

HISTORIC AND DESIGN REVIEW COMMISSION

November 04, 2015

Agenda Item No: 3

HDRC CASE NO: 2015-440
ADDRESS: 9822 ESPADA RD
LEGAL DESCRIPTION: NCB 11041 BLK LOT 12B
ZONING: R6 H RIO-6
CITY COUNCIL DIST.: 3
DISTRICT: Mission Historic District
TYPE OF WORK: Installation of Solar Panels
REQUEST:

The applicant is requesting a Certificate of Appropriateness for approval to install photovoltaic panels on garage roof.

APPLICABLE CITATIONS:

Historic Design Guidelines, Chapter 3, Guidelines for Additions

6. Designing for Energy Efficiency

C. SOLAR COLLECTORS

- i. Location*—Locate solar collectors on side or rear roof pitch of the primary historic structure to the maximum extent feasible to minimize visibility from the public right-of-way while maximizing solar access. Alternatively, locate solar collectors on a garage or outbuilding or consider a ground-mount system where solar access to the primary structure is limited.
- ii. Mounting (sloped roof surfaces)*—Mount solar collectors flush with the surface of a sloped roof. Select collectors that are similar in color to the roof surface to reduce visibility.
- iii. Mounting (flat roof surfaces)*—Mount solar collectors flush with the surface of a flat roof to the maximum extent feasible. Where solar access limitations preclude a flush mount, locate panels towards the rear of the roof where visibility from the public right-of-way will be minimized.

FINDINGS:

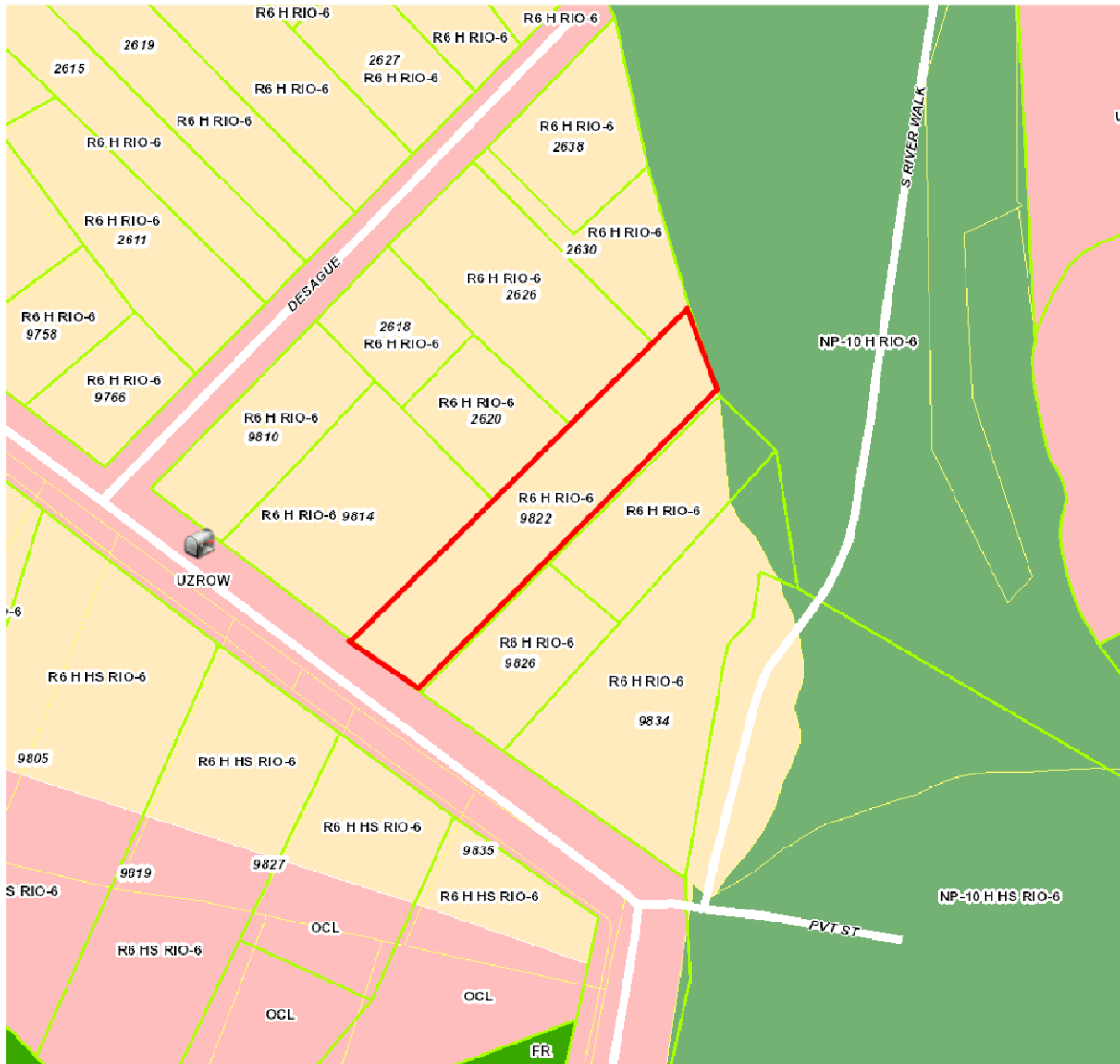
- a. Staff finds that with the setback of the accessory structure and the existing foliage, the proposed solar installation will not negatively impact the historic structure nor negatively impact the existing view from the public right of way.
- b. The applicant has proposed to mount a solar photovoltaic system to the roof on the southeastern side of the non-contributing accessory structure's roof 9822 Espada Road. According to the Guidelines for Additions 6.C.i., solar collectors should be located on the side or rear roof pitch of the primary historic structure to minimize visibility from the public right of way. The location of the accessory structure is at the rear of the long narrow lot. Staff finds the proposed location appropriate and consistent with the Guidelines.

RECOMMENDATION:

Staff recommends approval as submitted based on findings a and b.

CASE MANAGER:

Lauren Sage





Flex Viewer

Powered by ArcGIS Server

Printed: Oct 20, 2015

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NOTES:

1. ALL EQUIPMENT IS TO BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE PORTIONS OF THE 2014 NEC ARTICLE 690 AND THE 2012 IFC 605.11.

2. DISCONNECT SWITCH COMPLIES WITH NEC 690-17 AND HAS A SIGN READING: "WARNING- ELECTRIC SHOCK HAZARD- DO NOT TOUCH- TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION".

3. CIRCUIT BREAKERS IN THE CUSTOMER'S DISTRIBUTION PANEL SHALL BE LABELED " PHOTOVOLTAIC POWER SOURCE" PER NEC 705-10 AND "BREAKERS ARE BACKFED" PER NEC 705.12(d)5.

4. THE SOLAR OUTPUT METER, TO BE SUPPLIED AND INSTALLED BY CONTRACTOR, SHALL BE INSTALLED BETWEEN THE INVERTER AND SYSTEM DISCONNECT SWITCH AND SHALL BE LABELED: "PHOTOVOLTAIC SYSTEM KWH METER." THE PV ARRAY SAFETY DC DISCONNECT WILL BE MARKED WITH PV SOURCE RATINGS PER NEC 690.53.

1. OPERATING CURRENT
2. OPERATING VOLTAGE
3. MAXIMUM SYSTEM VOLTAGE
4. SHORT-CIRCUIT CURRENT
5. LABELED "PV ARRAY DC SAFETY DISCONNECT".

5. EXISTING AC LOAD CENTER MUST MEET REQUIREMENTS OF 2014 NEC CODE 705.12. SUM OF MAIN BREAKER PLUS SOLAR BREAKER(S) MUST BE LESS THAN OR EQUAL TO BUS RATING. IF BACKFED BREAKERS ARE MOUNTED AT OPPOSITE END OF BUS FROM MAIN BREAKER OR FEEDER, THE SUM OF SOLAR BREAKERS AND MAIN BREAKER MAY BE EQUAL TO OR LESS THAN 120% OF BUS RATING.

6. ALL CONDUIT TO BE EMT OR EQUAL AND NOT LESS THAN 1/2" TRADE SIZE.

7. THE WIRING SIZES LISTED ARE PER 2014 NEC. INSTALLER IS RESPONSIBLE FOR DETERMINING HOW THE WIRES WILL BE RUN, LENGTH OF CONDUIT, AND FINAL ELECTRICAL COMPLETION OF PROJECT W/ ALL STRAPS, ETC.

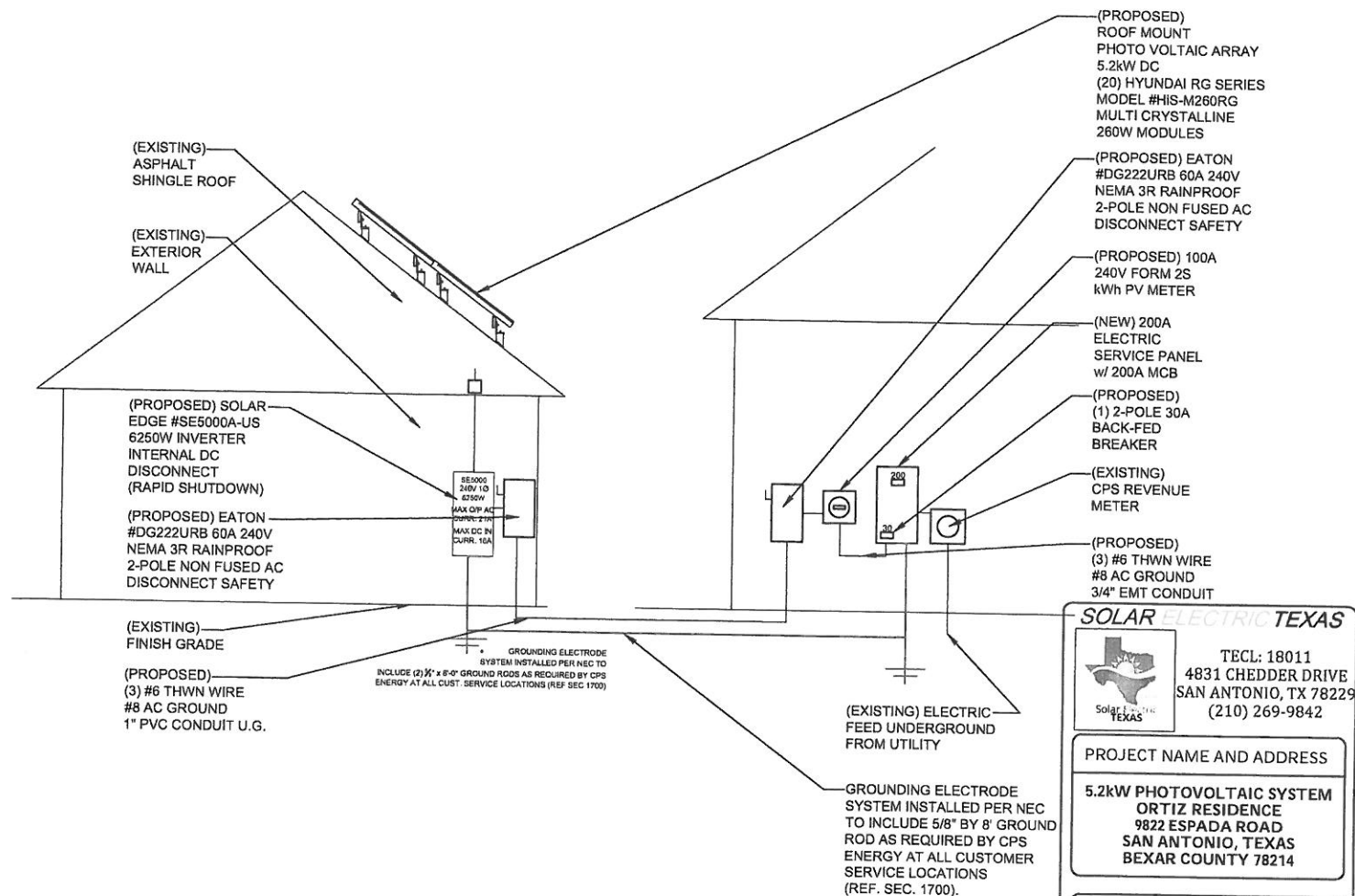
8. EACH MODULE SHALL BE GROUNDED USING THE MANUFACTURER'S SUPPLIED HARDWARE.

9. ALL GROUNDED POINT LOCATIONS ARE AS SPECIFIED BY MANUFACTURER'S INSTALLATION INSTRUCTIONS, INCLUDING CLEAR & LEGIBLE IDENTIFICATION OF REQUIRED GROUNDING POINTS ON EACH MODULE.

10. MARKING IS REQUIRED ON ALL INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES, CABLE ASSEMBLIES, AND JUNCTION BOXES TO ALERT THE FIRE SERVICE TO AVOID CUTTING THEM. MARKING SHOULD BE PLACED ON ALL INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES, AND CABLE ASSEMBLIES, EVERY 10 FEET, AT TURNS AND ABOVE AND/OR BELOW PENETRATIONS AND ALL DC COMBINER AND JUNCTION BOXES.

11. EACH MODULE HAS A SOLAR EDGE OPTIMIZER THAT LIMITS THE MODULE OPEN CIRCUIT VOLTAGE TO 1V AND THE STRING SHORT CIRCUIT CURRENT TO 15.5A DC. INVERTER UTILIZES THE OPTIMIZERS TO MAINTAIN OPTIMUM V_{mp}/I_{mp} .

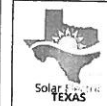
EXTERIOR ELEVATION



ELECTRICAL SERVICE RISER METER LOOP DIAGRAM

SCALE: NTS

SOLAR ELECTRIC TEXAS



TECL: 18011
4831 CHEDDER DRIVE
SAN ANTONIO, TX 78229
(210) 269-9842

PROJECT NAME AND ADDRESS

5.2kW PHOTOVOLTAIC SYSTEM
ORTIZ RESIDENCE
9822 ESPADA ROAD
SAN ANTONIO, TEXAS
BEXAR COUNTY 78214

ELECTRICAL
RISER DIAGRAM

DATE:
10/14/2015

DRAWN BY:
DAG

SHEET:

E0

SYSTEM INVERTER : (1) 6250W-SOLAR EDGE - SE5000A-US
INVERTER LOAD :

(20) MODULES ON (1) 6250W INVERTERS
260W MODULES X 20 = 5,200WATTS > 6,250WATTS = OK

Vmp(VbV) MAX VOLT per optimizer = 500.00V
Imp(Amp) 8.40A X 1 = 8.40A

Voc(VDC) w/ Optimizer	=	1.0V
CONT. 1.0V X 10	=	10.0V

Vmp(VDV) MAX VOLT per optimizer = 500.00V
Imp(AMP) 8.40A X 2 = 16.80A

Voc(VDC) w/ Optimizer 1.0 x 10	=	10.0V
Isc(AMP) w/ Optimizer	=	20.0A

Vmp(VDV) MAX VOLT per optimizer = 500.00V
Imp(AMP) 8.40A X 2 = 16.80A

Voc(VDC) w/ Optimizer 1.0 x 20 = 20.0V
Isc(A/MP) w/ Optimizer = 31.20A

MAX INPUT POWER-6250W
MAX VDC IN - 500V
AC:
MAX OUT POWER-5450VA@240V
NOM OUT CURRENT-22.7A@240V

NOM. INPUT VOLT.-350@240V
NOM. OUTPUT CURRENT.-21.0A@240V
MAX. IN CURRENT.-15.5A@240V

MAX POWER RATING-	260W	SHORT CIR. CURR.-	8.90A
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MAX. POWER VOLTAGE- 31.10V	MAX. POWER CURRENT- 8.40A
OPEN CIRCUIT VOLTAGE- 37.60V	MAX. FUSE- 15A
MAX. SYSTEM VOLT.- 1000V	

MAX INPUT POWER-	300W	MAX OUTPUT CURR.-	15.0A
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MAX. INPUT VOLTAGE- 48.00V
MAX. OUTPUT VOLT.- 60.0V
APPT. OPERATING RANGE- 8 - 48V
MAX. SYSTEM VOLTAGE- 1000V
MAX. CONT. INPUT CURRENT- 10 mA (typ)
MIN. STRIP LENGTH- 3"

SCALE: NTS



1. ALL SOLAR PV MODULES INSTALLED FLUSH MOUNTED ON ROOF PITCH
FACING DUE S. E. @ ± 160 DEGREE AZIMUTH.


2. SUPPORT ENTIRE PV ARRAY WITH UNIRAC QUICK MOUNT RACKING, TO
BE SECURED INTO EXISTING ROOF FRAMING (4" MAX) W/ GRK ASS
3/8" X 3-1/8" STAINLESS STEEL LAG SCREWS (MIN. 2" INTO RAFTER).

3. SUPPORT ALL PHOTOVOLTAIC MODULES WITH UNIRAC QUICK RAILS,
MOUNTED ON SERRATED 1-FEET W/ 3" FLASHING COVERED STANDOFFS.

4. THE SOLAR MODULES, ROOF MOUNTED, SYSTEM MUST BE ATTACHED
TO THE EXIST ROOF FRAMING STRUCTURE. DRAINAGE & MOISTURE
ALLOW MOISTURE PENETRATION MUST BE PROPERLY SEALED NOT TO
5. INSTALLATION OF SOLAR EQUIPMENT INTO THE EXIST ROOF CONSTRUCTION,
PARALLEL MEMBERS, INSURING THAT STRUCTURAL
SUPPORT MEMBERS CAN SUPPORT THE SOLAR
PANELS. LAG SCREWS HAVE ADEQUATE
PULLOUT STRENGTH AS INSTALLED, AND THE
PROPER DESIGN LOADS FOR ROOF MOUNTING
SYSTEMS ARE CORRECTLY CALCULATED.

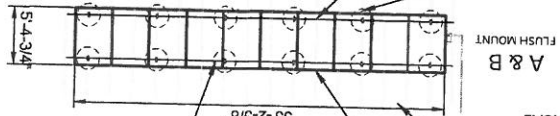
6. EACH MODULE HAS A SOLAR EDGE OPTIMIZER
THAT LIMITS THE MODULE OPEN CIRCUIT VOLTAGE
TO 1V AND THE STRING SHORT CIRCUIT CURRENT TO
15.5A DC. INVERTER UTILIZES THE OPTIMIZERS TO MAINTAIN OPTIMUM VMP

NORTH



(-X-RIS) SHINGLE
ROOF, TYPICAL
(-POPOSED)
ROOF MOUNTED
5.2kW DC
PHOTOVOLTAIC SOLAR
RG-SERIES
MODEL: #HIS-M26RG
260W MODULES
REQUIRED
3.0" IFC
CLEARANCE
(-POPOSED) (1) SOLAR EDGE
SE5000A-US 6250W
INVERTER/DISCONNECT
(-POPOSED) 60A 240V
2-POL NON FUSED
AC DISCONNECT
(-POPOSED) 60A 240V
2-POL NON FUSED
AC DISCONNECT
(-POPOSED) PV METER
(MOUNT @ MAIN HOUSE)
(NEW) 200A
ELECTRIC PANEL
@ MAIN HOUSE)
EXISTING) CP
REVENUE METER
@ MAIN HOUSE)

TYPICAL



24" RADIUS

NON OVERLAPPING
MINI-RECORDED
POINT LOAD

(20) HYUNDAI SOLAR
#HIS-M260RG, 260W MODULES

ALL EXIST ROOF FRAMING @ 2

ALL EXIST ROOF FRAMING @ 24" OC (TYP)

WIND PRESSURE = 34

SQUARE FOOT DISTRIBUTION

WEIGHT PER POINT LOAD = 45 LBS
OF POINT LOAD CONNECTIONS = 12 MIN
= 2,90 LBS

NON OVERLAPPING RADIUS REQ = 24"

PANEL GROUPS A - G
(20) HYUNDAI SOLAR

#HIS-M260RG, 260W MODULES

ALL EXIST ROOF FRAMING @ 24" OC (T)

SOLAR ELUTIONS



TELE: 18011
4831 CHEDDER DRIVE

SAN ANTONIO, TX 782
(210) 269-9842

PROJECT NAME AND ADDRESS

PROJECT NAME AND ADDRESS

ORTIZ RESIDENCE
9822 ESPADA ROAD

SAN ANTONIO, TEXAS
BEXAR COUNTY 78214

11501

ROOF & MODULE LAYOUT
& SYSTEM CALCULATIONS

DATE:	10/14/2015
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10/14/2013	DRAWN BY:
E3	

	DAG
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ONE-LINE DIAGRAM

PROPOSED 5.2kW DC (20 MODULES) HYUNDAI SOLAR RG-SERIES, #HiS-M260RG, 260W MODULES

NOTES:

SCALE: (NO SCALE)

- ALL EQUIPMENT IS TO BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE PORTIONS OF THE 2014 NEC ARTICLE 690 AND THE 2012 IFC 605.11.
- DISCONNECT SWITCH COMPLIES WITH NEC 690-17 AND HAS A SIGN READING: "WARNING- ELECTRICAL SHOCK HAZARD- DO NOT TOUCH- TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION" HAS BEEN APPLIED.
- CIRCUIT BREAKERS IN THE CUSTOMER'S DISTRIBUTION PANEL SHALL BE LABELED " PHOTOVOLTAIC POWER SOURCE" PER NEC 705-10 AND "BREAKERS ARE BACKFED" PER NEC 690-64(b)5.
- THE SOLAR OUTPUT METER, **TO BE SUPPLIED AND INSTALLED BY CONTRACTOR**, SHALL BE INSTALLED BETWEEN THE INVERTER AND SYSTEM DISCONNECT SWITCH AND SHALL BE LABELED: "PHOTOVOLTAIC SYSTEM KWH METER."
- THE PV ARRAY SAFETY DC DISCONNECT WILL BE MARKED WITH PV SOURCE RATINGS PER NEC 690.53.

- OPERATING CURRENT
- OPERATING VOLTAGE
- MAXIMUM SYSTEM VOLTAGE
- SHORT-CIRCUIT CURRENT
- LABELED "PV ARRAY DC SAFETY DISCONNECT".

- EXISTING AC LOAD CENTER MUST MEET REQUIREMENTS OF 2014 NEC CODE 705.12. SUM OF MAIN BREAKER PLUS SOLAR BREAKER(S) MUST BE LESS THAN OR EQUAL TO BUS RATING. IF BACKFED BREAKERS ARE MOUNTED AT OPPOSITE END OF BUS FROM MAIN BREAKER OR FEEDER, THE SUM OF SOLAR BREAKERS AND MAIN BREAKER MAY BE EQUAL TO OR LESS THAN 120% OF BUS RATING.
- ALL CONDUIT TO BE EMT OR EQUAL AND NOT LESS THAN 1/2" TRADE SIZE.
- ROOF STANCHIONS, FLASHING AND RAILING TO BE PROVIDED BY PV INSTALLER.
- THE WIRING SIZES LISTED ARE PER 2014 NEC. INSTALLER IS RESPONSIBLE FOR DETERMINING HOW THE WIRES WILL BE RUN, LENGTH OF CONDUIT, AND FINAL ELECTRICAL COMPLETION OF PROJECT W/ ALL STRAPS, ETC.
- EACH MODULE SHALL BE GROUNDED USING THE MANUFACTURER'S SUPPLIED HARDWARE.
- ALL GROUNDED POINT LOCATIONS ARE AS SPECIFIED BY MANUFACTURER'S INSTALLATION INSTRUCTIONS, INCLUDING CLEAR & LEGIBLE IDENTIFICATION OF REQUIRED GROUNDING POINTS ON EACH MODULE.

(IFC 605.11.1 and 605.11.4)

- Marking is required on all interior and exterior dc conduit, raceways, enclosures, cable assemblies, and junction boxes to alert the fire service to avoid cutting them. Marking should be placed on all interior and exterior dc conduit, raceways, enclosures, and cable assemblies, every 10 feet, at turns and above and/or below penetrations and all dc combiner and junction boxes.

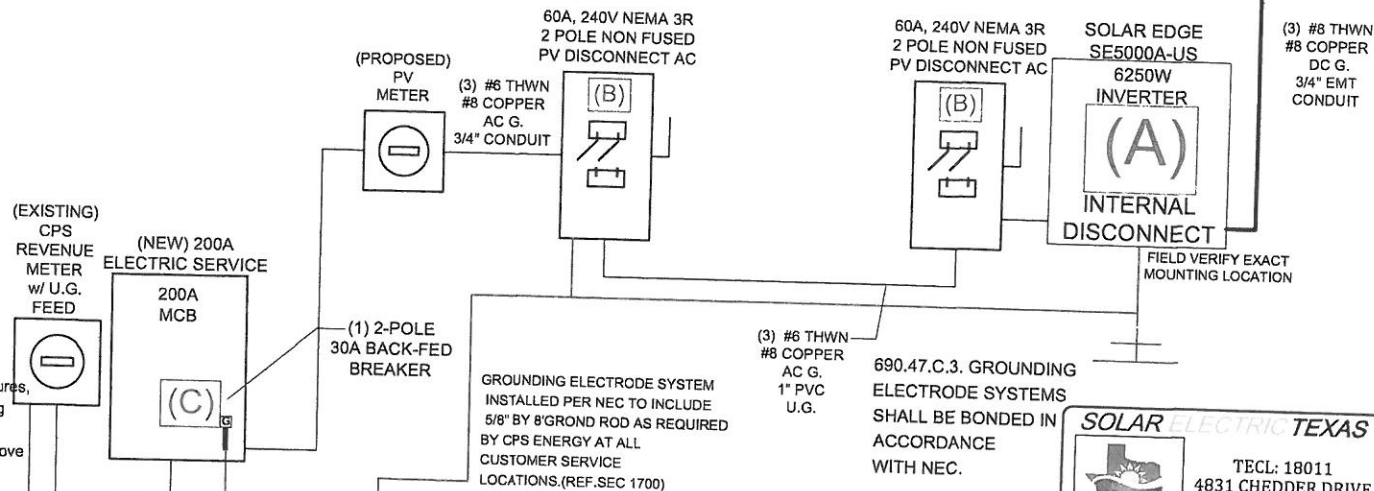
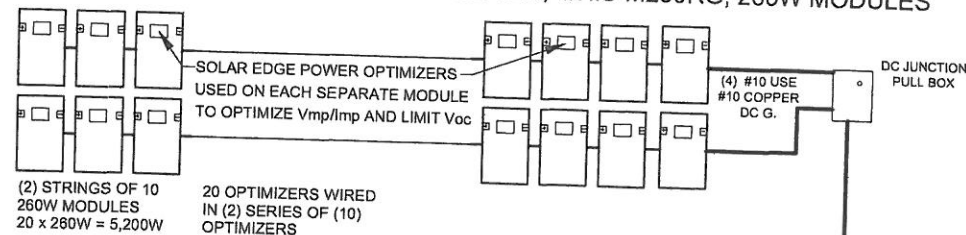
LABELS:

- (Aa) 690.53 & 690.17 (PLACE ON DC DISCONNECT) WARNING: ELECTRICAL SHOCK HAZARD DO NOT TOUCH TERMINALS. BOTH LINE & LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION. DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT.
- (Ab) 690.5 C (PLACE ON INVERTER) WARNING: ELECTRICAL SHOCK HAZARD IF A GROUND FAULT IS INDICATED NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED
- (Ac) 690.56 FACILITIES w/ RAPID SHUTDOWN. BUILDINGS OR STRUCTURES WITH BOTH UTILITY SERVICE & PV SYSTEM, COMPLYING WITH 690.12, SHALL HAVE A PERMANENT PLAQUE OR DIRECTORY INCLUDING THE FOLLOWING WORDING: PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN THE PLAQUE SHALL BE REFLECTIVE, w/ ALL LETTERS CAPITALIZED AND HAVING A MIN. HEIGHT OF 9.5mm (3/8") IN WHITE LETTERING ON RED BACKGROUND.

- (B) 605.11.1.3 (PLACE AT MAIN SERVICE DISCONNECT) WARNING: PHOTOVOLTAIC POWER SOURCE

- MARKING CONTENT: CAUTION: SOLAR ELECTRIC SYSTEM
- RED BACKGROUND,
- WHITE LETTERING,
- MINIMUM 3/8" LETTER HEIGHT,
- ALL CAPITAL LETTERS,
- ARIAL OR SIMILAR FONT, NON-BOLD,
- REFLECTIVE, WEATHER RESISTANT MATERIAL SUITABLE FOR THE ENVIRONMENT

- (C) 690.54 (PLACE AT MAIN SERVICE) INTERACTIVE SYSTEM POINT OF INTERCONNECTION TO BE MARKED AT AN ACCESSIBLE LOCATION AT THE DISCONNECTING MEANS AS A POWER SOURCE

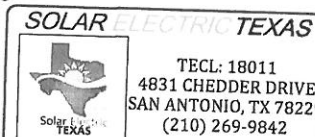


PV SYSTEM DC DISCONNECT

OPERATING CURRENT	31.2 A
OPERATING VOLTAGE	350 V
MAXIMUM SYSTEM VOLTAGE	500 V
SHORT CIRCUIT CURRENT	16.8 A

PHOTOVOLTAIC AC DISCONNECT

MAXIMUM AC OPERATING CURRENT	21.0 A
MAXIMUM AC OPERATING VOLTAGE	240 V



PROJECT NAME AND ADDRESS

5.2kW PHOTOVOLTAIC SYSTEM
ORTIZ RESIDENCE
9822 ESPADA ROAD
SAN ANTONIO, TEXAS
BEXAR COUNTY 78214

ONE-LINE DIAGRAM

DATE: 10/14/2015
DRAWN BY: DAG

SHEET:

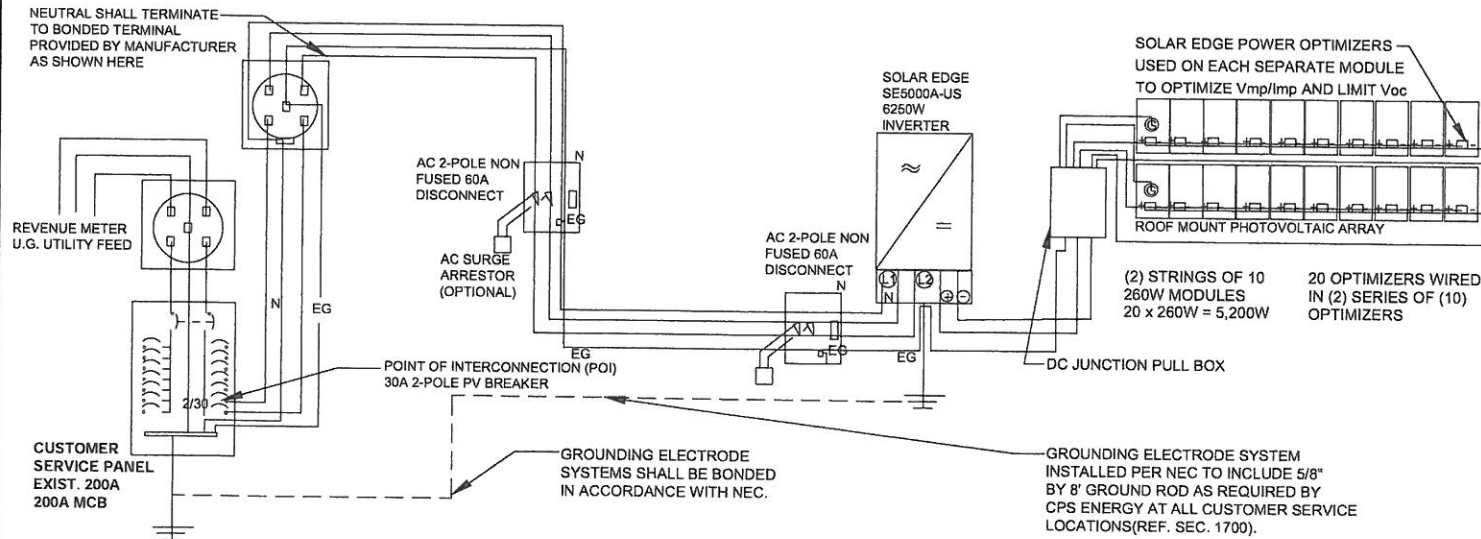
E1

PROPOSED 5.2kW DC (20 MODULES) HYUNDAI SOLAR RG-SERIES, #HIS-M260RG, 260W MODULES

THREE LINE DIAGRAM LOAD-SIDE POINT OF INTERCONNECTION

SCALE: NTS

TYPICAL PHOTOVOLTAIC (PV) SYSTEM
120/240-VOLT
SINGLE-PHASE
THREE-WIRE DIAGRAM



SOLAR ELECTRIC TEXAS



TECL: 18011
4831 CHEDDER DRIVE
SAN ANTONIO, TX 78229
(210) 269-9842

PROJECT NAME AND ADDRESS

5.2kW PHOTOVOLTAIC SYSTEM
ORTIZ RESIDENCE
9822 ESPADA ROAD
SAN ANTONIO, TEXAS
BEXAR COUNTY 78214

THREE-LINE
DIAGRAM

DATE:
10/14/2015

DRAWN BY:
DAG

SHEET:

E2

5.2kW DC PHOTOVOLTAIC SYSTEM ORTIZ RESIDENCE 9822 ESPADA ROAD SAN ANTONIO, TEXAS 78214

TAXPAYER INFORMATION:
ORTIZ, GILBERT JR.
9822 ESPADA ROAD
SAN ANTONIO, TEXAS
BEXAR COUNTY 78214

LEGAL DESCRIPTION:

NCB 11041 BLK LOT 12B

STREET ADDRESS:

9822 ESPADA ROAD
SAN ANTONIO, TEXAS 78214

GEOGRAPHIC ID:

11041-000-0120

SHEET INDEX:

- T-1 TITLE SHEET AND PLOT LAYOUT
- E-0 ELECTRIC RISER DIAGRAM
- E-1 ONE-LINE DIAGRAM
- E-2 THREE-LINE DIAGRAM
- E-3 ROOF & MODULE LAYOUT
& SYSTEM CALCULATIONS

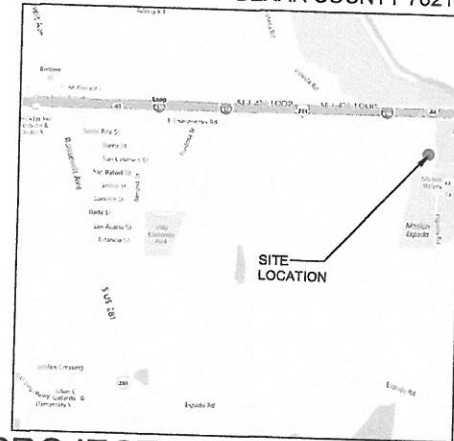
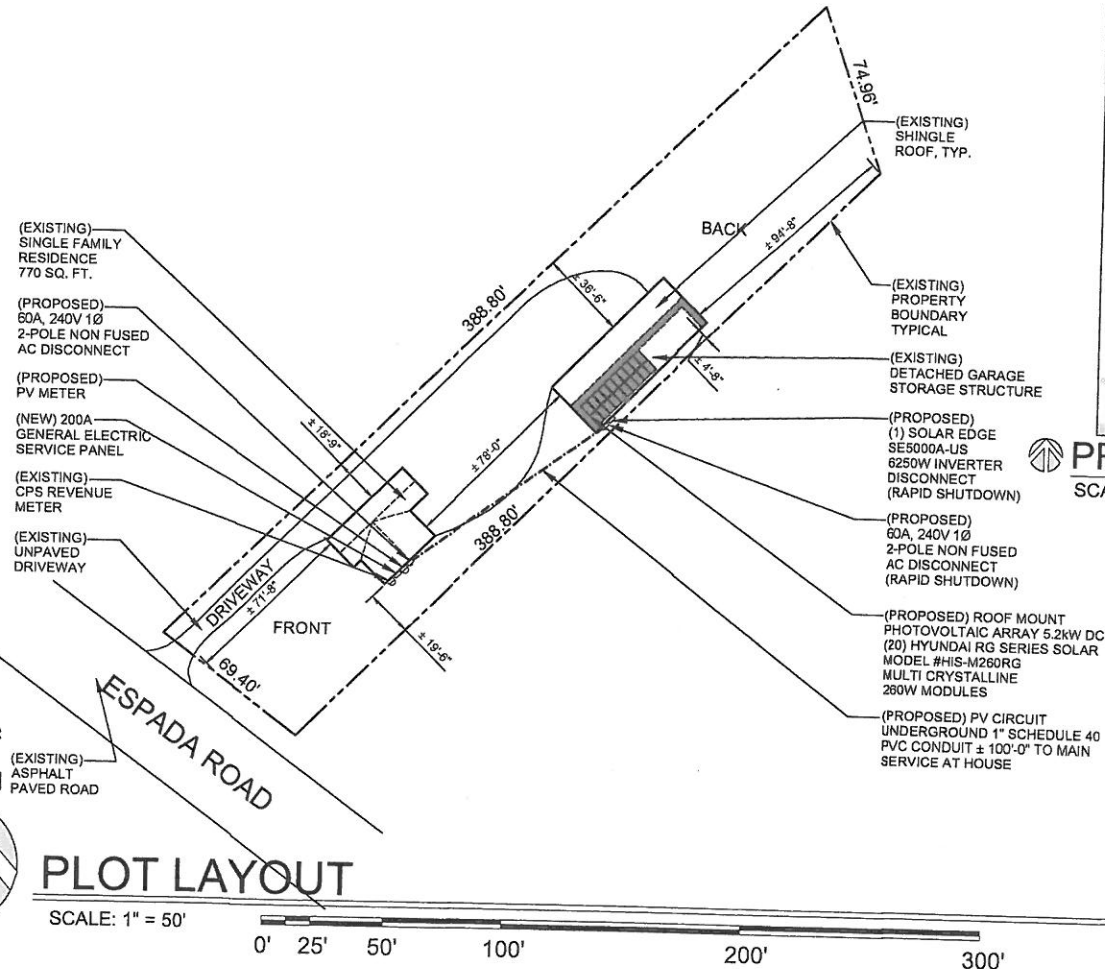
APPLICABLE CODES:

- 2014 NEC
- 2012 IBC
- 2012 IRC
- 2012 IFC

NOTES:

1. ALL INSTALLATION MANUALS FOR MANUFACTURED COMPONENTS SHALL BE AVAILABLE AND ON THE JOB SITE FOR THE SOLAR INVERTERS, PV MODULES, COMBINER BOX, DISCONNECTS & MOUNTING RACK SYSTEMS. ANY OTHER COMPONENTS, AS PART OF THIS SYSTEM DESIGN, COULD BE ADDITIONALLY REQUIRED PER REQUEST OF THE INSPECTOR.

2. INVERTERS ARE INSTALLED PER MANUFACTURER'S INSTALLATION INSTRUCTIONS, HOWEVER, AS A PRECAUTION, CARE SHOULD BE TAKEN WITH THE INSTALLATION OF THE INVERTERS SUBJECT TO DIRECT ELEMENTS SUCH AS; DIRECT SUNLIGHT, DIRECT WATER SPRAY, OR NEAR DOWNSPOUTS.



PROJECT LOCATION MAP

SCALE: (NTS)

SOLAR ELECTRIC TEXAS



TECL: 18011
4831 CHEDDER DRIVE
SAN ANTONIO, TX 78229
(210) 269-9842

PROJECT NAME AND ADDRESS

5.2kW PHOTOVOLTAIC SYSTEM
ORTIZ RESIDENCE
9822 ESPADA ROAD
SAN ANTONIO, TEXAS
BEXAR COUNTY 78214

SITE PLAN AND LEGAL DESCRIPTION

DATE: 10/14/2015

DRAWN BY: DAG

SHEET:

T1

ACCESSORY STRUCTURE



Panels will go on opposite side
of Roof

