

WABASHA PLANNING COMMISSION

Join Zoom Meeting:

<https://us02web.zoom.us/j/85171236693>

June 9, 2020 6:00 PM

MEETING AGENDA

- 1) Call to Order
- 2) Approval of Minutes-
 - a) Minutes Special Meeting April 29, 2020
- 3) Changes or Additions to Agenda
- 4) Public Comment
- 5) Public Hearings
 - a) 1712 Hiawatha Dr E Solar Garden (IPS Development LLC)
- 6) Old Business
 - a) Subcommittee Solar Moratorium - Set up coming meeting times.
- 7) New Business
- 8) Board of Adjustment Business
- 9) Other Business
- 10) Next Regular Meeting Date - July 14, 2020
- 11) Adjourn

Planning Commission

2) a)

Meeting Date: 06/09/2020

SUBJECT: Minutes Special Meeting April 29, 2020

DEPARTMENT: Planning & Zoning

TITLE:

Minutes Special Meeting April 29, 2020

PURPOSE:

Attachments

4-29-2020 Special Planning Commission Meeting

DRAFT

WABASHA PLANNING COMMISSION

April 29, 2020 6:00 PM

MEETING MINUTES

Commission Members: Tim Wallerich, Chair Sara Carrels
 Scott Durand, Vice Chair Sharon Burke
 Jeff Sulla Ozzie Goodman
 Kris Kruse

Present: Scott Durand; Chair Tim Wallerich; Sharon Burke; Kris Kruse; Sara Carrels; Ozzie Goodman; Jeff Sulla

Also Present: Alex Conzemius, Contracted City Planner; Wendy Busch, City Clerk

- 1) Call to Order
The special meeting was called to order by Chair Wallerich at 6:00 PM. The meeting was held via video conference, as a result of the COVID-19 pandemic. Roll call was conducted, and all Planning Commission members were in attendance. All actions were conducted via roll call vote.
- 2) Changes or Additions to Agenda
There were no changes or additions to the agenda.
- 3) Public Comment
Evan Carlson introduced himself as a representative of IPS Solar. He noted that the company has leased a parcel of land in Wabasha but that a solar garden application has not yet been submitted to Xcel Energy. He detailed the development process and the associated fees. He requested that this project be excluded from a potential moratorium on solar garden projects. Chair Wallerich indicated that this topic would be discussed later in the meeting.
- 4) Old Business
 - A) Solar Garden Moratorium
City Planner Conzemius provided background information and provided rationale for consideration of a solar garden project moratorium at this time. He stated that a moratorium is utilized when communities want to do a detailed study of a certain land use. He stated that a moratorium would allow the City to understand the City's capacity to accommodate more solar garden installations, take inventory of available residential lots, and determine future land needs over the next few years. He referenced a draft resolution that would create a solar garden moratorium for up to one year, along with a plan to complete a detailed study regarding this use, as required by law.

City Planner Conzemius noted that he spoke with an attorney from the League of Minnesota Cities with regard to the pending application by IPS Solar. He indicated that the attorney has determined that a moratorium would consider any pending application to be denied for the duration of the moratorium. He stated that the attorney referenced case studies in this regard. He reviewed moratorium ordinance resolution language options, one of which would not allow pending applications to move forward during the moratorium, and the other option that would allow pending applications to be considered during the moratorium.

Chair Wallerich provided additional background information and requested input regarding the moratorium. He stated that, while he is in favor of solar gardens and alternative energy, he would support a land use study at this time. He referenced the increasing number of solar garden applications.

Planning Commissioner Burke spoke in support of a moratorium, for the reasons offered by Chair Wallerich.

Planning Commissioner Sulla spoke in opposition to a moratorium, stating that he is against infringing upon landowners' property rights. He suggested reviewing each application individually. He added that a moratorium could result in legal challenges and indicated that funds were not budgeted for a land use study. City Planner Conzemius described a potential land use study. He stated that this could be as simple as evaluating the Comprehensive Plan in terms of population projections for the next 20 years and conducting an inventory of vacant land for housing development.

Planning Commissioner Durand spoke in support of the use of underutilized property for solar garden projects. He referenced the Comprehensive Plan in terms of projected new housing starts over the next few years. He stated that Wabasha is a progressive, green community in terms of energy development. He suggested denying applications for certain types of solar systems that are deemed to be offensive. He commented that newer systems are much more attractive and much less invasive. He stated that he would not be in favor of a moratorium. He noted that, if a moratorium is imposed, he would suggest establishing a time limit along with identifying specific study criteria.

Planning Commissioner Durand suggested considering a future CUP request for the proposed IPS Solar project, noting that the proposed site is favorable for this use.

The length of the proposed moratorium was discussed along with study criteria. City Planner Conzemius referenced model ordinances. Zoning considerations in terms of site locations were discussed. City Planner Conzemius suggested development of a solar garden overlay district, which would include property not in close proximity to the city.

Chair Wallerich discussed the challenges of denying solar garden applications. He spoke in support of excluding the pending IPS Solar application from a moratorium, due to the favorable location of the proposed site.

Planning Commissioner Sulla referenced budget challenges related to the COVID-19 pandemic, stating that he would not support spending money on a study.

City Planner Conzemius commented that development of a solar garden overlay district would essentially constitute a study. A question was raised regarding whether the results of a moratorium study would be beneficial in terms of defending potential legal challenges, and City Planner Conzemius provided additional information in this regard. He commented that it is the responsibility of the Planning Commission to design the community with compatible land uses in mind.

A suggestion was made, in lieu of a moratorium and study, to consider adding language to current ordinances. City Planner Conzemius discussed the benefits of a moratorium, which would allow time to consider restrictions in some areas.

When asked whether City staff have considered recommendations in this regard, City Planner Conzemius provided additional information. He stated that there are some obvious areas that would seem to be the most appropriate for future residential development, adding that he has not studied the Comprehensive Plan in detail. City Clerk Busch referenced potential areas for residential growth and potential solar garden sites. She added that the study could be accomplished by subcommittee groups. She provided examples of past moratoriums. She reviewed the process of drafting and approving ordinance language revisions.

Chair Wallerich summarized the discussion and recommended consideration of a moratorium and study. City Clerk Busch asked whether a moratorium could be lifted at any point. City Planner Conzemius indicated that a moratorium can be revoked at any point. He suggested a limited moratorium that would allow a subcommittee to propose recommendations to the Planning Commission and the City Council in terms of areas for potential future solar garden development and areas to protect for future residential development. He suggested consideration of excluding the pending solar garden project from the moratorium and allow this proposal to move forward through the process. He also suggested stipulating the types of solar garden structures that would be allowed in the future, in order for these structures to be less physically and visibly obtrusive. Planning Commission members expressed agreement with this approach. The duration of the moratorium was discussed, and a six-month moratorium was deemed appropriate.

Resolution language options were reviewed. The study criteria and process were discussed. It was suggested to evaluate areas for potential solar garden development and screening requirements.

Planning Commissioners Burke, Sulla, and Goodman volunteered to serve on the subcommittee along with City Planner Conzemius, City Clerk Busch, and Chair Wallerich. The work of this group was discussed. City Clerk Busch discussed Open Meeting Law considerations, noting that four members constitute a quorum. Chair Wallerich suggested that the three-member subcommittee work to move the process forward, with further discussion during Planning Commission meetings.

Mr. Carlson indicated that he would be willing to provide additional information, as requested. The proposed solar garden site was clarified, and landowner involvement in the process was discussed.

Motion made by Scott Durand, seconded by Sharon Burke to recommend revisions to the solar garden ordinance, as follows:

No applications shall be processed and no land use approvals shall be considered or issued for solar installations, until the studies referenced above are completed and appropriate land use controls have been adopted.

All applications subject to this moratorium that are pending shall be considered by the Planning Commission and City Council in accordance with Minnesota Statutes Section 15.99. Conditional Use Permit (CUP) applications may submit and receive approval for building permits.

This ordinance shall take effect upon its adoption and legal publication and shall remain in effect for 6 months or upon the date of adoption of land use controls referenced above, whichever occurs first.

Vote: 7 - 0 Adopted - Unanimously

5) Adjourn

Motion made by Sharon Burke, seconded by Jeff Sulla to adjourn the meeting. The meeting adjourned at 6:42 PM.

Vote: 7 - 0 Adopted - Unanimously

Respectfully submitted by: _____
Wendy Busch, City Clerk

Adopted Date

Planning Commission

5) a)

Meeting Date: 06/09/2020

SUBJECT: 1712 Hiawatha Dr E Solar Garden (IPS Development LLC)

DEPARTMENT: Planning & Zoning

TITLE:

1712 Hiawatha Dr E Solar Garden (IPS Development LLC)

PURPOSE:

Attachments

Application

CUP Information

Equipment Report

Seed Plantings

ASES Study

Narrative

Staff Report

city of wabasha
application for land development activity

[] Concept PUD [] Preliminary PUD [] Final PUD
[] Preliminary Plat [] Final Plat [] Lawrence Boulevard Shore Improvement
[] Site Plan Review [] Request for Zoning Amendment (map or text)
[] Variance/Appeal [] CUP/IUP [] Other _____

MN CSG 2019-55 LLC

Applicant's Name

() 952 212 0824
Phone

IPS Development LLC

evanc@ips-solar.com

Mailing Address

e-mail address

Lawrence and Deborah Stegmann Stegmann

Property Owner's Name (if different)

1712 Hiawatha Dr. E, Wabasha, MN 55981

Property Owner's Mailing Address (if different)

Provide also contact information of Architects, Engineers, Contractors and/or other development professionals on separate page (s) along with a notation of their pertinent licenses

Description of Property: Parcel ID # (PIN) R27.00110.00 Current Zoning R2 Proposed Zoning R2

Name of Development: Stegmann Stegmann Community Solar

Street Address: Unassigned

Total Acreage: 61.4

Acreage To Be Developed: 8

Type of Water Supply: NA

Sewage Disposal: NA

Proposed Activity (include number/size of lots and/or buildings, type of use, public improvements proposed or need/hardship for Variance):

Permit to construct a 1MW Community Solar Garden

(provide attached pages as needed)

Describe Any Development Constraints (wetlands, shoreland, floodplain, existing structures/uses, etc.):

See attached Narrative

(provide attached pages as needed)

Signatures:

Applicant

Property Owner

4-17-2020
Date

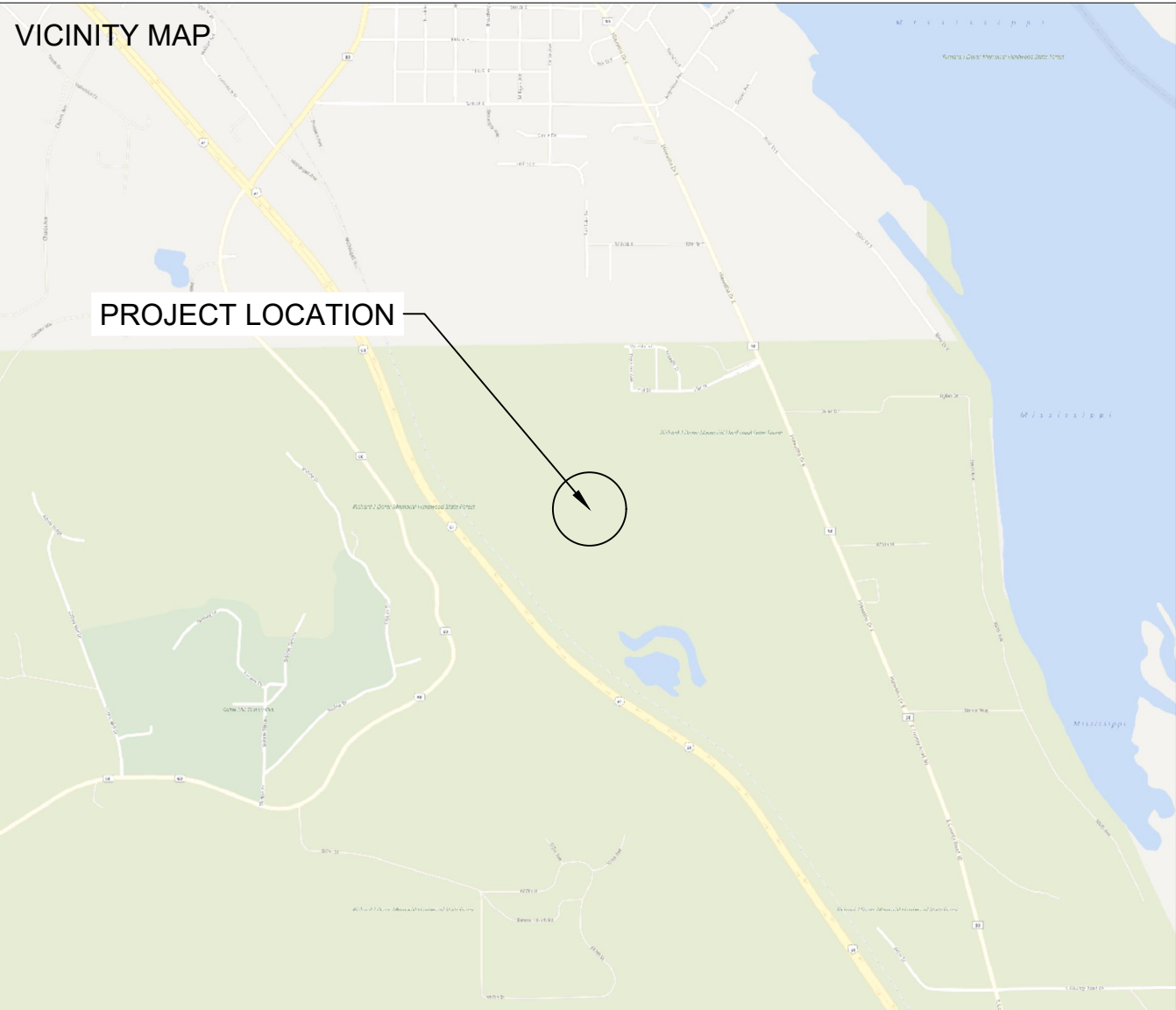
Office Use

Date Received: _____ Planner Initials: _____ Fee Paid: (amount) _____ (date) _____

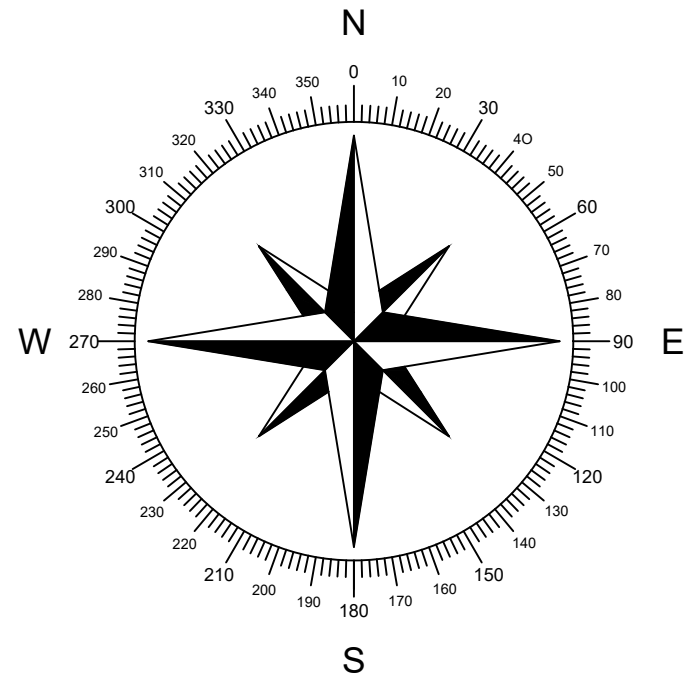
Public Hearing Scheduled _____ Hearing Advertised _____ Notice Sent to Adjacent _____
(date) (date) (date)

Review By:

Planning Commission _____ Board of Adjustment _____ City Council _____



SPACE FOR PE STAMP:



SHEET NOTES:

UTILITY POLES ARE SHOWN FOR INDICATING LOCATIONS ONLY. SPACING BETWEEN POLES, PHYSICAL PROTECTION BARRIER FOR SWITCHBOARDS, ETC. WILL BE ADDED IN THE DRAWINGS PREPARED FOR THE CONSTRUCTION DOCUMENTS



NEW ENERGY EQUITY, LLC
2530 RIVA ROAD, SUITE 200
ANNAPOLIS, MD 21041
NEWENERGYEQUITY.COM
443-267-5012

PROJECT ADDRESS
924 21ST ST
WABASHA, MN 55981

LAT: 44.3633924125
LONG: -92.0267205706

SYSTEM SPECIFICATIONS

SYSTEM SIZE DC	1.452 MW
SYSTEM SIZE AC	1.000 MW
DC/AC RATIO	1.452
AZIMUTH	180°
TILT	+/- 52°
MODULE COUNT	3822
MODULE TYPE	REC 380TP72
MODULE STC RATING	380 W
INVERTER COUNT	8
INVERTER TYPE	CPS SCA125KTL-DO/US
INVERTER POWER	125kW
RACKING	TBD
MONITORING	ALSO ENERGY

DESIGN CRITERIA

MIN/MAX TEMP.	-28°C / 32°C
WIND SPEED (ASCE 7-10)	105 MPH
BUILDING CATEGORY	I
EXPOSURE CATEGORY	C
GROUND SNOW LOAD	50 PSF
BUILDING HEIGHT	0'-0"

OTHER NOTES

CASE NUMBER 03651411

NO POSITION, DISTANCE, OR CLEARANCE ISSUES WITH OVERHEAD ELECTRIC SERVICE LINES OR OTHER UTILITIES IN RELATION TO THE PV PANELS.

24/ 7 UNESCORTED KEYLESS ACCESS PROVIDED FOR THE METERS AND AC DISCONNECT.

REVISIONS

#	DESCRIPTION	BY	DATE
0	ORIGINAL DESIGN	SPC	3/20/2020
1			
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DRAWN BY

STEVEN CHAN

PROJECT NAME

STEGEMANN CSG

DRAWING TITLE

SITE PLAN

SCALE ¹

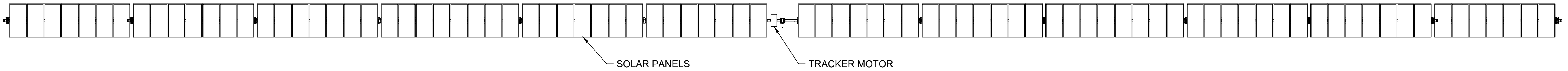
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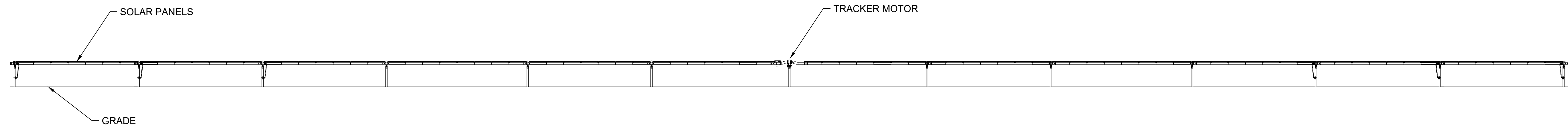
SHEET

PV1

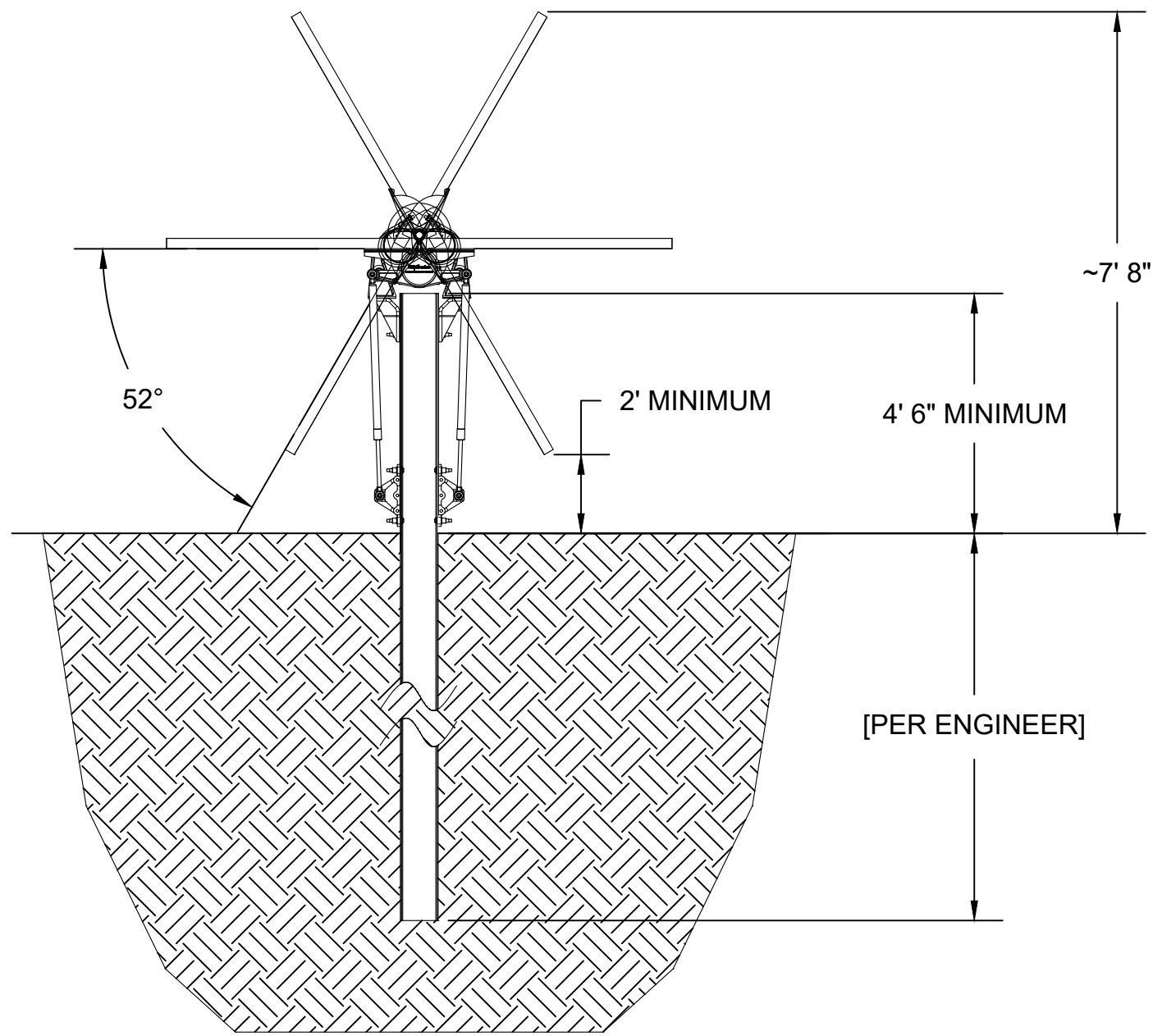




1 SINGLE AXIS TRACKER TOP DOWN VIEW
NTS



2 SINGLE AXIS TRACKER EAST-WEST ELEVATION
NTS



3 SINGLE AXIS TRACKER NORTH-SOUTH ELEVATION
NTS



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INVERTER POWER	125kW
RACKING	TBD
MONITORING	ALSO ENERGY

DESIGN CRITERIA

MIN/MAX TEMP.	-28°C / 32°C
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EXPOSURE CATEGORY	C
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OTHER NOTES

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DRAWN BY

STEVEN CHAN

PROJECT NAME

STEGEMANN CSG

DRAWING TITLE

SAT RACKING DETAIL

SCALE ¹

NTS

SHEET

PV2

SYSTEM SPECIFICATIONS

SYSTEM SIZE DC	1.452 MW
SYSTEM SIZE AC	1.000 MW
DC/AC RATIO	1.452
AZIMUTH	180°
TILT	+/- 52°
MODULE COUNT	3822
MODULE TYPE	REC 380TP72
MODULE STC RATING	380 W
INVERTER COUNT	8
INVERTER TYPE	CPS SCA125KTL-DO/US
INVERTER POWER	125kW
RACKING	TBD
MONITORING	ALSO ENERGY

DESIGN CRITERIA

MIN/MAX TEMP.	-28°C / 32°C
WIND SPEED (ASCE 7-10)	105 MPH
BUILDING CATEGORY	I
EXPOSURE CATEGORY	C
GROUND SNOW LOAD	50 PSF
BUILDING HEIGHT	0'-0"

OTHER NOTES

CASE NUMBER 03651411

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DRAWN BY

STEVEN CHAN

PROJECT NAME

STEGEMANN CSG

DRAWING TITLE

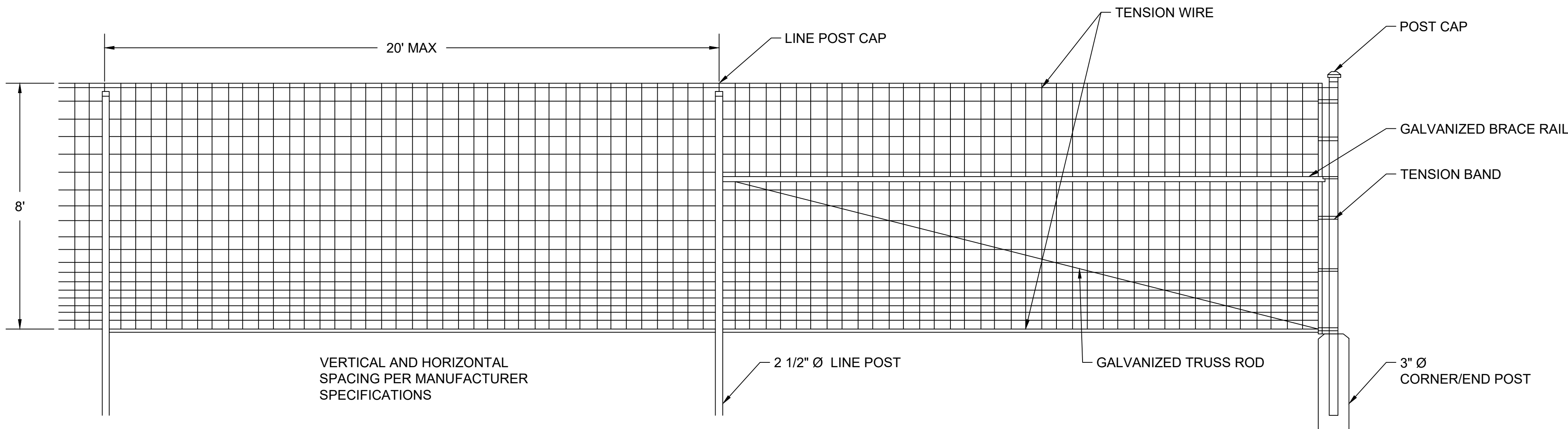
FENCE DETAIL

SCALE ¹

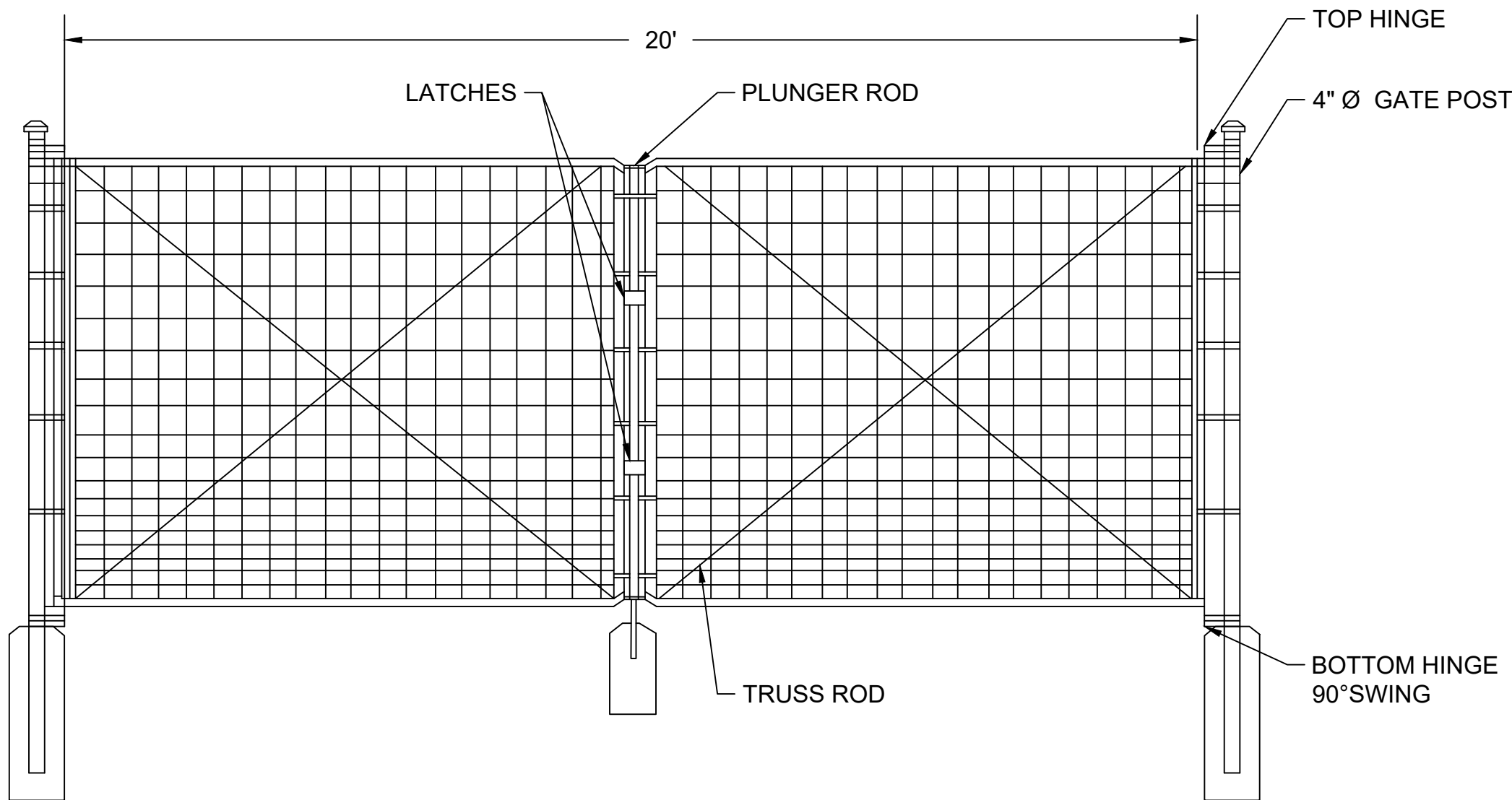
NTS

SHEET

PV3



1 8' FIXED KNOT FENCE
NTS



2 8' FIXED KNOT FENCE GATE
NTS

NOTE:
1. THIS DRAWING IS FOR INFORMATIONAL PURPOSES ONLY
AND NOT TO BE USED FOR CONSTRUCTION.
2. DO NOT SCALE DRAWING

SYSTEM SPECIFICATIONS

SYSTEM SIZE DC	1.452 MW
SYSTEM SIZE AC	1.000 MW
DC/AC RATIO	1.452
AZIMUTH	180°
TILT	+/- 52°
MODULE COUNT	3822
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INVERTER COUNT	8
INVERTER TYPE	CPS SCA125KTL-DO/US
INVERTER POWER	125KW
RACKING	TBD
MONITORING	ALSO ENERGY

DESIGN CRITERIA

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OTHER NOTES

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STEVEN CHAN

PROJECT NAME

STEGEMANN CSG

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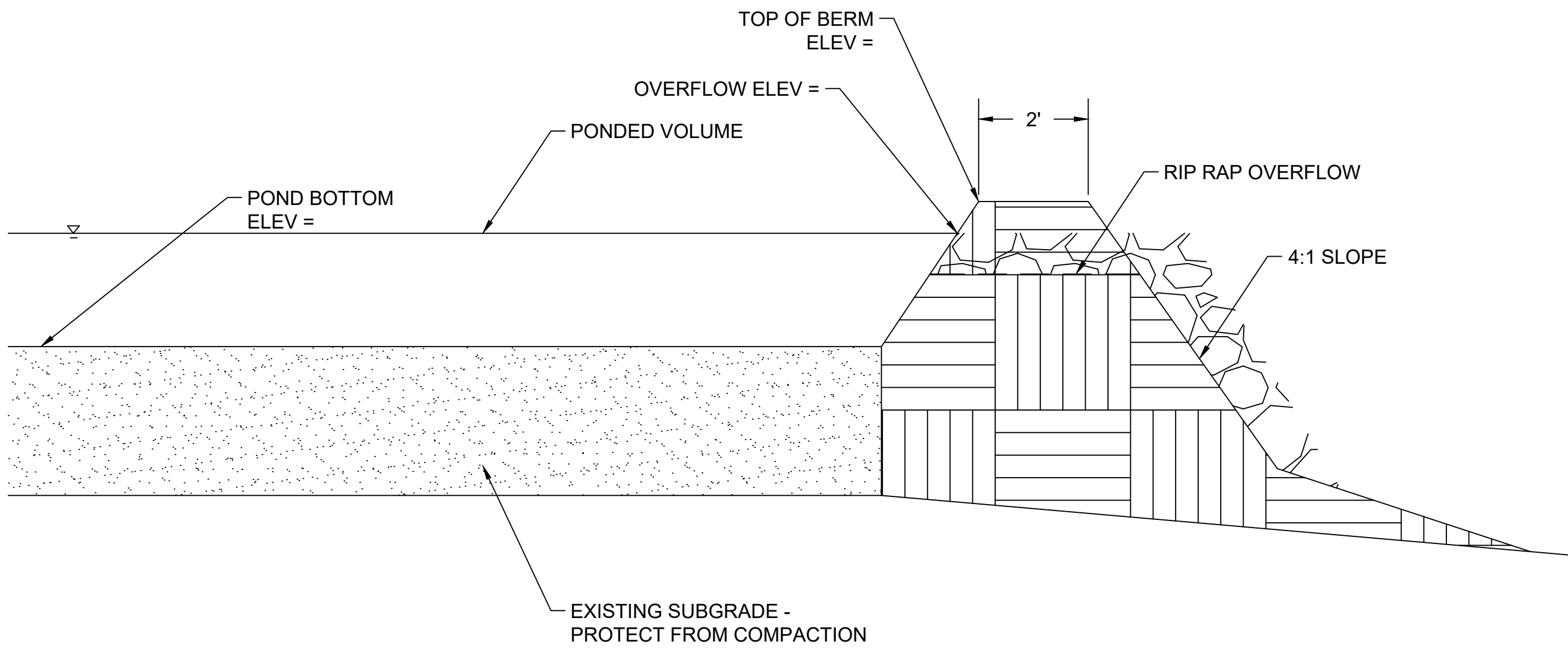
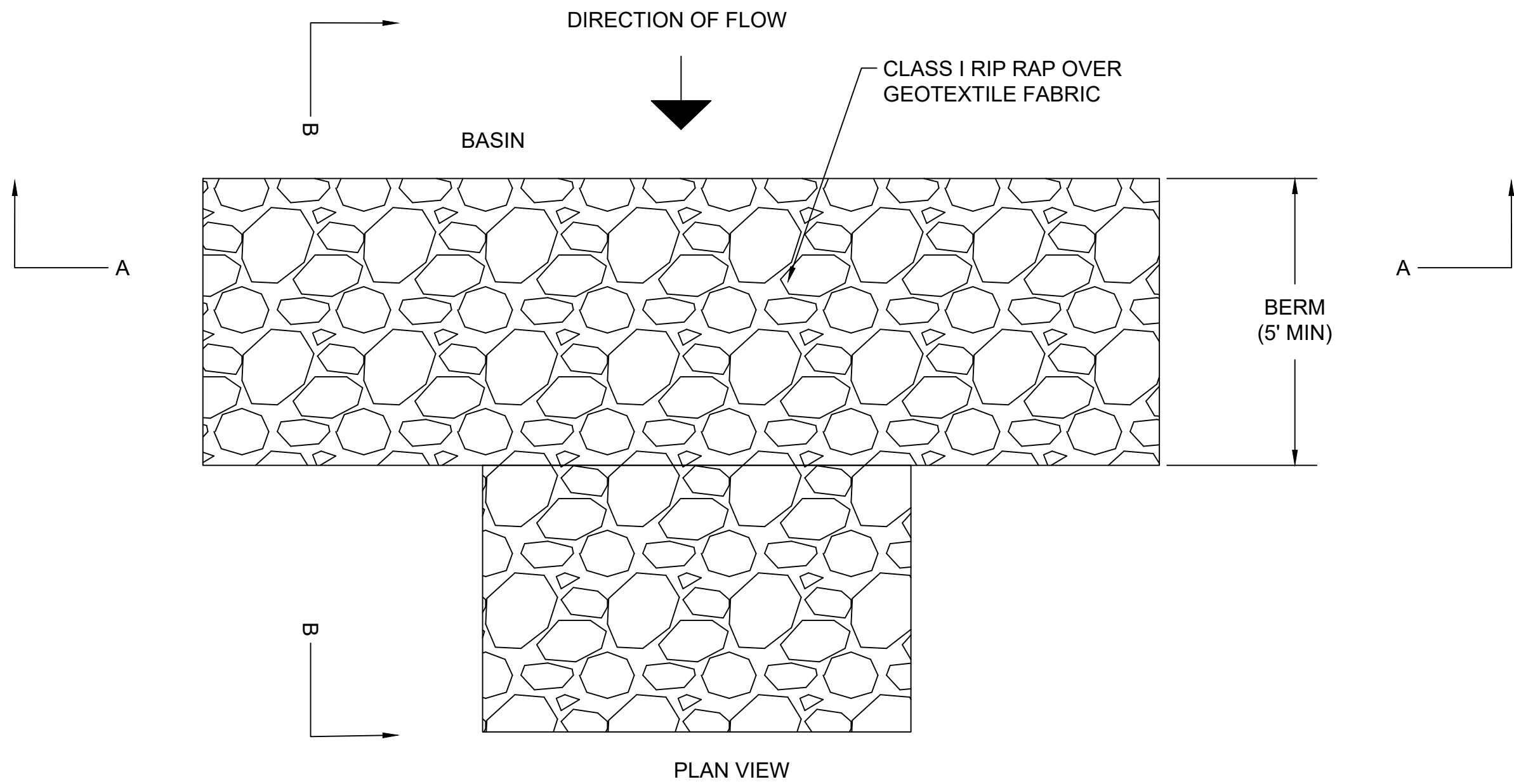
INFILTRATION BASIN DETAIL

SCALE ¹

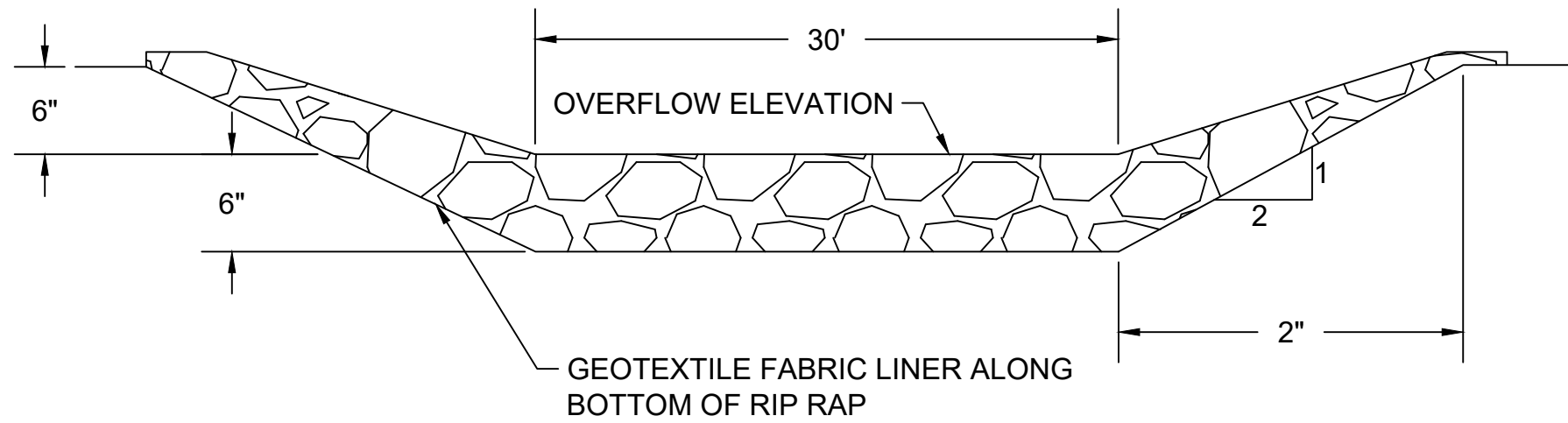
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SHEET

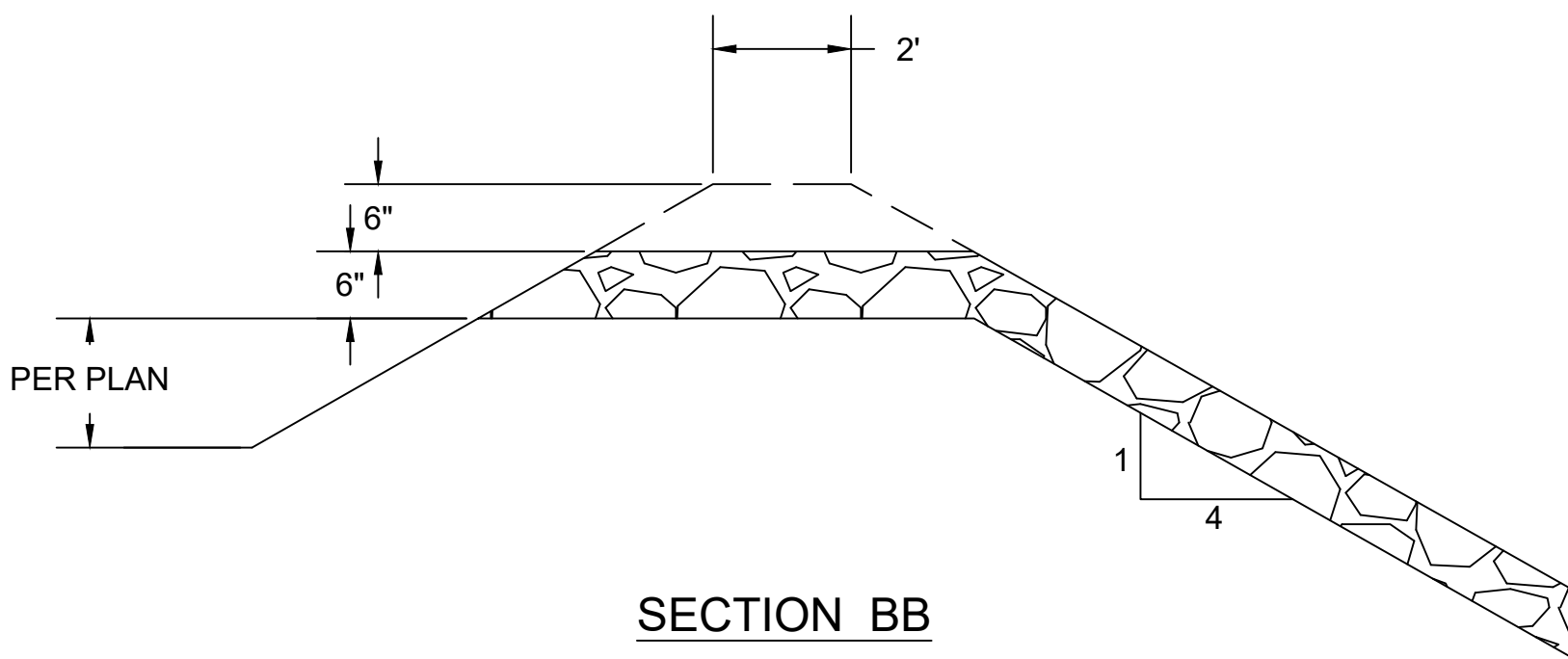
PV4



1 INFILTRATION BASIN
NTS



SECTION AA



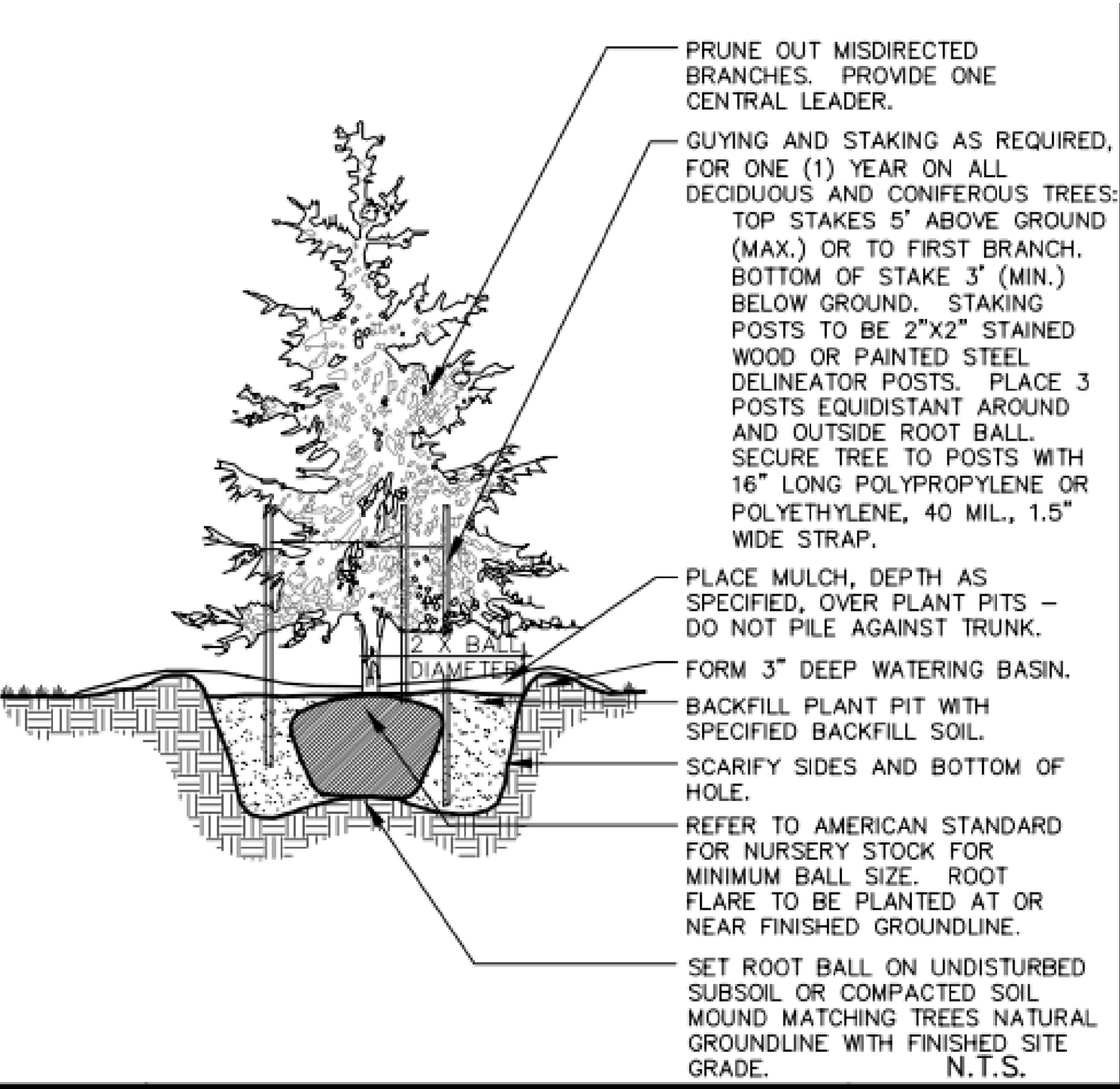
SECTION BB

2 RIP RAP OVERFLOW
NTS



1 BLACK HILLS SPRUCE SCREENING

Scale: N.T.S.



2 EVERGREEN PLANTING DETAIL

Scale: N.T.S.

PLANTING SCHEDULE

TYPE : BLACK HILLS SPRUCE

HEIGHT : 6' MIN WITHIN 3 YEARS OF PLANTING

NUMBER OF ROWS: 1

SPACING: 16' O.C.



3 PLAN VIEW

Scale: N.T.S.



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2530 RIVA ROAD, SUITE 200
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INVERTER POWER	125kW
RACKING	TBD
MONITORING	ALSO ENERGY

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GROUND SNOW LOAD	50 PSF
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OTHER NOTES

CASE NUMBER 03651411

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24/ 7 UNESCORTED KEYLESS ACCESS
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DRAWN BY

STEVEN CHAN

PROJECT NAME

STEGEMANN CSG

DRAWING TITLE

TREE PLAN

SCALE ¹

NTS

SHEET

PV5

SYSTEM SPECIFICATIONS

SYSTEM SIZE DC	1.452 MW
SYSTEM SIZE AC	1.000 MW
DC/AC RATIO	1.452
AZIMUTH	180°
TILT	+/- 52°
MODULE COUNT	3822
MODULE TYPE	REC 380TP72
MODULE STC RATING	380 W
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INVERTER POWER	125kW
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MONITORING	ALSO ENERGY

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BUILDING HEIGHT	0'-0"

OTHER NOTES

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STEVEN CHAN

PROJECT NAME

STEGEMANN CSG

DRAWING TITLE

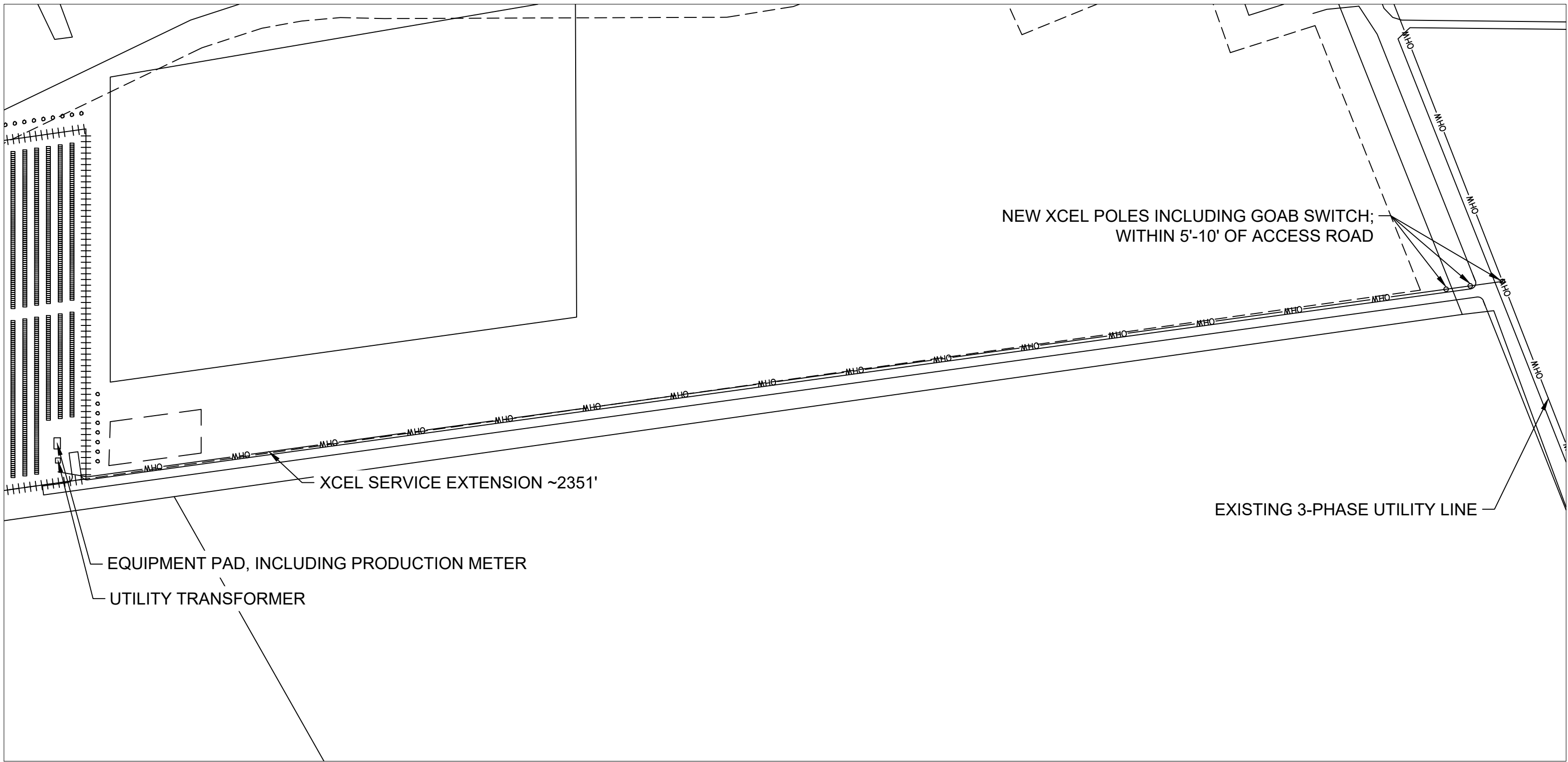
ELECTRICAL DETAILS

SCALE ¹

AS NOTED

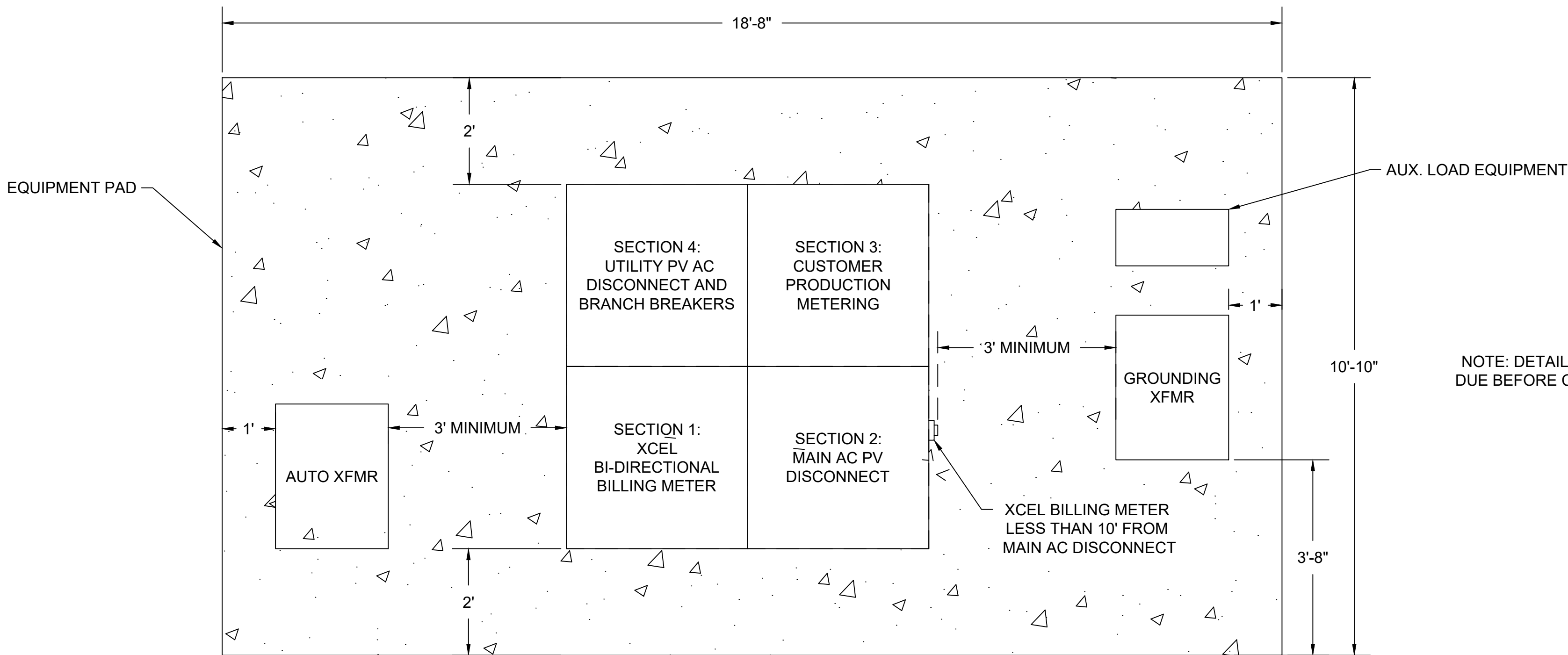
SHEET

E3



1 INTERCONNECTION PLAN

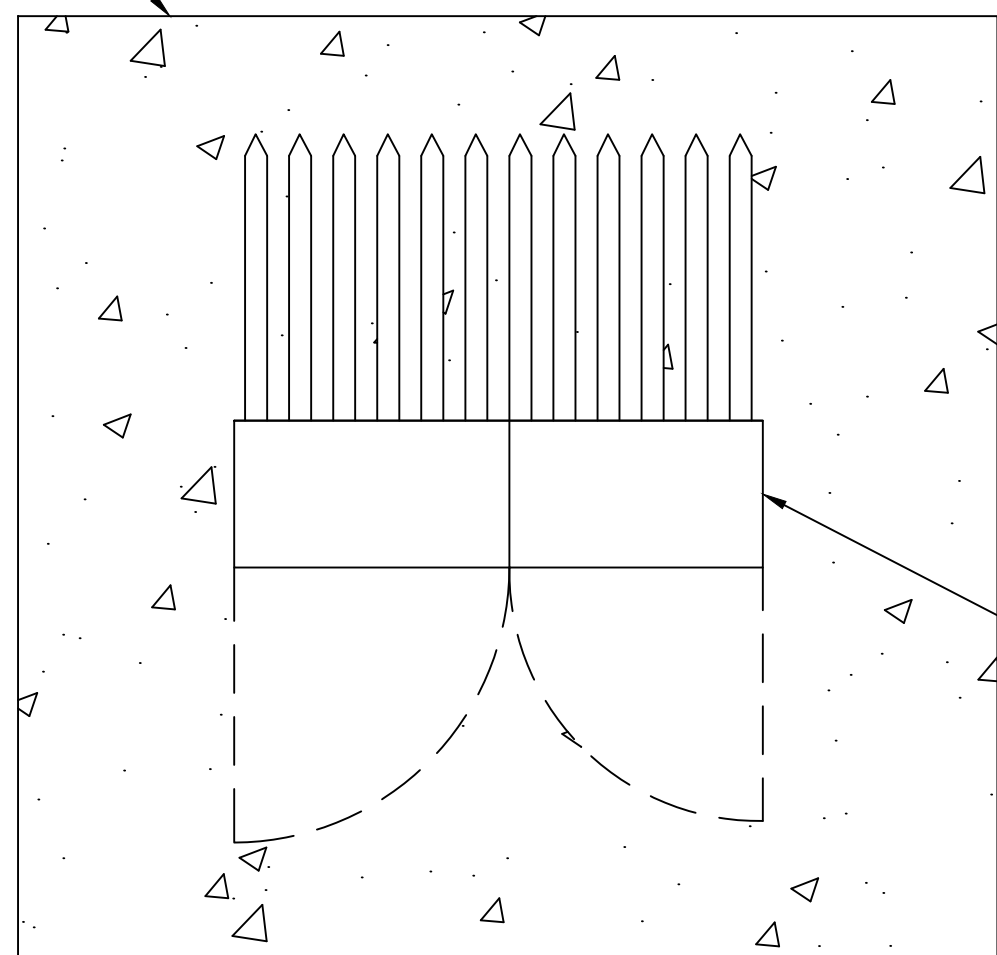
Scale: 1" = 160'



2 EQUIPMENT PAD PLAN

Scale: 3/4" = 1'

NOTE: DETAILED DRAWINGS
DUE BEFORE CONSTRUCTION





Datasheet

100/125kW, 1500Vdc String Inverters for North America



CPS SCH100/125KTL-DO/US-600

The 100 & 125kW high power CPS three phase string inverters are designed for ground mount applications. The units are high performance, advanced and reliable inverters designed specifically for the North American environment and grid. High efficiency at 99.1% peak and 98.5% CEC, wide operating voltages, broad temperature ranges and a NEMA Type 4X enclosure enable this inverter platform to operate at high performance across many applications. The CPS 100/125kW products ship with the Standard or Centralized Wire-box, each fully integrated and separable with AC and DC disconnect switches. The Standard Wire-box includes touch safe fusing for up to 20 strings. The CPS Flex Gateway enables communication, controls and remote product upgrades.

Key Features

- NFPA 70, NEC 2014 and 2017 compliant
- Touch safe DC Fuse holders adds convenience and safety
- CPS Flex Gateway enables remote FW upgrades
- Integrated AC & DC disconnect switches
- 1 MPPT with 20 fused inputs for maximum flexibility
- Copper and Aluminum compatible AC connections
- NEMA Type 4X outdoor rated, tough tested enclosure
- Advanced Smart-Grid features (CA Rule 21 certified)
- kVA Headroom yields 100kW @ 0.9PF and 125kW @ 0.95PF
- Generous 1.87 and 1.5 DC/AC Inverter Load Ratios
- Separable wire-box design for fast service
- Standard 5 year warranty with extensions to 20 years



100/125KTL Standard Wire-box



100/125KTL Centralized Wire-box



© CHINT POWER SYSTEMS AMERICA 2020/01-MKT NA

Chint Power Systems America

6800 Kohl Center Parkway, Suite 233 Pleasanton, CA 94566
Tel: 855-584-7168 Mail: AmericaSales@chintpower.com Web: www.chintpowersystems.com



Technical Data

Model Name	CPS SCH100KTL-DO/US-600	CPS SCH125KTL-DO/US-600
DC Input		
Max. PV Power	187.5kW	
Max. DC Input Voltage	1500V	
Operating DC Input Voltage Range	860-1450Vdc	
Start-up DC Input Voltage / Power	900V / 250W	
Number of MPPT Trackers	1	
MPPT Voltage Range ¹	870-1300Vdc	
Max. PV Input Current (Isc x1.25)	275A	
Number of DC Inputs	1 PV source circuits, pos. & neg. fused (Standard Wire-box) 1 PV output circuit, 1-2 terminations per pole, non-fused (Centralized Wire-box)	
DC Disconnection Type	Load-rated DC switch	
DC Surge Protection	Type II MOV (with indicator/remote signaling), Up=2.5kV, In=20kA (820uS)	
AC Output		
Rated AC Output Power	100kW	125kW
Max. AC Output Power ²	100kVA (111kVA @ PF>0.9)	125kVA (132kVA @ PF>0.95)
Rated Output Voltage	600Vac	
Output Voltage Range ³	528-660Vac	
Grid Connection Type ⁴	3Ø / PE / N (Neutral optional)	
Max. AC Output Current @600Vac	96.2/106.8A	120.3/127.2A
Rated Output Frequency	60Hz	
Output Frequency Range ⁵	57-63Hz	
Power Factor	>0.99 (±0.8 adjustable)	>0.99 (±0.8 adjustable)
Current THD	<3%	
Max. Fast Current Contribution (1-cycle RMS)	41.47A	
Max. OCPD Rating	150A	175A
AC Disconnection Type	Load-rated AC switch	
AC Surge Protection	Type II MOV (with indicator/remote signaling), Up=2.5kV, In=20kA (820uS)	
System		
Topology	Transformerless	
Max. Efficiency	99.1%	
CEC Efficiency	98.5%	
Stand-by / Night Consumption	<4W	
Environment		
Enclosure Protection Degree	NEMA Type 4X	
Cooling Method	Variable speed cooling fans	
Operating Temperature Range	-22°F to +140°F / -30°C to +40°C (operating from +113°F / +45°C)	
Non-Operating Temperature Range ⁶	-40°F to +158°F / -40°C to +70°C maximum	
Operating Humidity	0-100%	
Operating Altitude	8200ft / 2500m (no derating)	
Audible Noise	<55dBA@1m and 25°C	
Display and Communication		
User Interface and Display	LED Indicators, WiFi + APP	
Inverter Monitoring	Modbus RS485	
Site Level Monitoring	CPS Flex Gateway (1 per 32 inverters)	
Modbus Data Mapping	SunSpec/CPS	
Remote Diagnostics / FW Upgrade Functions	Standard / with Flex Gateway	
Mechanical		
Dimensions (WxHxD)	45.28x24.25x9.84in (1150x616x250mm) with Standard Wire-box 39.37x24.25x9.84in (1000x616x250mm) with Centralized Wire-box	
Weight	Inverter: 121lbs / 55kg; Wire-box: 55lbs / 25kg (Standard Wire-box); 33lbs / 15kg (Centralized Wire-box)	
Mounting / Installation Angle	15 - 40 degrees from horizontal (vertical or angled)	
AC Termination	M10 Stud Type Terminal Block (D6) (Wire range: 10AWG - 500kcmil CU/AL, Lugs not supplied) Screw Clamp Terminal Block (N) (#12 - 10AWG CU/AL)	
DC Termination	Screw Clamp Fuse Holder (Wire range: #12 - #14AWG CU) - Standard Wire-box Busbar, MB PEMs (Wire range: #14AWG - 550kcmil CU/AL, Lugs not supplied) - Centralized Wire-box	
Fused String Inputs	15A or 20A fuses provided (Determined by product SKU)	
Safety	UL1741-SA-2016, CSA-C22.2 NO.107.1-01, IEEE1547a-2014, FCC PART15	
Safety and EMC Standard	UL1741-SA-2016, CSA-C22.2 NO.107.1-01, IEEE1547a-2014, FCC PART15	
Selectable Grid Standard	IEEE 1547a-2014, CA Rule 21, ISO-91	
Smart-Grid Features	Volt-RideThru, Freq-RideThru, Ramp-Rate, Specified-PF, Volt-VAr, Freq-Watt, Volt-Watt	
Warranty	Standard ⁷ 5 years Extended Terms 10, 15 and 20 years	

¹ See user manual for further information regarding MPPT Voltage Range when operating at non-unity PF
² Max. AC Apparent Power rating valid with MPPT voltage range and temperature range of 30°C to +40°C (82°F to +104°F) for 100kW PF 20 and 150kW PF 20.05
³ The "Output Voltage Range" and "Output Frequency Range" may differ according to the specific grid standard.
⁴ If not pre-arranged, data may not be correct.
⁵ See user manual for further requirements regarding non-operating conditions.
⁶ 5 year warranty effective for units purchased after October 1st, 2019.



NEW ENERGY EQUITY, LLC
2530 RIVA ROAD, SUITE 200
ANNAPOLIS, MD 21041
NEWENERGYEQUITY.COM
443-267-5012

PROJECT ADDRESS
924 21ST ST
WABASHA, MN 55981

LAT: 44.3633924125
LONG: -92.0267205706

SYSTEM SPECIFICATIONS

SYSTEM SIZE DC	1.452 MW
SYSTEM SIZE AC	1.000 MW
DC/AC RATIO	1.452
AZIMUTH	180°
TILT	+/- 52°
MODULE COUNT	3822
MODULE TYPE	REC 380TP72
MODULE STC RATING	380 W
INVERTER COUNT	8
INVERTER TYPE	CPS SCA125KTL-DO/US
INVERTER POWER	125kW
RACKING	TBD
MONITORING	ALSO ENERGY

DESIGN CRITERIA

MIN/MAX TEMP.	-28°C / 32°C
WIND SPEED (ASCE 7-10)	105 MPH
BUILDING CATEGORY	I
EXPOSURE CATEGORY	C
GROUND SNOW LOAD	50 PSF
BUILDING HEIGHT	0'-0"

OTHER NOTES

CASE NUMBER 03651411

NO POSITION, DISTANCE, OR CLEARANCE
ISSUES WITH OVERHEAD ELECTRIC
SERVICE LINES OR OTHER UTILITIES IN
RELATION TO THE PV PANELS.

24/ 7 UNESCORTED KEYLESS ACCESS
PROVIDED FOR THE METERS AND AC
DISCONNECT.

REVISIONS

#	DESCRIPTION	BY	DATE
0	ORIGINAL DESIGN	SPC	3/20/2020
1			
2			
3			
4			
5			
6			
7			

DRAWN BY

STEVEN CHAN

PROJECT NAME

STEGEMANN CSG

DRAWING TITLE

EQUIPMENT DOCUMENTS

SCALE¹

NTS

SHEET

E4

REC TWINPEAK 25 MONO 72 SERIES

PREMIUM SOLAR PANELS
100% MADE IN SINGAPORE

REC TwinPeak 25 Mono 72 Series solar panels feature an innovative design with high efficiency and an industry-leading lightweight, yet robust construction, enabling customers to get the most out of the installation area.

Combined with the product quality and reliability of a strong and established European brand, REC TwinPeak 25 Mono 72 Series panels are ideal for all types of commercial rooftop and utility installations worldwide.

NOW
WITH NEW
WARRANTY!

INTEGRATED MANUFACTURING IN SINGAPORE



WAFERS



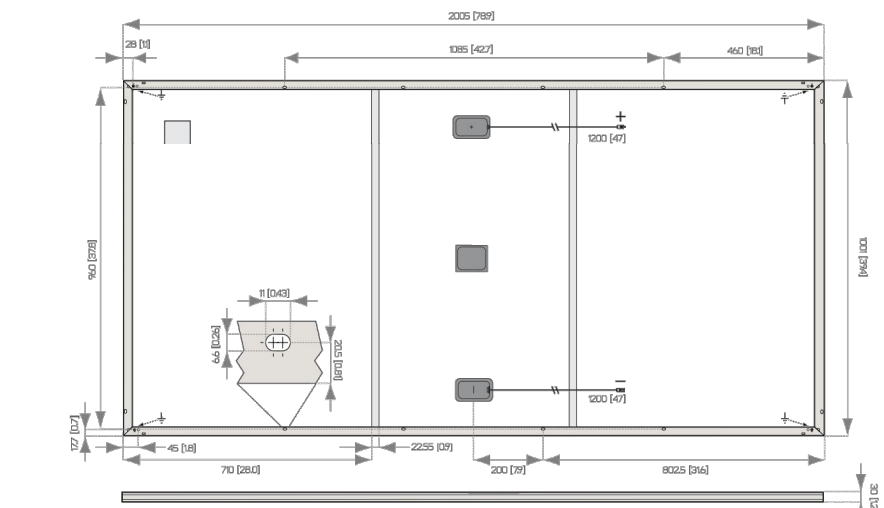
CELLS



MODULES



REC TWINPEAK 25 MONO 72 SERIES



All measurements in mm [in]

ELECTRICAL DATA @ STC	Product Code ¹ : RECxxxTP25M 72
Nominal Power - P _{nom} (Wp)	360 365 370 375 380
Watt Class Sorting - (W)	-0/+5 -0/+5 -0/+5 -0/+5 -0/+5
Nominal Power Voltage - V _{mp} (V)	39.4 39.6 39.8 40.1 40.3
Nominal Power Current - I _{mp} (A)	9.14 9.22 9.30 9.36 9.43
Open Circuit Voltage - V _{oc} (V)	47.4 47.6 47.8 48.0 48.2
Short Circuit Current - I _{sc} (A)	9.74 9.82 9.85 9.96 10.05
Panel Efficiency (%)	17.9 18.2 18.4 18.7 18.9

Values at standard test conditions STC (airmass AM 1.5, irradiance 1000 W/m², cell temperature 77°F (25°C).
At low irradiance of 200 W/m² (SAT 1.5) and cell temperature 77°F (25°C) at least 95% of the STC module efficiency will be achieved.
¹ xxx indicates the nominal power class (P_{nom}) at STC, and can be followed by the suffix XY for modules with a 500 V maximum system rating.

ELECTRICAL DATA @ NOCT	Product Code ¹ : RECxxxTP25M 72
Nominal Power - P _{nom} (Wp)	271 274 278 282 286
Nominal Power Voltage - V _{mp} (V)	36.6 36.8 37.0 37.3 37.5
Nominal Power Current - I _{mp} (A)	7.39 7.45 7.51 7.56 7.62
Open Circuit Voltage - V _{oc} (V)	44.1 44.3 44.4 44.6 44.8
Short Circuit Current - I _{sc} (A)	7.87 7.93 7.96 8.05 8.12

Nominal cell operating temperature NOCT 1800 W/m² AM 1.5, wind speed 1 m/s, ambient temperature 45°F (10°C).
¹ xxx indicates the nominal power class (P_{nom}) at STC, and can be followed by the suffix XY for modules with a 500 V maximum system rating.

CERTIFICATION



UL 1703, Fire classification: Type I (500V XY), Type 2 (1000V)
IEC 61215, IEC 61730, IEC 62104 (P0), IEC 62716 (Anomalous)
IEC 61730 (Type II, Max level II)
ISO 9001:2015, ISO 14001:2015, CE, CEAS 18001:2017

WARRANTY

20 year product warranty
25 year linear power output warranty
Max. performance degradation of 0.5% p.a. from 97.5% to year 1
See warranty conditions for further details.

18.9% EFFICIENCY
20 YEAR PRODUCT WARRANTY
25 YEAR LINEAR POWER OUTPUT WARRANTY

TEMPERATURE RATINGS
Nominal Operating Cell Temperature (NOCT): 44.9°C (±2°C)
Temperature Coefficient of P _{mp} : -0.37%/°C
Temperature Coefficient of V _{mp} : -0.28%/°C
Temperature Coefficient of I _{sc} : 0.04%/°C

GENERAL DATA
Cell type: 144 half-cut monocrystalline PERC cells 5 strings of 24 cells in series
Glass: 0.13" (3.2 mm) solar glass with anti-reflection surface treatment
Back Sheet: Highly resistant polyester
Frame: Anodized aluminum (painted to backsheet)
Support bars: Anodized aluminum (bonded to backsheet)
Junction Box: IP67 rated with 3 bypass diodes 12 AWG (4 mm ²) PV wires, 47" ± 47" (1.2 m ± 1.2 m)
Connectors: Tongtan TL-Cable (0.5" ± 14 mm) Origins: Made in Singapore

MAXIMUM RATINGS
Operational Temperature: -40 ~ +85°F (-40 ~ +85°C)
Maximum System Voltage: 1000 V / 1500 V* *dependent on inverter type
Design Load: (4) 75.2 lbs/ft ² (3600 Pa) Design Load: (3) 33.4 lbs/ft ² (1600 Pa) Refer to installation instructions
Max Series Fuse Rating: 20 A
Max Reverse Current: 20 A

MECHANICAL DATA

Dimensions: 78.9" x 39.4" x 1.2" (2005 x 1003 x 30 mm)
Area: 216 ft ² (20.1 m ²)
Weight: 48.5 lbs (22 kg)

Note: Specifications subject to change without notice.



www.recgroup.com

IMS CSG

EQUIPMENT SPECIFICATIONS

Prepared for:

Innovative Power Systems

**2670 Patton Rd,
Roseville, MN 55113**

**Location: St Joseph, MN
Date: March 15, 2017**



EVS Project No.: 2017-023.1

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1- SYSTEM DESCRIPTION:

The IMS 972KW solar PV project is rated to 972 kW AC/ 1.302 kW DC.

The system consists of the following:

- A. 3888 modules (REC Solar REC335PE 72, 335W, 1000V modules) feed into inverters.
- B. 27 inverters (CHINT SCA36KTL-DO/US, 480 inverter W/integrated DC and AC disconnects) which feed into 4 MLO panels.
- C. Low voltage switchgear- 1600A, 480V, 3 phase, 4 wire, 3R which is connected to the 480V side of the step-up transformer.
- D. Step up three phase pad mounted transformer- 1.5MVA, 12. 47kV:480V, 5.32%
- E. Zig-zag grounding transformer on the 480V side

The 3888 modules are divided into strings and each string has 18 modules.

- Each inverter has 8 strings input of 18 modules each.

2- 1.5MVA STEP-UP TRANSFORMER SPECS:

IMS Step-up Power Transformer	
Item	Description
General	Liquid Filled Pad Mounted Transformer - Three Phase
Standards	ANSI/IEEE C57
Primary	12470/7200 V grounded wye - 95 kV BIL
Secondary	480/270 V Grounded wye - 30 kV BIL
MVA	1.5
Frequency	60 Hz
Impedance	5.32%
Temperature Rise	55-65 degree Celsius at rated KVA in a 30 degree Celsius ambient
Primary Taps	(2) +/- 2-1/2%
Windings	Aluminum
Liquid	Envirotemp FR3 Fluid
Fuses	Internal – Expulsion and Current Limiting
Gauges	Thermometer, Pressure-Vacuum, Oil Level
Relief	Pressure relief device
Arresters	Primary 10.2 kV MCOV
Color	ANSI #70 light gray

3- LOW VOLTAGE SWITCHGEAR SPECS:

IMS 480V Pad-mount Low Voltage Switchgear	
Item	Description
General	Low Voltage switchboard
Standards	UL Standard 891, NEMA PB-2 (Switchboard Standards)
Voltage	480V 3P, 4W
BIL	30 kV
Frequency	60 Hz
Main Bus	1600A Copper
Design	Outdoor, NEMA 3R, Non-walk-in, Service Entrance Rated
Fault Rating	65 kA
Main CB	1600A, 42kA, Draw-out, insulated case, LSIG Trip. Provide arc flash maintenance switch
Utility Production Metering Section	Metering Section per Xcel Energy TR-40 requirements (Xcel will supply the metering sockets and everything. We just need a section per TR-40 requirements)
Isolation Switch (unfused)	1600A with lockout provision, UL 98, 65 kA minimum
480V Feeder Circuit Breakers	molded case w/electronic trip, 35 kA, LOTO provisions. 3x400 Amps & 1x350 Amps, per drawing.
Aux Transformer	10 kVA, single-phase, 480 L-L - 120/240V. Primary fused (25A)
Aux Power Panel	120/240V, 40A, MCB, 10 kA, Feeders as shown on schedule.
Heaters	Provide (1) condensate heater per section - 250W, 120V - powered by aux panel. Provide adjustable thermostat.
Color	ANSI #70 light gray
Misc.	Provide top lifting provisions.
	Provide (2) 120V, 20A, GFI outlets.
	Provide exterior padlock provisions.
	Provide nameplates per equipment section

120/240V Auxiliary Power Panel Schedule		
Circuit	CB Size (A)	# Poles
Main	50	2
One Heater/section	20	1
DAS System	20	1
GFI Outlet #1	20	1
GFI Outlet #2	20	1
Spare	20	1
Spare	20	1
Spare	20	1
Spare	20	1

4- GROUNDING TRANSFORMER SPECS:

IMS Zig-Zag Grounding Transformer	
Item	Description
General	Low Voltage, Dry-Type, Zig-Zag, Grounding Transformer
Standards	ANSI C57, UL
Voltage	480V, 3P
BIL	30 KV
Frequency	60 Hz
Windings	Aluminum
Enclosure	3R powder coat painted enclosure
Zero Sequence Reactance (X0) - per phase	0.1422 ohm +/- 10% (On a 0.972 MVA, 480V base)
X0/R0 Ratio	Must be ≥ 4
Zero Sequence Current (I0)	Must exceed 78.34 A, per phase
Neutral Current (In)	Must exceed 235 A continuous
5 second Withstand Rating	2770.1 A
Relay	SEL-751 In Cabinet Relay

NOTE: Don't proceed with the procurement of the Zig-zag grounding transformer before having the calculations document approved by Xcel.

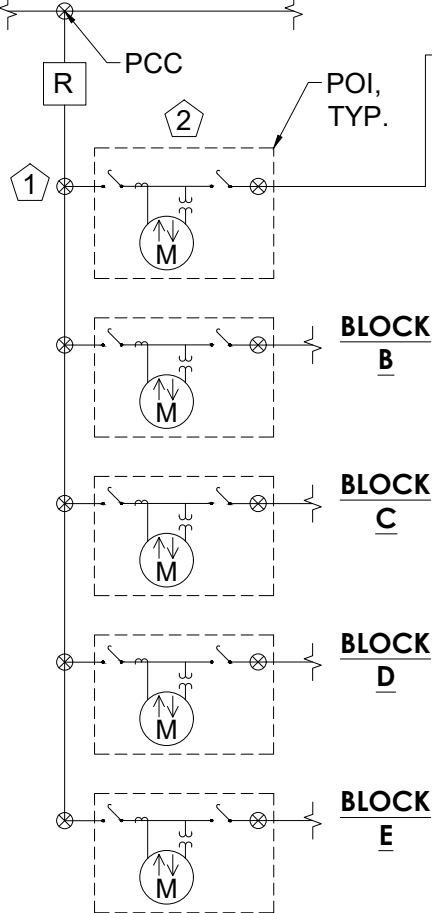


IMS				
972 KW Project, Zig-Zag Grounding Transformer Connecting at 480V side				
Main Transformer Specs		Inverters Specs		THESE CALCULATIONS NEED TO BE APPROVED BY XCEL BEFORE PROCEEDING WITH THE GROUNDING ZIG-ZAG TRANSFORMER PROCUREMENT.
Primary (v)	12470/7200 Grounded wye	Type	CHINT SCA36KTL	
Secondary (v)	480/277 Grounded wye	I _{ac, max} (A)	43.5	
Size (kVA)	1500	Contributory Fault Current (A)	60	
Impedance (%)	5.32	Rated Power (kW)	36	
Xcel Requirement #	Description	Formulas		Zig-Zag Transformer Specifications/Results
1	Zero Sequence Reactance (X ₀) - per phase	1- X _{0, DG} = 0.6(Z _{base}) Ω ± 10% 2- Z _{base} = KV ² /MVAPV = 0.48 ² /0.972 = 0.2370 Ω 3- X ₀ = 0.6*(0.2370) Ω ± 10% = 0.1422 ± 10%		1- X ₀ = 0.1422 Ω ± 10% (On a 972 KVA, 480V base)
2	X _{0, DG} /R _{0, DG} ≥ 4	1- X _{0, DG} /R _{0, DG} ≥ 4 2- X _{0, DG} /4 ≥ R ₀ 3- R _{0, DG} ≤ (0.1422 ± 10%)/4 4- R _{0, DG} Must be ≤ 0.0355 ± 10%		1- X _{0, DG} /R _{0, DG} ≥ 4 2- R _{0, DG} Must be ≤ 0.0355 ± 10%
3	Zig-Zag Transformer must withstand V ₀ = 4% and remain connected; Determine the continuous current (I _n) and transformer per phase rating (I ₀) associated with V ₀ = 4%	1- I ₀ = I _{base} *I _{0, p.u.} 2- I _{base} = V _{base} /Z _{base} = (480/1.73)/0.2370 = 1170 A 3- I _{0, p.u.} = V ₀ /Z ₀ = 0.04/0.6 = 0.067 p.u. 4- I ₀ = 1170*0.067 = 78.34 A 5- I _n = 3*(I ₀) = 3*78.34 = 235 A		1- I ₀ , Per Phase Rating, must be > 78.34 A 2- I _n , Neutral Current, must be > 235 A
4	5 second Withstand Rating	1- XFMR secondary fault current = 33909.8 A 2- PV Contribution = (Inverters numbers* Contributory Fault Current) = 60*27 = 1620 A 3- 5 second withstanding rating fault current = 277/ (0.1422 + (277/ (33909.8 + 1620))) = 1846.8 A 4- 1846.8*1.5= 2770.1 A		1- Transformer 5 Second withstanding rating, must be > 2770.1 A

$S = V_{L-G} * I_n / 1.73 = 277 * 235 / 1.73 = 37.6 \text{KVA}$

$Z = \sqrt{X^2 + R^2} = 0.1465 \Omega \quad Z = 14.65\%$

EXISTING XCEL 12.5KV
3PH DISTRIBUTION LINE



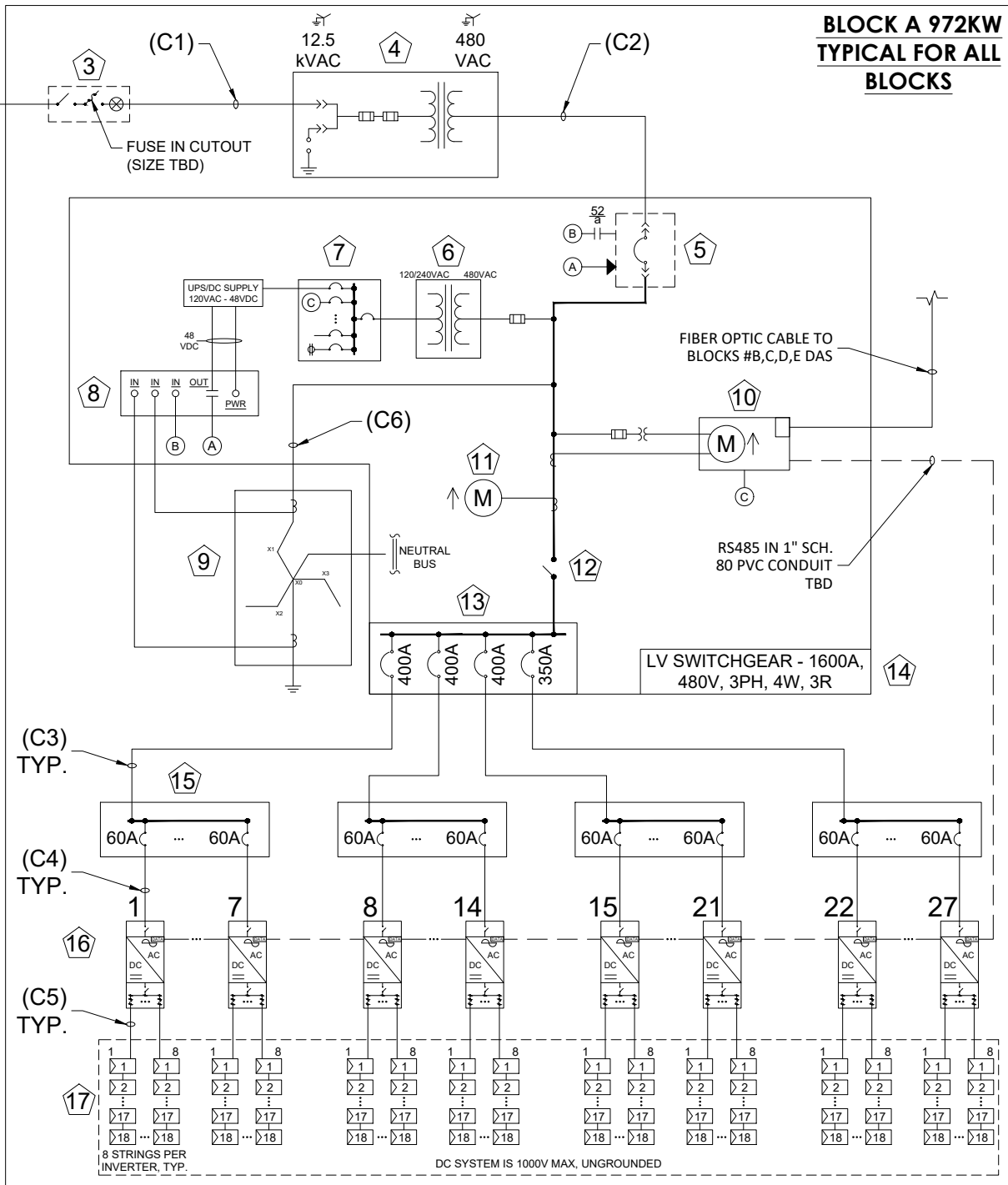
Placard Calcs: REC335TP72 335W	
Imp (A)	8.75
Vmp (V)	38.30
Voc (V)	46.20
Isc (A)	9.27
TcVoc (%/°C)	-0.31
Extreme Low Temp (°C)	-32.00
# Modules in Series	18.00
# Source Circuits	8.00

Rated MPP Current (A)	70.00
Rated MPP Voltage (V)	689.40
Max. System Voltage (V)	978.54
SC Current (A)	92.70

DC STRING WIRING CONDUIT FILL

PVC SCH. 80 CONDUIT SIZE	MAX NUMBER OF #10 PV CONDUCTORS
1"	4 (2 STRINGS)
1 1/4"	10 (5 STRINGS)
1 1/2"	14 (7 STRINGS)
2"	20 (10 STRINGS)
1. DO NOT EXCEED 20 CONDUCTORS IN ONE CONDUIT. THIS WILL DERATE THE CONDUCTOR AMPACITY AND REQUIRE UPSIZING OF THE WIRE.	
2. CONDUIT FILL IS FOR #10 AWG RHW-2 PV WIRE CONDUCTORS (OD = 0.24") INCLUDING [1] #6 AWG BARE COPPER GROUND WIRE.	

CUSTOMER RESPONSIBILITY
UTILITY RESPONSIBILITY



CABLE LIST

ID # (CX)	WIRE QTY.	WIRE SIZE	CONDUCTOR MATERIAL	INSULATION	SIZE / TYPE OF GROUND	CONDUIT
1	3	1/0 AWG	AL	15kV, TRXLPE W/ 16x #14 AWG CU JCN	4/0 BARE CU	DIRECT BURIED / (1) 4" PVC
2	12	500 MCM	CU	600V, XHHW-2	4/0 CU XHHW-2	(3) 4" PVC
3	4	500 MCM	CU	600V, XHHW-2	#3 CU XHHW-2	(1) 4" PVC
4	4	#4 AWG	CU	600V, XHHW-2	#10 CU XHHW-2	(1) 1.5" PVC
5	2	#10 AWG	CU	2kV, PV-WIRE	#6 BARE CU	OPEN AIR / (1) 1" PVC
6	4	#4 AWG	CU	600V, XHHW-2	#8 CU XHHW-2	(1) 1.5" PVC

972kW BLOCK SCHEDULE

ID #	QTY. (5 TOTAL ON SITE)	DESCRIPTION	LABEL SHEET NUMBERS
1	1	UTILITY PROVIDED INTERCONNECTION POLE	
2	1	XCEL OWNED POLE MOUNTED BI-DIRECTION PRIMARY BILLING METER W/ SINGLE PHASE HOOK SWITCHES PER BLUE BOOK DRAWING PM-10	11,12,18
3	1	CUSTOMER PROVIDED RISER POLE W/ 3PH GANG OPERATED AERIAL SWITCH W/ FUSED CUTOUT	
4	1	CUSTOMER PROVIDED 1.5MVA TRANSFORMER, 12.5KV: 480V Z=5.32%, GROUNDED WYE:GROUNDED WYE	17,23
5	1	MAIN AC DISCONNECT: 1600A DRAW-OUT STYLE MAIN CIRCUIT BREAKER W/ LSIG TRIP TO BE VISIBLE, LOCKABLE, READILY ACCESSIBLE	2,4,6,8,9,13
6	1	AUX XFMR-10kVA, 1PH, 480 L-L :120/240V W/ 25A FUSES	
7	1	HOUSE POWER 40A LOAD CENTER 120/240V	
8	1	SEL 751 GROUNDING TRANSFORMER RELAY	
9	1	ZIG-ZAG GROUNDING TRANSFORMER	
10	1	LOCUS LGATE 360 DATA ACQUISITION SYSTEM (DAS) W/ CUSTOMER REVENUE METER 480V, 3PH, 4W	24
11	1	XCEL PRODUCTION METER 480V, 3PH, 4W PER BLUE BOOK DRAWING TR-40	1,11,12,13
12	1	UTILITY AC DISCONNECT: CUSTOMER PROVIDED 1600A, VISIBLE BLADE, LOCKABLE, READILY ACCESSIBLE	2,4,6,8,10,20
13	1	MLO PANEL W/ (3) 400A, (1) 350A FEEDER BREAKERS	
14	1	LOW VOLTAGE SWITCHGEAR, 1600A, 480V, 3PH, 4W, 3R	7,11,12,13,16,17
15	4	AC COMBINER PANEL W/ 60A BREAKERS 400A, 480V 3PH, 4W, 3R	2,7,14,15
16	27	CHINT SCA36KTL-DO/US-480 36kW, 480V INVERTER W/ INTEGRATED DC AND AC DISCONNECTS	3,5,21,22
17	3888	REC SOLAR REC335TP 72 335W, 1000V MODULES	

LEGEND

	PV MODULE		FUSE
	INVERTER W/ INTEGRATED DC AND AC DISCONNECTS		DRAW-OUT STYLE CIRCUIT BREAKER
	CIRCUIT BREAKER		SURGE ARRESTOR
	DISCONNECT SWITCH		GROUNDED WYE
	SINGLE PHASE HOOK SWITCH		EQUIPMENT SCHEDULE ID TAG
	METER		(CX) CABLE IDENTIFIER
	CURRENT TRANSFORMER (CT)		OVERHEAD POLE
	POTENTIAL TRANSFORMER (PT)		RECLOSER
	GFCI OUTLET		IDENTIFICATION TAG
	FUSED CUTOUT		GROUNDING POINT



CLIENT



SCALE

PROJECT
IMS

LOCATION
11400 COUNTY RD 51
ST. JOSEPH, MN
56374
SHEET
**ONE LINE &
CABLE LIST**

SUBMITTAL
50% SUBMITTAL

#	DATE	REVISION

DRAWN BY
K HAAB
DATE
03.15.17

CHECKED BY
S DAS
PROJECT #
2017-023.1

SHEET NUMBER

E-201-02
Page 7



TWIN CITY SEED COMPANY

35-241

Mesic Prairie General

Common Name	Scientific Name	Rate (kg/ha)	Rate (lb/ac)	% of Mix (% by wt)	Seeds/sq ft
big bluestem	<i>Andropogon gerardii</i>	2.24	2.00	5.48%	7.35
side-oats grama	<i>Bouteloua curtipendula</i>	1.79	1.60	4.39%	3.53
kalm's brome	<i>Bromus kalmii</i>	0.56	0.50	1.37%	1.47
nodding wild rye	<i>Elymus canadensis</i>	1.31	1.17	3.20%	2.23
slender wheatgrass	<i>Elymus trachycaulus</i>	1.12	1.00	2.73%	2.53
switchgrass	<i>Panicum virgatum</i>	0.07	0.06	0.17%	0.32
little bluestem	<i>Schizachyrium scoparium</i>	1.79	1.60	4.39%	8.82
Indian grass	<i>Sorghastrum nutans</i>	2.24	2.00	5.48%	8.82
prairie dropseed	<i>Sporobolus heterolepis</i>	0.08	0.07	0.18%	0.39
Total Grasses		11.21	10.00	27.39%	35.46
blue giant hyssop	<i>Agastache foeniculum</i>	0.07	0.06	0.15%	1.82
lead plant	<i>Amorpha canescens</i>	0.07	0.06	0.15%	0.25
common milkweed	<i>Asclepias syriaca</i>	0.04	0.04	0.10%	0.06
butterfly milkweed	<i>Asclepias tuberosa</i>	0.04	0.04	0.10%	0.06
Canada milk vetch	<i>Astragalus canadensis</i>	0.07	0.06	0.17%	0.39
white prairie clover	<i>Dalea candida</i>	0.07	0.06	0.17%	0.44
purple prairie clover	<i>Dalea purpurea</i>	0.21	0.19	0.51%	1.03
Canada tick trefoil	<i>Desmodium canadense</i>	0.07	0.06	0.18%	0.13
stiff sunflower	<i>Helianthus pauciflorus</i>	0.07	0.06	0.17%	0.09
ox-eye	<i>Heliopsis helianthoides</i>	0.15	0.13	0.34%	0.29
rough blazing star	<i>Liatris aspera</i>	0.03	0.03	0.08%	0.18
great blazing star	<i>Liatris pycnostachya</i>	0.03	0.03	0.09%	0.13
wild bergamot	<i>Monarda fistulosa</i>	0.07	0.06	0.17%	1.61
stiff goldenrod	<i>Oligoneuron rigidum</i>	0.07	0.06	0.17%	0.94
black-eyed susan	<i>Rudbeckia hirta</i>	0.35	0.31	0.86%	10.56
heath aster	<i>Symphyotrichum ericoides</i>	0.03	0.03	0.09%	2.30
smooth aster	<i>Symphyotrichum laeve</i>	0.07	0.06	0.17%	1.26
blue vervain	<i>Verbena hastata</i>	0.04	0.04	0.12%	1.50
hoary vervain	<i>Verbena stricta</i>	0.07	0.06	0.17%	0.64
golden alexanders	<i>Zizia aurea</i>	0.07	0.06	0.15%	0.23
Total Forbs		1.68	1.50	4.11%	23.89
Oats	<i>Avena sativa</i>	28.02	25.00	68.50%	11.14
Total Cover Crop		28.02	25.00	68.50%	11.14
Totals:		40.91	36.50	100.00%	70.49
Purpose:	General mesic prairie mix for native roadsides, ecological restoration, or conservation program plantings.				
Planting Area:	Tallgrass Aspen Parklands, Prairie Parkland, and Eastern Broadleaf Forest Provinces. Mn/DOT Districts 2(west), 3B, 4, Metro, 6, 7 & 8.				

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SALVAGE VALUE OF PHOTOVOLTAIC SYSTEMS

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ABSTRACT

As photovoltaic (PV) system prices become less expensive, the salvage value can be increasingly important in life cycle economic calculations. This report examines data from historic utility salvage sales, reliability perspectives, and an actual 2011 salvage operation. From 2005 to 2010, large volume PV modules sold at salvage for a variety of pricing dependent upon strength of glass, amount of easily recycled aluminum, industry reduced average selling price (ASP) of new modules and expectations for future energy production. Reliability of product, both real and perceived, are important factors in resale valuations.

1. INTRODUCTION

Used PV modules have been selling for decades. In 1994 the author purchased slightly brown, nine year old Siemens M-55's pulled from the Carissa Plains California project; they worked well. These modules were re-sold again on E-bay six years later. The value of large scale salvage PV bids have been tracked since 2005 – 2010 and in 2011 we performed a salvage value analysis on one of these bids.

2. LARGE SCALE SALVAGE SALES

The Sacramento Municipal Utility District (SMUD) has been re-selling salvaged PV equipment since 2005. The table presented includes the technology based dollar per nameplate watt prices. Over 0.9 megawatts of nameplate modules were sold during this period.

Winning bids ranged from \$0.04 to \$1.26 / watt. The table shows minimum, maximum, average \$/watt winning price for individual lots and approximate nameplate wattage sold that year. Modules sold included tandem amorphous silicon (a-Si), single crystal (Single) and polycrystal

(Poly) PV. Model numbers included: Solarex MST 43 and MSX 60, Shell SQ 75/80, Solec SP-102 and SQ-80, and Siemens M55's. Some modules had been panelized, as shown in Photo #1 demonstrating well handled, nicely stacked and high resale valued of crystalline PV modules.

3. ECONOMICS

Most engineering students are required to learn present value calculations for comparing the life cycle economics of different systems solutions. These calculations include capitol costs, maintenance costs, any gradually increasing costs or escalating costs (like an increasing electrical utility bill) and salvage values. In the past, PV systems typically didn't include salvage value because there wasn't a recognized resale market. In addition, the life expectancy of PV systems is 20 years or more, thus present value salvage values were considered minimal in comparison to yesteryear's high capital costs. Removal costs should be factored into the economic calculations.

Working modules have some value, based on the electricity they can generate for the remainder of their useful life. It is possible that high value, non-breakable glass modules can consistently obtain half the going retail rate per watt.

A module selling for \$0.20 / watt salvage value at the end of 20 years, using a 6% discount rate has a present value of \$0.06; however at \$1.26 / watt the salvage value is \$0.39 today. Present value salvage values can now be subtracted from today's installed systems costs with confidence that they will be resold.

4. BANK ESTIMATION OF VALUE

An investigation into large scale bank financed PV projects indicates that banks use residual values ranging from 15-25%. Banks base this on 3rd party appraisals,

TABLE 1: SMUD WINNING BIDS, 2005 TO 2010 SALVAGE SALES

Winning Bids from 6 Years of Surplus Photovoltaic Sales at SMUD										
	2005		2006		2007		2008		2009	
Bid Lot	Type	Price Per watt	Type	Price Per watt	Type	Price Per watt	Type	Price Per watt	Type	Price Per watt
1	a-Si	\$0.46	a-Si	\$0.46	Single	\$0.78	a-Si	\$0.53	a-Si	\$0.07
2	a-Si	\$0.46	a-Si	\$0.31	Single	\$0.66	a-Si	\$0.50	a-Si	\$0.06
3	a-Si	\$0.46	a-Si	\$0.20	Single	\$0.77	a-Si	\$0.97	a-Si	\$0.04
4	Poly	\$0.98	a-Si	\$0.22	Single	\$0.82	Poly	\$0.44	a-Si	\$0.06
5	Poly	\$0.75	a-Si	\$0.24	Single	\$0.73	Poly	\$1.15	a-Si	\$0.04
6	Single	\$0.51	Single	\$0.66	Single	\$0.82	Single	\$0.54	a-Si	\$0.04
7	Single	\$0.51	Single	\$1.04	Single	\$0.72	Single	\$0.83	Poly	\$0.17
8	Single	\$0.61	Single	\$1.26	Single	\$0.48	Single	\$0.88	Poly	\$0.48
9	Single	\$0.61	Single	\$0.77	Single	\$0.66	Single	\$0.76	Poly	\$0.24
10	Single	\$0.61	Single	\$0.77	Single	\$0.82	Single	\$0.88	Poly	\$0.29
11			Single	\$0.92	Single	\$0.78	Single	\$0.91	Poly	\$0.21
12					Single	\$0.82	Single	\$0.72	Poly	\$0.17
13					Single	\$0.52	Single	\$0.56	Poly	\$0.23
14							Single	\$0.72	Single	\$0.25
15							Single	\$0.65	Single	\$0.24
16									Single	\$0.17
17									Single	\$0.30
18									Single	\$0.16
Min		\$0.46		\$0.20		\$0.48		\$0.44		\$0.04
Max		\$0.98		\$1.26		\$0.82		\$1.15		\$0.48
Total kW		150		69		177		136		212
										160

**Photo 1: Stacked single crystal silicon salvage sales PV panels.**

which the banks then reduced by 50 to 70%. Two reported appraisals approaches used by banks include:

1) An income approach. Banks assumed a useful life of 35 years for both crystalline and a-Si, then discounted back the future energy revenues from years 21-35, back to year 20. Because of an anticipated rise in value of the electricity PV module would generate after 20 years, the 15 years of energy revenue (at year 20) results in very high residual values (in the 50-70% range). This income approach recognizes that functioning modules will always have an energy revenue value based on life expectancy and in comparison to future alternative electric generation costs.

2) A replacement value approach. What might PV modules cost down the road, for a new buyer that had the choice of buying used modules, or the same power generation capability of new modules? A bank might assume a 5% decline in the cost of a module every year, and a 5% gain in energy value every year. When you factor in what a PV module should cost (without regards to oversupply / undersupply), based on these historical trends, you get a value of what a person should be willing to pay per watt for a used PV module at any given year, vs. the alternative of purchasing a new PV module.

5. RESALE MARKETS

Used or salvaged modules are bought and sold in a number of ways. In some cases, they can be installed into non-incentivized systems like off grid markets. Or they might be showing up in resale channels like on E-Bay, Craigslist or classified section of Home Power Magazine. We were able to sell 15 year old modules for approximately \$0.50 / watt in 2011.

It is possible individual modules are being sold into existing systems where a component has broken. All modules in a system should perform at exactly the same level, thus avoiding miss match conditions that reduce overall system performance. Similar to a fine china dinner set that has a broken plate; specific modules have a high replacement value, even if they are a used module. If an existing PV system has a problem with an individual module, replacing that module could have a very high system level value.

Used modules could be sold into a wholesale green power generator; however a tax credit or renewable energy credits (RECs) for the installation would not be allowable because the PV materials are not new.

Scrap markets can utilize crystalline cells, as well as the aluminum frames, thus non-working crystalline modules can have an attractive scrap value. Various PV recycling programs have begun around the world including PV

ReCycling with headquarters in Tucson Arizona and additional collection point in San Jose CA.

6. ENERGY and GLASS

Most PV technologies lose 1% per year in performance consistent with typical 20 year, 80% power warranties. A module with an original standard test condition (STC) power output rating of 100 watts will probably be producing 90 watts at STC after ten years, 80 watts after 20 years. Used modules can be tested for their performance using a max power point current / voltage meter, correcting for module temperature and actual solar radiation normalized to the STC conditions of 1,000 watts per square meter and 25 degrees centigrade cell temperature.

It is important to note that the SMUD salvage sales illustrates a-Si on breakable float glass has considerable less salvage value than single or poly silicon technologies using tempered glass (see Photo #2). CdTe might have similar issues with removability and transportability of the more fragile glass compared with tempered glass of crystalline PV. Even tempered glass is subject to breakage during decommissioning, removal transportation and storage activities (see Photo #4) . If flexible PV like United Solar or other newer flexible PV players in the market were designed for removability, it is possible the salvage value would be even higher than glass based PV.



Photo 2: Poorly handled float glass a-Si for bid 2005

Visual factors including browning of EVA was an important factor for resale, with large amounts of browning, as shown in the 15 year old single crystals cells of Photo 5, dramatically reducing the resale value.

7. SALVAGE OPERATION

In 2011 we examined the 144 Solec SP-102's 24 volt modules shown in photo #3 for the actual resale value. Operating modules produced approximately 85 watts in full sun, consistent with a 1%/year degradation. Performance was measured with a 100 watt variable resistor providing

voltage open circuit, short circuit current and an approximation of voltage and current at max power in full sunlight. Good modules with junction boxes sold on a roadside in Grass Valley CA for between \$30 and \$50 each. Modules without junction boxes sold in bulk for \$20 each. Approximately 15% of the modules were discarded because of glass breakage, delamination, serious browning of EVA, obvious burn marks on interconnections or damaged backsheets. Angle aluminum used to panelize the modules was salvaged at a high value.

The time needed to transport, warehouse, clean, examine, sort, inventory, and sell the surplus modules considerably reduced the value of the salvage operation. Ideally modules are taken out of service and immediately installed in a new location.



Photo 3: 1995 Solec SP-102's piled up in 2010.



Photo 4: Side by side broken and good quality modules.

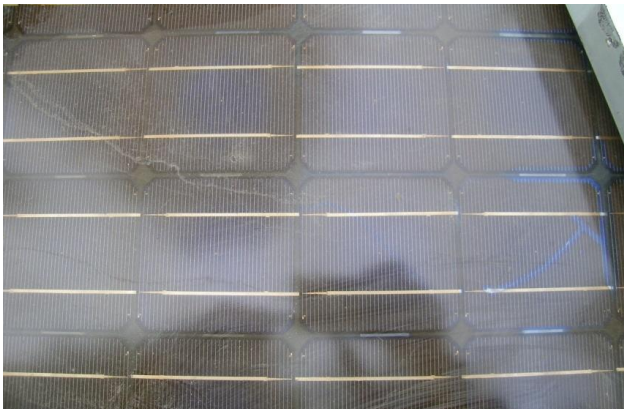


Photo 5: EVA discoloration.



Photo 6: Selling PV in northern CA 2011.

8. CONCLUSION

There is a healthy resale market for PV modules that should be recognized in project level economic calculations. As systems costs become lower and lower, salvage value have more significant ramifications. Functioning modules will have a revenue value based on life/performance expectations considering the additional shipping and handling costs in comparison to other alternatives to electric generation. The fragility due to glass used in PV modules has important resale value ramifications. Non-glass modules should have greater resale values because of no potential breakage during removal, and resale. Over time, bank residual values can be compared with actual salvage sales for accuracy in future assumptions. Safety and performance standards for used modules will become more important as salvaged modules show up in greater numbers in future years.

9. ACKNOWLEDGEMENTS

Thanks and appreciations are extended to Brian Robertson, Jigar Shah, Daniel Shugar, Eric McCabe, Jennifer Woolwich, ASES and SMUD (Jon Bertolino and Lynne Valdez).

10 REFERENCES

- (1) Personal Communication, January 26, 2009, Dan Shugar.
- (2) Personal Communication, January 25, 2009, Jigar Shah.
- (3) Personal Communication, January 26, 2009, Brian Robertson.
- (4) SMUD Salvage Sales, 2005 – 2010 (www.smud.org/).
- (5) Personal Communication, On-going, Jennifer Woolwich.
- (6) NREL PVRW 2010 BP Solar presentation
pvrw2010_wohlgemuth.pdf



**Application for Conditional Use Permit for a
Community Solar Garden**

Thursday, June 4, 20
City of Wabasha

Innovative Power Systems (IPS) is requesting rezoning to Industrial, Conditional Use Permit for a period of Thirty-Five years, and a lot combination to construct a 1MW AC photovoltaic community solar garden (solar farm) on approximately 8 acres of land in The City of Wabasha known as PID R27.00110.00, Wabasha County, MN. The site was selected due to its physical characteristics, proximity to existing electrical infrastructure and distribution lines, zoning and permitting requirements, and landowner participation.

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1. Design and Interconnection:

The garden will consist of approximately four thousand one hundred solar panels. The panels are mounted on a steel and aluminum racking structure that tracks the sun along a single axis, and generally averages approximately ten feet above grade. The installation will not exceed a maximum height of twenty feet above grade. The racking system is installed in the ground with pilings (I-beams) that are driven directly into the ground at a depth usually between six feet and ten feet depending on soil conditions. The racking system manufacturer's engineer will provide certification that the design of the foundations and panels are within accepted professional standards, given local soil and climate controls. The equipment is designed to withstand wind up to one hundred twenty MPH and fifty pounds per square foot of snow. Each of the gardens will have one concrete equipment pad, typically less than five hundred square feet, to support interconnection and metering equipment. The only proposed grading that will occur is for the roads and concrete equipment pads. Demonstrative equipment specifications are attached as **Exhibit C.**

The panels will be arranged into rows. Each row of solar panels will connect to an inverter. The inverters will be connected by directionally bored underground conduit that is housed inside of a PVC housing which will be installed two feet below the surface. The conduit will lead to the concrete equipment pad for each garden. The inverters transform the direct current power generated by the photovoltaic system to alternating current power, which is then connected to the existing three-phase power distribution line at the point of interconnection.

The solar array will be contained within an area protected by a fixed knot fence. It will not create any noise, dust, fumes, glare, or other pollutants or nuisance to surrounding neighbors. There will be signage along the fence, approximately 2' x 3', including utility hazard, company information, and contact information on the fence. The solar garden will comply with all applicable state, county, and federal regulations. No exterior lighting is proposed for the project. We do not request the City to provide any services or City personnel.

2. Construction:

IPS would like to begin construction as soon as December 2019 and complete the project before November 2020. The construction process typically takes approximately three months. Operating hours during construction will be 8am-6pm. The site will have a portable toilet for workers. No water supply will be required. Any waste or debris will be gathered in a dumpster that will be removed during construction progress as necessary. Multiple truckloads of equipment will be delivered throughout the construction period. In addition, crews in passenger vehicles, pickup trucks, bobcats and skid steer loaders on tracks will be on site almost every day throughout the construction process. IPS will use appropriate temporary (construction-related) erosion and sediment control best management practices through construction. IPS agrees to the Site Rules attached as **Exhibit D.**

3. Storm Water Management Measures

A licensed civil engineering firm will determine storm water management measures. Measures will include an analysis of the existing topography, the use of erosion control logs and silt fences where necessary, and establishment a germinated pollinator friendly vegetative base underneath the project site before construction begins to prevent erosion.

4. Operations & Emergency Response:

The solar garden site will operate and be monitored 24 hours a day, 365 days a year after construction has been completed. It will be monitored remotely through a computer data acquisition system (DAS) so that appropriate personal can be dispatched to investigate potential problems. Additionally, twice a year qualified solar operations and maintenance crews will perform maintenance on the array and inspect the solar components, array and fence.

Construction, maintenance and decommissioning of the garden will be conducted in accordance with the Innovative Power Systems Safety Manuel, which is attached as **Exhibit E**. The proposed contacts for emergency response as well as ongoing maintenance and operations are local and easily accessible. No chemicals will be used, stored, or disposed of on the modules unless they are certified organic cleaning products.

Drainage, weeds, screening, general operations, maintenance, stray voltage or electrical:
Innovative Power Systems, Inc.
jamieb@ips-solar.com
612-801-5999

5. Access, Parking, Road Use and Maintenance:

Construction and operation and maintenance crews will access to the site by a twelve foot wide gravel road that has a twenty foot entrance connected to Hiawatha Road East on the East part of the property. IPS shall use the existing road and improve it where necessary. Road access will be controlled for erosion control during construction. The road will be sprayed for dust control as necessary. Construction crew parking will be located entirely within the site. No additional permanent parking is required. Maintenance crews will park within the site access road and turnaround area.

6. Landscaping:

IPS has voluntarily participated in the Pollination Pledge, whereby it has agreed to seed with native pollinator friendly vegetation underneath the panels and in surrounding areas within the project site. Seeding will be done as soon as is suitable for good germination. IPS will contract with a local company to maintain the grounds. Vegetation will be mowed and maintained on an as needed basis and in a manner as to maximize

weed and erosion control. Ground cover within the fenced portion of the array will not exceed 24 inches in height.

IPS proposes a seed mix design specific to this site based on the parameters and methodology as defined by Minn. Stat. 216B.1642, using the seed mix attached as **Exhibit H**.

The design goals for this solar garden seed mix will be:

- Withstand harsh climate conditions
- Minimize maintenance costs
- Minimize erosion
- Improve water quality
- Infiltrate storm water runoff

IPS will be responsible for maintaining any existing drain tile system underneath the array and replacing any damage to tile occurring during construction, or any time prior to or during decommissioning. Existing drain tile lines will be identified upon the completion of the ALTA survey prior to construction.

7. Fire Prevention:

This solar array will meet the requirements of the 2012 International Fire Code, specifically to sections 605.11 – 605.11.2 for clearance, markings and location of underground DC conductors. The solar garden will meet the international Building Code (IBC), National Electric Code (NEC), and local electric and fire code. NEC code is produced by the National Fire Protection Agency (NFPA) with safety of the public, contractors, and firefighters as the entire objective. Solar specific Code has been included in the NEC for over a decade. Safety is paramount in our solar PV facilities, as we need them to function optimally for their entire system life.

8. Visual Impact Analysis:

IPS would like to coordinate with the City to determine if vegetative screening is necessary to obstruct the view of the solar array from adjacent properties. IPS would appreciate the City's feedback on where and if it is appropriate. The array is behind another solar array. IPS proposes vegetative screening along the North side of the array due to the home building sites to the North and on part of the East side that is not screened by the other array.

9. Decommissioning Plan:

IPS expects that decommissioning will occur 25-35 years after the date that the system becomes operational. Decommissioning will occur in the event that the array is not used for twelve consecutive months. All structures, foundations, electrical equipment all internal or perimeter access roads will be removed. Soils and vegetation will be restored. Disposal of structures and foundations shall meet the provisions of Wabasha County Solid Waste Ordinance, or comparable City ordinance or successor ordinance.

Installation by IPS will be done with no significant or permanent alterations to the land. The system will be dismantled and removed using minimal impact construction equipment and materials will be safely recycled or disposed. Appropriate temporary construction-related erosion and sediment control best management practices will be used during the decommissioning of the project.

Decommissioning requirements:

The decommissioning party shall:

- a. Obtain any permits required for the decommissioning, removal, and legal disposal of the system components prior to the commencement of the decommissioning activities.
- b. Remove and dispose of all equipment and components.
- c. Remove all hazardous materials (if any) and transport them to be disposed of by licensed contractors at an appropriate facility in accordance with rules and regulations.
- d. If appropriate, grading, and re-vegetation in accordance with permits and in compliance with all applicable rules and regulations.
- e. Preserve and reclaim the soils on the project site to a level of pre-project quality
- f. Reclaim soils in the access driveway and equipment pad areas by removing imported aggregate material and concrete foundations and replacing with soils as needed.
- g. Remove non-biodegradable electrical conduits and backfill trenches with the native soils removed.

Equipment Removal Procedure:

The decommissioning of the project proceeds in reverse order of the installation:

- a. The solar system shall be disconnected from the utility power grid.
- b. PV modules shall be disconnected, unattached, collected, and removed.
- c. Site aboveground and underground electrical interconnection and distribution materials shall be removed and recycled off site by an approved recycler.
- d. PV module support racking shall be removed and recycled off site by an approved recycler.
- e. PV modules support steel and support posts shall be removed and recycled off site by an approved recycler.
- f. Electrical devices, including transformers and inverters, shall be removed and recycled off-suite by an approved recycler.
- g. Concrete pads shall be removed and recycled by an approved recycler.
- h. Fencing shall be removed and recycled by an approved recycler.

Nonfunctioning solar components consist of valuable recyclable materials including silver, semiconductor material, steel, aluminum, copper and plastics that have a significant salvage value. Due to changing market conditions and prices of raw materials, estimating scrap value 25 years in the future is impractical. Also, it is more likely that the System components would be used for continued electrical generation than for scrap.

Information is available regarding what used solar equipment sells for at auction. The American Solar Energy Society conducted a study to assess the resale value of used solar equipment. Data was conducted from the

winning bids of surplus sales. The study is attached as **Exhibit F**. Winning bids for lots larger than .9MW sold for anywhere between \$0.04 and \$1.26 per watt, or \$40,000 to \$1,260,000 per megawatt. The variances in price reflect the conditions of the modules and their suitability for continued use or recyclability. These prices do not represent the additional value of the racking equipment that would be sold after decommissioning of this project. In all cases the prices appeared to exceed removal cost.

IPS estimates that 125% of the cost to meet the requirements of the decommissioning plans is less than \$50,000. IPS or its partners shall submit a financial guarantee in the form of a letter of credit, cash deposit, or bond in favor of the property owner equal to \$50,000.

10. Insurance Information:

IPS's or its successor will provide a certificate of insurance meeting the following requirements:

- Insurance provider must be rated B+ or better by "Best."
- Limits of \$2,000,000 for each occurrence.
- Coverage against claims for damages resulting from bodily injury, wrongful death, and property damage arising out of the Interconnection Customer's ownership and/or operating of the Generation System under the interconnection agreement.
- Contain a severability of interest clause of cross-liability insurance

We at IPS sincerely appreciate all of the help we have received from your staff with regard to our applications and we look forward to collaborating with you further to develop a great project that we can all be proud of.

11. Exhibit List:

- A. Application Form
- B. Site Plan
- C. Equipment Pack
- D. Site Rules
- E. IPS Safety Manuel
- F. Seed Mix
- G. ASES Study



Memorandum

Office of the City Planner

To: Wabasha Planning Commission
From: Alex Conzemius, AICP
Date: May 26, 2020
Subject: CUP application – IPS Development, LLC

MEETING DATE: Tuesday June 9th, 2020

I. REQUEST:

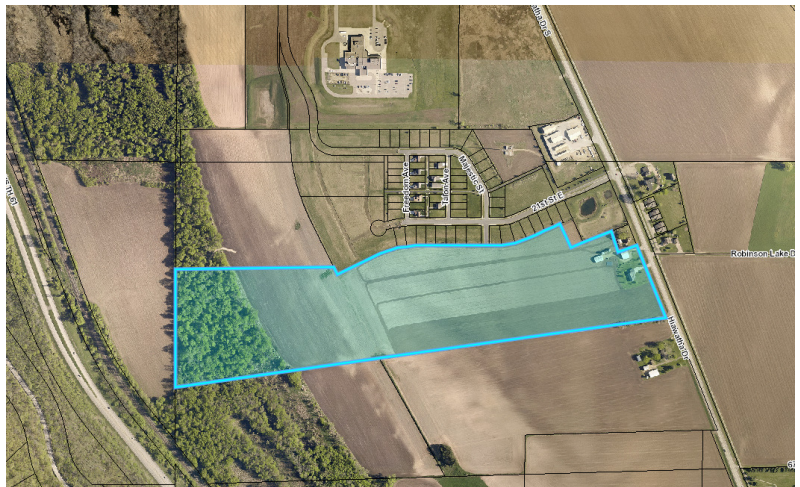
- 1) **Applicant:** IPS Development, LLC
- 2) **Owner:** Lawrence and Deborah Stegemann
- 3) **Location:** NW of the NW of Section 04, Township 110 Range 010, Wabasha

II. Staff Report

Zoning Summary

A Conditional Use Permit has been requested by IPS Solar on behalf of Lawrence and Deborah Stegemann to construct a 1 MW Solar Garden on a 62 Acre site in the southern part of the Wabasha Community (PIN R27.00110.00). The applicant proposes to construct a series of Solar Panels encumbering an 8 acre site.

Zone: R-2 Residential, RC Rural Conservancy, and Unidentified Floodplain District (No detailed maps identifying if it is in the Floodway or Flood-fringe) Shoreland Overlay S1 and S2 District



Existing Land Use: Agricultural and Open Space

	R-2	RC	
District Provisions	Min	Min	Solar Site
Min. Lot Size:	6,000 SF	20,000 SF (Unsewered)	61.4 Acres
Min. Lot Width:	60 feet	60 feet	Approximately 290'
Min. Lot Frontage:	20 feet	25 feet	Approximately 290'
Setbacks:	25' (Front)	25' (Front)	50 feet from property line
	25' (Rear)	25' (Rear)	
	5' (Side)	5' (Side)	

Parking: 1 stall per employee plus 1 space per vehicle stored on site
Application material suggests infrequently a maintenance person may visit the site

Details of the request:

- This 972 kilowatt array of photovoltaic panels will generate electricity that will be purchased by Xcel Energy under a 25-year contract.
- The solar energy conversion panels will be a single axis tracker, which will follow the sun west to east. They will be around 8 feet tall at the highest point of the panels tracking of the sun. There would be approximately 3,888 module solar panels.
- The racking system is installed in the ground with pilings/footings designed to engineered specifications that are driven directly into the ground at a depth usually between 6 feet and 8 feet depending on soil conditions.
- Building inspector will certify the design as part of the building permit.
- Site plan shows a 15' wide drive to access the site. It is unclear the material proposed for the drive.
- No grading plan has been included in the application material. Ordinance states that Planning Commissioners may require one. Applicant to supplement any information about grading plans at or before the public hearing.
- Runoff will be mitigated through plantings on site and will be engineered as part of the building permit process.
- A portion of the property is located in the floodplain without a detailed study of Floodway/Flood Fringe. DNR requires a PE verify the floodwaters in this area would not be excessive or dangerous to life and property.
- The applicant should confirm that the solar panels will be elevated above the regulatory flood protection elevation (panels themselves, not necessarily support poles).
- It appears the large parcel already includes principal residential structures on the east side of the property. Adding a 1 MW solar garden would add an additional principal use to the property. The applicant should think critically about any subdivision that will be done as part of this project. It may be in the applicant's best interest to do so for tax reasons. If a subdivision were to occur, impervious surface coverage would need to be considered.
- Section 162.106 of the Wabasha Zoning Ordinance provides specific performance standards for Solar Gardens/Farms.
 - A decommissioning plan outlining the removal of all structures and electrical components is required; a salvage value of photovoltaic systems have been provided. Staff have been

coordinating with the applicant on additional information that could be supplemented regarding the decommissioning specifically.

- The previous solar garden was required to provide a financial security to assure that the site is restored. Planning Commission should discuss if one could/should be provided.
- A 8 foot galvanized fence is proposed for safety and security. Screening in the form of spruce evergreens are also proposed on the north lot line mitigating any visual effects on residential properties. The tree line appears that it would mostly block views, but additional plantings on a portion of the east fence of the proposed solar garden would be required to totally block views.
- Applicant should confirm that all on-site power will be buried so as to meet ordinance standards.
- Applicant should inform of any signage planned on the site. Signs must not exceed 32 square feet so as to require a IUP/CUP. Any sign is likely to require a permit.
- Infrequent maintenance is anticipated. Applicant should inform of how much/often and any regular hours of operation.
- The application should confirm that the site “will not create any noise, dust, fumes, glare, or other.”
- It is understood that no lighting is proposed.

Hours of Operation – Daylight, with panel pivoting as sun location warrants.

Surrounding Property Uses: Open space to the west. A residential subdivision to the northeast. There are other solar gardens constructed or proposed in the area. There is also agricultural property in the area.

Neighborhood Notification: All property owners within 350' feet of this property were notified within ten days of the public hearing and published in the paper on Wednesday, May 27th 2020 that a public hearing would be held on June 9, 2020 for this conditional use permit request.

Recommended Conditions:

- 1) All performance standards for a solar garden/farm are met.
- 2) Additional evergreens could/should be planted an additional 100 feet to the east or 200 feet to the south to fully screen the solar field from established residential neighborhoods.
- 3) All on-site power and communication lines running between solar panels and buildings shall be buried underground on the premise.
- 4) If the project disturbs more than 1-acre, a Construction SWPPP and Stormwater Management Plan Permit must be submitted and approved by the MPCA.
- 5) A grading plan must be approved by the City Engineer prior to the start of construction for the project.
- 6) A PE must verify the floodwaters in this area would not be excessive or dangerous to life and property.
- 7) Solar panels shall be elevated above the regulatory flood protection elevation (panels themselves, not necessarily support poles).
- 8) A decommissioning plan should be submitted and financial assurances provided to ensure the removal of the project from the site at the end of its useful life.
- 9) The site shall not create any noise, dust, fumes, glare, or other.
- 10) A sign permit is required if necessary.

III. PLANNING COMMISSION ACTION:

Following are sample resolutions for both approval and denial which may be used by the Planning Commission in their decision.

Sample resolution for approval

**Resolution _____
CUP for a Solar Garden / Farm**

WHEREAS, the property numbered PID # R27.00110.00 located in the NW of the NW of Section 04, Township 110 Range 010, Wabasha

WHEREAS, the site is currently utilized for agricultural purposes but zoned RC and R2 residential, which allows Solar Gardens as a conditional use.

WHEREAS, The Planning Commission provides the following findings:

- a) IPS Development, LLC on behalf of Lawrence and Deborah Stegemann have submitted a complete Conditional Use permit application
- b) The use, if approved will not have a negative impact on the health, welfare or safety of the area or the community in general
- c) The solar garden, if approved, will support the energy needs of the community.
- d) Conditions placed in this CUP will protect the health, safety & general welfare of the community and neighbors use and enjoyment of property and their property values.
- e) The City of Wabasha has sufficient areas zoned Residential to meet the residential needs of the City of Wabasha for the life of the Solar Garden
- f) The applicant will complete and comply with all other state and federal regulatory agencies and obtain all necessary permits.
- g) The proposed use is consistent with the City comprehensive land use plan.
- h) Ingress and egress is provided off access road that is to be constructed by the developer.
- i) The site does not need city sewer or water service.

NOW THEREFORE, IT IS HEREBY RESOLVED, the Planning Commission approves the Conditional Use Permit for a solar garden / farm allowing the applicant to submit plans for a building permit, with conditions:

Sample resolution for denial:

Resolution _____
CUP for a Solar Garden / Farm

WHEREAS, the property numbered PID # R27.00110.00 located in the NW of the NW of Section 04, Township 110 Range 010, Wabasha

WHEREAS, the site is currently utilized for agricultural purposes but zoned R2 residential, which allows Solar Gardens as a conditional use.

WHEREAS, The Planning Commission provides the following findings: **[insert findings as deemed appropriate]**

- The solar garden, as proposed, does not adequately screen the site from adjacent uses
- The use, as proposed would have negative impacts on the health, safety & general welfare and would cause hazardous, harmful or otherwise adverse impacts to the environment or the value of the neighborhood or community.
- The establishment, maintenance or operation of the use would be detrimental to or endanger the public health, safety, comfort or general welfare of the city;
- The use would be injurious to the use and enjoyment of other property in the immediate vicinity for the purposes already permitted, nor substantially diminish and impair property values within the neighborhood;
- The establishment of the use will not impede the normal and orderly development of the surrounding property for uses permitted in the district;
- There is inadequate access to utilities, access road
- The solar garden, as proposed, would create drainage and erosion control issues
- The site, as proposed would provide inadequate ingress and egress so as to minimize traffic congestion in the public streets;
- The use shall does not conform to the applicable regulations of the district in which it is located;
- The site, as proposed, provided inadequate parking facilities
- The site, as proposed, does not preserve natural resources
- The site, as proposed, would obstruct scenic views
- The site, as proposed, is not of adequate size and configuration of property for the proposed use or activity;

NOW THEREFORE, IT IS HEREBY RESOLVED, the *Planning* Commission denies the Conditional Use Permit for a solar garden / farm use as requested in the application dated February 10, 2020.



Legend

- City Limits
- Parcels (06/01/2019)
- Current Floodplain
 - 100 Year
 - 500 Year

Approximate Floodplain Location



Disclaimer:

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0 263 Feet



Legend

- City Limits
- Parcels (06/01/2019)
- Zoning Overlay**
 - PUD Overlay District Eagle Basin
 - PUD Overlay District Downtown
 - Historic Preservation District
 - Shoreland S1
 - Shoreland S2
 - Shoreland S3
 - Shoreland S4
 - Shoreland Brewery Creek

Approximate Floodplain Location

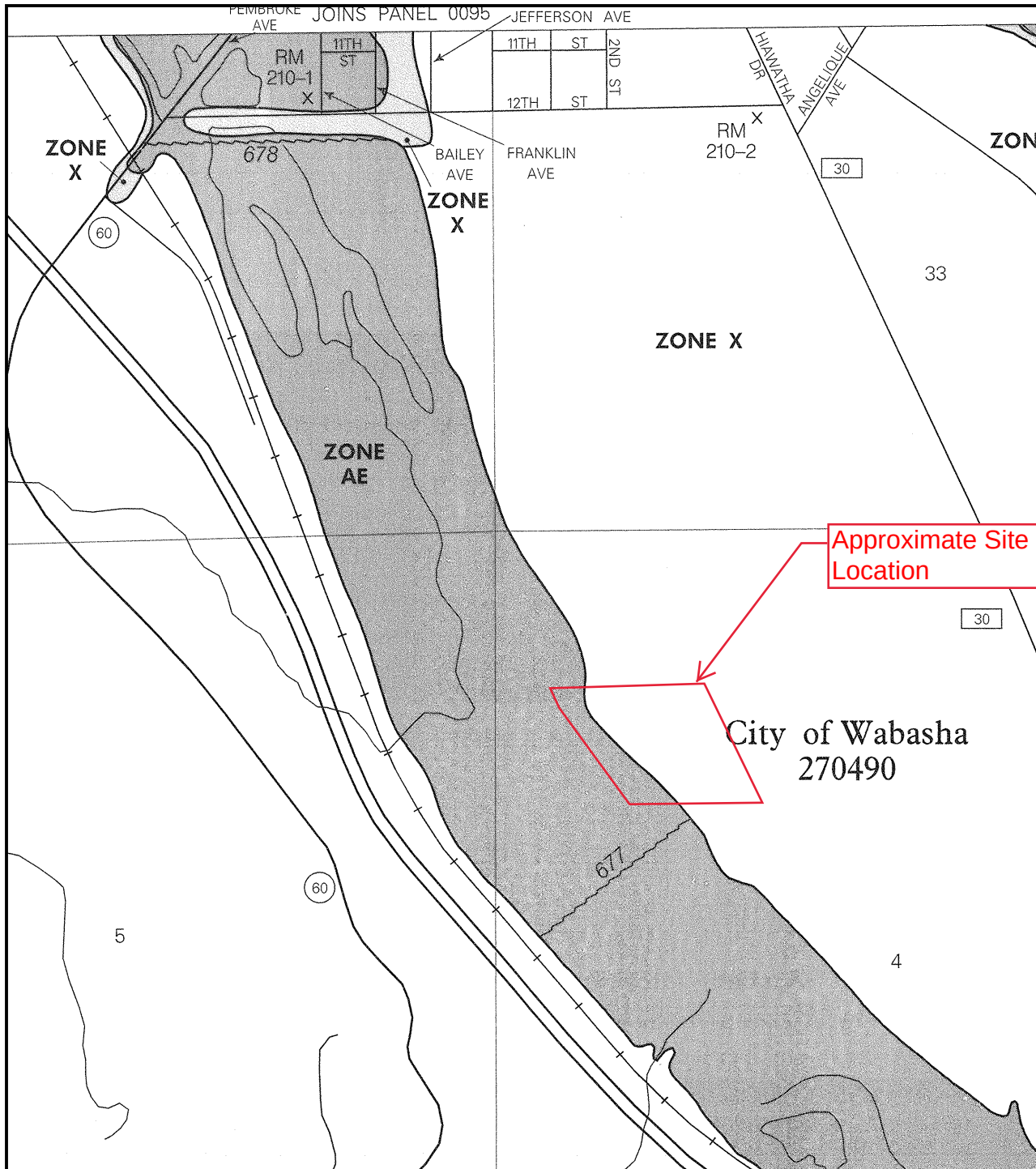


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0 263 Feet






 APPROXIMATE SCALE
 1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP
 WABASHA COUNTY,
 MINNESOTA
 AND INCORPORATED AREAS

PANEL 210 OF 500

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
WABASHA CITY OF	270490	0210	D
WABASHA COUNTY	270483	0210	D

Notice to User: The MAP NUMBER shown below should be used when placing map order; the COMMUNITY NUMBER shown above should be used on insurance applications for the subject community.

MAP NUMBER
27157C0210 D
EFFECTIVE DATE:
JUNE 20, 2000


 Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



Legend

City Limits

Parcels (06/01/2019)

Zoning

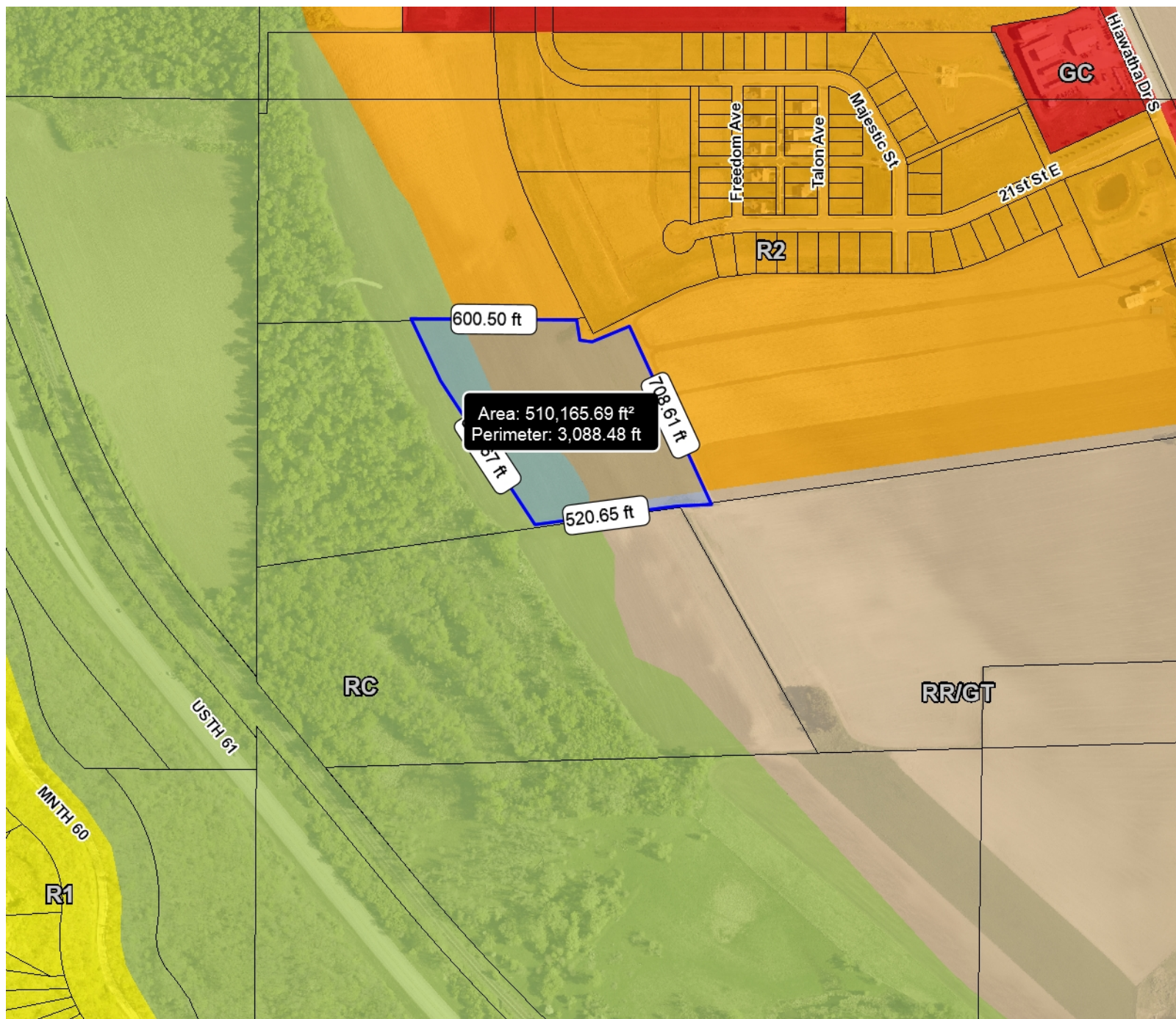
- RC - Residential Conservancy
- RR/LA - Rural/Residential/Limited/Agriculture
- RR/GT - Rural Residential Growth/Transitional
- R1 - Low Density Residential
- R2 - Medium Density Residential
- Traditional Downtown Commercial
- GC - General Commercial
- HC - Highway Commercial
- I - Industrial

Zoning District Approximate Site Location



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0 500 Feet

Planning Commission

6) a)

Meeting Date: 06/09/2020

SUBJECT: Solar Garden Moratorium

DEPARTMENT: Planning & Zoning

TITLE:

Subcommittee Solar Moratorium - Set up coming meeting times.

PURPOSE:

Attachments

Solar Subcommittee 1st Draft

§ 162.073 SOLAR GARDEN/FARM OVERLAY ZONE

Note that we would also need to renumber current section 162.073 to 162.074. It seems logical to me to keep the overlay districts together.

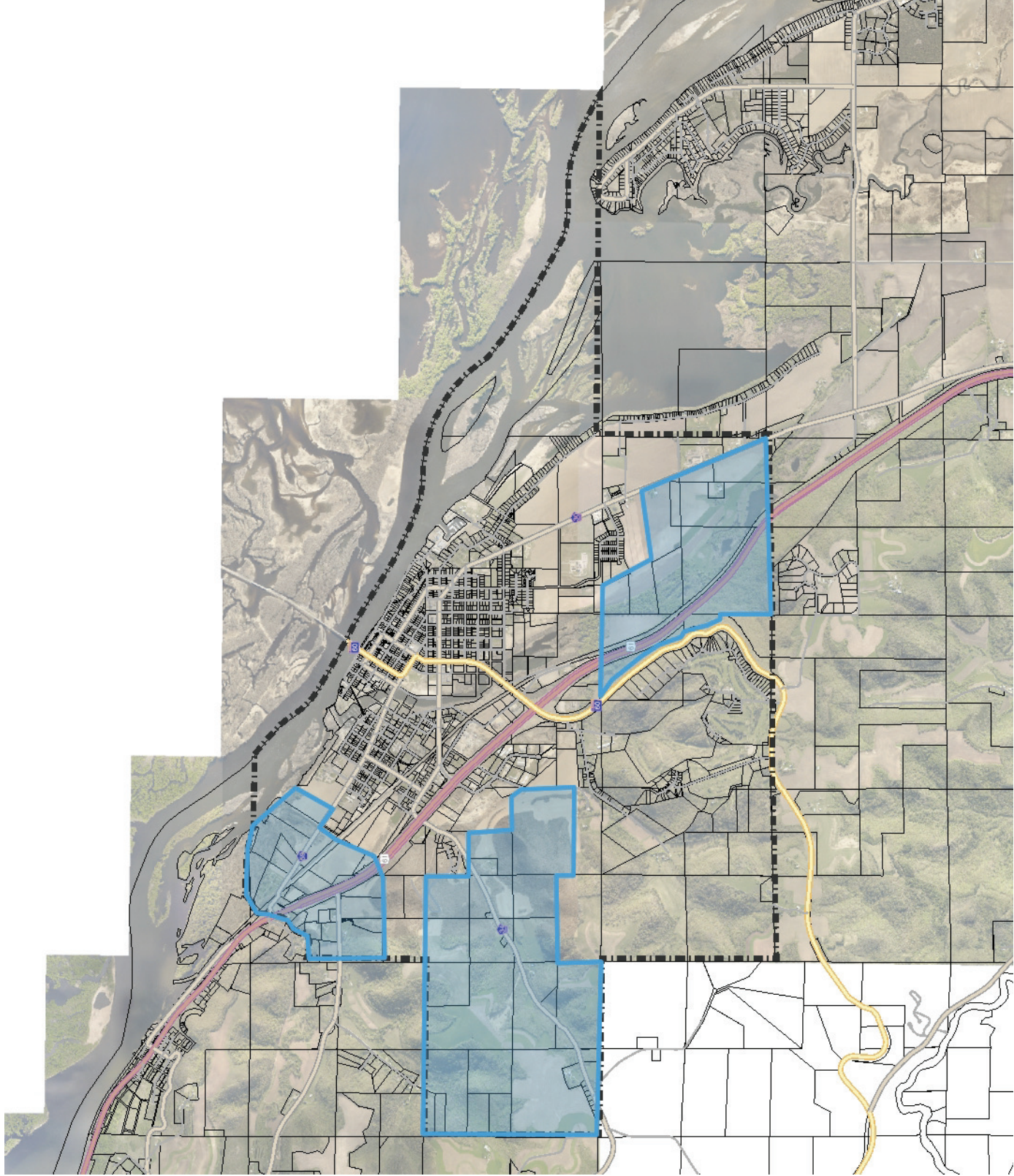
(A) Policy. The City of Wabasha values clean energy and rights of property owners to utilize their property for the highest and best use, provided these properties do not cause negative externalities on neighbors or injure the ability of the City of Wabasha to provide good land use planning/compatibility or impair the City of Wabasha's ability to provide for the needs of the community as it continues to grow. As such, the City of Wabasha has developed a solar garden overlay district to allow for the further development of solar fields in the community while reserving properties with immediate access to utilities to be developed for the orderly development of the community.

The uncontrolled use of shorelands of the city affects the public health, safety and general welfare by contributing to pollution of public waters and by impairing the local tax base. It is, therefore, in the best interests of the public health, safety and welfare to provide for the wise development of shorelands of public waters and thus preserve and enhance the quality of surface waters, conserve the economic and natural environmental values of shorelands, and provide for the wise utilization of waters and related land resources. The legislature of the state has delegated this responsibility to local governments. The responsibility is hereby recognized by the city.

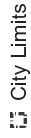
(B) General provisions and definitions.

(1) Interpretation. A shoreland overlay district map has been developed to determine the appropriateness of solar gardens throughout the community. Solar gardens refer to the larger energy producing facilities that sell energy back to the grid. Nothing in this section shall govern private wholesale solar systems that are designed to help offset the energy use of a property.

Institutional uses															
Family day care															
Group family day care															
Group day care														P	
Supervised living facility															
~~Solar garden/farm > 5,000 s.f.~~	C		C		C		C		C		C		C	C	C
MISCELLANEOUS USES															
Adult entertainment establishment															I
Commercial kenneling	I		I		I										
Nursery/greenhouses/landscape business	I		C		I										
Major traffic generator	C		C		C		C		C		C		C	C	C
Mixed use with permitted < 4 dwelling units														P	
Mixed use with any permitted > 5 dwelling units														C	
Parking garage														C	
Structures higher than maximum height (§§ 162.065 and 162.066 of this chapter)															
OFFICE USES															
Professional use up to 1,500 sq. ft.									C		C		P	P	P
Professional use > 1,501 sq. ft.											C		P	P	P
RECREATIONAL USES															
Club									C		C		P	P	
Golf course	C				C		C								
Hunting/shooting club	C		C		C										
Marina	C		C		C		C		C		C		C		
Parks and open space	P		P		P		P		P		P		P	P	P
Recreational entertainment facility, major	C		C								C		C	P	P
Recreational entertainment facility, minor			C		C						C		P	P	
RESIDENTIAL USES															
Accessory apartment	I		P		I		I		I		I				
Bed and breakfast	I		C		I		I				C		C		
Campground	I		C						C				C		
Guest cottage	C		P		C		C		C		C				
Home occupation	P		P		P		P				P				
Hotel/motel up to 40 rooms													P	P	P
Hotel/motel - 40 - 70 rooms													C	C	P
Hotel/motel > 70 rooms														C	C



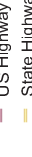
Legend



City Limits



Roads



Local Roads



Interstate



US Highway



State Highway



County Roads



Parcels (06/01/2019)



Solar Garden
Overlay District
Draft



Solar Garden Overlay District

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& MENK**

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0 4,115 Feet

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