									
4.62									
4.80									

CABLE SIZING CALCULATIONS								ALUMINUM OPTION			
ARRAY	RUNS	CU WIRE	CU CABLE AMPACITY	LOAD (AMPS)	FACTOR	REQUIRED CABLE AMPACITY	MAX. PERMISSIBLE OCP	OCP PROVIDED	RUNS	AL WIRE	AL CABLE AMPACITY
TYP STR 22 MODS	1	#10	35.00	9.03	1.5625	14.11	15.00	15.00	1	#8	40.00
36 KW INV 4-12,14	1	#4	85.00	43.32	1.25	54.15	60.00	60.00	1	#2	90.00
28 KW INV 1,2,3	1	#6	65.00	33.69	1.25	42.12	50.00	50.00	1	#4	65.00
23 KW INV 13	1	#8	50.00	27.68	1.25	34.60	40.00	40.00	1	#6	50.00
INV 1,2	1	#2	115.00	67.39	1.25	84.24	90.00	90.00	1	#1/0	120.00
INV 1,2	1	#2	115.00	67.39	1.25	84.24	90.00	90.00	1	#1/0	120.00
INV 3	1	#2	115.00	33.69	1.25	42.12	50.00	50.00	1	#1/0	120.00
INV 3	1	#2	115.00	33.69	1.25	42.12	50.00	50.00	1	#1/0	120.00
INV 4	1	#2	115.00	43.32	1.25	54.15	60.00	60.00	1	#1/0	120.00
INV 4	1	#2	115.00	43.32	1.25	54.15	60.00	60.00	1	#1/0	120.00
INV 3,4	1	#1	130.00	77.02	1.25	96.27	100.00	100.00	1	#2/0	135.00
INV 5,6	1	#2/0	175.00	86.64	1.25	108.30	125.00	125.00	1	#4/0	180.00
INV 7,8	1	#2/0	175.00	86.64	1.25	108.30	125.00	125.00	1	#4/0	180.00
INV 9,10	1	#3/0	200.00	86.64	1.25	108.30	125.00	125.00	1	#250	205.00
INV 11,12	1	#4/0	230.00	86.64	1.25	108.30	125.00	125.00	1	#300	230.00
INV 13	1	#2	115.00	27.68	1.25	34.60	40.00	40.00	1	#1/0	120.00
INV 13,14	1	#3/0	200.00	71.00	1.25	88.75	100.00	100.00	1	#250	205.00
PANEL 'A'	2	#500	760	561.97	1.25	702.47	800.00	800.00	2	#700	750.00
DISC	2	#500	760	561.97	1.25	702.47	800.00	800.00	2	#700	750.00

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ENGINEERING
CONSULTANTS INC.
10555 Old Pacific Blvd
Sacramento, CA 95827-2603
Phone: (916) 458-4490
Fax: (916) 458-4490
www.soecon.com
Job No. 16550

REGISTERED PROFESSIONAL ENGINEERS
STATE OF CALIFORNIA
Date Signed: June 24, 2016
Signature: [Signature]

DATE: JUNE 2016
JOB NO.: 16550

PV3.1

BPI
PO BOX 10637
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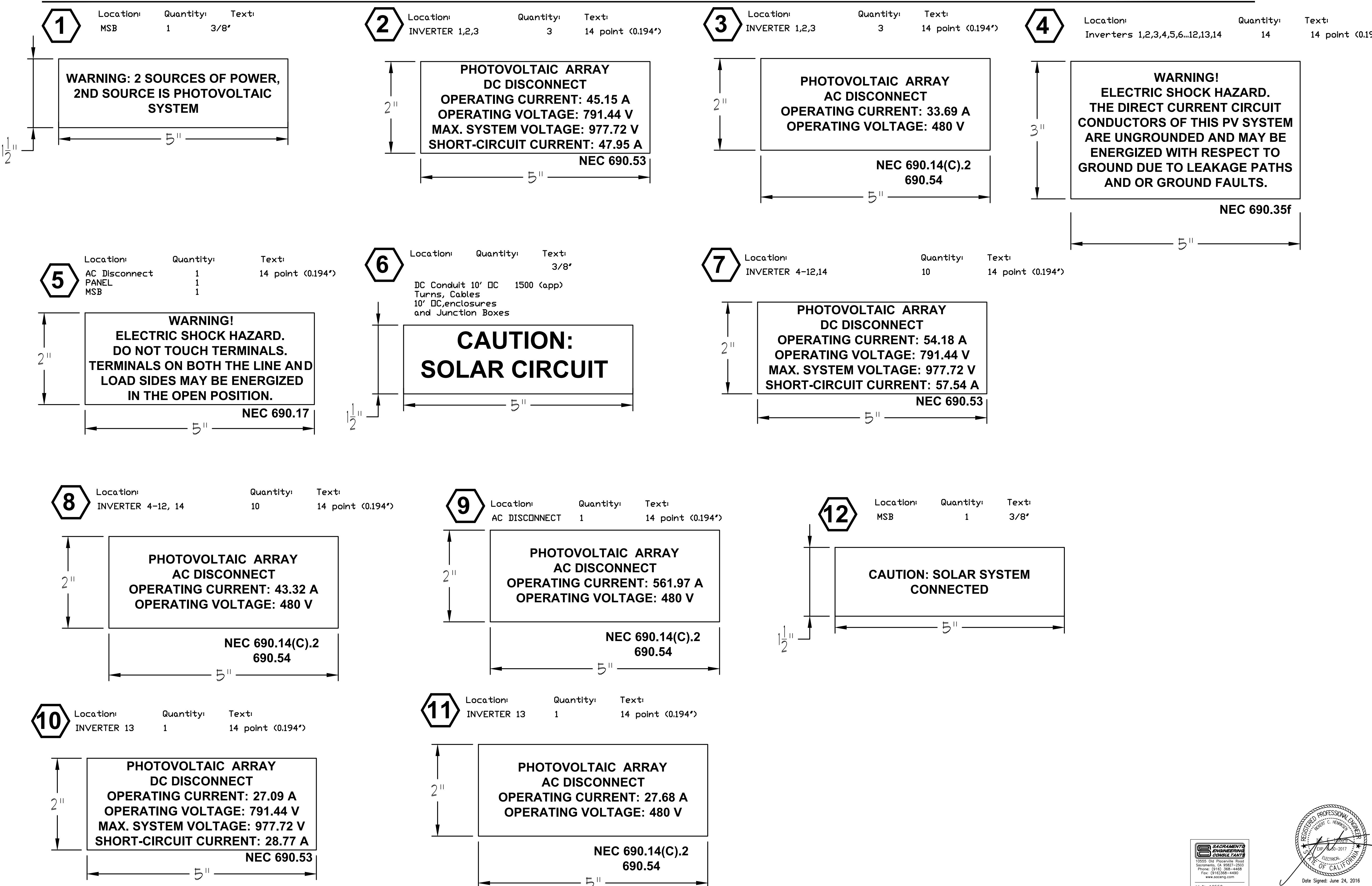
BY

All Text to Be:

Color: White Text
Red Background

Material: ABS UV
Font: Arial

Scale 1:1



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PV
SIGNAGE

PV4.1

DATE: JUNE 2016
JOB NO.: 16550

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