CITY OF WASHINGTON

PLANNING & DEVELOPMENT DEPARTMENT
301 Walnut St. · Washington, IL 61571
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http://www.washington-illinois.org
joliphant@ci.washington.il.us

MEMORANDUM

TO: Chairman Burdette and Planning and Zoning Commission
FROM: Jon R. Oliphant, AICP, Planning & Development Director
SUBJECT: Public Hearing – Request by Aaron Forinash to allow a ground-mount solar array at 206 Legion Road
DATE: August 30, 2023

Zoning: CE (Country Estates)
Comprehensive Plan: Rural Residential

Summary: Aaron Forinash has requested a variance to allow a ground-mount solar array to be installed at 206 Legion Road. The property is zoned CE (Country Estates).

Background: The Washington zoning code does not allow for ground-mount solar arrays to be placed within the city limits. A code amendment previously drafted would allow for them to be placed on certain properties with non-residential uses that have a minimum lot size of 0.75 acres. The City Council indicated an interest at the August 14 Committee of the Whole meeting to potentially allow for ground-mounts on certain residential properties. Staff will eventually offer a framework for such a code amendment following further review and consultation with the City Attorney. An amendment will be scheduled for a public hearing at an upcoming Planning and Zoning Commission meeting.

The 206 Legion Road property is five acres in size. Each of the parcels in the Meadow Valley Farms subdivision has at least two acres, which is the minimum lot size in the CE district. Mr. Forinash proposes the placement of a 21.84 kW ground-mount array just west of an existing accessory structure. The west half of the property is very wooded, though there are few trees in the east half. Mr. Forinash has proposed placing an 8'1"-high ground-mount array within the rear yard. The arrays would be approximately 15 feet from the accessory structure and 65 feet from the subject property's principal structure. The proposed array would be located 30 feet from the south side property line, 357 feet from the west property line, and 307 feet from the east property line. The nearest house at 212 Legion would be approximately 165 feet from the proposed array. It would be about 335 feet to the house at 218 Legion and 350 feet to the house at 200 Legion.

As was the case with the recent consideration of a variance request for a ground-mount array at 1505 Pine Tree Drive, it is difficult to firmly judge whether its location on a larger lot would pose any issues with adjacent properties given that ground-mount arrays are currently prohibited. There is a relatively large distance between the proposed array and the adjacent property lines and principal structures. There is not much of a vegetation barrier between the properties to the north and south. The proposed array would primarily be shielded from both of the neighboring principal structures by other structures. Mr. Forinash has proposed on his application to plant trees to the east of the array to reduce any aesthetic impact. There do not appear to be any trees that would restrict the placement of roof-mount arrays. A property of this size would almost certainly meet a minimum lot size for the potential future allowance for residential ground-mount arrays, though. Given the tabling of a similar variance request at 1505 Pine Tree, **staff recommends tabling this variance request until it can be considered in context with the drafting of a future zoning code text amendment pertaining to residential ground-mount arrays**.

A public hearing will be held by the Planning and Zoning Commission at their meeting on Wednesday, September 6, 2023. Please note that the PZC is an advisory body for this particular case and its recommendation will be given to the City Council.

CITY OF WASHINGTON, ILLINOIS

APPLICATION FOR VARIANCE

To have a complete application for a variance, you must submit the following:

- Signed and completed application
- Plat showing subject property and proposed site improvements
- Ownership documentation (lease, deed, mortgage, etc.)
- Application fee of $100 payable to the City of Washington

Name(s) of Applicant(s): Aaron Forinash

Phone Number of Applicant: [redacted]

Address of Applicant: 206 Legion Rd

Owner of Property: Aaron Forinash

Address of Owner: 206 Legion Rd

I would like to receive correspondence by: ☐ Mail ☑ Email Email Address: [redacted]

Property Tax ID (PIN) number: 02-02-21-300-009

Current zoning classification of the property: Residential Current use of the property: Primary Household

Describe how your property cannot yield a reasonable return, if it is required to be used only under the general conditions of your zoning classification:

Current dwelling will not support 100% of solar generation from roof mounted panels.

To the best of your knowledge, can you affirm that the hardship described above was not created by an action of anyone having property interests in the land after the Zoning Ordinance became law? Yes ☑ No ☐

If "no," explain why the hardship should not be regarded as self-imposed. (Self-imposed hardships are NOT entitled to variations.)

Describe how your situation is unique or different from any other property:

My property is 5 acres within the city limits. The placement of the groud mount solar array will fit wtih no issues in regards to set back and be minimally visable from the road or neighbors

Describe the alteration or change, if any, in the basic character of the neighborhood the variation, if granted, would make:

Only 2 neighbors will see the ground mount array, both agree that there is no issue with the placement of the panels. Trees will be added to road side of the array post installation to aid in aesthetics.

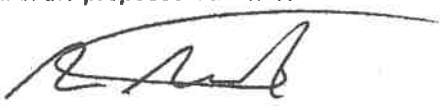
Describe the nature of the variation you are requesting (*attach dimensioned site plan*):

Seeking variation to install ground mount solar array on the south side of my outbuilding.

PUBLIC HEARING: Your case will be referred with staff's recommendation to the next regularly scheduled Planning and Zoning Commission (PZC) meeting for a public hearing. The PZC meets the first Wednesday of every month at 6:30 p.m. at the Washington District Library meeting room at 380 N. Wilmor Road. At the PZC meeting, you will present your request. A variance cannot be granted by the PZC unless the PZC finds, based upon the application and evidence presented at the public hearing, that a strict application of the terms of the Zoning Ordinance imposes practical difficulties or particular hardship. The following are examples of variances that can be granted:

1. To permit the extension of a district where the boundary line of a district divides a lot in single ownership as shown of record.
2. To permit the reconstruction of a nonconforming building which has been destroyed or damaged to an extent of more than fifty percent (50%) of its value, by fire or act of God, or the public enemy, where the PZC shall find some compelling public necessity requiring a continuance of the nonconforming use, but in no case shall such a permit be issued if its primary function is to continue a monopoly.
3. To make a variance, by reason of exceptional narrowness, shallowness or shape of a specific piece of property of record, or by reason of exceptional topographical conditions the strict application of any provision of this chapter would result in peculiar and exceptional practical difficulties or particular hardship upon the owner of such property, and amount to a practical confiscation of property, as distinguished from a mere inconvenience to such owner, provided such relief can be granted without substantial detriment to the public good and without substantially impairing the general purpose and intent of the comprehensive plan as established by the regulations and provisions contained in the Zoning Ordinance.
4. To interpret the provisions of this chapter where the street layout actually on the ground varies from the street layout as shown on the district map fixing the several districts.
5. To waive the parking requirements in the business or industrial districts whenever the character or use of the building is such as to make unnecessary the full provision of parking facilities or where such regulations would impose an unreasonable hardship upon the use of the lot, as contrasted with merely granting an advantage or convenience.
6. To permit a building to be erected, reconstructed, altered, or enlarged so that the building lines would extend beyond the distance specific in this chapter into side yards or into front yards; provided that such variance may not be granted:
    a. Unless there is a building in the block that extends beyond the distance from the front street line specified in this chapter, in which case the building line may be permitted to extend as near to the front street line as such nonconforming building;
    b. Unless the lot is irregular in shape, topography, or size; or
    c. Unless the street line of the lot is directly opposite the street line of a lot which is irregular in shape, topography, or size.
7. To permit in any district such modifications of the requirements of the regulations of this chapter as the Board may deem necessary to secure all appropriate development of a lot where adjacent to such lot on two or more sides there are buildings that do not conform to the regulations of the district.

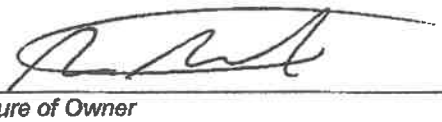
Certification: *To the best of my knowledge, the information contained herein, and on the attachments, is true, accurate, and correct, and substantially represents the existing features and proposed features. Any error, misstatement, or misrepresentation of material fact or expression of material fact, with or without intention, shall constitute sufficient grounds for the revocation or denial of the proposed Variance.*



Signature of Applicant

8/2/23

Date



Signature of Owner

Date

After receiving a completed application, the City Clerk will file notice of your request with the local newspaper and with the adjoining property owners. If you have any questions, please contact Aaron Paque, Planner, at (309) 444-1122.

Tazewell County, Illinois

generated on 8/30/2023 3:11:42 PM CDT

Parcel

Parcel ID	Alt. PIN	Parcel Address	Data as of
02-02-21-300-009		206 LEGION RD, WASHINGTON	8/26/2023

Tax Payer Information

Tax Payer	FORINASH AARON M
Tax Payer Address	206 LEGION RD WASHINGTON IL 615710000
Transfer Date	03/01/2022

Location Information

GIS		**Section & Plat**	
District No.	02014	**State Assigned District No.**	020
Township No.	002,	**Routing No.**	
Parcel Address	206 LEGION RD, WASHINGTON	**Legal Desc.**	SEC 21 T26N R3W MEADOW VALLEY FARMS SUB SEC 1 LOT 3 SW 1/4 5.00 AC

Parcel Information

Property Class Code	40 IMPROVED RESIDENTIAL LOT
Neighborhood Code	209
Neighborhood Factor	105.00
Neighborhood Type	
Street or Road Code	

Topography

Level	N
High	N
Low	N
Rolling	N
Swampy	N
Flood Hazard	
Waterfront Property Type	

Services

Water	
Sewer	
Gas	
Electricity	N
Sidewalk	
Alley	N

NEW PV SYSTEM: 21.840 kWp

FORINASH RESIDENCE

206 LEGION RD
WASHINGTON, IL 61571
ASSESSOR'S #: 020221300009

GENERAL NOTES

1.1.1 PROJECT NOTES:
1.1.2 THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (NEC) ARTICLE 690, ALL MANUFACTURERS'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION'S (AHJ) APPLICABLE CODES.
1.1.3 THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION
1.1.4 ALL PV SYSTEM COMPONENTS; MODULES, UTILITY-INTERACTIVE INVERTERS, AND SOURCE CIRCUIT COMBINER BOXES ARE IDENTIFIED AND LISTED FOR USE IN PHOTOVOLTAIC SYSTEMS AS REQUIRED BY NEC 690.4: PV MODULES: UL1703, IEC61730, AND IEC61215, AND NFPA 70 CLASS C FIRE INVERTERS: UL 1741 CERTIFIED, IEEE 1547, 929, 519 COMBINER BOX(ES): UL 1703 OR UL 1741 ACCESSORY
1.1.5 MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC. IF UNAVAILABLE, MAX DC VOLTAGE CALCULATED ACCORDING TO NEC 690.7.
1.1.6 ALL INVERTERS, PHOTOVOLTAIC MODULES, PHOTOVOLTAIC PANELS, AND SOURCE CIRCUIT COMBINERS INTENDED FOR USE IN A PHOTOVOLTAIC POWER SYSTEM WILL BE IDENTIFIED AND LISTED FOR THE APPLICATION PER 690.4 (D). SHALL BE INSTALLED ACCORDING TO ANY INSTRUCTIONS FROM LISTING OR LABELING [NEC 110.3].
1.1.7 ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.

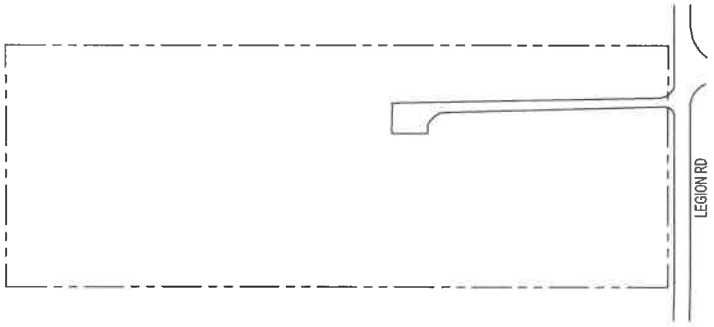
1.2.1 SCOPE OF WORK:
1.2.2 PRIME CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND SPECIFICATIONS OF THE GRID-TIED PHOTOVOLTAIC SYSTEM RETROFIT. PRIME CONTRACTOR WILL BE RESPONSIBLE FOR COLLECTING EXISTING ONSITE REQUIREMENTS TO DESIGN, SPECIFY, AND INSTALL THE GROUND MOUNT ARRAY PORTION OF THE PHOTOVOLTAIC SYSTEMS DETAILED IN THIS DOCUMENT.

1.3.1 WORK INCLUDES:
1.3.2 PV GROUND MOUNT SYSTEM INSTALLATION - SUNMODO GROUND MOUNT SYSTEM - SUNTURF
1.3.3 PV MODULE AND INVERTER INSTALLATION - JINKO SOLAR JKM455M-7RL3-TV / ENPHASE IQ8H-240-72-2-US (240V)
1.3.4 PV EQUIPMENT GROUNDING
1.3.5 PV LOAD CENTERS (IF INCLUDED)
1.3.6 PV METERING/MONITORING (IF INCLUDED)
1.3.7 PV DISCONNECTS
1.3.8 PV GROUNDING ELECTRODE & BONDING TO (E) GEC
1.3.9 PV FINAL COMMISSIONING
1.3.10 (E) ELECTRICAL EQUIPMENT RETROFIT FOR PV
1.3.11 SIGNAGE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE
1.3.12 TRENCHING (IF NECESSARY)

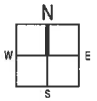
SCOPE OF WORK

SYSTEM SIZE:	STC: 48 X 455W = 21.840KW
	PTC: 48 X 429.52W = 20.617KW
	(48) JINKO SOLAR JKM455M-7RL3-TV
	(48) ENPHASE IQ8H-240-72-2-US (240V)
ATTACHMENT TYPE:	SUNMODO GROUND MOUNT SYSTEM - SUNTURF
MSP UPGRADE:	NO

01 AERIAL PHOTO
NOT TO SCALE



02 PLAT MAP
NOT TO SCALE



SHEET LIST TABLE

PROJECT INFORMATION

OWNER
NAME: AARON FORINASH

PROJECT MANAGER
NAME: ASHLI LAWLER
PHONE: 4806164545

CONTRACTOR
NAME: ILLINOIS SOLAR SERVICES
PHONE: 309-444-0982

AUTHORITIES HAVING JURISDICTION
BUILDING: WASHINGTON, IL
ZONING: WASHINGTON, IL
UTILITY: AMEREN

DESIGN SPECIFICATIONS
OCCUPANCY: II
CONSTRUCTION: SINGLE-FAMILY
ZONING: RESIDENTIAL
GROUND SNOW LOAD: 20 PSF
WIND EXPOSURE: B
WIND SPEED: 115 MPH

APPLICABLE CODES & STANDARDS
BUILDING: IBC 2018, IRC 2018
ELECTRICAL: NEC 2017
FIRE: IFC 2018

ILLINOIS SOLAR SERVICES

CONTRACTOR

ILLINOIS SOLAR SERVICES

PHONE: 309-444-0982
ADDRESS: 1412 WILLOW DR, WASHINGTON, IL 61571

LIC. NO.:
HIC. NO.:
ELE. NO.:

NEW PV SYSTEM: 21.840 kV

FORINASH RESIDENCE

206 LEGION RD
WASHINGTON, IL 61571
APN: 020221300009

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

COVER PAGE

DATE: 04.04.2023
DESIGN BY: E.T.
CHECKED BY: M.M.

REVISIONS

T-001.00
(SHEET 1)

2.1.1 SITE NOTES:

2.1.2 THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.

2.1.3 THE SOLAR PV INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING OR MECHANICAL.

2.1.4 PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION NEC 110.26.

2.2.1 EQUIPMENT LOCATIONS

2.2.2 ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY NEC 110.26.

2.2.3 WIRING SYSTEMS INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC 690.31 (A),(C) AND NEC TABLE 310.15 (B)(2)(A).

2.2.4 JUNCTION AND PULL BOXES PERMITTED INSTALLED UNDER PV MODULES ACCORDING TO NEC 690.34.

2.2.5 ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVICING DISCONNECT.

2.2.6 ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES.

2.2.7 ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.

2.2.8 SOLAR ARRAY LOCATION SHALL BE ADJUSTED ACCORDINGLY TO MEET LOCAL SETBACK REQUIREMENTS.

2.3.1 STRUCTURAL NOTES:

2.3.2 RACKING SYSTEM & PV ARRAY WILL BE INSTALLED ACCORDING TO CODE-COMPLIANT INSTALLATION MANUAL. TOP CLAMPS REQUIRE A DESIGNATED SPACE BETWEEN MODULES, AND RAILS MUST ALSO EXTEND A MINIMUM DISTANCE BEYOND EITHER EDGE OF THE ARRAY/SUBARRAY, ACCORDING TO RAIL MANUFACTURER'S INSTRUCTIONS.

2.3.3 JUNCTION BOX WILL BE INSTALLED PER MANUFACTURERS' SPECIFICATIONS. IT SHALL BE SEALED PER LOCAL REQUIREMENTS.

2.3.4 ALL PV RELATED ATTACHMENTS TO BE SPACED NO GREATER THAN THE SPAN DISTANCE SPECIFIED BY THE RACKING MANUFACTURER.

2.4.1 GROUNDING NOTES:

2.4.2 GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVICES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR SUCH USE.

2.4.3 PV SYSTEMS REQUIRE AN EQUIPMENT GROUNDING CONDUCTOR. ALL METAL ELECTRICAL EQUIPMENT AND STRUCTURAL COMPONENTS BONDED TO GROUND, IN ACCORDANCE WITH 250.134 OR 250.136(A). ONLY THE DC CONDUCTORS ARE UNGROUNDED.

2.4.4 PV EQUIPMENT SHALL BE GROUNDED ACCORDING TO NEC 690.43 AND MINIMUM NEC TABLE 250.122.

2.4.5 METAL PARTS OF MODULE FRAMES, MODULE RACKING, AND ENCLOSURE CONSIDERED GROUNDED IN ACCORD WITH 250.134 AND 250.136(A).

2.4.6 EACH MODULE WILL BE GROUNDED USING WEEB GROUNDING CLIPS AS SHOWN IN MANUFACTURER DOCUMENTATION AND APPROVED BY THE AHJ. IF WEEBS ARE NOT USED, MODULE GROUNDING LUGS MUST BE INSTALLED AT THE SPECIFIED GROUNDING LUG HOLES PER THE MANUFACTURERS' INSTALLATION REQUIREMENTS.

2.4.7 THE GROUNDING CONNECTION TO A MODULE SHALL BE ARRANGED SUCH THAT THE REMOVAL OF A MODULE DOES NOT INTERRUPT A GROUNDING CONDUCTOR TO ANOTHER MODULE.

2.4.8 GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLORED GREEN OR MARKED GREEN IF #4 AWG OR LARGER [NEC 250.119]

2.4.9 THE GROUNDING ELECTRODE SYSTEM COMPLIES WITH NEC 690.47 AND NEC 250.50 THROUGH 250.106. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, A GROUNDING ELECTRODE SYSTEM PROVIDED ACCORDING TO NEC 250, NEC 690.47 AND AHJ.

2.4.10 DC PV ARRAYS SHALL BE PROVIDED WITH DC GROUND-FAULT PROTECTION MEETING THE REQUIREMENTS OF 690.41(B)(1) AND (2) TO REDUCE FIRE HAZARDS.

2.5.1 INTERCONNECTION NOTES:

2.5.2 LOAD-SIDE INTERCONNECTION SHALL BE IN ACCORDANCE WITH [NEC 705.12 (B)]

2.5.3 THE SUM OF 125 PERCENT OF THE POWER SOURCE(S) OUTPUT CIRCUIT CURRENT AND THE RATING OF THE OVERCURRENT DEVICE PROTECTING THE BUSBAR SHALL NOT EXCEED 120 PERCENT OF THE AMPACITY OF THE BUSBAR, PV DEDICATED BACKFEED BREAKERS MUST BE LOCATED OPPOSITE END OF THE BUS FROM THE UTILITY SOURCE OCPD [NEC 705.12(B)(2)(3)].

2.5.4 AT MULTIPLE ELECTRIC POWER SOURCES OUTPUT COMBINER PANEL, TOTAL RATING OF ALL OVERCURRENT DEVICES SHALL NOT EXCEED AMPACITY OF BUSBAR. HOWEVER, THE COMBINED OVERCURRENT DEVICE MAY BE EXCLUDED ACCORDING TO NEC 705.12 (B)(2)(3)(C).

2.5.5 FEEDER TAP INTERCONNECTION (LOAD SIDE) ACCORDING TO NEC 705.12 (B)(2)(1)

2.5.6 SUPPLY SIDE TAP INTERCONNECTION ACCORDING TO NEC 705.12 (A) WITH SERVICE ENTRANCE CONDUCTORS IN ACCORDANCE WITH NEC 230.42

2.5.7 BACKFEEDING BREAKER FOR ELECTRIC POWER SOURCES OUTPUT IS EXEMPT FROM ADDITIONAL FASTENING [NEC 705.12 (B)(5)].

2.6.1 DISCONNECTION AND OVER-CURRENT PROTECTION NOTES:

2.6.2 DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING ENERGIZED ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS).

2.6.3 DISCONNECTS TO BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH.

2.6.4 BOTH POSITIVE AND NEGATIVE PV CONDUCTORS ARE UNGROUNDED. THEREFORE BOTH MUST OPEN WHERE A DISCONNECT IS REQUIRED, ACCORDING TO NEC 690.13.

2.6.5 ISOLATING DEVICES OR EQUIPMENT DISCONNECTING MEANS SHALL BE INSTALLED IN CIRCUITS CONNECTED TO EQUIPMENT AT A LOCATION WITHIN THE EQUIPMENT, OR WITHIN SIGHT AND WITHIN 10 FT. OF THE EQUIPMENT. AN EQUIPMENT DISCONNECTING MEANS SHALL BE PERMITTED TO BE REMOTE FROM THE EQUIPMENT WHERE THE EQUIPMENT DISCONNECTING MEANS CAN BE REMOTELY OPERATED FROM WITHIN 10 FT. OF THE EQUIPMENT, ACCORDING TO NEC 690.15 (A).

2.6.6 PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION TO REDUCE SHOCK HAZARD FOR EMERGENCY RESPONDERS IN ACCORDANCE WITH 690.12(A) THROUGH (D)

2.6.7 ALL OCPD RATINGS AND TYPES SPECIFIED ACCORDING TO NEC 690.8, 690.9, AND 240.

2.6.8 BOTH POSITIVE AND NEGATIVE PV CONDUCTORS ARE UNGROUNDED, THEREFORE BOTH REQUIRE OVER-CURRENT PROTECTION, ACCORDING TO NEC 240.21. (SEE EXCEPTION IN NEC 690.9)

2.6.9 IF REQUIRED BY AHJ, SYSTEM WILL INCLUDE ARC-FAULT CIRCUIT PROTECTION ACCORDING TO NEC 690.11 AND UL1699B.

2.7.1 WIRING & CONDUIT NOTES:

2.7.2 ALL CONDUIT AND WIRE WILL BE LISTED AND APPROVED FOR THEIR PURPOSE. CONDUIT AND WIRE SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING.

2.7.3 ALL CONDUCTORS SIZED ACCORDING TO NEC 690.8, NEC 690.7.

2.7.4 EXPOSED PV SOURCE CIRCUITS AND OUTPUT CIRCUITS SHALL USE WIRE LISTED AND IDENTIFIED AS PHOTOVOLTAIC (PV) WIRE [690.31 (C)]. PV MODULES WIRE LEADS SHALL BE LISTED FOR USE ON PV ARRAYS, ACCORDING TO NEC 690.31 (A).

2.7.5 PV WIRE BLACK WIRE MAY BE FIELD-MARKED WHITE [NEC 200.6 (A)(6)].

2.7.6 MODULE WIRING SHALL BE LOCATED AND SECURED UNDER THE ARRAY.

2.7.7 ACCORDING TO NEC 200.7, UNGROUNDED SYSTEMS DC CONDUCTORS COLORED OR MARKED AS FOLLOWS:

DC POSITIVE- RED, OR OTHER COLOR EXCLUDING WHITE, GRAY AND GREEN

DC NEGATIVE- BLACK, OR OTHER COLOR EXCLUDING WHITE, GRAY AND GREEN

2.7.8 AC CONDUCTORS COLORED OR MARKED AS FOLLOWS:

PHASE A OR L1- BLACK

PHASE B OR L2- RED, OR OTHER CONVENTION IF THREE PHASE

PHASE C OR L3- BLUE, YELLOW, ORANGE*, OR OTHER CONVENTION

NEUTRAL- WHITE OR GRAY

* IN 4-WIRE DELTA CONNECTED SYSTEMS THE PHASE WITH HIGHER VOLTAGE TO BE MARKED ORANGE [NEC 110.15].

2.7.9 ELECTRICAL WIRES IN TRENCH SHALL BE AT LEAST 18IN. BELOW GRADE (RESIDENTIAL).

ILLINOIS SOLAR SERVICES

CONTRACTOR

ILLINOIS SOLAR SERVICES

PHONE: 309-444-0982

ADDRESS: 1412 WILLOW DR, WASHINGTON, IL 61571

LIC. NO.:

HIC. NO.:

ELE. NO.:

NEW PV SYSTEM: 21.840 kV

FORINASH RESIDENCE

206 LEGION RD
WASHINGTON, IL 61571
APN: 020221300009

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

NOTES

DATE: 04.04.2023

DESIGN BY: E.T.

CHECKED BY: M.M.

REVISIONS

G-001.00

(SHEET 2)

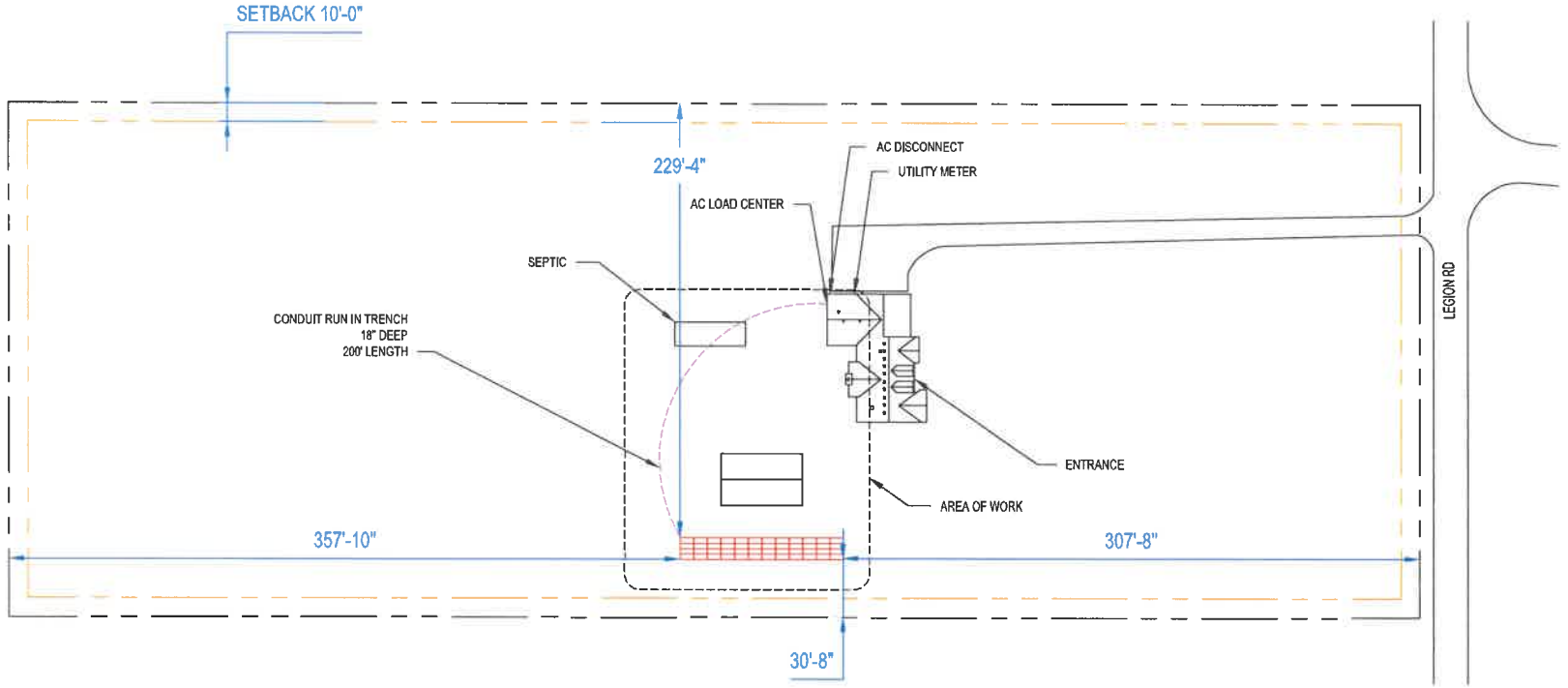
GENERAL NOTES

1. FIELD VERIFY ALL MEASUREMENTS

PROPERTY LINE

SETBACK LINE

CONDUIT



01 SITE PLAN

1/32" = 1'-0"

0 16' 32'

N W E S

ILLINOIS SOLAR SERVICES

CONTRACTOR

ILLINOIS SOLAR SERVICES

PHONE: 309-444-0982

ADDRESS: 1412 WILLOW DR, WASHINGTON, IL 61571

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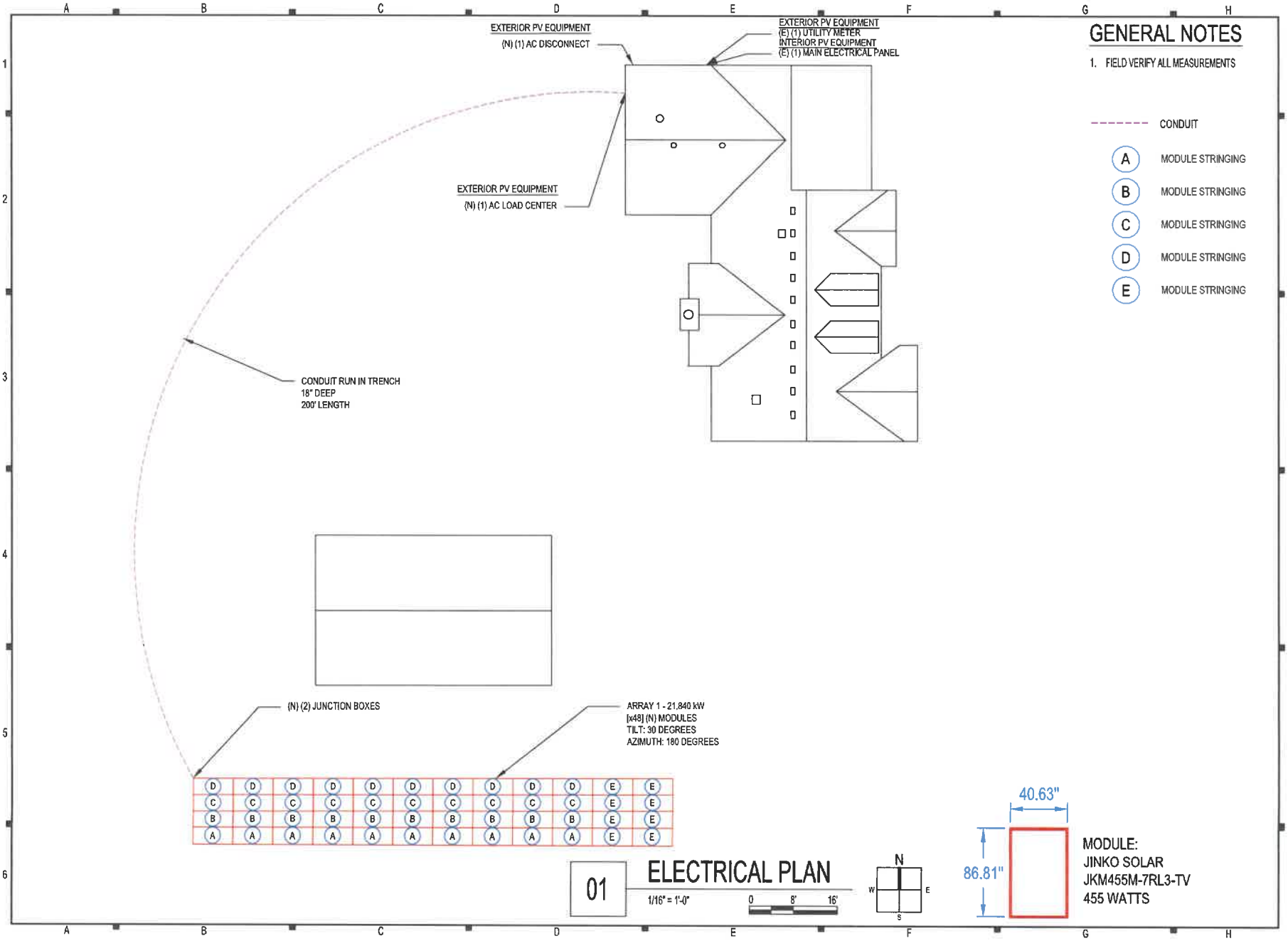
A-101.00

(SHEET 3)



GENERAL NOTES

1. FIELD VERIFY ALL MEASUREMENTS

CONDUIT

- A — MODULE STRINGING
- B — MODULE STRINGING
- C — MODULE STRINGING
- D — MODULE STRINGING
- E — MODULE STRINGING

01 **ELECTRICAL PLAN**

1/16" = 1'-0"

0 8' 16'

N W E S

MODULE:
JINKO SOLAR
JKM455M-7RL3-TV
455 WATTS

ILLINOIS SOLAR SERVICES

CONTRACTOR

ILLINOIS SOLAR SERVICES

PHONE: 309-444-0982

ADDRESS: 1412 WILLOW DR,
WASHINGTON, IL 61571

LIC. NO.:
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ELE. NO.:

NEW PV SYSTEM: 21.840 kV

FORINASH RESIDENCE

206 LEGION RD
WASHINGTON, IL 61571
APN: 020221300009

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

ELECTRICAL PLAN

DATE: 04.04.2023

DESIGN BY: E.T.

CHECKED BY: M.M.

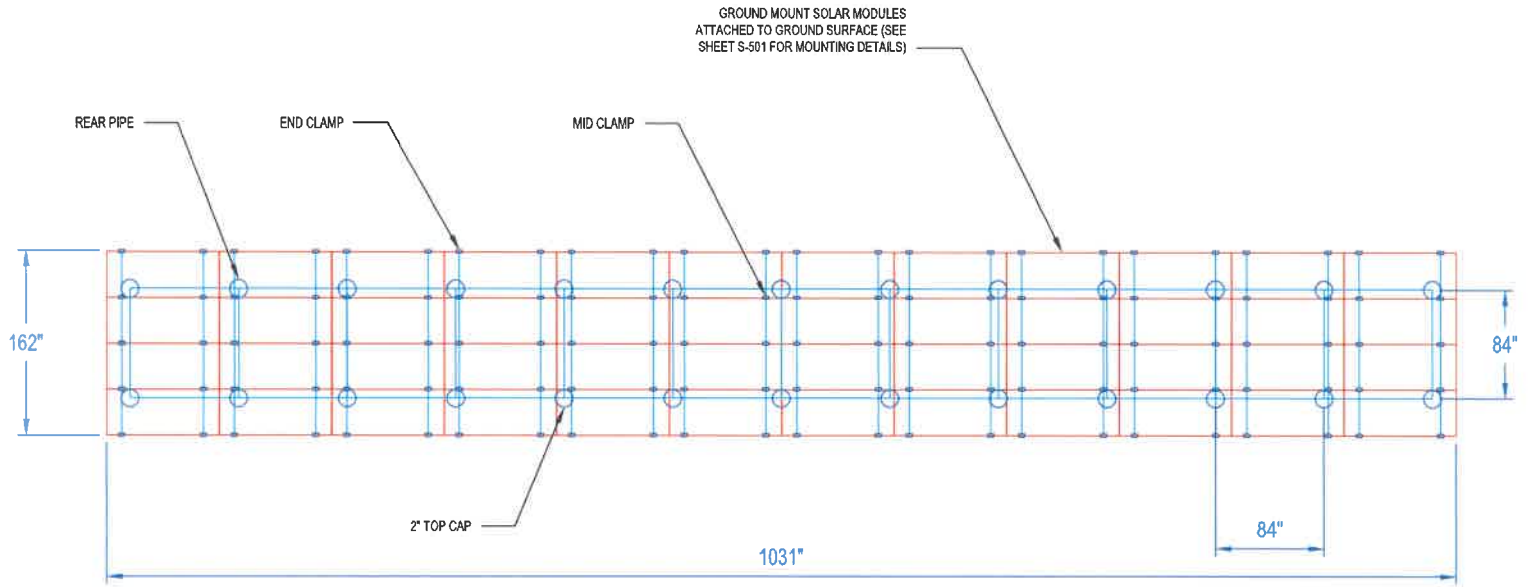
REVISIONS

A-102.00

(SHEET 4)

GENERAL NOTES

1. FIELD VERIFY ALL MEASUREMENTS

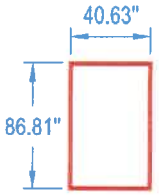


01 **SOLAR ATTACHMENT PLAN**

1/8" = 1'-0"

0 4' 8'

N W E S



MODULE:
JINKO SOLAR
JKM455M-7RL3-TV
455 WATTS

ILLINOIS SOLAR SERVICES

CONTRACTOR

ILLINOIS SOLAR SERVICES

PHONE: 309-444-0982

ADDRESS: 1412 WILLOW DR,
WASHINGTON, IL 61571

LIC. NO.:
HIC. NO.:
ELE. NO.:

NEW PV SYSTEM: 21.840 kV

FORINASH RESIDENCE

206 LEGION RD
WASHINGTON, IL 61571
APN: 020221300009

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

SOLAR ATTACHMENT PLA

DATE: 04.04.2023

DESIGN BY: E.T.

CHECKED BY: M.M.

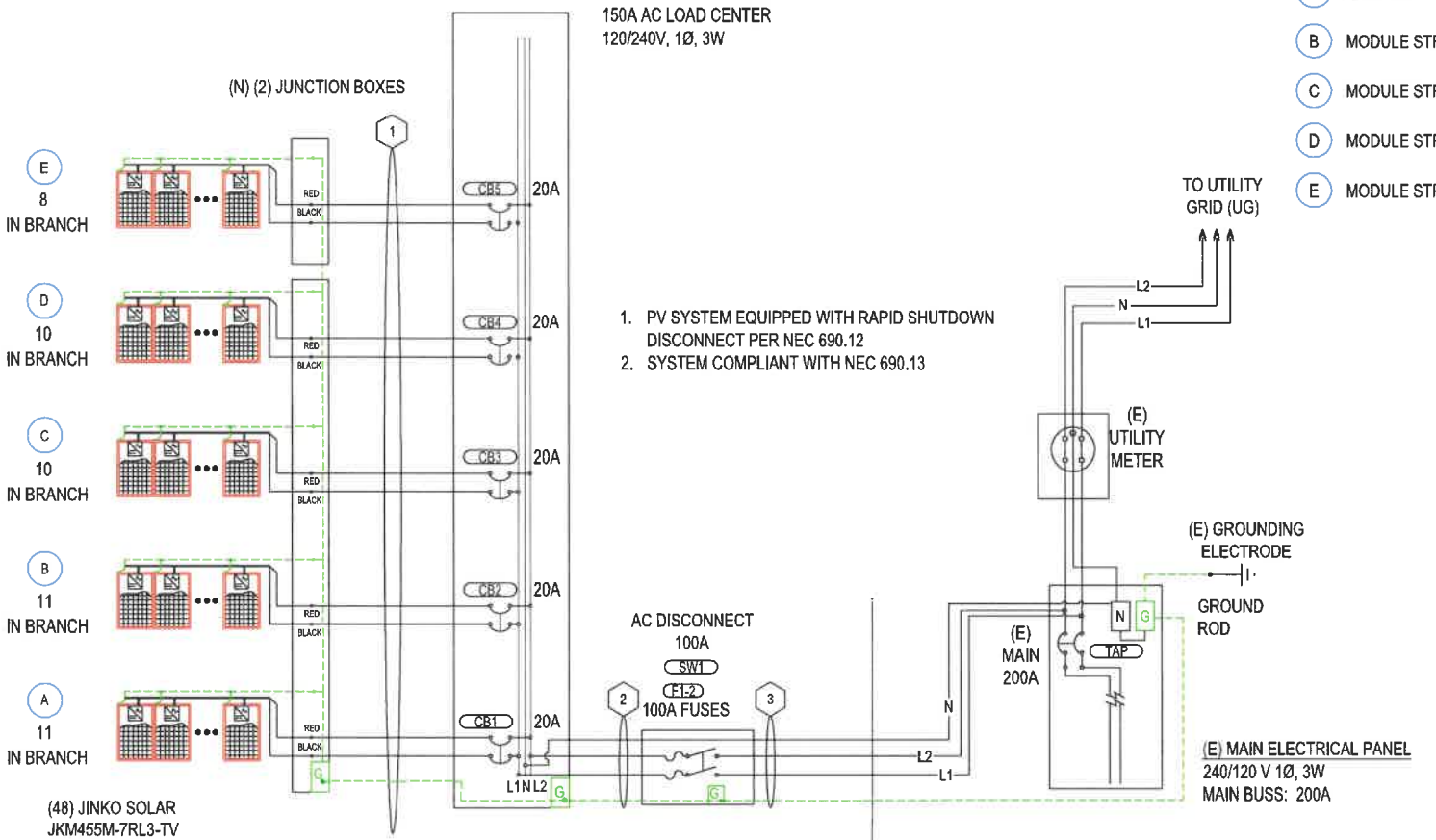
REVISIONS

A-103.00

(SHEET 5)

CONDUCTOR AND CONDUIT SCHEDULE W/ELECTRICAL CALCULATIONS

ID	TYPICAL	CONDUCTOR	CONDUIT	CURRENT-CARRYING CONDUCTORS IN CONDUIT	OCPD	EGC	TEMP. CORR. FACTOR	CONDUIT FILL FACTOR	CONT. CURRENT	MAX. CURRENT (125%)	BASE AMP.	DERATED AMP.	TERM. TEMP. RATING	AMP. @ TERMINAL
1	2	6 AWG THWN-2, COPPER	0.75" DIA PVC-40	8	20A	6 AWG THWN-2, COPPER	0.96 (33.6 °C)	0.7	15.8A	19.75A	75A	50.4A	75°C	65A
2	1	3 AWG THWN-2, COPPER	1.25" DIA PVC-40	2	100A	3 AWG THWN-2, COPPER	0.96 (33.6 °C)	1	75.84A	94.8A	115A	110.4A	75°C	100A
3	1	3 AWG THWN-2, COPPER	1.25" DIA PVC-40	2	N/A	3 AWG THWN-2, COPPER	0.96 (33.6 °C)	1	75.84A	94.8A	115A	110.4A	75°C	100A



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ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

LINE DIAGRAM

DATE: 04.04.2023

DESIGN BY: E.T.

CHECKED BY: M.M.

REVISIONS

E-601.00

(SHEET 6)

SYSTEM SUMMARY					
	BRANCH #1	BRANCH #2	BRANCH #3	BRANCH #4	BRANCH #5
INVERTERS PER BRANCH	10	10	10	10	8
MAX AC CURRENT	15.8A	15.8A	15.8A	15.8A	12.64A
MAX AC OUTPUT POWER	3,800W	3,800W	3,800W	3,800W	3,040W
ARRAY STC POWER	21,840W				
ARRAY PTC POWER	20,617W				
MAX AC CURRENT	75.84A				
MAX AC POWER	18,240W				
DERATED (CEC) AC POWER	18,240W				

MODULES										
REF.	QTY.	MAKE AND MODEL	PMAX	PTC	ISC	IMP	VOC	VMP	TEMP. COEFF. OF VOC	FUSE RATING
PM1-48	48	JINKO SOLAR JKM455M-7RL3-TV	455W	429.52W	11.26A	10.52A	51.8V	43.25V	-0.145V/°C (-0.28%/°C)	25A

INVERTERS										
REF.	QTY.	MAKE AND MODEL	AC VOLTAGE	GROUND	OCPD RATING	RATED POWER	MAX OUTPUT CURRENT	MAX INPUT CURRENT	MAX INPUT VOLTAGE	CEC WEIGHTED EFFICIENCY
I1-48	48	ENPHASE IQ8H-240-72-2-US	240V	FLOATING	20A	380W	1.58A	15A	60V	97.0%

DISCONNECTS				
REF.	QTY.	MAKE AND MODEL	RATED CURRENT	MAX RATED VOLTAGE
SW1	1	EATON DG223NRB OR EQUIV.	100A	240VAC

OCPDS			
REF.	QTY.	RATED CURRENT	MAX VOLTAGE
CB1-5	5	20A	240VAC
F1-2	2	100A	240VAC

ASHRAE EXTREME LOW	-27.2°C (-17.0°F), SOURCE: GREATER PEORIA MUNI (40.67°; -89.68°)
ASHRAE 2% HIGH	33.6°C (92.5°F), SOURCE: GREATER PEORIA MUNI (40.67°; -89.68°)

ILLINOIS SOLAR SERVICES

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PAPER SIZE: 11" x 17" (ANSI B)

DESIGN TABLES

DATE: 04.04.2023

DESIGN BY: E.T.

CHECKED BY: M.M.

REVISIONS

E-602.00

(SHEET 7)

LABELING NOTES
1.1 LABELING REQUIREMENTS BASED ON THE 2017 NATIONAL ELECTRICAL CODE, INTERNATIONAL FIRE CODE 605.11, OSHA STANDARD 1910.145, ANSI Z535
1.2 MATERIAL BASED ON THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
1.3 LABELS TO BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED.
1.4 LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8" AND PERMANENTLY AFFIXED.
1.5 ALERTING WORDS TO BE COLOR CODED. "DANGER" WILL HAVE RED BACKGROUND; "WARNING" WILL HAVE ORANGE BACKGROUND; "CAUTION" WILL HAVE YELLOW BACKGROUND. [ANSI Z535]

WARNING
ELECTRICAL SHOCK HAZARD
TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL 1
AT EACH DISCONNECTING MEANS FOR PHOTOVOLTAIC EQUIPMENT (2" X 4").
[NEC 690.13].

WARNING
POWER SOURCE OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL 2
AT POINT OF INTERCONNECTION OVERCURRENT DEVICE (2" X 4").
[NEC 705.12(B)(2)(3)(B)].

PHOTOVOLTAIC SYSTEM AC DISCONNECT
RATED AC OUTPUT CURRENT 75.84 A
NOMINAL OPERATING AC VOLTAGE 240 V

LABEL 3
AT POINT OF INTERCONNECTION, MARKED AT DISCONNECTING MEANS (4" X 2").
[NEC 690.54]

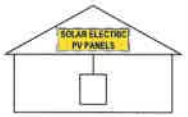
PHOTOVOLTAIC SOLAR AC DISCONNECT

LABEL 4
AT EACH AC DISCONNECTING MEANS (4" X 1").
[NEC 690.13(B)].

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

LABEL 5
AT RAPID SHUTDOWN DISCONNECT SWITCH (5 1/4" X 2").
[NEC 690.56(C)(3)].

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 ARRAY

LABEL 6
AT RAPID SHUTDOWN SYSTEM (3 3/4" X 5 1/4"). [NEC 690.56(C)(1)(A)].

WARNING
DUAL POWER SUPPLY
SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

LABEL 7
AT POINT OF INTERCONNECTION (2 3/4" X 1 5/8").
[NEC 705.12(B)(3)]

WARNING
SOLAR ELECTRIC CIRCUIT BREAKER IS BACKFED

LABEL 8
AT POINT OF INTERCONNECTION (2" X 1").
[NEC 705.12(B)(3)]

INTERACTIVE PHOTOVOLTAIC SYSTEM CONNECTED
PHOTOVOLTAIC SYSTEM DISCONNECT LOCATED NORTH SIDE OF THE HOUSE

DIRECTORY
PERMANENT PLAQUE OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS IF NOT IN THE SAME LOCATION (5 3/4" X 1 1/8").
[NEC 690.56(B)]

WHERE THE PV SYSTEMS ARE REMOTELY LOCATED FROM EACH OTHER, A DIRECTORY IN ACCORDANCE WITH 705.10 SHALL BE PROVIDED AT EACH PV SYSTEM DISCONNECTING MEANS.
PV SYSTEM EQUIPMENT AND DISCONNECTING MEANS SHALL NOT BE INSTALLED IN BATHROOMS
[NEC 690.4(D),(E)]

WARNING: PHOTOVOLTAIC POWER SOURCE

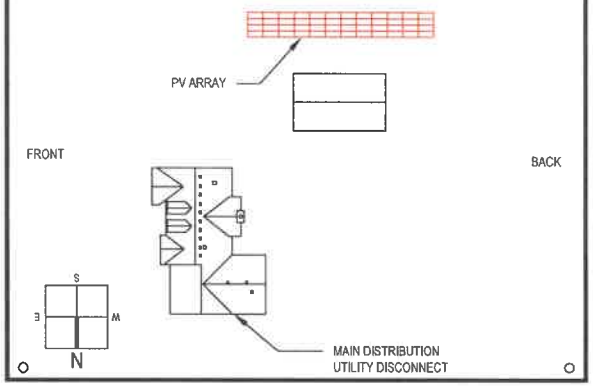
LABEL 9
AT EXPOSED RACEWAYS, CABLE TRAYS, AND OTHER WIRING METHODS; SPACED AT MAXIMUM 10 FT SECTION OR WHERE SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS (5 3/4" X 1 1/8").
[NEC 690.31(G)]
LETTERS AT LEAST 3/8 INCH; WHITE ON RED BACKGROUND; REFLECTIVE
[IFC 605.11.1.1]

CAUTION
SOLAR ELECTRIC SYSTEM CONNECTED

LABEL 10
AT UTILITY METER (5 3/4" X 1 1/8")
[NEC 690.56(B)]

!CAUTION!

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM GROUND MOUNTED SOLAR ARRAYS WITH SAFETY DISCONNECTS AS SHOWN:



ILLINOIS SOLAR SERVICES

CONTRACTOR

ILLINOIS SOLAR SERVICES
PHONE: 309-444-0982
ADDRESS: 1412 WILLOW DR, WASHINGTON, IL 61571
LIC. NO.:
HIC. NO.:
ELE. NO.:

NEW PV SYSTEM: 21.840 kV

FORINASH RESIDENCE

206 LEGION RD
WASHINGTON, IL 61571
APN: 020221300009

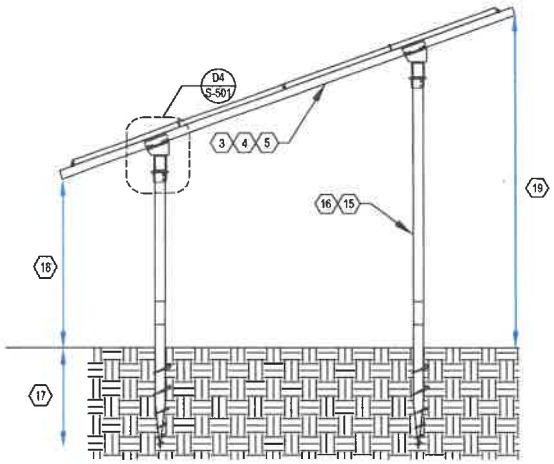
ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

PLACARDS

DATE: 04.04.2023
DESIGN BY: E.T.
CHECKED BY: M.M.
REVISIONS

E-603.00
(SHEET 8)

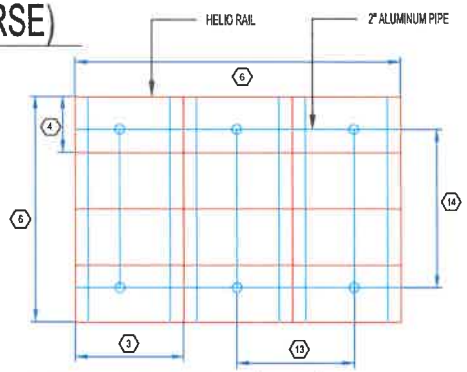


D1 RACKING DETAIL (TRANSVERSE)

NOT TO SCALE

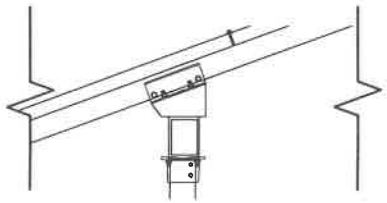
D2 RACKING DETAIL (LONGITUDINAL)

NOT TO SCALE



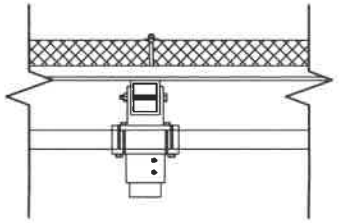
D3 RACKING DETAIL (TOP)

NOT TO SCALE



D4 DETAIL (TRANSVERSE)

NOT TO SCALE



D5 DETAIL (LONGITUDINAL)

NOT TO SCALE

GENERAL NOTES

1. FIELD VERIFY ALL MEASUREMENTS

SHEET KEYNOTES

1. MODULE MANUFACTURER: JINKO SOLAR
2. MODULE MODEL: JKM455M-7RL3-TV
3. MODULE LENGTH: 86.81"
4. MODULE WIDTH: 40.63"
5. MODULE WEIGHT: 55.12 LBS.
6. SEE SHEET A-103 FOR DIMENSION(S)
7. MIN. SETBACK REQUIREMENT: 10 FT.
8. FOUNDATION/ANCHOR TYPE: EARTH SCREW
9. TOTAL # OF FOUNDATION/ANCHOR: 26
10. TOTAL AREA: 1175.7 SQ. FT.
11. TOTAL WEIGHT: 3100.99 LBS.
12. WEIGHT PER ATTACHMENT: 119.27 LBS.
13. EAST/WEST SPACING: 84"
14. NORTH/SOUTH SPACING: 84"
15. RACKING MANUFACTURER (OR EQUIV.): SUNMODO
16. RACKING MODEL (OR EQUIVALENT): SUNTURF GROUND MOUNT SYSTEM
17. MIN. SCREW DEPTH
    FRONT : 63" REAR: 63"
18. FRONT CLEARANCE: 12 IN.
19. REAR CLEARANCE: 97 IN.

ILLINOIS SOLAR SERVICES

CONTRACTOR

ILLINOIS SOLAR SERVICES

PHONE: 309-444-0962

ADDRESS: 1412 WILLOW DR, WASHINGTON, IL 61571

LIC. NO.:
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ELE. NO.:

NEW PV SYSTEM: 21.840 kV

FORINASH RESIDENCE

206 LEGION RD
WASHINGTON, IL 61571
APN: 020221300009

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

ASSEMBLY DETAILS

DATE: 04.04.2023
DESIGN BY: E.T.
CHECKED BY: M.M.

REVISIONS

S-501.00
(SHEET 9)

www.jinkosolar.com

JinKO Solar
Building Your Trust in Solar

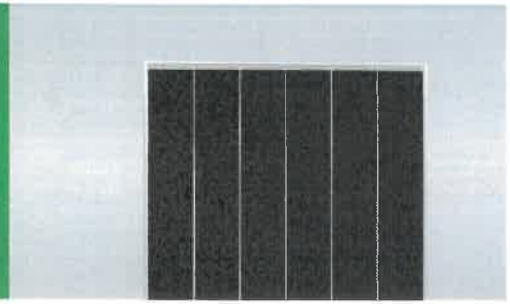
Tiger Bifacial
445-465 Watt

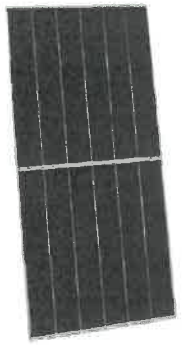
Tiling Ribbon (TR) Technology

Positive power tolerance of 0~+3%

ISO9001:2015, ISO14001:2015, ISO45001:2018 certified factory

IEC61215, IEC61730 certified product





KEY FEATURES

TR technology + Half Cell
TR technology with Half cell aims to eliminate the cell gap to increase module efficiency (bi-facial up to 20.43%)

9BB instead of 5BB
9BB technology decreases the distance between bus bars and finger grid line which is benefit to power increase.

Higher lifetime Power Yield
2.5% first year degradation,
0.55% linear degradation

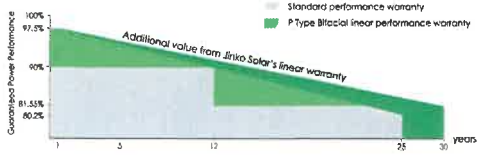
Best Warranty
12 year product warranty,
30 year linear power warranty

Avoid debris, cracks and broken gate risk effectively
9BB technology using circular ribbon that could avoid debris, cracks and broken gate risk effectively

Severe Weather Resilience
Certified to withstand: wind load (2400 Pascal) and snow load (5400 Pascal).

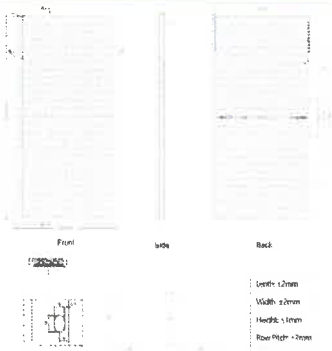
LINEAR PERFORMANCE WARRANTY

12 Year Product Warranty • 30 Year Linear Power Warranty
0.55% Annual Degradation Over 30 years



PV CYCLE · CE · POSITIVE QUALITY · CLEAN ENERGY COUNCIL MEMBER

Engineering Drawings

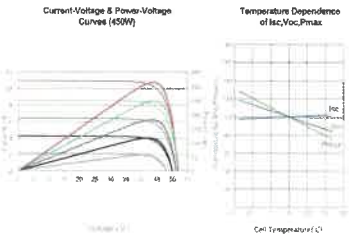


Packaging Configuration

(Two pallets = One stack)

31pcs/pallets, 62pcs/stack, 620pcs/40'HQ Container

Electrical Performance & Temperature Dependence



Mechanical Characteristics

Cell Type	P type Mono-crystalline
No.of cells	156 (2×78)
Dimensions	2205×1032×35mm (86.81×40.63×1.38 inch)
Weight	25.0 kg (55.12 lbs)
Front Glass	3.2mm,Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP67 Rated
Output Cables	TUV 1×4.0mm², (+) 250mm, (-) 150 mm or Customized Length

SPECIFICATIONS

Module Type	JKM445M-7RL3-TV		JKM450M-7RL3-TV		JKM455M-7RL3-TV		JKM460M-7RL3-TV		JKM465M-7RL3-TV	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	445Wp	331Wp	450Wp	335Wp	455Wp	339Wp	460Wp	342Wp	465Wp	346Wp
Maximum Power Voltage (Vmp)	43.13V	39.51V	43.19V	39.62V	43.25V	39.73V	43.32V	39.84V	43.38V	39.95V
Maximum Power Current (Imp)	10.32A	8.38A	10.42A	8.45A	10.52A	8.52A	10.62A	8.58A	10.72A	8.68A
Open-circuit Voltage (Voc)	51.60V	48.70V	51.70V	48.80V	51.80V	48.89V	51.90V	48.99V	52.00V	49.08V
Short-circuit Current (Isc)	11.06A	8.86A	11.17A	9.02A	11.26A	9.09A	11.35A	9.17A	11.44A	9.24A
Module Efficiency STC (%)	19.56%		19.78%		20.00%		20.21%		20.43%	
Operating Temperature(°C)	-40°C~+85°C									
Maximum system voltage	1500VDC (IEC)									
Maximum series fuse rating	25A									
Power tolerance	0~+3%									
Temperature coefficients of Pmax	-0.35%/°C									
Temperature coefficients of Voc	-0.28%/°C									
Temperature coefficients of Isc	0.048%/°C									
Nominal operating cell temperature (NOCT)	45±2°C									
Refer. Bifacial Factor	70±5%									

BIFACIAL OUTPUT-REARSIDE POWER GAIN

5%	Maximum Power (Pmax)	467Wp	473Wp	478Wp	483Wp	488Wp
	Module Efficiency STC (%)	20.53%	20.78%	20.98%	21.23%	21.46%
15%	Maximum Power (Pmax)	512Wp	518Wp	523Wp	529Wp	535Wp
	Module Efficiency STC (%)	22.49%	22.74%	22.98%	23.25%	23.50%
25%	Maximum Power (Pmax)	556Wp	563Wp	569Wp	575Wp	581Wp
	Module Efficiency STC (%)	24.44%	24.72%	24.98%	25.27%	25.54%

*STC: Irradiance 1000W/m² Cell Temperature 25°C AM=1.5

NOCT: Irradiance 800W/m² Ambient Temperature 20°C AM=1.5 Wind Speed 1m/s

* Power measurement tolerance: ± 3%

ILLINOIS SOLAR SERVICES

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RESOURCE DOCUMENT

DATE: 04.04.2023

DESIGN BY: E.T.

CHECKED BY: M.M.

REVISIONS

R-001.00
(SHEET 10)

ENPHASE

DATA SHEET

IQ8 Series Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has super-fast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.

Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the Enphase IQ Battery, Enphase IQ Gateway, and the Enphase App monitoring and analysis software.

Enphase 25 year limited warranty

IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.

Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.

UL CERTIFIED

IQ8 Series Microinverters are UL Listed as PV Rapid Shut Down Equipment and conform with various regulations, when installed according to manufacturer's instructions.

Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

IQ8 Series Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US
Commonly used module pairings[1]	W	235 - 350	235 - 440	260 - 460	295 - 500	320 - 540+	295 - 500+
Module compatibility		60-cell/120 half-cell		60-cell/120 half-cell and 72-cell/144 half-cell			
MPPT voltage range	V	27 - 37	29 - 45	33 - 45	36 - 45	38 - 45	38 - 45
Operating range	V	25 - 48			25 - 58		
Min/max start voltage	V	30 / 48			30 / 58		
Max input DC voltage	V	50			60		
Max DC current[2] [module Isc]	A			15			
Overvoltage class DC port				II			
DC port backfeed current	mA			0			
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit					

OUTPUT DATA (AC)		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US
Peak output power	VA	245	300	330	366	384	366
Max continuous output power	VA	240	290	325	349	380	360
Nominal (L-L) voltage/range[4]	V			240 / 211 - 264			208 / 183 - 250
Max continuous output current	A	1.0	1.21	1.35	1.45	1.58	1.73
Nominal frequency	Hz			60			
Extended frequency range	Hz			50 - 68			
Max units per 20 A (L-L) branch circuit[5]		16	13	11	11	10	9
Total harmonic distortion				<5%			
Overvoltage class AC port				III			
AC port backfeed current	mA			30			
Power factor setting				1.0			
Grid-tied power factor (adjustable)				0.85 leading - 0.85 lagging			
Peak efficiency	%	97.5	97.6	97.6	97.6	97.6	97.4
CEC weighted efficiency	%	97	97	97	97.5	97	97
Night-time power consumption	mW			60			

MECHANICAL DATA	
Ambient temperature range	-40°C to +60°C (-40°F to +140°F)
Relative humidity range	4% to 100% (condensing)
DC Connector type	MC4
Dimensions (HxWxD)	212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")
Weight	1.08 kg (2.38 lbs)
Cooling	Natural convection - no fans
Approved for wet locations	Yes
Acoustic noise at 1 m	<60 dBA
Pollution degree	PD3
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure
Environ. category / UV exposure rating	NEMA Type 6 / outdoor

COMPLIANCE	
Certifications	CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.

(1) The IQ8H-208 variant will be operating in grid-tied mode only at 208V AC. (2) No enforced DC/AC ratio. See the compatibility calculator at https://link.enphase.com/module-compatibility (3) Maximum continuous input DC current is 10.6A (4) Nominal voltage range can be extended beyond nominal if required by the utility. (5) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

ILLINOIS SOLAR SERVICES

CONTRACTOR

ILLINOIS SOLAR SERVICES

PHONE: 309-444-0982

ADDRESS: 1412 WILLOW DR, WASHINGTON, IL 61571

LIC. NO.:
HIC. NO.:
ELE. NO.:

NEW PV SYSTEM: 21.840 kV

FORINASH RESIDENCE

206 LEGION RD
WASHINGTON, IL 61571
APN: 020221300009

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

RESOURCE DOCUMENT

DATE: 04.04.2023

DESIGN BY: E.T.

CHECKED BY: M.M.

REVISIONS

R-002.00

(SHEET 11)

SUNMODO

GO BIG ON TURF

SunTurf™ Ground Mount System

SunModo offers the next generation Ground Mount System with SunTurf™. The streamlined design combines the strength of Helio Rails with steel pipes to create the perfect ground mount solution.

SunTurf™ is ideal for solar installers looking for a durable and cost-effective system that can accommodate a wide variety of soil conditions.

The SunTurf™ Ground Mount Advantage

- ✓ Easily scalable from kilowatts to multimegawatts PV Arrays.
- ✓ Foundation design solution for every soil condition.
- ✓ Online configuration tool available to streamline design process.
- ✓ Components optimized for strength, durability and fast installation.
- ✓ UL 2703 Listed by Intertek.

Key Features of SunTurf™ Ground Mount System

SUNMODO
We've Got Your Rack!

SunTurf™ Ground Mount System easily integrate Helio Rails with Schedule 40 steel pipes. No drilling is required to attach the aluminum rails to the horizontal pipe. Optional bracing can provide additional structural rigidity for sites with high snow or wind load conditions. Anchor any ground mount installation using one of our fountain types including helical piles, precast ballasts and concrete piers.

Augers and Ground Screws

Our augers are suitable for use in weak to moderate strength soils and areas with a high-water table. Our ground screws are ideal for use in hard packed earth or soils with large amounts of cobble and gravel.

Ground Screw

Earth Auger

Technical Data

Application	Ground Mount
Material	High grade aluminum, galvanized steel and 304 stainless steel hardware
Module Orientation	Portrait and Landscape
Tilt Angle	Range between 10 to 50 degrees
Foundation Types	Post in concrete, helical earth auger, ground screw anchor and ballast
Structural Integrity	Stamped engineering letters available
Certificate	UL2703 listed by ETL
Warranty	25 years

SunModo, Corp. Vancouver, WA., USA • www.sunmodo.com • 360.844.0048 • info@sunmodo.com

ILLINOIS SOLAR SERVICES

CONTRACTOR

ILLINOIS SOLAR SERVICES

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ADDRESS: 1412 WILLOW DR, WASHINGTON, IL 61571

LIC. NO.:
HIC. NO.:
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DATE: 04.04.2023

DESIGN BY: E.T.

CHECKED BY: M.M.

REVISIONS

R-003.00

(SHEET 12)

Aaron Forinash
67852F
Ground Mount - SunTurf System

SUNMODO

Project Details

Project Name	Aaron Forinash	Zip Code:	61571
ASCE	7-16	City, State	Washington, IL
Total Watts	22 kW	Date	04/03/23
Total Modules	48		
Module Model	JinkoSolar, JKM455M-7RL3-V		
Module Dimensions	Height: 2,182.1 mm, Width: 1,029.0 mm, Depth: 40.0 mm (85.91" x 40.51" x 1.57")		

Load Assumptions

Wind Speed	115 mph
Wind Exposure	B
Ground Snow Load	20 psf

Structure & Foundation

Span Selection	Automatic: 84"
Front Edge Height	12"
Foundation Type	Post-In-Concrete
Tilt	30°

Sub Array #1 Details

Orientation	Landscape	Rail Type	Helio Rail HR300, 168"
Layout	4 rows by 12 cols	N/S Span (in)	84
Front Posts	13	E/W Max Span (in)	84
Back Posts	13	Area	1031" (EW) x 162" (NS)

Last edited by Evgeniy on 04/03/23 11:18 PM PST

Bill of Materials

Part	Spares	Total Qty
A21165-120 HSS 2.375" OD Front Pipe		13
Not provided by SunModo - ASTM A53 Grade B Sch. 40 Galvanized Pipe (or better) - 139"		13
A21168-112 2.875" OD E/W Pipe Beam. 112"		20
A50164-066 HSS E/W Tube Brace		2
A50164-092 HSS N/S Tube Brace		13
A20288-168-ML Helio Rail HR300. 168"		24
K10343-004 2.5" Pipe U-Clamp Kit		48
K10341-002 2.5" Pipe T-Cap Kit		26
K10219-001 2" Pipe Clamp Kit		28
K10222-001 2.5" Pipe Clamp Kit		2
K10342-001 2.5" Pipe Splice Kit		18
K10180-001 Universal Mid Clamp Kit		72
K10224-140 End Clamp Kit		48
K10469-003 Grounding Lug		1
A20297-001 Rail End Cap		48

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ILLINOIS SOLAR SERVICES

CONTRACTOR

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RESOURCE DOCUMENT

DATE: 04.04.2023

DESIGN BY: E.T.

CHECKED BY: M.M.

REVISIONS

R-004.00
(SHEET 13)

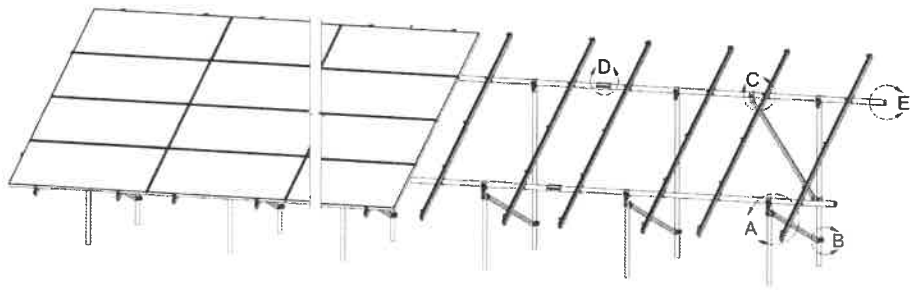
Sub Array #1 Layout

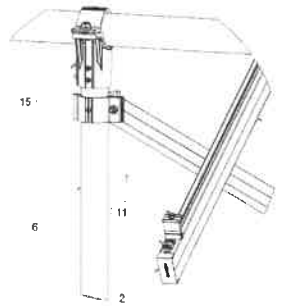
NOTES: UNLESS OTHERWISE SPECIFIED

1. THIS DRAWING IS NOT FOR CONSTRUCTION UNTIL ENGINEERING HAS REVIEWED AND STAMPED THIS DOCUMENT.
2. DIMENSIONS SHOWN ARE INCHES.
3. THE SELF-BONDING SYSTEM AND SINGLE GROUND LUG IS FOR USE WITH PV MODULES THAT HAVE A MAXIMUM SERIES FUSE RATING OF 30A.
4. MATERIALS ARE AS SPECIFIED OR EQUIVALENT.
   HARDWARE: 304 STAINLESS STEEL
   FABRICATED EXTRUDED PARTS: 6005-T5 ALUMINUM ALLOY
   FABRICATED DIE CAST PARTS: ANSI/AA A380 ALUMINUM ALLOY
   STEEL PIPE: SCHEDULE 40 GALVANIZED
   ALUMINUM PIPE: SCHEDULE 10 ANODIZED
5. THE MAXIMUM PERMISSIBLE LENGTH OF ANY STRUCTURE SHALL BE 200 FT. FOR SYSTEMS USING A SHARED RAIL CONFIGURATION, A THERMAL BREAK IS REQUIRED IN THE RAIL EVERY 40 FT. PER THE DRAWING DETAILS.
6. 4LX12-30DEG-STR-GSM-AGM-BGM-PGM
7. APPROVED RAIL PROFILES
   VARY BASED ON ENGINEERING REQUIREMENTS. CONFIRM SELECTION WITH STRUCTURAL ENGINEER. SEE BOM IN BOTTOM RIGHT CORNER.
8. K10224-XXX END CLAMP KIT OR K10298-XXX ADJ. END CLAMP KIT.
9. FOUNDATION TYPES:
   GSM = GROUND SCREW GROUND MOUNT
   AGM = HELICAL AUGER GROUND MOUNT
   PGM = POST-IN-CONCRETE GROUND MOUNT
   BSM = BALLAST GROUND MOUNT
10. 1 OF 1 ARRAY TYPES
11. 1 ARRAYS TOTAL

PACKET A5A	
Model Code	ASCE 7-16
Exposure Category	B
Wind Speed	115
Ground Snow Load	20
Tilt	30

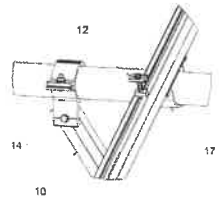
4LX12 ARRAY





DETAIL A

DETAIL B



DETAIL C

DETAIL D

DETAIL E

ITEM	PART NUMBER	DESCRIPTION	QTY
17	K10343-004	2.5" Pipe U-Clamp Kit	48
16	K10342-001	2.5" Pipe Splice Kit	18
15	K10341-002	2.5" Pipe T-Cap Kit	26
14	K10222-001	2.5" Pipe Clamp Kit	2
13	K10219-001	2" Pipe Clamp Kit	28
12	K10180-001	Universal Mid Clamp Kit	72
11	K10469-003	Grounding Lug	1
10	A50164-066	HSS E/W Tube Brace	2
9	A50164-092	HSS N/S Tube Brace	13
8	A21168-112	2.875" OD E/W Pipe Beam, 112"	20
7	A21165-120	HSS 2.375" OD Front Pipe	13
6			0
5	A20380-001	2.5" PIPE END CAP (OPTIONAL)	4
4		Panel 2,182 x1,029 x40.0mm	48
3	A20288-168-ML	Helio Rail HR300, 168"	24
2	A20297-001	Rail End Cap	48
1	K10224-140	End Clamp Kit	48

SunModo Corp.
AARON FORINASH
D 67850F
SCALE N.T.S. SHEET 1 of 1

3 of 7

Last edited by Evgeniy on 04/03/23 11:18 PM PST

ILLINOIS SOLAR SERVICES

CONTRACTOR

ILLINOIS SOLAR SERVICES

PHONE: 309-444-0982

ADDRESS: 1412 WILLOW DR, WASHINGTON, IL 61571

LIC. NO.:
HIC, NO.:
ELE, NO.:

NEW PV SYSTEM: 21.840 kV

FORINASH RESIDENCE

206 LEGION RD
WASHINGTON, IL 61571
APN: 020221300009

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

RESOURCE DOCUMENT

DATE: 04.04.2023

DESIGN BY: E.T.

CHECKED BY: M.M.

REVISIONS

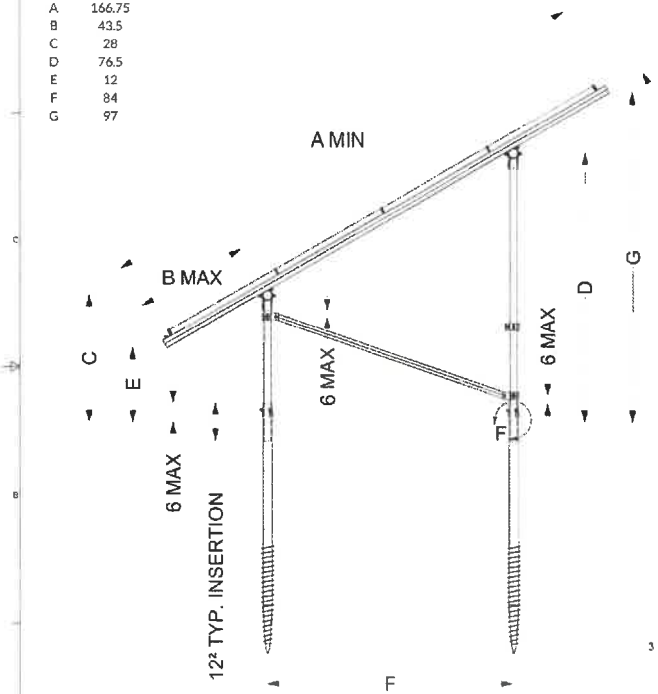
R-005.00
(SHEET 14)

Sub Array #1 Foundation Part 1

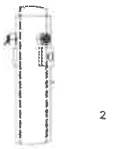
NOTES:
1. MAX DENOTES MAXIMUM PERMISSIBLE DIMENSIONS
2. PIPE IS DESIGNED TO TELESCOPE IN AND OUT OF SCREW/AUGER FOR FIELD ADJUSTABILITY. 12" IS RECOMMENDED

DIMENSIONS

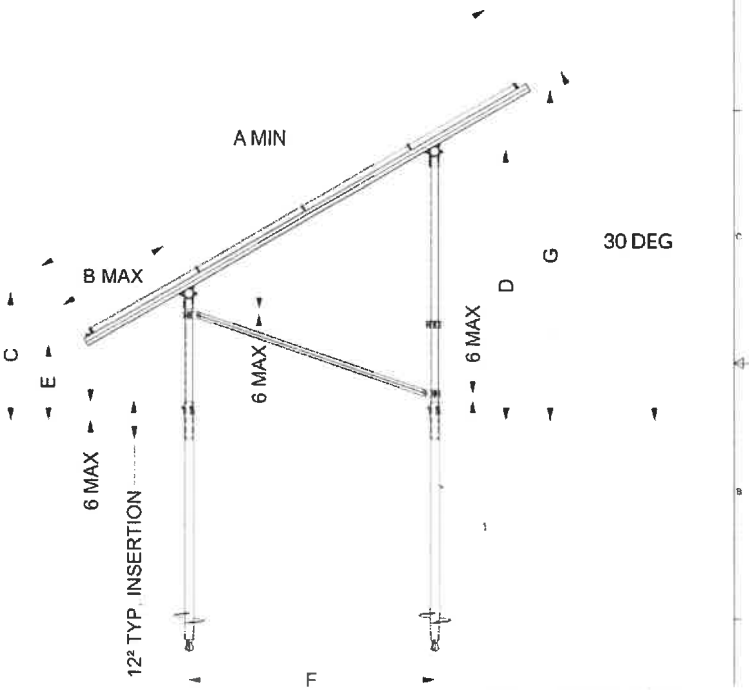
A	166.75
B	43.5
C	28
D	76.5
E	12
F	84
G	97



GROUND SCREW GOUND MOUNT (GSM)



DETAIL F



AUGER GROUND MOUNT (AGM)

ITEM	PART NUMBER	DESCRIPTION	QTY
2	K10423	ANCHOR, SCREW AUGER	0
1	K10414-079	ANCHOR, 10" HELIX BLADE AUGER	0

SunModo Corp.
AARON FORINASH
D 678595
NTS

ILLINOIS SOLAR SERVICES

CONTRACTOR

ILLINOIS SOLAR SERVICES

PHONE: 309-444-0982

ADDRESS: 1412 WILLOW DR, WASHINGTON, IL 61571

LIC. NO.:
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PAPER SIZE: 11" x 17" (ANSI B)

RESOURCE DOCUMENT

DATE: 04.04.2023

DESIGN BY: E.T.

CHECKED BY: M.M.

REVISIONS

R-006.00
(SHEET 15)

City of Washington

8/4/2023, 11:25:45 AM

1:1,128

0 0.01 0.01 0.02 mi

0 0.01 0.02 0.04 km

Tazewell County, IL

Highway Markers

- 8 IL 8
- 3 Co Hwy 3
- 24 US 24
- BUS 24 US BR 24
- Centerline_Washington

Building Footprints

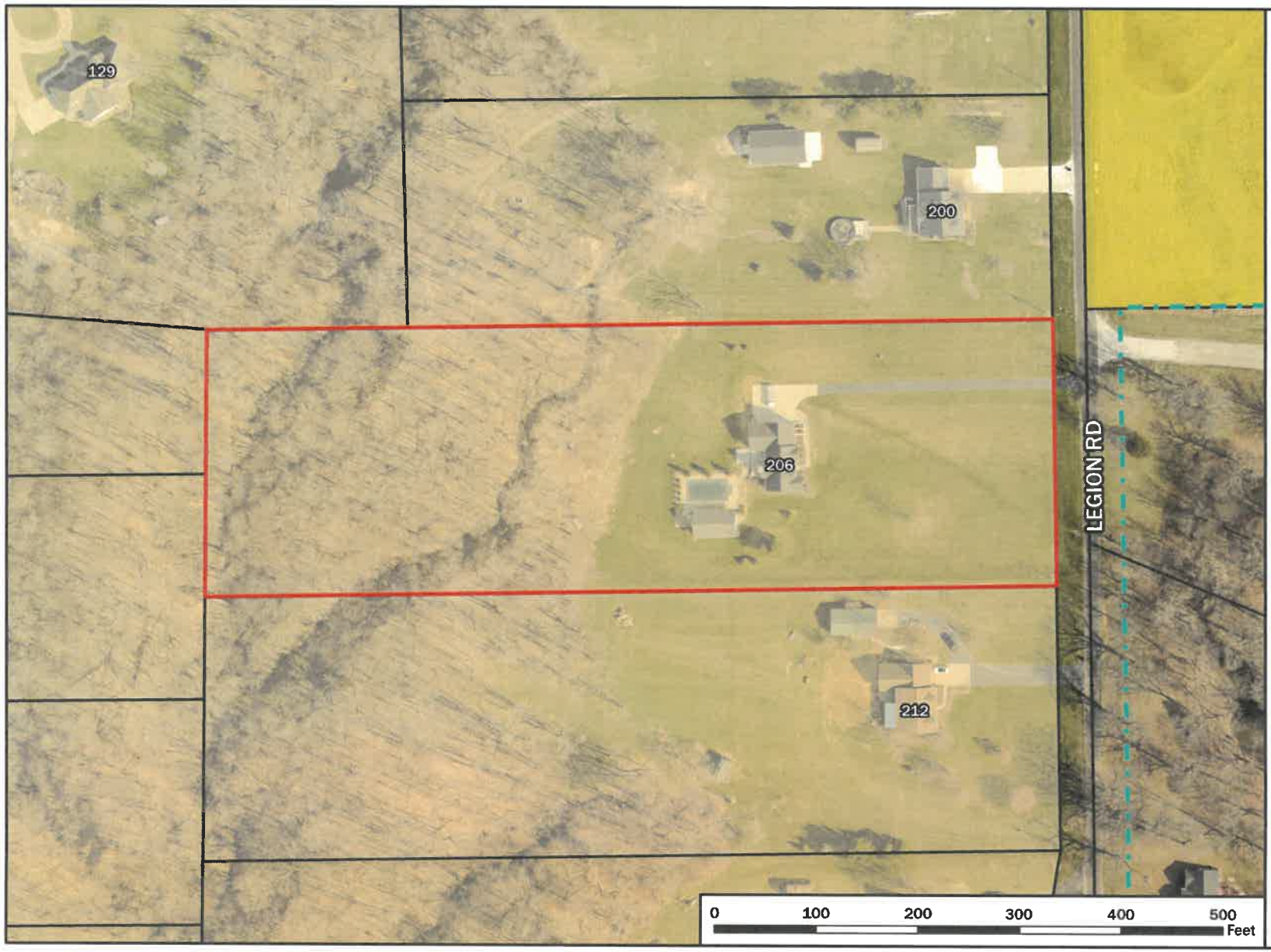
- Single Family / Duplex
- Garage
- Shed, Accessory Bldg

Parcels

- Washington City Limits

Web AppBuild

Tazewe



206 Legion Rd.

PIN: 02-02-21-300-009

Legend

- 206 Legion Rd
- Parcels

Zoning

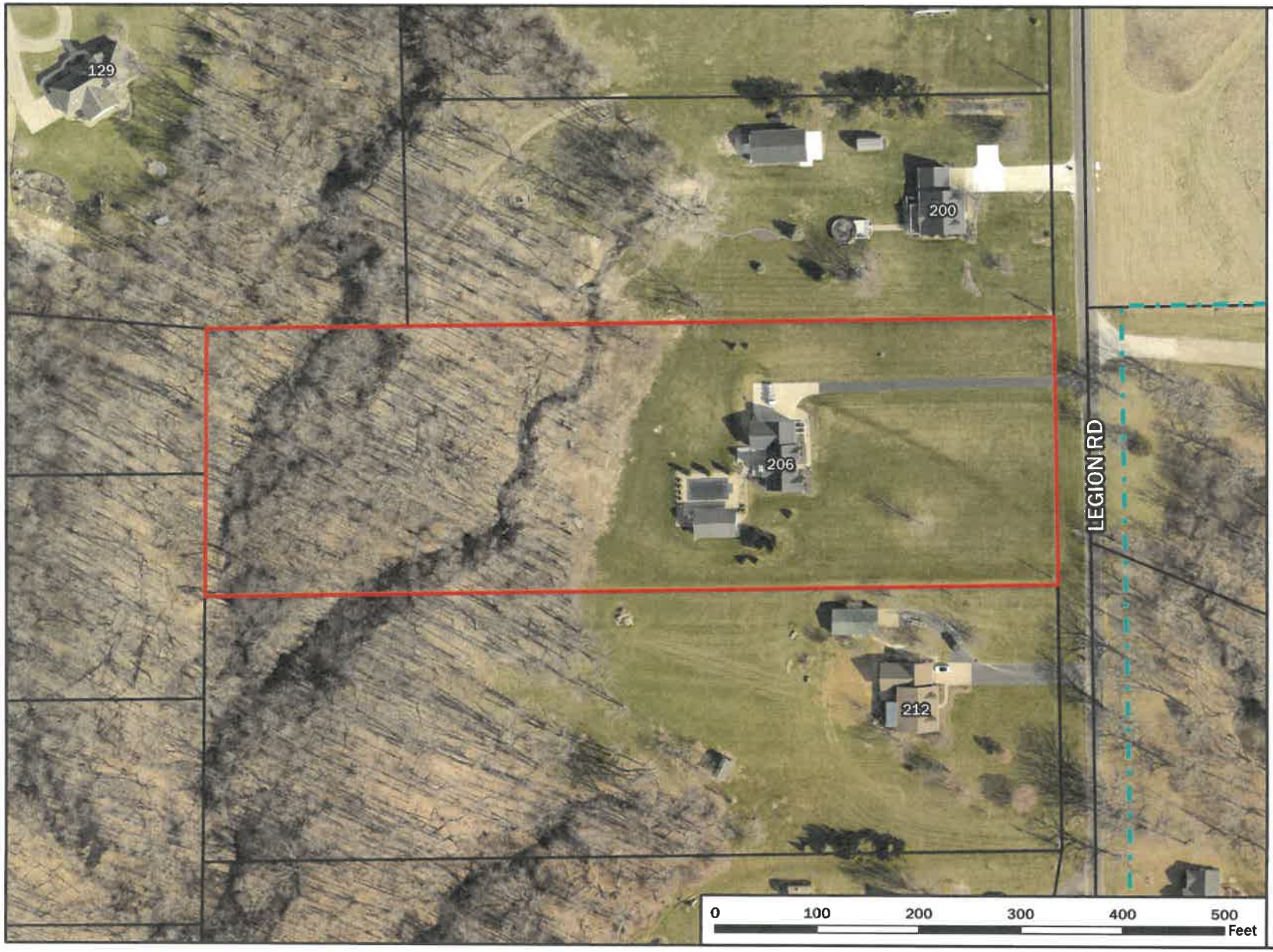
- CE
- R-1
- City Boundary

N

City of Washington Est. 1825

Date: 8/10/2023

This map indicates approximate data locations and may not be 100% accurate. Parcels are provided and maintained by Tazewell County.



206 Legion Rd.

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Legend

- 206 Legion Rd
- Parcels
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N

City of Washington Est. 1825

Date: 8/10/2023

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