STAFF REPORT: MAY 13, 2020 MEETING PREPARED BY: B. CAGNEY
APPLICATION NUMBER: 19-6697
ADDRESS: 4087 FULLERTON
HISTORIC DISTRICT: RUSSELL WOODS - SULLIVAN
APPLICANT: PETER DENICOLA – POWER HOME SOLAR
PROPERTY OWNER: JESSICA TIDWELL
SCOPE OF WORK: INSTALL NEW SOLAR PANELS ON GARAGE ROOF

EXISTING CONDITIONS
The 2-story, single-family home at 4087 Fullerton was built in 1947. It is the second home on the south side of the residential block, east of Petosky Ave., in the Russell Woods – Sullivan Historic District. The brick home features architectural details that are typical with an English Revival style home: an a-symmetrical façade, detailed expressive stone work in the facade, and stone surrounds around the doors and windows on the front elevation.

In February 2020, HDC staff received a proposal from Power Home Solar to install solar panels on the rear side of the home. The proposed location of the solar panels was not staff approvable under HDC guidelines. Staff informed the applicant that the current proposal would have to be approved by the Commission at a monthly meeting and requested the applicant provide a demonstration of how the solar impact the roof of the house when viewed from the right of way. The applicant revised the drawing, moving the solar panels to the detached garage at the rear of the property.

CURRENT PROPOSAL
The current proposal seeks to install eight (8) solar panels on the roof of the detached garage, along with a battery and service panel installed with the utility meter on the rear side of the home.

STAFF OBSERVATIONS:
- The proposed solar panels on the detached garage would be slightly visible from the Right of Way.
- The battery and service panel will be installed at the rear of the home next to the existing utility meter.
- HDC staff has previously assisted the homeowner in replacing the asphalt shingle roof, issuing a COA for the work in January, 2019. On September 5th, HDC staff received a photographic complaint from a neighbor that altered staff to vinyl windows were installed on the front façade of the home. Upon checking with HDC and BSEED databases, no COA or permit was issued for the installation of the vinyl windows. Upon further investigation through Google Streetview, it appears the windows were installed prior to the current homeowner purchasing the home, sometime between 2013 and 2018.

ISSUES:
- The proposed solar panels on the detached garage would be slightly visible from the right of way.
- The plan shows that Solar Attic Fan on the roof of the home with location to be determined. It is unclear what impact (if any) this feature will have on the roof line.

RECOMMENDATIONS:

- **Solar Panels**: While slightly visible from the Right of Way, it is staffs opinion that the installation of the solar panels on the detached garage will not detract from the historic character of the home. Further, the panels can be installed or removed without irreparable damage to the roof of the garage. Therefore, staff recommends that the Commission issue a Certificate of Appropriateness for the installation of the solar panels as proposed as it meets The Secretary of the Interior's Standards for Rehabilitation 9) *New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment*; and 10) *New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.*

8 roof mounted solar modules, grid tied, 2.40KW installation on existing structure.

Info on placement:

4 panels are being installed on the southwest side of the garage, 4 panels on the southeast side of the roof. Total of 8 panels installed.

How/ What is being installed?

The panels are being installed with Quick- Mount Q rails on the composite shingle roof, screws that are being used are Hex Head Lag Screw.

Panel type is a 60 Cell Monocrystalline PV Module manufactured by Silfab Solar.

The first step is we install the Quick Mount L-mount Flashing, we take a Hex Head Lag Screw and we secure the Quick Mount L- Mount and the Offset L- feet into place.

The next step is we take a Quick Mount Q rails and install that with the Offset L- feet and install the PV Module with a Universal End/Mid Clamp.

All of the above steps are listed in the design drawings on page PV-3.

Scope of Work

- 8 solar roof mounted modules, grid tied, 2.40 kW, solar installation on existing structure

Permit # BLD2020-00660


4087


4087


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4087


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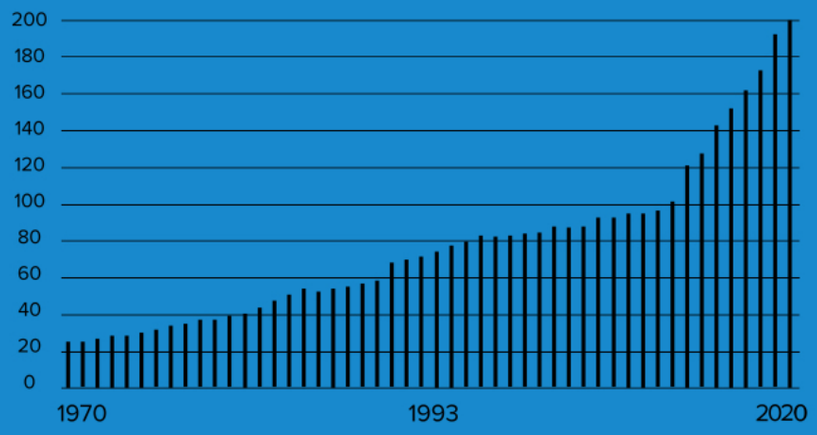
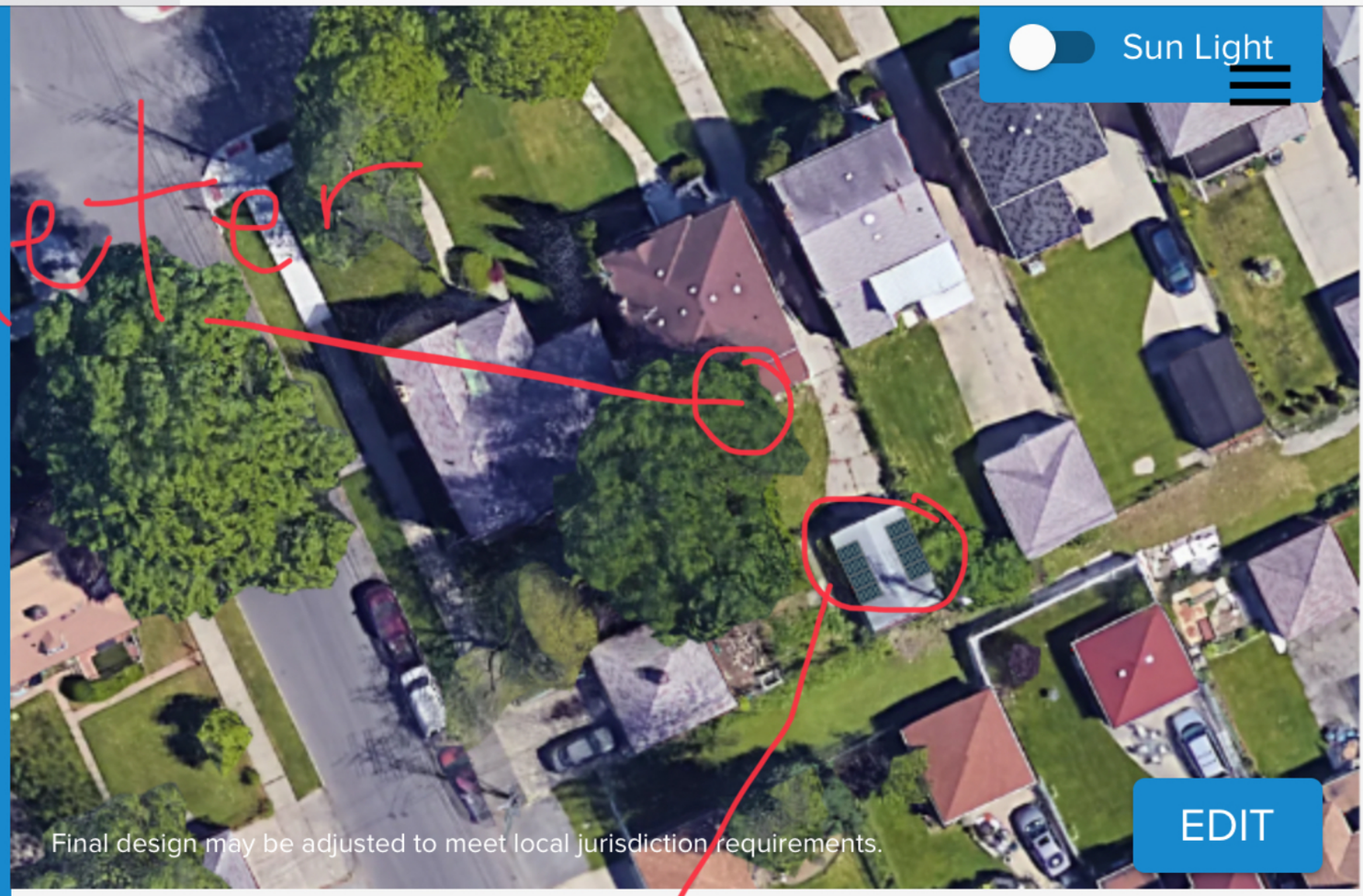




SYSTEM SIZE **2.48 kW**	ESTIMATED YEARLY PRODUCTION **1,674 kWh** Show Details
MODULES **8 Silfab 310w**	INVERTER **SolarEdge SE7600A-US**

PROJECT DESCRIPTION:

8 X SILFAB SIL - 310 ML MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES

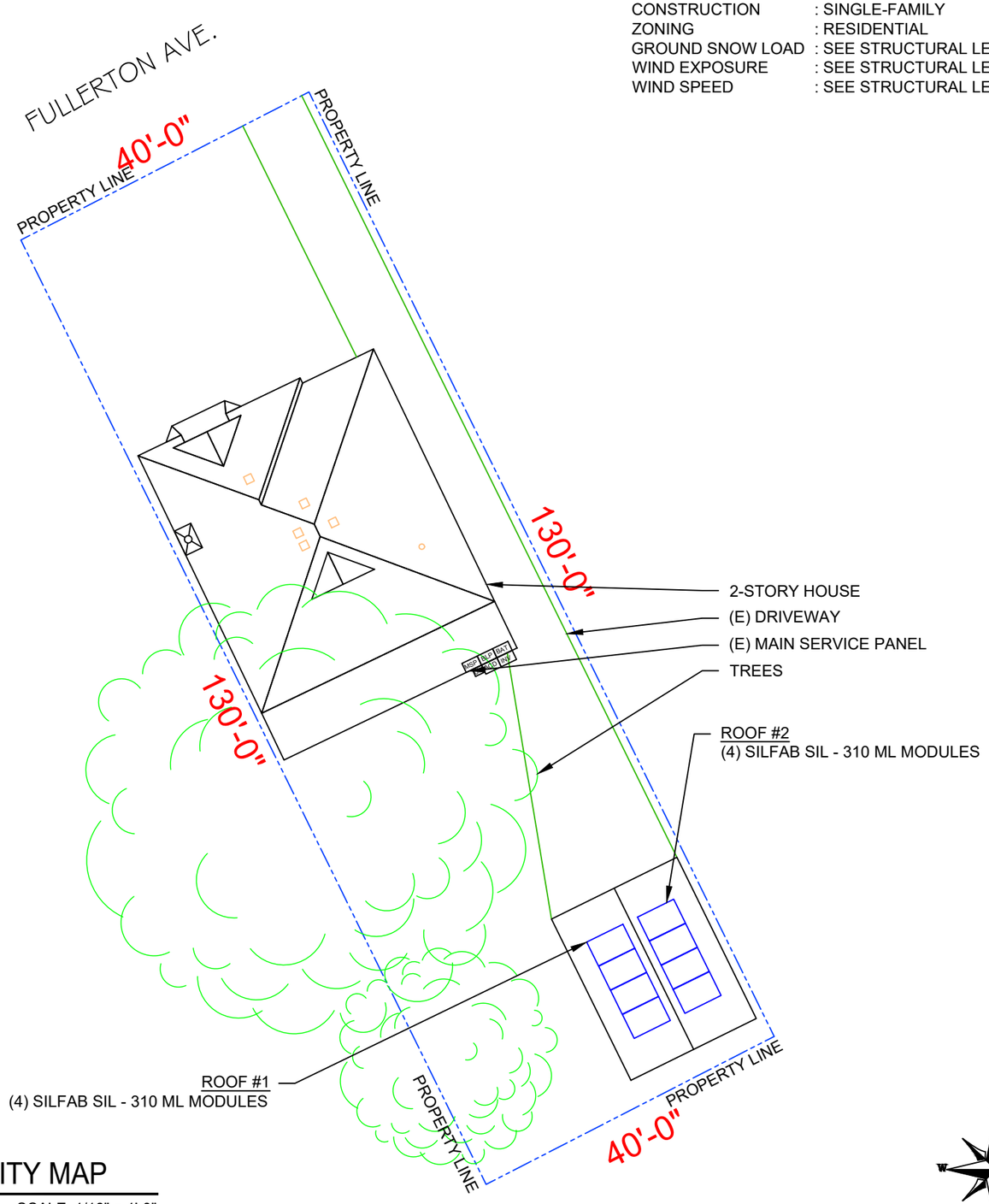
SYSTEM SIZE:2.48 kW DC STC
ARRAY AREA: ROOF#1 - 73.20 SQ FT
ARRAY AREA: ROOF#2 - 73.20 SQ FT

AUTHORITIES HAVING JURISDICTION
BUILDING : WAYNE COUNTY
ZONING : WAYNE COUNTY
UTILITY : DTE ENERGY

EQUIPMENT SUMMARY
8 SILFAB SOLAR SIL-310 ML MODULES
02 GENERAC PV LINK S2502 POWER OPTIMIZERS
01 GENERAC PWRCELL X7602 7600W INVERTER

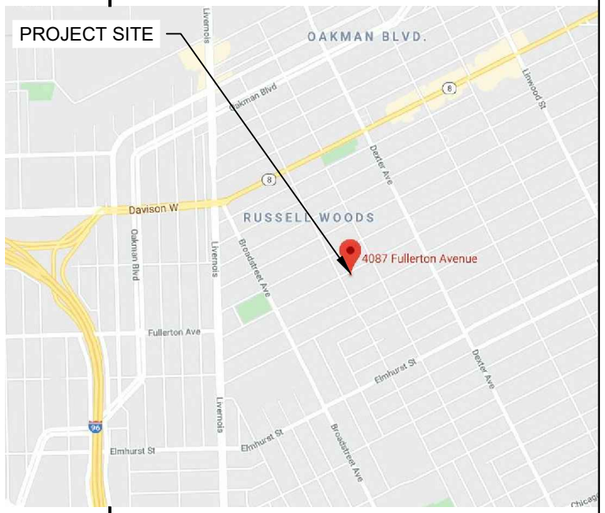
APPLICABLE CODES & STANDARDS
MICHIGAN RESIDENTIAL CODE 2015
NEC 2017

DESIGN SPECIFICATIONS
OCCUPANCY : II
CONSTRUCTION : SINGLE-FAMILY
ZONING : RESIDENTIAL
GROUND SNOW LOAD : SEE STRUCTURAL LETTER
WIND EXPOSURE : SEE STRUCTURAL LETTER
WIND SPEED : SEE STRUCTURAL LETTER



1 PLOT PLAN & VICINITY MAP
PV-1 SCALE: 1/16" = 1'-0"

2 HOUSE PHOTO
PV-1 SCALE: NTS



3 VICINITY MAP
PV-1 SCALE: NTS

SHEET INDEX

POWERHOME
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MOORESVILLE, NC 28115
Phone: 704-800-6591 (OFFICE)
Email: info@powerhome.com
Web: www.powerhome.com

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 3/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL
RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

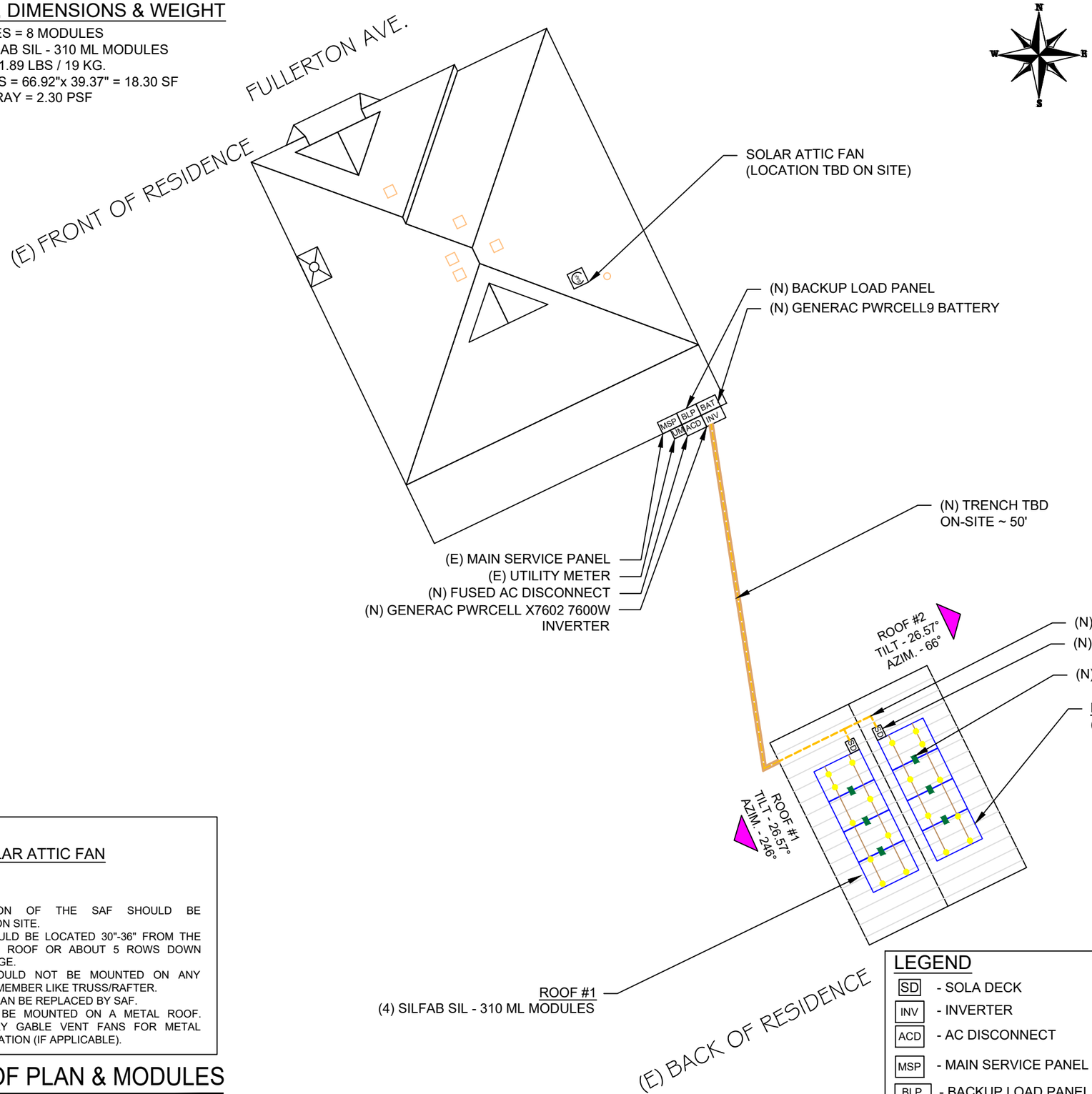
SHEET NAME
PLOT PLAN & VICINITY MAP

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-1

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 8 MODULES
MODULE TYPE = SILFAB SIL - 310 ML MODULES
MODULE WEIGHT = 41.89 LBS / 19 KG.
MODULE DIMENSIONS = 66.92"x 39.37" = 18.30 SF
UNIT WEIGHT OF ARRAY = 2.30 PSF



ROOF DESCRIPTION				
ROOF TYPE			COMPOSITION SHINGLE	
ROOF	ROOF TILT	AZIMUTH	FRAMING SIZE	FRAMING SPACING
#1	26.57°	246°	SEE STRUCTURAL LETTER	
#2	26.57°	66°		

ARRAY AREA & ROOF AREA CALC'S				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	4	73.20	191.50	38.22
#2	4	73.20	191.50	38.22

LEGEND

SD	- SOLA DECK		- VENT, ATTIC FAN (ROOF OBSTRUCTION)
INV	- INVERTER		- ROOF ATTACHMENT
ACD	- AC DISCONNECT		- RAFTERS
MSP	- MAIN SERVICE PANEL		- CONDUIT
BLP	- BACKUP LOAD PANEL	BAT	- BATTERY
OP	- PV LINK OPTIMIZER		- RAPID SHUTDOWN

SAF — SOLAR ATTIC FAN

NOTES:
- THE LOCATION OF THE SAF SHOULD BE DETERMINED ON SITE.
- THE SAF SHOULD BE LOCATED 30"-36" FROM THE PEAK OF THE ROOF OR ABOUT 5 ROWS DOWN FROM THE RIDGE.
- THE SAF SHOULD NOT BE MOUNTED ON ANY STRUCTURAL MEMBER LIKE TRUSS/RAFTER.
- "CAN VENTS" CAN BE REPLACED BY SAF.
- SAF CANNOT BE MOUNTED ON A METAL ROOF. PLEASE CARRY GABLE VENT FANS FOR METAL ROOF INSTALLATION (IF APPLICABLE).

1 ROOF PLAN & MODULES
PV-2
SCALE: 3/32" = 1'-0"

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DESCRIPTION	DATE	REV

Signature with Seal

DATE: 3/6/2020

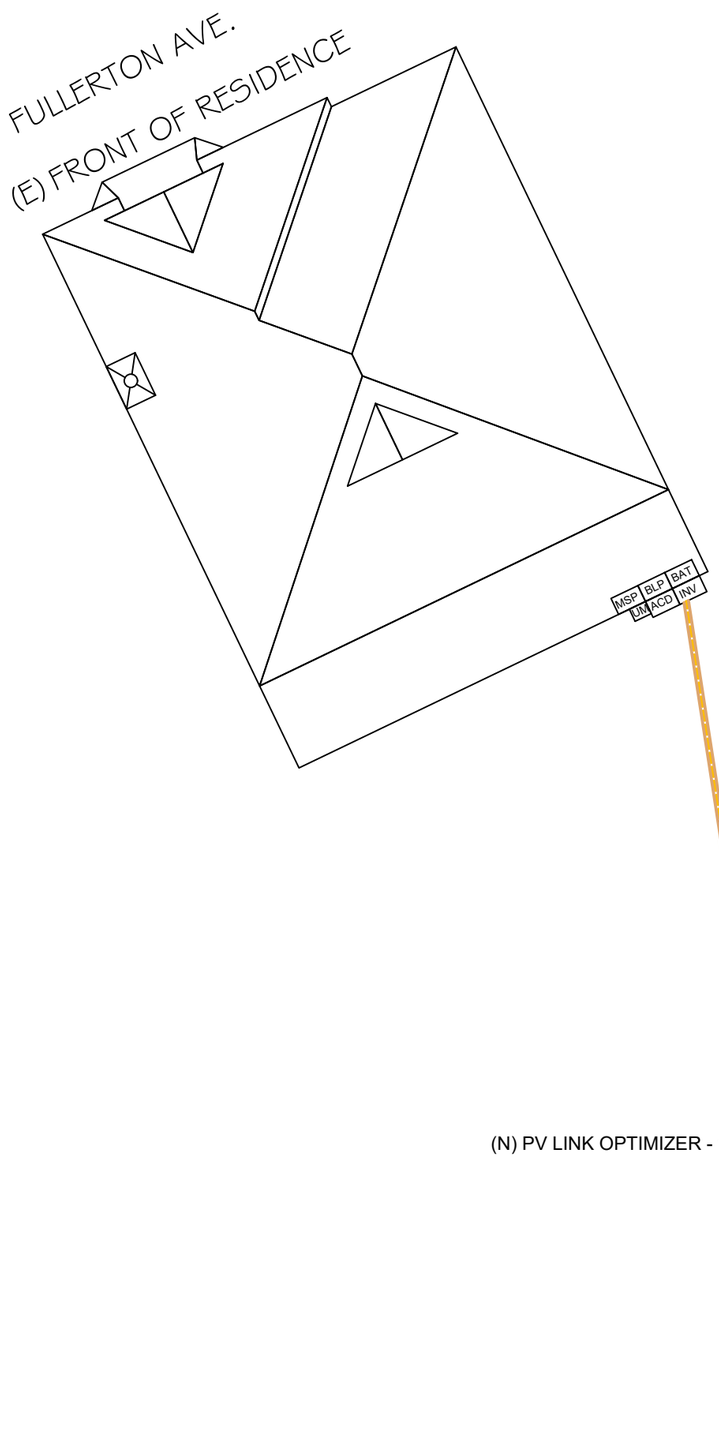
PROJECT NAME & ADDRESS

JESSICA C TIDWELL
RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
ROOF PLAN & MODULES

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2



1 ROOF PLAN WITH STRING LAYOUT

PV-2A

SCALE: 3/32" = 1'-0"

BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	8	SILFAB SIL - 310 ML MODULES
OPTIMIZER	02	GENERAC PV LINK S2502 POWER OPTIMIZERS
GENERAC SNAP RS	8	GENERAC SNAPRS MODEL RS801
INVERTER	01	GENERAC PWRCELL X7602 7600W INVERTER
AC DISCONNECT	1	60A FUSED, (2) 40A FUSES, 240V, NEMA 3R, UL LISTED
SOLA DECK	2	SOLA DECKES 600 V, NEMA 3R, UL LISTED
BATTERY	1	GENERAC PWRCELL9 BATTERY
BACKUP PANEL	1	125A, BACKUP PANEL, 240V
RAILS	6	QRAIL LIGHT 14 FT. BLACK
SPLICE KIT	2	QSPLICE INTERNAL LIGHT
TRUNK CABLE	0	TRUNK/PV CABLE CLIP
MODULE CLAMPS	12	UNIVERSAL MID CLAMP
GROUNDING LUG	2	WEEB LUG W/ T-BOLT
END CLAMPS	8	UNIVERSAL END CLAMPS
ATTACHMENT	22	L-MOUNT ATTACHMENT (QUICKMOUNT)
T-BOLT	30	T-BOLT W/ NUT M8 X 20MM

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Signature with Seal

DATE: 3/6/2020

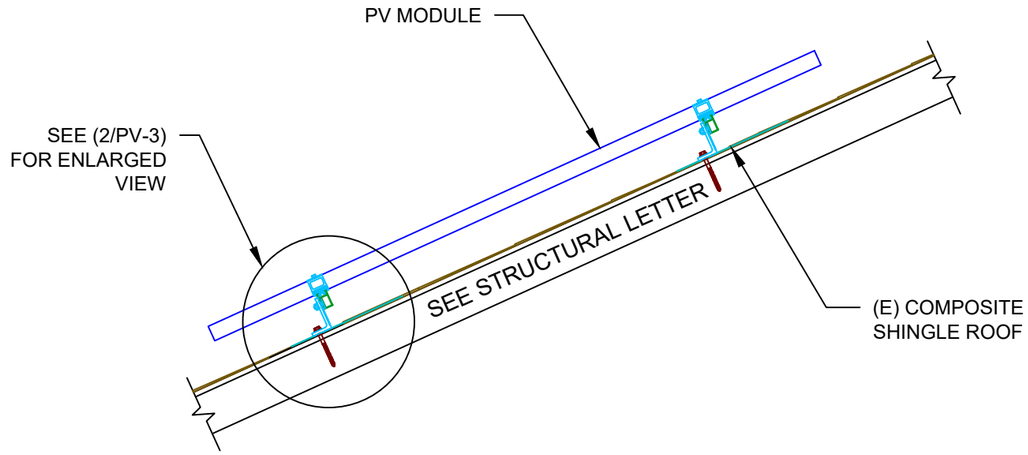
PROJECT NAME & ADDRESS

JESSICA C TIDWELL RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
STRING LAYOUT

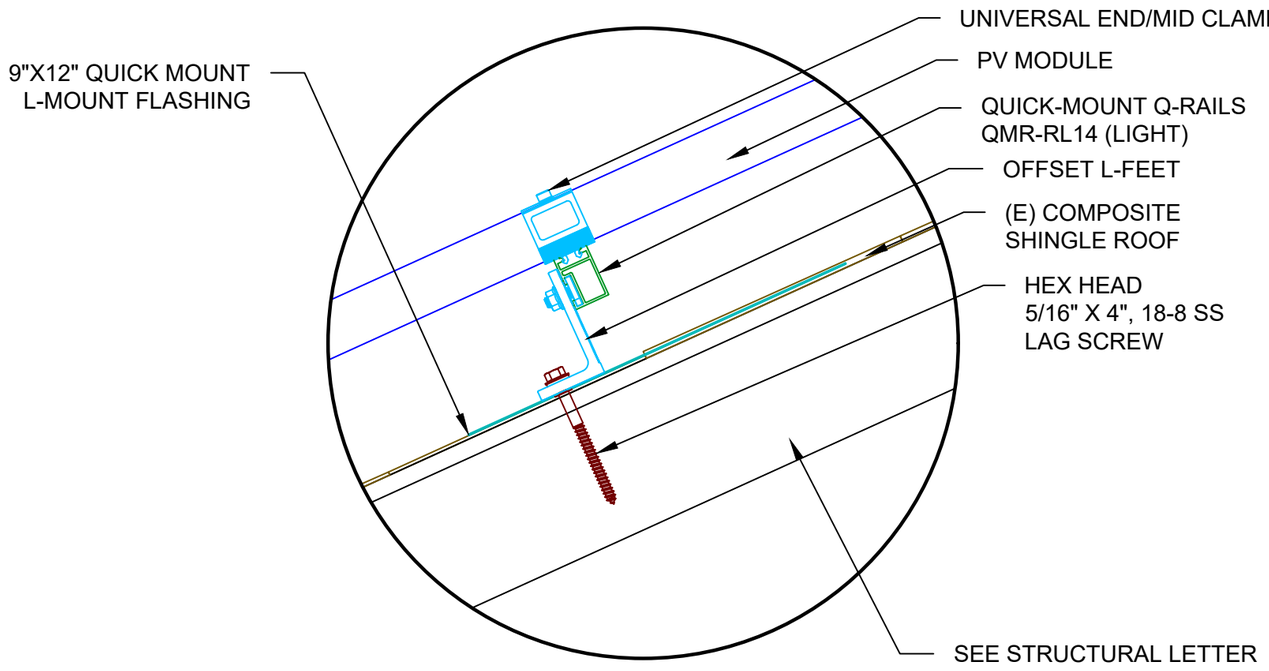
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2A



1 ATTACHMENT DETAIL

PV-3 SCALE: 1" = 1'-0"



2 ATTACHMENT DETAIL (enlarged view)

PV-3 SCALE: NTS

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Signature with Seal

DATE: 3/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL
RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
ATTACHMENT DETAIL

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-3

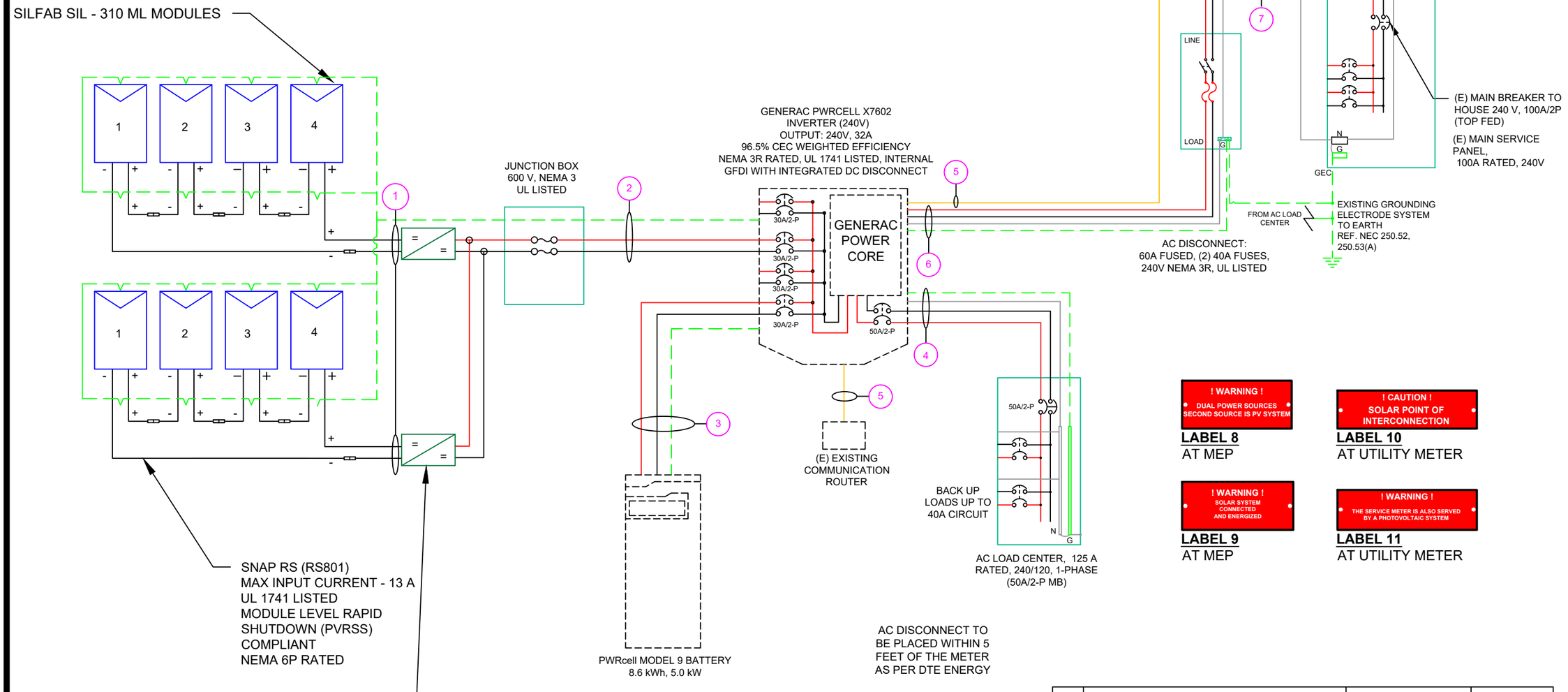
(8) SILFAB SIL - 310 ML MODULES
(2) PV LINK OF 04 MODULES CONNECTED IN SERIES

WIRE LEGEND

- PV ARRAY +VE CONDUCTOR AND L1
- PV ARRAY -VE CONDUCTOR AND L2
- NEUTRAL CONDUCTOR
- EGC AND GEC
- SINGLE TWISTED PAIR, CAT 5 WIRE

SERVICE INFO

UTILITY PROVIDER:	DTE ENERGY
MAIN SERVICE VOLTAGE:	240V
MAIN PANEL BRAND:	SQUARE D
MAIN SERVICE PANEL:	100A
MAIN CIRCUIT BREAKER RATING:	100A
MAIN SERVICE LOCATION:	SOUTH-EAST
SERVICE FEED SOURCE:	OVERHEAD



AC DISCONNECT TO
BE PLACED WITHIN 5
FEET OF THE METER
AS PER DTE ENERGY

! WARNING !
DUAL POWER SOURCES
SECOND SOURCE IS PV SYSTEM

LABEL 8
AT MEP

! CAUTION !
SOLAR POINT OF
INTERCONNECTION

LABEL 10
AT UTILITY METER

! WARNING !
SOLAR SYSTEM
CONNECTED
AND ENERGIZED

LABEL 9
AT MEP

! WARNING !
THE SERVICE METER IS ALSO SERVED
BY A PHOTOVOLTAIC SYSTEM

LABEL 11
AT UTILITY METER

WARNING:
PHOTOVOLTAIC
POWER SOURCE

LABEL 1
ON ALL CONDUITS
SPACED AT MAX 10FT

SOLAR PV SYSTEM EQUIPPED
WITH RAPID SHUTDOWN
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY

LABEL 2
AT INVERTER

! CAUTION !
SOLAR ELECTRIC
SYSTEM CONNECTED
AND ENERGIZED

LABEL 3
AT INVERTER

PHOTOVOLTAIC
DC DISCONNECT

LABEL 4
AT EACH DC
DISCONNECT

! WARNING !
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS.
TERMINALS ON BOTH LINE AND LOAD SIDES
MAY BE ENERGIZED IN THE OPEN POSITION

LABEL 5
AT EACH AC
DISCONNECT

PHOTOVOLTAIC
AC
DISCONNECT

LABEL 6
AT EACH AC
DISCONNECT

	QTY	CONDUCTOR INFORMATION		CONDUIT TYPE	CONDUIT SIZE
1	(4)	#10AWG -	PV WIRE/USE-2	N/A	N/A
	(1)	#6AWG -	BARE COPPER IN FREE AIR		
2	(2)	#10AWG -	THWN-2	EMT OR FLEX IN ATTIC	3/4"
	(1)	#10AWG -	THWN-2 GND		
3	(2)	#10AWG -	THWN-2	EMT OR FLEX	3/4"
	(1)	#10AWG -	THWN-2 GND		
	(1)	CAT 5 COMMUNICATION WIRE			
4	(3)	#6AWG -	THWN-2	EMT OR FLEX	3/4"
	(1)	#6AWG -	THWN-2 GND		
5	(1)	CAT 5 COMMUNICATION WIRES		EMT OR FLEX	3/4"
6	(3)	#6AWG -	THWN-2	EMT OR FLEX	3/4"
	(1)	#6AWG -	THWN-2 GND		
7	(3)	#6AWG -	THWN-2	EMT OR FLEX	3/4"

1 ELECTRICAL LINE DIAGRAM
PV-4 SCALE: NTS

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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 3/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL
RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-4

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	SILFAB SIL310-ML
VMP	33.05V
IMP	9.38A
VOC	40.25V
ISC	9.93A
TEMP. COEFF. VOC	-0.28%/°C
MODULE DIMENSION	66.92"L x 39.37"W x 1.49"D (In Inch)
MODULE EFFICIENCY	18.4%

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	GENERAC PWRCELL X7602
AC POWER OUTPUT (LOADS/GRID)	7600VA
AC POWER OUTPUT (BACKUP)	8000VA
NOMINAL OUTPUT VOLTAGE	240 VAC
MAX OUTPUT CURRENT @240V (LOADS/GRID)	32A
MAX OUTPUT CURRENT @240V (BACKUP)	50A
NOMINAL DC INPUT VOLTAGE	380Vdc
MAX DC INPUT VOLTAGE	420Vdc
CEC WEIGHTED EFFICIENCY	96.5%
MAX DC POWER (PV)	10000W
MAX INPUT CURRENT (PV)	20Adc
CONT. PEAK POWER (BATTERY)	8000W

SERIES SUB STRING OPTIMIZER SPECIFICATIONS	
MANUFACTURER / MODEL #	PV LINK S2502
RATED POWER	2500W
MPPT VOLTAGE RANGE	60-360 Vmp
MAXIMUM INPUT VOLTAGE	420Voc
MAXIMUM OUTPUT	420 Adc
NOMINAL OUTPUT	380 Vdc
MAXIMUM OUTPUT CURRENT	8 A
MAXIMUM SHORT CIRCUIT CURRENT	18 A

BATTERY SPECIFICATIONS	
MANUFACTURER / MODEL #	GENERAC PWRCELL BATTERY
USABLE ENERGY	8.6kW
RATED CONTINUOUS POWER	3.4Kw
POWER: 60 MINUTES	4.2kW
POWER: 2 MINUTES	5.0kW
REBUS VOLTAGE: INPUT/ OUTPUT	360-420Vdc
MODULE VOLTAGE	46.8Vdc
ROUND-TRIP EFFICIENCY	96.5%

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-19°
AMBIENT TEMP (HIGH TEMP 2%)	32°
CONDUIT HEIGHT	0.5"
ROOF TOP TEMP	54°

DC CONDUCTOR AMPACITY CALCULATIONS:
ARRAY TO SOLA DECK:

EXPECTED WIRE TEMP (In Celsius)	54°
TEMP. CORRECTION PER NEC TABLE 310.15 (B)(2)(a)	0.76
NO. OF CURRENT CARRYING CONDUCTORS	4
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	0.8
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE 310.15(B)(16)	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	10A
1.25 X Imax	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	24.32A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (10A) otherwise less the entry for circuit conductor size and ampacity	

FROM SOLA DECK TO INVERTER:

EXPECTED WIRE TEMP (In Celsius)	54°
TEMP. CORRECTION PER NEC TABLE 310.15 (B)(2)(a)	0.76
NO. OF CURRENT CARRYING CONDUCTORS	2
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	1
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE 310.15(B)(16)	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	20A
1.25 X Imax X # of PV LINKS	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	28.4A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (20A) otherwise less the entry for circuit conductor size and ampacity	

FROM BATTERY TO INVERTER:

EXPECTED WIRE TEMP (In Celsius)	32°
TEMP. CORRECTION PER NEC TABLE 310.15 (B)(2)(a)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	2
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	1
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE310.15(B)(16)	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	26.25A
1.25 X Imax	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	38.40A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (26.25A) otherwise less the entry for circuit conductor size and ampacity	

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM INVERTER TO BACK-UP PANEL:

No. OF INVERTER	1
EXPECTED WIRE TEMP (In Celsius)	32°
TEMP. CORRECTION PER NEC TABLE 310.15(B)(2)(a)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	2
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	1
CIRCUIT CONDUCTOR SIZE	6 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE 310.15(B)(16)	75A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	42.5A
1.25 X INVERTER OUTPUT CURRENT (BACKUP POWER)	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	72A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (42.5A) otherwise less the entry for circuit conductor size and ampacity	

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM INVERTER TO MEP:

No. OF INVERTER	1
EXPECTED WIRE TEMP (In Celsius)	32°
TEMP. CORRECTION PER NEC TABLE 310.15(B)(2)(a)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	2
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	1
CIRCUIT CONDUCTOR SIZE	6 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE 310.15(B)(16)	75A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	40A
1.25 X MAX INVERTER OUTPUT CURRENT (LOADS/GRID)	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	72A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (40A) otherwise less the entry for circuit conductor size and ampacity	

POWERHOME
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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 3/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL
RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
WIRING CALCULATIONS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-5

SIL-310 ML

BAA ARRA · 25 YEAR PRODUCT WARRANTY · AUTOMATED MANUFACTURING · JUST-IN-TIME · PVEL DNV-GL TOP PERFORMER · TIER 1 BANKABLE $$$ · HIGH EFFICIENCY

60 Cell
Monocrystalline PV Module

CE · Intertek · Intertek · IEC · Fraunhofer ISE · CEC LISTED

CHUBB*
* Chubb provides error and omission insurance to Silfab Solar Inc.

INDUSTRY LEADING WARRANTY
All our products include an industry leading 25-year product workmanship and 30-year performance warranty.

35+ YEARS OF SOLAR INNOVATION
Leveraging over 35+ years of worldwide experience in the solar industry, Silfab is dedicated to superior manufacturing processes and innovations such as Bifacial and Back Contact technologies, to ensure our partners have the latest in solar innovation.

NORTH AMERICAN QUALITY
Silfab is the leading automated solar module manufacturer in North America. Utilizing premium quality materials and strict quality control management to deliver the highest efficiency, premium quality PV modules 100% made in North America.

BAA / ARRA COMPLIANT
Silfab panels are designed and manufactured to meet Buy American Act Compliance. The US State Department, US Military and FAA have all utilized Silfab panels in their solar installations.

LIGHT AND DURABLE
Engineered to accommodate low load bearing structures up to 5400Pa. The light-weight frame is exclusively designed for wide-ranging racking compatibility and durability.

LOWEST DEFECT RATE
Total automation ensures strict quality controls during the entire manufacturing process at our ISO certified facilities. 48.18 ppm as per December 2018.

DOMESTIC PRODUCTION
Silfab Solar manufactures our PV modules in two automated locations within North America. Our 300+ North American team is ready to help our partners win the hearts and minds of customers, providing customer service and product delivery that is direct, efficient and local.

AESTHETICALLY PLEASING
All black sleek design, ideal for high-profile residential or commercial applications.

PID RESISTANT
PID Resistant due to advanced cell technology and material selection. In accordance to IEC 62804-1.

Electrical Specifications		SIL-310 ML mono PERC	
Test Conditions		STC	NOCT
Module Power (Pmax)	Wp	310	234
Maximum power voltage (Vpmax)	V	33.05	29.7
Maximum power current (Ipmax)	A	9.38	7.9
Open circuit voltage (Voc)	V	40.25	37.2
Short circuit current (Isc)	A	9.93	8.14
Module efficiency	%	18.2	17.2
Maximum system voltage (VDC)	V	1000	
Series fuse rating	A	20	
Power Tolerance	Wp	0 to +10	

Measurement conditions: STC 1000 W/m2 • AM 1.5 • Temperature 25 °C • NOCT 800 W/m² • AM 1.5 • Measurement uncertainty ≤ 3%
• Sun simulator calibration reference modules from Fraunhofer Institute. Electrical characteristics may vary by ±5% and power by 0 to +10W.

Temperature Ratings	SIL-310 ML mono PERC
Temperature Coefficient Isc	0.064 %/°C
Temperature Coefficient Voc	-0.28 %/°C
Temperature Coefficient Pmax	-0.36 %/°C
NOCT (± 2°C)	45 °C
Operating temperature	-40/+85 °C

Mechanical Properties and Components	SIL-310 ML mono PERC	
	Metric	Imperial
Module weight	18.6 kg ±0.2 kg	41 ±0.4 lbs
Dimensions (H x L x D)	1700 mm x 1000 mm x 38 mm	66.9 in x 39.4 in x 1.5 in
Maximum surface load (wind/snow)*	4000 Pa rear load / 5400 Pa front load N/m²	83.5/112.8 lb/ft^2
Hail impact resistance	ø 25 mm at 83 km/h	ø 1 in @ 51.6 mph
Cells	60 - Si mono PERC - 5 busbar 156.75 x 156.75 mm	60 - Si mono PERC - 5 busbar 6.17 x 6.17 Inch
Glass	3.2 mm high transmittance, tempered, DSM anti-reflective coating	0.126 high transmittance, tempered, DSM anti-reflective coating
Cables and connectors (refer to installation manual)	1200 mm, ø 5.7 mm, MC4 compatible	47.2 in, ø 0.22 in, MC4 compatible
Backsheet	High durability, superior hydrolysis resistance, multi-layer dielectric film	
Frame	Anodized Aluminum (Black)	
Bypass diodes	3 diodes-30SQ045T (45V max DC blocking voltage, 30A max forward rectified current)	
Junction Box	UL 3730 Certified, IP67 rated	

Warranties	SIL-310 ML mono PERC			
Module product workmanship warranty	25 years**			
Linear power performance guarantee	30 years			
	≥ 97% end 1st year	≥ 90% end 12th year	≥ 82% end 25th year	≥ 80% end 30th year

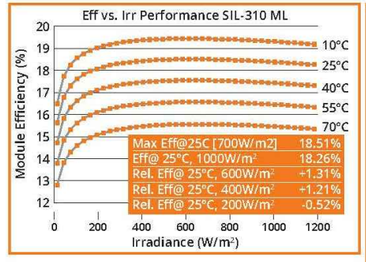
Certifications	SIL-310 ML mono PERC
Product	ULC ORD C1703, CEC listed, IEC 62716 Ammonia Corrosion; IEC61701:2011 Salt Mist Corrosion Certifed, UL Fire Rating: Type 2
Factory	ISO9001:2015

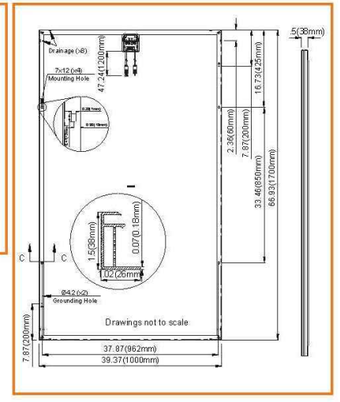
- Modules Per Pallet: 26
- Pallets Per Truck: 36
- Modules Per Truck: 936

*⚠ Warning. Read the Safety and Installation Manual for mounting specifications and before handling, installing and operating modules.

**12 year extendable to 25 years subject to registration and conditions outlined under "Warranty" at www.silfabsolar.com.

Third-party generated pan files from Fraunhofer-Institute for Solar Energy Systems ISE are available for download at: www.silfabsolar.com/downloads





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2019 TOP PERFORMER PVEL DNV-GL PV MODULE RELIABILITY SCORECARD

POWERHOME
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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 3/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL
RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-6

FEATURES:

No autotransformer or battery inverter needed

User-selectable modes

Free system monitoring

GENERAC

PWRCELL

Inverter
Model: X7602, X11402

Solar-plus-storage is simple with the Generac PWRcell Inverter. This bi-directional, REbus™-powered inverter offers a simple, efficient design for integrating smart batteries with solar. Ideal for self-supply, backup power, zero-export and energy cost management, the PWRcell inverter is the industry's most feature-rich line of inverters, available in single-phase and three-phase models.

ADDITIONAL FEATURES

- Single inverter for grid-tied solar with smart battery integration
- Simplified system design: No autotransformer or battery inverter needed
- User-selectable modes for backup power, self-supply, time-of-use and zero-export
- Free system monitoring included via PWRview Web Portal and Mobile App

AC OUTPUT/ GRID-TIE	MODEL X7602	MODEL X11402
RATED AC POWER OUTPUT	7600 W	11400 W
AC OUTPUT VOLTAGE	120/240, 1Ø VAC	120/208, 3Ø VAC
AC FREQUENCY	60 Hz	60 Hz
MAXIMUM CONTINUOUS OUTPUT CURRENT	32 A, RMS	32 A, RMS
GROUND-FAULT ISOLATION DETECTION	Included	Included
CHARGE BATTERY FROM AC	Yes	Yes
THD (CURRENT)	< 2 %	< 2 %
TYPICAL NIGHTTIME POWER CONSUMPTION	< 7 W	< 7 W

AC OUTPUT/ BACKUP	MODEL X7602	MODEL X11402
RATED AC BACKUP POWER OUTPUT	8000 W	8000 W
MAXIMUM AC BACKUP POWER OUTPUT	12000 W	12000 W
AC BACKUP OUTPUT VOLTAGE	120/240, 1Ø VAC	120/240, 1Ø VAC
AC FREQUENCY	60 HZ	60 HZ
AC CIRCUIT BREAKER	50 A	50 A
THD (VOLTAGE)	< 2 %	< 2 %
AUTOMATIC SWITCHOVER TIME	< 1 Seconds	< 1 Seconds
TYPICAL NIGHTTIME POWER CONSUMPTION	30 W	30 W

DC INPUT	MODEL X7602	MODEL X11402
DC INPUT VOLTAGE RANGE	360-420 VDC	360-420 VDC
NOMINAL DC BUS VOLTAGE	380 VDC	380 VDC
MAX INPUT CURRENT	20 A	30 A
REVERSE-POLARITY PROTECTION	YES	YES
GROUND-FAULT ISOLATION DETECTION	YES	YES
TRANSFORMERLESS, UNGROUNDED	YES	YES

DC INPUT/ BATTERY	MODEL X7602	MODEL X11402
MAXIMUM CONTINUOUS POWER	8000 W	8000 W
INTERNAL DC DISTRIBUTION BREAKERS	4X 2P30A	4X 2P30A
DC FUSES ON PLUS AND MINUS	40 A	40 A
2-POLE DISCONNECTION	YES	YES

EFFICIENCY	MODEL X7602	MODEL X11402
PEAK EFFCIENCY	97 %	98 %
CEC WEIGHTED EFFCIENCY	96.5 %	97.5 %

GENERAC

Generac Power Systems, Inc.
S45 W29290 Hwy. 59, Waukesha, WI 53189
www.Generac.com 1-888-GENERAC (1-888-436-3722)

Specifications

FEATURES AND MODES	
ISLANDING[3]	Yes
GRID SELL	Yes
SELF CONSUMPTION	Yes
PRIORITIZED CHARGING FROM RENEWABLES	Yes
GRID SUPPORT - ZERO EXPORT	Yes

ADDITIONAL FEATURES	
SUPPORTED COMMUNICATION INTERFACES	CANbus, RS4854, Ethernet
SYSTEM MONITORING	PWRview Web Portal and Mobile App
CRITICAL LOADS DISCONNECT[3]	Yes
MANUAL INVERTER BYPASS SWITCH	Automatic
WARRANTY	10 Years

STANDARDS COMPLIANCE	
SAFETY	UL1741 SA, CSA 22.2
GRID CONNECTION STANDARDS	IEEE1547, Rule 21, Rule 14H
EMISSIONS	FCC part15 class B

DIMENSIONS AND INSTALLATION SPECIFICATIONS	
WIRE GAUGE RANGE	10 - 8 AWG
TOTAL AC KNOCKOUTS X SIZE	2" x 0.75", 2 x 1"
TOTAL DC KNOCKOUTS X SIZE	5" x 1"
DIMENSIONS (L,W,H)	24.5" x 19.25" x 8"
WEIGHT	62.7 lb
COOLING	Forced convection
NOISE	< 40 dBA
OPERATING TEMPERATURE	-20 to 50 °C*
PROTECTION RATING	NEMA 3R

INSTALLATION GUIDELINES	
BATTERY TYPES SUPPORTED	PWRcell battery module
MODULE STRING SIZE PER PV LINK OPTIMIZER	2-9 PV modules
MAXIMUM RECOMMENDED DC POWER FROM PV	10kW (1Ø), 15kW (3Ø)
BATTERIES PER INVERTER	Up to 2

[3] 3Ø inverters offer islanding for 1Ø loads, [4] Modbus,
*Reduced power at extreme temperatures

Specifications subject to change without notice.

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DATE: 3/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL
RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-7

FEATURES:

Easy installation

Low cost, high efficiency solution

NEC 2017 and 2020 PVRSS compliant

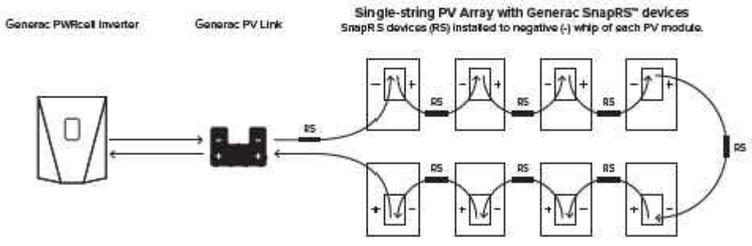
SnapRS™

Instant Rapid Shutdown Compliance
Model: RS801

The Generac SnapRS is NEC 2017 compliant, and doesn't require any extra hardware to mount, no pairing and no fussy digital communications. Just snap a Generac SnapRS disconnect device to each PV module for total rapidshutdown performance. When signaled by the inverter, SnapRS units break the PV circuit, reducing array voltage to <80V in seconds.

SYSTEM DESIGN

Snap a Generac SnapRS disconnect device to the negative whip (-) of each module in the solar array for simple NEC-2017 module-level rapid shutdown compliance. SnapRS devices isolate array voltage when a rapid shutdown command is given by a connected Islanding Inverter



ADDITIONAL FEATURES

- Fast, easy and simple to install
- One SnapRS device per PV module
- Achieves PVRSS Compliance
- Low cost, high efficiency solution

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Specifications

SNAPRS (RS801)

PV MODULE MAX VOC	75 V	OPERATING TEMPERATURE	-40 to 70 °C
EFFICIENCY	99.9 %	CERTIFICATIONS	UL1741
MAX INPUT CURRENT	13 A	WEIGHT	100 g
SHUTDOWN TIME	< 10 Seconds	DIMENSIONS (L,W,H)	1" x 1" x 7"
ENCLOSURE RATING	NEMA 6P	WARRANTY	25 Years

Specifications subject to change without notice.

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DETROIT, MI 48238

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-8

FEATURES:

Connect up to 2 PWRcells to a single PWRcell Inverter

Plug-and-play with PWRcell Inverters and PV Links

Residential and commercial application ready

GENERAC

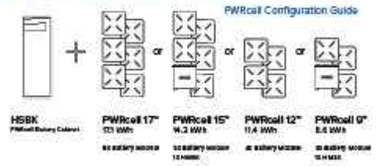
PWRCELL

Battery
Model: 9, 12, 15, 17

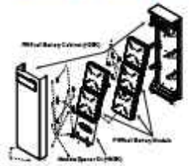
No other smart battery offers the flexibility of PWRcell. Whether for backup power or smart energy management, the PWRcell battery has power and capacity options for every need, without sacrificing flexibility or function.

The PWRcell battery series allows system owners the flexibility to scale from the economical 8.6kWh PWRcell 9™ to the massive 17.1 kWh PWRcell 17™ by adding additional PWRcell battery modules, the gold standard in storage.

PWRCELL CONFIGURATION GUIDE



PWRCELL ASSEMBLY



PWRCELL BATTERY DESIGN

PWRcell is a modular smart battery platform that allows for a range of configurations to suit any need, small or large. PWRcell can be built in capacities ranging from 8.6-17.1kWh. When needs change, PWRcell can be upgraded with additional modules. Use the chart above to understand what components you need for your chosen PWRcell configuration.

ADDITIONAL FEATURES

- Connect as many as two 2 PWRcells to a single PWRcell Inverter™ for up to 34.2kWh of storage
- Best-in-class battery backup power
- Plug-and-play with PWRcell Inverters™ and PV Links™
- Time-of-use (TOU) and zero-export ready
- Residential and commercial application ready

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Specifications

PWRCELL MODEL	9	12	15	17
BATTERY MODULES	3	4	5	6
USABLE ENERGY	8.6 kWh	11.4 kWh	14.3 kWh	17.1 kWh
POWER: RATED CONTINUOUS	3.4 kW	4.5 kW	5.6 kW	6.7 kW
POWER: 60 MINUTES	4.2 kW	5.6 kW	7.0 kW	8.4 kW
POWER: 2 MINUTES	5.0 kW	6.7 kW	8.4 kW	10.0 kW
REBUS VOLTAGE: INPUT/OUTPUT	360-420 VDC			
MODULE VOLTAGE	46.8 VDC			
ROUND-TRIP EFFICIENCY	96.5 %			
OPERATING TEMPERATURE	-10 to 45 °C*			
RECOMMENDED TEMPERATURE	13 to 30 °C			
MAXIMUM INSTALLATION ALTITUDE	9834 ft, (3000 m)			
DIMENSIONS (L,W,H)	68" x 22" x 10"			
WEIGHT (ENCLOSURE)	115 lb, (52 kg)			
WEIGHT (INSTALLED)	280 lb, (127 kg)	335 lb, (152 kg)	390 lb, (178 kg)	445 lb, (202 kg)
WARRANTY: LI-ION MODULES	10 Years, (22.6 MWh)	10 Years, (30.2 MWh)	10 Years, (37.8 MWh)	10 Years, (45.3 MWh)
WARRANTY: ELECTRONICS AND ENCLOSURE	10 Years			
COMMUNICATION PROTOCOL	REbus DC Nanogrid™			
COMPLIANCE	UL 9540, UL 1973, UL 1642, CSA 22.2			

*Reduced power at extreme temperatures

Specifications subject to change without notice.

UPGRADING PWRCELL

Inside of the PWRcell battery, the PWRcell battery modules are stacked 2-deep on three levels, allowing for up to six modules to be connected in series. Upgrade an existing PWRcell battery by adding modules and a module spacer (HMSK) if required. PWRcell 9 and PWRcell 15 require a module spacer.

Generac offers a convenient PWRcell Battery Upgrade Kit (HMUK) to help replace lost or misplaced hardware. A PWRcell Battery Upgrade Kit may be purchased from your Generac distributor.

Refer to the table to the right for material requirements related to upgrading PWRcell.

UPGRADE MATERIAL REQUIREMENTS

Starting Configuration \ Ending Configuration	PWRCELL 17	PWRCELL 15	PWRCELL 12
PWRCELL 9	+3 x PWRCell Mod +2 x HMUK*	+2 x PWRCell Mod +1 x HMUK*	+1 x PWRCell Mod +1 x HMUK*
PWRCELL 12	+2 x PWRCell Mod +1 x HMUK*	+1 x PWRCell Mod +1 x HMSK	
PWRCELL 15	+1 x PWRCell Mod +1 x HMUK*		

*HMUK (Upgrade kit) only required if original hardware is unavailable

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DATE: 3/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-9

FEATURES:

Fast, simple installation

Lower failure risk than module-level optimizers

NEC 2017 rapid shutdown compliant with SnapRS®

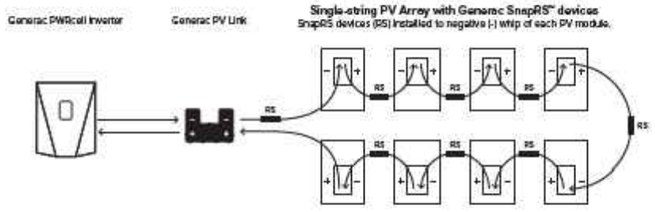
PV Link™

S2500 Series substring optimizer
Model: S2502

PV Link is the simple solar optimizer for quick installation and long-lasting performance. Connect as few as two or as many as nine PV modules to each PV Link to overcome shading and challenging roof lines.

ADDITIONAL FEATURES

- Quick connections with MC4 connectors
- 2500W capacity
- Compatible with high-voltage smart batteries
- Cost-effective solution for high-performance PV
- Ground-fault protection



Specifications

PWRCELL PV LINK (S2502)

RATED POWER	2500 W
PEAK EFFICIENCY	99%
MPPT VOLTAGE RANGE	60-360 VMP
MAX INPUT VOLTAGE	420 VOC; max when cold
MAX OUTPUT	420 VOC
NOMINAL OUTPUT (REBUS™)	380 VDC
MAX OUTPUT CURRENT	8 A
MAX SHORT CIRCUIT CURRENT (ISC)	18 A
STANDBY POWER	< 1 W

PROTECTIONS	Ground-fault, Arc-fault (Arc-fault Type 1 AFCI, Integrated)
MAX OPERATING TEMP	70 °C
SYSTEM MONITORING	PWRview Web Portal and Mobile App
ENCLOSURE	Type 3R
WEIGHT	7.3 lb
DIMENSIONS (L,W,H)	2" x 15.4" x 9.6"
COMPLIANCE	UL 1741, CSA 22.2
WARRANTY	25 Years

Specifications subject to change without notice.

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SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
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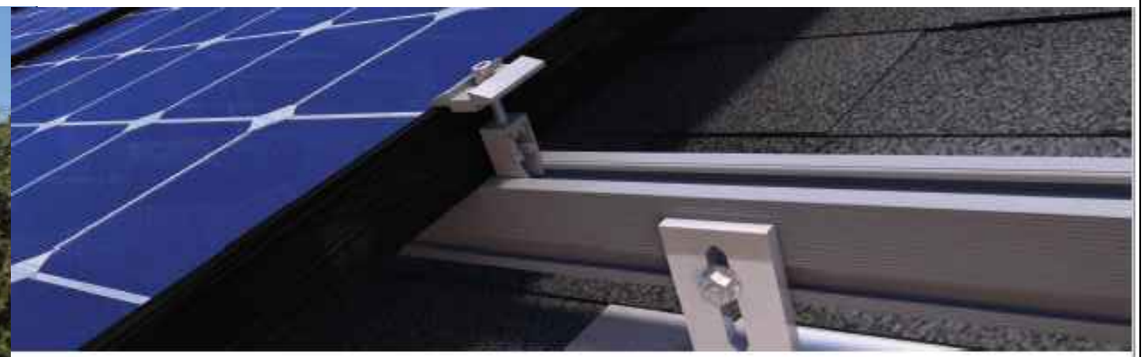
SHEET NUMBER
PV-10



QRail™— Fully Integrated Mounting and Racking System

The QRail Series is a strong and versatile solar array mounting system that provides unrivaled benefits to solar designers and installers. Combined with Quick Mount PV's industry-leading waterproof mounts, QRail offers a complete racking solution for mounting solar modules on any roof.

Easily design array configurations with the QDesign software application. Generate complete engineering reports and calculate a precise bill of materials for all the mounting, racking and accessories needed for a complete solar array.

Comprehensive, One-Source Solution

QRail, together with Quick Mount PV's waterproof mounting products, provides the benefit of a single-sourced, seamlessly integrated rooftop installation that works with all roof types — composition/asphalt shingles, flat or curved tile, metal shingle, shake, slate and low slope roofs. The QRail system also works with any roof attachment system for maximum flexibility.

Superior Strength and Versatility

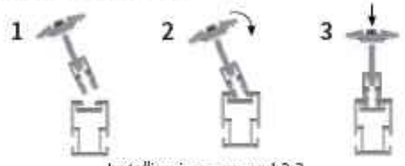
QRail is engineered for optimal structural performance. The system is certified to UL 2703, fully code compliant and backed by a 25-year warranty. QRail is available in Light, Standard and Heavy versions to match all geographic locations. QRail is compatible with virtually all modules and works on a wide range of pitched roof surfaces. Modules can be mounted in portrait or landscape orientation in standard or shared-rail configurations.

QRails come in two lengths — 168 inches (14 ft) and 208 inches (17.3 ft) Mill and Black Finish

Fast, Simple Installation: It Just Clicks

QClick Technology™

The universal mid and end clamps use QClick technology to simply "click" into the rail channel and remain upright, ready to accept the module. The pre-assembled clamps fit virtually all module frames and require no extra hardware, eliminating pre-loading and reducing installation time.



Installing is as easy as 1-2-3

Universal End Clamp

2 clamps for modules from 30-45mm or 38-50mm thick

Universal Bonded Mid Clamp

2 clamps for modules from 30-45mm or 38-50mm thick

QSplice™ Technology

QRail's innovative internal QSplice installs in seconds, requiring no tools or screws. Simply insert QSplice into the rail and slide the other rail on to create a fully structural, bonded splice. An external splice is also available.

Installs in seconds — no tools or hardware required

Fully Integrated Electrical Bonding

The QRail system provides an integrated electrical bonding path, ensuring that all exposed metal parts and the solar module frames are electrically connected. All electrical bonds are created when the components are installed and tightened down.

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JESSICA C TIDWELL
RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-10A

QRail™ Configurations

Item Code	Part Number	Description	Finish
QMR-RL14A60	800	QRail Light, 14 ft., 60 Pack	Mill
QMR-RL17.3A60	801	QRail Light, 17.3 ft, 60 Pack	Mill
QMR-RL14B60	805	QRail Light, 14 ft., 60 Pack	Black
QMR-RL17.3B60	806	QRail Light, 17.3 ft, 60 Pack	Black
QMR-RS14A60	810	QRail Standard, 14 ft., 60 Pack	Mill
QMR-RS17.3A60	811	QRail Standard, 17.3 ft, 60 Pack	Mill
QMR-RS14B60	815	QRail Standard, 14 ft., 60 Pack	Black
QMR-RS17.3B60	816	QRail Standard, 17.3 ft, 60 Pack	Black
QMR-RH14A60	820	QRail Heavy, 14 ft., 60 Pack	Mill
QMR-RH17.3A60	821	QRail Heavy, 17.3 ft, 60 Pack	Mill
QMR-RH14B60	825	QRail Heavy, 14 ft, 60 Pack	Black
QMR-RH17.3B60	826	QRail Heavy, 17.3 ft, 60 Pack	Black

QSplice™ Internal Structural Splice

Item Code	Part Number	Description	Finish
QMR-ISLA15	830	QSplice Internal, Light, 15 Pack	Mill
QMR-ISSA15	831	QSplice Internal, Standard, 15 Pack	Mill
QMR-ISHA15	832	QSplice Internal, Heavy, 15 Pack	Mill

QSplice™ External Structural Splice

Item Code	Part Number	Description	Finish
QMR-ESSA15	834	QSplice External, Standard, 15 Pack	Mill
QMR-ESHA15	835	QSplice External, Heavy, 15 Pack	Mill

POWERHOME
POWER HOME SOLAR, LLC
"POWER YOUR FUTURE"
919 N. MAIN ST.
MOORESVILLE, NC 28115
Phone: 704-800-6591 (OFFICE)
Email: info@powerhome.com
Web: www.powerhome.com

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 3/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
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SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11

Universal End Clamp with QClick™ Technology

Black *Mill*

Item Code	Part Number	Description	Finish
QMR-UEC3045A20	860	Universal End Clamp, 30-45mm, 20 Pack	Mill
QMR-UEC3850A20	861	Universal End Clamp, 38-50mm, 20 Pack	Mill
QMR-UEC3045B20	865	Universal End Clamp, 30-45mm, 20 Pack	Black
QMR-UEC3850B20	866	Universal End Clamp, 38-50mm, 20 Pack	Black
QMR-UEC3045BPA20	862	Universal End Clamp, 30-45mm, w/ Bonding, 20 Pack	Mill
QMR-UEC3850BPA20	863	Universal End Clamp, 38-50mm, w/ Bonding, 20 Pack	Mill
QMR-UEC3045BPB20	867	Universal End Clamp, 30-45mm, w/ Bonding, 20 Pack	Black
QMR-UEC3850BPB20	868	Universal End Clamp, 38-50mm, w/ Bonding, 20 Pack	Black

Mid Clamp with QClick™ Technology

Black *Mill*

Item Code	Part Number	Description	Finish
QMR-UMC3045BP1.2A20	872	Universal Mid Clamp, 30-45mm, w/ Bonding, 20 Pack	Mill
QMR-UMC3850BP1.2A20	873	Universal Mid Clamp, 38-50mm, w/ Bonding, 20 Pack	Mill
QMR-UMC3045BP1.2B20	877	Universal Mid Clamp, 30-45mm, w/ Bonding, 20 Pack	Black
QMR-UMC3850BP1.2B20	878	Universal Mid Clamp, 38-50mm, w/ Bonding, 20 Pack	Black

Single-Slot L-Foot

Item Code	Part Number	Description	Finish
QMC-LF A12	692	Single-slot L-foot, 12 Pack	Mill
QMC-LF B12	693	Single-slot L-foot, 12 Pack	Black

End Caps

Heavy *Standard* *Light*

Item Code	Part Number	Description	Finish
QMR-CPL B50	885	End Cap Light, 50 Pack	Black
QMR-CPS B50	886	End Cap Standard, 50 Pack	Black
QMR-CPH B50	887	End Cap Heavy, 50 Pack	Black

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SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11A

T-Bolt

Item Code	Part Number	Description	Finish
QMR-TB A 300	880	T-Bolt w/ Nut, 300 Pack	stainless steel

Wire Clip

Works with both PV and Trunk Cabling

Item Code	Part Number	Description	Finish
QMR-WC A 300	882	Trunk/PV Cable, 300 Pack	stainless steel

Grounding Lug

Item Code	Part Number	Description	Finish
QMR-GL A 50	890	WEEB Lug w/ T-Bolt, 50 Pack	n/a

WEEB BMC

Item Code	Part Number	Description	Finish
QMR-ECW A 50	891	WEEB BMC, 50 Pack	stainless steel

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DESCRIPTION	DATE	REV

Signature with Seal

DATE: 3/6/2020

PROJECT NAME & ADDRESS

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4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
EQUIPMENT SPECIFICATION

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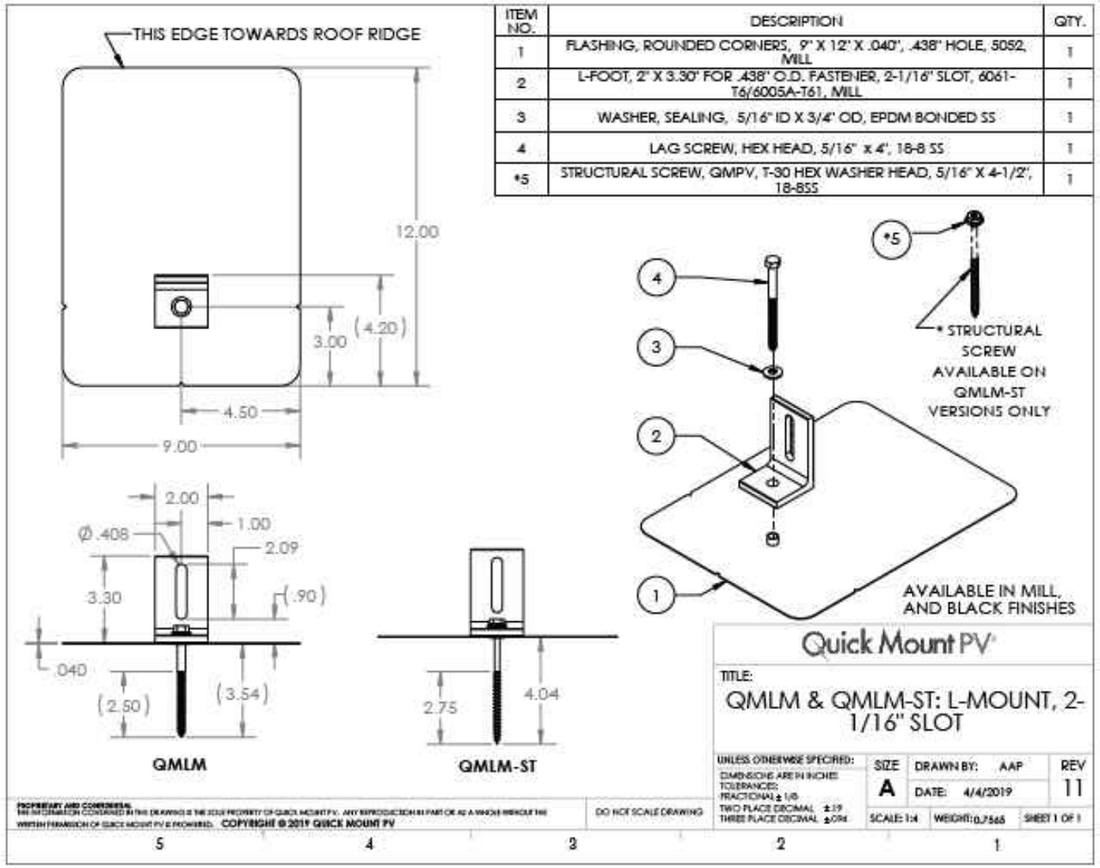
ANSI B
11" X 17"

SHEET NUMBER
PV-11B

L-Mount | QMLM / QMLM-ST

Elevated Water Seal Technology®



ITEM NO.	DESCRIPTION	QTY.
1	FLASHING, ROUNDED CORNERS, 9" X 12" X .040", .438" HOLE, 5052, MILL	1
2	L-FOOT, 2" X 3.30" FOR .438" O.D. FASTENER, 2-1/16" SLOT, 6061-T6/6005A-T61, MILL	1
3	WASHER, SEALING, 5/16" ID X 3/4" OD, EPDM BONDED SS	1
4	LAG SCREW, HEX HEAD, 5/16" x 4", 18-8 SS	1
*5	STRUCTURAL SCREW, QMPV, T-30 HEX WASHER HEAD, 5/16" X 4-1/2", 18-8SS	1

Quick Mount PV®

TITLE: QMLM & QMLM-ST: L-MOUNT, 2-1/16" SLOT

UNLESS OTHERWISE SPECIFIED:	SIZE	DRAWN BY: AAP	REV
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± 1/8 TWO PLACE DECIMAL ±.19 THREE PLACE DECIMAL ±.094	A	DATE: 4/4/2019	11
	SCALE: 1:4	WEIGHT: 0.7565	SHEET 1 OF 1

DO NOT SCALE DRAWING

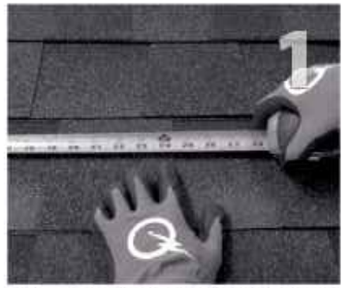
5 4 3 2 1

Quick Mount PV®
RESPECT THE ROOF

L-Mount Installation Instructions

Installation Tools Required: tape measure, roofing bar, chalk line, stud finder, caulking gun, sealant compatible with roofing materials, drill with 7/32" or 1/8" bit, drill or impact gun with 1/2" socket.

WARNING: Quick Mount PV products are NOT designed for and should NOT be used to anchor fall protection equipment.



Locate, choose, and mark centers of rafters to be mounted. Select the courses of shingles where mounts will be placed.

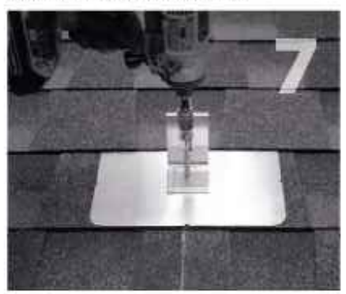
Carefully lift composition roof shingle with roofing bar, just above placement of mount. Remove nails as required and backfill holes with aproved sealant. See "Proper Flashing Placement" on next page.

Insert flashing between 1st and 2nd course. Slide up so top edge of flashing is at least ¾" higher than the butt-edge of the 3rd course and lower flashing edge is above the butt-edge of 1st course. Mark center for drilling.

If attaching with lag bolt use a 7/32" bit (Lag). Use a ⅛" bit (ST) for attaching with the structural screw. Drill pilot hole into roof and rafter, taking care to drill square to the roof. Do not use mount as a drill guide. Drill a 2" deep hole into rafter.

Clean off any sawdust, and fill hole with sealant compatible with roofing materials.

Place L-foot onto elevated flute and rotate L-foot to desired orientation.



Prepare lag bolt or structural screw with sealing washer. Using a ½-inch socket on an impact gun, drive prepared lag bolt through L-foot until L-foot can no longer easily rotate. **DO NOT over-torque.** NOTE: Structural screw can be driven with T-30 hex head bit.

BI 7.2.3-44

You are now ready for the rack of your choice. Follow all the directions of the rack manufacturer as well as the module manufacturer. NOTE: Make sure top of L-Foot makes solid contact with racking.

All roofing manufacturers' written instructions must also be followed by anyone modifying a roof system. Consult the roof manufacturer's specs and instructions prior to working on the roof.

Apr-2019 Rev 6

POWERHOME
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Web: www.powerhome.com

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 3/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-12

152 S. Broad St.
Lansdale, PA 19446
(215)361-8040

May 1, 2020

PowerHome Solar
919 N. Main St
Mooresville, NC 28115

RE: Tidwell Residence
4087 Fullerton AVe, Detroit, MI 48238
Client Project #: 4087TIDW
PFE Project #: 201245

On behalf of PowerHome Solar, Penn Fusion Engineering LLC (PFE) performed a structural analysis of the roof at the above referenced location. The purpose of our analysis was to determine if the existing roof system is structurally sufficient to support the new photovoltaic moudles in addition to the code required design loads. Our analysis is based on the information provided by PowerHome Solar and is isolated only to the areas where the modules are intended to be placed. If any discrepancies are found by the contractor during installation, please contact PFE.

System Specifications:
Panel Specs: (8) Silfab Solar - SLA-M
Racking System: Quick Mount PV - QRail Light

The modules are to be located on the following roof planes:

Mounting Plane	Rafter Size	Rafter Spacing	Horizontal Span	Collar Ties	Collar Tie Spacing	Sheathing	Shingle Type	Number of Shingle Layers	Ceiling Profile
1	2x4	24"	9ft. 6in.	N/A	0"	CDX 1/2"	Asphalt Shingles	1	Flat
2	2x4	24"	9ft. 6in.	N/A	0"	CDX 1/2"	Asphalt Shingles	1	Flat

The roof design has been analyzed in accordance with the 2015 Michigan Residential Code with design loads as follows:

Ground Snow (Pg): 20 psf
Wind Speed (V): 115 mph

Mounting Plane 1
The calculations for these structural members are attached. It has been determined by this office that the rafters, as specified above, exceed the allowable span for the total design loading. Attached are repair details that, when installed, will render the roof design structurally adequate to support the new PV modules in addition to the code required design loading.

Attach the module rail brackets to the roof with 5/16" lag bolts at 48 on center maximum with staggered penetration such that load is distributed evenly among roof members. Provide a minimum of 2" of penetration into the wood members.

Mounting Plane 2
The calculations for these structural members are attached. It has been determined by this office that the rafters, as specified above, exceed the allowable span for the total design loading. Attached are repair details that, when installed, will render the roof design structurally adequate to support the new PV modules in addition to the code required design loading.

Attach the module rail brackets to the roof with 5/16" lag bolts at 48 on center maximum with staggered penetration such that load is distributed evenly among roof members. Provide a minimum of 2" of penetration into the wood members.

This office has determined that the installation of the PV System as specified above will meet the structural requirements of the 2015 Michigan Residential Code and ASCE7-10 when installed in accordance with the manufacture's instructions.

If you have any questions regarding this analysis, please feel free to contact us.

Best Regards,
Penn Fusion Engineering LLC

Andrew D. Leone, P.E.
Principal

152 S. Broad St.
Lansdale, PA 19446
(267)640-2758

Client Name: PowerHome Solar
PFE Project Number: 201245
Client Project Number: 4087TIDW
Project: Tidwell Residence
Address: 4087 Fullerton AVe
Detroit, MI 48238
Description: Mounting Plane 1
Calculations By: ADL
Date: May 1, 2020

Roof Construction

2x4 Rafters at 24" on center

A=	5.25 in^2
Ix=	5.36 in^4
Sx=	3.06 in^3
Wood Species=	Doug-Fir Larch #2
Fb=	900 psi
Fv=	180 psi
E=	1600000 psi
Roof Slope=	18 °
Rafter Span=	9.51 ft
Ceiling Attached to Rafters?:	No

Design Criteria

Ground Snow (P_g):	20 psf
Design Wind Speed:	115 mph
Live Load:	20 psf
Dead Load:	3.63 psf
PV Modules:	3.15 psf

Wind Calculations

Directionality Factor (K_d):	0.85
Topographic Factor (K_{zt}):	1
Velocity Pressure Exposure Coefficient (K_z):	0.7
Importance Factor (I):	1
Velocity Pressure (q_z):	20.14 psf
Tributary Square Footage on Component:	10.83 ft^2
Component Roof Pressures:	13.56 / -55.58 psf

Snow Load Calculations

Exposure Factor (C_e):	1
Thermal Factor (C_t):	1
Importance Factor (I):	1
Flat Roof Snow Loads (P_f):	14 psf
Roof Slope Factor (C_s):	1
Sloped Snow Loads (P_s):	14 psf
Unbalanced Snow Load:	20 psf

Member Calculations

Bending

M_d:	605.75 ft*lb		
f_b:	2373.54 psi		
Load Duration Factor (C_d):	1.15		
Stability Factor (C_L):	1		
Wet Service Factor (C_M):	1		
Temperature Factor (C_T):	1		
Size Factor (C_F):	1.5		
Flat Use Factor (C_{fu}):	1		
Incising Factor (C_i):	1		
Repetitive Member Factor (C_r):	1.15		
F_b:	900 psi		
F'_b:	1785.38 psi	**2373.54>1785.38**	**No Good in Bending**

Shear

V_d:	254.77 lb		
f_v:	72.79 psi		
Load Duration Factor (C_d):	1.15		
Wet Service Factor (C_M):	1		
Temperature Factor (C_T):	1		
Size Factor (C_F):	1.5		
Flat Use Factor (C_{fu}):	1		
Incising Factor (C_i):	1		
F_v:	180 psi		
F'_v):	207 psi	**72.79<=207**	**OK in Shear**

Deflection

Live Load Deflection (Δ_L):	0.86 in	**L/133**	**No Good in Live Load Deflection**
Total Load Deflection (Δ_T):	1.15 in	**L/99**	**No Good in Total Load Deflection**

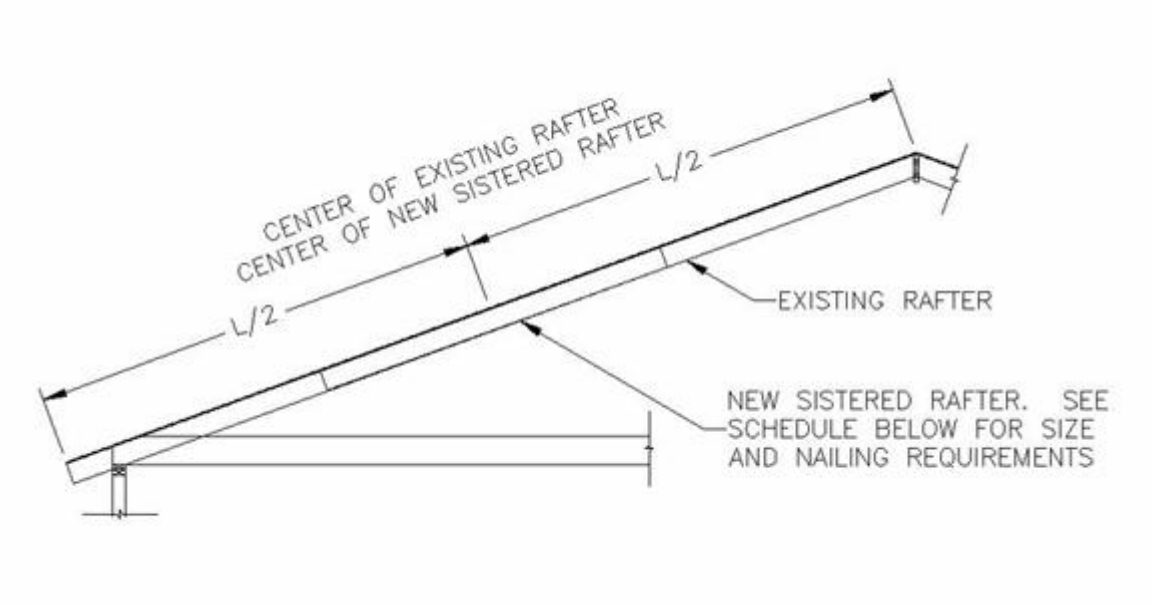
Uplift Calculation

Tributary Square Footage on Component:	10.83 ft^2
Uplift Pressure:	-55.58 psf
Uplift per Lag:	-602.13 lbs
Lag Screw Diameter:	5/16 in
Allowable Withdrawal per Inch:	490.99 lbs/in
Minimal Screw Penetration:	1.23 in

Install 5/16" diameter lag screws @ 48 on center with minimum penetration of 2" into rafter.

152 S. Broad St.
Lansdale, PA 19446
(267)640-2758

Client Name: PowerHome Solar
PFE Project Number: 201245
Client Project Number: 4087TIDW
Project: Tidwell Residence
Address: 4087 Fullerton AVe
Detroit, MI 48238
Description: Mounting Plane 1
Calculations By: ADL
Date: May 1, 2020



New Sistered Rafter Size: 2x4x8' Doug-Fir Larch #2 or better*
Nailing Requirements: (2) 10d Nails @ 12" on center with (3) additional 10d Nails at each end

10d = .12" shank diameter x 3" long minimum

Note: Apply repair to each rafter under PV system
*Suitable Alternate Species:
- Spruce-Pine-Fir #2 or #1
- Southern-Yellow-Pine #2 or #1

NOTE: Replace all ceiling joists that were removed and secure to existing rafters.

152 S. Broad St.
Lansdale, PA 19446
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Client Name:	PowerHome Solar
PFE Project Number:	201245
Client Project Number:	4087TIDW
Project:	Tidwell Residence
Address:	4087 Fullerton AVe Detroit, MI 48238
Description:	Mounting Plane 2
Calculations By:	ADL
Date:	May 1, 2020

Roof Construction

2x4 Rafters at 24" on center

A=	5.25 in^2
Ix=	5.36 in^4
Sx=	3.06 in^3
Wood Species=	Doug-Fir Larch #2
Fb=	900 psi
Fv=	180 psi
E=	1600000 psi
Roof Slope=	18 °
Rafter Span=	9.51 ft
Ceiling Attached to Rafters?:	No

Design Criteria

Ground Snow (P_g):	20 psf
Design Wind Speed:	115 mph
Live Load:	20 psf
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PV Modules:	3.15 psf

Wind Calculations

Directionality Factor (K_d):	0.85
Topographic Factor (K_{zt}):	1
Velocity Pressure Exposure Coefficient (K_z):	0.7
Importance Factor (I):	1
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Component Roof Pressures:	13.56 / -55.58 psf

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Sloped Snow Loads (P_s):	14 psf
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Temperature Factor (C_T):	1		
Size Factor (C_F):	1.5		
Flat Use Factor (C_{fu}):	1		
Incising Factor (C_i):	1		
Repetitive Member Factor (C_r):	1.15		
F_b:	900 psi		
F'_b:	1785.38 psi	**2373.54>1785.38**	**No Good in Bending**

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F_v:	180 psi		
F'_v):	207 psi	**72.79<=207**	**OK in Shear**

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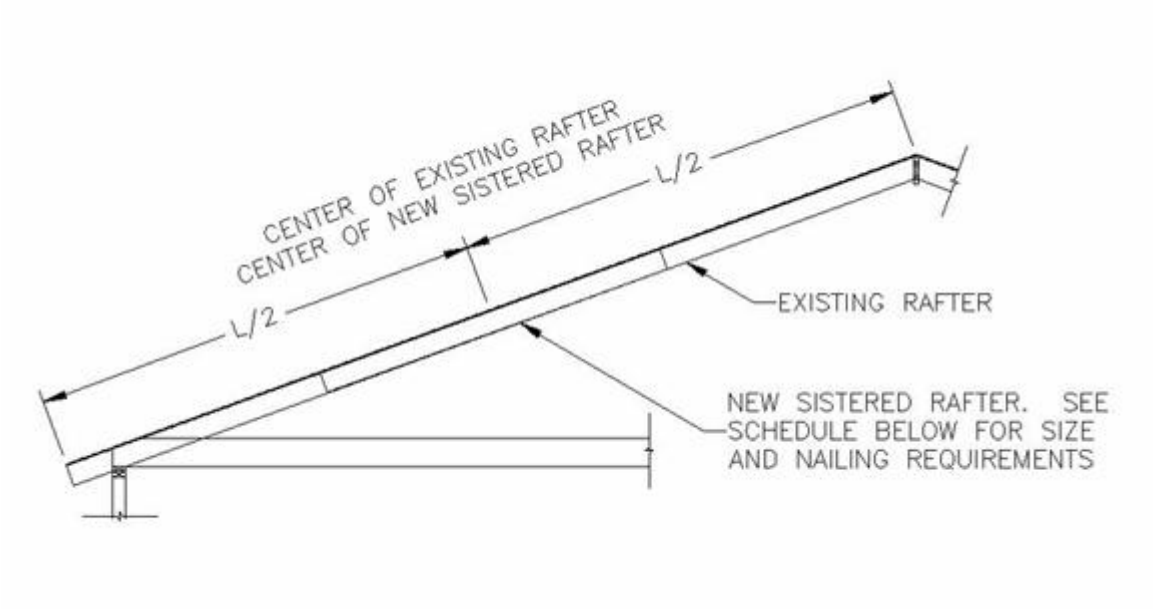
Client Name: PowerHome Solar
PFE Project Number: 201245
Client Project Number: 4087TIDW
Project: Tidwell Residence
Address: 4087 Fullerton AVe
Detroit, MI 48238
Description: Mounting Plane 2
Calculations By: ADL
Date: May 1, 2020



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Nailing Requirements: (2) 10d Nails @ 12" on center with (3) additional 10d Nails at each end

10d = .12" shank diameter x 3" long minimum

Note: Apply repair to each rafter under PV system

*Suitable Alternate Species:
- Spruce-Pine-Fir #2 or #1
- Southern-Yellow-Pine #2 or #1

NOTE: Replace all ceiling joists that were removed and secure to existing rafters.

How do I….install solar panels?

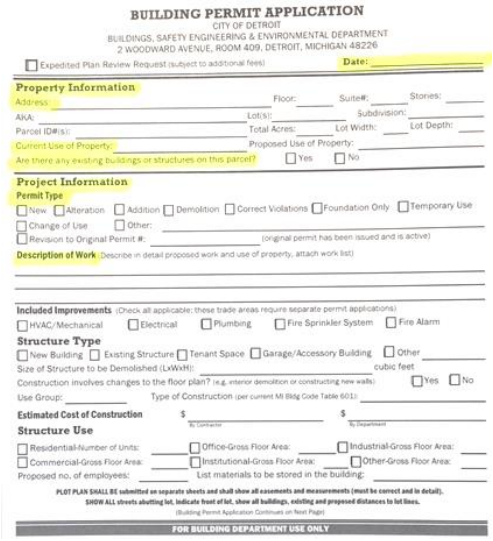
Information needed for HDC review (only)

Note: BSEED requirements are not included below

1. Provide pictures of the house and site, where the proposed installation is to occur.
   Photos here are for illustrative purposes only; digital photos must be provided

- The Commission will not consider a roof mounted proposal, unless: it is proposed for a flat roof, and/or proposed for the rear elevation of a gable roof, so long as the panels will not be visible from the public right-of-way. Photographs of the flat and/or gable roof, confirming its location, and visibility to the right-of-way must be submitted. Additionally, only flat-mounted panels (not angle-mount), with minimal height/profile will be considered. The panels and frame must have a matte, dark finish. Installing a lip along the perimeter of the panels to further hide them from view should be considered.

2. Provide information within all the highlighted portions of the building permit application.



BUILDING PERMIT APPLICATION
CITY OF DETROIT
BUILDINGS, SAFETY ENGINEERING & ENVIRONMENTAL DEPARTMENT
2 WOODWARD AVENUE, ROOM 409, DETROIT, MICHIGAN 48226

Expedited Plan Review Request (subject to additional fees) Date:

Property Information
Address: Floor: Suite#: Stories:
AKA: Lot(s): Subdivision:
Parcel ID#(s): Total Acres: Lot Width: Lot Depth:
Current Use of Property: Proposed Use of Property:
Are there any existing buildings or structures on this parcel? Yes No

Project Information
Permit Type
New Alteration Addition Demolition Correct Violations Foundation Only Temporary Use
Change of Use Other:
Revision to Original Permit #: (original permit has been issued and is active)
Description of Work (Describe in detail proposed work and use of property, attach work list)

Included Improvements (Check all applicable; these trade areas require separate permit applications)
HVAC/Mechanical Electrical Plumbing Fire Sprinkler System Fire Alarm
Structure Type
New Building Existing Structure Tenant Space Garage/Accessory Building Other
Size of Structure to be Demolished (LxWxH): cubic feet
Construction involves changes to the floor plan? (e.g. interior demolition or constructing new walls) Yes No
Use Group: Type of Construction (per current MI Bldg Code Table 601):
Estimated Cost of Construction $ (By Contractor) $ (By Department)
Structure Use
Residential-Number of Units: Office-Gross Floor Area: Industrial-Gross Floor Area:
Commercial-Gross Floor Area: Institutional-Gross Floor Area: Other-Gross Floor Area:
Proposed no. of employees: List materials to be stored in the building:

PLOT PLAN SHALL BE submitted on separate sheets and shall show all easements and measurements (must be correct and in detail). SHOW ALL streets abutting lot, indicate front of lot, show all buildings, existing and proposed distances to lot lines.
(Building Permit Application Continues on Next Page)

FOR BUILDING DEPARTMENT USE ONLY

BUILDING PERMIT APPLICATION
CITY OF DETROIT BUILDINGS, SAFETY ENGINEERING & ENVIRONMENTAL DEPARTMENT Page 2

Identification (All Fields Required)
Property Owner / Homeowner Property Owner/Homeowner is Permit Applicant
Name: Company Name:
Address: City: State: Zip:
Phone: Mobile:
Driver's License#: Email:

Contractor Contractor is Permit Applicant
Representative Name: Company Name:
Address: City: State: Zip:
Phone: Mobile: Email:
City of Detroit License#:

Tenant or Business Occupant Tenant is Permit Applicant
Name: Phone: Email:

Architect/Engineer/Consultant Architect/Engineer/Consultant is Permit Applicant
Name: State Registration#: Expiration Date:
Address: City: State: Zip:
Phone: Mobile: Email:

Homeowner Affidavit (Only required for residential permits obtained by homeowner.)
I hereby certify that I am the legal owner and occupant of the subject property and the work described on this permit application shall be completed by me. I am familiar with the applicable codes and requirements of the City of Detroit and take full responsibility for all code compliance, fees and inspections related to the installation/work herein described. I shall neither hire nor sub-contract to any other person, firm or corporation any portion of the work covered by this building permit.

Print Name: Signature: Date:
(Homeowner)

Subscribed and sworn to before me this day of 20 A.D. County, Michigan

CITY OF DETROIT
HISTORIC DISTRICT COMMISSION
COLEMAN A. YOUNG MUNICIPAL CENTER
2 WOODWARD, SUITE 808
DETROIT, MICHIGAN 48226
PHONE 313-224-8907 / 313-224-6543

How do I….install solar panels? (continued)

3. Provide full scope of work:
   - Narrative to explain what is being installed and why
   - Catalog cuts detailing the panels, frame, installation method, materials, color, finish, etc.
   - List any and all other related work to be completed:
     - If a roof mount, include: a roof plan showing proposed panel location (with dimensions from edges of roof noted) and finish height
     - If a ground mount, include: a site plan showing proposed panel location with setbacks from property lines and adjacent buildings on property (i.e., garage, rear of house); an elevation confirming all dimensions, including overall height and distance between grade and the bottom of the panels, material and finish specification for panel frame/pergola.

ADDITIONAL INFORMATION:

The National Park Service's website goes into detail on solar installations in historic districts: https://www.nps.gov/tps/sustainability/new-technology/solar-on-historic.htm

The National Park Service, Dept. of the Interior, Technical Preservation Services published the document entitled, "*Incorporating Solar Panels in a Rehabilitation Project*" (ITS Number 52). A copy is attached to this informational sheet.

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National Park Service
U.S. Department of the Interior
Technical Preservation Services

ITS
NUMBER 52

Interpreting
The Secretary of the Interior's Standards for Rehabilitation

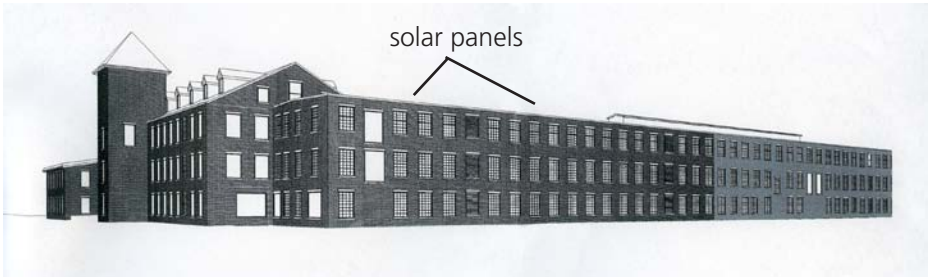
Subject: Incorporating Solar Panels in a Rehabilitation Project

Applicable Standards:
2. Retention of Historic Character
9. Compatible Additions/Exterior Alterations

Issue: Enhancing the energy efficiency of a historic building is important. To that end, it is often possible to install features such as solar panels and photovoltaic cells provided they are installed in a sensitive manner. Because these elements must be positioned to take advantage of unobstructed sunlight, the roof of a historic structure is an obvious location. The roofline of a historic building is often a distinctive feature. Therefore, the installation of solar panels should conform to guidance regarding rooftop additions, i.e. that they be minimally visible, to avoid altering the historic character of the building. Historic buildings with a flat roof or parapet can usually accommodate solar panels because the panels will be hidden, while properties with a hipped or gabled roof are generally not good candidates for a rooftop solar installation. Solar panels on historic buildings should not be visible from the public right of way such as nearby streets, sidewalks or other public spaces.

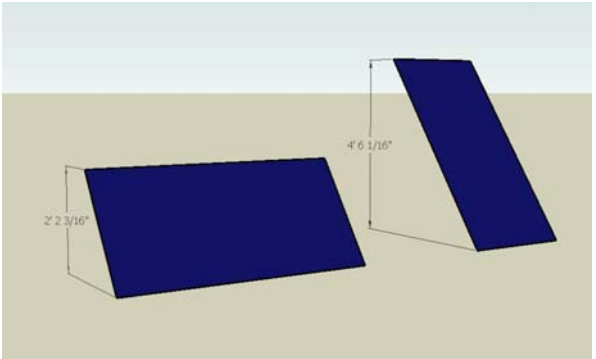
In circumstances where solar collectors are not placed on rooftops, they should only be positioned in limited or no-visibility locations in secondary areas of the property. Vegetation or a compatible screen may also be an option to further reduce the impact of these features on a historic property. For some historic buildings, it may not be possible to incorporate solar panels and meet the Secretary of the Interior's Standards for Rehabilitation.

Application 1 (*Compatible treatment*): The rehabilitation of this mid-nineteenth century mill incorporated a large, roof-mounted photovoltaic installation. Although the historic building does not have a parapet wall at the roofline, the height of the building and the arrangement of the panels render the entire installation invisible from the ground. It is important to note that the panels are placed horizontally. Had the panels been installed with a vertical tilt, the angle required to maximize efficiency would have caused the panels to extend significantly higher above the roof. Simply changing the direction in which the panels are tilted can affect their visibility and reduce their impact on the character of the historic property.



Because of the size of this historic mill, a large array of solar panels could be installed on the flat roof without being seen from the ground.

Solar panels installed on the flat roof.



By placing the panels horizontally, the overall height of the installation and its visibility is reduced.

Application 2 (*Incompatible treatment*): During the rehabilitation of this late-nineteenth century commercial building, a conspicuous rooftop monitor with prominent solar panels and skylights was constructed on the one-story structure. The size and finish of this rooftop addition are incompatible with the historic character of the building. However, the building could have accommodated both skylights and solar panels if they had been installed differently. An alternative design that could have met the Standards would have included low-profile skylights and solar panels concealed behind the parapet wall.

The addition of a large rooftop monitor featuring skylights on the front slope and solar panels on the rear slope is not compatible with the historic character of this small, one-story commercial building.

Application 3 (*Compatible treatment*): The rehabilitation of this historic post office incorporated solar panels as dual-function features: generation of electricity and shading for south-facing windows. In this instance, the southern elevation of the building is also a secondary elevation with limited visibility from the public right of way. Additionally, because this area of the building is immediately next to the post office's loading dock, it has a more utilitarian character than the primary facades and, therefore, can better accommodate solar panels. Because the panels are in a suitable location at the rear of the property and are appropriately sized to serve as awnings, they do not affect the overall historic character of the property. Additionally, a screen of tall plantings shields the solar panels from view from the front of the building, further limiting their visibility.

Above: *Shown from the rear of the property, these solar panels serve a secondary function as awnings to shade south-facing windows. Because of their location at the back of the building immediately adjacent to a loading dock, the installation of these panels does not affect the historic character of the property.*

Left: *The solar panels are not visible from the front of the building. Additionally, even if the vegetation were removed, the installation would only be minimally visible along an alley at the rear of a secondary side elevation.*

Jenny Parker, Technical Preservation Services, National Park Service

PROJECT DESCRIPTION:

8 X 300 SILFAB SOLAR SIL-300 ML MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES

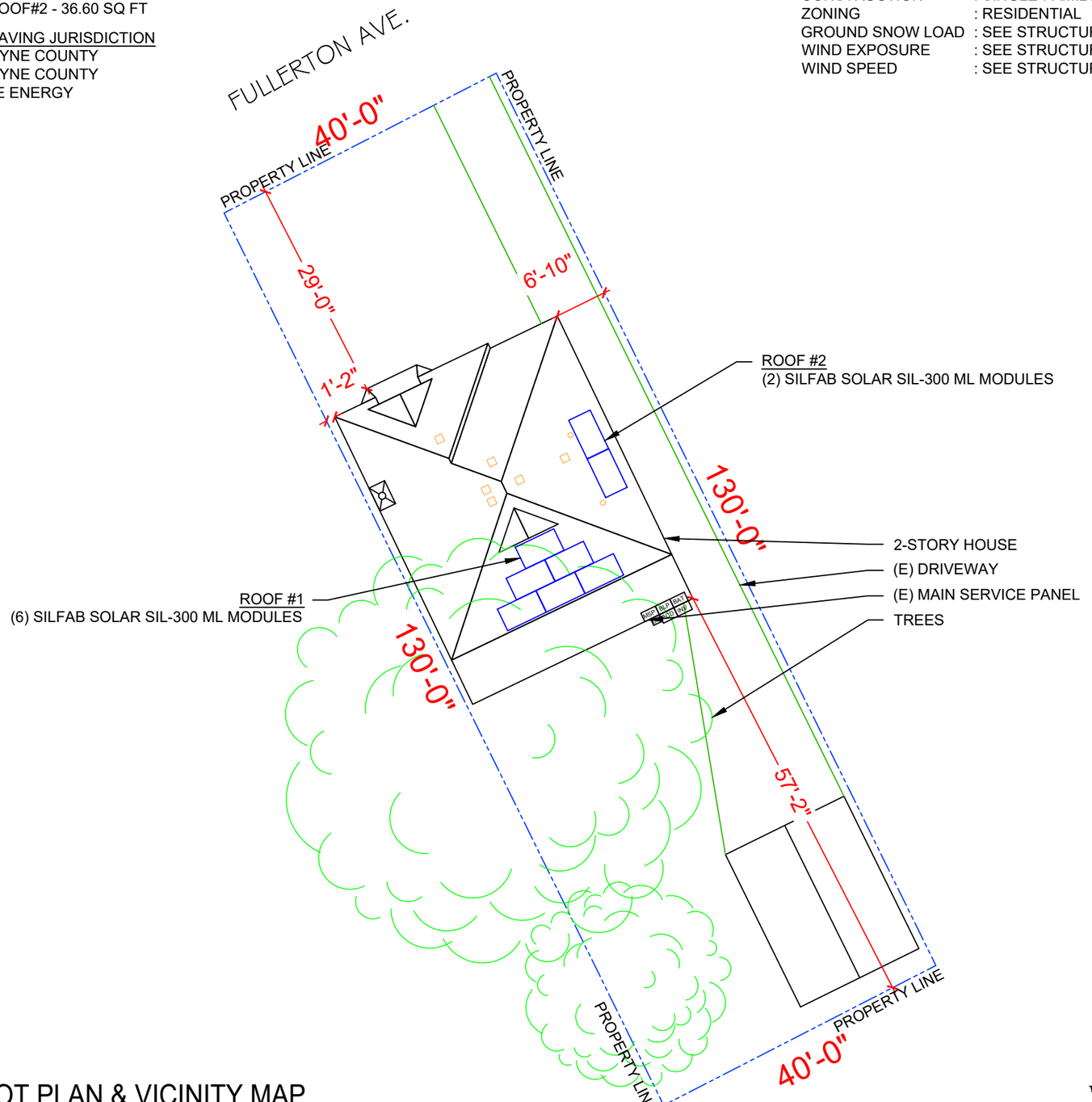
SYSTEM SIZE:2.40 kW DC STC
ARRAY AREA: ROOF#1 - 109.80 SQ FT
ARRAY AREA: ROOF#2 - 36.60 SQ FT

AUTHORITIES HAVING JURISDICTION
BUILDING : WAYNE COUNTY
ZONING : WAYNE COUNTY
UTILITY : DTE ENERGY

EQUIPMENT SUMMARY
8 SILFAB SOLAR SIL-300 ML MODULES
02 GENERAC PV LINK S2502 POWER OPTIMIZERS
01 GENERAC PWRCELL X7602 7600W INVERTER

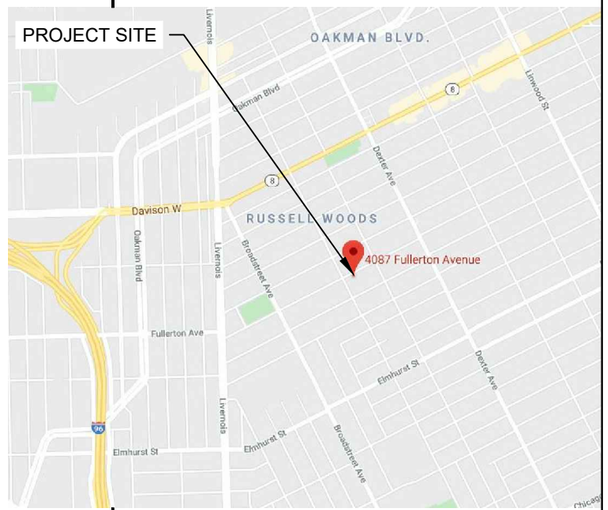
APPLICABLE CODES & STANDARDS
MICHIGAN RESIDENTIAL CODE 2015
NEC 2017

DESIGN SPECIFICATIONS
OCCUPANCY : II
CONSTRUCTION : SINGLE-FAMILY
ZONING : RESIDENTIAL
GROUND SNOW LOAD : SEE STRUCTURAL LETTER
WIND EXPOSURE : SEE STRUCTURAL LETTER
WIND SPEED : SEE STRUCTURAL LETTER



1 PLOT PLAN & VICINITY MAP
PV-1 SCALE: 1/16" = 1'-0"

2 HOUSE PHOTO
PV-1 SCALE: NTS



3 VICINITY MAP
PV-1 SCALE: NTS

SHEET INDEX

PV-1	PLOT PLAN & VICINITY MAP
PV-2	ROOF PLAN & MODULES
PV-2A	STRING LAYOUT
PV-3	ATTACHMENT DETAIL
PV-4	ELECTRICAL LINE DIAGRAM
PV-5	WIRING CALCULATIONS
PV-6 to 12	EQUIPMENT SPECIFICATIONS

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MOORESVILLE, NC 28115
Phone: 704-800-6591 (OFFICE)
Email: info@powerhome.com
Web: www.powerhome.com

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 2/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL
RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

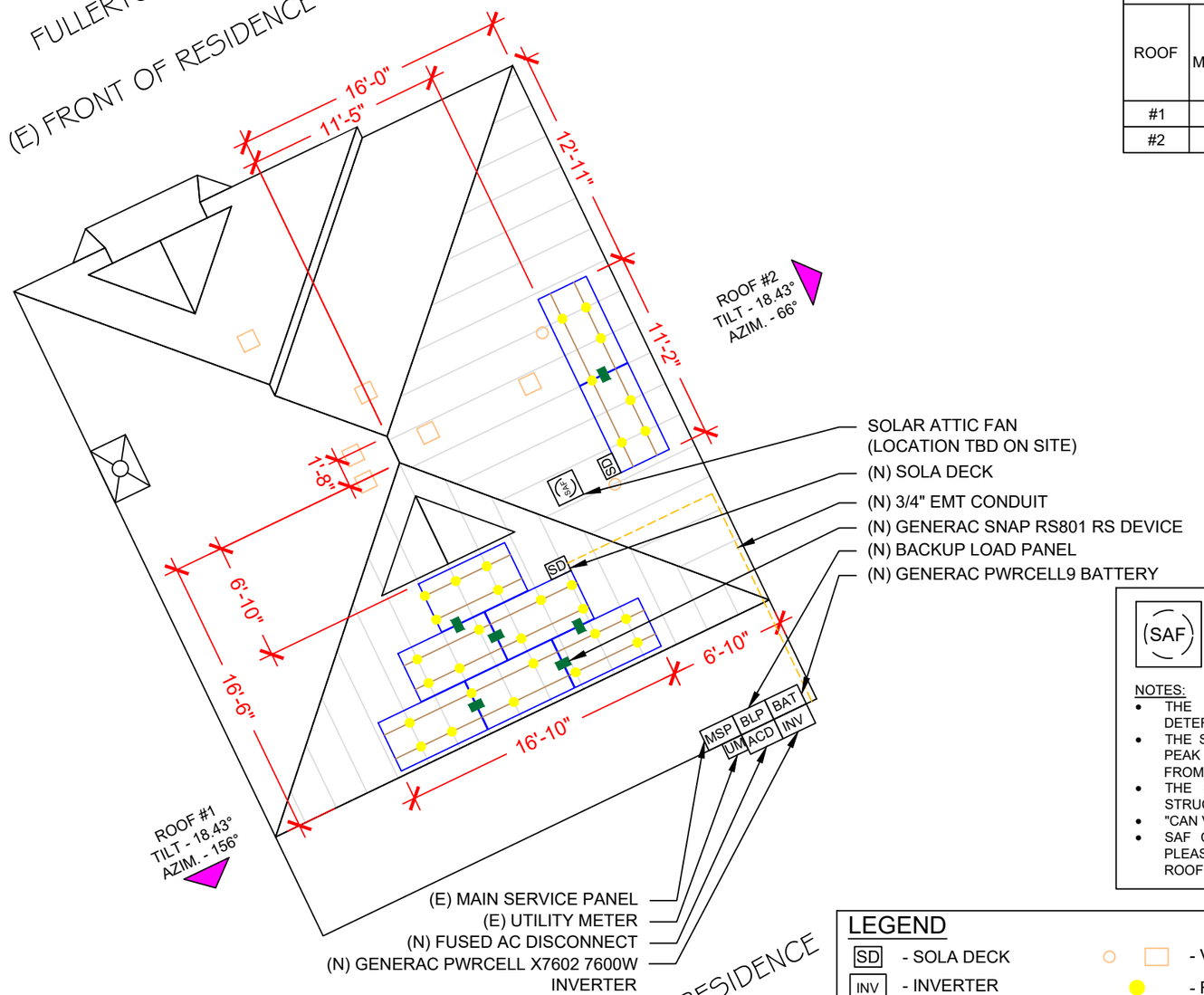
SHEET NAME
PLOT PLAN & VICINITY MAP

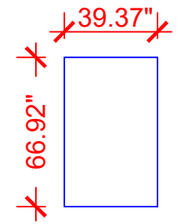
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-1

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 8 MODULES
MODULE TYPE = SILFAB SOLAR SIL-300 ML MODULES
MODULE WEIGHT = 41.89 LBS / 19 KG.
MODULE DIMENSIONS = 66.92"x 39.37" = 18.30 SF
UNIT WEIGHT OF ARRAY = 2.30 PSF





SILFAB SOLAR
SIL-300 ML
300 WATT

ROOF DESCRIPTION				
ROOF TYPE			COMPOSITION SHINGLE	
ROOF	ROOF TILT	AZIMUTH	FRAMING SIZE	FRAMING SPACING
#1	18.43°	156°	SEE STRUCTURAL LETTER	
#2	18.43°	66°		

ARRAY AREA & ROOF AREA CALC'S				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	6	109.80	264.00	42
#2	2	36.60	289.54	13

SOLAR ATTIC FAN

NOTES:
- THE LOCATION OF THE SAF SHOULD BE DETERMINED ON SITE.
- THE SAF SHOULD BE LOCATED 30"-36" FROM THE PEAK OF THE ROOF OR ABOUT 5 ROWS DOWN FROM THE RIDGE.
- THE SAF SHOULD NOT BE MOUNTED ON ANY STRUCTURAL MEMBER LIKE TRUSS/RAFTER.
- "CAN VENTS" CAN BE REPLACED BY SAF.
- SAF CANNOT BE MOUNTED ON A METAL ROOF. PLEASE CARRY GABLE VENT FANS FOR METAL ROOF INSTALLATION (IF APPLICABLE).

LEGEND

- SD - SOLA DECK
- INV - INVERTER
- ACD - AC DISCONNECT
- MSP - MAIN SERVICE PANEL
- BLP - BACKUP LOAD PANEL
- OP - PV LINK OPTIMIZER
- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- ROOF ATTACHMENT
- RAFTERS
- CONDUIT
- BAT - BATTERY
- RAPID SHUTDOWN

1 ROOF PLAN & MODULES
PV-2
SCALE: 1/8" = 1'-0"

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MOORESVILLE, NC 28115
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Email: info@powerhome.com
Web: www.powerhome.com

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 2/6/2020

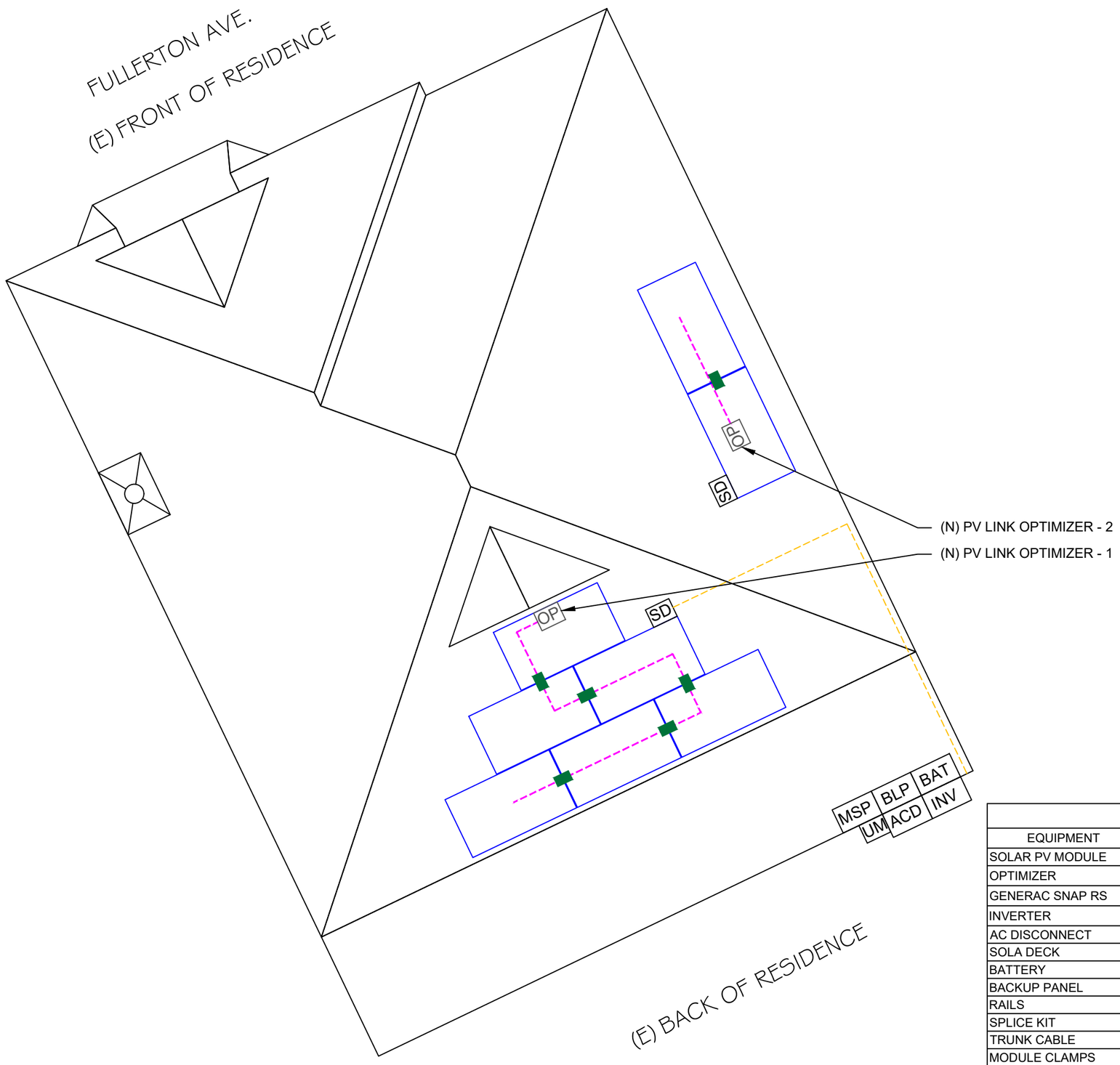
PROJECT NAME & ADDRESS

JESSICA C TIDWELL RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
ROOF PLAN & MODULES

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2



1 ROOF PLAN WITH STRING LAYOUT

PV-2A SCALE: 3/16" = 1'-0"

BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	8	SILFAB SOLAR SIL-300 ML MODULES
OPTIMIZER	02	GENERAC PV LINK S2502 POWER OPTIMIZERS
GENERAC SNAP RS	8	GENERAC SNAPRS MODEL RS801
INVERTER	01	GENERAC PWRCELL X7602 7600W INVERTER
AC DISCONNECT	1	60A FUSED, (2) 40A FUSES, 240V, NEMA 3R, UL LISTED
SOLA DECK	2	SOLA DECKES 600 V, NEMA 3R, UL LISTED
BATTERY	1	GENERAC PWRCELL9 BATTERY
BACKUP PANEL	1	125A, BACKUP PANEL, 240V
RAILS	8	QRAIL LIGHT 14 FT. BLACK
SPLICE KIT	2	QSPLICE INTERNAL LIGHT
TRUNK CABLE	18	TRUNK/PV CABLE CLIP
MODULE CLAMPS	8	UNIVERSAL MID CLAMP
GROUNDING LUG	4	WEEB LUG W/ T-BOLT
END CLAMPS	16	UNIVERSAL END CLAMPS
ATTACHMENT	30	L-MOUNT ATTACHMENT (QUICKMOUNT)
T-BOLT	39	T-BOLT W/ NUT M8 X 20MM

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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 2/6/2020

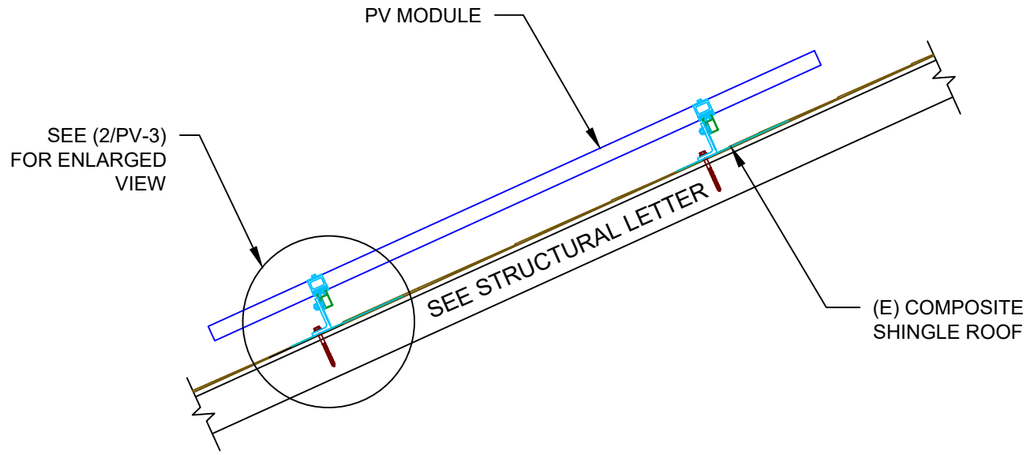
PROJECT NAME & ADDRESS

JESSICA C TIDWELL RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
STRING LAYOUT

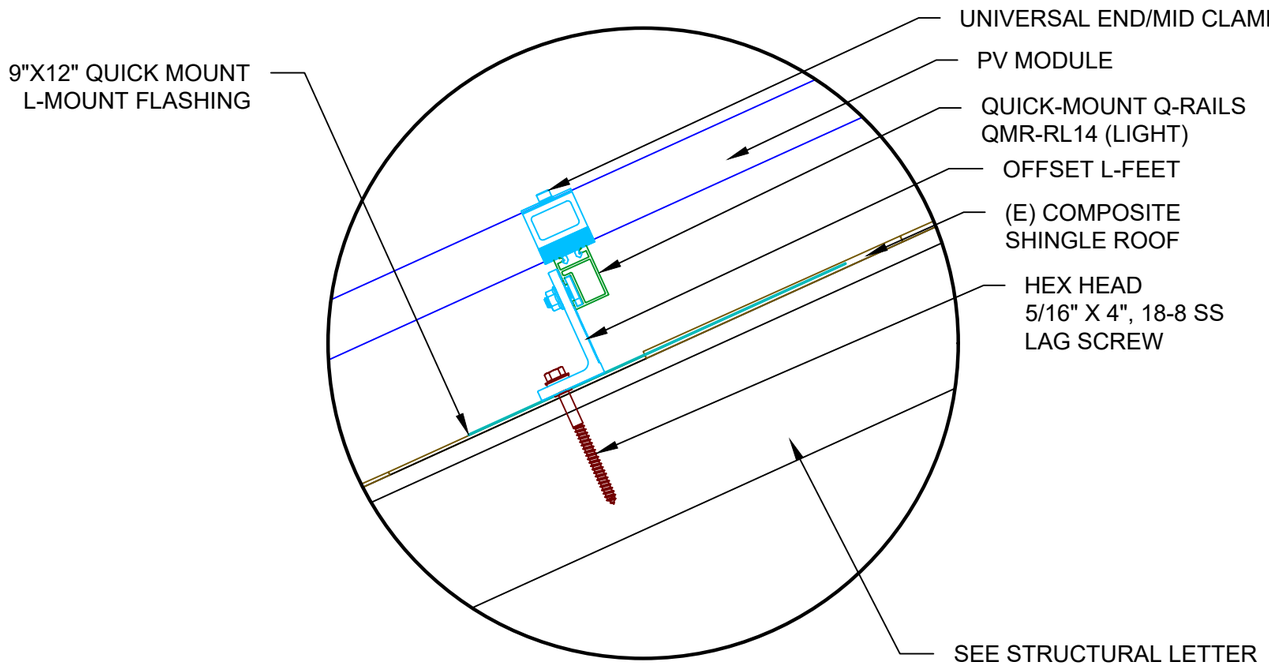
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2A



1 ATTACHMENT DETAIL

PV-3 SCALE: 1" = 1'-0"



2 ATTACHMENT DETAIL (enlarged view)

PV-3 SCALE: NTS

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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 2/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL
RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
ATTACHMENT DETAIL

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-3

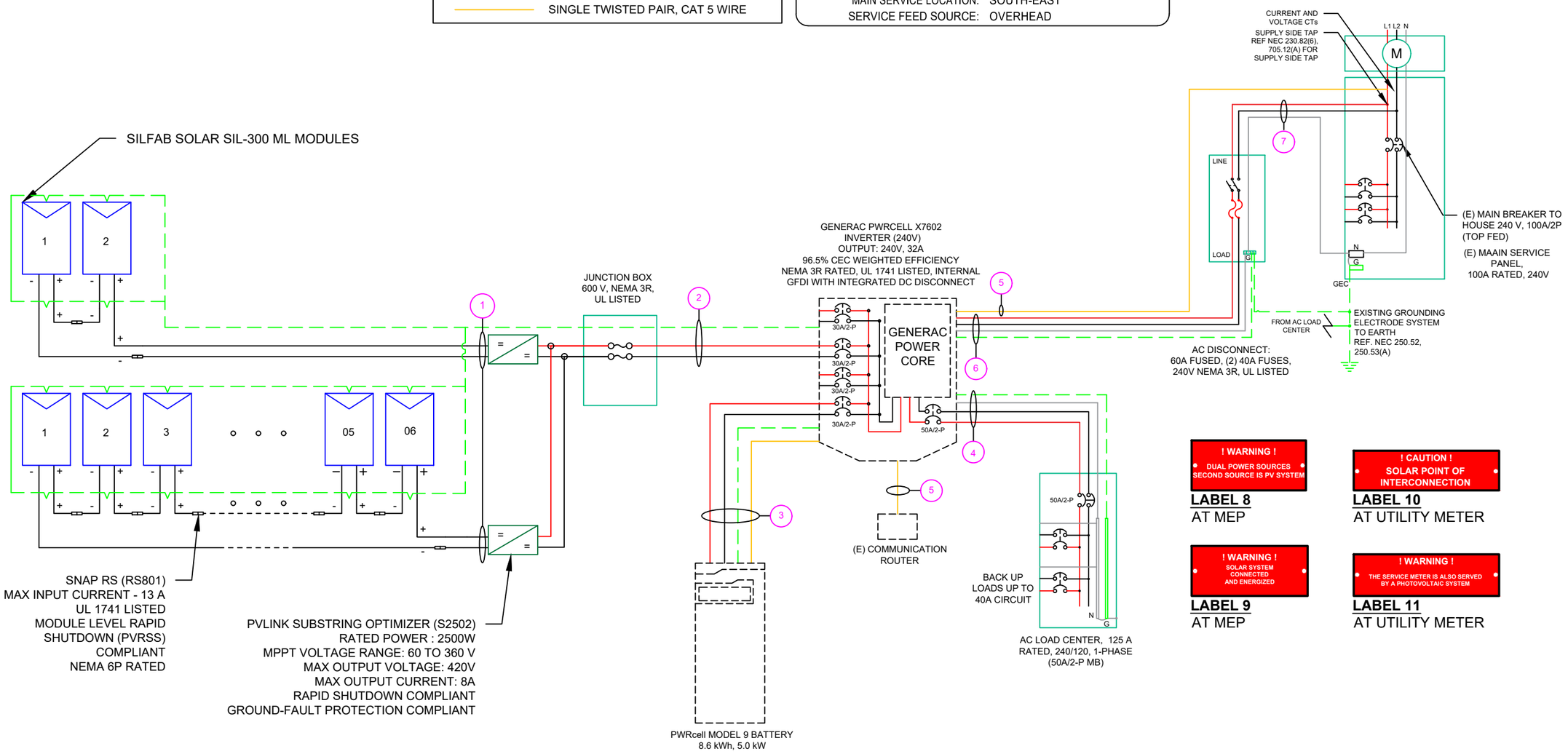
(8) SILFAB SOLAR SIL-300 ML MODULES
(1) PV LINK OF 02 MODULES &
(1) PV LINK OF 06 MODULES CONNECTED IN SERIES

WIRE LEGEND

- PV ARRAY +VE CONDUCTOR AND L1
- PV ARRAY -VE CONDUCTOR AND L2
- NEUTRAL CONDUCTOR
- EGC AND GEC
- SINGLE TWISTED PAIR, CAT 5 WIRE

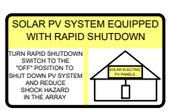
SERVICE INFO

UTILITY PROVIDER:	DTE ENERGY
MAIN SERVICE VOLTAGE:	240V
MAIN PANEL BRAND:	SQUARE D
MAIN SERVICE PANEL:	100A
MAIN CIRCUIT BREAKER RATING:	100A
MAIN SERVICE LOCATION:	SOUTH-EAST
SERVICE FEED SOURCE:	OVERHEAD



AC DISCONNECT TO
BE PLACED WITHIN 5
FEET OF THE METER
AS PER DTE ENERGY

WARNING: PHOTOVOLTAIC POWER SOURCE
LABEL 1
ON ALL CONDUITS
SPACED AT MAX 10FT



LABEL 2
AT INVERTER

! CAUTION ! SOLAR ELECTRIC SYSTEM CONNECTED AND ENERGIZED
LABEL 3
AT INVERTER

PHOTOVOLTAIC DC DISCONNECT
LABEL 4
AT EACH DC
DISCONNECT

! WARNING ! ELECTRIC SHOCK HAZARD DO NOT TOUCH TERMINALS. TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION
LABEL 5
AT EACH AC
DISCONNECT

PHOTOVOLTAIC AC DISCONNECT
LABEL 6
AT EACH AC
DISCONNECT

! WARNING ! DUAL POWER SOURCES SECOND SOURCE IS PV SYSTEM
LABEL 8
AT MEP

! CAUTION ! SOLAR POINT OF INTERCONNECTION
LABEL 10
AT UTILITY METER

! WARNING ! SOLAR SYSTEM CONNECTED AND ENERGIZED
LABEL 9
AT MEP

! WARNING ! THE SERVICE METER IS ALSO SERVED BY A PHOTOVOLTAIC SYSTEM
LABEL 11
AT UTILITY METER

	QTY	CONDUCTOR INFORMATION		CONDUIT TYPE	CONDUIT SIZE
1	(4)	#10AWG -	PV WIRE/USE-2	N/A	N/A
	(1)	#6AWG -	BARE COPPER IN FREE AIR		
2	(2)	#10AWG -	THWN-2	EMT OR FLEX IN ATTIC	3/4"
	(1)	#6AWG -	THWN-2 GND		
3	(2)	#10AWG -	THWN-2	EMT OR FLEX	3/4"
	(1)	#10AWG -	THWN-2 GND		
	(1)	CAT 5 COMMUNICATION WIRE			
4	(3)	#6AWG -	THWN-2	EMT OR FLEX	3/4"
	(1)	#6AWG -	THWN-2 GND		
5	(1)	CAT 5 COMMUNICATION WIRES		EMT OR FLEX	3/4"
6	(3)	#6AWG -	THWN-2	EMT OR FLEX	3/4"
	(1)	#6AWG -	THWN-2 GND		
7	(3)	#6AWG -	THWN-2	EMT OR FLEX	3/4"

1 ELECTRICAL LINE DIAGRAM
PV-4 SCALE: NTS

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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 2/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL
RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-4

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	SILFAB SIL300-ML
VMP	32.8V
IMP	9.16A
VOC	39.85V
ISC	9.71A
TEMP. COEFF. VOC	-0.28%/°C
MODULE DIMENSION	66.92"L x 39.37"W x 1.49"D (In Inch)
MODULE EFFICIENCY	18.4%

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	GENERAC PWRCELL X7602
AC POWER OUTPUT (LOADS/GRID)	7600VA
AC POWER OUTPUT (BACKUP)	8000VA
NOMINAL OUTPUT VOLTAGE	240 VAC
MAX OUTPUT CURRENT @240V (LOADS/GRID)	32A
MAX OUTPUT CURRENT @240V (BACKUP)	50A
NOMINAL DC INPUT VOLTAGE	380Vdc
MAX DC INPUT VOLTAGE	420Vdc
CEC WEIGHTED EFFICIENCY	96.5%
MAX DC POWER (PV)	10000W
MAX INPUT CURRENT (PV)	20Adc
CONT. PEAK POWER (BATTERY)	8000W

SERIES SUB STRING OPTIMIZER SPECIFICATIONS	
MANUFACTURER / MODEL #	PV LINK S2502
RATED POWER	2500W
MPPT VOLTAGE RANGE	60-360 Vmp
MAXIMUM INPUT VOLTAGE	420Voc
MAXIMUM OUTPUT	420 Adc
NOMINAL OUTPUT	380 Vdc
MAXIMUM OUTPUT CURRENT	8 A
MAXIMUM SHORT CIRCUIT CURRENT	18 A

BATTERY SPECIFICATIONS	
MANUFACTURER / MODEL #	GENERAC PWRCELL BATTERY
USABLE ENERGY	8.6kW
RATED CONTINUOUS POWER	3.4Kw
POWER: 60 MINUTES	4.2kW
POWER: 2 MINUTES	5.0kW
REBUS VOLTAGE: INPUT/ OUTPUT	360-420Vdc
MODULE VOLTAGE	46.8Vdc
ROUND-TRIP EFFICIENCY	96.5%

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-19°
AMBIENT TEMP (HIGH TEMP 2%)	32°
CONDUIT HEIGHT	0.5"
ROOF TOP TEMP	54°

DC CONDUCTOR AMPACITY CALCULATIONS:
ARRAY TO SOLA DECK:

EXPECTED WIRE TEMP (In Celsius)	54°
TEMP. CORRECTION PER NEC TABLE 310.15 (B)(2)(a)	0.76
NO. OF CURRENT CARRYING CONDUCTORS	4
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	0.8
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE 310.15(B)(16)	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	10A
1.25 X Imax	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	24.32A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (10A) otherwise less the entry for circuit conductor size and ampacity	

FROM SOLA DECK TO INVERTER:

EXPECTED WIRE TEMP (In Celsius)	54°
TEMP. CORRECTION PER NEC TABLE 310.15 (B)(2)(a)	0.76
NO. OF CURRENT CARRYING CONDUCTORS	2
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	1
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE 310.15(B)(16)	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	20A
1.25 X Imax X # of PV LINKS	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	28.4A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (20A) otherwise less the entry for circuit conductor size and ampacity	

FROM BATTERY TO INVERTER:

EXPECTED WIRE TEMP (In Celsius)	32°
TEMP. CORRECTION PER NEC TABLE 310.15 (B)(2)(a)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	2
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	1
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE310.15(B)(16)	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	26.25A
1.25 X Imax	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	38.40A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (26.25A) otherwise less the entry for circuit conductor size and ampacity	

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM INVERTER TO BACK-UP PANEL:

No. OF INVERTER	1
EXPECTED WIRE TEMP (In Celsius)	32°
TEMP. CORRECTION PER NEC TABLE 310.15(B)(2)(a)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	2
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	1
CIRCUIT CONDUCTOR SIZE	6 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE 310.15(B)(16)	75A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	42.5A
1.25 X INVERTER OUTPUT CURRENT (BACKUP POWER)	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	72A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (42.5A) otherwise less the entry for circuit conductor size and ampacity	

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM INVERTER TO MEP:

No. OF INVERTER	1
EXPECTED WIRE TEMP (In Celsius)	32°
TEMP. CORRECTION PER NEC TABLE 310.15(B)(2)(a)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	2
CONDUIT FILL CORRECTION PER NEC TABLE 310.15(B)(3)(a)	1
CIRCUIT CONDUCTOR SIZE	6 AWG
CIRCUIT CONDUCTOR AMPACITY PER NEC TABLE 310.15(B)(16)	75A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	40A
1.25 X MAX INVERTER OUTPUT CURRENT (LOADS/GRID)	
DERATED AMPACITY OF CIRCUIT CONDUCTOR	72A
TEMP. CORRECTION PER TABLE 310.15 (B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY 310.15 (B)(16)	
Result should be greater than (40A) otherwise less the entry for circuit conductor size and ampacity	

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MOORESVILLE, NC 28115
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Email: info@powerhome.com
Web: www.powerhome.com

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 2/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL
RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
WIRING CALCULATIONS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-5

SIL-300 ML

BAA ARRA · 25 YEAR PRODUCT WARRANTY · AUTOMATED MANUFACTURING · JUST-IN-TIME · PVEL DNV·GL TOP PERFORMER · TIER 1 BANKABLE $$$ · HIGH EFFICIENCY

60 Cell
Monocrystalline PV Module

INDUSTRY LEADING WARRANTY
All our products include an industry leading 25-year product workmanship and 30-year performance warranty.

35+ YEARS OF SOLAR INNOVATION
Leveraging over 35+ years of worldwide experience in the solar industry, Silfab is dedicated to superior manufacturing processes and innovations such as Bifacial and Back Contact technologies, to ensure our partners have the latest in solar innovation.

NORTH AMERICAN QUALITY
Silfab is the largest and most automated solar manufacturer in North America. Utilizing premium quality materials and strict quality control management to deliver the highest efficiency, premium quality PV modules 100% made in North America.

CE · Intertek · Intertek · IEC · CEC Listed · FSEC · Fraunhofer ISE

CHUBB*
* Chubb provides error and omission insurance to Silfab Solar Inc.

BAA / ARRA COMPLIANT
Silfab panels are designed and manufactured to meet Buy American Act Compliance. The US State Department, US Military and FAA have all entrusted Silfab panels in their solar installations.

LIGHT AND DURABLE
Engineered to accommodate low load bearing structures up to 5400Pa. The light-weight frame is exclusively designed for wide-ranging racking compatibility and durability.

LOWEST DEFECT RATE
Total automation ensures strict quality controls during the entire manufacturing process at our ISO certified facilities. 48.18 ppm as per December 2018.

DOMESTIC PRODUCTION
Silfab is 100% North American which means our customer service is direct, efficient and local. Your solar panels can be delivered anywhere in the Continental USA within days.

AESTHETICALLY PLEASING
All black sleek design doesn't compromise on quality.

PID RESISTANT
PID Resistant due to advanced cell technology and material selection. In accordance to IEC 62804-1

Electrical Specifications		SILFAB SIL-300 ML mono PERC	
Test Conditions		STC	NOCT
Module Power (Pmax)	Wp	300	227
Maximum power voltage (Vpmax)	V	32.8	29.5
Maximum power current (Ipmax)	A	9.16	7.69
Open circuit voltage (Voc)	V	39.85	36.9
Short circuit current (Isc)	A	9.71	7.96
Module efficiency	%	18.4	17.3
Maximum system voltage (VDC)	V	1000	
Series fuse rating	A	20	
Power Tolerance	Wp	-0/+10	

Measurement conditions: STC 1000 W/m2 • AM 1.5 • Temperature 25 °C • NOCT 800 W/m² • AM 1.5 • Measurement uncertainty ≤ 3%
• Sun simulator calibration reference modules from Fraunhofer Institute. Electrical characteristics may vary by ±5% and power by -0/+10W.

Temperature Ratings		SILFAB SIL-300 ML mono PERC
Temperature Coefficient Isc	%/°C	0.064
Temperature Coefficient Voc	%/°C	-0.28
Temperature Coefficient Pmax	%/°C	-0.36
NOCT (± 2°C)	°C	45
Operating temperature	°C	-40/+85

Mechanical Properties and Components		SILFAB SIL-300 ML mono PERC
Module weight (± 1 kg)	kg	19
Dimensions (H x L x D; ± 1mm)	mm	1700 x 1000 x 38
Maximum surface load (wind/snow)*	N/m²	4000 Pa rear load / 5400 Pa front load
Hail impact resistance		ø 25 mm at 83 km/h
Cells		60 - Si monocrystalline - 4 or 5 busbar - 156.75 x 156.75 mm
Glass		3.2 mm high transmittance, tempered, antireflective coating
Backsheet		Multilayer polyester-based
Frame		Anodized Al (Black)
Bypass diodes		3 diodes, 20SQ040 (45V/20A)
Cables and connectors		1200 mm ø 5.7 mm (4 mm2), MC4 compatible (refer to installation manual)
Junction Box		UI 3730 Certified, IP67 rated

Warranties		SILFAB SIL-300 ML mono PERC
Module product workmanship warranty		25 years**
Linear power performance guarantee		30 years ≥ 97% end of 1st year ≥ 90% end of 12th year ≥ 82% end of 25th year ≥ 80% end of 30th year

Certifications	SILFAB SIL 300 ML mono PERC
Product	ULC ORD C1703, UL 1703, IEC 61215, IEC 61730-1 and IEC 61730-2 Certified. FSEC and CEC listed. IEC 62716 Ammonia Corrosion, IEC 61701:2011 Salt Mist Corrosion Certified UL Fire Rating: Type 2
Factory	ISO9001:2015

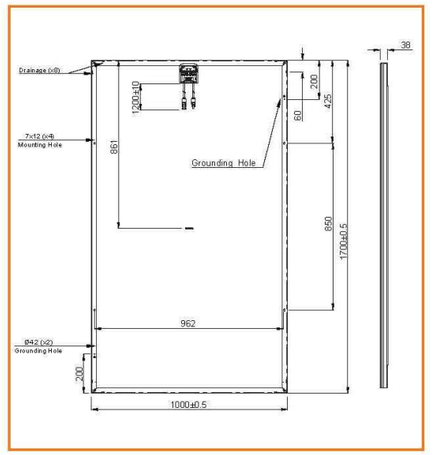
*Please refer to the Safety and Installation Manual for mounting specifications.
**12 year extendable to 25 years subject to registration and conditions outlined under "Warranty" at www.silfabsolar.com.

⚠ Warning: Read the installation and User Manual before handling, installing and operating modules.

Third-party generated pan files from Fraunhofer-Institute for Solar Energy Systems ISE are available for download at: www.silfabsolar.com/downloads

2019 TOP PERFORMER PVEL DNV·GL PV MODULE RELIABILITY SCORECARD

- Modules Per Pallet: 26
- Pallets Per Truck: 36
- Modules Per Truck: 936



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Signature with Seal

DATE: 2/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL
RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-6

FEATURES:

No autotransformer or battery inverter needed

User-selectable modes

Free system monitoring

GENERAC

PWRCELL

Inverter
Model: X7602, X11402

Solar-plus-storage is simple with the Generac PWRcell Inverter. This bi-directional, REbus™-powered inverter offers a simple, efficient design for integrating smart batteries with solar. Ideal for self-supply, backup power, zero-export and energy cost management, the PWRcell inverter is the industry's most feature-rich line of inverters, available in single-phase and three-phase models.

ADDITIONAL FEATURES

- Single inverter for grid-tied solar with smart battery integration
- Simplified system design: No autotransformer or battery inverter needed
- User-selectable modes for backup power, self-supply, time-of-use and zero-export
- Free system monitoring included via PWRview Web Portal and Mobile App

AC OUTPUT/ GRID-TIE	MODEL X7602	MODEL X11402
RATED AC POWER OUTPUT	7600 W	11400 W
AC OUTPUT VOLTAGE	120/240, 1Ø VAC	120/208, 3Ø VAC
AC FREQUENCY	60 Hz	60 Hz
MAXIMUM CONTINUOUS OUTPUT CURRENT	32 A, RMS	32 A, RMS
GROUND-FAULT ISOLATION DETECTION	Included	Included
CHARGE BATTERY FROM AC	Yes	Yes
THD (CURRENT)	< 2 %	< 2 %
TYPICAL NIGHTTIME POWER CONSUMPTION	< 7 W	< 7 W

AC OUTPUT/ BACKUP	MODEL X7602	MODEL X11402
RATED AC BACKUP POWER OUTPUT	8000 W	8000 W
MAXIMUM AC BACKUP POWER OUTPUT	12000 W	12000 W
AC BACKUP OUTPUT VOLTAGE	120/240, 1Ø VAC	120/240, 1Ø VAC
AC FREQUENCY	60 HZ	60 HZ
AC CIRCUIT BREAKER	50 A	50 A
THD (VOLTAGE)	< 2 %	< 2 %
AUTOMATIC SWITCHOVER TIME	< 1 Seconds	< 1 Seconds
TYPICAL NIGHTTIME POWER CONSUMPTION	30 W	30 W

DC INPUT	MODEL X7602	MODEL X11402
DC INPUT VOLTAGE RANGE	360-420 VDC	360-420 VDC
NOMINAL DC BUS VOLTAGE	380 VDC	380 VDC
MAX INPUT CURRENT	20 A	30 A
REVERSE-POLARITY PROTECTION	YES	YES
GROUND-FAULT ISOLATION DETECTION	YES	YES
TRANSFORMERLESS, UNGROUNDED	YES	YES

DC INPUT/ BATTERY	MODEL X7602	MODEL X11402
MAXIMUM CONTINUOUS POWER	8000 W	8000 W
INTERNAL DC DISTRIBUTION BREAKERS	4X 2P30A	4X 2P30A
DC FUSES ON PLUS AND MINUS	40 A	40 A
2-POLE DISCONNECTION	YES	YES

EFFICIENCY	MODEL X7602	MODEL X11402
PEAK EFFCIENCY	97 %	98 %
CEC WEIGHTED EFFCIENCY	96.5 %	97.5 %

GENERAC

Generac Power Systems, Inc.
S45 W29290 Hwy. 59, Waukesha, WI 53189
www.Generac.com 1-888-GENERAC (1-888-436-3722)

Specifications

FEATURES AND MODES	
ISLANDING[3]	Yes
GRID SELL	Yes
SELF CONSUMPTION	Yes
PRIORITIZED CHARGING FROM RENEWABLES	Yes
GRID SUPPORT - ZERO EXPORT	Yes

ADDITIONAL FEATURES	
SUPPORTED COMMUNICATION INTERFACES	CANbus, RS4854, Ethernet
SYSTEM MONITORING	PWRview Web Portal and Mobile App
CRITICAL LOADS DISCONNECT[3]	Yes
MANUAL INVERTER BYPASS SWITCH	Automatic
WARRANTY	10 Years

STANDARDS COMPLIANCE	
SAFETY	UL1741 SA, CSA 22.2
GRID CONNECTION STANDARDS	IEEE1547, Rule 21, Rule 14H
EMISSIONS	FCC part15 class B

DIMENSIONS AND INSTALLATION SPECIFICATIONS	
WIRE GAUGE RANGE	10 - 8 AWG
TOTAL AC KNOCKOUTS X SIZE	2" x 0.75", 2 x 1"
TOTAL DC KNOCKOUTS X SIZE	5" x 1"
DIMENSIONS (L,W,H)	24.5" x 19.25" x 8"
WEIGHT	62.7 lb
COOLING	Forced convection
NOISE	< 40 dBA
OPERATING TEMPERATURE	-20 to 50 °C*
PROTECTION RATING	NEMA 3R

INSTALLATION GUIDELINES	
BATTERY TYPES SUPPORTED	PWRcell battery module
MODULE STRING SIZE PER PV LINK OPTIMIZER	2-9 PV modules
MAXIMUM RECOMMENDED DC POWER FROM PV	10kW (1Ø), 15kW (3Ø)
BATTERIES PER INVERTER	Up to 2

[3] 3Ø inverters offer islanding for 1Ø loads, [4] Modbus,
*Reduced power at extreme temperatures

Specifications subject to change without notice.

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DESCRIPTION	DATE	REV

Signature with Seal

DATE: 2/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL
RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-7

FEATURES:

Easy installation

Low cost, high efficiency solution

NEC 2017 and 2020 PVRSS compliant

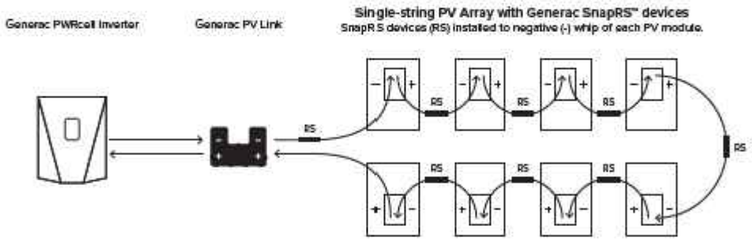
SnapRS™

Instant Rapid Shutdown Compliance
Model: RS801

The Generac SnapRS is NEC 2017 compliant, and doesn't require any extra hardware to mount, no pairing and no fussy digital communications. Just snap a Generac SnapRS disconnect device to each PV module for total rapidshutdown performance. When signaled by the inverter, SnapRS units break the PV circuit, reducing array voltage to <80V in seconds.

SYSTEM DESIGN

Snap a Generac SnapRS disconnect device to the negative whip (-) of each module in the solar array for simple NEC-2017 module-level rapid shutdown compliance. SnapRS devices isolate array voltage when a rapid shutdown command is given by a connected Islanding Inverter



ADDITIONAL FEATURES

- Fast, easy and simple to install
- One SnapRS device per PV module
- Achieves PVRSS Compliance
- Low cost, high efficiency solution

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www.Generac.com 1-888-GENERAC (1-888-436-3722)

Specifications

SNAPRS (RS801)

PV MODULE MAX VOC	75 V	OPERATING TEMPERATURE	-40 to 70 °C
EFFICIENCY	99.9 %	CERTIFICATIONS	UL1741
MAX INPUT CURRENT	13 A	WEIGHT	100 g
SHUTDOWN TIME	< 10 Seconds	DIMENSIONS (L,W,H)	1" x 1" x 7"
ENCLOSURE RATING	NEMA 6P	WARRANTY	25 Years

Specifications subject to change without notice.

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DATE: 2/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-8

FEATURES:

Connect up to 2 PWRcells to a single PWRcell Inverter

Plug-and-play with PWRcell Inverters and PV Links

Residential and commercial application ready

GENERAC

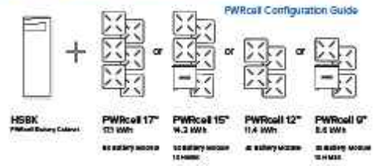
PWRCELL

Battery
Model: 9, 12, 15, 17

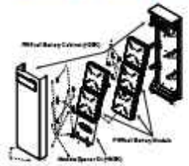
No other smart battery offers the flexibility of PWRcell. Whether for backup power or smart energy management, the PWRcell battery has power and capacity options for every need, without sacrificing flexibility or function.

The PWRcell battery series allows system owners the flexibility to scale from the economical 8.6kWh PWRcell 9™ to the massive 17.1 kWh PWRcell 17™ by adding additional PWRcell battery modules, the gold standard in storage.

PWRCELL CONFIGURATION GUIDE



PWRCELL ASSEMBLY



PWRCELL BATTERY DESIGN

PWRcell is a modular smart battery platform that allows for a range of configurations to suit any need, small or large. PWRcell can be built in capacities ranging from 8.6-17.1kWh. When needs change, PWRcell can be upgraded with additional modules. Use the chart above to understand what components you need for your chosen PWRcell configuration.

ADDITIONAL FEATURES

- Connect as many as two 2 PWRcells to a single PWRcell Inverter™ for up to 34.2kWh of storage
- Best-in-class battery backup power
- Plug-and-play with PWRcell Inverters™ and PV Links™
- Time-of-use (TOU) and zero-export ready
- Residential and commercial application ready

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Specifications

PWRCELL MODEL	9	12	15	17
BATTERY MODULES	3	4	5	6
USABLE ENERGY	8.6 kWh	11.4 kWh	14.3 kWh	17.1 kWh
POWER: RATED CONTINUOUS	3.4 kW	4.5 kW	5.6 kW	6.7 kW
POWER: 60 MINUTES	4.2 kW	5.6 kW	7.0 kW	8.4 kW
POWER: 2 MINUTES	5.0 kW	6.7 kW	8.4 kW	10.0 kW
REBUS VOLTAGE: INPUT/OUTPUT	360-420 VDC			
MODULE VOLTAGE	46.8 VDC			
ROUND-TRIP EFFICIENCY	96.5 %			
OPERATING TEMPERATURE	-10 to 45 °C*			
RECOMMENDED TEMPERATURE	13 to 30 °C			
MAXIMUM INSTALLATION ALTITUDE	9834 ft, (3000 m)			
DIMENSIONS (L,W,H)	68" x 22" x 10"			
WEIGHT (ENCLOSURE)	115 lb, (52 kg)			
WEIGHT (INSTALLED)	280 lb, (127 kg)	335 lb, (152 kg)	390 lb, (178 kg)	445 lb, (202 kg)
WARRANTY: LI-ION MODULES	10 Years, (22.6 MWh)	10 Years, (30.2 MWh)	10 Years, (37.8 MWh)	10 Years, (45.3 MWh)
WARRANTY: ELECTRONICS AND ENCLOSURE	10 Years			
COMMUNICATION PROTOCOL	REbus DC Nanogrid™			
COMPLIANCE	UL 9540, UL 1973, UL 1642, CSA 22.2			

*Reduced power at extreme temperatures

Specifications subject to change without notice.

UPGRADING PWRCELL

Inside of the PWRcell battery, the PWRcell battery modules are stacked 2-deep on three levels, allowing for up to six modules to be connected in series. Upgrade an existing PWRcell battery by adding modules and a module spacer (HMSK) if required. PWRcell 9 and PWRcell 15 require a module spacer.

Generac offers a convenient PWRcell Battery Upgrade Kit (HMUK) to help replace lost or misplaced hardware. A PWRcell Battery Upgrade Kit may be purchased from your Generac distributor.

Refer to the table to the right for material requirements related to upgrading PWRcell.

UPGRADE MATERIAL REQUIREMENTS

Starting Configuration \ Ending Configuration	PWRCELL 17	PWRCELL 15	PWRCELL 12
PWRCELL 9	+3 x PWRCell Mod +2 x HMUK*	+2 x PWRCell Mod +1 x HMUK*	+1 x PWRCell Mod +1 x HMUK*
PWRCELL 12	+2 x PWRCell Mod +1 x HMUK*	+1 x PWRCell Mod +1 x HMSK	
PWRCELL 15	+1 x PWRCell Mod +1 x HMUK*		

*HMUK (Upgrade kit) only required if original hardware is unavailable

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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 2/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-9

FEATURES:

Fast, simple installation

Lower failure risk than module-level optimizers

NEC 2017 rapid shutdown compliant with SnapRS®

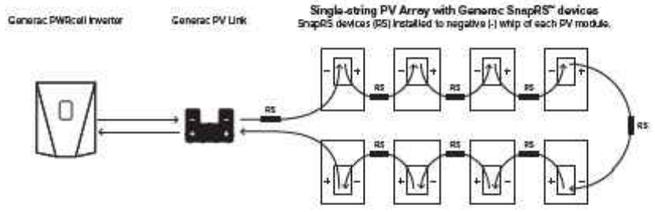
PV Link™

S2500 Series substring optimizer
Model: S2502

PV Link is the simple solar optimizer for quick installation and long-lasting performance. Connect as few as two or as many as nine PV modules to each PV Link to overcome shading and challenging roof lines.

ADDITIONAL FEATURES

- Quick connections with MC4 connectors
- 2500W capacity
- Compatible with high-voltage smart batteries
- Cost-effective solution for high-performance PV
- Ground-fault protection



Specifications

PWRCELL PV LINK (S2502)

RATED POWER	2500 W
PEAK EFFICIENCY	99%
MPPT VOLTAGE RANGE	60-360 VMP
MAX INPUT VOLTAGE	420 VOC; max when cold
MAX OUTPUT	420 VOC
NOMINAL OUTPUT (REBUS™)	380 VDC
MAX OUTPUT CURRENT	8 A
MAX SHORT CIRCUIT CURRENT (ISC)	18 A
STANDBY POWER	< 1 W

PROTECTIONS	Ground-fault, Arc-fault (Arc-fault Type 1 AFCI, Integrated)
MAX OPERATING TEMP	70 °C
SYSTEM MONITORING	PWRview Web Portal and Mobile App
ENCLOSURE	Type 3R
WEIGHT	7.3 lb
DIMENSIONS (L,W,H)	2" x 15.4" x 9.6"
COMPLIANCE	UL 1741, CSA 22.2
WARRANTY	25 Years

Specifications subject to change without notice.

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JESSICA C TIDWELL RESIDENCE
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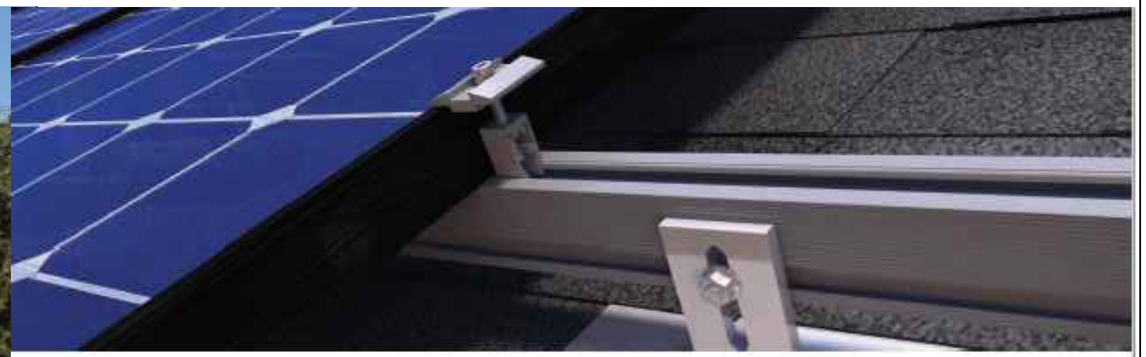
DETROIT, MI 48238

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-10



QRail™ — Fully Integrated Mounting and Racking System

The QRail Series is a strong and versatile solar array mounting system that provides unrivaled benefits to solar designers and installers. Combined with Quick Mount PV's industry-leading waterproof mounts, QRail offers a complete racking solution for mounting solar modules on any roof.

Easily design array configurations with the QDesign software application. Generate complete engineering reports and calculate a precise bill of materials for all the mounting, racking and accessories needed for a complete solar array.

Comprehensive, One-Source Solution

QRail, together with Quick Mount PV's waterproof mounting products, provides the benefit of a single-sourced, seamlessly integrated rooftop installation that works with all roof types — composition/asphalt shingles, flat or curved tile, metal shingle, shake, slate and low slope roofs. The QRail system also works with any roof attachment system for maximum flexibility.

Superior Strength and Versatility

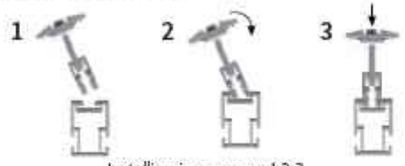
QRail is engineered for optimal structural performance. The system is certified to UL 2703, fully code compliant and backed by a 25-year warranty. QRail is available in Light, Standard and Heavy versions to match all geographic locations. QRail is compatible with virtually all modules and works on a wide range of pitched roof surfaces. Modules can be mounted in portrait or landscape orientation in standard or shared-rail configurations.

QRails come in two lengths — 168 inches (14 ft) and 208 inches (17.3 ft) Mill and Black Finish

Fast, Simple Installation: It Just Clicks

QClick Technology™

The universal mid and end clamps use QClick technology to simply "click" into the rail channel and remain upright, ready to accept the module. The pre-assembled clamps fit virtually all module frames and require no extra hardware, eliminating pre-loading and reducing installation time.



Installing is as easy as 1-2-3

Universal End Clamp

2 clamps for modules from 30-45mm or 38-50mm thick

Universal Bonded Mid Clamp

2 clamps for modules from 30-45mm or 38-50mm thick

QSplice™ Technology

QRail's innovative internal QSplice installs in seconds, requiring no tools or screws. Simply insert QSplice into the rail and slide the other rail on to create a fully structural, bonded splice. An external splice is also available.

Installs in seconds — no tools or hardware required

Fully Integrated Electrical Bonding

The QRail system provides an integrated electrical bonding path, ensuring that all exposed metal parts and the solar module frames are electrically connected. All electrical bonds are created when the components are installed and tightened down.

POWERHOME
POWER HOME SOLAR, LLC
"POWER YOUR FUTURE"
919 N. MAIN ST.
MOORESVILLE, NC 28115
Phone: 704-800-6591 (OFFICE)
Email: info@powerhome.com
Web: www.powerhome.com

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 2/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL
RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-10A

QRail™ Configurations

Item Code	Part Number	Description	Finish
QMR-RL14A60	800	QRail Light, 14 ft., 60 Pack	Mill
QMR-RL17.3A60	801	QRail Light, 17.3 ft, 60 Pack	Mill
QMR-RL14B60	805	QRail Light, 14 ft., 60 Pack	Black
QMR-RL17.3B60	806	QRail Light, 17.3 ft, 60 Pack	Black
QMR-RS14A60	810	QRail Standard, 14 ft., 60 Pack	Mill
QMR-RS17.3A60	811	QRail Standard, 17.3 ft, 60 Pack	Mill
QMR-RS14B60	815	QRail Standard, 14 ft., 60 Pack	Black
QMR-RS17.3B60	816	QRail Standard, 17.3 ft, 60 Pack	Black
QMR-RH14A60	820	QRail Heavy, 14 ft., 60 Pack	Mill
QMR-RH17.3A60	821	QRail Heavy, 17.3 ft, 60 Pack	Mill
QMR-RH14B60	825	QRail Heavy, 14 ft, 60 Pack	Black
QMR-RH17.3B60	826	QRail Heavy, 17.3 ft, 60 Pack	Black

QSplice™ Internal Structural Splice

Item Code	Part Number	Description	Finish
QMR-ISLA15	830	QSplice Internal, Light, 15 Pack	Mill
QMR-ISSA15	831	QSplice Internal, Standard, 15 Pack	Mill
QMR-ISHA15	832	QSplice Internal, Heavy, 15 Pack	Mill

QSplice™ External Structural Splice

Item Code	Part Number	Description	Finish
QMR-ESSA15	834	QSplice External, Standard, 15 Pack	Mill
QMR-ESHA15	835	QSplice External, Heavy, 15 Pack	Mill

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4087 FULLERTON AVE.,
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SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11

Universal End Clamp with QClick™ Technology

Black *Mill*

Item Code	Part Number	Description	Finish
QMR-UEC3045A20	860	Universal End Clamp, 30-45mm, 20 Pack	Mill
QMR-UEC3850A20	861	Universal End Clamp, 38-50mm, 20 Pack	Mill
QMR-UEC3045B20	865	Universal End Clamp, 30-45mm, 20 Pack	Black
QMR-UEC3850B20	866	Universal End Clamp, 38-50mm, 20 Pack	Black
QMR-UEC3045BPA20	862	Universal End Clamp, 30-45mm, w/ Bonding, 20 Pack	Mill
QMR-UEC3850BPA20	863	Universal End Clamp, 38-50mm, w/ Bonding, 20 Pack	Mill
QMR-UEC3045BPB20	867	Universal End Clamp, 30-45mm, w/ Bonding, 20 Pack	Black
QMR-UEC3850BPB20	868	Universal End Clamp, 38-50mm, w/ Bonding, 20 Pack	Black

Mid Clamp with QClick™ Technology

Black *Mill*

Item Code	Part Number	Description	Finish
QMR-UMC3045BP1.2A20	872	Universal Mid Clamp, 30-45mm, w/ Bonding, 20 Pack	Mill
QMR-UMC3850BP1.2A20	873	Universal Mid Clamp, 38-50mm, w/ Bonding, 20 Pack	Mill
QMR-UMC3045BP1.2B20	877	Universal Mid Clamp, 30-45mm, w/ Bonding, 20 Pack	Black
QMR-UMC3850BP1.2B20	878	Universal Mid Clamp, 38-50mm, w/ Bonding, 20 Pack	Black

Single-Slot L-Foot

Item Code	Part Number	Description	Finish
QMC-LF A12	692	Single-slot L-foot, 12 Pack	Mill
QMC-LF B12	693	Single-slot L-foot, 12 Pack	Black

End Caps

Heavy *Standard* *Light*

Item Code	Part Number	Description	Finish
QMR-CPL B50	885	End Cap Light, 50 Pack	Black
QMR-CPS B50	886	End Cap Standard, 50 Pack	Black
QMR-CPH B50	887	End Cap Heavy, 50 Pack	Black

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SHEET NUMBER
PV-11A

T-Bolt

Item Code	Part Number	Description	Finish
QMR-TB A 300	880	T-Bolt w/ Nut, 300 Pack	stainless steel

Wire Clip

Works with both PV and Trunk Cabling

Item Code	Part Number	Description	Finish
QMR-WC A 300	882	Trunk/PV Cable, 300 Pack	stainless steel

Grounding Lug

Item Code	Part Number	Description	Finish
QMR-GL A 50	890	WEEB Lug w/ T-Bolt, 50 Pack	n/a

WEEB BMC

Item Code	Part Number	Description	Finish
QMR-ECW A 50	891	WEEB BMC, 50 Pack	stainless steel

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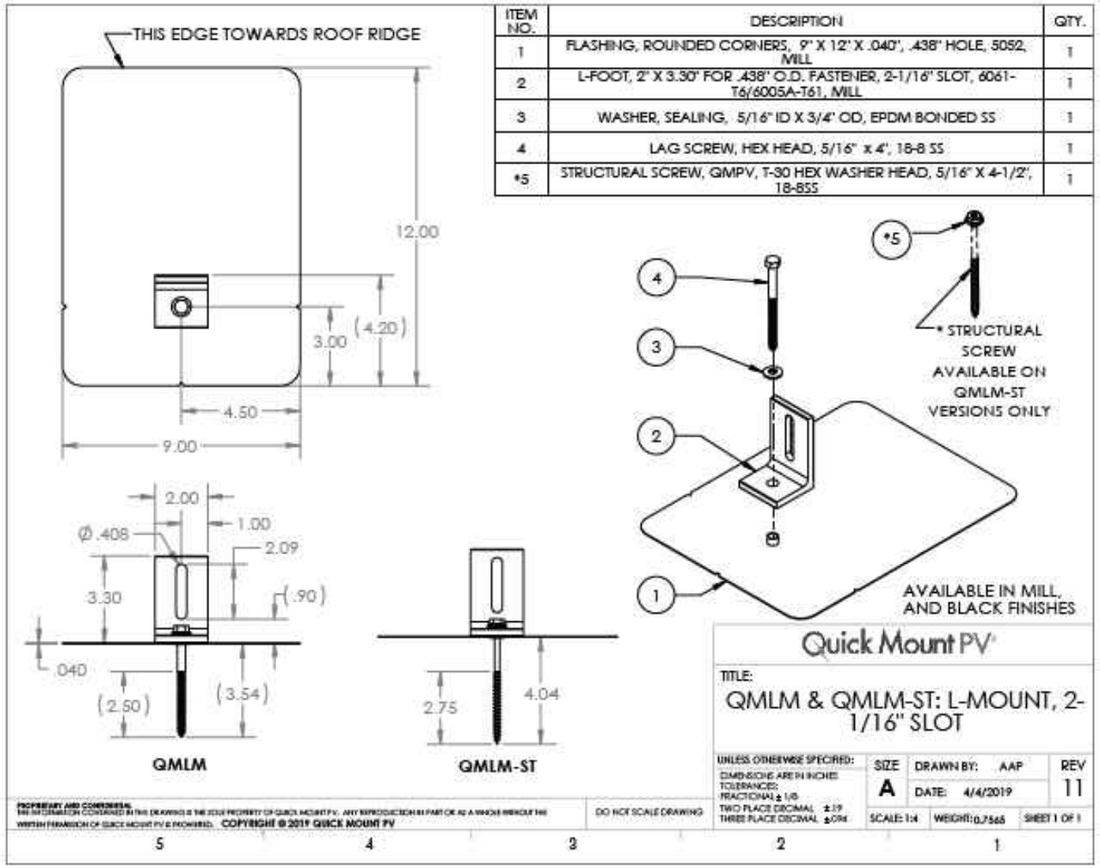
SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11B

L-Mount | QMLM / QMLM-ST

Elevated Water Seal Technology®



ITEM NO.	DESCRIPTION	QTY.
1	FLASHING, ROUNDED CORNERS, 9" X 12" X .040", .438" HOLE, 5052, MILL	1
2	L-FOOT, 2" X 3.30" FOR .438" O.D. FASTENER, 2-1/16" SLOT, 6061-T6/6005A-T61, MILL	1
3	WASHER, SEALING, 5/16" ID X 3/4" OD, EPDM BONDED SS	1
4	LAG SCREW, HEX HEAD, 5/16" x 4", 18-8 SS	1
*5	STRUCTURAL SCREW, QMPV, T-30 HEX WASHER HEAD, 5/16" X 4-1/2", 18-8SS	1

Quick Mount PV®

TITLE: QMLM & QMLM-ST: L-MOUNT, 2-1/16" SLOT

UNLESS OTHERWISE SPECIFIED:	SIZE	DRAWN BY: AAP	REV
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± 1/8 TWO PLACE DECIMAL ±.19 THREE PLACE DECIMAL ±.094	A	DATE: 4/4/2019	11
	SCALE: 1:4	WEIGHT: 0.7565	SHEET 1 OF 1

DO NOT SCALE DRAWING

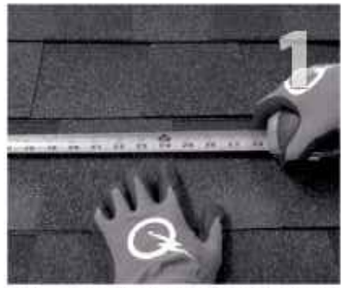
5 4 3 2 1

Quick Mount PV®
RESPECT THE ROOF

L-Mount Installation Instructions

Installation Tools Required: tape measure, roofing bar, chalk line, stud finder, caulking gun, sealant compatible with roofing materials, drill with 7/32" or 1/8" bit, drill or impact gun with 1/2" socket.

WARNING: Quick Mount PV products are NOT designed for and should NOT be used to anchor fall protection equipment.



Locate, choose, and mark centers of rafters to be mounted. Select the courses of shingles where mounts will be placed.

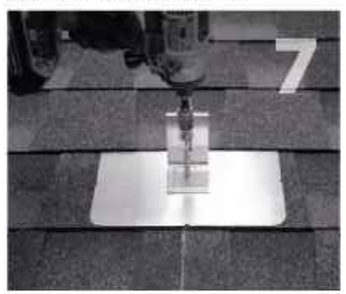
Carefully lift composition roof shingle with roofing bar, just above placement of mount. Remove nails as required and backfill holes with aproved sealant. See "Proper Flashing Placement" on next page.

Insert flashing between 1st and 2nd course. Slide up so top edge of flashing is at least ¾" higher than the butt-edge of the 3rd course and lower flashing edge is above the butt-edge of 1st course. Mark center for drilling.

If attaching with lag bolt use a 7/32" bit (Lag). Use a ⅛" bit (ST) for attaching with the structural screw. Drill pilot hole into roof and rafter, taking care to drill square to the roof. Do not use mount as a drill guide. Drill a 2" deep hole into rafter.

Clean off any sawdust, and fill hole with sealant compatible with roofing materials.

Place L-foot onto elevated flute and rotate L-foot to desired orientation.



Prepare lag bolt or structural screw with sealing washer. Using a ½-inch socket on an impact gun, drive prepared lag bolt through L-foot until L-foot can no longer easily rotate. **DO NOT over-torque.** NOTE: Structural screw can be driven with T-30 hex head bit.

BI 7.2.3-44

You are now ready for the rack of your choice. Follow all the directions of the rack manufacturer as well as the module manufacturer. NOTE: Make sure top of L-Foot makes solid contact with racking.

All roofing manufacturers' written instructions must also be followed by anyone modifying a roof system. Consult the roof manufacturer's specs and instructions prior to working on the roof.

Apr-2019 Rev 6

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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 2/6/2020

PROJECT NAME & ADDRESS

JESSICA C TIDWELL
RESIDENCE
4087 FULLERTON AVE.,
DETROIT, MI 48238

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-12

HISTORIC DISTRICT COMMISSION
PROJECT REVIEW REQUEST

CITY OF DETROIT
PLANNING & DEVELOPMENT DEPARTMENT
2 WOODWARD AVENUE, ROOM 808, DETROIT, MI 48226

DATE: 2/20/2020

PROPERTY INFORMATION

ADDRESS: 4087 Fullerton Ave **AKA:**

HISTORIC DISTRICT:

SCOPE OF WORK: (Check ALL that apply)

- ☐ Windows/ Doors
- ☐ Roof/Gutters/ Chimney
- ☐ Porch/ Deck
- ☐ Landscape/Fence/ Tree/Park
- ☐ General Rehab
- ☐ New Construction
- ☐ Demolition
- ☑ Addition
- ☐ Other:

APPLICANT IDENTIFICATION

- ☐ Property Owner/ Homeowner
- ☑ Contractor
- ☐ Tenant or Business Occupant
- ☐ Architect/Engineer/ Consultant

NAME: Peter DeNicola **COMPANY NAME:** Power Home Solar

ADDRESS: 500 Stephenson Hwy **CITY:** Troy **STATE:** MI **ZIP:** 48083

PHONE: 919.300.7976 **MOBILE:** **EMAIL:** permit@powerhome.com

PROJECT REVIEW REQUEST CHECKLIST

Please attach the following documentation to your request:

PLEASE KEEP FILE SIZE OF ENTIRE SUBMISSION UNDER 30MB

NOTE:
Based on the scope of work, additional documentation may be required.
See www.detroitmi.gov/hdc for scope-specific requirements.

- ☐ **Completed Building Permit Application** (highlighted portions only)
- ☐ **ePLANS Permit Number** (only applicable if you've already applied for permits through ePLANS)
- ☐ **Photographs** of ALL sides of existing building or site
- ☐ **Detailed photographs** of location of proposed work (photographs to show existing condition(s), design, color, & material)
- ☐ **Description of existing conditions** (including materials and design)
- ☐ **Description of project** (if replacing any existing material(s), include an explanation as to why replacement--rather than repair--of existing and/or construction of new is required)
- ☐ **Detailed scope of work** (formatted as bulleted list)
- ☐ **Brochure/cut sheets** for proposed replacement material(s) and/or product(s), as applicable

Upon receipt of this documentation, staff will review and inform you of the next steps toward obtaining your building permit from the Buildings, Safety Engineering and Environmental Department (BSEED) to perform the work.

SUBMIT COMPLETED REQUESTS TO HDC@DETROITMI.GOV

P2 - BUILDING PERMIT APPLICATION

Date: 2/20/2020

PROPERTY INFORMATION

Address: 4087 Fullerton Ave Floor: _____ Suite#: _____ Stories: _____

AKA: _____ Lot(s): _____ Subdivision: _____

Parcel ID#(s): 14004811. Total Acres: _____ Lot Width: _____ Lot Depth: _____

Current Legal Use of Property: _____ Proposed Use: _____

Are there any existing buildings or structures on this parcel? ☐ Yes ☐ No

PROJECT INFORMATION

Permit Type: ☐ New ☒ Alteration ☐ Addition ☐ Demolition ☐ Correct Violations

☐ Foundation Only ☐ Change of Use ☐ Temporary Use ☐ Other: _____

☐ Revision to Original Permit #: _____ (Original permit has been issued and is active)

Description of Work (Describe in detail proposed work and use of property, attach work list)

8 solar roof mounted modules, grid tied, 2.40 kw, solar installation on existing structure

☐ MBC use change ☐ No MBC use change

Included Improvements (Check all applicable; these trade areas require separate permit applications)

☐ HVAC/Mechanical ☒ Electrical ☐ Plumbing ☐ Fire Sprinkler System ☐ Fire Alarm

Structure Type

☐ New Building ☒ Existing Structure ☐ Tenant Space ☐ Garage/Accessory Building

☐ Other: _____ Size of Structure to be Demolished (LxWxH) _____ cubic ft.

Construction involves changes to the floor plan? ☐ Yes ☐ No

(e.g. interior demolition or construction to new walls)

Use Group: _____ Type of Construction (per current MI Bldg Code Table 601) _____

Estimated Cost of Construction $ 31,682.00 (By Contractor) $ _____ (By Department)

Structure Use

☐ Residential-Number of Units: _____ ☐ Office-Gross Floor Area _____ ☐ Industrial-Gross Floor Area _____

☐ Commercial-Gross Floor Area: _____ ☐ Institutional-Gross Floor Area _____ ☐ Other-Gross Floor Area _____

Proposed No. of Employees: _____ List materials to be stored in the building: _____

PLOT PLAN SHALL BE submitted on separate sheets and shall show all easements and measurements (must be correct and in detail). SHOW ALL streets abutting lot, indicate front of lot, show all buildings, existing and proposed distances to lot lines. (Building Permit Application Continues on Next Page)

For Building Department Use Only

Intake By: _____ Date: _____ Fees Due: _____ DngBld? ☐ No

Permit Description:

Permit #:

Current Legal Land Use: _____ Proposed Use: _____

Permit#: _____ Date Permit Issued: _____ Permit Cost: $ _____

Zoning District: _____ Zoning Grant(s): _____

Lots Combined? ☐ Yes ☐ No (attach zoning clearance)

Revised Cost (revised permit applications only) Old $ _____ New $ _____

Structural: _____ Date: _____ Notes: _____

Zoning: _____ Date: _____ Notes: _____

Other: _____ Date: _____ Notes: _____

IDENTIFICATION (All Fields Required)

Property Owner/Homeowner ☐ Property Owner/Homeowner is Permit Applicant

Name: Jessica Tidwell Company Name: _____

Address: 4087 Fullerton Ave City: Detroit State: MI Zip: 48238

Phone: 313.647.6148 Mobile: _____

Driver's License #: _____ Email: _____

Contractor ■ Contractor is Permit Applicant

Representative Name: Peter DeNicola Company Name: Power Home Solar

Address: 500 Stephenson Hwy City: Troy State: MI Zip: 48083

Phone: 919.300.7976 Mobile: _____ Email: permit@powerhome.com

City of Detroit License #: LIC2017-00383

TENANT OR BUSINESS OCCUPANT ☐ Tenant is Permit Applicant

Name: _____ Phone: _____ Email: _____

ARCHITECT/ENGINEER/CONSULTANT ☐ Architect/Engineer/Consultant is Permit Applicant

Name: _____ State Registration#: _____ Expiration Date: _____

Address: _____ City: _____ State: _____ Zip: _____

Phone: _____ Mobile: _____ Email: _____

HOMEOWNER AFFIDAVIT (Only required for residential permits obtained by homeowner.)

I hereby certify that I am the legal owner and occupant of the subject property and the work described on this permit application shall be completed by me. I am familiar with the applicable codes and requirements of the City of Detroit and take full responsibility for all code compliance, fees and inspections related to the installation/work herein described. I shall neither hire nor sub-contract to any other person, firm or corporation any portion of the work covered by this building permit.

Print Name: _____ (Homeowner) Signature: _____ Date: _____

Subscribed and sworn to before me this _____ day of _____ 20 ____ A.D. _____ County, Michigan

Signature: _____ (Notary Public) My Commission Expires: _____

PERMIT APPLICANT SIGNATURE

I hereby certify that the information on this application is true and correct. I have reviewed all deed restrictions that may apply to this construction and am aware of my responsibility thereunder. I certify that the proposed work is authorized by the owner of the record and I have been authorized to make this application as the property owner(s) authorized agent. Further I agree to conform to all applicable laws and ordinances of jurisdiction. **I am aware that a permit will expire when no inspections are requested and conducted within 180 days of the date of issuance or the date of the previous inspection and that expired permits cannot be**

Print Name: Peter DeNiola (Permit Applicant) Signature: _____ Date: 2/20/2020

Driver's License #: 000039728002 Expiration: 6/5/24

Subscribed and sworn to before me this _____ day of _____ 20 ____ A.D. _____ County, Michigan

Signature: _____ (Notary Public) My Commission Expires: _____

Section 23a of the state construction code act of 1972, 1972PA230, MCL 125.1523A, prohibits a person from conspiring to circumvent the licensing requirements of this state relating to persons who are to perform work on a residential building or a residential structure. Visitors of Section 23a are subject to civil fines.

This application can also be completed online. Visit detroitmi.gov/bseed/elaps for more information.