PRELIMINARY STORMWATER MANAGEMENT REPORT

Wilson School Solar Project

Kane County, Illinois

JULY 15, 2025

PREPARED FOR:

SUNVEST SOLAR LLC®

PREPARED BY:

Westwood

Preliminary Stormwater Management Report

Wilson School Solar Project

Kane County, Illinois

Prepared For:

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Project Number: R0069290.00
July 15, 2025

Westwood

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Introduction

The purpose of this report is to summarize the proposed stormwater management for the Wilson School Solar Project ("the project"). This report was prepared to meet the runoff reduction and water quality requirements of Kane County and the State of Illinois. This is a preliminary plan which will need to be updated as the design progresses.

The project site will encompass approximately 35 acres and is located approximately 39 miles northwest of the city of Chicago in Kane County, Illinois, with the nearest town being Elgin. Elgin is located 4 miles southeast of the project area. The site's current use is agricultural row crops.

The proposed use of the site will be a solar facility with the area below the solar panels modeled as pervious surface as consistent with industry standard. The proposed site will consist of approximately 34.6 acres of meadow grasses and 0.4 acres of the new impervious surface including gravel access roads, substation, and other associated solar infrastructure.

FEMA has completed a study to determine flood hazards for the selected location; there are no Special Flood Hazard Areas within the fenced boundary. No preliminary or pending FEMA data was located that will affect the project area.

Minimal new impervious area and grading will be proposed on site and existing drainage patterns will be maintained. It is proposed to convert the project area from row crop land cover to meadow grass to meet the runoff reduction and water quality requirements of Kane County and the state of Illinois. Other stormwater measures are proposed to route water through the site including culverts and swales.

Data Sources

TABLE 1: DATA SOURCES

Task	Format	Source	Use
Elevation	DWG	SunVest Solar	Onsite Elevations
Elevation	1-meter Lidar	USGS	Offsite Elevations
Landcover	Shapefile	USDA 2021 Crop Data Layer	Existing Landcover
Soils	Shapefile	USGS SSURGO Dataset	Curve Numbers
Soils (Wetlands Report)	PDF	Area M Consulting	Reference
Precipitation	PDF File	Illinois Bulletin 75 State Water Survey	Design Storms
Site Boundary	DWG	SunVest Solar	Define Model Extents
2014 Aerial Photography	ArcGIS Map Service	USDA FSA	Reference
FEMA Flood Zones	PDF; Shapefile	FEMA	Reference

Site Conditions

Site Location

The project site will encompass approximately 35 acres and is located approximately 39 miles northwest of the city of Chicago in Kane County, Illinois, with the nearest town being Elgin. Elgin is located 4 miles southeast of the project area. See Exhibit 1 for a map of the project location.

Topography Description

The existing topographic information utilized in the analysis consists of a CAD surface provided by SunVest Solar and USGS National Elevation Set 1m elevation data obtained from The National Map. The provided CAD surface was used for onsite elevations whereas the 1m data was used to determine offsite contributing watersheds. The site is generally located on mild terrain, with a majority of slopes between 1%-5%.

Drainage Patterns

Approximately 9.4 acres of offsite runoff enters the site from the west. Onsite runoff is split into 5 drainage areas based on discharge locations and flowpaths. Two existing areas of depression are present onsite which may pond water during rainfall events. The site has two ultimate discharge locations: one to a pond to the west of the site and one into a wetland to the south of the site. Drainage areas and overall discharge locations are shown in Exhibits 5 & 6.

FEMA Flood Zones

FEMA has completed a study to determine flood hazards for the selected location; the project area is covered by panel 17089C0161H (Appendix G). No FEMA Special Flood Hazard Areas are present within the project's area of development. No preliminary or pending FEMA changes are proposed within the project area.

Soils

Soils data was downloaded from SSURGO and was used for the soils identification portion of the site analysis.

The site consists primarily of Hydrologic Soil Group (HSG) C and D soil. Type D soils have high runoff potential and low infiltration rates. Type C soils have moderate runoff potential and low infiltration rates. Low infiltration rates can cause localized flooding in low areas for extended periods on site. See Exhibit 3 for the soils distribution throughout the site.

Landcover

A review of aerial photographs and the USDA 2021 Crop Data Layer shows that the site is currently used and has historically been used for agricultural row crops. See Exhibit 4 for a map of the landcover throughout the site.

Requirements

State and County requirements have been reviewed for the project. All requirements determined to be relevant to the project are summarized below.

Construction Stormwater Requirements

During construction, soil disturbance leads to areas of bare ground that produce higher runoff rates and volumes as well as increased sediment erosion. A temporary sediment trap is

recommended upstream of the Drainage Area 4 discharge point during the construction phase in accordance with the Illinois Urban Manual, https://illinoisurbanmanual.org/wp-content/uploads/2018/08/Temporary-Sediment-Trap-Standard-11-2017.pdf.

TABLE 2: TEMPORARY SEDIMENTATION TRAP REQUIREMENTS

Item	Requirement/Recommendation
Contributing Area	1-5 acres
Design Volume	134 CY per tributary acre. Half of volume must be for dead storage, and half for live storage.
Min. Depth	3' from bottom to EOF
Outlet Structure	Riser/Skimmer
Secondary Outlet	Emergency Overflow Spillway (EOF)
Freeboard	Min. 0.5' from HWL to top of berm

Post-Construction Stormwater Management Requirements

The following post-construction requirements need to be met for the project.

TABLE 3: STORMWATER MANAGEMENT REQUIREMENTS

Agency	Location of Requirements	New Impervious Area	Requirement
Kane County	Kane County Stormwater Management Ordinance (Rev. 06/01/2019)	5,000 sq.ft. – 24,999 sq.ft.	Provide volume reduction and water quality treatment of one-inch of rainfall over the impervious area

The project also proposes to provide a watershed benefit measure by converting the existing land cover from row crop to a proposed meadow grass cover. See the Stormwater Management Approach section for more information.

Drainage Improvements

Proposed drainage improvements will be sized per Table 4.

TABLE 4: DRAINAGE IMPROVEMENT SIZING REQUIREMENTS

Drainage Improvement	Source	Requirement
Entrance Culverts	Kane County Storwmater Management Ordinance	100-year 24-hour
Diversion Swales		

Methodology

Existing and proposed conditions are modeled in HydroCAD software. HydroCAD is a widely accepted hydrologic and hydraulic modeling package based on National Engineering Handbook (NEH) Part 630. It models stormwater runoff discharge rates and velocities from ponds, culverts, outlet control structures, and stream reaches.

Hydrology

Curve Number Methodology, based on NEH Part 630 Chapter 9, was used in the modeling for predicting direct runoff. Curve numbers were assigned by reviewing the soil and landcover for each drainage area.

Times of concentration were calculated for each drainage area in HydroCAD using methods described in Chapter 15 of NEH Part 630.

Precipitation and distribution data used for the analysis was gathered from the Illinois State Water Survey (ISWS) Bulletin 75. See Table 5 and Appendix A for the precipitation values used.

TABLE 5: RAINFALL TABLE

Storm Event	2-year 24-hour	10-year 24-hour	100-year 24-hour
Rainfall (in)	3.34	5.15	8.57

Hydraulics

Culvert sizing was completed using HydroCAD and contributing watershed properties to find runoff rates to the anticipated culvert location. CulvertMaster was then used to size the culvert assuming 1' allowable headwater and Manning's number of 0.024 for corrugated metal culverts. CulvertMaster uses the methodologies outlined in Hydraulic Design Series Number 5 from the U.S. Federal Highway Administration to calculate capacities and end conditions.

Stormwater Management Approach

A solar project differs greatly from other commercial or residential developments. When constructed, a solar project will include solar panels, at-grade gravel access roads, and other electrical equipment. The panels will be mounted above the ground with a low maintenance perennial meadow grass growing below. Due to the area between and beneath the panels being vegetated, panels are modeled as pervious surface. While solar projects may require grading, the existing terrain is smoothed to accommodate array installation, rather than significant changes to grades or slopes, and the grading is designed to maintain existing drainage patterns. Access roads are installed at grade and allow for runoff to sheet flow through the proposed meadow cover which provides treatment and reduction in runoff. The proposed vegetation slows the runoff and allows for water to filter into the soils for treatment.

Water quality is improved over pre-development conditions due to the land cover's conversion from a higher runoff rate row-crop field to a lower runoff rate meadow grass. Water quality concerns are also minimized due to the low percentage of impervious surfaces and that runoff from these surfaces filters through the meadow grasses on site prior to discharging.

A diversion swale is proposed along the western edge of the project to route offsite drainage south away from the proposed solar array while maintaining existing overall drainage patterns.

In addition to typical stormwater management BMPs, the recommended approach for solar projects should include the following: limit the amount of impervious surfaces to reduce runoff, minimize the amount of grading to promote sheet flow, and the planting of the meadow grass on the majority of the site to provide both runoff reduction and treatment.

Modeling

The site is modeled in existing and proposed conditions in order to complete the water quantity analysis required.

Existing Conditions

The existing site consists of row crops and wooded areas. Offsite runoff is included in the analysis. Curve numbers were assigned based on the landcover and soil types, see Table 6 for a summary of existing conditions.

TABLE 6: EXISTING CONDITIONS COVER

Cover	CN	Area (ac)
Row Crops, HSG C	85	31.46
Row Crops, HSG D	89	3.54
Row Crops, HSG C (Offsite)	85	1.30
Wooded, HSG C (Offsite)	70	8.06
Total	83	44.36

Proposed Conditions

The use of the site will be a solar facility. The solar modules will be located above grade with meadow grass below the proposed array and a small percentage of impervious areas. See Table 7 below for a summary of proposed conditions.

TABLE 7: PROPOSED CONDITIONS COVER

Cover	CN	Area (ac)
Meadow, HSG C	71	31.05
Meadow, HSG D	78	3.54
Row Crops, HSG C (Offsite)	85	1.30
Wooded, HSG C (Offsite)	70	8.06
Roads/Inverters/Substation/Switchyard*	98	0.41
Total	72	44.36

*Panels are considered meadow cover, see Stormwater Management Approach section for details.

Results

The results of the various analyses are described below.

Water Quantity Analysis

Stormwater runoff calculations for the site were prepared using HydroCAD. The proposed site reduces runoff rates and volumes from existing to proposed conditions by converting the area between and below the array from row crop to meadow grass cover. This land cover acts as a filter strip across the entire project area, implementing a watershed benefit measure that improves water quality and reduces stormwater runoff. Tables 8 and 9 show a summary of the runoff rates and volumes for the 2-year, 10-year, and 100-year 24-hour storm events at each site discharge location, including offsite runoff onto the site. Calculations are included in Appendices B & C.

TABLE 8: RUNOFF RATE SUMMARY

Location	2-year Runoff (cfs)		10-year Runoff (cfs)		100-year Runoff (cfs)	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
1	0.89	0.59	1.57	1.22	2.84	2.49
2	5.06	3.31	16.42	9.10	31.48	26.97

TABLE 9: RUNOFF VOLUME SUMMARY

Location	2-year Runoff (af)		10-year Runoff (af)		100-year Runoff (af)	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
1	0.503	0.303	0.940	0.666	1.813	1.458
2	3.360	1.743	8.188	5.219	18.148	14.166

Water Quality Analysis

Treatment of the stormwater quality volume for the site will be provided through filter strip BMPs by the conversion from row crop to meadow grass land cover across the site. The filter strip BMP treats and reduces the runoff volume from the one-inch rainfall event over the impervious area. Table 10 shows the required and provided treatment volume for drainage area 1 and 2. The provided treatment volume was calculated by taking the difference between the proposed runoff volume and the existing runoff volume for each drainage area containing proposed impervious area for the 1-inch rainfall event. Calculations can be found in Appendix D.

TABLE 10: WATER QUALITY TREATMENT SUMMARY

Drainage Area	Proposed Impervious Area (ac)	Required Treatment Volume (cu ft)	Provided Treatment Volume (cu ft)
1	0.025	91	1,786
2	0.381	1,383	1,699
Total	0.406	1,474	3,485

Stormwater Management Practices

Crossing Sizing

An entrance culvert is proposed at the access road entrance of the project. The culvert is sized for the 100-year 24-hour rain event with a 1 foot allowable head. Calculations were performed using HydroCAD and CulvertMaster and are included in Appendix E.

TABLE 11: ENTRANCE CULVERT SUMMARY

Location	Culvert Size	Culvert Material
EC-01	18”	CMP

Swale Sizing

A diversion swale is proposed along the western edge of the project to route offsite drainage away from proposed infrastructure while maintaining overall existing drainage patterns. The diversion swale was sized using HydroCAD to safely pass the 100-year 24-hour rainfall event. Calculations can be found in Appendix F. Lining material was chosen based on shear stress through the proposed swale. Table 12 summarizes the proposed swale geometry and lining material. See Exhibit 6 for the location of the proposed diversion swale.

TABLE 12: SWALE SUMMARY

Bottom Width (ft)	Depth (ft)	Side Slopes	Shear Stress (lb/sf)	Lining Material
2	1	4:1	0.52	Eronet P300*

*Or approved equal

Conclusion

The proposed site was designed to meet the water quality and runoff reduction requirements of Kane County and the State of Illinois. The proposed vegetative cover below the solar array reduces runoff rates and volumes from existing to proposed conditions while providing water quality treatment of stormwater runoff. Overall existing drainage patterns shall be maintained from existing to proposed conditions and grading should be minimized to the extent possible. This report is preliminary and updates should be made as the design progresses.

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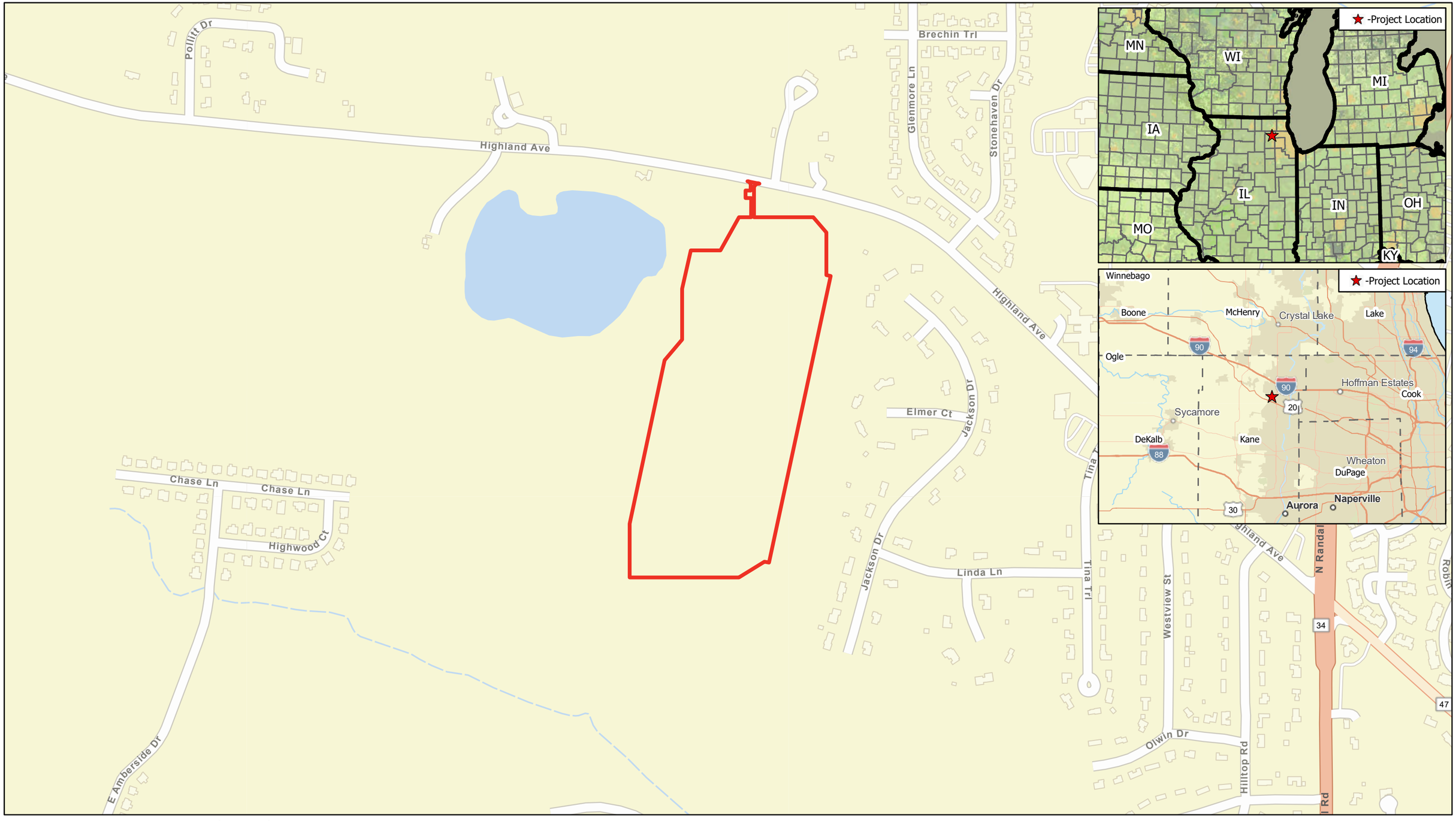
Exhibits



Data Source(s): Westwood (2025); Esri WMS Basemap Imagery (Accessed 2025); USGS (2025); FEMA (2025); USDA (2025)

Legend

- Project Area
- County Boundary

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N

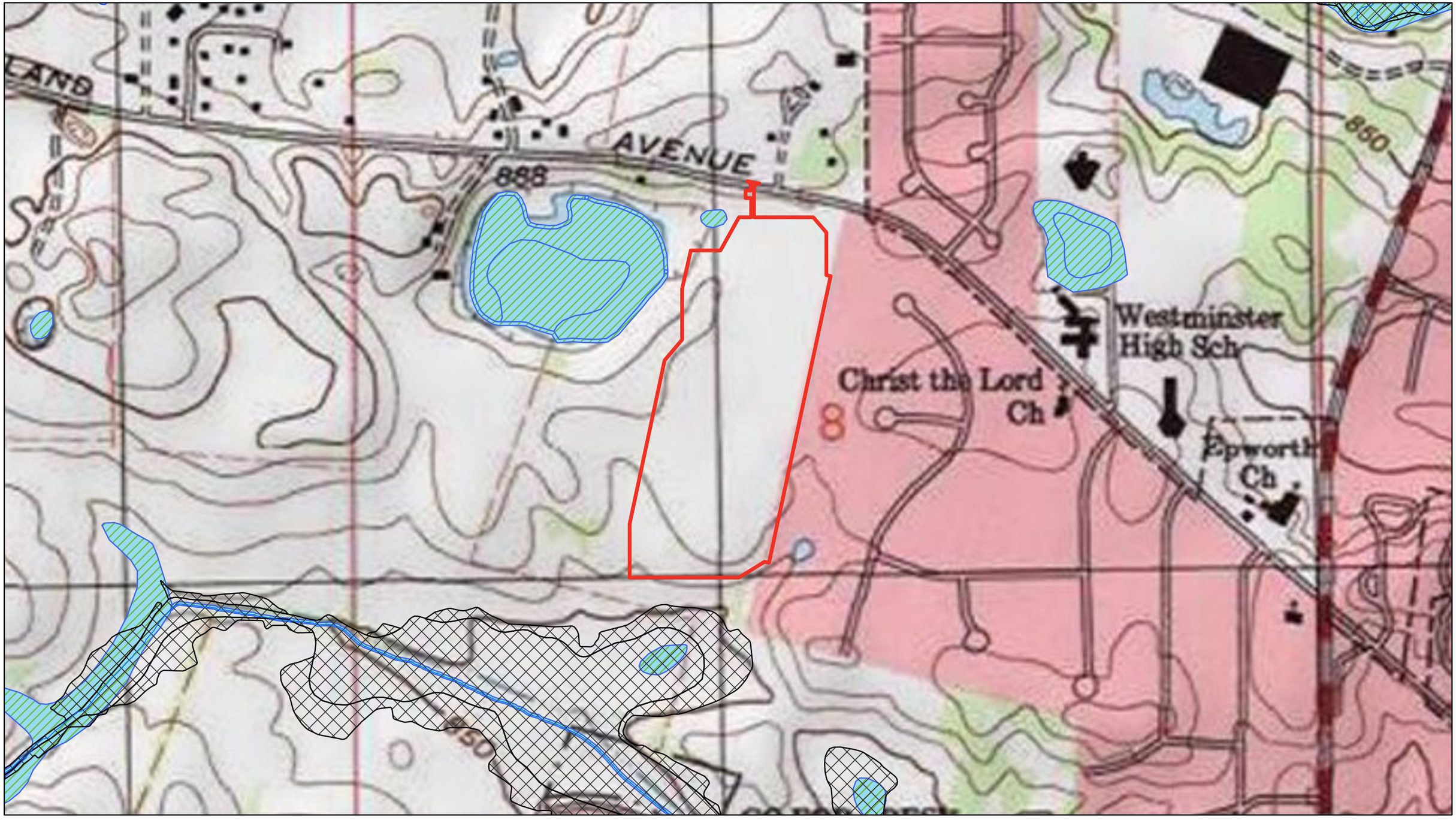
0 Feet 1,000

Wilson School Solar Project

Kane County, IL

Exhibit 1: Location Map

July 15, 2025



Data Source(s): Westwood (2025); Esri WMS Basemap Imagery (Accessed 2025); USGS (2025); FEMA (2025); USDA (2025)

Legend

- Project Area
- HUC-12 Boundary
- County Boundary
- FEMA Zone A
- FEMA Zone AE
- NWI Wetlands
- NHD Flowlines

N

0 — Feet — 1,000

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Kane County, IL

Exhibit 2: Base Hydrologic Map

July 15, 2025

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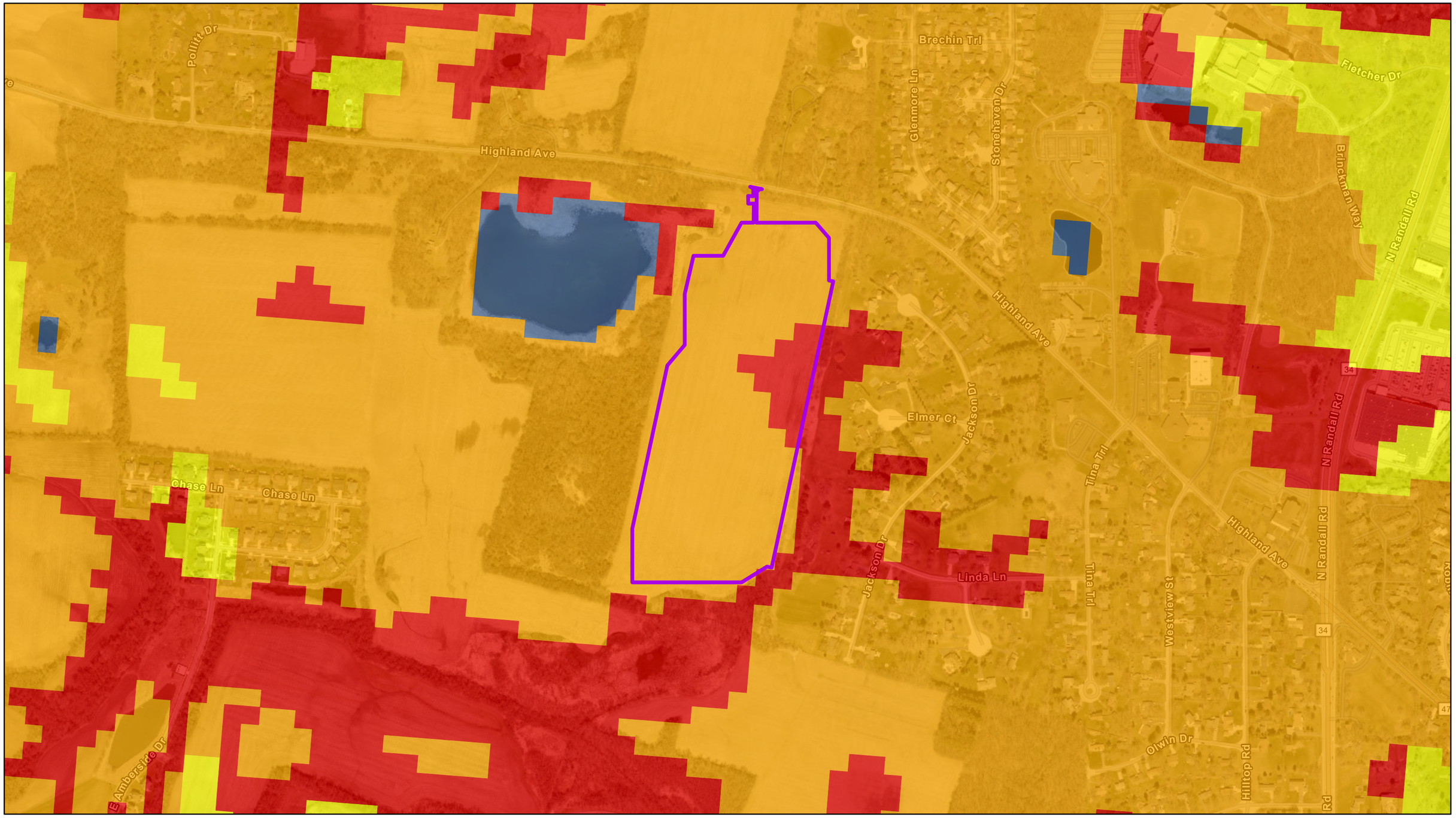

Data Source(s): Westwood (2025); Esri WMS Basemap Imagery (Accessed 2025); USGS (2025); FEMA (2025); USDA (2025)

Legend

- Project Area
- County Boundary

Hydrologic Soil Group

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Water

N

0 — 1,000 Feet

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Kane County, IL

Exhibit 3: Soils Map

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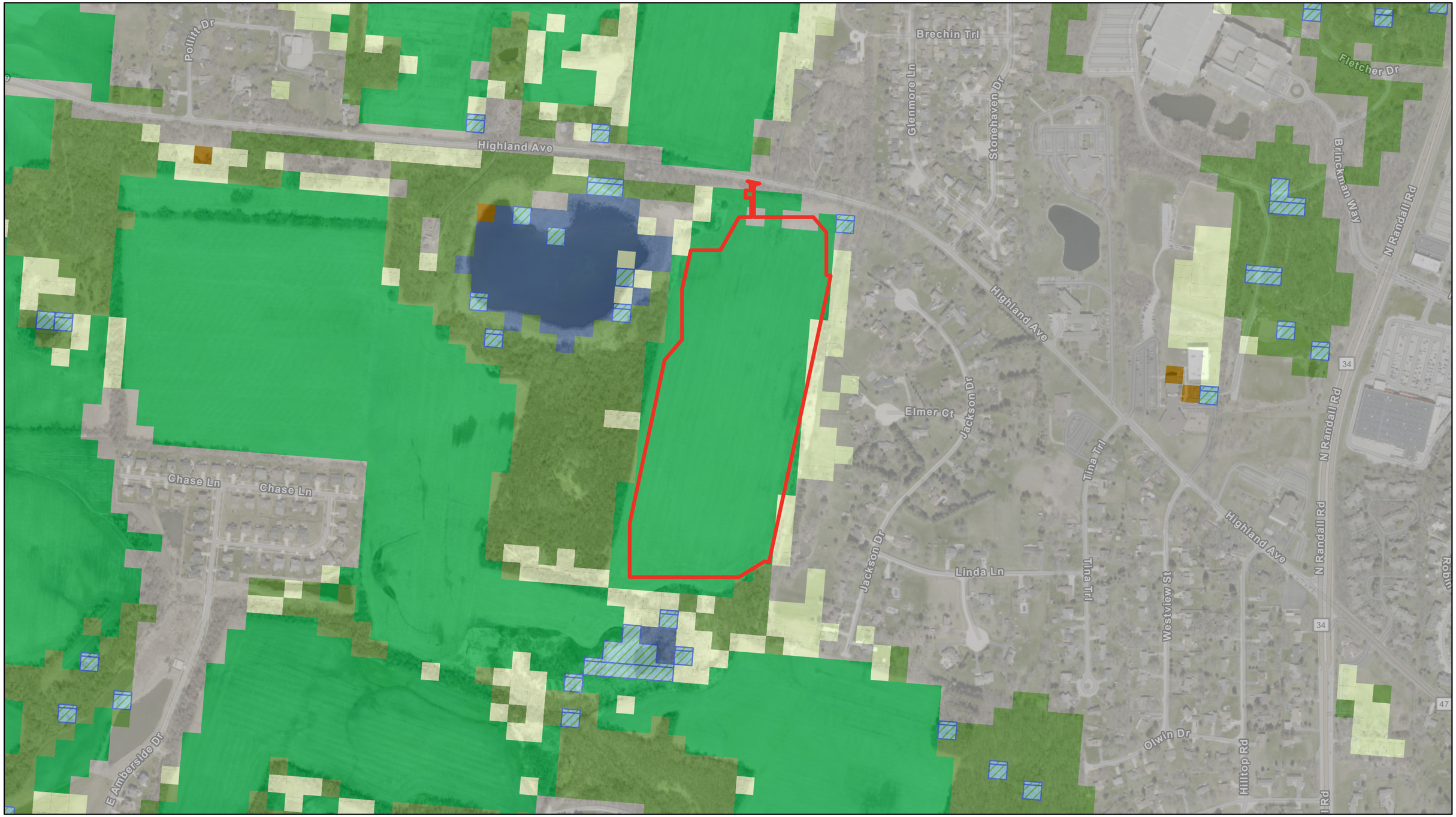

Data Source(s): Westwood (2025); Esri WMS Basemap Imagery (Accessed 2025); USGS (2025); FEMA (2025); USDA (2025)

Legend

- Project Area
- County Boundary
- Landcover
  - Barren
  - Cultivated
  - Developed
  - Fallow
  - Woods
  - Pastureland
  - Shrubland
  - Water
  - Wetland

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N

0 — Feet — 1,000

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Exhibit 4: Landcover Map

July 15, 2025

LEGEND:

- FEMA FLOOD ZONE AE
- EX. ONSITE DRAINAGE AREA BOUNDARY
- EX. OFFSITE DRAINAGE AREA BOUNDARY
- EX. TIME OF CONCENTRATION LINE
- EX. OFFSITE TIME OF CONCENTRATION LINE
- DISCHARGE LOCATION
- 1 — DRAINAGE AREA LABEL
- 1ER — DISCHARGE AREA LABEL

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REVISIONS:

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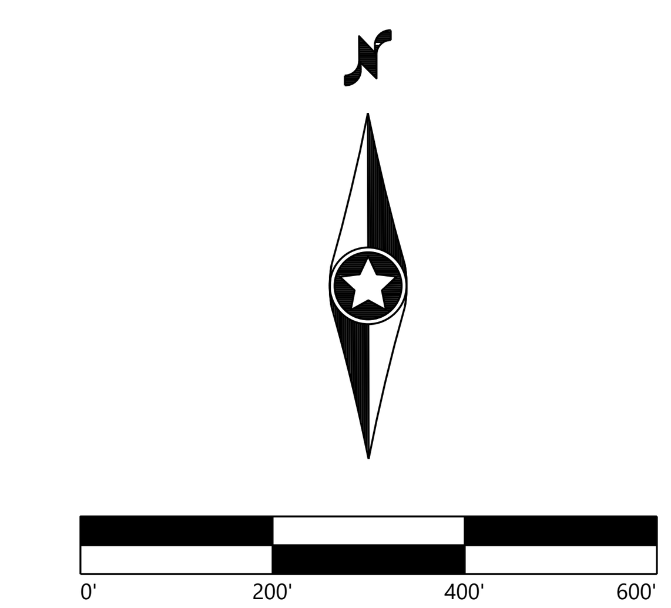


Wilson School Solar Project

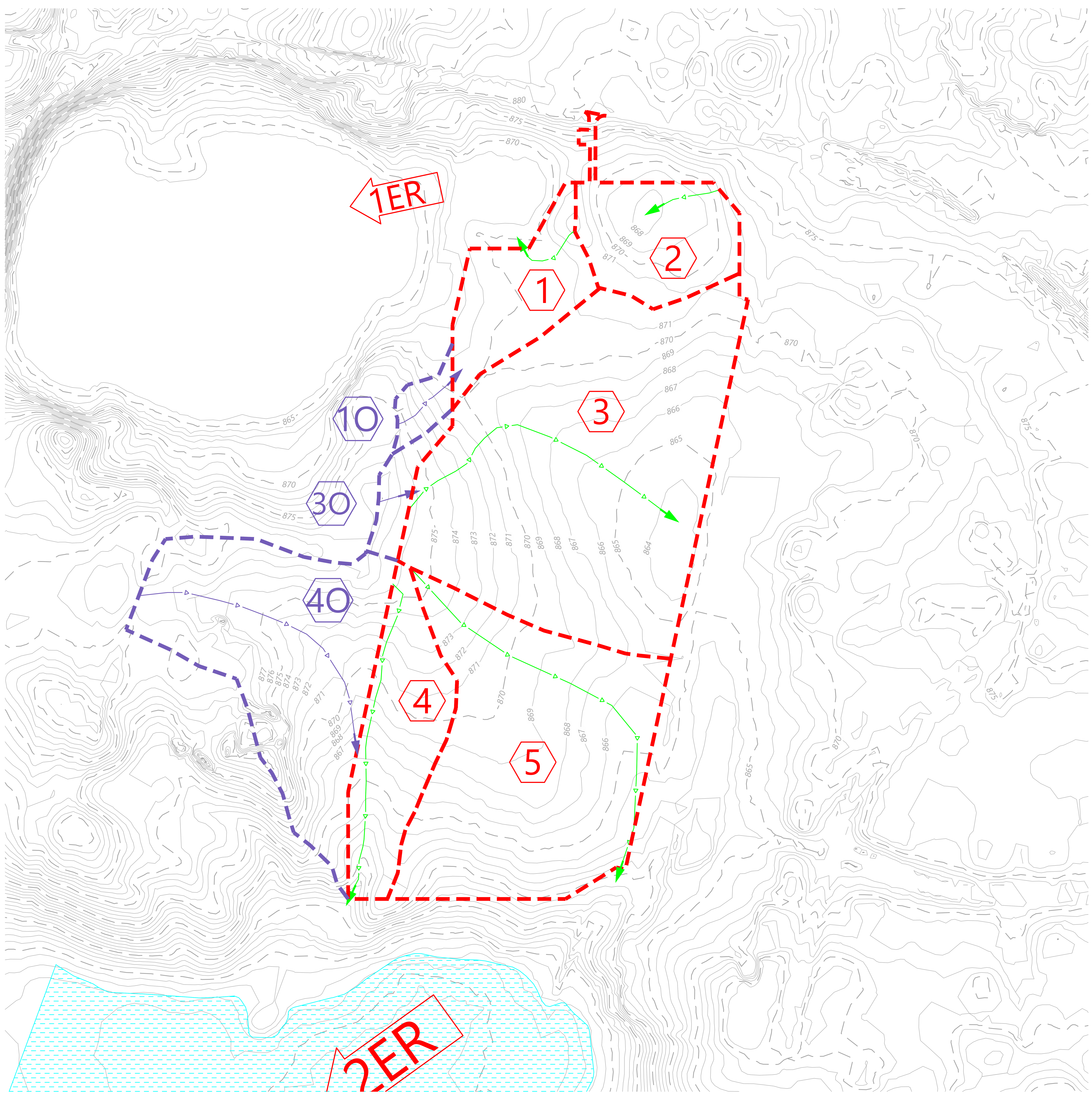
Kane County, Illinois

Overall Existing Drainage Map

DATE: July 15, 2025

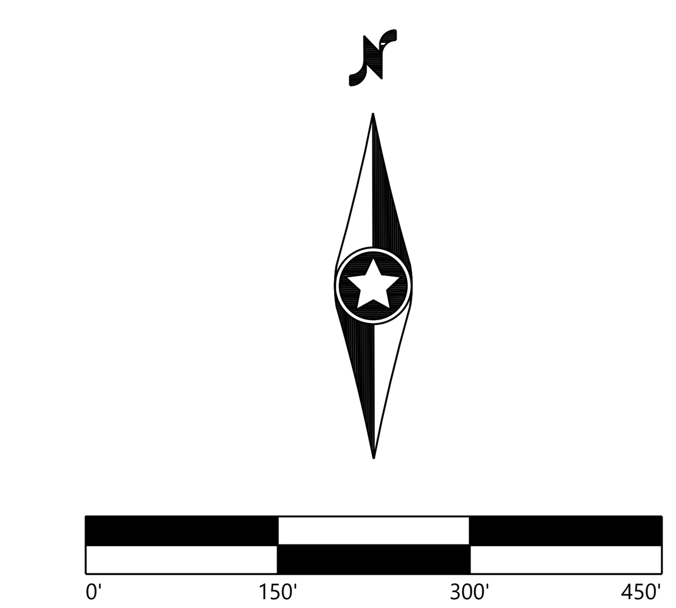
REV:

SHEET: 5



LEGEND:

- EX. INDEX CONTOUR
- EX. INTERVAL CONTOUR
- FEMA FLOOD ZONE AE
- EX. ONSITE DRAINAGE AREA BOUNDARY
- EX. OFFSITE DRAINAGE AREA BOUNDARY
- EX. TIME OF CONCENTRATION LINE
- EX. OFFSITE TIME OF CONCENTRATION LINE
- DISCHARGE LOCATION
- DRAINAGE AREA LABEL
- DISCHARGE AREA LABEL



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Wilson School Solar Project

Kane County, Illinois

Existing Drainage Map

DATE: July 15, 2025

REV:

SHEET: 5A

LEGEND:

- FEMA FLOOD ZONE AE
- EX. ONSITE DRAINAGE AREA BOUNDARY
- EX. OFFSITE DRAINAGE AREA BOUNDARY
- EX. TIME OF CONCENTRATION LINE
- EX. OFFSITE TIME OF CONCENTRATION LINE
- EX. PROPOSED SWALE LINE
- DISCHARGE LOCATION
- 1 DRAINAGE AREA LABEL
- 1ER DISCHARGE AREA LABEL

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0' 200' 400' 600'

Wilson School Solar Project

Kane County, Illinois

Overall Proposed Drainage Map

DATE: July 15, 2025

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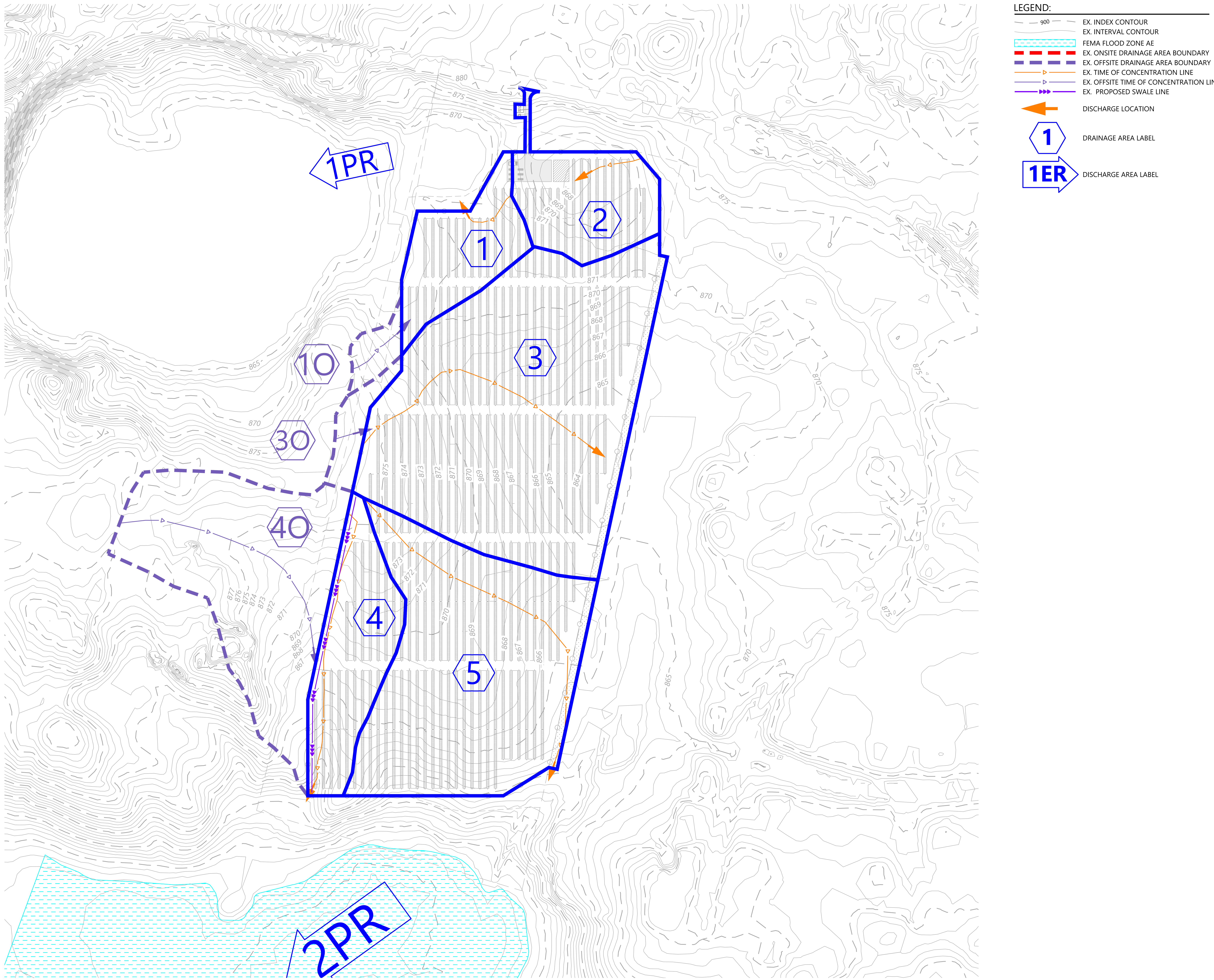

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Wilson School Solar Project

Kane County, Illinois

Proposed Drainage Map

DATE: July 15, 2025

REV:

SHEET: 6A

Appendix A

Precipitation Frequency Study for Illinois

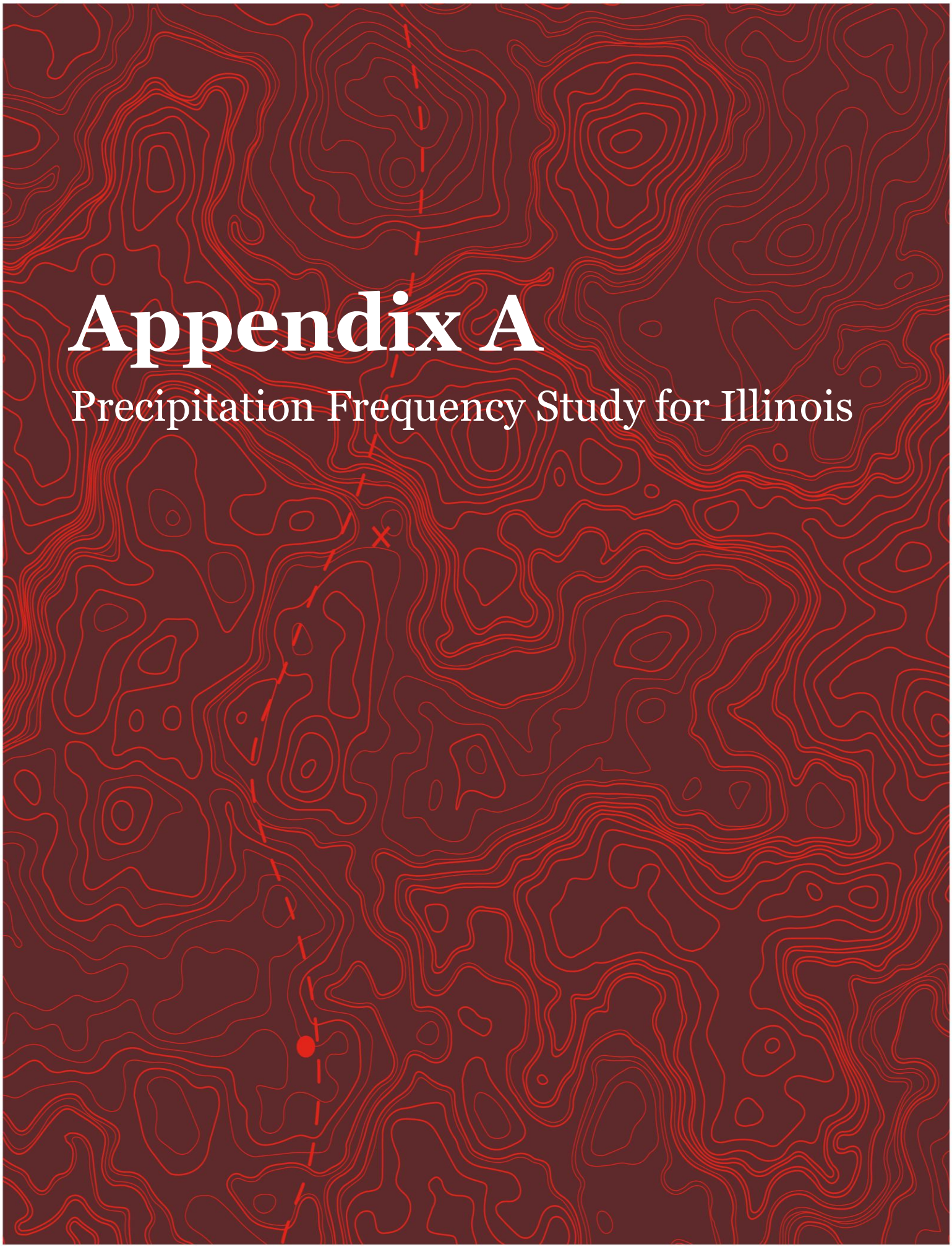


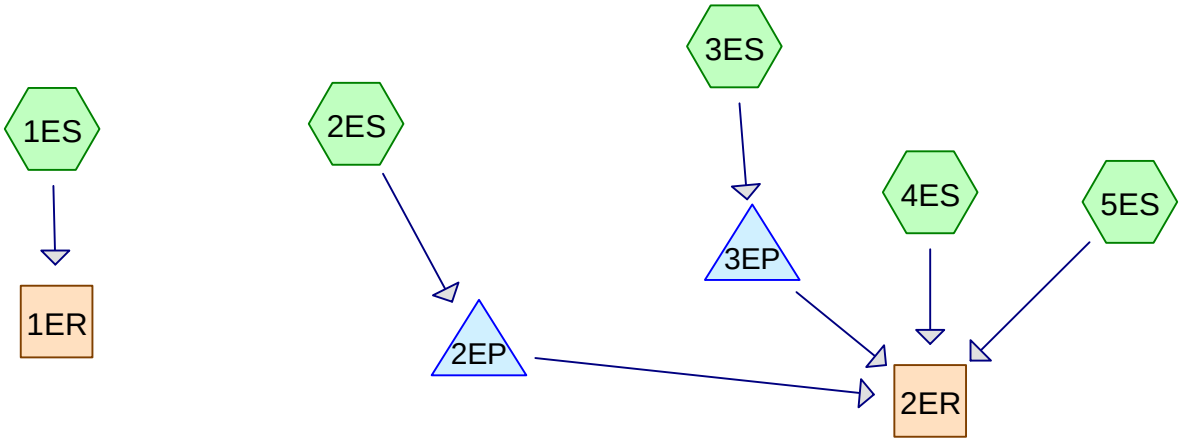
Table 7. Rainfall (inches) for Given Recurrence Interval for Section 2 (Northeast)

Storm Duration	2-month	3-month	4-month	6-month	9-month	1-year	2-year	5-year	10-year	25-year	50-year	100-year	500-year
5 minutes	0.19	0.22	0.24	0.27	0.31	0.33	0.40	0.52	0.62	0.77	0.90	1.03	1.35
10 minutes	0.33	0.38	0.41	0.47	0.53	0.58	0.70	0.90	1.08	1.35	1.58	1.80	2.36
15 minutes	0.42	0.49	0.53	0.61	0.69	0.75	0.90	1.16	1.39	1.74	2.03	2.32	3.04
30 minutes	0.58	0.66	0.73	0.83	0.94	1.03	1.24	1.59	1.91	2.39	2.78	3.17	4.16
1 hour	0.74	0.84	0.93	1.05	1.20	1.30	1.57	2.02	2.42	3.03	3.53	4.03	5.28
2 hours	0.91	1.04	1.14	1.30	1.48	1.61	1.94	2.49	2.99	3.74	4.35	4.97	6.52
3 hours	1.00	1.15	1.26	1.44	1.63	1.77	2.14	2.75	3.30	4.13	4.80	5.49	7.20
6 hours	1.18	1.35	1.48	1.68	1.91	2.08	2.51	3.23	3.86	4.84	5.63	6.43	8.43
12 hours	1.37	1.56	1.71	1.95	2.21	2.41	2.91	3.74	4.48	5.61	6.53	7.46	9.78
18 hours	1.48	1.69	1.85	2.11	2.39	2.61	3.14	4.04	4.84	6.06	7.05	8.06	10.57
24 hours	1.57	1.80	1.97	2.24	2.55	2.77	3.34	4.30	5.15	6.45	7.50	8.57	11.24
48 hours	1.72	1.97	2.16	2.46	2.79	3.04	3.66	4.71	5.62	6.99	8.13	9.28	12.10
72 hours	1.87	2.14	2.34	2.67	3.03	3.30	3.97	5.08	6.05	7.49	8.64	9.85	12.81
120 hours	2.08	2.38	2.61	2.97	3.37	3.67	4.42	5.63	6.68	8.16	9.39	10.66	13.81
240 hours	2.63	3.01	3.30	3.76	4.27	4.65	5.60	7.09	8.25	9.90	11.26	12.65	16.00

Appendix B

Existing HydroCAD Results

Existing Conditions



Subcat Reach Pond Link

Routing Diagram for Wilson School Solar
Prepared by Westwood Professional Services, Printed 7/15/2025

Summary for Subcatchment 1ES:

Runoff = 0.89 cfs @ 15.75 hrs, Volume= 0.503 af, Depth= 1.88"
Routed to Reach 1ER :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 2-yr 24-hr Rainfall=3.34"

	Area (ac)	CN	Description
*	2.668	85	Row Crop, HSG C
*	0.548	85	Row Crop, HSG C (Offsite)
	3.216	85	Weighted Average
	3.216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0340	0.19		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
2.0	100	0.0090	0.85		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
10.6	200	Total			

Summary for Subcatchment 2ES:

Runoff = 0.86 cfs @ 15.74 hrs, Volume= 0.485 af, Depth= 1.88"
Routed to Pond 2EP :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 2-yr 24-hr Rainfall=3.34"

	Area (ac)	CN	Description
*	3.099	85	Row Crop, HSG C
	3.099		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0282	0.18		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
2.2	104	0.0075	0.78		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
11.4	204	Total			

Summary for Subcatchment 3ES:

Runoff = 4.50 cfs @ 15.88 hrs, Volume= 2.593 af, Depth= 1.96"
Routed to Pond 3EP :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 2-yr 24-hr Rainfall=3.34"

	Area (ac)	CN	Description
*	11.610	85	Row Crop, HSG C
*	3.540	89	Row Crop, HSG D
*	0.747	85	Row Crop, HSG C (Offsite)
	15.897	86	Weighted Average
	15.897		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.0213	0.16		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
12.5	785	0.0135	1.05		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
22.8	885	Total			

Summary for Subcatchment 4ES:

Runoff = 2.22 cfs @ 15.93 hrs, Volume= 1.159 af, Depth= 1.19"
Routed to Reach 2ER :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 2-yr 24-hr Rainfall=3.34"

	Area (ac)	CN	Description
*	3.628	85	Row Crop, HSG C
	8.064	70	Woods, Good, HSG C
	11.692	75	Weighted Average
	11.692		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0230	0.17		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
11.3	905	0.0220	1.33		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
21.3	1,005	Total			

Summary for Subcatchment 5ES:

Runoff = 2.85 cfs @ 16.05 hrs, Volume= 1.636 af, Depth= 1.88"
Routed to Reach 2ER :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 2-yr 24-hr Rainfall=3.34"

	Area (ac)	CN	Description
*	10.458	85	Row Crop, HSG C
	10.458		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	100	0.0077	0.11		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
17.4	1,070	0.0130	1.03		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
32.9	1,170	Total			

Summary for Reach 1ER:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.216 ac, 0.00% Impervious, Inflow Depth = 1.88" for 2-yr 24-hr event
Inflow = 0.89 cfs @ 15.75 hrs, Volume= 0.503 af
Outflow = 0.89 cfs @ 15.75 hrs, Volume= 0.503 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 2ER:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 41.146 ac, 0.00% Impervious, Inflow Depth = 0.98" for 2-yr 24-hr event
Inflow = 5.06 cfs @ 15.98 hrs, Volume= 3.360 af
Outflow = 5.06 cfs @ 15.98 hrs, Volume= 3.360 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond 2EP:

Inflow Area = 3.099 ac, 0.00% Impervious, Inflow Depth = 1.88" for 2-yr 24-hr event
Inflow = 0.86 cfs @ 15.74 hrs, Volume= 0.485 af
Outflow = 0.16 cfs @ 24.12 hrs, Volume= 0.382 af, Atten= 81%, Lag= 502.7 min
Discarded = 0.16 cfs @ 24.12 hrs, Volume= 0.382 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 2ER :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 868.79' @ 24.12 hrs Surf.Area= 0.770 ac Storage= 0.337 af

Plug-Flow detention time= 817.8 min calculated for 0.382 af (79% of inflow)
Center-of-Mass det. time= 733.7 min (1,692.9 - 959.2)

Volume	Invert	Avail.Storage	Storage Description
#1	868.00'	6.916 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
868.00	0.160	0.000	0.000	0.160
869.00	1.010	0.524	0.524	1.010
870.00	1.850	1.409	1.933	1.850
871.00	2.600	2.214	4.147	2.601
872.00	2.940	2.768	6.916	2.942

Device	Routing	Invert	Outlet Devices
#1	Discarded	868.00'	**0.200 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 855.00'
#2	Primary	871.00'	**15.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.16 cfs @ 24.12 hrs HW=868.79' (Free Discharge)
1=Exfiltration (Controls 0.16 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=868.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 3EP:

Inflow Area = 15.897 ac, 0.00% Impervious, Inflow Depth = 1.96" for 2-yr 24-hr event
Inflow = 4.50 cfs @ 15.88 hrs, Volume= 2.593 af
Outflow = 2.18 cfs @ 18.53 hrs, Volume= 1.912 af, Atten= 52%, Lag= 159.1 min
Discarded = 0.50 cfs @ 18.53 hrs, Volume= 1.348 af
Primary = 1.68 cfs @ 18.53 hrs, Volume= 0.564 af
Routed to Reach 2ER :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 865.05' @ 18.53 hrs Surf.Area= 2.329 ac Storage= 1.577 af

Plug-Flow detention time= 689.6 min calculated for 1.912 af (74% of inflow)
Center-of-Mass det. time= 589.3 min (1,552.5 - 963.3)

Volume	Invert	Avail.Storage	Storage Description
#1	864.00'	3.866 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
864.00	0.740	0.000	0.000	0.740
865.00	2.320	1.457	1.457	2.320
866.00	2.500	2.409	3.866	2.502

Device	Routing	Invert	Outlet Devices
#1	Discarded	864.00'	**0.200 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 855.00'
#2	Primary	865.00'	**50.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.50 cfs @ 18.53 hrs HW=865.05' (Free Discharge)
└**1=Exfiltration** (Controls 0.50 cfs)

Primary OutFlow Max=1.65 cfs @ 18.53 hrs HW=865.05' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 1.65 cfs @ 0.64 fps)

Summary for Subcatchment 1ES:

Runoff = 1.57 cfs @ 15.72 hrs, Volume= 0.940 af, Depth= 3.51"
Routed to Reach 1ER :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 10-yr 24-hr Rainfall=5.15"

	Area (ac)	CN	Description
*	2.668	85	Row Crop, HSG C
*	0.548	85	Row Crop, HSG C (Offsite)
	3.216	85	Weighted Average
	3.216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0340	0.19		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
2.0	100	0.0090	0.85		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
10.6	200	Total			

Summary for Subcatchment 2ES:

Runoff = 1.51 cfs @ 15.72 hrs, Volume= 0.906 af, Depth= 3.51"
Routed to Pond 2EP :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 10-yr 24-hr Rainfall=5.15"

	Area (ac)	CN	Description
*	3.099	85	Row Crop, HSG C
	3.099		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0282	0.18		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
2.2	104	0.0075	0.78		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
11.4	204	Total			

Summary for Subcatchment 3ES:

Runoff = 7.83 cfs @ 15.88 hrs, Volume= 4.779 af, Depth= 3.61"
Routed to Pond 3EP :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 10-yr 24-hr Rainfall=5.15"

	Area (ac)	CN	Description
*	11.610	85	Row Crop, HSG C
*	3.540	89	Row Crop, HSG D
*	0.747	85	Row Crop, HSG C (Offsite)
	15.897	86	Weighted Average
	15.897		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.0213	0.16		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
12.5	785	0.0135	1.05		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
22.8	885	Total			

Summary for Subcatchment 4ES:

Runoff = 4.52 cfs @ 15.88 hrs, Volume= 2.505 af, Depth= 2.57"
Routed to Reach 2ER :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 10-yr 24-hr Rainfall=5.15"

	Area (ac)	CN	Description
*	3.628	85	Row Crop, HSG C
	8.064	70	Woods, Good, HSG C
	11.692	75	Weighted Average
	11.692		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0230	0.17		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
11.3	905	0.0220	1.33		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
21.3	1,005	Total			

Summary for Subcatchment 5ES:

Runoff = 5.02 cfs @ 15.97 hrs, Volume= 3.056 af, Depth= 3.51"
Routed to Reach 2ER :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 10-yr 24-hr Rainfall=5.15"

	Area (ac)	CN	Description
*	10.458	85	Row Crop, HSG C
	10.458		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	100	0.0077	0.11		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
17.4	1,070	0.0130	1.03		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
32.9	1,170	Total			

Summary for Reach 1ER:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.216 ac, 0.00% Impervious, Inflow Depth = 3.51" for 10-yr 24-hr event
Inflow = 1.57 cfs @ 15.72 hrs, Volume= 0.940 af
Outflow = 1.57 cfs @ 15.72 hrs, Volume= 0.940 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 2ER:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 41.146 ac, 0.00% Impervious, Inflow Depth = 2.39" for 10-yr 24-hr event
Inflow = 16.42 cfs @ 16.03 hrs, Volume= 8.188 af
Outflow = 16.42 cfs @ 16.03 hrs, Volume= 8.188 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond 2EP:

Inflow Area = 3.099 ac, 0.00% Impervious, Inflow Depth = 3.51" for 10-yr 24-hr event
Inflow = 1.51 cfs @ 15.72 hrs, Volume= 0.906 af
Outflow = 0.23 cfs @ 24.14 hrs, Volume= 0.611 af, Atten= 84%, Lag= 505.0 min
Discarded = 0.23 cfs @ 24.14 hrs, Volume= 0.611 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 2ER :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 869.14' @ 24.14 hrs Surf.Area= 1.114 ac Storage= 0.675 af

Plug-Flow detention time= 908.3 min calculated for 0.611 af (67% of inflow)
Center-of-Mass det. time= 783.5 min (1,709.4 - 925.9)

Volume	Invert	Avail.Storage	Storage Description
#1	868.00'	6.916 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
868.00	0.160	0.000	0.000	0.160
869.00	1.010	0.524	0.524	1.010
870.00	1.850	1.409	1.933	1.850
871.00	2.600	2.214	4.147	2.601
872.00	2.940	2.768	6.916	2.942

Device	Routing	Invert	Outlet Devices
#1	Discarded	868.00'	**0.200 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 855.00'
#2	Primary	871.00'	**15.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.23 cfs @ 24.14 hrs HW=869.14' (Free Discharge)
1=Exfiltration (Controls 0.23 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=868.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 3EP:

Inflow Area = 15.897 ac, 0.00% Impervious, Inflow Depth = 3.61" for 10-yr 24-hr event
Inflow = 7.83 cfs @ 15.88 hrs, Volume= 4.779 af
Outflow = 7.49 cfs @ 16.19 hrs, Volume= 4.087 af, Atten= 4%, Lag= 18.5 min
Discarded = 0.51 cfs @ 16.19 hrs, Volume= 1.461 af
Primary = 6.98 cfs @ 16.19 hrs, Volume= 2.626 af
Routed to Reach 2ER :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 865.14' @ 16.19 hrs Surf.Area= 2.344 ac Storage= 1.772 af

Plug-Flow detention time= 411.4 min calculated for 4.086 af (86% of inflow)
Center-of-Mass det. time= 346.6 min (1,277.4 - 930.8)

Volume	Invert	Avail.Storage	Storage Description
#1	864.00'	3.866 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
864.00	0.740	0.000	0.000	0.740
865.00	2.320	1.457	1.457	2.320
866.00	2.500	2.409	3.866	2.502

Device	Routing	Invert	Outlet Devices
#1	Discarded	864.00'	**0.200 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 855.00'
#2	Primary	865.00'	**50.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.51 cfs @ 16.19 hrs HW=865.14' (Free Discharge)
1=Exfiltration (Controls 0.51 cfs)

Primary OutFlow Max=6.97 cfs @ 16.19 hrs HW=865.14' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 6.97 cfs @ 1.03 fps)

Summary for Subcatchment 1ES:

Runoff = 2.84 cfs @ 15.70 hrs, Volume= 1.813 af, Depth= 6.76"
Routed to Reach 1ER :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 100-yr 24-hr Rainfall=8.57"

	Area (ac)	CN	Description
*	2.668	85	Row Crop, HSG C
*	0.548	85	Row Crop, HSG C (Offsite)
	3.216	85	Weighted Average
	3.216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0340	0.19		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
2.0	100	0.0090	0.85		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
10.6	200	Total			

Summary for Subcatchment 2ES:

Runoff = 2.74 cfs @ 15.72 hrs, Volume= 1.747 af, Depth= 6.76"
Routed to Pond 2EP :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 100-yr 24-hr Rainfall=8.57"

	Area (ac)	CN	Description
*	3.099	85	Row Crop, HSG C
	3.099		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0282	0.18		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
2.2	104	0.0075	0.78		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
11.4	204	Total			

Summary for Subcatchment 3ES:

Runoff = 14.05 cfs @ 15.83 hrs, Volume= 9.121 af, Depth= 6.88"
Routed to Pond 3EP :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 100-yr 24-hr Rainfall=8.57"

	Area (ac)	CN	Description
*	11.610	85	Row Crop, HSG C
*	3.540	89	Row Crop, HSG D
*	0.747	85	Row Crop, HSG C (Offsite)
	15.897	86	Weighted Average
	15.897		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.0213	0.16		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
12.5	785	0.0135	1.05		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
22.8	885	Total			

Summary for Subcatchment 4ES:

Runoff = 9.13 cfs @ 15.83 hrs, Volume= 5.416 af, Depth= 5.56"
Routed to Reach 2ER :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 100-yr 24-hr Rainfall=8.57"

	Area (ac)	CN	Description
*	3.628	85	Row Crop, HSG C
	8.064	70	Woods, Good, HSG C
	11.692	75	Weighted Average
	11.692		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0230	0.17		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
11.3	905	0.0220	1.33		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
21.3	1,005	Total			

Summary for Subcatchment 5ES:

Runoff = 9.10 cfs @ 15.97 hrs, Volume= 5.895 af, Depth= 6.76"
Routed to Reach 2ER :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 100-yr 24-hr Rainfall=8.57"

	Area (ac)	CN	Description
*	10.458	85	Row Crop, HSG C
	10.458		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	100	0.0077	0.11		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
17.4	1,070	0.0130	1.03		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
32.9	1,170	Total			

Summary for Reach 1ER:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.216 ac, 0.00% Impervious, Inflow Depth = 6.76" for 100-yr 24-hr event
Inflow = 2.84 cfs @ 15.70 hrs, Volume= 1.813 af
Outflow = 2.84 cfs @ 15.70 hrs, Volume= 1.813 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 2ER:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 41.146 ac, 0.00% Impervious, Inflow Depth = 5.29" for 100-yr 24-hr event
Inflow = 31.48 cfs @ 15.93 hrs, Volume= 18.148 af
Outflow = 31.48 cfs @ 15.93 hrs, Volume= 18.148 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond 2EP:

Inflow Area = 3.099 ac, 0.00% Impervious, Inflow Depth = 6.76" for 100-yr 24-hr event
Inflow = 2.74 cfs @ 15.72 hrs, Volume= 1.747 af
Outflow = 0.33 cfs @ 24.16 hrs, Volume= 0.928 af, Atten= 88%, Lag= 506.3 min
Discarded = 0.33 cfs @ 24.16 hrs, Volume= 0.928 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 2ER :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 869.69' @ 24.16 hrs Surf.Area= 1.558 ac Storage= 1.397 af

Plug-Flow detention time= 1,009.2 min calculated for 0.928 af (53% of inflow)
Center-of-Mass det. time= 820.8 min (1,713.1 - 892.4)

Volume	Invert	Avail.Storage	Storage Description
#1	868.00'	6.916 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
868.00	0.160	0.000	0.000	0.160
869.00	1.010	0.524	0.524	1.010
870.00	1.850	1.409	1.933	1.850
871.00	2.600	2.214	4.147	2.601
872.00	2.940	2.768	6.916	2.942

Device	Routing	Invert	Outlet Devices
#1	Discarded	868.00'	**0.200 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 855.00'
#2	Primary	871.00'	**15.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.33 cfs @ 24.16 hrs HW=869.69' (Free Discharge)
1=Exfiltration (Controls 0.33 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=868.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 3EP:

Inflow Area = 15.897 ac, 0.00% Impervious, Inflow Depth = 6.88" for 100-yr 24-hr event
Inflow = 14.05 cfs @ 15.83 hrs, Volume= 9.121 af
Outflow = 13.84 cfs @ 16.01 hrs, Volume= 8.420 af, Atten= 2%, Lag= 10.9 min
Discarded = 0.52 cfs @ 16.01 hrs, Volume= 1.584 af
Primary = 13.32 cfs @ 16.01 hrs, Volume= 6.837 af
Routed to Reach 2ER :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 865.21' @ 16.01 hrs Surf.Area= 2.357 ac Storage= 1.943 af

Plug-Flow detention time= 253.8 min calculated for 8.420 af (92% of inflow)
Center-of-Mass det. time= 214.3 min (1,112.5 - 898.2)

Volume	Invert	Avail.Storage	Storage Description
#1	864.00'	3.866 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
864.00	0.740	0.000	0.000	0.740
865.00	2.320	1.457	1.457	2.320
866.00	2.500	2.409	3.866	2.502

Device	Routing	Invert	Outlet Devices
#1	Discarded	864.00'	**0.200 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 855.00'
#2	Primary	865.00'	**50.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

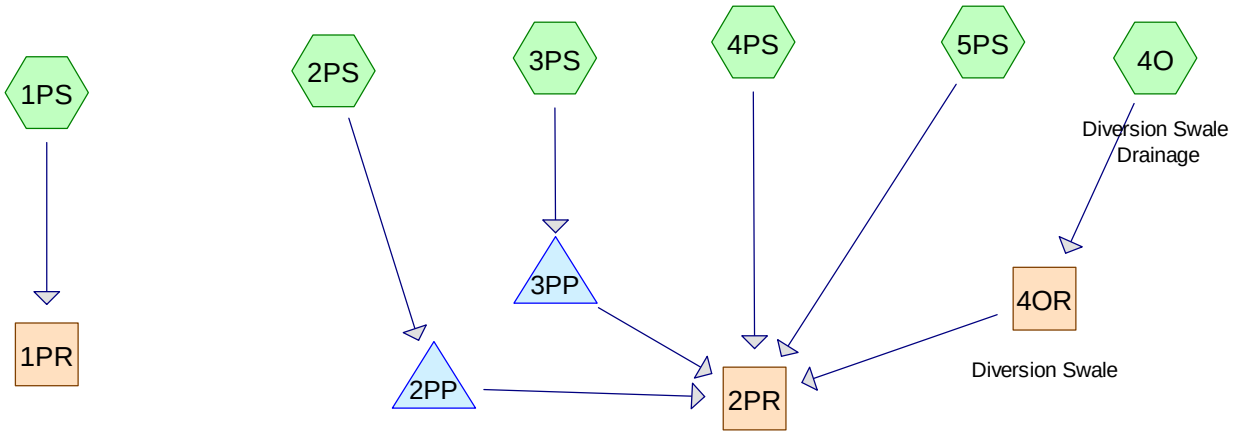
Discarded OutFlow Max=0.52 cfs @ 16.01 hrs HW=865.21' (Free Discharge)
└**1=Exfiltration** (Controls 0.52 cfs)

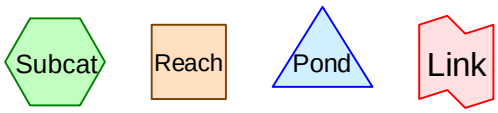
Primary OutFlow Max=13.31 cfs @ 16.01 hrs HW=865.21' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 13.31 cfs @ 1.28 fps)

Appendix C

Proposed HydroCAD Results

Proposed Conditions





Routing Diagram for Wilson School Solar
Prepared by Westwood Professional Services, Printed 7/15/2025

Summary for Subcatchment 1PS:

Runoff = 0.59 cfs @ 15.78 hrs, Volume= 0.303 af, Depth= 1.13"
Routed to Reach 1PR :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 2-yr 24-hr Rainfall=3.34"

	Area (ac)	CN	Description
	2.643	71	Meadow, non-grazed, HSG C
*	0.025	98	Impervious
*	0.548	85	Row Crop, HSG C (Offsite)
	3.216	74	Weighted Average
	3.191		99.22% Pervious Area
	0.025		0.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0340	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
2.5	100	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.3	200	Total			

Summary for Subcatchment 2PS:

Runoff = 0.57 cfs @ 15.78 hrs, Volume= 0.292 af, Depth= 1.13"
Routed to Pond 2PP :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 2-yr 24-hr Rainfall=3.34"

	Area (ac)	CN	Description
	2.718	71	Meadow, non-grazed, HSG C
*	0.381	98	Impervious
	3.099	74	Weighted Average
	2.718		87.71% Pervious Area
	0.381		12.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0282	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
2.9	104	0.0075	0.61		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.3	204	Total			

Summary for Subcatchment 3PS:

Runoff = 2.74 cfs @ 16.01 hrs, Volume= 1.422 af, Depth= 1.07"
Routed to Pond 3PP :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 2-yr 24-hr Rainfall=3.34"

	Area (ac)	CN	Description
	11.610	71	Meadow, non-grazed, HSG C
	3.540	78	Meadow, non-grazed, HSG D
*	0.747	85	Row Crop, HSG C (Offsite)
	15.897	73	Weighted Average
	15.897		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.0213	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
16.1	785	0.0135	0.81		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
25.5	885	Total			

Summary for Subcatchment 4O: Diversion Swale Drainage

Runoff = 1.17 cfs @ 16.49 hrs, Volume= 0.612 af, Depth= 0.91"
Routed to Reach 4OR : Diversion Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 2-yr 24-hr Rainfall=3.34"

Area (ac)	CN	Description
8.064	70	Woods, Good, HSG C
8.064		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.6	100	0.0093	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.34"
20.4	750	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
49.0	850	Total			

Summary for Subcatchment 4PS:

Runoff = 0.57 cfs @ 16.02 hrs, Volume= 0.291 af, Depth= 0.96"
Routed to Reach 2PR :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 2-yr 24-hr Rainfall=3.34"

Area (ac)	CN	Description
3.628	71	Meadow, non-grazed, HSG C
3.628		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0230	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
14.5	905	0.0220	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.6	1,005	Total			

Summary for Subcatchment 5PS:

Runoff = 1.62 cfs @ 16.25 hrs, Volume= 0.840 af, Depth= 0.96"
Routed to Reach 2PR :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 2-yr 24-hr Rainfall=3.34"

Area (ac)	CN	Description
10.458	71	Meadow, non-grazed, HSG C
10.458		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0077	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
22.3	1,070	0.0130	0.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
36.3	1,170	Total			

Summary for Reach 1PR:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.216 ac, 0.78% Impervious, Inflow Depth = 1.13" for 2-yr 24-hr event
Inflow = 0.59 cfs @ 15.78 hrs, Volume= 0.303 af
Outflow = 0.59 cfs @ 15.78 hrs, Volume= 0.303 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 2PR:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 41.146 ac, 0.93% Impervious, Inflow Depth = 0.51" for 2-yr 24-hr event
Inflow = 3.31 cfs @ 16.34 hrs, Volume= 1.743 af
Outflow = 3.31 cfs @ 16.34 hrs, Volume= 1.743 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 4OR: Diversion Swale

Inflow Area = 8.064 ac, 0.00% Impervious, Inflow Depth = 0.91" for 2-yr 24-hr event
Inflow = 1.17 cfs @ 16.49 hrs, Volume= 0.612 af
Outflow = 1.17 cfs @ 16.62 hrs, Volume= 0.612 af, Atten= 0%, Lag= 7.8 min
Routed to Reach 2PR :

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.55 fps, Min. Travel Time= 6.0 min
Avg. Velocity = 1.50 fps, Avg. Travel Time= 10.2 min

Peak Storage= 422 cf @ 16.52 hrs
Average Depth at Peak Storage= 0.17' , Surface Width= 3.37'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 40.77 cfs

2.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 10.00'
Length= 920.0' Slope= 0.0207 '/'
Inlet Invert= 876.00', Outlet Invert= 857.00'

‡

Summary for Pond 2PP:

Inflow Area = 3.099 ac, 12.29% Impervious, Inflow Depth = 1.13" for 2-yr 24-hr event
Inflow = 0.57 cfs @ 15.78 hrs, Volume= 0.292 af
Outflow = 0.12 cfs @ 24.13 hrs, Volume= 0.256 af, Atten= 79%, Lag= 501.0 min
Discarded = 0.12 cfs @ 24.13 hrs, Volume= 0.256 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 2PR :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 868.58' @ 24.13 hrs Surf.Area= 0.562 ac Storage= 0.197 af

Plug-Flow detention time= 748.3 min calculated for 0.256 af (88% of inflow)
Center-of-Mass det. time= 700.4 min (1,721.9 - 1,021.5)

Volume	Invert	Avail.Storage	Storage Description
#1	868.00'	6.916 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
868.00	0.160	0.000	0.000	0.160
869.00	1.010	0.524	0.524	1.010
870.00	1.850	1.409	1.933	1.850
871.00	2.600	2.214	4.147	2.601
872.00	2.940	2.768	6.916	2.942

Device	Routing	Invert	Outlet Devices
#1	Discarded	868.00'	**0.200 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 855.00'
#2	Primary	871.00'	**15.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.12 cfs @ 24.13 hrs HW=868.58' (Free Discharge)
1=Exfiltration (Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=868.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 3PP:

Inflow Area = 15.897 ac, 0.00% Impervious, Inflow Depth = 1.07" for 2-yr 24-hr event
Inflow = 2.74 cfs @ 16.01 hrs, Volume= 1.422 af
Outflow = 0.42 cfs @ 24.36 hrs, Volume= 1.013 af, Atten= 85%, Lag= 501.1 min
Discarded = 0.42 cfs @ 24.36 hrs, Volume= 1.013 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 2PR :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 864.82' @ 24.36 hrs Surf.Area= 1.969 ac Storage= 1.069 af

Plug-Flow detention time= 833.3 min calculated for 1.013 af (71% of inflow)
Center-of-Mass det. time= 737.3 min (1,777.2 - 1,039.9)

Volume	Invert	Avail.Storage	Storage Description
#1	864.00'	3.866 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
864.00	0.740	0.000	0.000	0.740
865.00	2.320	1.457	1.457	2.320
866.00	2.500	2.409	3.866	2.502

Device	Routing	Invert	Outlet Devices
#1	Discarded	864.00'	**0.200 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 855.00'
#2	Primary	865.00'	**50.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.42 cfs @ 24.36 hrs HW=864.82' (Free Discharge)
1=Exfiltration (Controls 0.42 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=864.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Subcatchment 1PS:

Runoff = 1.22 cfs @ 15.74 hrs, Volume= 0.666 af, Depth= 2.48"
Routed to Reach 1PR :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 10-yr 24-hr Rainfall=5.15"

	Area (ac)	CN	Description
	2.643	71	Meadow, non-grazed, HSG C
*	0.025	98	Impervious
*	0.548	85	Row Crop, HSG C (Offsite)
	3.216	74	Weighted Average
	3.191		99.22% Pervious Area
	0.025		0.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0340	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
2.5	100	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.3	200	Total			

Summary for Subcatchment 2PS:

Runoff = 1.18 cfs @ 15.76 hrs, Volume= 0.642 af, Depth= 2.48"
Routed to Pond 2PP :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 10-yr 24-hr Rainfall=5.15"

	Area (ac)	CN	Description
	2.718	71	Meadow, non-grazed, HSG C
*	0.381	98	Impervious
	3.099	74	Weighted Average
	2.718		87.71% Pervious Area
	0.381		12.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0282	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
2.9	104	0.0075	0.61		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.3	204	Total			

Summary for Subcatchment 3PS:

Runoff = 5.80 cfs @ 15.95 hrs, Volume= 3.178 af, Depth= 2.40"
Routed to Pond 3PP :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 10-yr 24-hr Rainfall=5.15"

	Area (ac)	CN	Description
	11.610	71	Meadow, non-grazed, HSG C
	3.540	78	Meadow, non-grazed, HSG D
*	0.747	85	Row Crop, HSG C (Offsite)
	15.897	73	Weighted Average
	15.897		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.0213	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
16.1	785	0.0135	0.81		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
25.5	885	Total			

Summary for Subcatchment 4O: Diversion Swale Drainage

Runoff = 2.62 cfs @ 16.28 hrs, Volume= 1.444 af, Depth= 2.15"
Routed to Reach 4OR : Diversion Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 10-yr 24-hr Rainfall=5.15"

Area (ac)	CN	Description
8.064	70	Woods, Good, HSG C
8.064		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.6	100	0.0093	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.34"
20.4	750	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
49.0	850	Total			

Summary for Subcatchment 4PS:

Runoff = 1.25 cfs @ 15.92 hrs, Volume= 0.674 af, Depth= 2.23"
Routed to Reach 2PR :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 10-yr 24-hr Rainfall=5.15"

Area (ac)	CN	Description
3.628	71	Meadow, non-grazed, HSG C
3.628		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0230	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
14.5	905	0.0220	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.6	1,005	Total			

Summary for Subcatchment 5PS:

Runoff = 3.56 cfs @ 16.09 hrs, Volume= 1.944 af, Depth= 2.23"
Routed to Reach 2PR :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 10-yr 24-hr Rainfall=5.15"

Area (ac)	CN	Description
10.458	71	Meadow, non-grazed, HSG C
10.458		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0077	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
22.3	1,070	0.0130	0.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
36.3	1,170	Total			

Summary for Reach 1PR:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.216 ac, 0.78% Impervious, Inflow Depth = 2.48" for 10-yr 24-hr event
Inflow = 1.22 cfs @ 15.74 hrs, Volume= 0.666 af
Outflow = 1.22 cfs @ 15.74 hrs, Volume= 0.666 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 2PR:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 41.146 ac, 0.93% Impervious, Inflow Depth = 1.52" for 10-yr 24-hr event
Inflow = 9.10 cfs @ 17.33 hrs, Volume= 5.219 af
Outflow = 9.10 cfs @ 17.33 hrs, Volume= 5.219 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 4OR: Diversion Swale

Inflow Area = 8.064 ac, 0.00% Impervious, Inflow Depth = 2.15" for 10-yr 24-hr event
Inflow = 2.62 cfs @ 16.28 hrs, Volume= 1.444 af
Outflow = 2.62 cfs @ 16.47 hrs, Volume= 1.444 af, Atten= 0%, Lag= 11.3 min
Routed to Reach 2PR :

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.24 fps, Min. Travel Time= 4.7 min
Avg. Velocity = 1.87 fps, Avg. Travel Time= 8.2 min

Peak Storage= 742 cf @ 16.39 hrs
Average Depth at Peak Storage= 0.26' , Surface Width= 4.11'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 40.77 cfs

2.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 10.00'
Length= 920.0' Slope= 0.0207 '/'
Inlet Invert= 876.00', Outlet Invert= 857.00'

‡

Summary for Pond 2PP:

Inflow Area = 3.099 ac, 12.29% Impervious, Inflow Depth = 2.48" for 10-yr 24-hr event
Inflow = 1.18 cfs @ 15.76 hrs, Volume= 0.642 af
Outflow = 0.20 cfs @ 24.14 hrs, Volume= 0.467 af, Atten= 83%, Lag= 502.9 min
Discarded = 0.20 cfs @ 24.14 hrs, Volume= 0.467 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 2PR :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 868.95' @ 24.14 hrs Surf.Area= 0.946 ac Storage= 0.471 af

Plug-Flow detention time= 850.3 min calculated for 0.467 af (73% of inflow)
Center-of-Mass det. time= 751.4 min (1,732.2 - 980.8)

Volume	Invert	Avail.Storage	Storage Description
#1	868.00'	6.916 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
868.00	0.160	0.000	0.000	0.160
869.00	1.010	0.524	0.524	1.010
870.00	1.850	1.409	1.933	1.850
871.00	2.600	2.214	4.147	2.601
872.00	2.940	2.768	6.916	2.942

Device	Routing	Invert	Outlet Devices
#1	Discarded	868.00'	**0.200 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 855.00'
#2	Primary	871.00'	**15.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.20 cfs @ 24.14 hrs HW=868.95' (Free Discharge)
1=Exfiltration (Controls 0.20 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=868.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 3PP:

Inflow Area = 15.897 ac, 0.00% Impervious, Inflow Depth = 2.40" for 10-yr 24-hr event
Inflow = 5.80 cfs @ 15.95 hrs, Volume= 3.178 af
Outflow = 3.84 cfs @ 17.76 hrs, Volume= 2.489 af, Atten= 34%, Lag= 108.6 min
Discarded = 0.51 cfs @ 17.76 hrs, Volume= 1.332 af
Primary = 3.34 cfs @ 17.76 hrs, Volume= 1.157 af
Routed to Reach 2PR :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 865.08' @ 17.76 hrs Surf.Area= 2.335 ac Storage= 1.649 af

Plug-Flow detention time= 552.3 min calculated for 2.489 af (78% of inflow)
Center-of-Mass det. time= 470.3 min (1,468.9 - 998.5)

Volume	Invert	Avail.Storage	Storage Description
#1	864.00'	3.866 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
864.00	0.740	0.000	0.000	0.740
865.00	2.320	1.457	1.457	2.320
866.00	2.500	2.409	3.866	2.502

Device	Routing	Invert	Outlet Devices
#1	Discarded	864.00'	**0.200 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 855.00'
#2	Primary	865.00'	**50.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.51 cfs @ 17.76 hrs HW=865.08' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.51 cfs)

Primary OutFlow Max=3.33 cfs @ 17.76 hrs HW=865.08' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 3.33 cfs @ 0.81 fps)

Summary for Subcatchment 1PS:

Runoff = 2.49 cfs @ 15.71 hrs, Volume= 1.458 af, Depth= 5.44"
Routed to Reach 1PR :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 100-yr 24-hr Rainfall=8.57"

	Area (ac)	CN	Description
	2.643	71	Meadow, non-grazed, HSG C
*	0.025	98	Impervious
*	0.548	85	Row Crop, HSG C (Offsite)
	3.216	74	Weighted Average
	3.191		99.22% Pervious Area
	0.025		0.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0340	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
2.5	100	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.3	200	Total			

Summary for Subcatchment 2PS:

Runoff = 2.40 cfs @ 15.73 hrs, Volume= 1.404 af, Depth= 5.44"
Routed to Pond 2PP :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 100-yr 24-hr Rainfall=8.57"

	Area (ac)	CN	Description
	2.718	71	Meadow, non-grazed, HSG C
*	0.381	98	Impervious
	3.099	74	Weighted Average
	2.718		87.71% Pervious Area
	0.381		12.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0282	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
2.9	104	0.0075	0.61		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.3	204	Total			

Summary for Subcatchment 3PS:

Runoff = 12.00 cfs @ 15.90 hrs, Volume= 7.045 af, Depth= 5.32"
Routed to Pond 3PP :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 100-yr 24-hr Rainfall=8.57"

	Area (ac)	CN	Description
	11.610	71	Meadow, non-grazed, HSG C
	3.540	78	Meadow, non-grazed, HSG D
*	0.747	85	Row Crop, HSG C (Offsite)
	15.897	73	Weighted Average
	15.897		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.0213	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
16.1	785	0.0135	0.81		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
25.5	885	Total			

Summary for Subcatchment 4O: Diversion Swale Drainage

Runoff = 5.66 cfs @ 16.17 hrs, Volume= 3.332 af, Depth= 4.96"
Routed to Reach 4OR : Diversion Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 100-yr 24-hr Rainfall=8.57"

Area (ac)	CN	Description
8.064	70	Woods, Good, HSG C
8.064		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.6	100	0.0093	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.34"
20.4	750	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
49.0	850	Total			

Summary for Subcatchment 4PS:

Runoff = 2.65 cfs @ 15.87 hrs, Volume= 1.535 af, Depth= 5.08"
Routed to Reach 2PR :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 100-yr 24-hr Rainfall=8.57"

Area (ac)	CN	Description
3.628	71	Meadow, non-grazed, HSG C
3.628		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0230	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
14.5	905	0.0220	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.6	1,005	Total			

Summary for Subcatchment 5PS:

Runoff = 7.57 cfs @ 16.01 hrs, Volume= 4.425 af, Depth= 5.08"
Routed to Reach 2PR :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 100-yr 24-hr Rainfall=8.57"

Area (ac)	CN	Description
10.458	71	Meadow, non-grazed, HSG C
10.458		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0077	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
22.3	1,070	0.0130	0.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
36.3	1,170	Total			

Summary for Reach 1PR:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.216 ac, 0.78% Impervious, Inflow Depth = 5.44" for 100-yr 24-hr event
Inflow = 2.49 cfs @ 15.71 hrs, Volume= 1.458 af
Outflow = 2.49 cfs @ 15.71 hrs, Volume= 1.458 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 2PR:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 41.146 ac, 0.93% Impervious, Inflow Depth = 4.13" for 100-yr 24-hr event
Inflow = 26.97 cfs @ 16.09 hrs, Volume= 14.166 af
Outflow = 26.97 cfs @ 16.09 hrs, Volume= 14.166 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 4OR: Diversion Swale

Inflow Area = 8.064 ac, 0.00% Impervious, Inflow Depth = 4.96" for 100-yr 24-hr event
Inflow = 5.66 cfs @ 16.17 hrs, Volume= 3.332 af
Outflow = 5.66 cfs @ 16.35 hrs, Volume= 3.332 af, Atten= 0%, Lag= 10.4 min
Routed to Reach 2PR :

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.03 fps, Min. Travel Time= 3.8 min
Avg. Velocity = 2.33 fps, Avg. Travel Time= 6.6 min

Peak Storage= 1,291 cf @ 16.29 hrs
Average Depth at Peak Storage= 0.39' , Surface Width= 5.14'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 40.77 cfs

2.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 10.00'
Length= 920.0' Slope= 0.0207 '/'
Inlet Invert= 876.00', Outlet Invert= 857.00'

‡

Summary for Pond 2PP:

Inflow Area = 3.099 ac, 12.29% Impervious, Inflow Depth = 5.44" for 100-yr 24-hr event
Inflow = 2.40 cfs @ 15.73 hrs, Volume= 1.404 af
Outflow = 0.30 cfs @ 24.16 hrs, Volume= 0.796 af, Atten= 88%, Lag= 505.8 min
Discarded = 0.30 cfs @ 24.16 hrs, Volume= 0.796 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 2PR :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 869.50' @ 24.16 hrs Surf.Area= 1.396 ac Storage= 1.120 af

Plug-Flow detention time= 966.3 min calculated for 0.796 af (57% of inflow)
Center-of-Mass det. time= 809.8 min (1,748.9 - 939.1)

Volume	Invert	Avail.Storage	Storage Description
#1	868.00'	6.916 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
868.00	0.160	0.000	0.000	0.160
869.00	1.010	0.524	0.524	1.010
870.00	1.850	1.409	1.933	1.850
871.00	2.600	2.214	4.147	2.601
872.00	2.940	2.768	6.916	2.942

Device	Routing	Invert	Outlet Devices
#1	Discarded	868.00'	**0.200 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 855.00'
#2	Primary	871.00'	**15.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.30 cfs @ 24.16 hrs HW=869.50' (Free Discharge)
1=Exfiltration (Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=868.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 3PP:

Inflow Area = 15.897 ac, 0.00% Impervious, Inflow Depth = 5.32" for 100-yr 24-hr event
Inflow = 12.00 cfs @ 15.90 hrs, Volume= 7.045 af
Outflow = 11.74 cfs @ 16.14 hrs, Volume= 6.345 af, Atten= 2%, Lag= 14.6 min
Discarded = 0.52 cfs @ 16.14 hrs, Volume= 1.471 af
Primary = 11.22 cfs @ 16.14 hrs, Volume= 4.874 af
Routed to Reach 2PR :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 865.19' @ 16.14 hrs Surf.Area= 2.353 ac Storage= 1.891 af

Plug-Flow detention time= 287.4 min calculated for 6.343 af (90% of inflow)
Center-of-Mass det. time= 242.3 min (1,198.5 - 956.2)

Volume	Invert	Avail.Storage	Storage Description
#1	864.00'	3.866 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
864.00	0.740	0.000	0.000	0.740
865.00	2.320	1.457	1.457	2.320
866.00	2.500	2.409	3.866	2.502

Device	Routing	Invert	Outlet Devices
#1	Discarded	864.00'	**0.200 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 855.00'
#2	Primary	865.00'	**50.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

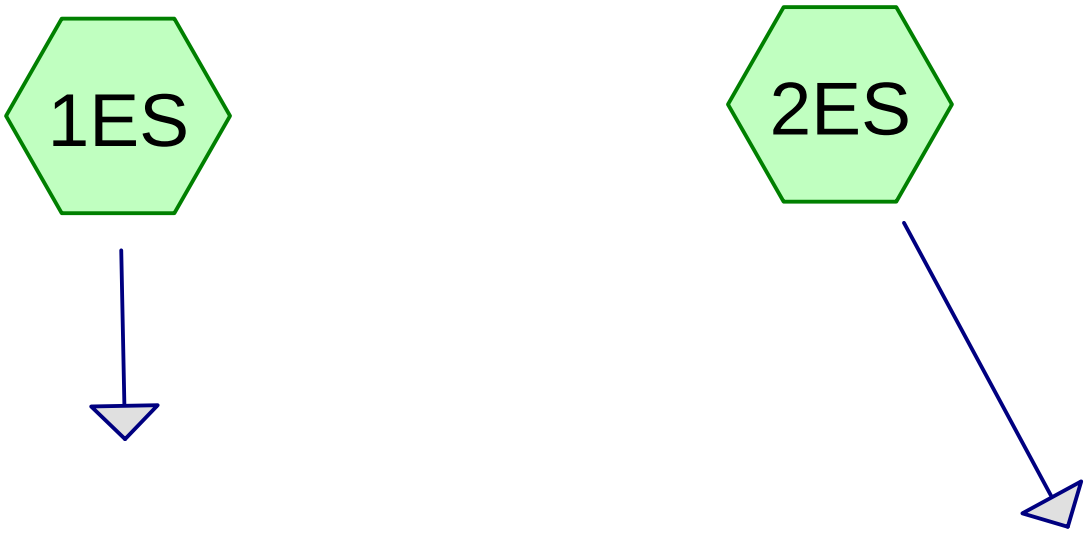
Discarded OutFlow Max=0.52 cfs @ 16.14 hrs HW=865.19' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.52 cfs)

Primary OutFlow Max=11.21 cfs @ 16.14 hrs HW=865.19' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 11.21 cfs @ 1.21 fps)

Appendix D

Water Quality Calculations

Existing Conditions



Subcat Reach Pond Link

Routing Diagram for Wilson School Solar
Prepared by Westwood Professional Services, Printed 7/15/2025

Summary for Subcatchment 1ES:

Runoff = 0.09 cfs @ 15.96 hrs, Volume= 0.047 af, Depth= 0.17"
Routed to Reach 1ER :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 1in Rainfall=1.00"

	Area (ac)	CN	Description
*	2.668	85	Row Crop, HSG C
*	0.548	85	Row Crop, HSG C (Offsite)
	3.216	85	Weighted Average
	3.216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0340	0.19		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
2.0	100	0.0090	0.85		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
10.6	200	Total			

Summary for Subcatchment 2ES:

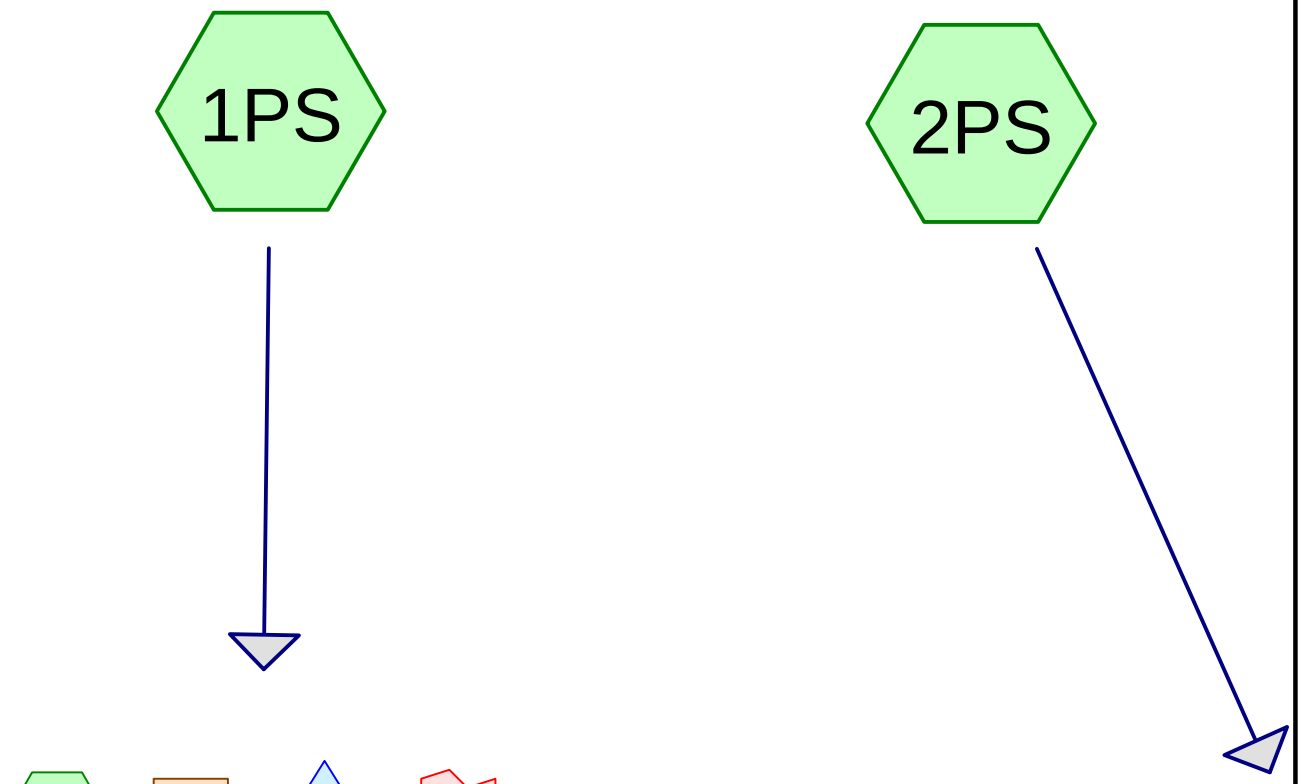
Runoff = 0.09 cfs @ 15.97 hrs, Volume= 0.045 af, Depth= 0.17"
Routed to Pond 2EP :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 1in Rainfall=1.00"

	Area (ac)	CN	Description
*	3.099	85	Row Crop, HSG C
	3.099		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0282	0.18		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 3.34"
2.2	104	0.0075	0.78		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
11.4	204	Total			

Proposed Conditions



Routing Diagram for Wilson School Solar
Prepared by Westwood Professional Services, Printed 7/15/2025

Summary for Subcatchment 1PS:

Runoff = 0.01 cfs @ 24.02 hrs, Volume= 0.006 af, Depth= 0.02"
Routed to Reach 1PR :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 1in Rainfall=1.00"

	Area (ac)	CN	Description
	2.643	71	Meadow, non-grazed, HSG C
*	0.025	98	Impervious
*	0.548	85	Row Crop, HSG C (Offsite)
	3.216	74	Weighted Average
	3.191		99.22% Pervious Area
	0.025		0.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0340	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
2.5	100	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.3	200	Total			

Summary for Subcatchment 2PS:

Runoff = 0.01 cfs @ 18.47 hrs, Volume= 0.006 af, Depth= 0.02"
Routed to Pond 2PP :

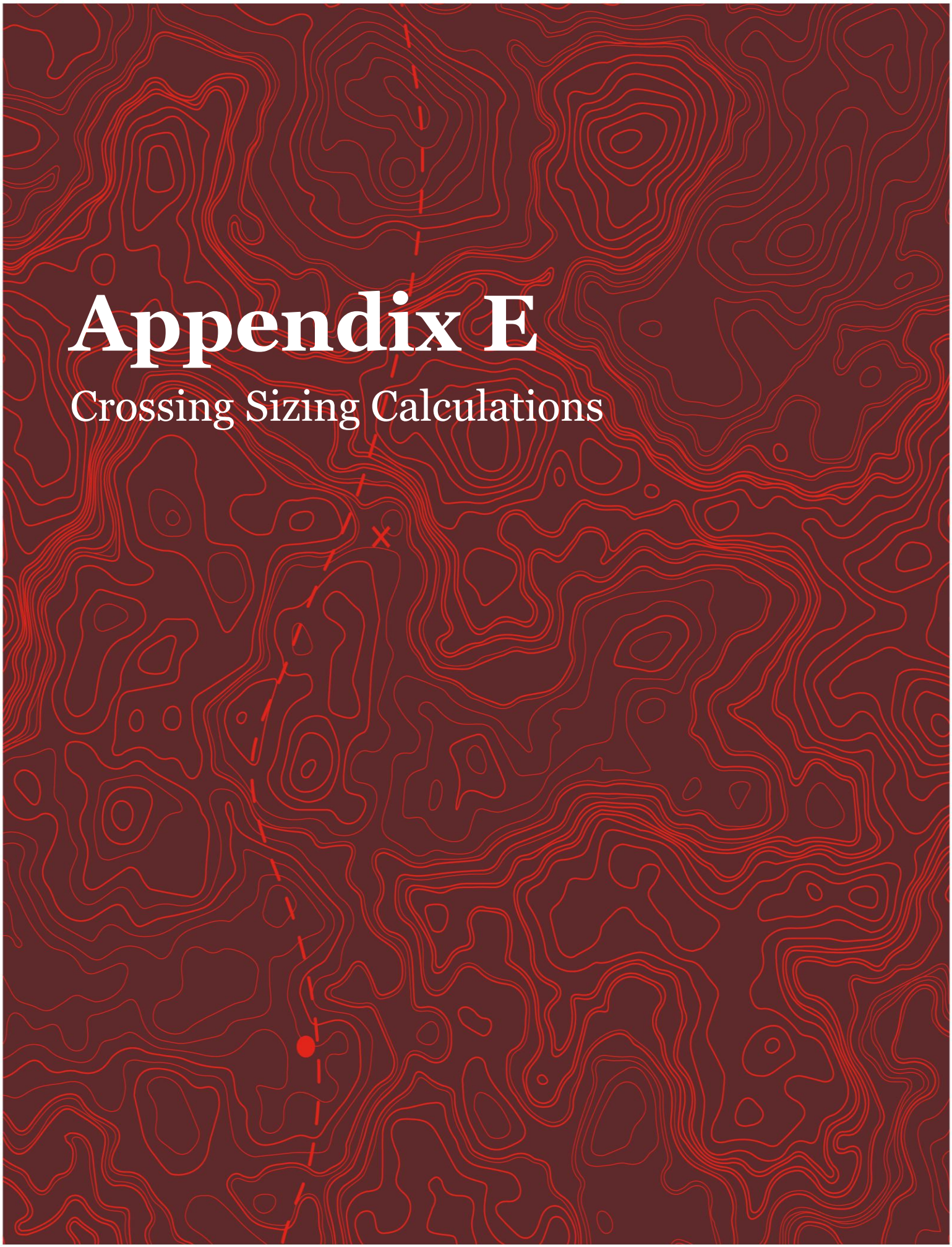
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 1in Rainfall=1.00"

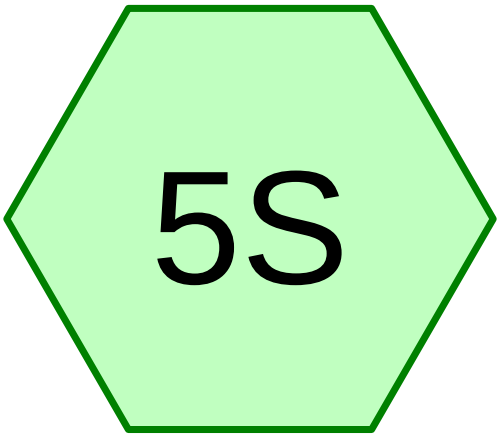
	Area (ac)	CN	Description
	2.718	71	Meadow, non-grazed, HSG C
*	0.381	98	Impervious
	3.099	74	Weighted Average
	2.718		87.71% Pervious Area
	0.381		12.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0282	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.34"
2.9	104	0.0075	0.61		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.3	204	Total			

Appendix E

Crossing Sizing Calculations





Culvert Drainage

Subcat Reach Pond Link

Routing Diagram for Wilson School Solar
Prepared by Westwood Professional Services, Printed 7/15/2025

Summary for Subcatchment 5S: Culvert Drainage

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.14 cfs @ 15.61 hrs, Volume= 0.104 af, Depth= 8.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 100-yr 24-hr Rainfall=8.57"

Area (ac)	CN	Description
0.150	98	Paved parking, HSG C
0.150		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	150	0.0130	2.31		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Culvert Design Report
Entrance Culvert

Peak Discharge Method: User-Specified			
Design Discharge	0.14 cfs	Check Discharge	0.00 cfs

Grades Model: Inverts			
Invert Upstream	878.50 ft	Invert Downstream	877.50 ft
Length	50.00 ft	Slope	0.020000 ft/ft
Drop	1.00 ft		

Headwater Model: Unspecified

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	N/A ft

	Name	Description	Discharge	HW Elev.	Velocity
x	Trial-1	1-18 inch Circular	0.14 cfs	878.73 ft	1.73 ft/s

Culvert Design Report
Entrance Culvert

Design:Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	878.73 ft	Discharge	0.14 cfs
Headwater Depth/Height	0.15	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	878.67 ft	Control Type	Outlet Control
Outlet Control HW Elev.	878.73 ft		

Grades			
Upstream Invert	878.50 ft	Downstream Invert	877.50 ft
Length	50.00 ft	Constructed Slope	0.020000 ft/ft

Hydraulic Profile			
Profile	M2	Depth, Downstream	0.14 ft
Slope Type	Mild	Normal Depth	0.14 ft
Flow Regime	Subcritical	Critical Depth	0.14 ft
Velocity Downstream	1.73 ft/s	Critical Slope	0.020029 ft/ft

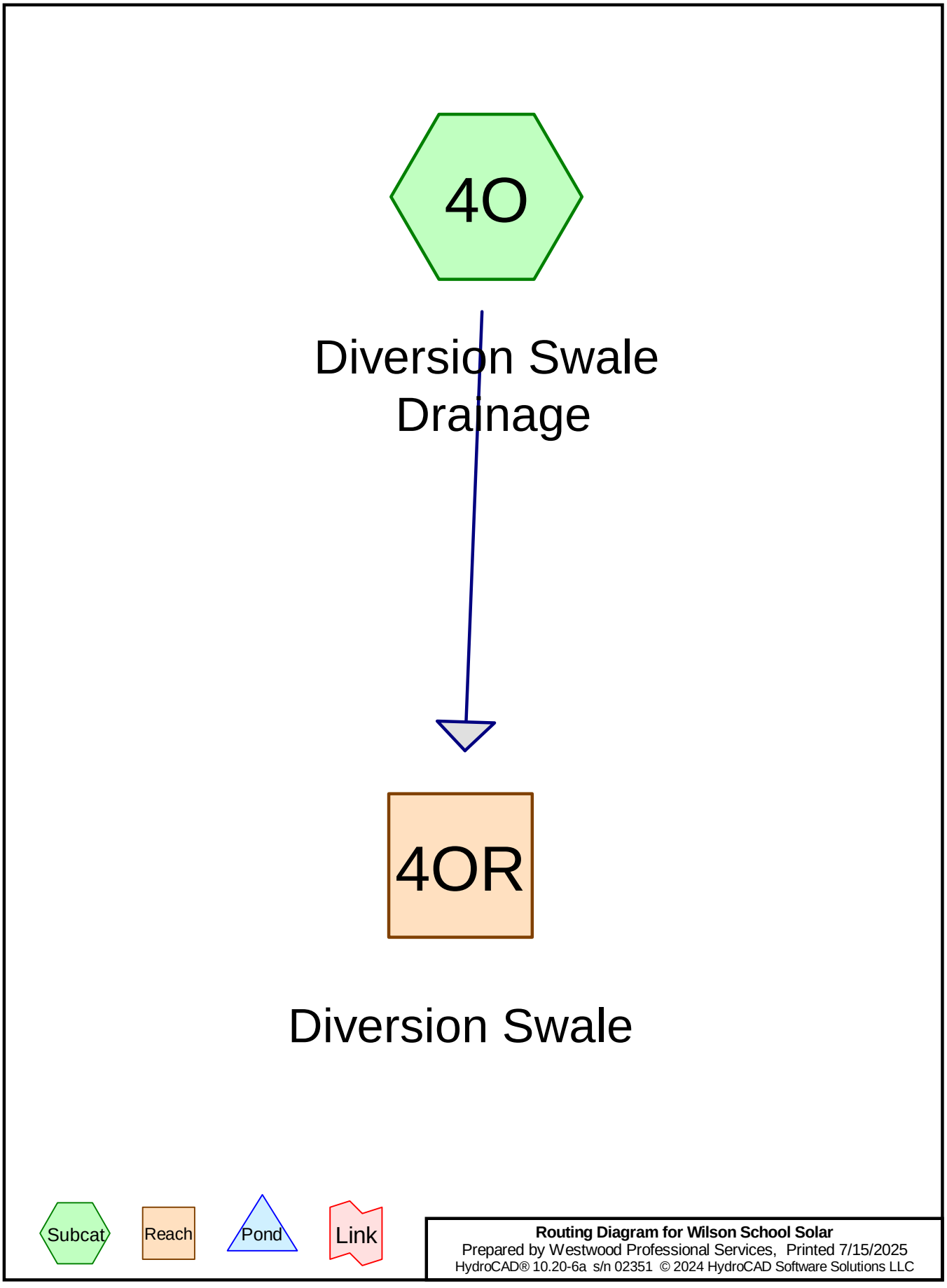
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	878.73 ft	Upstream Velocity Head	0.05 ft
Ke	0.90	Entrance Loss	0.04 ft

Inlet Control Properties			
Inlet Control HW Elev.	878.67 ft	Flow Control	Unsubmerged
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Appendix F

Swale Sizing Calculations



Routing Diagram for Wilson School Solar
Prepared by Westwood Professional Services, Printed 7/15/2025

Summary for Subcatchment 4O: Diversion Swale Drainage

Runoff = 5.80 cfs @ 16.32 hrs, Volume= 3.429 af, Depth= 4.96"
Routed to Reach 4OR : Diversion Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q scaled to 24.00 hrs 100-yr 24-hr Rainfall=8.57"

Area (ac)	CN	Description
8.300	70	Woods, Good, HSG C
8.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.0	100	0.0070	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.34"
21.8	800	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
53.8	900	Total			

Summary for Reach 4OR: Diversion Swale

Inflow Area = 8.300 ac, 0.00% Impervious, Inflow Depth = 4.96" for 100-yr 24-hr event
Inflow = 5.80 cfs @ 16.32 hrs, Volume= 3.429 af
Outflow = 5.80 cfs @ 16.40 hrs, Volume= 3.429 af, Atten= 0%, Lag= 4.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.06 fps, Min. Travel Time= 3.8 min
Avg. Velocity = 2.34 fps, Avg. Travel Time= 6.6 min

Peak Storage= 1,314 cf @ 16.33 hrs
Average Depth at Peak Storage= 0.40' , Surface Width= 5.18'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 40.77 cfs

2.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 10.00'
Length= 920.0' Slope= 0.0207 '/'
Inlet Invert= 876.00', Outlet Invert= 857.00'

‡

Westwood

SWALE CALCULATIONS

PROJECT: Wilson School Solar

	PROVIDED SIZING					SWALE CONFIGURATION				LINING DESIGN	
SWALE ID	BOTTOM WIDTH	DEPTH	SIDE SLOPES	100-YR AVERAGE FLOW DEPTH	FREEBOARD	LENGTH OF SWALE	INVERT ELEVATION	OUTLET ELEVATION	SLOPE	SHEAR STRESS	LINING MATERIAL
Diversion	2	1	4:1	0.4	0.6	920	876	857	0.0207	0.5155	P300

Appendix G

FEMA FIRM Panel

Approximate Project Boundary

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or flood plain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or flood plain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

In the State of Illinois, any portion of a stream or watercourse that lies within the **floodway fringe** of a studied (AE) stream may have a state regulated floodway. The FIRM may not depict these state regulated floodways.

Floodways restricted by anthropogenic features such as bridges and culverts are drawn to reflect natural conditions and may not agree with the model computed widths listed in the Floodway Data table in the Flood Insurance Study report.

Multiple **topographic sources** may have been used in the delineation of Special Flood Hazard Areas. See Flood Insurance Study report for details on source resolution and geographic extent.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 16. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services, NOAA, N/NGS12
National Geodetic Survey SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by Kane County GIS Technologies of Kane County, Illinois. Black and white digital orthophotos with a 5 inch pixel resolution were photogrammatically compiled from aerial photography obtained during the spring of 2004.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The Special Flood Hazard Areas and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

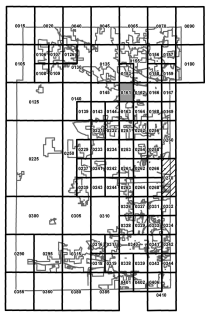
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

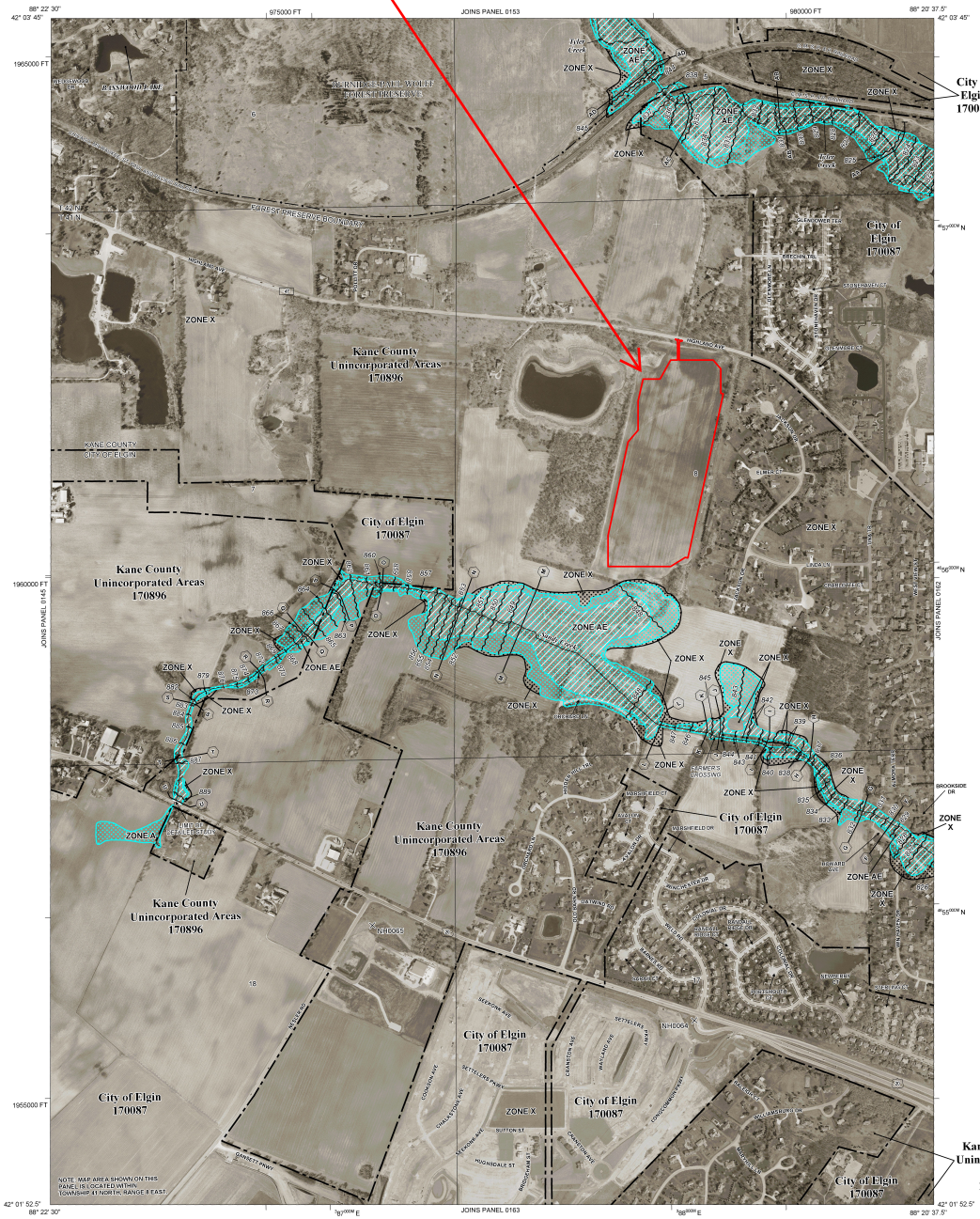
Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital version of this map. The FEMA Map Service Center may also be reached by fax at 1-800-358-9620 and its website at www.msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at www.fema.gov/business/nfip.

PANEL INDEX



Panel Not Printed



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- **ZONE A** — No Base Flood Elevations determined.
- **ZONE AE** — Base Flood Elevations determined.
- **ZONE AH** — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- **ZONE AO** — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE AR** — Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- **ZONE A99** — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- **ZONE V** — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- **ZONE VE** — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- **ZONE X** — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- **ZONE X** — Areas determined to be outside the 0.2% annual chance floodplain.
- **ZONE D** — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4987000 N — 1000-meter Universal Transverse Mercator grid values, zone 16
- 1965000 FT — 5000-foot grid tick: Illinois State Plane East Coordinate System, 3776 zone (FIPSZONE 1201) Transverse Mercator
- DX5510 X — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
DECEMBER 20, 2002

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

November 16, 2006 -

August 3, 2009 - to reflect updated topographic information, to incorporate previously issued Letters of Map Revision, to change Base Flood Elevations, to add Special Flood Hazard Areas and Base Flood Elevations, and to change zone designations.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

PANEL 0161H

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

KANE COUNTY, ILLINOIS AND INCORPORATED AREAS

PANEL 161 OF 410

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ELGIN, CITY OF	170087	0161	H
KANE COUNTY	170896	0161	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
17089C0161H

MAP REVISED
AUGUST 3, 2009

Federal Emergency Management Agency