Technical Memorandum

3159 Voyager Drive • Green Bay, WI 54311 • 920.455.8200

Via Email:	zoning@piattcounty.org
To:	Mrs. Keri Nusbaum, County Zoning Officer, Piatt County, Illinois
From:	Faith Zangl-Wiese, Project Manager and Jillian Finucane, Engineer
cc:	Copy sent to Ms. Ashley Fletcher, P.E., Sol Source Power Devco, LLC
Date:	November 20, 2025
Re:	Technical Memorandum – Conceptual Stormwater Calculations East Monticello Solar 1, LLC. Monticello, IL
Project No.:	2501182

GEI Consultants, Inc. (GEI) was retained by Sol Source Power Devco, LLC (Sol Source), to assist in obtaining a Special Use Permit for the proposed East Monticello Solar 1, LLC site (Project Area), located in Piatt County, Illinois. This Technical Memorandum and supporting attachments, are provided in accordance with Piatt County Solar Ordinance J(2)(E) and J(2)(F) to demonstrate the proposed development will not negatively impact stormwater quantity or quality at the project site.

Site Description

The Project Area (total parcel area) is approximately 120.94-acres in size and consists of agricultural land located to the east of N 1000 East Road and north of E 1500 North Road in Section 17, Township 18 North, Range 6 East, Monticello, Piatt County, Illinois. The Project Area is bounded to the west by residential properties, to the north by agricultural field and a residence, to the East by agricultural field, and to the south by E 1500 North Road, an agricultural field, and a farmstead. The property address is 1018 E. 1500 North Road, Monticello, IL, 61856. There is existing drain tile located on the southwest portion of the site. The existing or pre-development site is presented in **Appendix A, Figure 1.**

Proposed Development

The proposed development includes the installation of a photovoltaic module ground mount system. The system will be configured in one array consisting of solar panel modules arranged in rows with clear space between each row to provide access for maintenance. Solar panel modules will be fitted to an adjustable racking system set to track the optimum angle for solar radiation collection. The racking system will be secured to steel posts embedded in the ground. The system will be surrounded by a fence encompassing 21.3 acres. Two equipment pads will be installed, with a total of 0.04 acres of concrete within the fenced area. A 20-foot-wide gravel access road is proposed to provide access to the solar arrays and associated infrastructure. A 16-foot-wide gravel access road is proposed at the west edge of the property for Ameren access to the utility meter. The post-development site conditions are presented in **Appendix A, Figure 2.**

Assumptions

- This Technical Memorandum has been prepared to comply with Piatt County Solar Ordinance J(2)(E) and J(2)(F) for the purpose of obtaining a Special Use Permit for the Project Area. The information provided herein is based on conceptual site development plans which are subject to change and do not constitute a complete design. This Technical Memorandum shall not be used for construction purposes.
- This analysis does not account for potential stormwater run-on to the Project Area.
- This analysis evaluates stormwater runoff for the general Project Area as a whole and does not consider sub-watersheds or specific outfalls within the Project Area.
- Other assumptions provided in the Technical Memorandum.

Hydrologic Analysis

In general, stormwater runoff is dictated by geographic region/ climate, precipitation, soil type/ classification, topography, ground cover, and stormwater infrastructure. This analysis utilizes the Soil Conservation Service (SCS) runoff curve number method to estimate stormwater runoff. The following sections present the assumptions and methods used for evaluating the pre-development condition (agricultural field) and post-development condition (native vegetative cover and photovoltaic system).

Precipitation

Precipitation data was obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 2, Version 3, Precipitation Frequency Data Server (PFDS). The geographic location of the Project Area was input into the PFDS and the precipitation frequency estimates summarized in Table 1 were returned. The complete PFDS output is presented in **Appendix B**.

Table 1: Precipitation Summary

24-hour Design Storm	Rainfall Depth (inches)
1-year	2.57
2-year	3.07
5-year	3.74
10-year	4.31
25-year	5.18
50-year	5.95
100-year	6.82

Soil Classification

The Natural Resources Conservation Service (NRCS) Web Soil Survey provides information on soils for a specific area of interest. The soil resource report is included as **Appendix C** and provides the hydrologic soil groups (HSG) for the Project Area. The soil types identified in the NRCS report include Dana Silt Loam (56B2) with HSG C, Drummer Silty Clay Loam (152A) with HSG D, Flanagan Silt Loam (154A) with HSG D, and Peotone Silty Clay Loam (330A) with HSG D. If multiple HSG's were provided for a given soil, the more conservative classification, i.e. classification with greater runoff potential, was selected.

Runoff Curve Number

A runoff curve number (CN) is used to estimate rainfall excess based upon land use, ground cover and soil conditions in the watershed. CN's were developed using methods outlined in TR-55. For pre-development conditions, the Project area is comprised of two primary ground cover types: agricultural fields and woods. An area weighted CN is used where multiple ground covers exist in a watershed. The area weighted CN determination for the pre-development conditions is presented in Table 2.

Table 2: Pre-Development Weighted CN Determination

Ground Cover Type	Area (Acres)	Percent of Total Watershed Area (%)	NRCS TR-55, Ch. 2 CN	Product
Straight Row Crops, Good, HSG C	16.08	13.3	85	11
Straight Row Crops, Good, HSG D	102.62	84.9	89	75
Woods, Good, HSG C	0.94	0.8	76	1
Woods, Good, HSG D	0.28	0.2	72	0
Impervious Area, HSG C	0.26	0.2	98	0
Impervious Area, HSG D	0.76	0.6	98	1
			Weighted CN	**88**

For post-development conditions, much of the agricultural field area will be planted with native vegetation resulting in a meadow ground cover. The solar panels will be installed above grade, supported by posts embedded in the ground. The drip line will be located close enough to the ground to limit scour in the grass cover. Vegetation will be maintained throughout the Project Area and may be mowed as needed to reduce solar obstructions. The above ground installation will facilitate vegetative growth and stormwater infiltration within the solar array footprint. A gravel road will be constructed to provide access to the panels and equipment. A second gravel access road will be constructed on the west side of the property. The area weighted CN determination for the post-development condition is presented in Table 3.

Table 3: Post-Development Weighted CN Determination

Ground Cover Type	Area (Acres)	Percent of Total Watershed Area (%)	NRCS TR-55, Ch. 2 CN	Product
Meadow, HSG C	0.24	0.2	71	1
Meadow, HSG D	20.72	17.1	78	17
Straight Row Crops, Good, HSG C	15.57	12.9	85	10
Straight Row Crops, Good, HSG D	80.70	66.7	89	55
Woods, Good, HSG C	0.94	0.8	76	1
Woods, Good, HSG D	0.28	0.2	72	0
Impervious Area, HSG C	0.26	0.2	98	0
Impervious Area, HSG D	0.80	0.7	98	1
Gravel Road	1.43	1.2	96	0
			Weighted CN	**85**

Time of Concentration

Time of concentration (Tc) is defined in TR-55 as the time for runoff to travel from the most hydraulically distant point of a watershed to a point of interest in a watershed. Factors that impact Tc include surface cover, slope, and stormwater infrastructure. No major grading plans are proposed for the existing surface slopes and overall ground cover conditions will be improved as presented in the CN determinations. In general, runoff will begin as sheet flow and then will transition to shallow concentrated flow over much of the Project Area. It is assumed the time of concentration will remain unchanged for the pre-development and post-development conditions as the discontinuous nature of the driven steel posts and relatively small percentage of impervious surfaces will not significantly alter the natural runoff patterns.

Calculations and Results

The volume of runoff is estimated using methods described in Chapter 2 of TR-55 and the following equations:

$$Q = \frac{(P - 0.2S)^2}{(P + 0.8S)} \quad and \quad S = \frac{1000}{CN} - 10$$

Where:

Q = runoff (in)
P = rainfall (in)
S = potential maximum retention after runoff begins (in)
CN = runoff curve number

The results of the pre- and post-development stormwater runoff are summarized in Tables 4 and 5.

Table 4: Pre-Development Stormwater Runoff

Design Storm (24-hour)	P, Rainfall (in)	CN, Runoff Curve Number	S, Potential Retention (in)	Q, Runoff (in)	Total Runoff (ac-ft)
1-year	2.57	88	1.31	1.47	14.83
2-year	3.07	88	1.31	1.91	19.29
5-year	3.74	88	1.31	2.53	25.45
10-year	4.31	88	1.31	3.06	30.81
25-year	5.18	88	1.31	3.88	39.13
50-year	5.95	88	1.31	4.62	46.58
100-year	6.82	88	1.31	5.46	55.07

Table 5: Post-Development Stormwater Runoff

Design Storm (24-hour)	P, Rainfall (in)	CN, Runoff Curve Number	S, Potential Retention (in)	Q, Runoff (in)	Total Runoff (ac-ft)
1-year	2.57	85	1.72	1.25	12.65
2-year	3.07	85	1.72	1.67	16.83
5-year	3.74	85	1.72	2.25	22.71
10-year	4.31	85	1.72	2.77	27.87
25-year	5.18	85	1.72	3.57	35.94
50-year	5.95	85	1.72	4.29	43.22
100-year	6.82	85	1.72	5.12	51.56

Erosion and Sediment Control

Development of the Project Area will also include the implementation of best management practices (BMP's) to protect water quality in accordance with federal, state, and local ordinance. Wetlands immediately adjacent to the photovoltaic area were identified during a delineation performed by Encap Inc. on May 21, 2025. Erosion and sediment control (ESC) measures will be installed and maintained with the primary objective of preserving nearby wetland habitat.

Based on the conceptual site development plans, land disturbing activities will include discing or scarifying the former agricultural fields to facilitate seeding of native vegetation, construction of a gravel access road, concrete placement for the equipment pad footings, and installation of electric utility

infrastructure. BMP's identified for the project include construction road stabilization, permanent seeding, silt fence, construction entrance, and concrete washout facility. The ESC measures are presented in **Appendix A, Figure 3.**

Conclusion

The following conclusions resulted from the assessment:

- The proposed development includes the installation of a photovoltaic module ground mount system that will encompass approximately 21 acres of the 120.94-acre Project Area.
- Stormwater calculation results based on conceptual site development plans indicate the post-development condition (meadow vegetative cover and photovoltaic system) will produce a lower runoff volume than the pre-development condition (agricultural field) for the 1, 2, 5, 10, 25, 50, and 100-yr, 24-hr design storms. This is made possible due to converting the agricultural fields to a meadow, the above grade installation of solar panels, and relatively small quantity of impervious area constructed during the development.
- Erosion and sediment control BMP's will be implemented to protect water quality in accordance with federal, state, and local ordinance.

References

- NRCS, "Urban Hydrology for Small Watersheds", Technical Release 55 (TR-55), Second Ed., June 1986.
- NOAA, Precipitation Frequency Data Server, https://hdsc.nws.noaa.gov/pfds/ , Website accessed 9/24/25.
- NRCS, Web Soil Survey, Version 3.4.0, https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx , Website accessed 9/24/25.

Appendices

Appendix A Project Site Figures
- Figure 1 - Pre-Development Condition
- Figure 2 - Post-Development Condition
- Figure 3 - Erosion and Sediment Control

Appendix B NOAA Atlas 14, Vol. 2, Ver. 3, for Monticello, Illinois

Appendix C NRCS Custom Soil Resource Report for Piatt County, Illinois

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B:\Working\SOL SOURCE POWER, LLC\2501182 Illinois Solar Portfolio 2025\Task 12_E Monticello Solar 1 LLC\Task 12.08.01_Stormwater\E_Monticello_Solar_1_LLC_Stormwater_Memo_SolSource_DRAFT.docx

LEGEND:

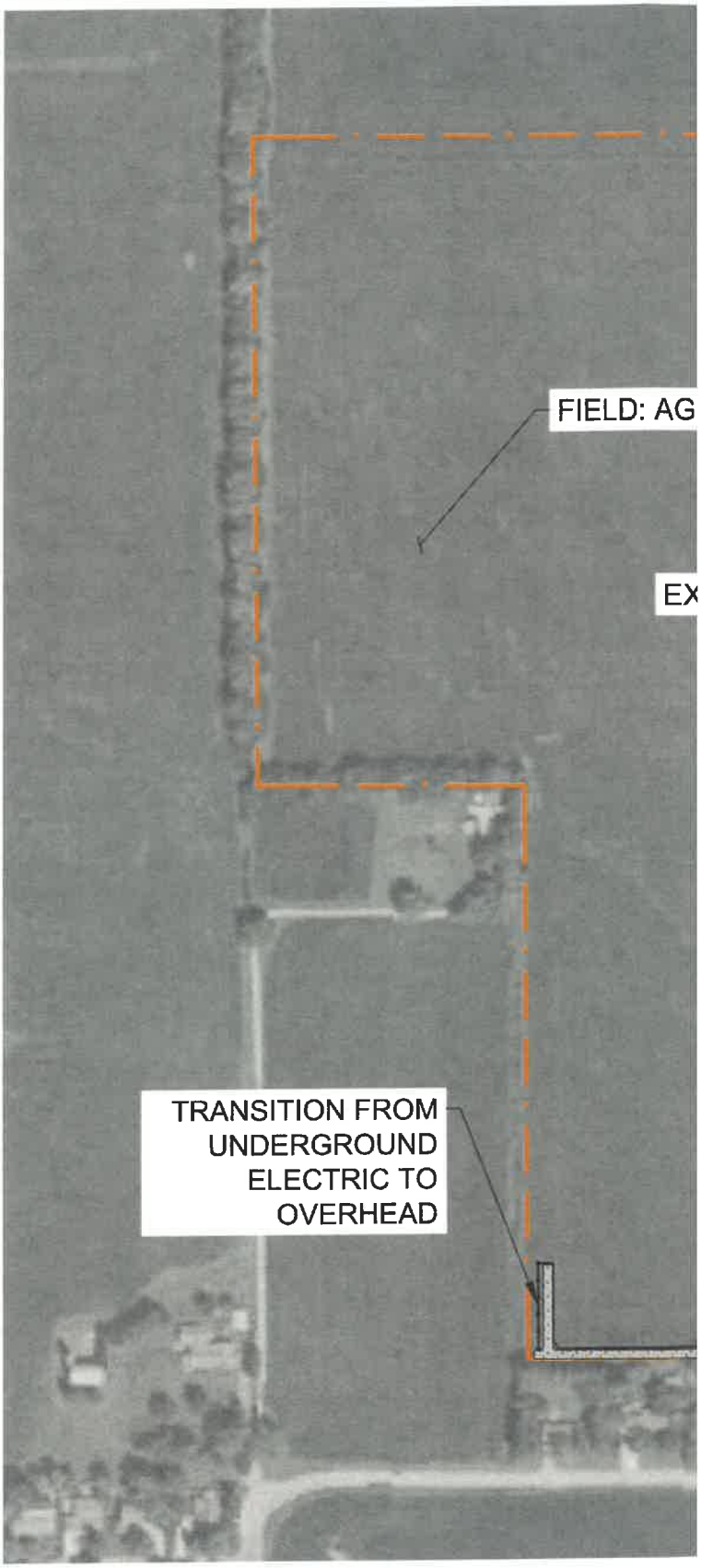
- PROPERTY LINE
- DELINEATED WETLAND
- GRAVEL ROAD
- FENCE
- UNDERGROUND ELECTRIC
- EQUIPMENT PAD
- SOLAR PANELS
- EXISTING DRAIN TILE

POST-DEVELOPMENT LAND CHARACTERISTICS

GROUND COVER TYPE	AREA (AC)
MEADOW, HSG C	0.24
MEADOW, HSG D	20.72
STRAIGHT ROW CROPS, GOOD, HSG C	15.57
STRAIGHT ROW CROPS, GOOD, HSG D	80.70
WOODS, GOOD, HSG C	0.94
WOODS, GOOD, HSG D	0.28
IMPERVIOUS AREA, HSG C	0.26
IMPERVIOUS AREA, HSG D	0.80
GRAVEL ROAD	1.43
WEIGHTED CN = 85	

NOTES:

1. AERIAL IMAGERY OBTAINED FROM © 2025 MICROSOFT CORPORATION, © 2025 MAXAR, AND © CNES (2025) DISTRIBUTION AIRBUS.
2. FIELD WETLAND AND WATERWAY DELINEATION PERFORMED BY ENCAP INC. ON MAY 21, 2025.
3. CONCEPTUAL PHOTOVOLTAIC SYSTEM LAYOUT OBTAINED FROM SOL SOURCE POWER DEVCON, LLC. "SITE LAYOUT" DWG. NO. C-101, REV. 5.



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