STAFFORD SOLAR ONE, LLC

CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, OPERATION AND MAINTENANCE OF A 4.0 MW AC GROUND-MOUNTED SOLAR PHOTOVOLTAIC PROJECT AT 92 UPPER ROAD, STAFFORD, CONNECTICUT

DRAFT FOR TOWN OF STAFFORD REVIEW

MARCH 25, 2024

VEROGY

Weston & Sampson[SM]

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STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

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CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, OPERATION AND MAINTENANCE OF A 4.0 MW AC GROUND-MOUNTED SOLAR PHOTOVOLTAIC PROJECT AT 92 UPPER ROAD, STAFFORD, CONNECTICUT	:	CERTIFICATE NO. ____
	:	March 25, 2024

I. INTRODUCTION

Pursuant to the Connecticut General Statues ("CGS") Section 4-176(a) and 16-50k(a) and Section 16-50j-38 *et seq.* of the Regulations of Connecticut State Agencies ("RCSA"), Stafford Solar One, LLC (the "Applicant" or "Stafford Solar One") is pleased to submit this Application for a Certificate of Environmental Compatibility and Public Need ("Certificate") for the development of a 4.0 megawatt ("MW") alternating current ("AC") solar-based electric generating facility (the "Facility" or "Project") located on property at 92 Upper Road, Stafford, Connecticut (the "Site").

CGS Section 16-50k(a) states, in relevant part:

a) *Except as provided in subsection (b) of section 16-50z, no person shall exercise any right of eminent domain in contemplation of, commence the preparation of the site for, commence the construction or supplying of a facility, or commence any modification of a facility, that may, as determined by the council, have a substantial adverse environmental effect in the state without having first obtained a certificate of environmental compatibility and public need, hereinafter referred to as a "certificate", issued with respect to such facility or modification by the council. Any facility with respect to which a certificate is required shall thereafter be built, maintained and operated in conformity with such certificate and any terms, limitations or conditions contained therein.*

As described below, the Project will generate 4.0 MW of clean renewable energy, result in no air emissions, and no significant adverse environmental effects, and will comply with the applicable air and water quality standards of the Connecticut Department of Energy and Environmental Protection ("CT DEEP").

II. APPLICANT AND CONTACT INFORMATION

Stafford Solar One is a Connecticut limited liability company with its principal place of business at 124 LaSalle Road in West Hartford, Connecticut. Stafford Solar One is a subsidiary of Verogy Holdings, LLC ("Verogy"). Verogy is a professional renewable energy business with decades of experience in the solar industry; the core of its business is developing, financing, constructing, managing, and operating solar generating facilities.

Mailing Address:	Stafford Solar One, LLC 124 LaSalle Road, 2nd Floor West Hartford, CT 06107
Internet Address(es):	https://www.verogy.com/ https://www.verogy.com/Stafford-solar-one/

Correspondence and other communications concerning the Project are to be addressed to, and notices, orders and other papers may be served upon the following:

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lhoffman@pullcom.com
(860) 424-4315

The Applicant's representatives' consent to electronic mailings of all Council and Application-related correspondence.

III. THE PROJECT

A. Project Overview

The Project was selected and awarded a 20-year contract for a total of 4.0 MW AC, to participate in the Connecticut Shared Clean Energy Facility ("SCEF") program, which allows eligible customers to subscribe and receive the benefits of renewable energy generation as a credit to their monthly utility bills. Beneficiaries of Connecticut's SCEF include low- and moderate-income customers, small businesses customers, state and municipal customers, commercial customers, and other residential customers not otherwise able to install on-site solar. At least sixty percent of the total capacity of each SCEF facility is provided to low- & moderate-income customers or low-income service organizations. The Project will help Connecticut meet its emission reduction targets via the State of Connecticut's Renewable Portfolio Standard and meet the Governor's goal of becoming carbon neutral by 2040. Pending approvals, the Project will commence financing, detailed engineering, procurement, and construction efforts in late 2024, with commercial operation planned for the Project in 2025.

B. Site Description

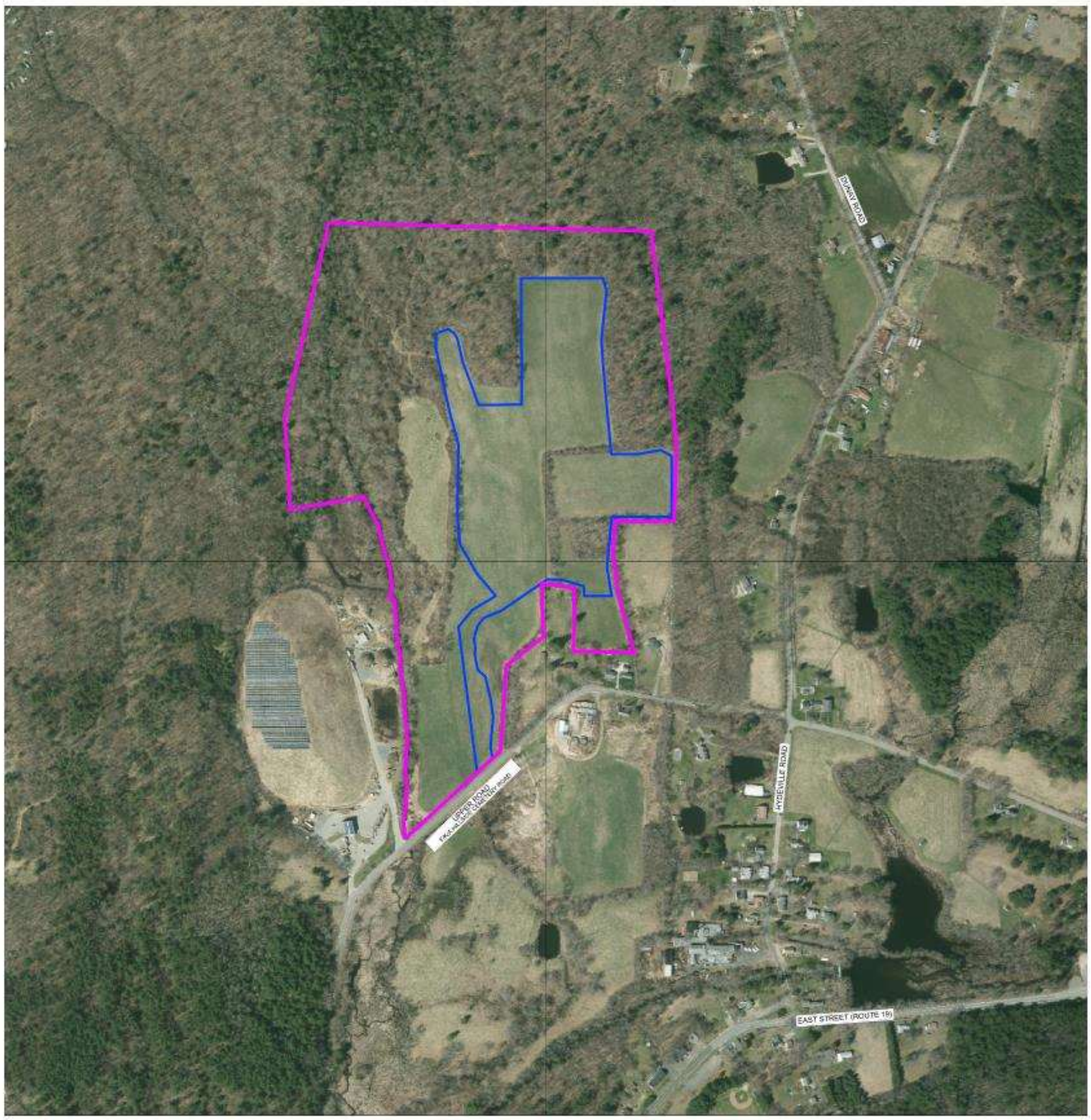
The Site is a 59-acre parcel, located in the Town of Stafford's AAA Residential Zone at 92 Upper Road, Stafford, Connecticut, and is currently owned by the estate of Edwina J. Mordasky. The Site is a mix of open fields that are utilized for growing and harvesting hay and undeveloped wooded areas. There are no existing structures located within the property limits. The Site is bordered by Upper Road to the south, Alden Brook and the Town of Stafford Landfill to the west, undeveloped woods to the north and northeast, and mix of undeveloped woods and single-family residences to the east and southeast. The Project area is approximately 22 acres.

See Figure 1 (Site Location Map) and Figure 2 (Existing Conditions Map) for a depiction of the Site and Project area.

C. Site Selection

The site selection for the Project was based on an evaluation of several key criteria, including but not limited to: (i) site availability; (ii) site suitability, (parcel size, site topography presence of wetlands or other environmentally sensitive features); (iii) proximity to critical utility infrastructure, including suitable electrical grid access; (iv) compatibility with surrounding land use; and (v) overall impact on the environment and the surrounding area.

Once the initial site evaluation was completed, the Applicant assessed potential effects of the Project on the environment and sensitive resources, including but not limited to scenic views and vistas, historic and archeological resources, wetlands, water quality and water resources, rare and endangered species, and air quality issues. As discussed in detail below, after this evaluation, the Applicant determined that the Site was suitable for development of the Project and that the Project will provide a significant benefit to the public.



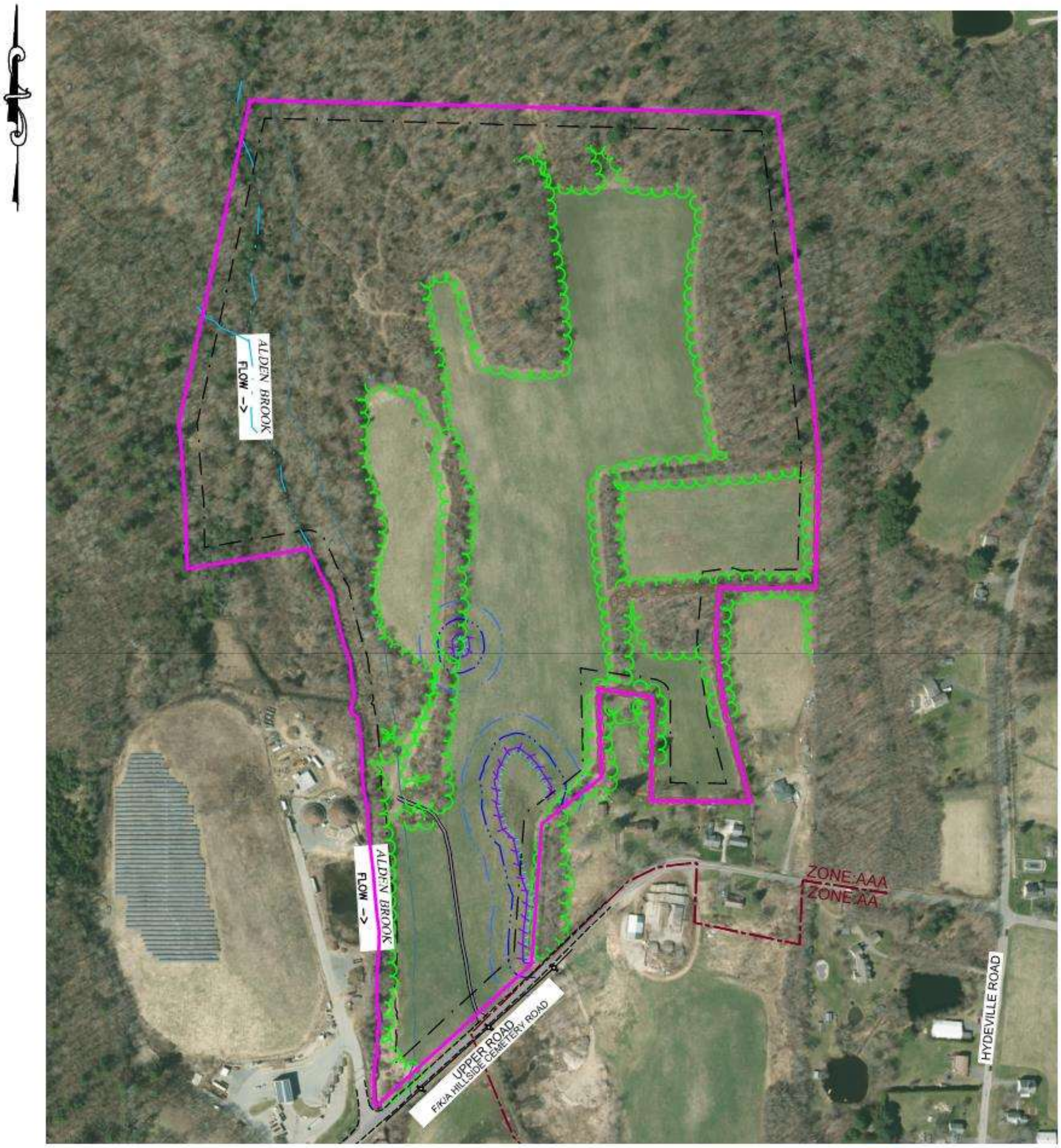
Weston & Sampson

LEGEND:
PROPERTY LINE
LIMIT OF WORK

SITE LOCATION MAP
FIGURE 1
PROPOSED SOLAR PV DEVELOPMENT
92 UPPER ROAD STAFFORD, CONNECTICUT
SCALE: 1" = 700'

0 700 1400

P:\Private\Verogy Solar\233034-Verogy Stafford CT\06-BIM-CAD\01-Civil-Survey\01 Permitting Set\03 Sheets\Figure 1 Site Location Map.dwg



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LEGEND:
PROPERTY LINE
50' PROPERTY LINE OFFSET
LIMIT OF WORK
STONEWALL
TREE LINE
10' WETLANDS BUFFER
10' WETLANDS BUFFER
50' WETLANDS BUFFER
100' WETLANDS BUFFER
100' UPLAND REVIEW AREA
ZONE LINE
PAVEMENT
GRAVEL

EXISTING CONDITIONS MAP
FIGURE 2
PROPOSED SOLAR PV DEVELOPMENT
92 UPPER ROAD STAFFORD, CONNECTICUT
SCALE: 1" = 400'

0 400 800

P:\Private\Verogy Solar\233034-Verogy Stafford CT\06-BIM-CAD\01-Civil-Survey\01 Permitting Set\03 Sheets\Figure 2 Existing Conditions.dwg

D. Project Description

The proposed Facility will be installed in an open field, previously used for agricultural purposes. The Facility will consist of a 4.0 MW AC ground mounted fixed tilt solar array. The Facility will be connected to the existing electric distribution system via an overhead service constructed by Eversource.

i. Facility Design

As currently designed, the proposed Project will consist of 10,040 First Solar Model FS-6465A-P-B, 465-Watt solar modules, 32 CPS 600V 125kW (SCH125KTL-DO/US-600) inverters, AC panel boards and/or switchgear, and two 2000 kVa transformers. The panels will be secured to a fixed tilt ground mounted steel racking structure, with the rows of panels extending due east-west. The steel racking structure will be anchored to the ground with driven posts or ground screws, to a depth to attain sufficient structural capacity to resist the loads from the weight of the panels, as well as environmental loads including snow, wind, and seismic forces. The array of solar panels and the equipment will be surrounded by a minimum seven-foot-high fence meeting applicable electrical codes. A proposed gravel access road, located in the southernmost portion of the Site, will be used to access the Facility from Upper Road and will extend to the north to the central portion of the Site, where the Project's transformers, panel boards/switchgears, and inverters will be located. The proposed utility interconnection service poles by Eversource will be located adjacent to the access road at its intersection with Upper Road. First Solar has performed a Toxicity Characteristic Leaching Procedure ("TCLP") test on its solar modules and has determined that the panels are not characterized as hazardous waste. See Appendix A for major system component specifications and the TCLP testing report.

The Facility's panels and inverters have an anticipated service life of thirty-five (35) years. The total 4.0 MW AC system will have an expected net AC capacity factor of approximately 14.8%. The Project is expected to produce more than 6,012,595 Kilowatt-Hours (kWh) of energy in the first year of operation, enough energy to power 829 homes. Energy produced by the Project will be sold to Eversource as part of the Connecticut SCEF Program. The SCEF Program, passed by the legislature and signed into law by Governor Lamont in 2018 (Public Act 18-50), is a six-year competitive energy procurement program supporting up to 150 MW of clean energy. The Applicant was a successful bidder in year four of the SCEF Program for the 4.0 MW AC system. The SCEF Program seeks to deploy new and incremental Class 1 renewable generation projects ranging in size from 100 to 5,000 kW (AC) for a contract term of twenty (20) years.

See Figure 3 (Proposed Conditions Map) for a depiction of the Facility layout. See Appendix B, Project Plans for design details.

ii. Interconnection

The interconnection application for the solar array was submitted to Eversource Energy on March 8, 2023, and it was subsequently determined by Eversource that a Distribution and Transmission Impact Study would be necessary. The Distribution Impact study, with an indication of no significant impact on the distribution grid, was completed by Eversource. These results, provided on November 27, 2023, indicate that a new service, consisting of an on-site pole-mounted primary meter and pole mounted recloser, will be required, in addition to the upgrade of off-site protective devices and the relocation of system regulators. It is anticipated that a formal Interconnection Agreement will be issued by Eversource sometime in the spring of 2024, upon completion of the Transmission Impact Study. Stafford Solar One intends to sign and return the Interconnection Agreement with Eversource promptly upon receipt.

iii. Stormwater Management

The Applicant's Engineer and Environmental Consultant, Weston & Sampson, has designed the Project in accordance with the 2004 State of Connecticut Stormwater Quality Manual, the Connecticut General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities ("General Permit") as modified November 25, 2022; and the Connecticut Department of Energy & Environmental Protection ("CT DEEP") Appendix I to the General Permit, Stormwater Management at Solar Array Construction Projects ("Appendix I"). The design addresses three primary concerns: the management of peak stormwater flows, water quality volume treatment, and soil erosion and sedimentation controls ("SESC") throughout the construction period. Weston & Sampson's Preliminary Pre & Post Stormwater Calculations are attached as Appendix C.

The Project proposes to construct a ground-mount solar PV array which involves the installation of solar racking and panels, concrete pads to support certain equipment, utility poles for interconnection, underground utilities, and a gravel access road. The stormwater management system has been designed such that pre-development drainage patterns are proposed to be maintained, to the greatest extent feasible, in an effort to maintain and/or reduce peak post-development flows to off-site areas. The stormwater management system has been designed to treat the water quality volume (WQV) associated with the post-development conditions and maintain the peak runoff rate and volume attenuation for the 2-, 10-, 25-, and

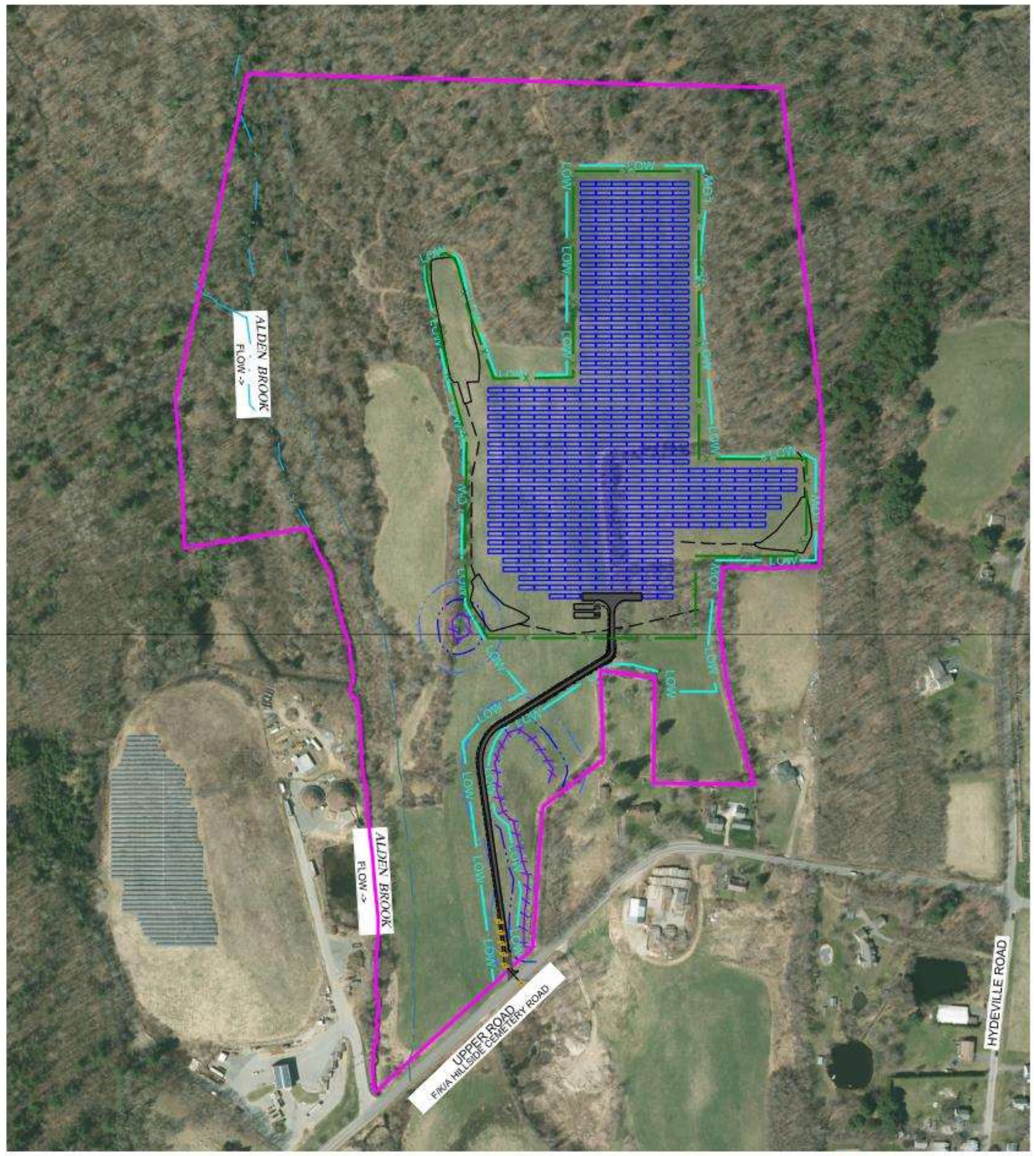
100-year 24-hour storm events for post-development conditions compared to pre-development conditions. The proposed stormwater management system will consist of perimeter swales which collect and distribute site runoff to three infiltration basins, and one infiltration trench. Appendix C demonstrates that there will be no net increase in runoff resulting from the developed condition of the site and that calculations are based on publicly available soil information. Test pits to confirm the soil condition and the assumed infiltration rates were being conducted on March 21-22, 2024. A comprehensive stormwater analysis report is still in progress at this time and will incorporate the results of these test pits.

The proposed stormwater management basins are to act as temporary sediment basins during construction and are to be restored and reutilized as permanent basins to provide WQV and retention of peak flows after construction ends. The basins have adequate capacity to manage/decrease the post-construction peak runoff rates to match the existing conditions runoff rates for the 2-, 25-, 50- and 100-year storm events. Water quality treatment will be handled within the stormwater basins via infiltration, within the vegetated buffer areas between the Project and adjacent downstream wetland areas, as well as via the seed mix proposed across the Site which will promote a meadow-type ground cover that encourages additional infiltration.

To safeguard water resources from potential impacts during construction, the Applicant is committed to implementing protective measures in the form of a Stormwater Pollution Control Plan ("SWPCP"), subject to review and approval by DEEP Stormwater Management team. The SWPCP will include monitoring of established SESC measures that are to be installed and maintained in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control and Appendix I. As indicated in the Stormwater Analysis Executive Summary, the stormwater management system has been designed per the Connecticut Guidelines for Soil Erosion & Sediment Control and involves the use of perimeter compost filter sock, erosion control blankets for steep slopes, temporary material stockpiles, and a stabilized construction entrance / exit.

The initial erosion control plans and details are provided in Appendix B. Upon completion of the test pit information noted above, the final erosion control plans will be developed, to meet the requirement of the General Permit. The proposed stormwater management basins will act as temporary sediment basins during construction activities. Perimeter SESC measures will encircle the Project to trap sediment mobilized during construction activity. The basins will be cleaned of deposited sediment as needed during construction to maintain sufficient sediment storage capacity. Upon final site stabilization, the basins will be restored and reutilized as permanent stormwater management basins.

With the incorporation of the protective measures outlined above, the Project is not anticipated to result in an adverse impact to water quality associated with nearby surface water bodies or downstream properties.



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LEGEND:

- PROPERTY LINE
- 50' PROPERTY LINE OFFSET
- LIMIT OF WORK
- STONEWALL
- FENCE
- 10' WETLANDS BUFFER
- 10' WETLANDS BUFFER
- 50' WETLANDS BUFFER
- 100' WETLANDS BUFFER
- 100' UPLAND REVIEW AREA
- UNDERGROUND ELECTRICAL
- INTERCONNECTION PATH
- GRAVEL ACCESS DRIVE
- SOLAR MODULES
- CONCRETE PAD
- EQUIPMENT
- UTILITY POLE

PROPOSED CONDITIONS MAP
FIGURE 3
PROPOSED SOLAR PV DEVELOPMENT
92 UPPER ROAD STAFFORD, CONNECTICUT
SCALE: 1" = 400'

0 400 800

P:\Private\Verogy Solar\233034-Verogy Stafford CT\06-BIM-CAD\01-Civil-Survey\01 Permitting Set\03 Sheets\Figure 3 Proposed Conditions Map.dwg

iv. Construction

The Applicant anticipates that construction of the Project will begin in late 2024 and will take approximately six (6) months to complete. Construction activities within the Project area will include: SESC measures, racking and modules, electrical trenching, the installation of interconnection infrastructure, and the new gravel access road. Existing grades throughout the Project area will remain and little or no grading on Site is expected.

Initial work would involve the installation of SESC measures. Upon completion of the installation of the SESC measures, the Applicant will begin the racking installation, followed by the installation of the solar modules and other electrical equipment. Final site stabilization, Facility testing, and Project commissioning would be expected to be completed in Spring 2025. Construction activities would occur between the hours of 7:00 a.m. to 6:00 p.m. Monday through Friday and Saturday between the hours of 8:00 a.m. and 5:00 p.m.

As noted in Section D.i., a SWPCP would also be developed and implemented for the Project. The SWPCP will include obligations for the regular inspection of SESC measures to prevent sedimentation or water quality impacts. The Applicant will also apply for a General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities from CT DEEP. Construction notes are included on Sheet C001 in Appendix B.

v. Operation & Maintenance

Throughout the operational life of the Project, periodic inspections and/or maintenance will be performed as required, based on the Applicant's experience, maintenance requirements would be minimal. The designated Operations & Maintenance ("O&M") service provider and/or its authorized subcontractors will visit the Site to assess site conditions on a semi-annual basis and perform maintenance as needed. Other anticipated management/maintenance activities for the Project will include:

1. Equipment Maintenance: The Applicant and/or its authorized subcontractors will inspect and maintain electrical and photovoltaic ("PV") equipment in accordance with the manufacturers' respective requirements to maintain proper operation and warranty status. The Applicant will also perform the following inspections: (a) the operation of all safety devices will be reviewed and, if necessary, corrected to maintain proper function; (b) full visual inspection of all equipment, including sub-assemblies, wiring, and connectors; (c) thermal scanning of electronic equipment, wiring terminations, and connectors; (d) mechanical inspection,

including torque verification of critical connections; I string testing (IV curve test); and (f) air filter elements.

2. Module Cleaning: Although module cleaning is rarely necessary in Connecticut, if the solar modules were to experience enough soiling to adversely affect production, the modules will be cleaned using water brought in by tanker truck and soft bristle brooms. No chemicals will be used in connection with any module cleaning.

3. Snow Maintenance/Removal: The Applicant does not intend to remove snow from the solar modules.

4. Ground Maintenance: The Applicant proposes to use sheep grazing to maintain the grass that will be established within the fenced area of the Project. The exterior of the site will be mowed and maintained on a periodic basis.

See Appendix D for the Operation and Maintenance Plan.

vi. Decommissioning

At the end of the Project's useful life, the Facility will be fully decommissioned and removed from the site in accordance with the requirements of the Applicant's land lease agreement and the Project's Decommissioning and Restoration Plan.

See Appendix E for the Decommissioning and Restoration Plan.

IV. PROJECT BENEFITS AND NEEDS ANALYSIS

Generally, the Project will support the State's energy policies as set forth in CGS § 16a-35k, including the goal to "develop and utilize renewable energy resources, such as solar and wind energy, to the maximum practicable extent." The Project will provide clean, renewable, solar-powered electricity and assist the State in meeting its legislatively-mandated obligations under the Renewable Portfolio Standard. The Project will also assist the State of Connecticut in reducing greenhouse gas emissions and reducing criteria air emissions pollutants associated with the displacement of older, less efficient, fossil fuel generation. Through the State of Connecticut's SCEF program, at least sixty percent of the total capacity of the Facility will be supplied to low- and moderate-income customers and/or low-income service organizations.

The Applicant also intends to use, where appropriate, local and regional labor for the construction and subsequent operation of the Project and expects that new construction and operation and maintenance jobs will be created. Moreover, there will be no additional burdens placed on municipal infrastructure or demands on East Windsor services due to the development of the Project.

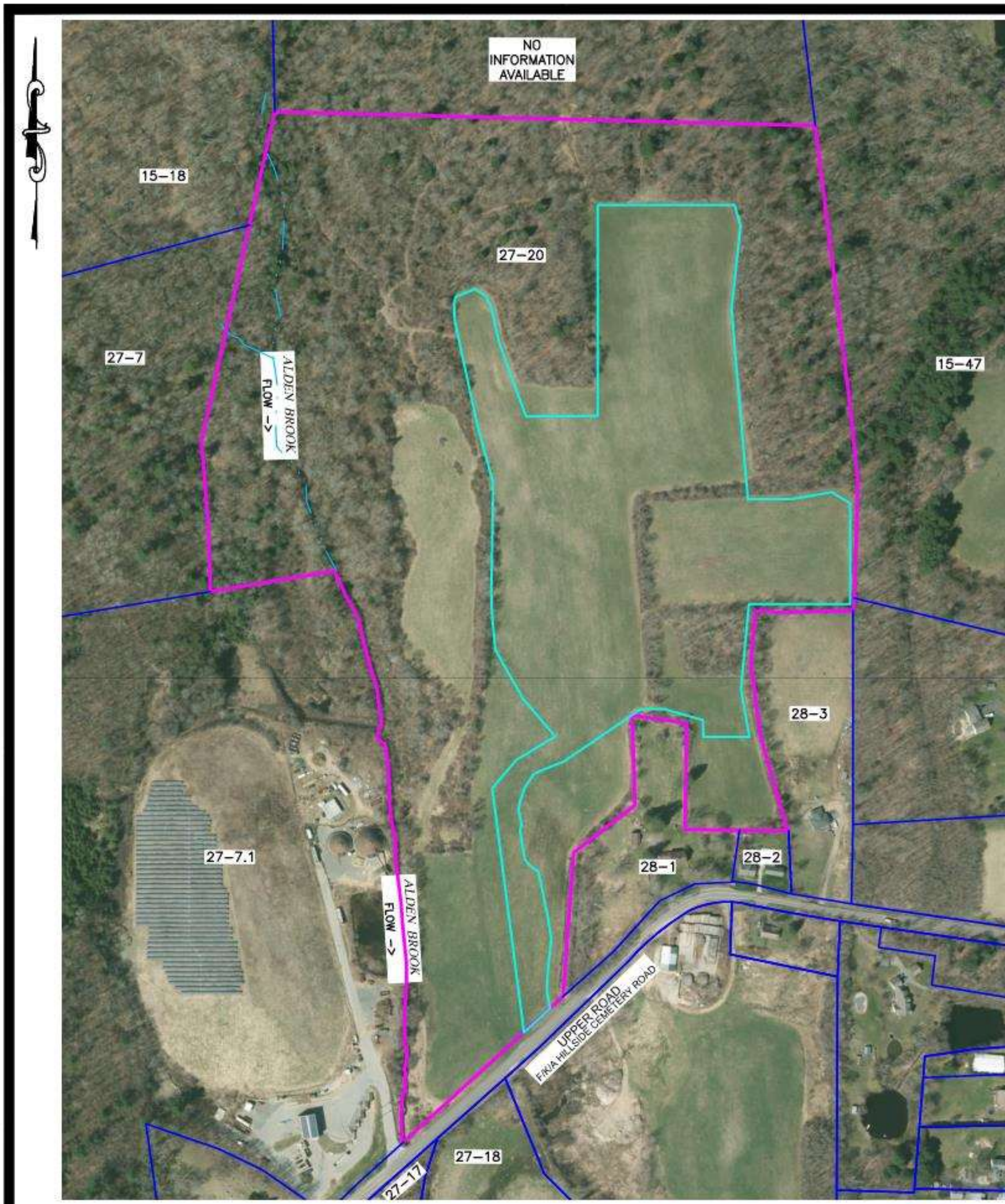
V. LOCAL OUTREACH AND PUBLIC NOTICE

On February 24, 2023, the Applicant emailed Salverio Titus, Stafford's First Selectman, information on its plans to develop the Project as part of the SCEF application process. The Applicant did not receive any feedback from the town in response to this. The Applicant then sent an update of these same materials on the Project to the new First Selectman, William Morrison on February 28, 2024, prior to meeting with the First Selectman, Zoning Enforcement Officer, and Building Official on February 29, 2024. Some minor questions were addressed, and general feedback was received at that meeting. On XXX 2024[1], the Applicant formally notified the abutting property owners and required government agencies of its intent to file the Certificate Request with the Council.

In addition to its outreach and notice to municipal officials and abutters, on XXX 2024[2], the Applicant also sent a Project Fact Sheet and other related information about the Project to abutting property owners and established a Project-specific web site (www.verogy.com/stafford-solar-one) to keep the public informed about the Project and the Applicant's progress. Included in Appendix F are copies of Verogy's public outreach materials, including the Project Fact Sheet and a sample letter sent to abutting landowners.

See Figure 4 (Abutting Parcels Map) for a map of the Site and the identified abutting property owners. See Appendix F for the Abutting Property Owner List and Sample Notice Letter and Appendix G[3] for the List of Municipal Officials and Government Agencies and Sample Notice Letter.

[1] Note – This notification will take place after the Town reviews this draft, but before the Application is filed with the Council.
[2] Note – This notification will take place after the Town reviews this draft, but before the Application is filed with the Council.
[3] Note – Appendix G will populated after the Town reviews this draft but before the Application is filed with the Council.



Weston & Sampson

LEGEND:

- PROPERTY LINE
- LIMIT OF WORK
- ABUTTING PARCEL

ABUTTING PARCELS MAP
FIGURE 4
PROPOSED SOLAR PV DEVELOPMENT
92 UPPER ROAD STAFFORD, CONNECTICUT
SCALE: 1" = 400'

0 400 800

P:\Private\Verogy Solar\233034-Verogy Stafford CT\06-BIM-CAD\01-Civil-Survey\01 Permitting Set\03 Sheets\Figure 4 Abutting Parcels.dwg

VI. POTENTIAL ENVIRONMENTAL EFFECTS

As described in more detail below, the Applicant respectfully submits that the Project will not adversely impact the natural environment, the ecological balance, public health and safety, scenic, historic or recreational values, prime farmland, forests and parks, air and water quality, or wildlife and its habitat on and around the Site.

A. Public Health and Safety

As a Class I Renewable Energy Source, the Project represents a clean and safe method of electricity generation in the State. The Project will contribute to reducing greenhouse gas emissions to the extent it displaces fossil-fueled generating resources, and the Project, once operational, will not create any waste or other emissions that would be detrimental to public health and safety. In addition, the Project will not consume any water or produce any wastewater or otherwise involve the injection of waste or harmful or toxic substances into ground water or area wells.

The Project has been designed to meet or exceed all applicable health and safety standards and requirements related to solar photovoltaic electric power generation, including the National Electrical Safety Code ("NESC"), and those codes and standards promulgated by the National Fire Protection Association ("NFPA").[4] Each employee working on the Project will:

- Receive required general and Site-specific health and safety training
- Comply with all health and safety controls as directed by local and state authorities
- Understand and employ a Project health and safety plan while on the Site
- Know the location of local emergency care facilities, travel times, ingress and egress routes
- Report all unsafe conditions to the construction manager.

The Applicant will also coordinate with the Town of Stafford emergency responders regarding access to the Facility and emergency shutoff switches.

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4 Collectively, these provisions govern the safe installation and maintenance of electrical systems, including alterations, repairs, replacement(s), equipment, appliances, fixtures, fittings, and appurtenances thereto.

B. Electromagnetic Fields ("EMF")

Existing sources of electric and magnetic fields ("EMF") along the boundaries of the Project Site include the EMF associated with the Eversource 23-kV overhead distribution line to which the electricity from the solar arrays will connect. During Project operation, electric and magnetic fields on the Project Site are expected to derive from the following sources: (1) the DC solar panels; (2) the DC cables that connect the solar arrays to the power inverter; (3) the AC power inverters that convert the DC power to AC power; and, (4) the aboveground and underground 23-kV interconnection and existing Eversource 23kV distribution line to which the Project will connect to at the public right of way. The proposed DC solar panels, AC power inverters, and AC transformers will be located more than 72 feet from the boundaries of the Site, with the nearest residences even further (minimum 450') away.

The Applicant has previously completed an EMF study for a similar sized solar facility in Burlington, CT that details the lack of EMF from solar facilities. For more information regarding the relative lack of EMF from solar facilities, please see Appendix S of the Application in Docket 497, whose project is currently owned by DG Connecticut Solar III LLC. Appendix S consists of a report, entitled "Report on Electric and Magnetic Fields" which can be found at: https://portal.ct.gov/-/media/CSC/1_Dockets-medialibrary/DO497/ApplicantSubmissions/applicationfiling/Appendix-S--EMF-Report.PDF.

The solar panels and DC cables on site will produce static fields (i.e., at 0 Hertz [Hz]). These sources will not be expected to produce any disturbance to the existing levels of static magnetic fields away from the site that are produced by natural sources within the earth (i.e., the earth's geomagnetic field). Existing levels of the earth's static geomagnetic field are about 8,000 times lower than the standard for exposure of the general public to static magnetic fields recommended by the International Commission on Non-ionizing Radiation Protection (ICNIRP, 2009).

The higher-frequency AC fields from the inverters, like the DC fields from the solar panels, generally decrease to near background levels within a few feet of distance from the panels. Thus, the operation of these sources is not anticipated to appreciably change the EMF levels outside the Project Site. Additionally, the project's additional current injected onto the existing 23-kV distribution line would not be expected to increase the magnetic-field level outside the range typical of distribution lines. Based on the distance of the Project Area from the boundaries of the Project Site, the EMF from the solar panels, power inverters, and related equipment, collectively, are not anticipated to affect the EMF levels outside the Project Site's boundary.

C. Land Use and Development

The State of Connecticut has committed to reducing its reliance on fossil fuels and natural gas to mitigate the effects of climate change. This is evident by the Governor signing Executive Order No. 3, with a goal of achieving a 100% zero carbon target for the electric sector by 2040.[5] This Project, if approved, will help support these ambitious efforts by developing a renewable energy resource that does not have a substantial adverse environmental effect.

The Project conforms to the Town of Stafford's 2022 Plan of Conservation and Development ("POCD") which indicates "Solar and wind power and other environmentally friendly sources of power should be promoted in residential, municipal, and commercial uses". Section 7.18 of the Stafford Zoning Regulations refers to the development of large scale energy systems, including solar energy. Though Siting Council jurisdiction supersedes these regulations, the Project has been designed to meet or exceed those regulations, wherever they can be reasonably adhered to.

D. Wildlife and Cover Type

Provided in the following sections is information regarding: (1) the identified onsite cover types and anticipated Project impacts; (2) core forest; and (3) threatened and endangered species.

i. Cover Types

The Site is comprised of mostly agricultural fields with small sections/pockets of wooded area. The Site also has two limited wetlands on the property. The Site cover types were confirmed by the field survey completed by RTK GPS & RTK Drone in August and September of 2023. The covers located on the Site are as follows:

- Agricultural Fields;
- Wooded Forest;
- Wetland

The proposed Facility is located entirely within the agricultural fields and some wooded forest. The project will require minor clearing but does not propose any disturbance to the wetland resource areas. See Figure 2 (Existing Conditions Map).

[5] See Governor Ned Lamont Executive Order No. 3, which can be found at https://portal.ct.gov/-/media/Office-of-the-Governor/Executive-Orders/Lamont-Executive-Orders/Executive-Order-No-3.pdf

a. Project Site Cover Types

Agricultural Field

Agricultural Field makes up the majority of the central portion of the Site. This habitat consists of a cultivated agricultural and hay field. The field has recently been primarily utilized for growing hay.

The Project will encompass the majority of the Agricultural Field cover type. The Project's impact is not expected to be significant due to the existing high level of human activity, disturbed nature of this area from historic and current agricultural practices, limited wildlife habitat value, and minimal species utilization.

Wooded Forest

There are pockets/swaths of wooded forest in the southeast corner of the site. Approximately 2 acres of tree clearing will be required for the construction of the Facility. Any potential indirect impacts will be minimized through the proper stabilization of soils during construction through strict adherence to the 2002 *Connecticut Guidelines for Soil Erosion and Sediment Control*.

Wetland

Two wetlands are located on site in the southeast corner and centrally on the western boundary of the Site. Please refer to Section VI.D. for more information regarding the wetland resource areas on site. No direct impacts to the wetlands on site are proposed. As per Appendix I of the CT General Permit for the Discharge of Stormwater and Dewatering of Wastewaters from Construction Activities (CGP-Appendix I) a minimum wetland buffer of 100-feet is being provided for the proposed array and minimum buffer of 20-feet is provided for the proposed gravel access road. There is a minor amount of tree clearing required to develop the Facility. Any potential secondary impacts to the Wetland will be avoided by implementation and maintenance of erosion and sediment control measures in compliance with the 2002 *Connecticut Guidelines for Soil Erosion and Sediment Control*.

Table 1, *Cover Types* provides the total acreages of each habitat type located on the Site and within the Project area in the pre-development conditions.

Table 1: Cover Types, Pre-Development

Habitat Areas		
Habitat Type	Total Area On-Site (+/- ac.)	Area Occupied by Project (+/- ac.)

Agricultural Field	31.26	20.00
Wooded Forest	26.96	2.00
Wetland	0.78	0.00

b. Potential Habitat Impact(s) and Mitigation

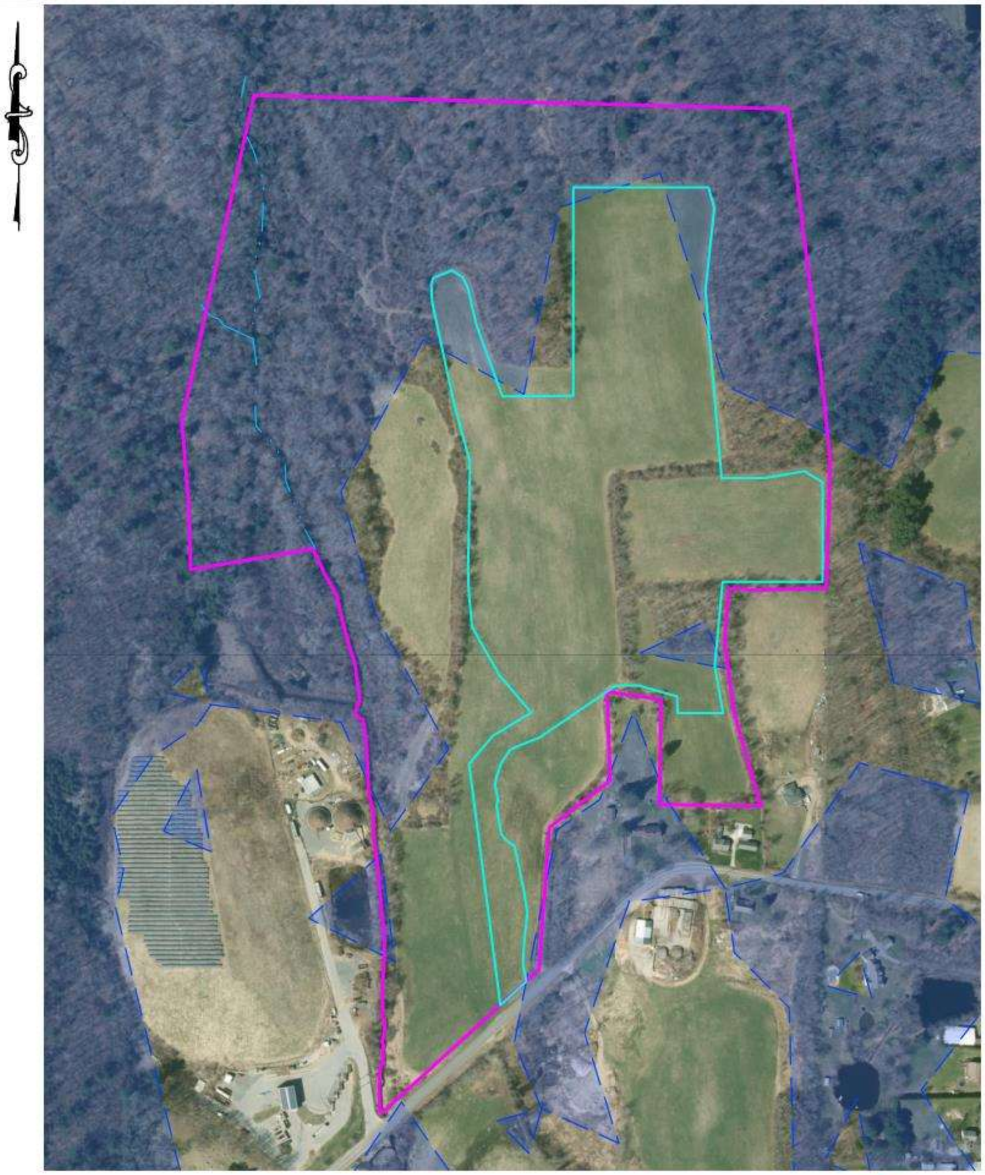
Development of the Project will occur within the agricultural field and some of the cleared forest, with a majority of the proposed Facility occupying what is currently agricultural field. Agricultural Fields currently provide limited value from a wildlife utilization standpoint as a result of routine management of these areas and the high level of human activity associated with cultivated cropland. Project-related impacts within these habitats are limited and are not anticipated to adversely affect wildlife.

Based on the surrounding land uses, the adjacent wooded forest swaths located in proximity to the Project area are likely utilized by species that prefer edge forest habitat and are more tolerant of human disturbance and habitat fragmentation. Generalist wildlife species common to the region, including several resident and migrant songbirds and mammals such as raccoon, striped skunk, grey squirrel, Virginia opossum, white-tailed deer, and eastern chipmunk could be expected to use this area. Given the abundance of similar habitat surrounding the Site, the Project is not anticipated to result in a significant impact to wildlife.

The Project will not encroach into the wetland areas on the project site. Project development activities will occur in areas of existing disturbances associated with human use of the agricultural fields and cleared forest swaths. Noise and associated human activities during construction of the Facility may result in limited, temporary disruption to wildlife using wooded forest areas. However, any wildlife displaced from these cleared forested areas during construction would be expected to disperse into surrounding similar forested habitats. Post construction, operation of the Facility will not result in a likely adverse effect to wildlife using these habitats because it will be unoccupied and does not generate any significant noise, traffic, or high level of human activity.

ii. Core Forest

There is a minor amount of tree clearing required to develop the Facility, approximately 2 acres. The Connecticut State Council on Environmental Quality defines Core Forest as “forest features that are relatively far (more than 300 feet) from the forest-nonforest boundary”. The proposed tree clearing for the Facility does not involve the destruction of any forest more than 300-feet from the fore-nonforest boundary and thus does not involve the destruction of Core Forest. In addition, the CT DEEP Bureau of Natural Resources reviewed our proposed plan and indicated via email response: “DEEP anticipates no material effect to core forest based upon the plans presented and supplemental information provided.” See Figure 5 (Forested Habitat Impacts Map) and Appendix H, CT DEEP Correspondence.



Weston & Sampson

LEGEND:

PROPERTY LINE

LIMIT OF WORK

FORESTED AREA

FORESTED HABITAT IMPACTS MAP
FIGURE 5
PROPOSED SOLAR PV DEVELOPMENT
92 UPPER ROAD STAFFORD, CONNECTICUT
SCALE: 1" = 400'

0 400 800

P:\Private\Verogy Solar\233034-Verogy Stafford CT\06-BIM-CAD\01-Civil-Survey\01 Permitting Set\03 Sheets\Figure 5 Forested Habitat Impacts.dwg

iii. Threatened and Endangered Species

Weston & Sampson reviewed publicly available information to determine the potential presence of state/federally listed species and critical habitat on or proximate to the Site. A discussion is provided in the following sections.

Natural Diversity Data Base

The DEEP Natural Diversity Data Base ("NDDB") program performs hundreds of environmental reviews each year to determine the impact of proposed development projects on state-listed species and to help landowners conserve the state's biodiversity. In furtherance of this endeavor, DEEP also developed maps to serve as a pre-screening tool to help Applicant's determine if there is the potential for project-related impact to state-listed species.

The NDDB maps represent approximate locations of (i) endangered, threatened and special concern species and, (ii) significant natural communities in Connecticut. The locations of species and natural communities depicted on the maps are based on data collected over the years by DEEP staff, scientists, conservation groups, and landowners. In some cases, an occurrence represents a location derived from literature, museum records and/or specimens. These data are compiled and maintained in the NDDB. The general locations of species and communities are symbolized as shaded (or cross-hatched) polygons on the maps. Exact locations have been masked to protect sensitive species from collection and disturbance and to protect landowner's rights whenever species occur on private property.

Weston & Sampson reviewed the most recent DEEP NDDB mapping (December 2023), which revealed that no known areas of state-listed species are currently depicted within the Site. The nearest NDDB buffer is ±0.8 mile southwest of the Site. Since the Site is not located within an NDDB buffer area, consultation with DEEP is not required in accordance with their review policy. Weston & Sampson notified DEEP of the proposed project on February 28, 2024, with an indication that the project is outside of any mapped NDDB area and DEEP NDDB provided a response on February 29, 2024, indicating the presence of the Whip-poor-will, a State Special Concern Species, along with the Best Management Practices regarding construction near this species. The applicable NDDB Best Management Practice recommendations will be considered and implemented during construction.

USFWS Consultation

Federal consultation was completed in accordance with Section 7 of the Endangered Species Act ("ESA") through the U.S. Fish and Wildlife Service's ("USFWS") Information, Planning, and Conservation System ("IPaC"). Based on the results of the IPaC review, one federally-listed[6] species is known to occur in the vicinity of the Site, northern long-eared bat ("NLEB"; *Myotis septentrionalis*). The NLEB's range encompasses the entire State of Connecticut and suitable NLEB roost habitat includes trees (live, dying, dead, or snag) with a diameter at breast height ("DBH") of three (3) inches or greater. Note that the IPaC review indicated "no effect" on the northern long-eared bat.

Weston & Sampson reviewed the DEEP's publicly available *Northern long-eared bat areas of concern in Connecticut to assist with Federal Endangered Species Act Compliance* map (February 1, 2016) to determine the locations of any known maternity roost trees or hibernaculum in the state. This map reveals that there are currently no known NLEB maternity roost trees in Connecticut. The nearest NLEB habitat resource to the Site is located in East Granby, Connecticut, approximately 25 miles to the west.

Effective March 31, the NLEB is classified as Endangered under the ESA. The reclassification eliminates use of the previous 4(d) rule for the NLEB, which is applicable only to Threatened species. An NLEB Interim Consultation Framework has been developed by USFWS to facilitate transition from the 4(d) rule to typical Endangered species consultation procedures for activities that are reasonably certain to occur before April 1, 2024 (date on which the NLEB Interim Consultation Framework expires). As stated above, an IPaC report was run on February 1, 2024 which confirms that the project will have "no effect" on the northern long-eared bat.

A full review of the Endangered Species Act (ESA) Compliance Determination and USFWS's Response Letter is provided in Appendix I, USFWS and NDDB Compliance Statement.

E. Wetlands

Wetlands

Davison Environmental Connecticut Registered Soil Scientists conducted field inspections and wetland delineations of the Site on November 8, 2023 and identified two (2) wetlands on or proximate to the

[6] Listing under the federal Endangered Species Act

Site. The results of the field delineation are summarized below. The location of this resource is depicted on Figure 2 (Existing Conditions Map).

The larger wetland area, Wetland 1, is located near the southeast site boundary near Upper Road and lies at the toe of a steep west facing slope. A small, isolated wetland, Wetland 2, is located in the middle of the property's western boundary. Wetland 2 is a small depressional feature that captures groundwater discharge from the bordering till ridge. The vegetation within both wetlands is dominated by hayfield grasses with some hydrophytic herbaceous vegetation and invasive reed canary grass. Wetland 1 drains east then south into a drainageway with an embedded intermittent stream. The southern portion of Wetland 1 drains into a culvert inlet at Upper Road. Dominant vegetation throughout the wetlands includes hayfield grasses, soft rush, reed canary grass. The portion of Wetland 2 near the edge of the hayfield is forested and has a red maple tree canopy and a spicebush and highbush blueberry understory. The Wetland Delineation Report completed by Davison Environmental is included in Appendix L.

The Facility will occupy central portions of the Site currently utilized as agricultural fields. There are no direct wetland impacts associated with the Project. The wetland buffers observed are a minimum of 100-ft to the proposed array and a minimum of 10-ft to the proposed access road from the delineated wetland per Appendix I of the CT General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (CGP-Appendix I (modified 11/25/2022). Therefore, Project activities would not be expected to result in an adverse impact to the Site's wetland resources based on the proposed protection measures outlined herein and in Appendix B, Project Plans, Sheet C001.

Table 2: Wetland Impacts Table

Table 2: Wetland Impacts		
Direct Impacts to Wetland (ac.)	0	
Project Area Proximity to Wetlands (from limit of disturbance)	Distance (+/-ft.)	Direction (of wetland/water from LOD)
Project Area Proximity to Wetland 1	26.3	East
Project Area Proximity to Wetland 2	21.8	Southwest

Potential Vernal Pools

Davison Environmental did not indicate the presence of any potential vernal pools in their report included in Appendix L.

F. Water Resources and Stormwater Management

The Project will not have an adverse impact on the State's water resources, as the Facility will be unstaffed, no potable water uses or sanitary discharges are planned, and no liquid fuels are proposed or necessary for the operation of the Facility. Therefore, the Project satisfies the water quality standards of CT DEEP.

i. Floodplain Areas

Weston & Sampson reviewed the United States Federal Emergency Management Agency ("FEMA") Flood Insurance Rate Maps ("FIRM") for the Site. The area inclusive of the Site is mapped on FIRM PANEL #090 152 0020 B, dated June 1, 1982. Based upon the reviewed FIRM Map, the Site is located in an area designated as Zone C, which is defined as an area of minimal flooding, typically above the 500-year flood level.

No special design considerations or precautions relative to flooding are required for the Facility. As no portion of the Facility is proposed to be located in or impact either 100- or 500-year flood zones, no impacts are anticipated to floodplain or downstream areas. See Figure 2 (Existing Conditions Map).

ii. Groundwater

Groundwater underlying the Site is classified by publicly available CT DEEP mapping as "GA".[7] This classification indicates groundwater within the area is presumed to be suitable for human consumption without treatment. Based upon a review of available CT DEEP mapping, the Site is not located within a mapped (preliminary or final) DEEP Aquifer Protection Area.[8] Thus, the Project will have no adverse environmental effect on ground water quality.

iii. Surface Water

The Project will have no adverse environmental effect on surface water quality. Based upon CT DEEP mapping, the Site is located in Major Drainage Basin 3 (Thames Basin), Regional Drainage Basin 31 (Willimantic River), Subregional Drainage Basin 3103 (Furnace Brook). The western portion of the Site and

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[7] Designated uses in GA classified areas include existing private and potential public or private supplies of drinking water and base flow for hydraulically connected surface water bodies.
[8] The Hunt (A 42) Aquifer Protection Area is located approximately 2,800 feet west of the Site.

Project is located in Local Drainage Basin 3103-07. The eastern portion of the Site and Project is located in Local Drainage Basin 3103-00.

The nearest waterbodies are listed below:

- Alden Brook, located approximately 380 feet west of the Project area;
- An unnamed pond located approximately 780 feet southeast of the Project area;
- Hatch Brook, located approximately 1,700 feet east of the Project area; and
- Hydeville Pond, located approximately 1,850 feet southeast of the Project area.

Hydeville Pond is classified as a Class A surface waterbody by DEEP.[9] The Project will have no effect on either surface waterbody.

Based upon the reviewed CT DEEP mapping, the Site is not located within a mapped Public Drinking Supply Watershed.

During construction, erosion and sediment ("E&S") controls will be installed and maintained in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control. Once operative, stormwater will be managed in accordance with the 2004 Connecticut Stormwater Quality Manual.

G. Soils and Geology

All exposed soils resulting from construction activities will be properly and promptly treated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control.

Based upon the United States Department of Agriculture Natural Resources Conservation Service (NRCS) Web Soil Survey, surficial materials within the Project Area are classified as HSG-B, HSG-C, HSG-D, and HSG-B/D soils. The soils within the Project Area are made up of mostly fine sandy loams. The soils located within the Project Area include Canton and Charlton Soils, Paxton and Montauk Fine Sandy Loams, and Sutton Fine Sandy Loams.

The Applicant does not anticipate encountering bedrock during Project development as the NRCS Soil Web Soil Survey indicates the entire site has a depth to bedrock of greater than 200 inches.

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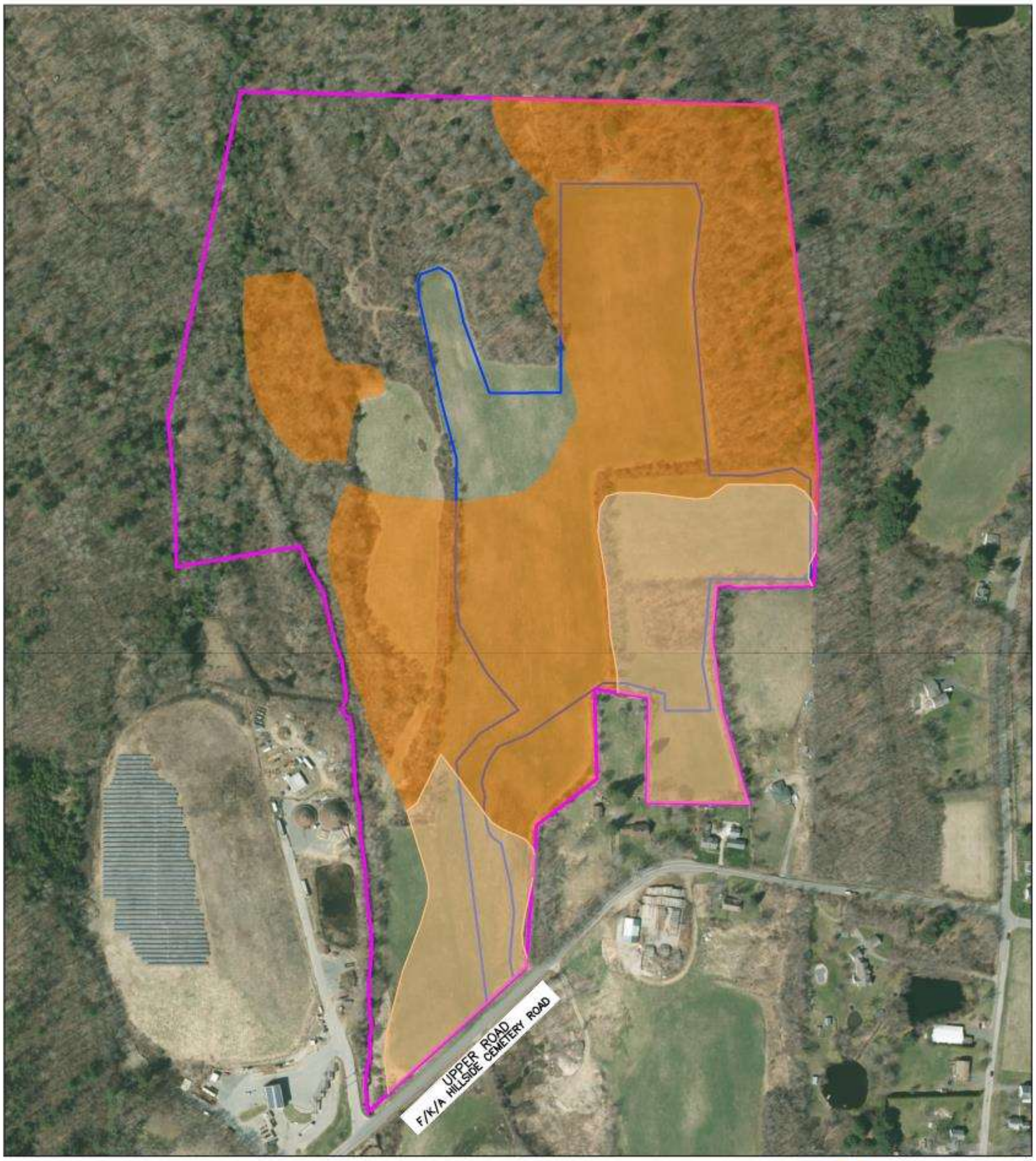
[9] Designated uses for A classified waterbodies include potential drinking water supply, fish and wildlife habitat, recreational use, agricultural and industrial supply and other legitimate uses including navigation.

Prime Farmland Soils and Statewide Soils of Importance are found on the Site and within the Project area. See Figure 6 (Farmland Soils Map). Some regrading is required for development of the Project, primarily for construction of the gravel site access drive, equipment pads, and stormwater management features. However, no topsoil is to be removed from the Project area, and none will leave the Site. A proposed plan for sheep grazing as an agricultural co-use as a part of the Project is being developed.



Weston & Sampson

LEGEND:

- PROPERTY LINE
- LIMIT OF WORK
- PRIME FARMLAND SOIL AREA
- STATEWIDE SOIL OF IMPORTANCE

FARMLAND SOILS MAP
FIGURE 6
PROPOSED SOLAR PV DEVELOPMENT
92 UPPER ROAD STAFFORD, CONNECTICUT
SCALE: 1" = 400'

0 400 800

P:\Private\Verogy Solar\233034-Verogy Stafford CT\06-BIM-CAD\01-Civil-Survey\01 Permitting Set\03 Sheets\Figure 7 Farmland Soils Map.dwg

H. Historic and Archaeological Resources

Heritage Consultants LLC ("Heritage") reviewed relevant historic and archaeological information to determine whether the Site holds potential historic or cultural resource significance. Their review of historic maps and aerial images of the Site, examination of files maintained by the Connecticut State Historic Preservation Office ("SHPO"), and a pedestrian survey of the Site revealed that there are two previously identified archeological sites and a single National Register of Historic Places ("NRHP") district within one (1) mile of the Site. The previously identified archeological sites include Site 134-19 (Valley Cotton Hill Site) and Site 134-6 (Hydeville Rockshelter Site). The National Register of Historic Places includes the Stafford Hollow Historic District.

In terms of archaeological potential, Heritage determined that much of the Project Area retains a moderate to high potential to contain intact archaeological deposits in the subsoil. A Phase 1B cultural resources reconnaissance survey was determined to be necessary by Heritage. The Phase 1B survey will be performed and, upon completion, results will be submitted to SHPO for review.

The Phase 1A report is included in Appendix J.

I. Air Quality

Overall, the Project will have minor emissions of regulated air pollutants during construction; however, no air permit is required for these activities. During construction of the Project, any air emission effects will be temporary and will be controlled by enacting appropriate mitigation measures (e.g., water for dust control, avoiding mass early morning vehicle startups, etc.). Accordingly, any potential effects on air quality as a result of the Project construction activities will be minimized.

During operation, the Project will not produce air emissions of any regulated air pollutants or greenhouse gases (e.g., PM10, PM2.5, VOCs, GHG or Ozone). Therefore, no adverse effect on air quality is anticipated and no air permit will be required.

J. Noise

As mentioned above, the Project is located in the Town of Stafford's AAA Residential Zone and all adjacent properties are also zoned AAA. Potential Project-related noise is regulated by Connecticut General Statutes section 22a-69 and Regulations of Connecticut State Agencies (RCSA) Section 22a-69 et. seq.

The State Noise Regulations prohibit the emission of continuous excessive noise beyond the boundary of their Noise Zone. The Project is considered a Class C Land use with residential receptors to the north and south of the Project Area, thus requiring a maximum level of 61 dBA during daytime hours (defined as 7 AM to 10 PM) and 51 dBA during nighttime hours (defined as 10 PM to 7 AM). Construction noise is exempt from the noise regulations.

The Facility, once operational, will have limited noise-producing equipment onsite, consisting of inverters and transformers. The loudest piece of equipment onsite will be the inverters. According to the manufacturer's specifications, this inverter will generate a maximum sound level of <65 dBA at 1m (3.281 feet) away.

The Applicant has taken great care in the placing of the Project inverters with relation to the abutting properties of the Site. The Project's equipment area, where the inverters and transformers are located, has been centrally placed on the Site (where still accessible by the access road) thereby maintaining the maximum feasible setback possible from any existing residential structures on any abutting property. This resulted in the nearest residence to the noise generating equipment (the inverters) being approximately 450 feet to the south. The distance from the nearest equipment pad to the nearest property line from this residential lot is approximately 131 feet. Per a previously completed sound analysis, a combined inverter bank has a calculated sound power level of under 85 dBA at a distance of one (1) meter. This was for a total of 16 inverters. The Petitioner applied the Inverse Square Law to evaluate the relative sound level of the inverters to the nearest residential property line, and the calculations show that an 85 dBA at one meter would drop to approximately 53.0 dBA at a distance of 131 feet (39.2 meters), which is below the maximum allowable of 61 dBA residential receptor daytime limit. The inverters only operate during daytime hours and therefore no noise generation is anticipated at night.

During the construction period, the Applicant expects that some typical construction equipment noise will occur, however the construction activities are only to occur between the hours of 7:00 a.m. to 6:00 p.m. Monday through Friday and Saturday between the hours of 8:00 a.m. and 5:00 p.m.

K. Lighting

No exterior lighting is planned for the Facility.

L. FAA Determination

The Project was reviewed using the Federal Aviation Administration (the "FAA") Notice Criteria Tool to determine if the Project needed to file with the FAA under the provisions of 49 U.S.C., Section 44718 and Title 14 of the Code of Federal Regulations, part 77. The Project was not required to file with the FAA because it did not exceed the notice criteria. See Appendix K for the FAA's determination on the Project.

M. Scenic and Recreational Areas

The closest scenic or recreational area to the Project is Staffordville Beach, located approximately 1.1 miles east of the Project. Due to the combination of distance, topography, and existing vegetation, the Project will not be visible from this recreational area.

No scenic roads are found within a one-mile radius of the Site. The nearest scenic road is a portion of Tolland Stage Road (CT State Route 74), located approximately 9.5 miles southwest of the Project in the Town of Tolland. Due to the combination of distance, topography, and existing vegetation, the Project will not be visible from this scenic road.

N. Visibility Evaluation

The majority of the Facility will be located in a previously cleared field. Off-Site visibility from the north, east, and west will be obscured by existing vegetation. Some year-round visibility of the Facility is predicted to the south from Upper Road; however, this will be from a significant distance of approximately 1,000 feet away. Seasonally, when the leaves are off the deciduous trees, views of the Project from the south may open up from the adjacent residential properties located at 100, 108, and 112 Upper Road.

VII. CONCLUSION

As demonstrated by the foregoing, the Project will have no air emissions, no significant adverse environmental effects and will comply with air and water quality standards of CT DEEP.

The Applicant, therefore, respectfully requests that the Council issue a Certificate of Environmental Compatibility and Public Need indicating that the proposed Project will comply with CT DEEP air and water quality standards, will not have a substantial adverse environmental effect.

Respectfully Submitted,

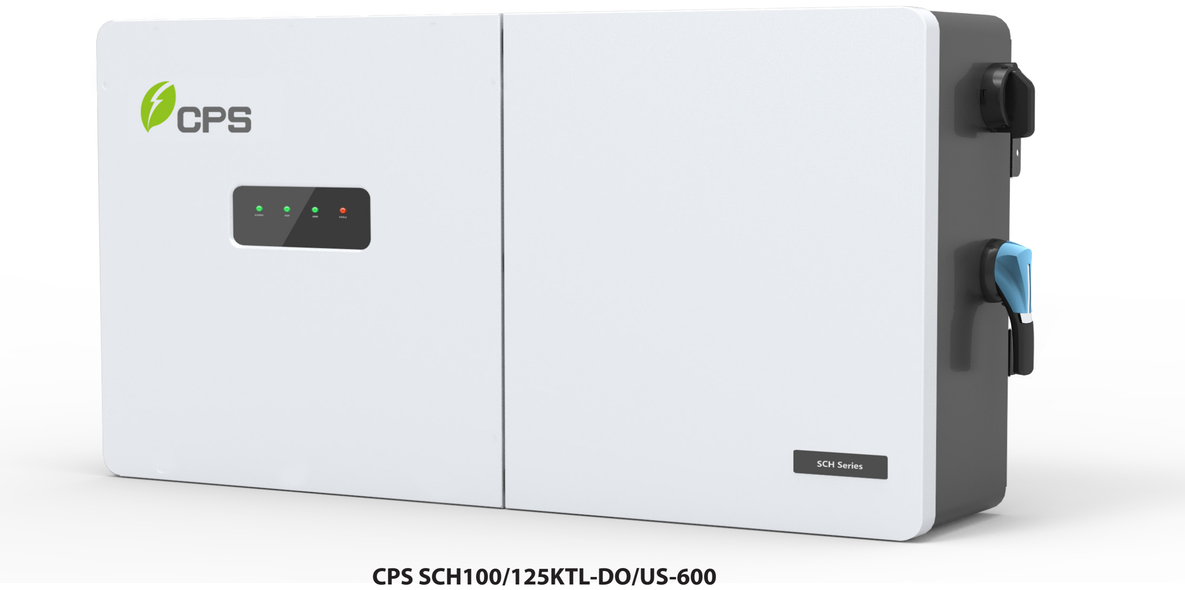
STAFFORD SOLAR ONE, LLC

By____________________________

Lee D. Hoffman
Pullman & Comley, LLC
90 State House Square
Hartford, CT 06103-3702
lhoffman@pullcom.com
(860) 424-4315
Its Attorney

Appendix A – Equipment Specifications, TCLP Report

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



CPS SCH100/125KTL-DO/US-600

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

Key Features

- NFPA 70 and NEC compliant
- Touch-safe DC Fuse holders add convenience and safety
- CPS FlexOM Gateway enables remote firmware upgrades
- Integrated AC and DC disconnect switches
- 1 MPPT with 20 fused inputs for maximum flexibility
- Copper- and Aluminum-compatible AC connections
- NEMA Type 4X outdoor rated enclosure
- Advanced Smart-Grid features (CA Rule 21 certified)
- kVA headroom yields 100 kW @ 0.9 PF and 125 kW @ 0.95 PF
- Generous 1.87 (100 kW) and 1.5 (125 kW) DC/AC inverter load ratios
- Separable wire-box design for fast service
- Standard 5-year warranty with extensions to 20 years

100/125KTL Standard Wire-box

100/125KTL Centralized Wire-box

This device complies with part 15 of the FCC Rules

Chint Power Systems America
1380 Presidential Drive, Suite 100, Richardson, TX 75081
Tel: 855-584-7168 Mail: AmericaSales@chintpower.com Web: www.chintpowersystems.com

Model Name	CPS SCH100KTL-DO/US-600	CPS SCH125KTL-DO/US-600
DC Input		
Max. PV power	187.5 kW	
Max. DC input voltage	1500 V	
Operating DC input voltage range	860-1450 Vdc	
Start-up DC input voltage / power	900 V / 250 W	
Number of MPP trackers	1	
MPPT voltage range[1]	870-1300 Vdc	
Max. PV input current (Isc x 1.25)	275 A	
Number of DC inputs	Standard Wire-box: 20 PV source circuits, pos. and neg. fused Centralized Wire-box: 1 input circuit, 1-2 terminations per pole, non-fused	
DC disconnection type	Load-rated DC switch	
DC surge protection	Type II MOV (with indicator/remote signaling)	
AC Output		
Rated AC output power	100 kW	125 kW
Max. AC output power[2]	100 kVA (111 kVA @ PF>0.9)	125 kVA (132 kVA @ PF>0.95)
Rated output voltage	600 Vac	
Output voltage range[3]	528-660 Vac	
Grid connection type[4]	3Φ / PE / N (neutral optional)	
Max. AC output current @ 600 Vac	96.2 / 106.8 A	120.3 / 127.0 A
Rated output frequency	60 Hz	
Output frequency range[3]	57-63 Hz	
Power factor	>0.99 (±0.8 adjustable)	>0.99 (±0.8 adjustable)
Current THD	<3%	
Max. fault current contribution (1-cycle RMS)	41.47 A	
Max. OCPD rating	200 A	
AC disconnection type	Load-rated AC switch	
AC surge protection	Type II MOV (with indicator/remote signaling)	
System		
Topology	Transformerless	
Max. efficiency	99.1%	
CEC efficiency	98.5%	
Stand-by / night consumption	<4 W	
Environment		
Enclosure protection degree	NEMA Type 4X	
Cooling method	Variable speed cooling fans	
Operating temperature range	-22°F to +140°F / -30°C to +60°C (derating from +108°F / +42°C)	
Non-operating temperature range[5]	-40°F to +158°F / -40°C to +70°C maximum	
Operating humidity	0-100%	
Operating altitude	8202 ft / 2500 m (no derating)	
Audible noise	<65 dBA @ 1 m and 25°C	
Display and Communication		
User interface and display	LED indicators, WiFi + APP	
Inverter monitoring	Modbus RS485	
Site-level monitoring	CPS FlexOM Gateway (1 per 32 inverters)	
Modbus data mapping	SunSpec / CPS	
Remote diagnostics / firmware upgrade functions	Standard / (with FlexOM Gateway)	
Mechanical		
Dimensions (W x H x D)	Standard Wire-box: 45.28 x 24.25 x 9.84 in (1150 x 616 x 250 mm) Centralized Wire-box: 39.37 x 24.25 x 9.84 in (1000 x 616 x 250 mm)	
Weight	Inverter: 121 lbs (55 kg) Standard Wire-box: 55 lbs (25 kg) Centralized Wire-box: 33 lbs (15 kg)	
Mounting / installation angle	15 - 90 degrees from horizontal (vertical or angled)	
AC termination	M10 stud type terminal [3Φ] (wire range: 1/0 AWG - 500 kcmil CU/AL; lugs not supplied) Screw clamp terminal block [N] (#12 - 1/0 AWG CU/AL)	
DC termination	Standard Wire-box: Screw clamp fuse holder (wire range: #12 - #6 AWG CU) Centralized Wire-box: Busbar, M10 bolts (wire range: #1AWG - 500kcmil CU/AL [1 termination per pole], #1 AWG - 300 kcmil CU/AL [2 terminations per pole]; lugs not supplied)	
Fused string inputs	20 A fuses provided (fuse values up to 30 A acceptable)	
Safety		
Certifications and standards	UL 1741-SA/SB Ed. 3, CSA-C22.2 NO.107.1-01, IEEE 1547-2018, FCC PART15	
Selectable grid standard	IEEE 1547a-2014, IEEE 1547-2018[6], CA Rule 21, ISO-NE	
Smart-grid features	Volt-RideThru, Freq-RideThru, Ramp-Rate, Specified-PF, Volt-VAR, Freq-Watt, Volt-Watt	
Warranty		
Standard[7]	5 years	
Extended terms	10, 15 and 20 years	

1) See user manual for further information regarding MPPT voltage range when operating at non-unity PF.
2) "Max AC apparent power" rating valid within MPPT voltage range and temperature range of -30°C to +40°C (-22°F to +104°F) for 100 kW PF≥0.9, and 125 kW PF≥0.95.
3) The "output voltage range" and "output frequency range" may differ according to the specific grid standard.
4) Wye neutral-grounded; delta may not be corner-grounded.
5) See user manual for further requirements regarding non-operating conditions.
6) Firmware version 12.0 or later required.
7) 5-year warranty effective for units purchased after October 1, 2019.

PARK

SWITCHGEAR

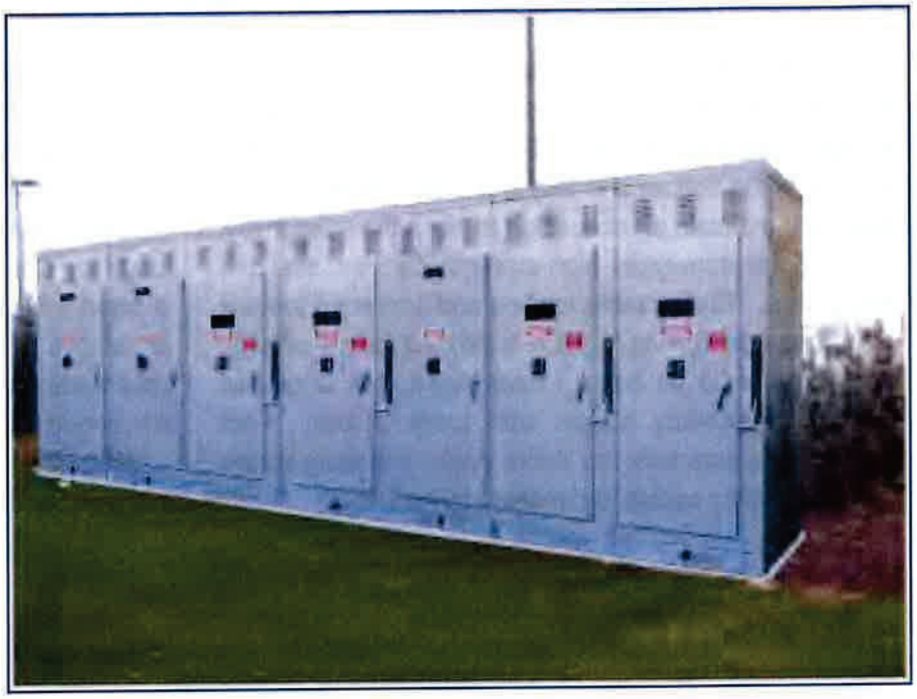
Engineered Solutions for Power Distribution

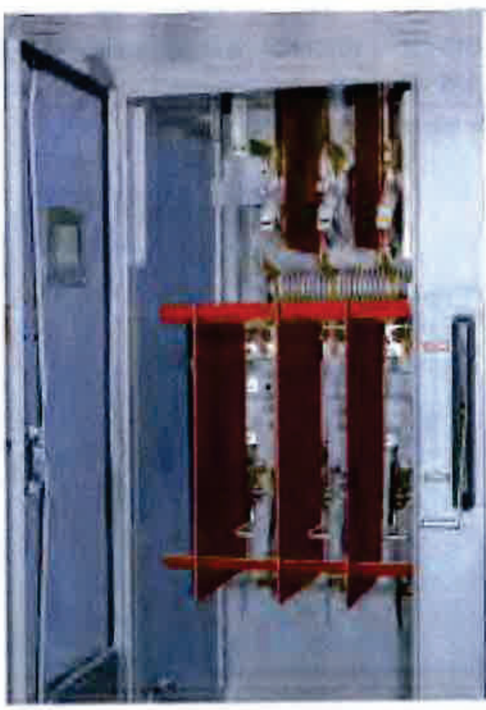
Switchgear

In this brochure, we present a complete range of advanced, problem-solving switchgear products that have established Park as an industry leader in power distribution systems. Shown and described are medium voltage switchgear units for many diverse applications, all featuring the Park hallmarks of modern design and cutting-edge technology. With some of the industry's finest electrical engineers on staff, Park is ideally equipped to handle difficult custom jobs that many other companies may not have the capability to undertake.

Special projects are one of our particular strengths at Park, evidenced by our outstanding record for delivering these systems on tight schedules, and often under demanding circumstances.

Whatever your switchgear requirements, you can always rely on Park to provide you with the finest, state-of-the-art products and support services.





FEATURES & ADVANTAGES

- Interrupter switches are completely factory adjusted.
- No taping of bus connections
- Built-in access control eliminates expensive fencing
- Wide-view windows allow inspection of switches from outside
- Louvers and space heaters reduce moisture
- Spare fuses store in built-in racks
- Generous access and ample work space
- Hot dipped galvanized base
- Sturdy, lockable latches
- Welded construction for security and strength
- Heavy duty hinges
- Manufactured to applicable utility standards

Metal Enclosed

Metal Enclosed Load Interrupter Switchgear

Park Switchgear configurations are limited only by your imagination.

Each unit features welded steel construction with wideview windows that allow checking switchgear without opening doors. Corrosionproof, rainproof louvers at the bottom and top, and space heaters inside each unit maintain air circulation to keep the interior dry. Three point cam-type, high-strength latches seal the doors shut. The lockable latches and screened louvers discourage tampering. Wide bulkhead doors provide easy access to all bays. Each full-length door has durable heavy-duty hinges with brass pivots. Foot operated holders lock the doors open, providing ample room for pulling cables and making terminations.

All interrupter switches are maintence-free and are available in 200, 600, and 1200 amp ratings. S&C® Power Fuses provide full-fault-spectrum protection. The switches are manually operated by nonremovable switch handles. Bus connections are silverplated copper for long life. Continuous ground bus in multibay lineups has a short-circuit rating equal to that of the integrated assembly. The HV meter bays are built to utility specifications and multibay lineups are assembled with a minimum of interbay bolting.

Call today and discuss your requirements with a Park sales representative.

UL® Listed up tp 15KV

SPECIFICATIONS

Ratings of S&C Mini-Ruptor Switches

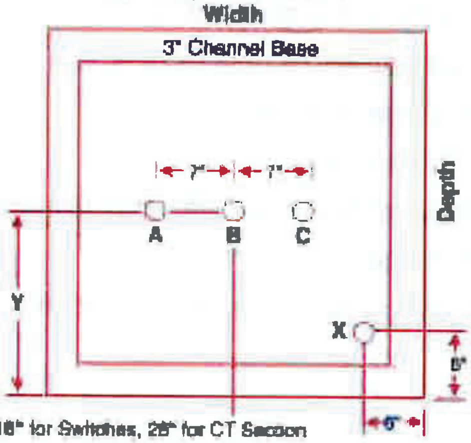
KV			Amperes, RMS				
				Interrupting			Mom. &
Nom.	Max. Des.	BIL	Cont.	Load	Cap.	Mag.	Fault Close (ASYM KA)
5	5.5	60	600	600	35	21	40
5	5.5	60	1200	1200	35	21	61
15	17	95	600	600	35	21	40
15	17	95	1200	1200	35	21	61
25	29	125	600	400	35	21	40
34.5	38	150	600	600	35	21	28

Physical Sizes & Park Numbers

Park No.	Voltage KV	Height	Depth	Width
PM 315-4.8	4.8	104"	44"	42"
PM 315-15	15	104"	44"	42"
PM 315-25	25	120"	44"	42"
PM 315-35	34.5	130"	70"	60"
PM 315-CT	PT/CT Bay	to match	to match	to match
PM 315-WM	Meter Bay	to match	to match	60"

To order specify current rating & fuse size.

Cabling Locations



Y – 18" for Switches, 28" for CT Section

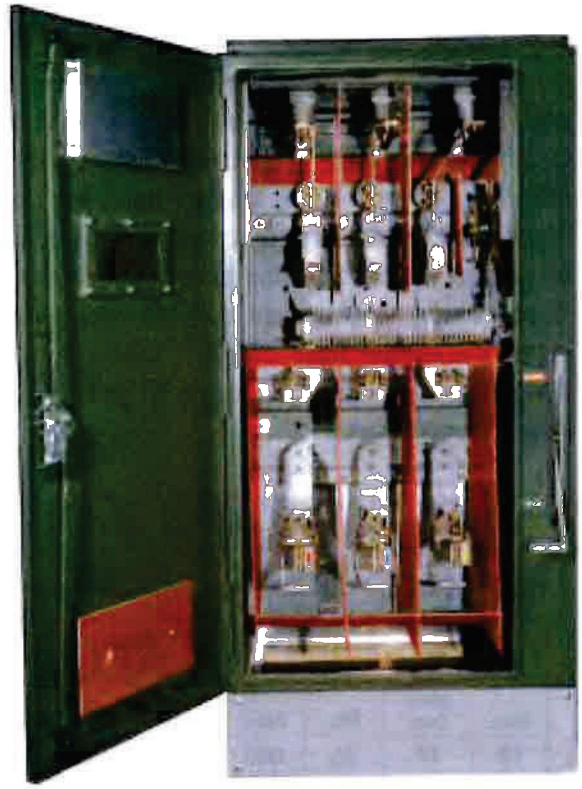
A,B,C – Approximate Cable Termination Points

X – Approximate Heating Cable Termination (for Sw only)

Switchgear

FEATURES & ADVANTAGES

- Interrupter switches are completely factory adjusted
- Built-in access control eliminates expensive fencing
- Standard drilling and tapping for mounting various size and manufacturers' current and potential transformers
- No taping of bus connections
- Front operator standard
- Side operator available as an option
- Louvers and space heaters reduce moisture
- Spare fuses store in built in racks
- Sturdy 3 point door latch
- Heavy duty hinges
- Sturdy, lockable latches
- Welded construction for security and strength
- Hot dipped galvanized base
- Manufactured to applicable utility standards
- Finished with one prime and two enamel coats for corrosion resistance



PM 123 Pad-mounted 15KV Primary Switch and Metering Cubicle

Each unit features welded steel construction. Corrosionproof, rainproof louvers at the bottom and top, and space heaters inside each unit maintain air circulation to keep the interior dry. Three point cam-type, high-strength latches seal the doors shut. The lockable latches and screened louvers discourage tampering. Wide bulkhead doors provide easy access. Each full-length door has durable heavy-duty hinges with brass pivots. Foot operated holders lock the doors open and provides ample room for pulling cables and making terminations.

Interruptor switches are maintenance-free and are 600 amp rated. S&C® Power Fuses provide full-fault-spectrum protection. The switches are manually operated by removable switch handles. Bus connections are silverplated copper for long life. The HV meter bays are built to utility specifications.

Call today and discuss your requirements with a Park sales representative.

UL® Listed up tp 15KV

SPECIFICATIONS

Ratings of S&C Mini-Ruptor Switches

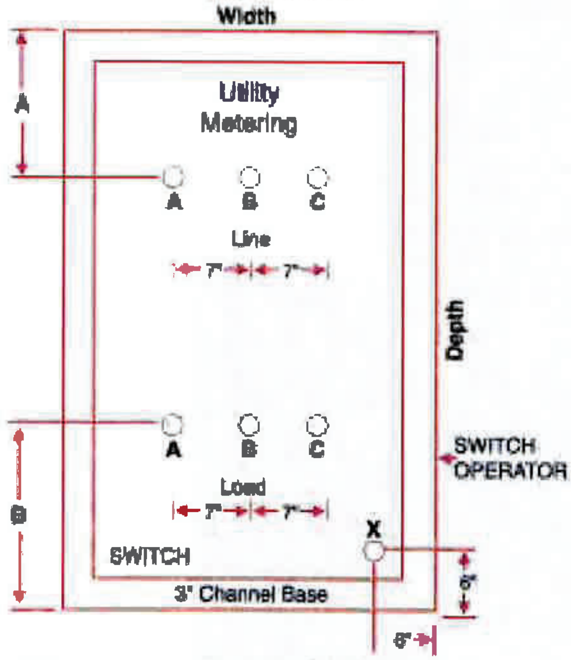
KV			Amperes, RMS				
				Interrupting			Mom. & Fault Close (ASYM KA)
Nom.	Max. Des.	BIL	Cont.	Load	Cap.	Mag.	
15	17	95	600	600	35	21	40
25	29	125	600	400	35	21	40

Physical Sizes & Park Numbers

Park No.	Voltage KV	Height	Depth	Width	A	B
PM 123-4.8	4.8	82"	60"	40"	19"	12"
PM 123-15	15	82"	60"	40"	19"	12"
PM 123-25	25	94"	60"	54"	19"	14"

To order specify current rating & fuse size.

Cabling Locations



A,B,C.– Approximate Cable Termination Points

X – Approximate Heating Cable Termination

NOTE: Front and rear clearance of 4' required—2' on right for handle operations

Switchgear

FEATURES & ADVANTAGES

- Welded steel construction for security and strength.
- Various combinations of switch and fuse arrangements available.
- Interrupter switches are factory adjusted.
- Built-in access control eliminates expensive fencing.
- No taping of bus connections.
- Folding switch handle stores in padlockable compartment on enclosure side.
- Sturdy 3 point lockable door latches.
- Heavy duty hinges.
- Louvers help reduce moisture.
- Manufactured to applicable utility standards.
- Hot dipped galvanized base.
- Finished with one prime and two enamel coats for corrosion resistance.

PM-255

PM-155

PM 155 & 255

Pad-mounted 15 & 25KV Switch & Fuse

All 155 and 255 units feature welded steel construction. Louvers at the top and bottom of each unit are rainproof and corrosion proof, maintain air circulation to keep interior dry. Three point cam-type, high-strength latches seal the doors shut. Lockable latches and screened louvers discourage tampering. Wide bulkhead doors provide easy access. Each full-length door has durable heavy-duty hinges with brass pivots. Foot operated holders lock the doors open, and provide ample room for pulling cables and making terminations.

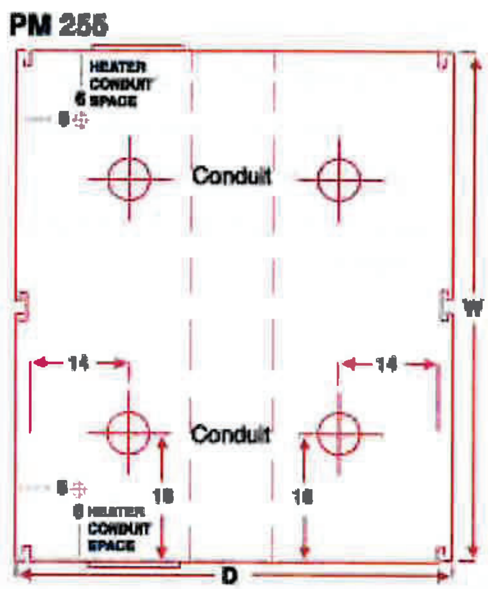
Interruptor switches are maintenance-free and rated at 600 amp. S&C® Power Fuses provide full-fault-spectrum protection. Switches are manually operated by removable switch handles. Bus connections are silverplated copper for long life.

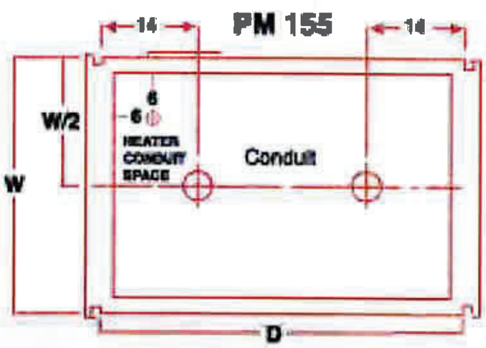
Call today and discuss your requirements with a Park sales representative.

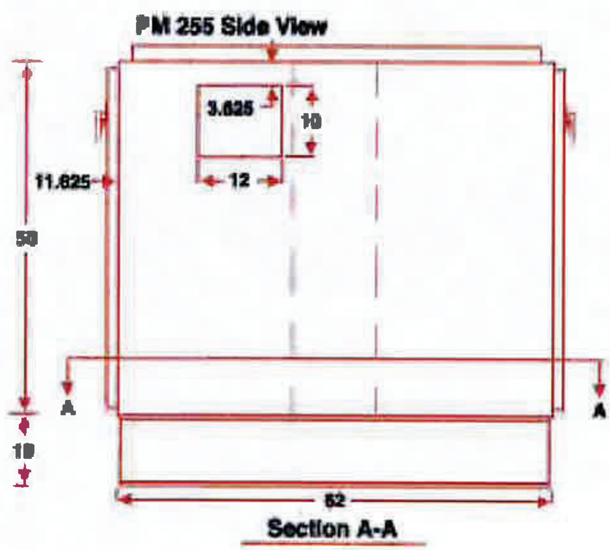
SPECIFICATIONS

Park #	Volts	Height*	Width	Depth
155	15 kv	60	36	52
155	25 kv	66	40	62
255	15 kv	60	72	62
255	25 kv	65	82	72

*Height includes 10" base.







PM-155 *front view* ▲

rear view ▲

PARK

Established 1945

POWER DISTRIBUTION SYSTEMS

RELIABLE POWER DISTRIBUTION SYSTEMS FOR EVERY REQUIREMENT

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THREE PHASE PADMOUNT TRANSFORMERS

Short for "Tamper-proof, compartmentalized, liquid-filled, pad mounted transformer", all padmount designs feature fully enclosed tamper-proof terminal compartments and can be supplied with dead-front or live-front configuration, for loop or radial feed applications, with Type II mineral oil, or environmentally friendly and high flash-point Envirotemp™ FR3™.

All new Maddox padmount transformers are constructed of the highest quality materials and built in the US to heavy duty industrial standards, making them ideal for commercial and industrial applications such as data centers, solar step-up, manufacturing facilities, shopping centers, etc. Our padmounts are designed to the latest department of energy efficiency standards built and tested in accordance with industry standards including NEMA, ANSI C.57, DOE, and IEEE as applicable.

With thousands of new units in stock and ready-to-ship, and the manufacturing ability to produce almost any custom design, Maddox stands ready to meet your transformer need(s). Maddox stocks all standard configurations to match most common applications and deliver on short notice.

Design

HV Bushing Config.:
- Dead front or live front
- Loop feed or radial feed

Fluid Options:
- Type II Mineral Oil
- Envirotemp™ FR3™

Standard Gauge/Accessory Package:
- Pressure relief valve
- Pressure vacuum gauge
- Liquid temp & level gauges
- Drain & sample valve
- Adjustment taps

Switch Options:
- 2 Position LBOR Switch
- 4 Position LBOR Switch (V-blade or T-blade)
- (3) 2 Position LBOR Switches

Fusing Options:
- Bayonets w/ isolation links or CLFs

Construction:
- 5-legged core
- Rectangular wound copper or aluminum windings
- Carbon rienforced or stainless steel tank
- Steel divider between HV and LV cabinets
- Penta-head captive bolt

Optional Design Features & Accessories:
- Gauges w/ Contacts
- External drain and sample valve
- Electrostatic Shielding
- Step-up Design
- Surge-Arresters

Available Ratings

Table 1. Typical Transformer Ratings

Sizes (kVA)	45, 75, 112.5, 150, 225, 300, 500, 750, 1000, 1500, 2000, 2500, 3000, 3750, 5000
Frequency	60 Hz or 50 Hz
Cooling Class	ONAN or KNAN
Temp Rise	55°C, 65°C, 55/65°C, 75°C
Voltages	*Available in Δ or Y configuration*
600V	208
	240
	416
	480
	600
2.5kv – 5kv	2400
	4160
	4800
15kV	12000
	12470
	13200
	13800
	14400
25kV	20780
	21600
	22900
	24940
	26400
35kV	33000
	34500

Fig 1. Padmount Transformer Outline

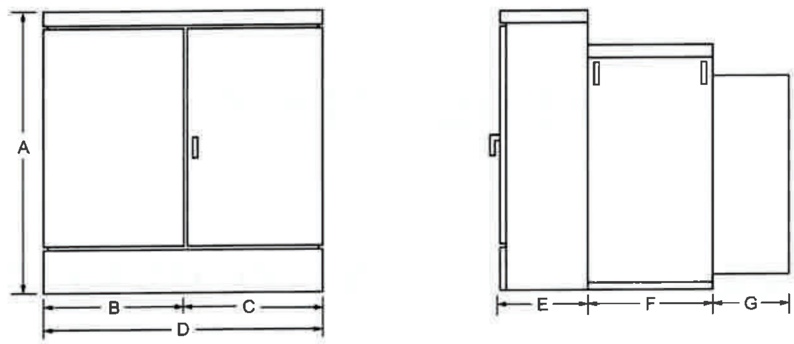


Table 2. Approximate Transformer Dimensions

kVA	A	B	C	D	E	F	G	Gallons	Weight (Lbs)
300	59"	29.5"	22"	51.5"	20.5"	24"	10"	196	4,056
500	59"	33"	26.5"	59.5"	24"	26.5"	10"	210	5,023
750	73"	36"	29"	65"	24"	26.5"	10"	358	7,664
1000	73"	36"	29"	65"	24"	27"	10"	354	8,530
1500	73"	36"	35.5"	71.5	24"	33.5"	10"	410	10,782
2000	75"	39.5"	28"	67.5	24"	35"	27"	433	12,490
2500	78"	39.5"	35.5"	75.5"	24"	37.5"	22.5"	545	14,246
3000	84"	30.5"	32"	62.5"	24"	37.5"	38"	550	14,014
3750	75"	50.5"	30"	80.5"	25.5"	42"	38"	730	17,785

Fig 2. Three Phase Maddox Padmount Transformer

Table 3. Common Accessories

1. Bayonet Fuses

2. Loadbreak Switch

3. Tap-changer

4. Bushings

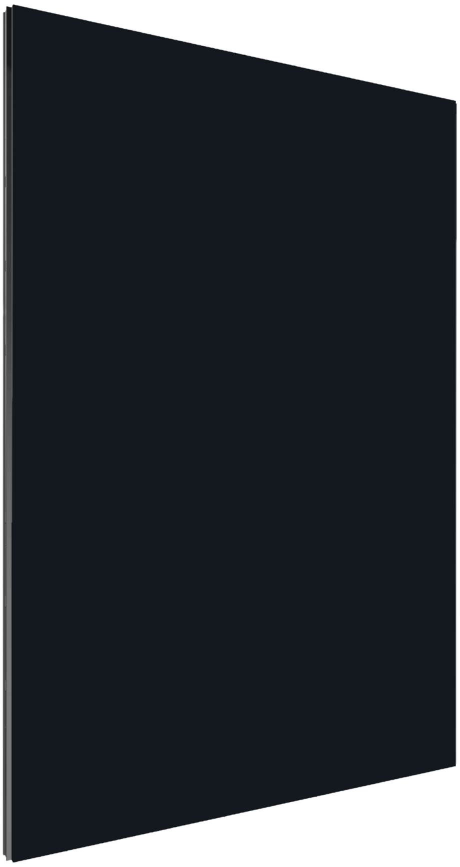
5. Parking Stand

6: Gauges

First Solar

Series 6 *Plus* Bifacial.

455-480 Watt Thin Film Solar Module



First Solar is once again setting the industry benchmark for reliable energy production, optimized design and environmental performance with Series 6 *Plus* Bifacial - the world's first bifacial thin film CdTe module. The advanced design signficantly reduces balance of system, shipping, and operating costs while delivering more energy per nameplate watt.

More Lifetime Energy per Nameplate Watt

- Industry's best (0.3%) warranted degradation rate
- Superior temperature coefficient, spectral response and shading behavior
- Unlike crystalline silicon modules, First Solar's thin film technology does not experience losses from LID or LeTID
- Anti-reflective coated glass enhances energy production
- Added bifacial energy yield

Innovative Module Design

- Under-mount frame provides the cleaning and snowshedding benefits of a frameless module while protecting edges against breakage
- Innovative SpeedSlots combine the robustness of bottom mounting with the speed of top clamping while utilizing fewer fasteners to achieve the industry's fastest installation times and lowest mounting hardware costs
- Dual junction box design reduces wire management complexity and cost

Best In-Class Reliability & Durability

- Manufactured under one roof with 100% traceable QA/QC
- Independently tested and certified for reliable performance that exceeds IEC standards in high temperature, high humidity, extreme desert and coastal applications
- Inherently immune to and warranted against power loss from cell cracking
- Durable glass/glass construction

Best Environmental Profile

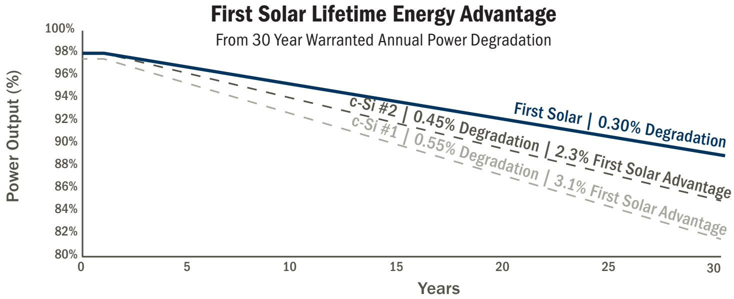
- Fastest energy payback time in the industry
- Carbon footprint that is 2.5X lower and a water footprint that is 3X lower than mono crystalline silicon panels on a life cycle basis
- Global PV module recycling services available through First Solar or customer-selected third-party

19.0%
HIGH BIN EFFICIENCY

30YR
LINEAR PERFORMANCE WARRANTY

98%
WARRANTY START POINT

0.3%
WARRANTED ANNUAL DEGRADATION RATE[1]



Learn more about First Solar and Series 6 *Plus* Bifacial at firstsolar.com/S6

Series 6 *Plus* Bifacial.

First Solar

Electrical Specifications

RATINGS AT STANDARD TEST CONDITIONS (1000W/m², AM 1.5, 25°C)[2]

SERIES 6 PLUS BIFACIAL MODEL TYPES: FS-6XXX-P-B / FS-6XXXA-P-B (XXX = NOMINAL POWER)

Nominal Power[3] (-0/+5%)	P_{MAX} (W)	455		460		465		470		475		480	
		STC[4]	BNPI[5]	STC	BNPI	STC	BNPI	STC	BNPI	STC	BNPI	STC	BNPI
Nominal Power	P_{MAX} (W)	455	464	460	469	465	474	470	479	475	485	480	490
Voltage at P_{MAX}	V_{MAX} (V)	187.8	187.8	188.8	188.8	189.8	189.8	191.1	191.1	191.5	191.5	192.8	192.8
Current at P_{MAX}	I_{MAX} (A)	2.42	2.47	2.44	2.49	2.45	2.50	2.46	2.50	2.48	2.53	2.49	2.54
Open Circuit Voltage	V_{OC} (V)	222.0	222.0	222.9	222.9	223.8	223.8	224.3	224.3	224.8	224.8	225.4	225.4
Short Circuit Current	I_{SC} (A)	2.58	2.63	2.59	2.64	2.60	2.65	2.61	2.66	2.61	2.66	2.62	2.67
Efficiency (%)	%	18.1		18.3		18.5		18.7		18.9		19.0	
Maximum System Voltage	V_{SYS} (V)	1500[6]											
Limiting Reverse Current	I_R (A)	5.0											
Maximum Series Fuse	I_{CF} (A)	5.0											

TEMPERATURE CHARACTERISTICS

Module Operating Temperature Range	°C	-40 to +85
Temperature Coefficient of P_{MAX}	T_K (P_{MAX})	-0.32%/°C [Temperature Range: 25°C to 75°C]
Temperature Coefficient of V_{OC}	T_K (V_{OC})	-0.28%/°C
Temperature Coefficient of I_{SC}	T_K (I_{SC})	+0.04%/°C
Nominal Operating Cell Temperature	°C	43
Bifaciality Factor	%	15±5

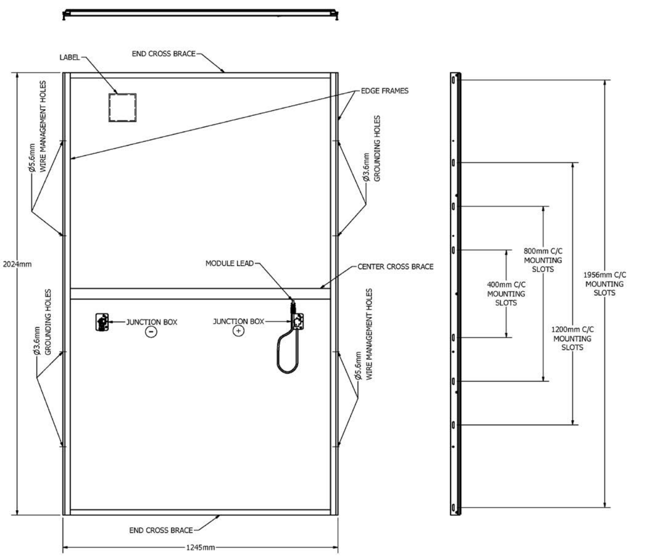
PACKAGING INFORMATION

Model Type	Modules Per Pack	Packs per 40' Container
FS-6XXX-P-B / FS-6XXXA-P-B	27	18

MECHANICAL DESCRIPTION

Module/Glass Length	2024mm/2016mm
Module/Glass Width	1245mm/1216mm
Module/Glass Area	2.52m²/2.45m²
Module Weight	34.0kg
Leadwire[7]	2.5mm², 733mm (+) & Bulkhead (-)
Connectors	TE Connectivity PV4-S, or alternate
Junction Box	IP68 Rated
Bypass Diode	N/A
Cell Type	Thin film CdTe semiconductor, up to 268 cells
Frame Material	Anodized Aluminum
Front Glass	Heat strengthened
Back Glass	Heat strengthened
Encapsulation	Laminate material with edge seal
Frame to Glass Adhesive	Silicone
Load Rating[8]	+/-2400Pa

Mechanical Specifications



Install in portrait only

Certifications & Tests[9]

CERTIFICATIONS AND LISTINGS	EXTENDED DURABILITY TESTS	QUALITY & EHS
IEC 61215:2021 & 61730-1:2016[6], CE IEC 61701 Salt Mist Corrosion IEC 60068-2-68 Dust and Sand Resistance UL 61730	IEC TS 63209-1 Extended Stress Test Long-Term Sequential Thresher Test PID Resistant	ISO 9001:2015 ISO 14001:2015 ISO 45001:2018 ISO 14064-3:2006 EPEAT Silver Registered

1 Limited power output and product warranties subject to warranty terms and conditions
2 All ratings ±10%, unless specified otherwise. Specifications are subject to change
3 Measurement uncertainty applies
4 Frontside electrical ratings
5 Bifacial Name Plate Irradiance, as per IEC 61215:2021
6 IEC 61730-1: 2016 Class II
7 Leadwire length from junction box exit to connector mating surface
8 1500Pa tentative load rating for 1956mm mounting slots. Higher loads may be acceptable,subject to testing
9 Testing Certifications/Listings pending

Series 6 Plus TCLP Report

March 21, 2022

1 INTRODUCTION

The purpose of this report is to provide waste characterization of First Solar Series 6 Plus photovoltaic (PV) modules using USEPA Method 1311 Toxicity Characteristic Leaching Procedure (TCLP).

2 METHODS

In February, 2022, First Solar provided three Series 6 Plus modules to Eurofins Calscience laboratory for TCLP testing.

3 RESULTS

TCLP test results are documented in the enclosed laboratory test report and are below the hazardous waste thresholds in Table 1 of 40 CFR 261.24[1].

[1] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-I/part-261/subpart-C/section-261.24

1 2 3 4 5 6 7 8 9 10 11 12 13 14

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ANALYTICAL REPORT

Eurofins Calscience
2841 Dow Avenue, Suite 100
Tustin, CA 92780
Tel: (714)895-5494

Laboratory Job ID: 570-85215-1
Client Project/Site: Photovoltaic (PV) Modules - TCLP Metals

For:
First Solar, Inc
28101 Cedar Park Blvd
Perrysburg, Ohio 43551

Attn: Adam Squire

Authorized for release by:
3/17/2022 2:23:03 PM

Rossina Tomova, Project Manager I
(657)210-6367
Rossina.Tomova@Eurofinset.com

LINKS

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Qualifiers

Metals

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client: First Solar, Inc Job ID: 570-85215-1
Project/Site: Photovoltaic (PV) Modules - TCLP Metals

Job ID: 570-85215-1

Laboratory: Eurofins Calscience

Narrative

Job Narrative
570-85215-1

Comments
No additional comments.

Receipt
The samples were received on 2/17/2022 1:30 PM. Unless otherwise noted below, the samples arrived in good condition. The temperature of the cooler at receipt was 23.0º C.

Receipt Exceptions
The samples were received at the laboratory outside the required temperature criteria for Mercury. There was no cooling media present in the cooler.

Metals
Method 6010B: The matrix spike / matrix spike duplicate (MS/MSD) recoveries of Barium for preparation batch 440-667641 and 440-667772 and analytical batch 440-667873 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.(440-294036-A-22-F MSD)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: First Solar, Inc
Project/Site: Photovoltaic (PV) Modules - TCLP Metals

Job ID: 570-85215-1

Client Sample ID: OD0-0026-01

Lab Sample ID: 570-85215-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.24		0.10		mg/L	1		6010B	TCLP
Cadmium	0.085		0.050		mg/L	1		6010B	TCLP

Client Sample ID: OD0-0026-02

Lab Sample ID: 570-85215-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.19		0.10		mg/L	1		6010B	TCLP

Client Sample ID: OD0-0026-03

Lab Sample ID: 570-85215-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.14		0.10		mg/L	1		6010B	TCLP

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: First Solar, Inc
Job ID: 570-85215-1
Project/Site: Photovoltaic (PV) Modules - TCLP Metals

Client Sample ID: OD0-0026-01
Lab Sample ID: 570-85215-1
Date Collected: 02/09/22 15:00
Matrix: Solid
Date Received: 02/17/22 13:30

Method: 6010B - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.20		mg/L		02/23/22 17:20	02/24/22 19:36	1
Barium	**0.24**		0.10		mg/L		02/23/22 17:20	02/24/22 19:36	1
Cadmium	**0.085**		0.050		mg/L		02/23/22 17:20	02/24/22 19:36	1
Chromium	ND		0.050		mg/L		02/23/22 17:20	02/24/22 19:36	1
Lead	ND		0.050		mg/L		02/23/22 17:20	02/24/22 19:36	1
Selenium	ND		0.20		mg/L		02/23/22 17:20	02/24/22 19:36	1
Silver	ND		0.10		mg/L		02/23/22 17:20	02/24/22 19:36	1

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0025		mg/L		03/15/22 19:30	03/16/22 13:38	1

Client: First Solar, Inc — Job ID: 570-85215-1

Project/Site: Photovoltaic (PV) Modules - TCLP Metals

Client Sample ID: OD0-0026-02 — **Lab Sample ID: 570-85215-2**

Date Collected: 02/09/22 15:00 — **Matrix: Solid**

Date Received: 02/17/22 13:30

Method: 6010B - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.20		mg/L		02/23/22 17:20	02/24/22 19:39	1
Barium	**0.19**		0.10		mg/L		02/23/22 17:20	02/24/22 19:39	1
Cadmium	ND		0.050		mg/L		02/23/22 17:20	02/24/22 19:39	1
Chromium	ND		0.050		mg/L		02/23/22 17:20	02/24/22 19:39	1
Lead	ND		0.050		mg/L		02/23/22 17:20	02/24/22 19:39	1
Selenium	ND		0.20		mg/L		02/23/22 17:20	02/24/22 19:39	1
Silver	ND		0.10		mg/L		02/23/22 17:20	02/24/22 19:39	1

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0025		mg/L		03/15/22 19:30	03/16/22 13:43	1

Client Sample Results

Client: First Solar, Inc
Job ID: 570-85215-1
Project/Site: Photovoltaic (PV) Modules - TCLP Metals

Client Sample ID: OD0-0026-03
Lab Sample ID: 570-85215-3

Date Collected: 02/09/22 15:00
Matrix: Solid
Date Received: 02/17/22 13:30

Method: 6010B - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.20		mg/L		02/23/22 17:20	02/24/22 19:34	1
Barium	**0.14**		0.10		mg/L		02/23/22 17:20	02/24/22 19:34	1
Cadmium	ND		0.050		mg/L		02/23/22 17:20	02/24/22 19:34	1
Chromium	ND		0.050		mg/L		02/23/22 17:20	02/24/22 19:34	1
Lead	ND		0.050		mg/L		02/23/22 17:20	02/24/22 19:34	1
Selenium	ND		0.20		mg/L		02/23/22 17:20	02/24/22 19:34	1
Silver	ND		0.10		mg/L		02/23/22 17:20	02/24/22 19:34	1

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0025		mg/L		03/15/22 19:30	03/16/22 13:45	1

Client: First Solar, Inc
Job ID: 570-85215-1
Project/Site: Photovoltaic (PV) Modules - TCLP Metals

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 440-667641/1-B
Matrix: Solid
Analysis Batch: 667873
Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 667772

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.20		mg/L		02/23/22 17:20	02/24/22 19:05	1
Barium	ND		0.10		mg/L		02/23/22 17:20	02/24/22 19:05	1
Cadmium	ND		0.050		mg/L		02/23/22 17:20	02/24/22 19:05	1
Chromium	ND		0.050		mg/L		02/23/22 17:20	02/24/22 19:05	1
Lead	0.0710		0.050		mg/L		02/23/22 17:20	02/24/22 19:05	1
Selenium	ND		0.20		mg/L		02/23/22 17:20	02/24/22 19:05	1
Silver	ND		0.10		mg/L		02/23/22 17:20	02/24/22 19:05	1

Lab Sample ID: LCS 440-667641/2-B
Matrix: Solid
Analysis Batch: 667873
Client Sample ID: Lab Control Sample
Prep Type: TCLP
Prep Batch: 667772

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	2.00	2.12		mg/L		106	80 - 120
Barium	2.00	2.12		mg/L		106	80 - 120
Cadmium	2.00	2.03		mg/L		101	80 - 120
Chromium	2.00	2.16		mg/L		108	80 - 120
Lead	2.00	2.09		mg/L		104	80 - 120
Selenium	2.00	1.89		mg/L		95	80 - 120
Silver	1.00	1.06		mg/L		106	80 - 120

Lab Sample ID: 440-294036-A-22-E MS
Matrix: Solid
Analysis Batch: 667873
Client Sample ID: Matrix Spike
Prep Type: TCLP
Prep Batch: 667772

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	ND		2.00	2.19		mg/L		103	75 - 125
Barium	5.4	F1	2.00	7.85		mg/L		121	75 - 125
Cadmium	0.055		2.00	2.09		mg/L		102	75 - 125
Chromium	0.36		2.00	2.53		mg/L		109	75 - 125
Lead	2.1	B	2.00	4.19		mg/L		104	75 - 125
Selenium	ND		2.00	1.85		mg/L		93	75 - 125
Silver	ND		1.00	1.04		mg/L		104	75 - 125

Lab Sample ID: 440-294036-A-22-F MSD
Matrix: Solid
Analysis Batch: 667873
Client Sample ID: Matrix Spike Duplicate
Prep Type: TCLP
Prep Batch: 667772

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	ND		2.00	2.21		mg/L		103	75 - 125	1	20
Barium	5.4	F1	2.00	8.23	F1	mg/L		140	75 - 125	5	20
Cadmium	0.055		2.00	2.08		mg/L		101	75 - 125	1	20
Chromium	0.36		2.00	2.58		mg/L		111	75 - 125	2	20
Lead	2.1	B	2.00	4.36		mg/L		113	75 - 125	4	20
Selenium	ND		2.00	1.91		mg/L		95	75 - 125	3	20
Silver	ND		1.00	1.05		mg/L		105	75 - 125	1	20

QC Sample Results

Client: First Solar, Inc   Job ID: 570-85215-1
Project/Site: Photovoltaic (PV) Modules - TCLP Metals

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 570-219655/1-B   **Client Sample ID: Method Blank**
Matrix: Solid   **Prep Type: TCLP**
Analysis Batch: 220034   **Prep Batch: 219783**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0025		mg/L		03/15/22 19:30	03/16/22 13:32	1

Lab Sample ID: LCS 570-219655/2-B   **Client Sample ID: Lab Control Sample**
Matrix: Solid   **Prep Type: TCLP**
Analysis Batch: 220034   **Prep Batch: 219783**

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			0.0500	0.0529		mg/L		106	80 - 120		

Lab Sample ID: LCSD 570-219655/6-B   **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid   **Prep Type: TCLP**
Analysis Batch: 220034   **Prep Batch: 219783**

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury			0.0500	0.0530		mg/L		106	80 - 120	0	20

Lab Sample ID: 570-85215-1 MS   **Client Sample ID: OD0-0026-01**
Matrix: Solid   **Prep Type: TCLP**
Analysis Batch: 220034   **Prep Batch: 219783**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	ND		0.0500	0.0503		mg/L		101	55 - 133		

Lab Sample ID: 570-85215-1 MSD   **Client Sample ID: OD0-0026-01**
Matrix: Solid   **Prep Type: TCLP**
Analysis Batch: 220034   **Prep Batch: 219783**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.0500	0.0504		mg/L		101	55 - 133	0	20

Metals

Leach Batch: 219655

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-85215-1	OD0-0026-01	TCLP	Solid	1311	
570-85215-2	OD0-0026-02	TCLP	Solid	1311	
570-85215-3	OD0-0026-03	TCLP	Solid	1311	
MB 570-219655/1-B	Method Blank	TCLP	Solid	1311	
LCS 570-219655/2-B	Lab Control Sample	TCLP	Solid	1311	
LCSD 570-219655/6-B	Lab Control Sample Dup	TCLP	Solid	1311	
570-85215-1 MS	OD0-0026-01	TCLP	Solid	1311	
570-85215-1 MSD	OD0-0026-01	TCLP	Solid	1311	

Prep Batch: 219783

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-85215-1	OD0-0026-01	TCLP	Solid	7470A	219655
570-85215-2	OD0-0026-02	TCLP	Solid	7470A	219655
570-85215-3	OD0-0026-03	TCLP	Solid	7470A	219655
MB 570-219655/1-B	Method Blank	TCLP	Solid	7470A	219655
LCS 570-219655/2-B	Lab Control Sample	TCLP	Solid	7470A	219655
LCSD 570-219655/6-B	Lab Control Sample Dup	TCLP	Solid	7470A	219655
570-85215-1 MS	OD0-0026-01	TCLP	Solid	7470A	219655
570-85215-1 MSD	OD0-0026-01	TCLP	Solid	7470A	219655

Analysis Batch: 220034

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-85215-1	OD0-0026-01	TCLP	Solid	7470A	219783
570-85215-2	OD0-0026-02	TCLP	Solid	7470A	219783
570-85215-3	OD0-0026-03	TCLP	Solid	7470A	219783
MB 570-219655/1-B	Method Blank	TCLP	Solid	7470A	219783
LCS 570-219655/2-B	Lab Control Sample	TCLP	Solid	7470A	219783
LCSD 570-219655/6-B	Lab Control Sample Dup	TCLP	Solid	7470A	219783
570-85215-1 MS	OD0-0026-01	TCLP	Solid	7470A	219783
570-85215-1 MSD	OD0-0026-01	TCLP	Solid	7470A	219783

Leach Batch: 667641

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-85215-1	OD0-0026-01	TCLP	Solid	1311	
570-85215-2	OD0-0026-02	TCLP	Solid	1311	
570-85215-3	OD0-0026-03	TCLP	Solid	1311	
MB 440-667641/1-B	Method Blank	TCLP	Solid	1311	
LCS 440-667641/2-B	Lab Control Sample	TCLP	Solid	1311	
440-294036-A-22-E MS	Matrix Spike	TCLP	Solid	1311	
440-294036-A-22-F MSD	Matrix Spike Duplicate	TCLP	Solid	1311	

Prep Batch: 667772

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-85215-1	OD0-0026-01	TCLP	Solid	3010A	667641
570-85215-2	OD0-0026-02	TCLP	Solid	3010A	667641
570-85215-3	OD0-0026-03	TCLP	Solid	3010A	667641
MB 440-667641/1-B	Method Blank	TCLP	Solid	3010A	667641
LCS 440-667641/2-B	Lab Control Sample	TCLP	Solid	3010A	667641
440-294036-A-22-E MS	Matrix Spike	TCLP	Solid	3010A	667641
440-294036-A-22-F MSD	Matrix Spike Duplicate	TCLP	Solid	3010A	667641

Client: First Solar, Inc
Job ID: 570-85215-1
Project/Site: Photovoltaic (PV) Modules - TCLP Metals

Metals

Analysis Batch: 667873

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-85215-1	OD0-0026-01	TCLP	Solid	6010B	667772
570-85215-2	OD0-0026-02	TCLP	Solid	6010B	667772
570-85215-3	OD0-0026-03	TCLP	Solid	6010B	667772
MB 440-667641/1-B	Method Blank	TCLP	Solid	6010B	667772
LCS 440-667641/2-B	Lab Control Sample	TCLP	Solid	6010B	667772
440-294036-A-22-E MS	Matrix Spike	TCLP	Solid	6010B	667772
440-294036-A-22-F MSD	Matrix Spike Duplicate	TCLP	Solid	6010B	667772

Lab Chronicle

Client: First Solar, Inc
Job ID: 570-85215-1
Project/Site: Photovoltaic (PV) Modules - TCLP Metals

Client Sample ID: OD0-0026-01
Lab Sample ID: 570-85215-1
Date Collected: 02/09/22 15:00
Matrix: Solid
Date Received: 02/17/22 13:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			100.20 g	2000 mL	667641	02/22/22 20:17		IRV 2
TCLP	Prep	3010A			5 mL	50 mL	667772	02/23/22 17:20		IRV 2
TCLP	Analysis	6010B		1			667873	02/24/22 19:36	P1R	IRV 2
	Instrument ID: ICP8									
TCLP	Leach	1311			100.20 g	2000 mL	219655	02/22/22 20:17		ECL 3
TCLP	Prep	7470A			10 mL	100 mL	219783	03/15/22 19:30	VWJ7	ECL 4
TCLP	Analysis	7470A		1			220034	03/16/22 13:38	VWJ7	ECL 4
	Instrument ID: HG7									

Client Sample ID: OD0-0026-02
Lab Sample ID: 570-85215-2
Date Collected: 02/09/22 15:00
Matrix: Solid
Date Received: 02/17/22 13:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			101.30 g	2000 mL	667641	02/22/22 20:17		IRV 2
TCLP	Prep	3010A			5 mL	50 mL	667772	02/23/22 17:20		IRV 2
TCLP	Analysis	6010B		1			667873	02/24/22 19:39	P1R	IRV 2
	Instrument ID: ICP8									
TCLP	Leach	1311			101.30 g	2000 mL	219655	02/22/22 20:17		ECL 3
TCLP	Prep	7470A			10 mL	100 mL	219783	03/15/22 19:30	VWJ7	ECL 4
TCLP	Analysis	7470A		1			220034	03/16/22 13:43	VWJ7	ECL 4
	Instrument ID: HG7									

Client Sample ID: OD0-0026-03
Lab Sample ID: 570-85215-3
Date Collected: 02/09/22 15:00
Matrix: Solid
Date Received: 02/17/22 13:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			100.42 g	2000 mL	667641	02/22/22 20:17		IRV 2
TCLP	Prep	3010A			5 mL	50 mL	667772	02/23/22 17:20		IRV 2
TCLP	Analysis	6010B		1			667873	02/24/22 19:34	P1R	IRV 2
	Instrument ID: ICP8									
TCLP	Leach	1311			100.42 g	2000 mL	219655	02/22/22 20:17		ECL 3
TCLP	Prep	7470A			10 mL	100 mL	219783	03/15/22 19:30	VWJ7	ECL 4
TCLP	Analysis	7470A		1			220034	03/16/22 13:45	VWJ7	ECL 4
	Instrument ID: HG7									

Laboratory References:

ECL 3 = Eurofins Calscience Knott, 11380 Knott Street, Garden Grove, CA 92841, TEL (714)895-5494
ECL 4 = Eurofins Calscience Tustin, 2841 Dow Avenue, Tustin, CA 92780, TEL (714)895-5494
IRV 2 = Eurofins Calscience Tustin, 2841 Dow Avenue, Tustin, CA 92780, TEL (714)895-5494

Accreditation/Certification Summary

Client: First Solar, Inc — Job ID: 570-85215-1
Project/Site: Photovoltaic (PV) Modules - TCLP Metals

Laboratory: Eurofins Calscience

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	Los Angeles County Sanitation Districts	10109	09-30-22
California	SCAQMD LAP	17LA0919	11-30-21 *
California	State	2944	09-30-22
Guam	State	21-003R	06-22-22
Nevada	State	CA00111	07-31-22
Oregon	NELAP	CA300001	01-31-23
USDA	US Federal Programs	P330-20-00034	02-10-23
Washington	State	C916-18	10-12-22

Laboratory: Eurofins Calscience

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	Los Angeles County Sanitation Districts	10256	06-30-22
California	State	2706	06-30-22
Kansas	NELAP	E-10420	07-31-22
Nevada	State	CA015312022-1	07-31-22
Washington	State	C900	09-03-22

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: First Solar, Inc
Project/Site: Photovoltaic (PV) Modules - TCLP Metals

Job ID: 570-85215-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	IRV 2
7470A	Mercury (CVAA)	SW846	ECL 4
1311	TCLP Extraction	SW846	ECL 3
1311	TCLP Extraction	SW846	IRV 2
3010A	Preparation, Total Metals	SW846	IRV 2
7470A	Preparation, Mercury	SW846	ECL 4

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

ECL 3 = Eurofins Calscience Knott, 11380 Knott Street, Garden Grove, CA 92841, TEL (714)895-5494

ECL 4 = Eurofins Calscience Tustin, 2841 Dow Avenue, Tustin, CA 92780, TEL (714)895-5494

IRV 2 = Eurofins Calscience Tustin, 2841 Dow Avenue, Tustin, CA 92780, TEL (714)895-5494

Sample Summary

Client: First Solar, Inc
Project/Site: Photovoltaic (PV) Modules - TCLP Metals

Job ID: 570-85215-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
570-85215-1	OD0-0026-01	Solid	02/09/22 15:00	02/17/22 13:30
570-85215-2	OD0-0026-02	Solid	02/09/22 15:00	02/17/22 13:30
570-85215-3	OD0-0026-03	Solid	02/09/22 15:00	02/17/22 13:30

Eurofins Calscience Irvine
2841 Dow Avenue, Suite 100
Tustin, CA 92780
Phone (949) 261-1022 Fax (949) 260-3297

Chain of Custody Record

eurofins Calsc

Loc: 570
85215

Client Information	Sampler:	Lab PM: Adam Squire	Carrier Tracking No(s): 12 430 69X03 9356 9815	COC No:
Client Contact: Karissa Gordon	Phone: 419-764-3475	E-Mail: karissa.gordon@firstsolar.com		Page: Page 1 of 1
Company: First Solar Inc				Job #:
Address: 28101 Cedar Park Blvd	Due Date Requested:			
City: Perrysburg	TAT Requested (days):			
State Zip: OH 43551				
Phone: 419-662-8500	PO #:			
Email:	WO #:			
Project Name:	Project #:			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Total Number of containers	Special Instructions/Note:
			Preservation Code:					
OD0-0026 -01	2/9/22	3:00 PM	COMP	SOLID	NO		3	200g (dispersed through
-02	|	|	|	|			3	200g 3 cases)
-03							3	200g

570-85215 Chain of Custody

Possible Hazard Identification
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☑ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Karissa Gordon	2/9/22	First Solar	Olga Ornelas	2/17/22 1330	ECIT

Custody Seals Intact: Δ Yes Δ No	Custody Seal No:	Cooler Temperature(s) °C and Other Remarks: IR-90 23.5/23.0

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: First Solar, Inc — Job Number: 570-85215-1

Login Number: 85215
List Number: 1
Creator: Cruise, Noel

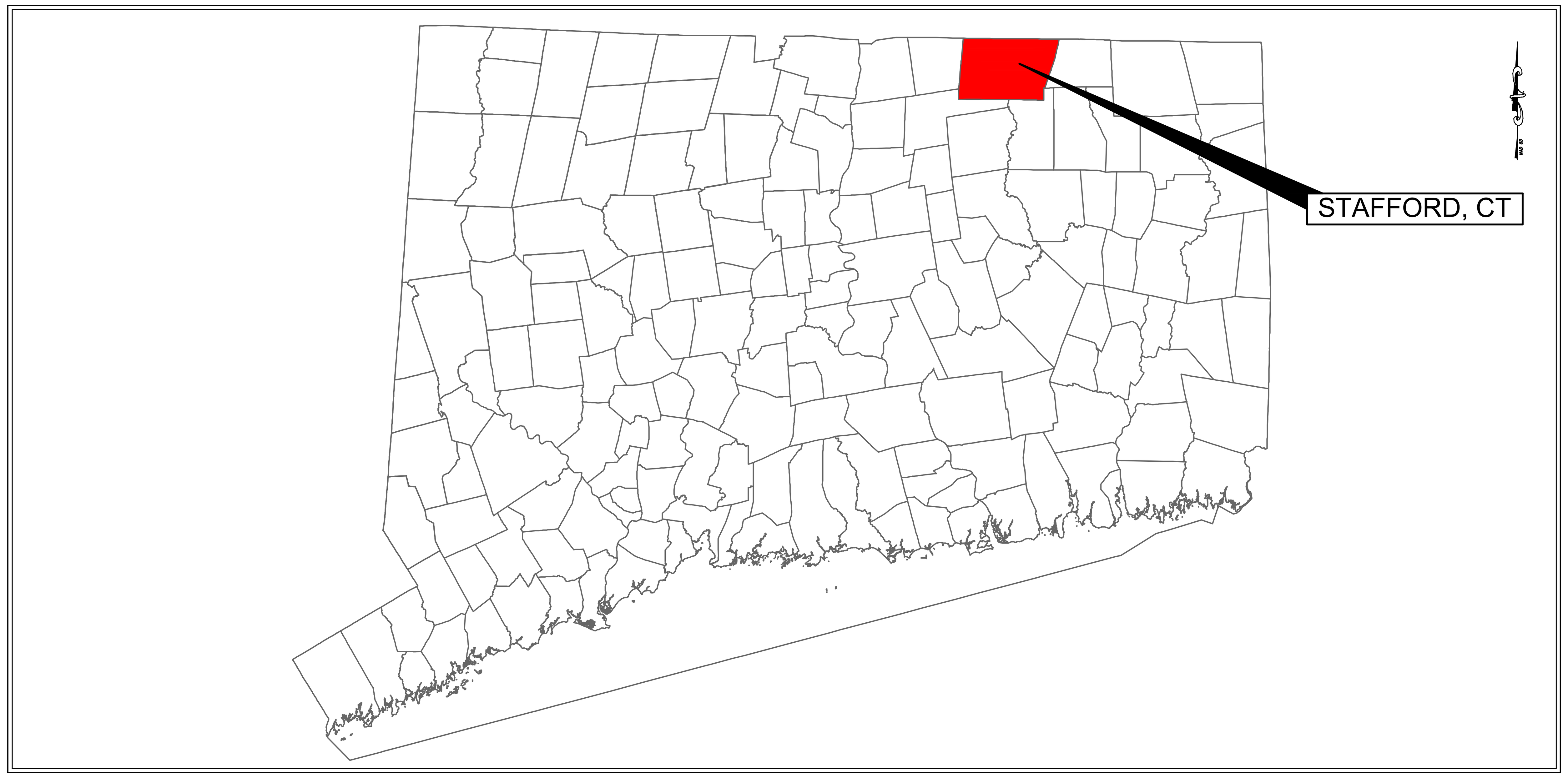
List Source: Eurofins Calscience

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Out of temperature for Mercury
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	False	Requested analyses are not listed on COC
Is the Field Sampler's name present on COC?	False	Refer to Job Narrative for details.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Appendix B – Project Plans

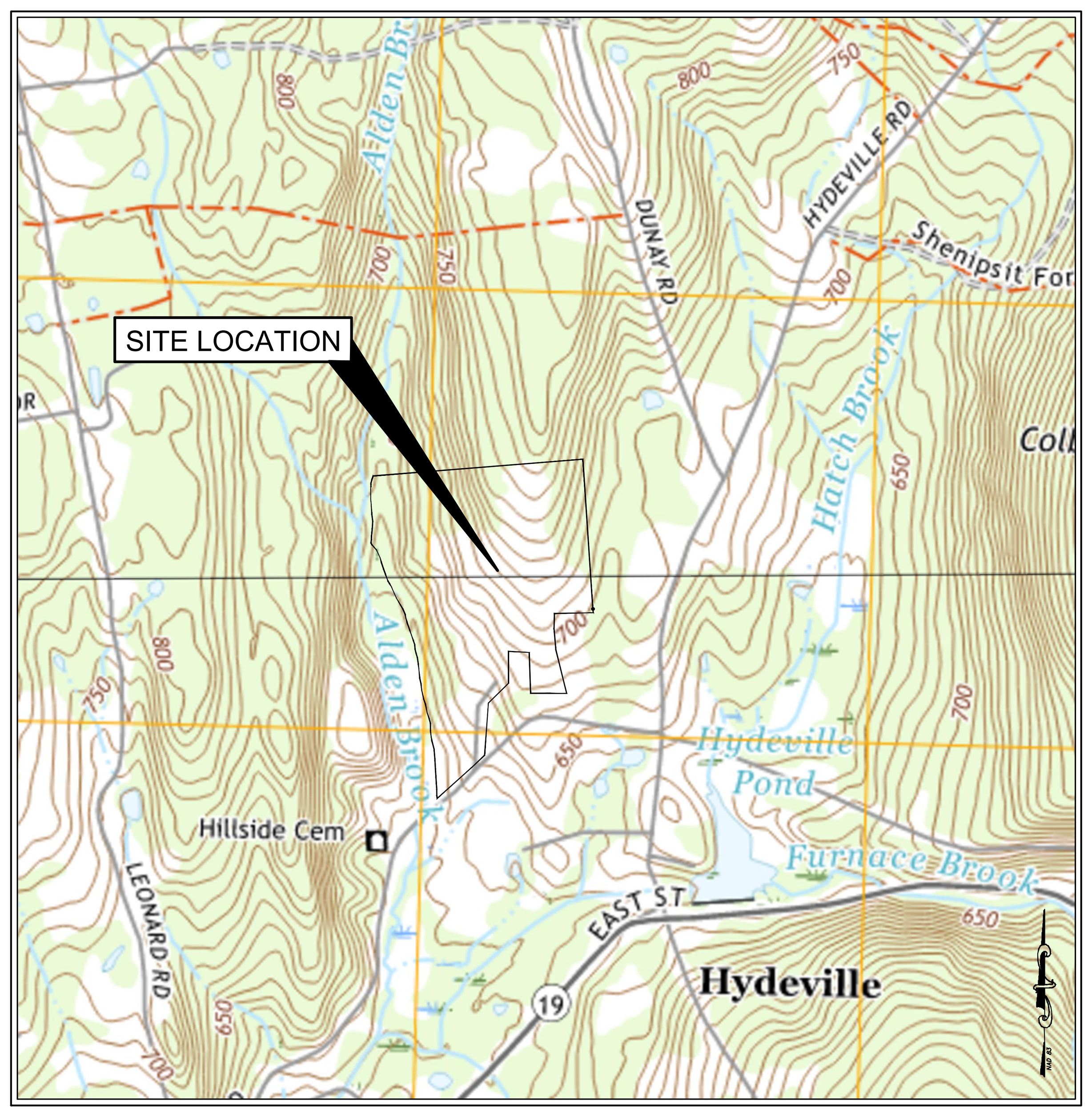
PROPOSED SOLAR PV DEVELOPMENT

92 UPPER ROAD, STAFFORD, CONNECTICUT



CONNECTICUT MUNICIPAL MAP

NOT TO SCALE



SITE LOCUS MAP

1" = 1,000'

SITE AERIAL MAP

1" = 500'

DRAWING INDEX

SHEET NUMBER	SHEET TITLE
GENERAL	
G000	COVER SHEET
SURVEY	
V101	EXISTING CONDITIONS PLAN
CIVIL	
C001	NOTES AND SPECIFICATIONS
C101	PROPOSED SITE PLAN
C501	DETAILS I
C502	DETAILS II
C503	DETAILS III

SITE INFORMATION

LAND OWNER:	EDWINA J MORDASKY EST
ACCOUNT NUMBER:	00132000
BOOK:	724
PAGE:	680
TAX MAP:	27
LOT:	20
PARCEL AREA:	59 ACRES

ZONING

ZONING DISTRICT	AAA - RURAL AND SINGLE FAMILY RESIDENCE
FRONT YARD:	NOT LESS THAN 50 FEET
SIDE YARD:	NOT LESS THAN 50 FEET
REAR YARD:	NOT LESS THAN 50 FEET

LAND OWNER:

Edwina J Mordasky EST
109 Upper Road
Stafford Springs, Connecticut 06076

PROJECT DEVELOPER:

VCP Stafford, LLC
124 LaSalle Road
2nd Floor
West Hartford, CT 06107
Tel: (860) 288-7215
www.verogy.com

CONSULTANT:

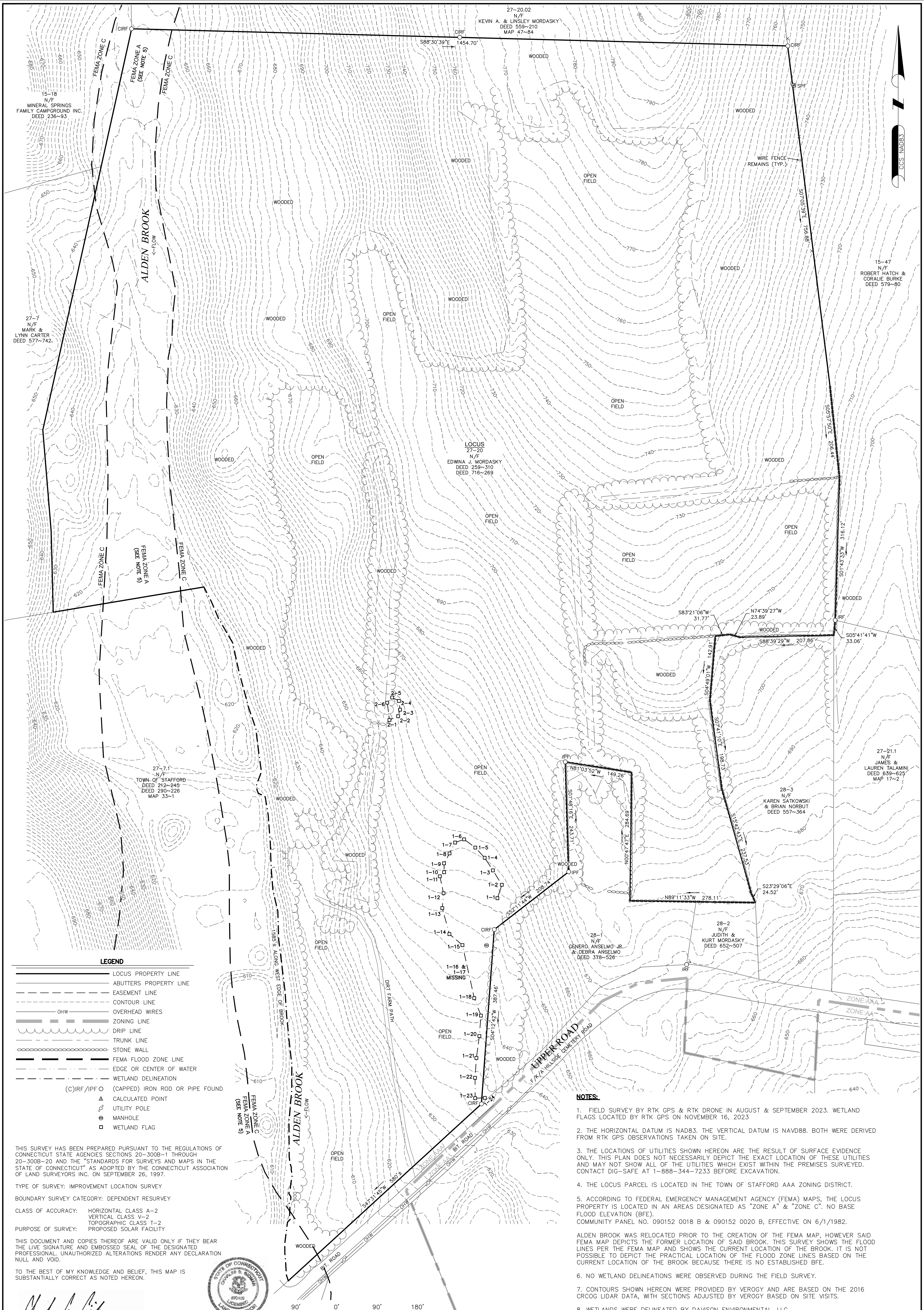
Weston & Sampson Engineers, INC.
712 Brook Street, Suite 103
Rocky Hill, CT 06067
860.513.1473 800.SAMPSON
www.westonandsampson.com

REV #	DESCRIPTION	DATE
0	ISSUED FOR PERMITTING	03/14/2024
REV #	DESCRIPTION	DATE

Seal:

Know what's below. Call before you dig.

Issued For: PERMITTING		Drawn By:	DED
		Reviewed By:	MRC
Original Issued Date: 03/14/2024		Approved By:	RJB
		Job No:	ENG23-3034
Drawing Title: COVER SHEET		Sheet Number: G000	



LEGEND

- LOCUS PROPERTY LINE
- ABUTTERS PROPERTY LINE
- EASEMENT LINE
- CONTOUR LINE
- OHW — OVERHEAD WIRES
- ZONING LINE
- DRIP LINE
- TRUNK LINE
- STONE WALL
- FEMA FLOOD ZONE LINE
- EDGE OR CENTER OF WATER
- WETLAND DELINEATION
- (C)IRF/IPF ○ (CAPPED) IRON ROD OR PIPE FOUND
- CALCULATED POINT
- UTILITY POLE
- MANHOLE
- WETLAND FLAG

THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300B-1 THROUGH 20-300B-20 AND THE "STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS INC. ON SEPTEMBER 26, 1997.

TYPE OF SURVEY: IMPROVEMENT LOCATION SURVEY

BOUNDARY SURVEY CATEGORY: DEPENDENT RESURVEY

CLASS OF ACCURACY: HORIZONTAL CLASS A-2
VERTICAL CLASS V-2
TOPOGRAPHIC CLASS T-2

PURPOSE OF SURVEY: PROPOSED SOLAR FACILITY

THIS DOCUMENT AND COPIES THEREOF ARE VALID ONLY IF THEY BEAR THE LIVE SIGNATURE AND EMBOSSED SEAL OF THE DESIGNATED PROFESSIONAL. UNAUTHORIZED ALTERATIONS RENDER ANY DECLARATION NULL AND VOID.

TO THE BEST OF MY KNOWLEDGE AND BELIEF, THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

CHARLES G. GIDMAN, P.L.S. #70103

STATE OF CONNECTICUT
CHARLES G. GIDMAN
LICENSED
LAND SURVEYOR

NOTES:

1. FIELD SURVEY BY RTK GPS & RTK DRONE IN AUGUST & SEPTEMBER 2023. WETLAND FLAGS LOCATED BY RTK GPS ON NOVEMBER 16, 2023

2. THE HORIZONTAL DATUM IS NAD83. THE VERTICAL DATUM IS NAVD88. BOTH WERE DERIVED FROM RTK GPS OBSERVATIONS TAKEN ON SITE.

3. THE LOCATIONS OF UTILITIES SHOWN HEREON ARE THE RESULT OF SURFACE EVIDENCE ONLY. THIS PLAN DOES NOT NECESSARILY DEPICT THE EXACT LOCATION OF THESE UTILITIES AND MAY NOT SHOW ALL OF THE UTILITIES WHICH EXIST WITHIN THE PREMISES SURVEYED. CONTACT DIG-SAFE AT 1-888-344-7233 BEFORE EXCAVATION.

4. THE LOCUS PARCEL IS LOCATED IN THE TOWN OF STAFFORD AAA ZONING DISTRICT.

5. ACCORDING TO FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) MAPS, THE LOCUS PROPERTY IS LOCATED IN AN AREAS DESIGNATED AS "ZONE A" & "ZONE C". NO BASE FLOOD ELEVATION (BFE).
COMMUNITY PANEL NO. 090152 0018 B & 090152 0020 B, EFFECTIVE ON 6/1/1982.

ALDEN BROOK WAS RELOCATED PRIOR TO THE CREATION OF THE FEMA MAP, HOWEVER SAID FEMA MAP DEPICTS THE FORMER LOCATION OF SAID BROOK. THIS SURVEY SHOWS THE FLOOD LINES PER THE FEMA MAP AND SHOWS THE CURRENT LOCATION OF THE BROOK. IT IS NOT POSSIBLE TO DEPICT THE PRACTICAL LOCATION OF THE FLOOD ZONE LINES BASED ON THE CURRENT LOCATION OF THE BROOK BECAUSE THERE IS NO ESTABLISHED BFE.

6. NO WETLAND DELINEATIONS WERE OBSERVED DURING THE FIELD SURVEY.

7. CONTOURS SHOWN HEREON WERE PROVIDED BY VEROGY AND ARE BASED ON THE 2016 CRCOG LIDAR DATA, WITH SECTIONS ADJUSTED BY VEROGY BASED ON SITE VISITS.

8. WETLANDS WERE DELINEATED BY DAVISON ENVIRONMENTAL, LLC.

SHEET NO.							
1 OF 1	PLAN OF LAND IN STAFFORD, CT PREPARED FOR VEROGY	SURVEYOR:	CGG	ENGINEER:	-	BOUNDARY SURVEY & LIDAR CONTOURS	NORTHEAST SURVEY CONSULTANTS 3 FERRY STREET STUDIO 1 EAST EASTHAMPTON, MA 01027 (413) 203-5144
		DRAFTING:	JDG	DESIGN:	-		
		FIELD WORK:	NAE NMC CRC	HORZ. SCALE:	1"=90'		
		PROJECT NUMBER:	23-156	VERT. SCALE:	-		
		DRAWING NAME:	23-156.DWG	DATE:	1-19-2024		

CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL "CALL BEFORE YOU DIG" AT 811 OR 1-888-DIG-SAFE AT LEAST 72 HOURS, SATURDAYS, SUNDAYS, AND HOLIDAYS EXCLUDED, PRIOR TO EXCAVATING AT ANY LOCATION. A COPY OF THE DIG SAFE PROJECT REFERENCE NUMBER(S) SHALL BE GIVEN TO THE OWNER PRIOR TO EXCAVATION.
2. LOCATIONS OF EXISTING PIPES, CONDUITS, UTILITIES, FOUNDATIONS AND OTHER UNDERGROUND OBJECTS ARE NOT WARRANTED TO BE CORRECT AND THE CONTRACTOR SHALL HAVE NO CLAIM ON THAT ACCOUNT SHOULD THEY BE OTHER THAN SHOWN.
3. STONE WALLS, FENCES, CURBS, ETC., SHALL BE REMOVED AND REPLACED AS NECESSARY TO PERFORM THE WORK. UNLESS OTHERWISE INDICATED, ALL SUCH WORK SHALL BE INCIDENTAL TO CONSTRUCTION OF THE PROJECT.
4. ALL AREAS DISTURBED BY THE CONTRACTOR BEYOND THE PROJECT AREA SHALL BE RESTORED AT NO ADDITIONAL COST TO THE OWNER.
5. NOTHING SHOWN OR OMITTED FROM THE DOCUMENTS PROVIDED SHALL RELIEVE THE CONTRACTOR FROM FULL COMPLIANCE WITH ALL APPLICABLE CODES, REGULATIONS, BYLAWS, AND ORDINANCES.

MATERIAL SPECIFICATIONS AND PLACEMENT REQUIREMENTS:

1.1 DENSE GRADED CRUSHED STONE

THIS MATERIAL SHALL CONSIST OF CLEAN HARD, DURABLE CRUSHED ROCK OR CRUSHED GRAVEL STONE, FREE FROM LOAM AND CLAY AND DELETERIOUS MATERIAL. THIS MATERIAL SHALL MEET THE FOLLOWING GRADATION :

SIEVE DESIGNATION	PERCENT PASSING
3.5-INCH	100
1.5-INCH	55-100
1/4-INCH	25-60
NO. 10	15-45
NO. 40	5-25
NO. 100	0-10
NO. 200	0-5

PRIOR TO USE, THE DENSE GRADED CRUSHED STONE SHALL BE TESTED FOR APPROVAL AS DESCRIBED BELOW IN SECTION 2.0 AND SHALL BE PLACED AS DESCRIBED BELOW IN SECTION 3.0.

1.2 3/4" CRUSHED STONE

THIS MATERIAL SHALL CONSIST OF SOUND, TOUGH, DURABLE BROKEN STONE AND BE FREE OF LOAM, CLAY, AND OTHER DELETERIOUS MATERIAL. THE MATERIAL SHALL SATISFY THE AASHTO SPECIFICATION FOR #67 STONE (3/4-INCH STONE).

PRIOR TO USE, THE 3/4" CRUSHED STONE SHALL BE TESTED FOR APPROVAL AS DESCRIBED BELOW IN SECTION 2.0 AND SHALL BE PLACED AS DESCRIBED BELOW IN SECTION 3.0.

1.3 GRANULAR BASE MATERIAL

GRANULAR FILL SHALL CONSIST OF CTDOT MATERIAL M.02.03, GRANULAR BASE, OR APPROVED EQUAL. THIS MATERIAL SHALL MEET THE FOLLOWING GRADATION FOR CTDOT M.02.06 GRADING "C":

SIEVE DESIGNATION	PERCENT PASSING
1.5-INCH	100
3/4-INCH	45-85
1/4-INCH	25-60
NO. 10	15-45
NO. 40	5-25
NO. 100	0-10
NO. 200	0-5

PRIOR TO USE, THE GRANULAR BASE SHALL BE TESTED FOR APPROVAL AS DESCRIBED IN SECTION 2.0 AND SHALL BE PLACED AS DESCRIBED IN SECTION 3.0.

1.4 TOPSOIL

TOPSOIL SHALL CONSIST OF CTDOT MATERIAL M.13.01, TOPSOIL, OR APPROVED EQUAL. TOPSOIL SHALL NOT CONTAIN LESS THAN 6% NOR MORE THAN 20% ORGANIC MATERIAL AS DETERMINED BY LOSS ON IGNITION OF OVEN-DRIED SAMPLES DRIED AT 221 DEG. F (105 DEG C). TOPSOIL SHALL BE LOOSE AND FRIABLE AND FREE OF FROM REFUSE, STUMPS, ROOTS, BRUSH, WEEDS, ROCKS AND STONES OVER 1-1/4-INCHES IN DIAMETER. TOPSOIL SHALL ALSO BE FREE FROM ANY MATERIAL THAT WILL PRVENT THE FORMATION OF A SUITABLE SEEDBED OR PREVENT SEED GERMINATION AND PLANT GROWTH.

1.5 GEOSYNTHETICS:

1. GENERAL:
   INSTALLATION OF GEOTEXTILE FABRICS SHALL BE IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND SPECIFIC LAYOUT PLANS AND DETAILS REVIEWED BY ENGINEER.
2. WOVEN GEOTEXTILE:
   THE WOVEN GEOTEXTILE SHALL BE MIRAFI HP 770 FABRIC, BY MIRAFI INC., OR APPROVED EQUIVALENT. THE WOVEN GEOTEXTILE SHALL BE COMPOSED OF POLYPROPYLENE STABILIZED WITH CARBON BLACK TO RESIST ULTRAVIOLET DEGRADATION AND BE RESISTANT TO BIOLOGICAL AND CHEMICAL DEGRADATION DUE TO ALL NATURALLY OCCURRING ORGANISMS OR REAGENTS NORMALLY ENCOUNTERED IN NATURAL SOIL ENVIRONMENTS.
3. NON-WOVEN GEOTEXTILE:
   THE NON-WOVEN GEOTEXTILE SHALL BE MIRAFI 140N FABRIC, BY MIRAFI INC., OR APPROVED EQUIVALENT. THE NON-WOVEN GEOTEXTILE SHALL BE COMPOSED OF POLYPROPYLENE FIBERS AND SHALL BE INERT TO BIOLOGICAL DEGRADATION AND RESISTANT TO NATURALLY ENCOUNTERED CHEMICALS, ALKALIS, AND ACIDS.

2.0 BORROW SOURCE TESTING REQUIREMENTS

PRIOR TO USE, BORROW SOURCE TESTING, INCLUDING GEOTECHNICAL CHARACTERIZATION REQUIREMENTS, SHALL BE CONDUCTED ON ALL SOIL MATERIALS PROPOSED FOR CONSTRUCTION AND SUBMITTED TO THE ENGINEER TO ASSESS CONFORMANCE TO MATERIAL SPECIFICATIONS.

3.0 MATERIAL PLACEMENT AND FIELD QUALITY CONTROL REQUIREMENTS

1. DO NOT PLACE FILL MATERIAL ON SURFACES THAT ARE MUDDY, FROZEN, OR CONTAIN FROST OR ICE.
2. SURFACES ON WHICH THE GEOTEXTILE WILL BE PLACED SHALL BE PREPARED TO A RELATIVELY SMOOTH SURFACE CONDITION. SURFACES SHALL BE FREE FROM OBSTRUCTION, DEBRIS, DEPRESSIONS, OR EROSION FEATURES. VEGETATION SHALL BE MOWED AS SHORT AS POSSIBLE PRIOR TO PLACEMENT OF GEOTEXTILE FABRIC. ANY IRREGULARITIES SHALL BE REMOVED SO AS TO ENSURE CONTINUOUS, INTIMATE CONTACT OF THE GEOTEXTILE WITH THE SURFACE. ANY LOOSE MATERIAL, SOFT OR LOW DENSITY POCKETS OF MATERIAL, SHALL BE REMOVED, FILLED WITH SUITABLE SUBGRADE FILL, AND COMPACTED. EROSION FEATURES SUCH AS RILLS AND GULLIES MUST BE GRADED OUT OF THE SURFACE BEFORE GEOTEXTILE PLACEMENT.
3. AT THE TIME OF INSTALLATION, FABRIC SHALL BE REJECTED IF IT HAS DEFECTS, RIPS, HOLES, FLAWS, DETERIORATION OR DAMAGE INCURRED DURING MANUFACTURE, TRANSPORTATION OR STORAGE.
4. PLACE FABRIC WITH THE LONG DIMENSION PARALLEL TO THE CENTERLINE OF THE ACCESS ROAD AND LAY SMOOTH AND FREE OF TENSION, STRESS, FOLDS, WRINKLES, OR CREASES.

EROSION AND SEDIMENTATION CONTROL PLAN:

THIS PLAN HAS BEEN DEVELOPED TO PROVIDE A STRATEGY FOR CONTROLLING SOIL EROSION AND SEDIMENTATION DURING AND AFTER CONSTRUCTION OF THE PROPOSED PROJECT.

THIS PLAN IS BASED ON STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION IN DEVELOPING AREAS AS CONTAINED IN 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

GENERAL EROSION AND SEDIMENTATION CONSTRUCTION DETAIL NOTES:

DURING CONSTRUCTION THE CONTRACTOR SHALL TAKE ALL REASONABLE MEASURES TO SCHEDULE EARTHWORK OPERATIONS SUCH THAT THE AREA OF EXPOSED AND DISTURBED SOIL IS MINIMIZED. CONSTRUCTION SHALL BE PHASED TO REDUCE THE AREA OF DISTURBED SOIL AT ANY ONE TIME. UPGRADIENT STORMWATER DIVERSION AND DISPERSION MEASURES SHALL BE INSTALLED WHERE APPROPRIATE. AFTER ACHIEVING ROUGH GRADE OF A PORTION OF THE SITE AND PRIOR TO EXTENDING EARTHWORK OPERATIONS, THE CONTRACTOR SHALL STABILIZE DISTURBED AREAS BY LAYING DOWN TEMPORARY MULCH UNTIL FINAL GRADE IS REACHED. ALL CUT AND FILL SLOPES SHALL BE STABILIZED UPON COMPLETION. THE FOLLOWING MEASURES WILL BE UNDERTAKEN TO PROVIDE MAXIMUM PROTECTION TO THE SOIL, WATER, AND ABUTTING LANDS:

1. PRIOR TO GRUBBING OR ANY EARTH MOVING OPERATION, SEDIMENT BARRIERS, OR OTHER APPROPRIATE BEST MANAGEMENT PRACTICE (BMP) SHALL BE INSTALLED ACROSS THE SLOPE ON THE CONTOUR AT THE DOWNHILL LIMIT OF THE WORK AS PROTECTION AGAINST CONSTRUCTION RELATED EROSION. INSTALL ALL NECESSARY STORMWATER DIVERSIONS AND DISPERSION MEASURES.
2. PERMANENT SOIL EROSION CONTROL MEASURES FOR ALL SLOPES, OR ANY DISTURBED LAND AREA SHALL BE COMPLETED WITHIN FOURTEEN (14) CALENDAR DAYS AFTER FINAL GRADING HAS BEEN COMPLETED. WHEN IT IS NOT POSSIBLE OR PRACTICAL TO PERMANENTLY STABILIZE DISTURBED LAND, TEMPORARY EROSION CONTROL MEASURES SHALL BE IMPLEMENTED ON DISTURBED AREAS INCLUDING STOCKPILES WITHIN FOURTEEN (14) CALENDAR DAYS OF EXPOSURE OF SOIL OR FORMATION OF PILES UNLESS THESE AREAS ARE TO BE SUBSEQUENTLY SURFACED. ALL DISTURBED AREAS SHALL BE MULCHED FOR EROSION CONTROL UPON COMPLETION OF ROUGH GRADING.
3. ANY EXPOSED SLOPES 3:1 OR GREATER SHALL BE STABILIZED WITH EROSION CONTROL BLANKET TO PREVENT EROSION DURING CONSTRUCTION AND TO FACILITATE REVEGETATION AFTER TOPSOILING AND SEEDING. SEE DETAIL 4 ON C501.
4. EXISTING TOPSOIL SHALL BE SAVED, STOCKPILED, AND REUSED AS MUCH AS POSSIBLE ON SITE. SEDIMENT BARRIER SHALL BE INSTALLED AT THE BASES OF STOCKPILES AT THE DOWNHILL LIMITS TO PROTECT AGAINST EROSION. STOCKPILES SHALL BE STABILIZED BY SEEDING AND MULCHING UPON FORMATION OF THE PILES. UPGRADIENT OF THE STOCKPILES, STABILIZED DITCHES AND/OR BERMS SHALL BE CONSTRUCTED TO DIVERT STORMWATER RUNOFF AWAY FROM THE PILES.
5. INTERCEPTED SEDIMENT SHALL BE REMOVED AND SHALL BE DEPOSITED TO AN AREA THAT SHALL NOT CONTRIBUTE TO OFF-SITE SEDIMENTATION, AND SHALL BE PERMANENTLY STABILIZED.
6. ADDITIONAL EROSION CONTROL METHODS SHALL BE IMPLEMENTED IF CONSTRUCTION OCCURS AFTER DECEMBER 15TH. ALL DISTURBED AREAS SHALL BE MINIMIZED TO THE EXTENT POSSIBLE. PRIOR TO FREEZING, ADDITIONAL EROSION CONTROL DEVICES SHALL BE INSTALLED AS APPROVED BY THE ENGINEER. INSPECTION OF THESE EROSION CONTROL ITEMS SHALL BE FREQUENT, WITH PARTICULAR ATTENTION PAID TO WEATHER PREDICTIONS TO ENSURE THAT THESE MEASURES ARE PROPERLY IN PLACE TO HANDLE LARGE QUANTITIES OF RUNOFF RESULTING FROM HEAVY RAINS AND/OR EXCESSIVE THAWS.
7. GENERAL EROSION AND SEDIMENTATION CONTROL ACTIONS SHALL INCLUDE THE FOLLOWING:
   - MARK SOIL DISTURBANCE LIMITS
   - INSTALL SEDIMENT BARRIERS BEFORE DISTURBING ANY SOILS
   - DIVERT AND DISPERSE STORM WATER RUNOFF TO UNDISTURBED AREAS WHEREVER POSSIBLE
   - MULCH DISTURBED AREAS
   - PROTECT STEEP SLOPES
   - INSPECT AND REPAIR EROSION CONTROLS AND SEDIMENT BARRIERS
   - REMOVE ACCUMULATED SEDIMENT

DUST CONTROL:

1. CONSTRUCTION ACTIVITIES SHALL BE SCHEDULED SO THAT A MINIMUM AMOUNT OF OF DISTURBED SOIL IS EXPOSED AT ONE TIME.
2. DUST SHALL BE CONTROLLED ON CONSTRUCTION ROUTES AND OTHER DISTURBED AREAS SUBJECT TO SURFACE DUST MOVEMENT AND DUST BLOWING.
3. MAINTAIN DUST CONTROL MEASURES PROPERLY THROUGH DRY WEATHER PERIODS UNTIL ALL DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.
4. DUST CONTROL METHODS SHALL INCLUDE VEGETATIVE COVER, MULCH (INCLUDING GRAVEL MULCH), WATER SPRINKLING, STONE, AND BARRIERS.
5. VEGETATIVE COVER - FOR DISTURBED AREAS NOT SUBJECT TO TRAFFIC, VEGETATION PROVIDES THE MOST PRACTICAL METHOD OF DUST CONTROL.
6. MULCH (INCLUDING GRAVEL MULCH) - WHEN PROPERLY APPLIED, MULCH OFFERS A FAST, EFFECTIVE MEANS OF CONTROLLING DUST.
7. SPRINKLING - THE SITE MAY BE SPRINKLED WITH WATER UNTIL THE SURFACE IS WET. SPRINKLING IS ESPECIALLY EFFECTIVE FOR DUST CONTROL ON HAUL ROADS AND OTHER TRAFFIC ROUTES. THE GROUND SURFACE SHALL NOT BE WATERED EXCESSIVELY, RUNOFF SHALL NOT OCCUR.
8. STONE - USED TO STABILIZE CONSTRUCTION ROADS; CAN ALSO BE EFFECTIVE FOR DUST CONTROL.
9. BARRIERS - A BOARD FENCE, WIND FENCE, SEDIMENT FENCE, OR SIMILAR BARRIER CAN CONTROL AIR CURRENTS AND BLOWING SOIL. ALL OF THESE FENCES ARE NORMALLY CONSTRUCTED OF WOOD AND THEY PREVENT EROSION BY OBSTRUCTING THE WIND NEAR THE GROUND AND PREVENTING THE SOIL FROM BLOWING OFFSITE.

MONITORING PROGRAM:

1. EROSION AND SEDIMENTATION CONTROLS SHALL BE INSPECTED AT LEAST ONCE EVERY 7 CALENDAR DAYS, OR EVERY 14 CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT OF 0.25 INCHES OR GREATER. ALL STRUCTURES DAMAGED BY CONSTRUCTION EQUIPMENT, VANDALS, OR THE ELEMENTS SHALL BE REPAIRED IMMEDIATELY. ALL DAMAGED STRUCTURES SHALL BE REPAIRED AND/OR ADDITIONAL EROSION CONTROL STRUCTURES SHALL BE INSTALLED PRIOR TO CONTINUING THE CONSTRUCTION. TRAPPED SEDIMENT SHALL BE REMOVED BEFORE IT HAS ACCUMULATED TO ONE-HALF FOOT DEEP AT THE INSTALLED SEDIMENT BARRIER. DEVICES NO LONGER SERVICEABLE DUE TO SEDIMENT ACCUMULATION SHALL ALSO BE REPAIRED AND/OR REPLACED AS REQUIRED. RUTTING OR EXPOSED SOIL SHALL BE REPAIRED TO PREVENT EROSION AND OTHERWISE MITIGATED AS NECESSARY TO MINIMIZE FUTURE EROSION.
2. FOLLOWING THE FINAL SEEDING, THE SITE SHALL BE INSPECTED TO ENSURE THAT THE VEGETATION HAS BEEN ESTABLISHED (70% COVER ACHIEVED). IN THE EVENT OF ANY UNSATISFACTORY GROWTH, RESEEDING WILL BE CARRIED OUT, WITH FOLLOW-UP INSPECTION.
3. AFTER THE CONSTRUCTION INSPECTOR HAS DETERMINED THAT THE PROJECT AREA HAS BEEN STABILIZED, THE CONTRACTOR SHALL REMOVE ALL SEDIMENT BARRIERS, TEMPORARY SEDIMENTATION CONTROL RISERS, AND ANY OTHER TEMPORARY EROSION CONTROL MEASURES.

SEEDING AND REVEGETATION PLAN:

UPON COMPLETION OF SITE CONSTRUCTION, ALL AREAS PREVIOUSLY DISTURBED SHALL BE TREATED AS STATED BELOW. THESE AREAS WILL BE CLOSELY MONITORED BY THE CONTRACTOR UNTIL SUCH TIME AS A SATISFACTORY GROWTH OF VEGETATION IS ESTABLISHED. SATISFACTORY GROWTH SHALL MEAN A MINIMUM OF 70% OF THE AREA IS VEGETATED WITH VIGOROUS GROWTH.

1. TOPSOIL WILL BE SPREAD OVER ALL DISTURBED AREAS TO BE REVEGETATED AND SHALL BE GRADED TO A DEPTH OF FOUR (4) TO SIX (6) INCHES.
2. FERTILIZER AT A 10-10-10 PROPORTION SHALL BE MIXED WITH HYDROSEED (AND LIME, IF REQUIRED) AT A RATE OF 300 LBS. PER ACRE.
3. WOOD FIBER MULCH SHALL BE APPLIED AT A RATE OF 2,000 LBS. PER ACRE FOR MAXIMUM MOISTURE RETENTION RESULTS.
4. DISTURBED AREAS SHALL BE SEEDED USING ONE OF THE FOLLOWING MIXES AS DIRECTED BY THE OWNER AND ENGINEER DEPENDING ON THE TIME OF YEAR AND AMOUNT OF SEEDING REQUIRED:

   4.1 CT PERMANENT SEED MIX: AT THE RATE OF 1 LB. PER 1,000 SQ. FT. OF THE FOLLOWING MIXTURE: 45% KENTUCKY BLUEGRASS, 45% CREEPING RED FESCUE, AND 10% PERENNIAL RYEGRASS (CTDEEP PERMANENT SEED MIX. NO. 1). SEEDING SHOULD BE PLANTED TO A DEPTH OF 1/4 TO 1/2 INCHES. SEEDING METHODS MAY BE DRILL SEEDINGS, BROADCASTS AND ROLLED, CULTIPACKED, OR TRACKED WITH A SMALL TRACK PIECE OF CONSTRUCTION EQUIPMENT, OR HYDROSEEDING, WITH SUBSEQUENT TRACKING. TACKIFIER SHALL BE USED IN HYDROSEED TO HELP IT ADHERE TO THE SOIL AND ANY SLOPES PROPERLY.
5. SEEDING SHALL BE COMPLETED BETWEEN THE DATES OF APRIL 1 THROUGH JUNE 15 AND AUGUST 15 THROUGH OCTOBER 1. WATERING MAY BE REQUIRED DURING DRY PERIODS.
6. STEEP SLOPES (3:1 AND STEEPER), IF ENCOUNTERED, SHALL BE STABILIZED BY INSTALLING EROSION CONTROL BLANKET (E.G., NORTH AMERICAN GREEN OR EXCELSIOR). SEE DETAIL 4 ON C501.
7. IF FINAL SEEDING OF THE DISTURBED AREA IS NOT COMPLETED BY OCTOBER 1ST OF THE YEAR OF CONSTRUCTION THEN, WITHIN THE NEXT 10 CALENDAR DAYS, THESE AREAS SHALL BE GRADED AND SMOOTHED, THEN SEEDED TO A WINTER COVER CROP OF WINTER RYE AT A RATE OF 3 LBS. PER 1,000 SQ. FT. THE FOLLOWING SHALL BE INCORPORATED INTO THE SOIL PRIOR TO WINTER RYE SEEDING: GROUND LIMESTONE AT A RATE OF 100 LBS. PER 1,000 SQ. FT., FOLLOWED BY A 10-10-10 FERTILIZER AT A RATE OF 14 LBS. PER 1,000 SQ. FT. HAY MULCH SHALL BE APPLIED AT A RATE OF 100 LBS. PER 1,000 SQ. FT. FOLLOWING SEEDING. IF THE WINTER RYE SEEDING CANNOT BE COMPLETED BY OCTOBER 1, OR DOES NOT MAKE ADEQUATE GROWTH BY NOVEMBER 1, THEN ON THAT DATE, HAY MULCH SHALL BE APPLIED AT THE RATE OF 100 LBS. PER 1,000 SQ. FT. A SUITABLE BINDER SUCH AS CURASOL OR RMB PLUS SHALL BE USED ON HAY MULCH FOR WIND CONTROL. EROSION CONTROL BLANKET WILL BE INSTALLED ON STEEP SLOPES (3:1 AND STEEPER) AND ON AREAS OF CONCENTRATED FLOWS.
8. INSPECT SEEDED AREAS FOR FAILURE AND MAKE NECESSARY REPAIRS AND RESEED IMMEDIATELY. CONDUCT A FOLLOW-UP SURVEY AFTER ONE YEAR AND RESEED WHERE NECESSARY.
9. IF THERE ARE AREAS WITH LESS THAN 40% COVER, REEVALUATE CHOICE OF PLANT MATERIALS AND QUANTITIES OF LIME AND FERTILIZER. IF THE SEASON PREVENTS RESEWING, MULCH OR JUTE NETTING IS AN EFFECTIVE TEMPORARY COVER.
10. SEEDED AREAS SHOULD BE FERTILIZED DURING THE SECOND GROWING SEASON.
11. LIME AND FERTILIZE THEREAFTER AT PERIODIC INTERVALS, AS NEEDED.
12. ALL SEDIMENT CONTROL STRUCTURES WILL REMAIN IN PLACE UNTIL VEGETATION IS ESTABLISHED. ESTABLISHED MEANS A MINIMUM OF 70%, OF THE AREA IS VEGETATED WITH VIGOROUS GROWTH AS DETERMINED BY THE ENGINEER.

NOT FOR CONSTRUCTION

Project:

PROPOSED SOLAR
PV DEVELOPMENT

92 UPPER ROAD
STAFFORD, CT 06076

Weston & Sampson

WESTON & SAMPSON ENGINEERS, INC.
712 BROOK STREET, SUITE 103
ROCKY HILL, CT 06067
860.513.1473 800.SAMPSON
www.westonandsampson.com

Applicant:

VEROGY

VCP Stafford, LLC
124 LaSalle Road
2nd Floor
West Hartford, CT 06107
TEL: (860) 288-7215
WWW.VEROGY.COM

Revisions:

No.	Date	Description
0	03/14/2024	ISSUED FOR PERMITTING

Seal:

Issued For:

PERMITTING

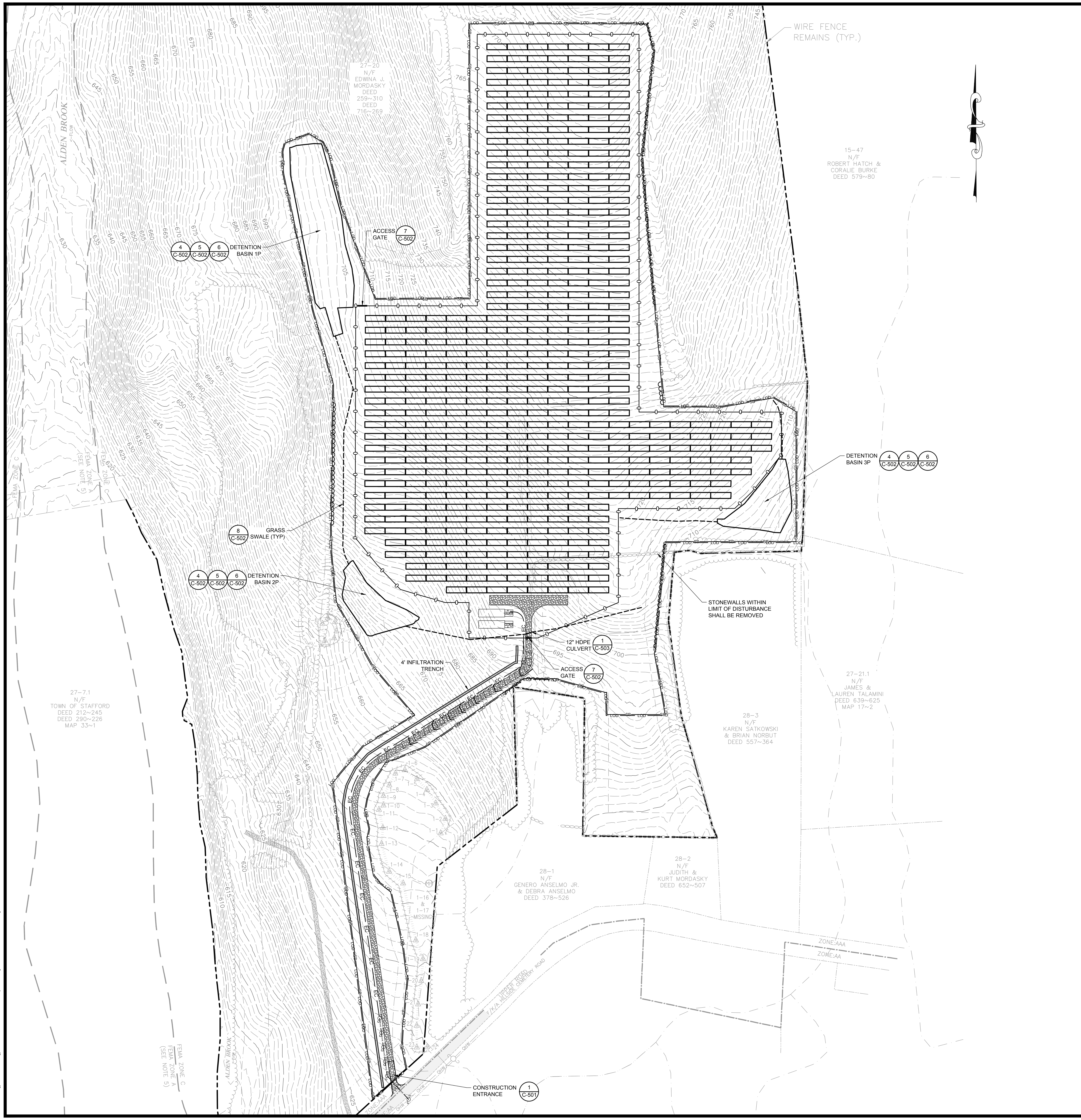
Scale:	AS SHOWN
Date Created:	03/14/2024
Drawn By:	DED
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG23-3034
W&S File No.:	VEROGY STAFFORD

Drawing Title:

NOTES AND SPECIFICATIONS

Sheet Number:

C001



NOTES:

1. ELECTRICAL DESIGN, INCLUDING UTILITY POLES, PERFORMED BY OTHERS. ELECTRICAL EQUIPMENT AND COMPONENTS SHOWN TO ILLUSTRATE LOCATIONS ONLY. REFER TO ELECTRICAL DRAWINGS FOR DETAILED ELECTRICAL SYSTEM INFORMATION.
2. SOLAR ARRAY LAYOUT IS SUBJECT TO FINAL DESIGN BUT WILL REMAIN WITHIN THE PROPOSED LIMITS OF WORK. PROPOSED FENCE MAY BE RELOCATED BEYOND THE LIMIT OF WORK PENDING FINAL DESIGN.
3. THE CONSTRUCTION ENTRANCE SHALL BE REMOVED UPON SUBSTANTIAL COMPLETION OF THE PROJECT. FOLLOWING REMOVAL, THE CONTRACTOR SHALL FINALIZE CONSTRUCTION OF THE PROPOSED ACCESS ROAD.
4. SEDIMENT TRAPS (SEE DETAIL 6, C501) SHALL BE INSTALLED AT ALL DETENTION BASIN LOCATIONS DURING CONSTRUCTION, PRIOR TO SITE RESTORATION.

EXISTING LEGEND:

- PROPERTY LINE
- ABUTTER'S PROPERTY LINE
- 50' PROPERTY LINE OFFSET
- 1480 MAJOR CONTOUR
- MINOR CONTOUR
- WETLAND LINE
- 10' WETLANDS BUFFER
- 50' WETLANDS BUFFER
- 100' WETLANDS BUFFER
- 100' UPLAND REVIEW AREA
- TREE LINE
- FEMA FLOOD ZONE LINE
- ZONING LINE
- OHW OVERHEAD WIRES
- STONEWALL
- UTILITY POLE
- MANHOLE
- 1-23 WETLAND FLAG WITH IDENTIFIER

PROPOSED LEGEND:

- LOD LIMIT OF DISTURBANCE
- TREE CLEARING LINE
- SB SEDIMENT BARRIER 3 C-501
- 700 MAJOR CONTOUR
- MINOR CONTOUR
- FENCE 6 C-502
- EC ELECTRIC CONDUIT 2 C-502
- OHE OVERHEAD ELECTRIC
- GRAVEL ACCESS ROAD 3 C-502
- SOLAR PV RACK AND PANELS 1 C-502
- UTILITY POLE
- EQUIPMENT PADS 4 C-502

0 50' 100' 200'
1" = 100' HORIZONTAL

NOT FOR CONSTRUCTION

Project:

PROPOSED SOLAR PV DEVELOPMENT

92 UPPER ROAD
STAFFORD, CT 06076

Weston & Sampson

WESTON & SAMPSON ENGINEERS, INC.
712 BROOK STREET, SUITE 103
ROCKY HILL, CT 06067
860.513.1473 800.SAMPSON
www.westonandsampson.com

Applicant:

VEROGY

VCP Stafford, LLC
124 LaSalle Road
2nd Floor
West Hartford, CT 06107
TEL: (860) 288-7215
WWW.VEROGY.COM

Revisions:

No.	Date	Description
0	03/14/2024	ISSUED FOR PERMITTING

Seal:

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Scale:	AS SHOWN
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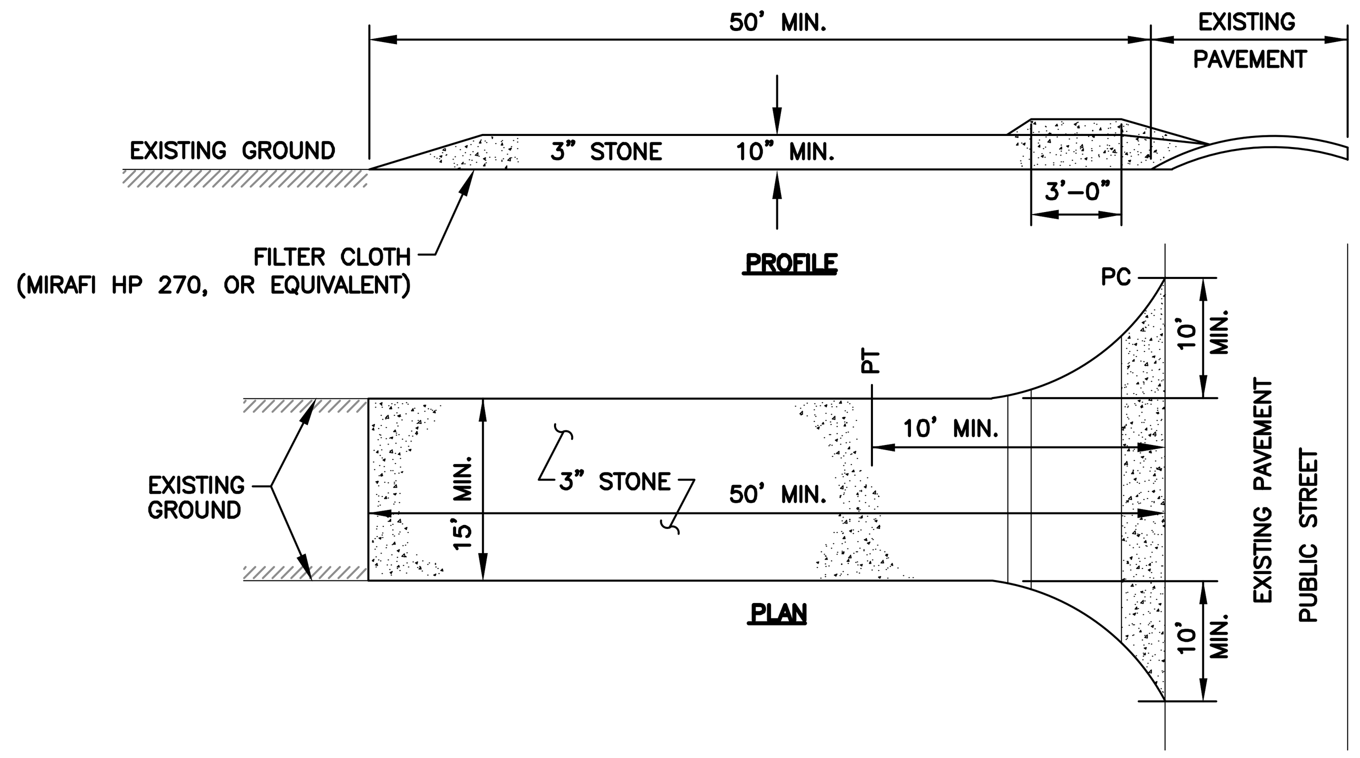
Drawn By:	DED
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG23-3034
W&S File No.:	VEROGY STAFFORD

Drawing Title:

PROPOSED SITE PLAN

Sheet Number:

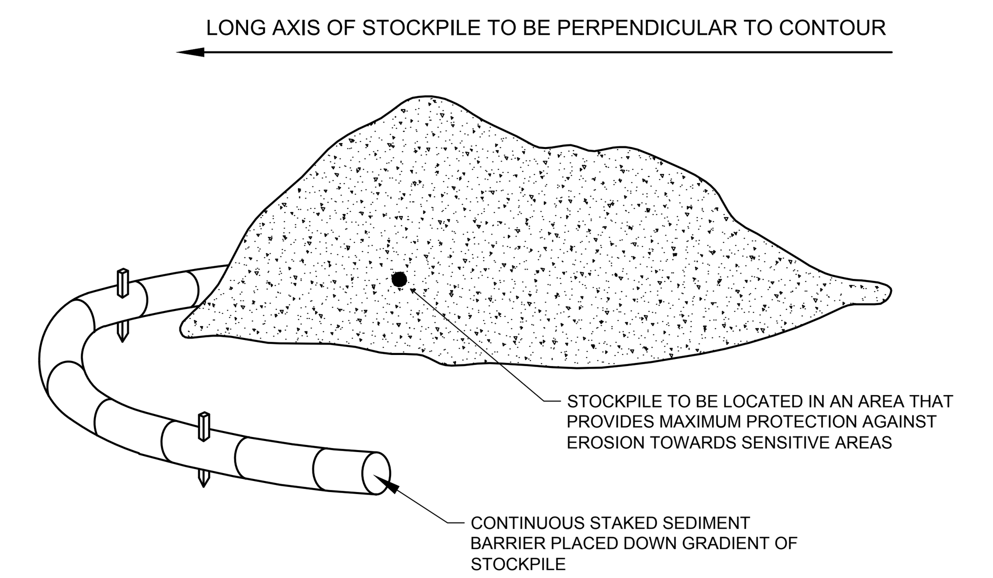
C101



STABILIZED CONSTRUCTION ENTRANCE NOTES:

1. FILTER CLOTH - WILL BE PLACED OVER THE ENTIRE AREA FOLLOWING GRADING (AS NEEDED) TO LEVEL PAD PRIOR TO PLACING OF STONE.
2. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
3. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED BY THE CONTRACTOR IMMEDIATELY.
4. WASHING - WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
5. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.
6. AT THE CONCLUSION OF PROJECT, ANY ACCUMULATED SEDIMENT SHALL BE DISPOSED OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS. REMOVAL OF ANTI-TRACKING PAD SHALL BE AT NO ADDITIONAL COST TO THE OWNER.
7. P.C. = POINT OF CURVATURE
8. P.T. = POINT OF TANGENCY

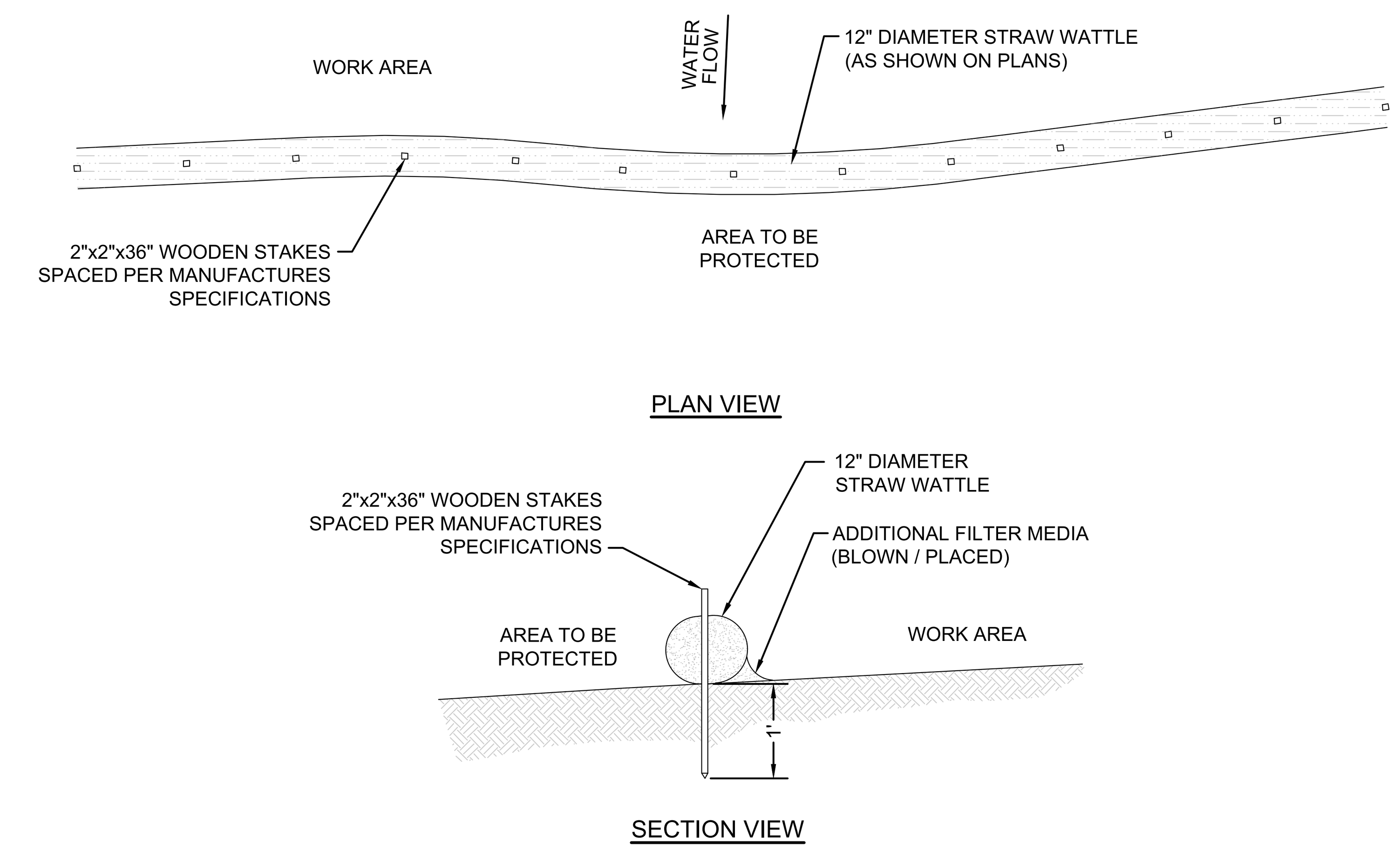
1 CONSTRUCTION ENTRANCE
SCALE: N.T.S.



NOTES:

1. STOCKPILE AREAS SHALL BE LOCATED OUTSIDE OF WETLANDS AND 100FT WETLAND BUFFERS, AND OFF THE EXISTING LANDFILL CAP AT THE SITE.

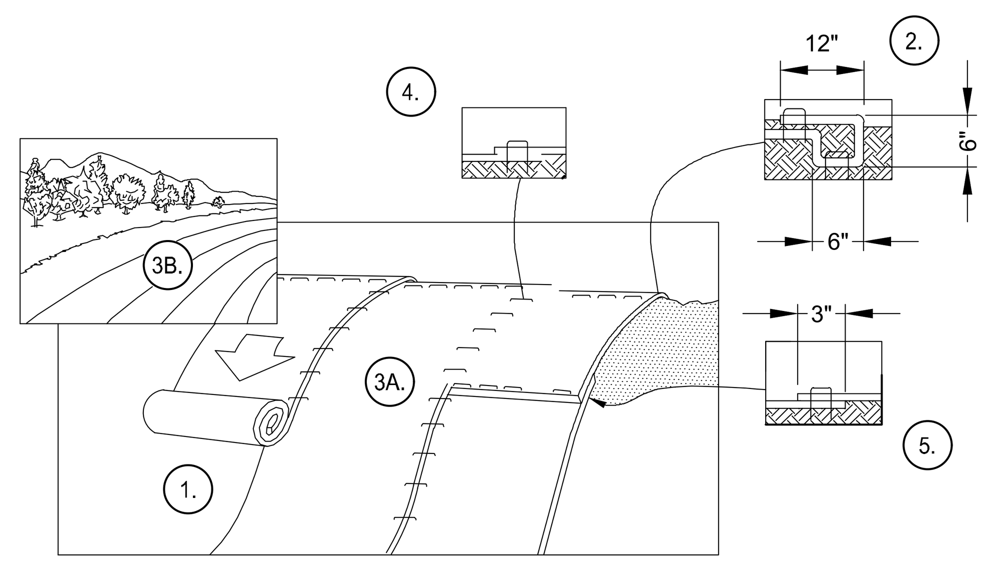
2 TEMPORARY STOCKPILE
SCALE: N.T.S.



NOTES:

1. COMPOST MATERIAL TO BE DISPERSED ON SITE AS DETERMINED BY ENGINEER.

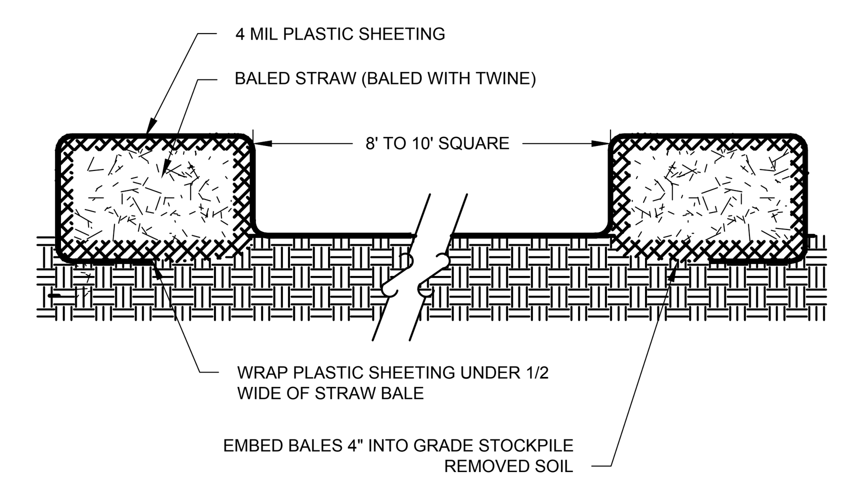
3 COMPOST SOCK SEDIMENT CONTROL BARRIER
SCALE: N.T.S.



NOTES:

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE BLANKET.
3. ROLL THE BLANKETS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING OPTIONAL DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2"-5" OVERLAP DEPENDING ON BLANKET TYPE. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE PREVIOUSLY INSTALLED BLANKET.
5. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE BLANKET WIDTH.
6. ALL 3H:1V SLOPES SHALL BE STABILIZED WITH EROSION CONTROL BLANKETING. BLANKETING SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.
7. ALL SLOPES STEEPER THAN 3H:1V SHALL BE STABILIZED WITH PERMANENT TURF REINFORCEMENT MATTING OR RIPRAP.

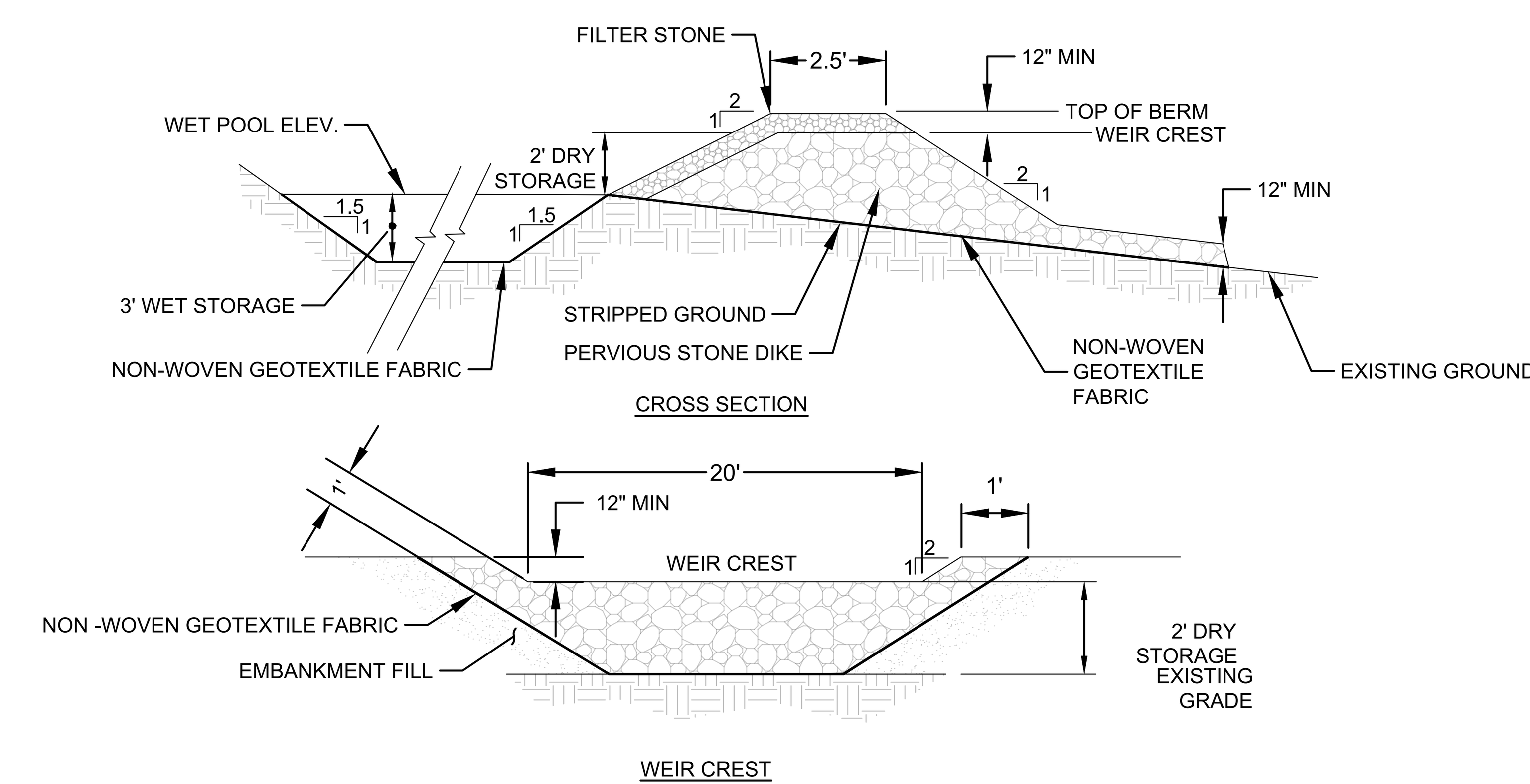
4 TEMPORARY EROSION CONTROL BLANKET
SCALE: N.T.S.



NOTES:

1. PLASTIC SHEETING SHALL BE FREE OF TEARS OR HOLES. AFTER BASIN IS USED, WASHWATER FROM WASHOUT BASIN SHALL EVAPORATE OR BE VACUUMED OUT. REMOVE REMAINING HARDENED SOLIDS. REPLACE PLASTIC SHEETING AND STRAWBALES AS REQUIRED.

5 CONCRETE WASHOUT BASIN
SCALE: N.T.S.



NOTES:

1. STORMWATER BASIN LOCATIONS SHALL BE USED AS SEDIMENT TRAPS DURING CONSTRUCTION. SEDIMENT TRAPS SHALL BE REMOVED AND OVER EXCAVATED BY 1FT PRIOR TO INSTALLATION / CONSTRUCTION OF PERMANENT STORMWATER BASIN

6 SEDIMENT TRAP DETAIL
SCALE: N.T.S.

NOT FOR CONSTRUCTION

Project:
PROPOSED SOLAR PV DEVELOPMENT

92 UPPER ROAD
STAFFORD, CT 06076

Weston & Sampson
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712 BROOK STREET, SUITE 103
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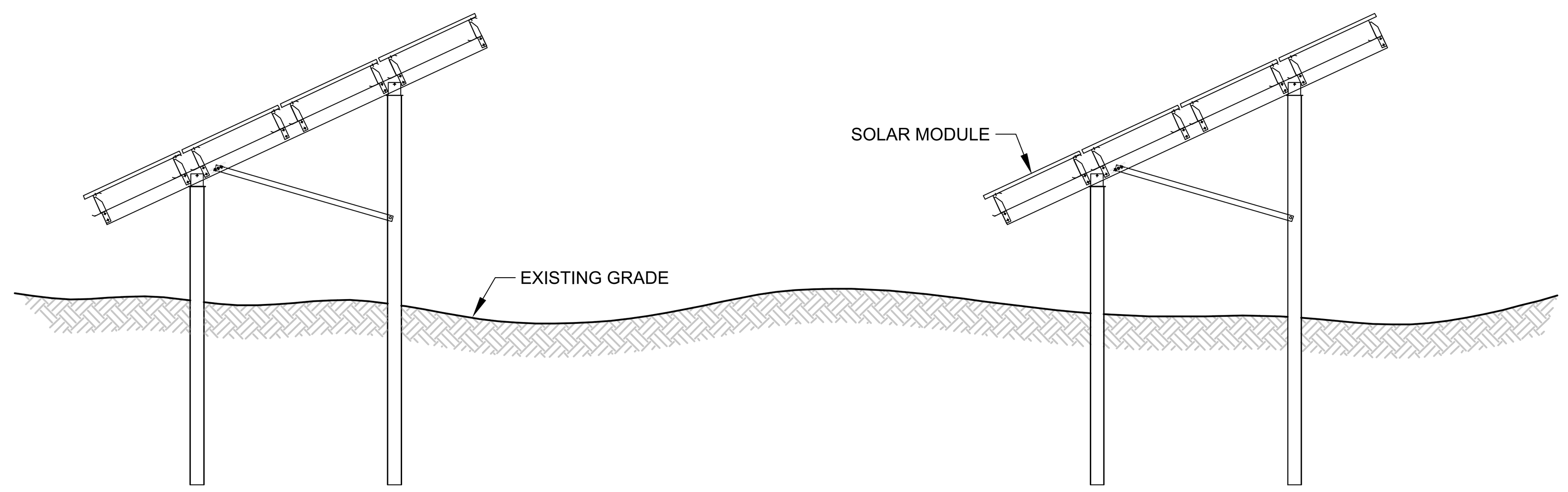
DETAILS I

Sheet Number:
C501

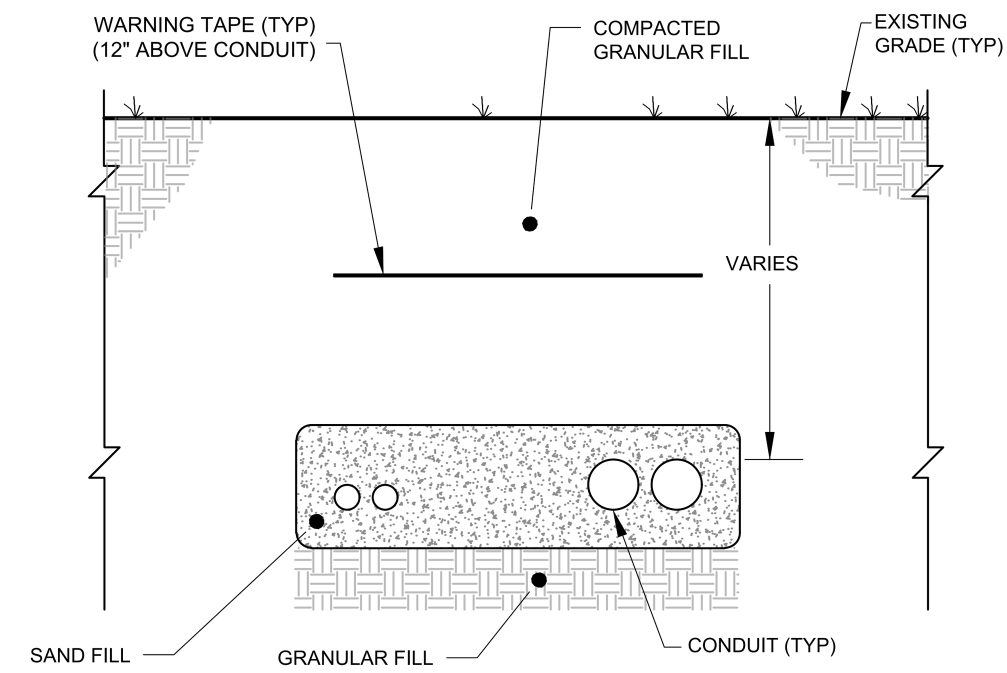


NOTE:

1. DESIGN FOR FOUNDATIONS, RACKING, AND MODULES BY OTHERS. DETAIL SHOWN FOR ILLUSTRATION PURPOSES ONLY.

1 TYPICAL PILE DRIVEN SOLAR RACKING SYSTEM DETAIL

SCALE: N.T.S.

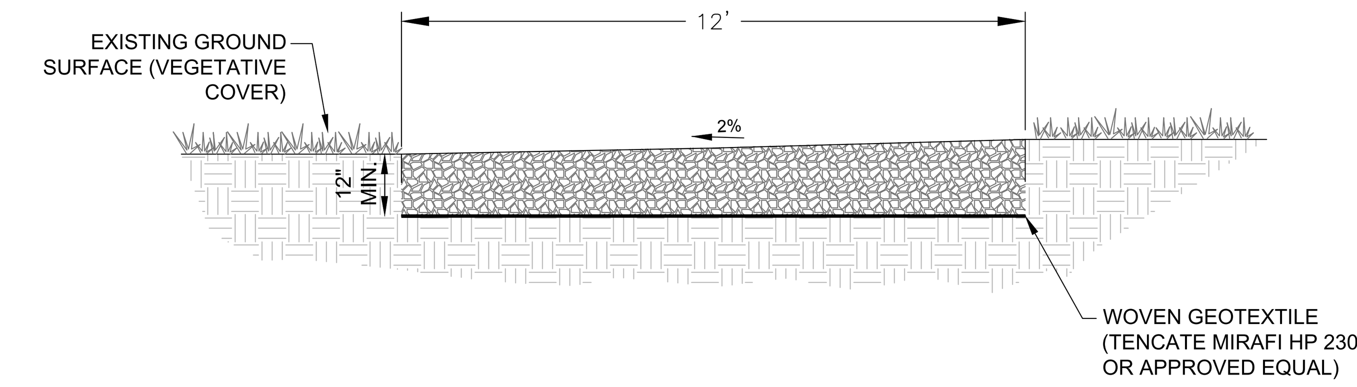


NOTES:

1. TRENCH SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. ELECTRICAL DESIGN AND CONFORMANCE WITH ELECTRICAL CODE REQUIREMENTS BY OTHERS.

2 TYPICAL BELOW GRADE CONDUIT DETAIL

SCALE: N.T.S.

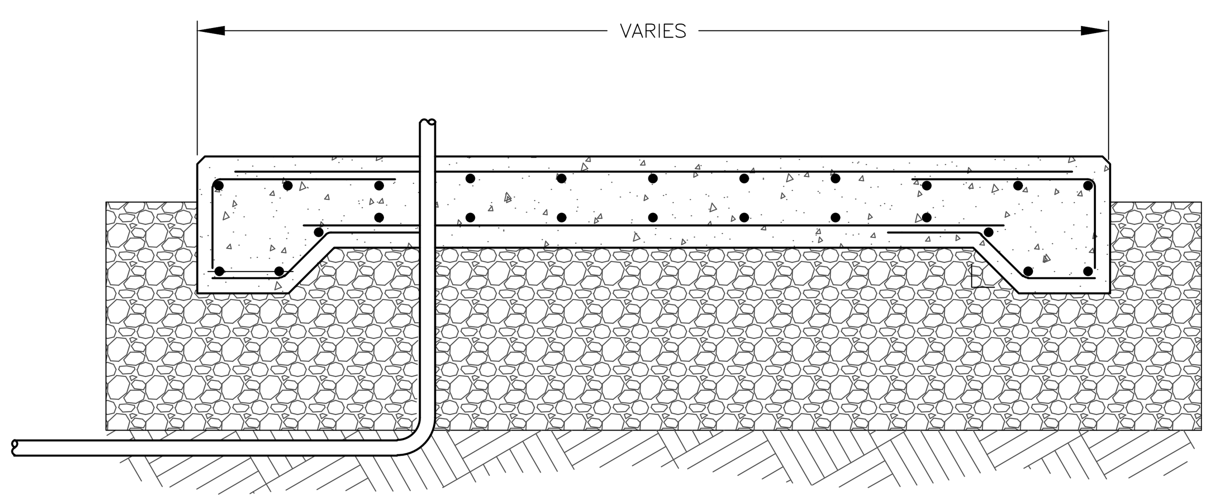


NOTES:

1. ACCESS ROAD TO BE CONSTRUCTED OF A MINIMUM 12" OF CRUSHED GRAVEL. SEE C001 FOR MATERIAL SPECIFICATIONS.
2. WOVEN GEOTEXTILE TO BE PLACED BETWEEN THE GROUND SURFACE AND THE CRUSHED STONE.
3. CRUSHED GRAVEL SHALL BE COMPACTED TO A FIRM AND NON-YIELDING CONDITION.
4. ROAD SHALL BE CONSTRUCTED SO THAT STORMWATER DOES NOT CONCENTRATE ON THE ROAD SURFACE AND IS DISTRIBUTED IN SHEET FLOW TO VEGETATED SHOULDERS OR THE GRASS SWALE WHERE AVAILABLE.
5. A GEOTECHNICAL INVESTIGATION AND EVALUATION SHALL BE PERFORMED PRIOR TO ROAD CONSTRUCTION TO ASSESS SLOPE STABILITY OF THE PROPOSED ACCESS ROAD.

3 GRAVEL ACCESS ROAD

NOT TO SCALE

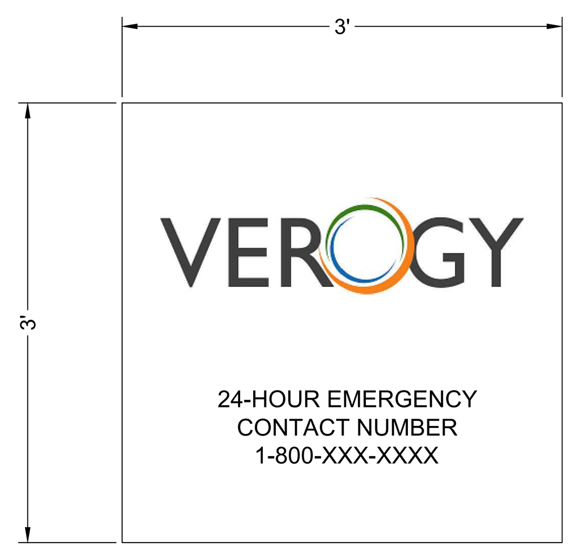


NOTES:

1. DETAIL IS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. FINAL FOUNDATION DESIGN TO BE PROVIDED PRIOR TO CONSTRUCTION.

4 TYPICAL CONCRETE EQUIPMENT PAD SECTION

SCALE: N.T.S.

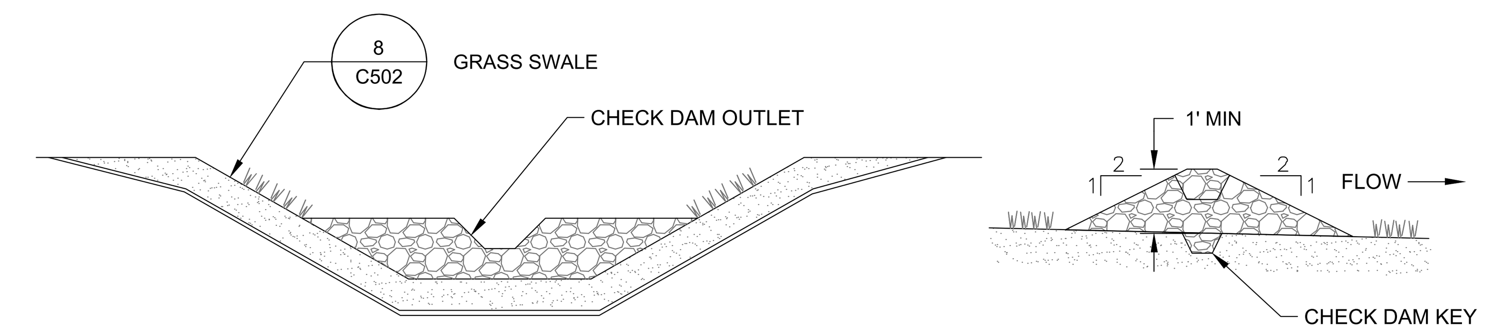


NOTES:

1. CONTRACTOR SHALL VERIFY CONTACT INFORMATION PRIOR TO CONSTRUCTION.

5 CONTRACTOR INFORMATION SIGN

SCALE: N.T.S.

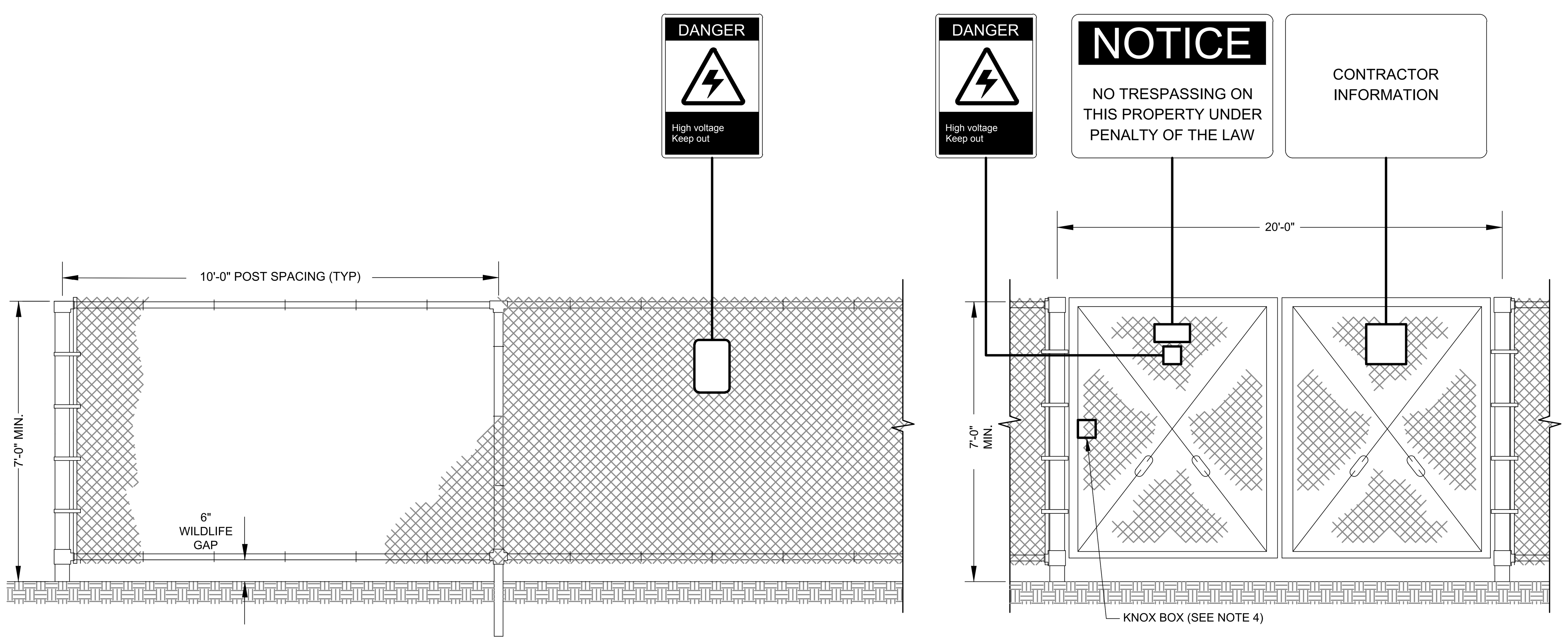


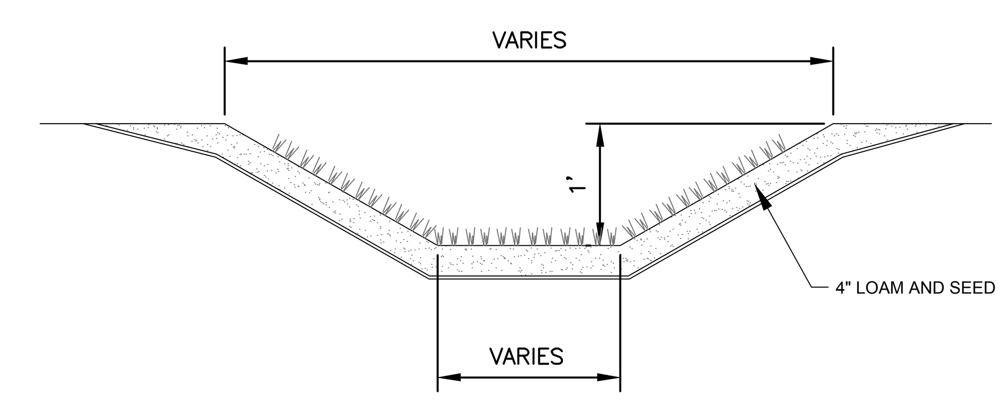
NOTES:

1. CHECK DAM TO BE COMPRISED OF WELL GRADED CRUSHED ROCK WITH A MAXIMUM DIAMETER OF 6 INCHES AND A MINIMUM DIAMETER OF 1 INCH.
2. HEIGHT OF CHECK DAM TO BE HALF THE HEIGHT OF THE GRASS SWALE.
3. CHECK DAM OUTLET TO BE HALF THE HEIGHT OF THE CHECK DAM.
4. 2:1 SIDE SLOPES ON SIDES PERPENDICULAR TO FLOW.
5. CHECK DAM KEY TO BE A MINIMUM OF 4 INCHES X 4 INCHES AND SPAN ENTIRE WIDTH OF CHECK DAM BASE.

6 GRAVEL CHECK DAM

SCALE: N.T.S.





NOTES:

1. STONE CHECK DAMS SHALL BE INSTALLED EVERY 100 FEET.

8 GRASS SWALE

SCALE: N.T.S.

NOTES:

1. FENCE SHALL MEET OR EXCEED THE CHAIN LINK FENCE MANUFACTURER (CLFM) GUIDELINES FOR SECURITY AND CHAIN LINK FENCE MATERIALS AND INSTALLATION.
2. SECURITY FENCE AROUND THE SITE SHALL BE CONTINUOUS AND 7'-0" (MINIMUM) PER THE NEC 110.31.
3. THE SECURITY FENCE SHALL BE GROUNDED IN ALL AREAS WHERE THE PV MODULES ARE LOCATED LESS THAN 10'-0" FROM THE FENCE TO LIMIT THE RISE OF HAZARDOUS VOLTAGE (IF APPLICABLE).
4. ALL GATES TO BE INSTALLED WITH KNOX BOX AND SIGNAGE WITH EMERGENCY CONTACT INFORMATION (TYP). KNOX BOX KEY SHALL BE GIVEN TO THE TOWN OF STAFFORD FIRE DEPARTMENT.
6. FENCE POST DESIGN BY OTHERS.

7 TYPICAL POST DRIVEN CHAIN LINK FENCE AND GATE DETAIL

SCALE: N.T.S.

NOT FOR CONSTRUCTION

Project:

PROPOSED SOLAR PV DEVELOPMENT

92 UPPER ROAD
STAFFORD, CT 06076

Weston & Sampson

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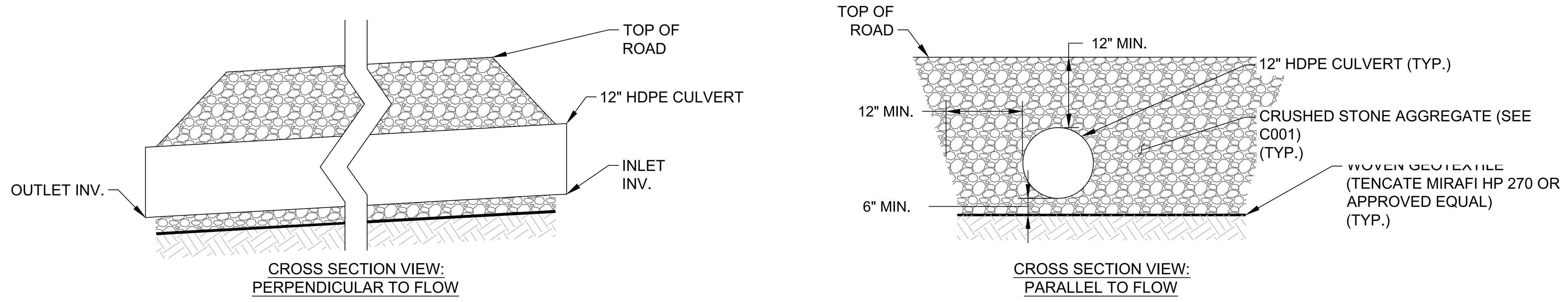
Drawing Title:

DETAILS II

Sheet Number:

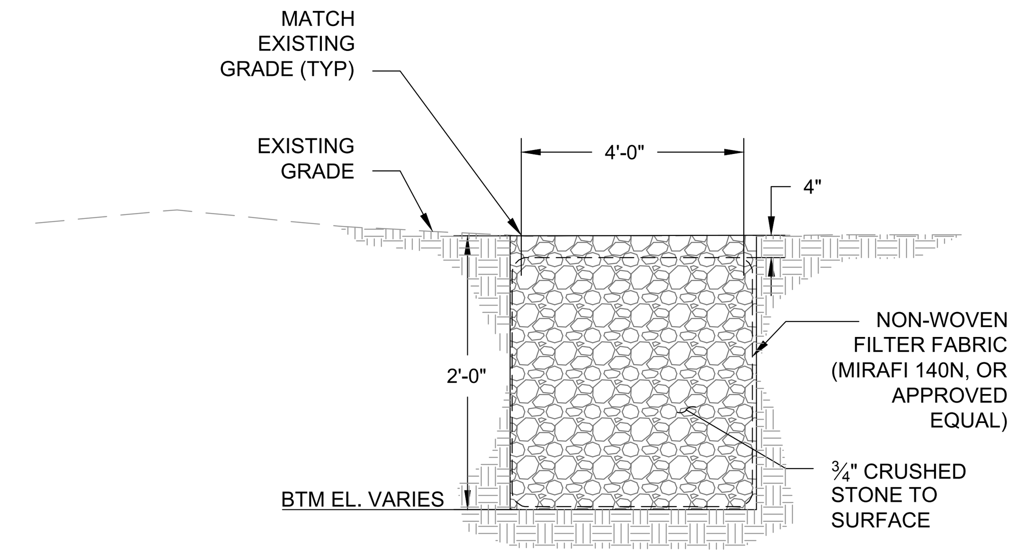
C502



NOTES:

1. SEE ACCESS ROAD DETAIL (#3 - C502) FOR ACCESS ROAD NOTES.

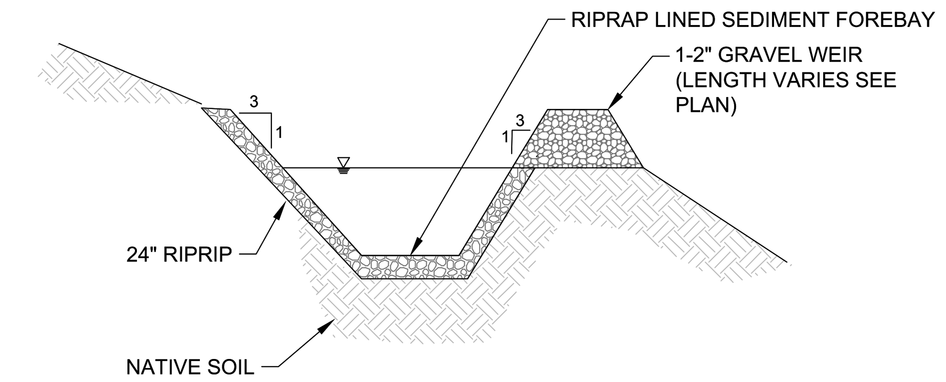
1 12 INCH CULVERT CROSSING
NOT TO SCALE



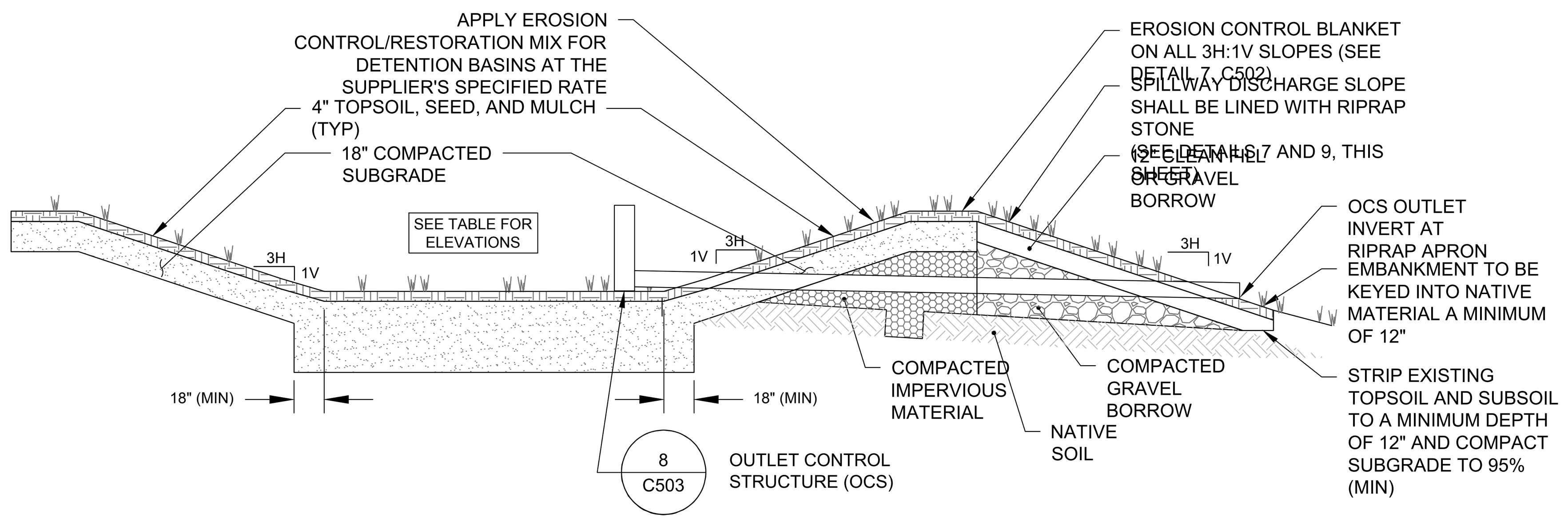
NOTES:

1. FINAL GRADE OF TRENCH SHALL MATCH EXISTING GRADE.

2 INFILTRATION TRENCH
NOT TO SCALE



3 SEDIMENT FOREBAY
NOT TO SCALE

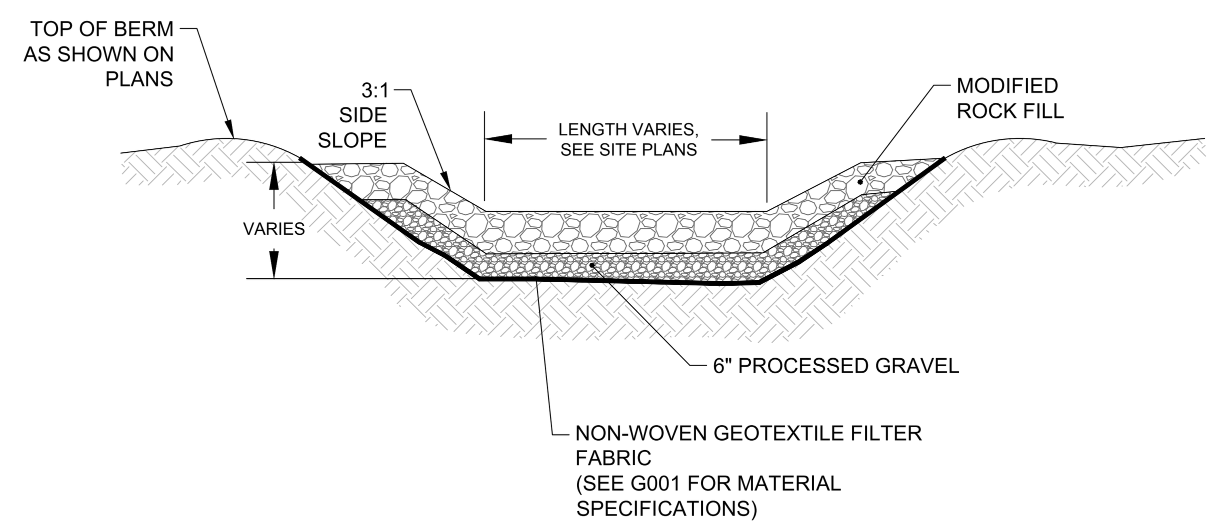


STORMWATER BASIN			
BASIN ID	BOTTOM	TOP OF BERM	SPILLWAY
	(ELEV FT)	(ELEV FT)	(ELEV FT)
1P	702	706	705
2P	672	675	674
3P	705	710	709

NOTES:

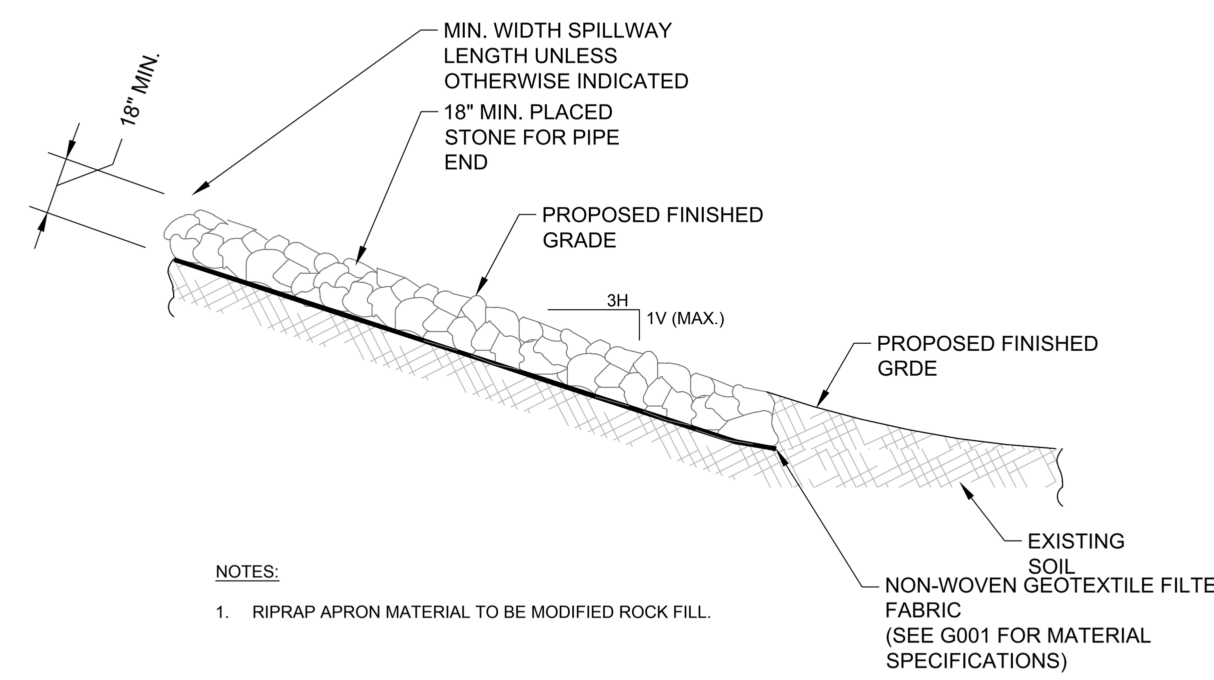
1. REMOVE VEGETATION, DEBRIS, ORGANIC MATERIALS, TOPSOIL, AND SUBSOIL TO A MINIMUM OF 12" BELOW EXISTING GRADE PRIOR TO EMBANKMENT CONSTRUCTION. COMPACTED EXPOSED SUBSOIL AND SCARIFY SURFACE.
2. IMPERVIOUS MATERIAL SHALL BE DENSE GRADED AND HAVE A PERMEABILITY OF $1X10^{-6}$ CM/S OR LESS, HAVE A PERCENTAGE OF MATERIALS PASSING THE NO. 200 SIEVE OF GREATER THAN 10%, AND AN EFFECTIVE GRAIN SIZE DIAMETER (D10) OF 0.05 MM OR LESS. IT SHALL BE FREE OF ORGANICS AND SHALL HAVE NO STONES GREATER THAN 2 IN.

4 DETENTION BASIN
NOT TO SCALE



BASIN ID	ELEVATION	LENGTH (FT)	WIDTH (FT)
1P	705	12	17.25
2P	674	12	11.75
3P	709	12	12

5 RIPRAP SPILLWAY
NOT TO SCALE



NOTES:

1. RIPRAP APRON MATERIAL TO BE MODIFIED ROCK FILL.

6 RIPRAP APRON AT SPILLWAY
NOT TO SCALE

NOT FOR CONSTRUCTION

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STAFFORD, CT 06076

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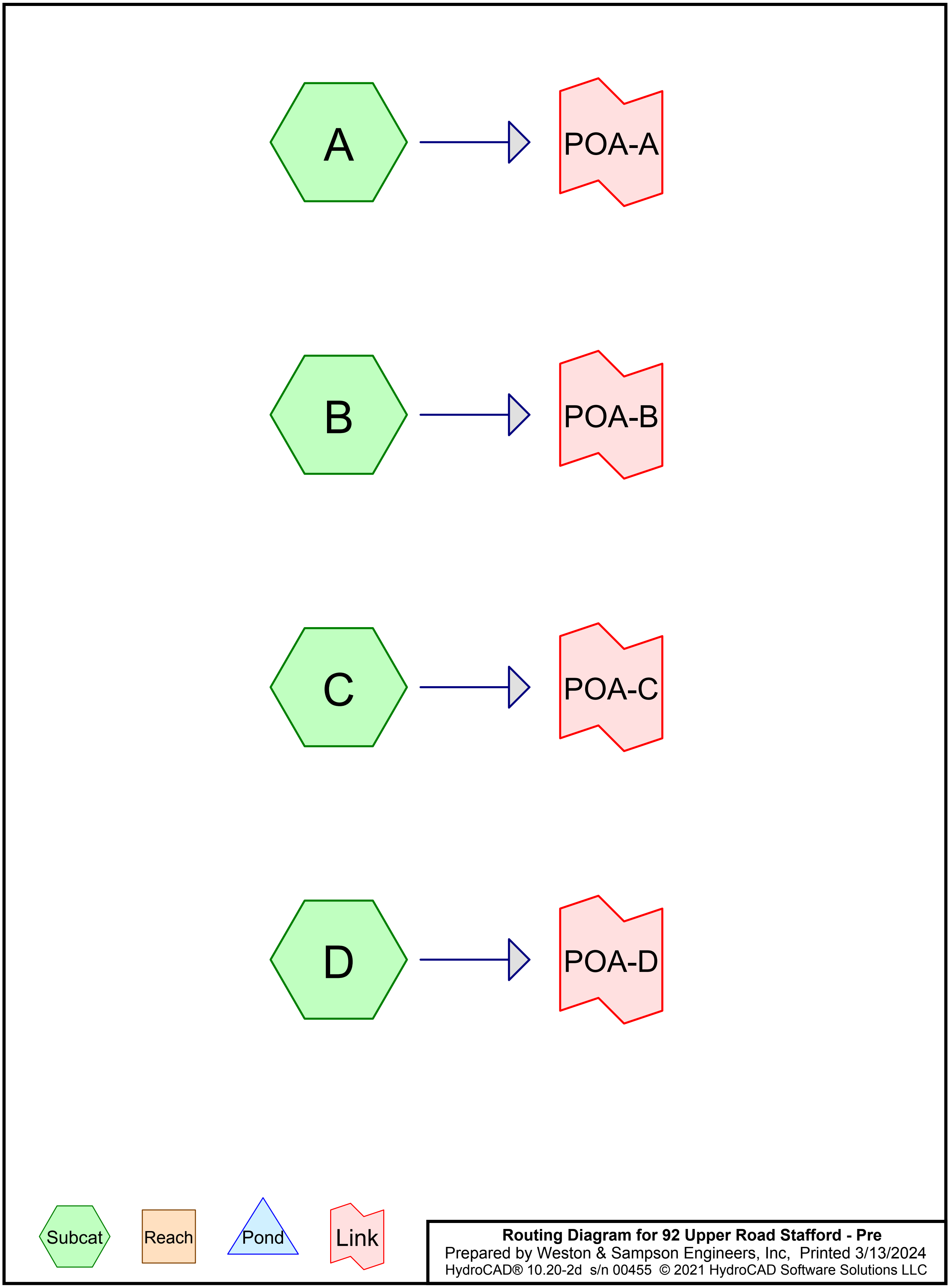
Drawing Title:

DETAILS III

Sheet Number:

C503

Appendix C – Preliminary Pre & Post Stormwater Calculations



Routing Diagram for 92 Upper Road Stafford - Pre
Prepared by Weston & Sampson Engineers, Inc, Printed 3/13/2024

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.686	61	>75% Grass cover, Good, HSG B (A)
19.813	74	>75% Grass cover, Good, HSG C (A, B, C, D)
7.539	80	>75% Grass cover, Good, HSG D (A, B)
6.278	55	Woods, Good, HSG B (A)
4.241	70	Woods, Good, HSG C (A, B, C, D)
3.227	77	Woods, Good, HSG D (A, B)
45.784	**71**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
10.963	HSG B	A
24.055	HSG C	A, B, C, D
10.766	HSG D	A, B
0.000	Other	
45.784		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	4.686	19.813	7.539	0.000	32.038	>75% Grass cover, Good	A, B, C, D
0.000	6.278	4.241	3.227	0.000	13.746	Woods, Good	A, B, C, D
0.000	**10.963**	**24.055**	**10.766**	**0.000**	**45.784**	**TOTAL AREA**	

Time span=6.00-30.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment A:	Runoff Area=1,517,513 sf 0.00% Impervious Runoff Depth=0.85" Flow Length=1,513' Tc=20.0 min CN=70 Runoff=20.87 cfs 2.472 af
Subcatchment B:	Runoff Area=248,473 sf 0.00% Impervious Runoff Depth=1.01" Flow Length=1,215' Tc=21.5 min CN=73 Runoff=4.10 cfs 0.479 af
Subcatchment C:	Runoff Area=99,980 sf 0.00% Impervious Runoff Depth=1.01" Flow Length=556' Tc=16.2 min CN=73 Runoff=1.85 cfs 0.193 af
Subcatchment D:	Runoff Area=128,381 sf 0.00% Impervious Runoff Depth=1.01" Flow Length=686' Tc=18.7 min CN=73 Runoff=2.24 cfs 0.248 af
Link POA-A:	Inflow=20.87 cfs 2.472 af Primary=20.87 cfs 2.472 af
Link POA-B:	Inflow=4.10 cfs 0.479 af Primary=4.10 cfs 0.479 af
Link POA-C:	Inflow=1.85 cfs 0.193 af Primary=1.85 cfs 0.193 af
Link POA-D:	Inflow=2.24 cfs 0.248 af Primary=2.24 cfs 0.248 af

Total Runoff Area = 45.784 ac Runoff Volume = 3.392 af Average Runoff Depth = 0.89"
100.00% Pervious = 45.784 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment A:

Runoff = 20.87 cfs @ 12.31 hrs, Volume= 2.472 af, Depth= 0.85"
Routed to Link POA-A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.24"

Area (sf)	CN	Description
204,104	61	>75% Grass cover, Good, HSG B
509,686	74	>75% Grass cover, Good, HSG C
328,384	80	>75% Grass cover, Good, HSG D
273,462	55	Woods, Good, HSG B
62,391	70	Woods, Good, HSG C
139,486	77	Woods, Good, HSG D
1,517,513	70	Weighted Average
1,517,513		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0700	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
2.1	200	0.0500	1.57		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
3.3	400	0.0825	2.01		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.3	189	0.1164	2.39		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.2	162	0.0988	2.20		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.4	61	0.2787	2.64		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
1.5	237	0.1435	2.65		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.6	164	0.1098	1.66		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
20.0	1,513	Total			

Summary for Subcatchment B:

Runoff = 4.10 cfs @ 12.33 hrs, Volume= 0.479 af, Depth= 1.01"
Routed to Link POA-B :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.24"

Area (sf)	CN	Description
190,995	74	>75% Grass cover, Good, HSG C
19	80	>75% Grass cover, Good, HSG D
56,389	70	Woods, Good, HSG C
1,070	77	Woods, Good, HSG D
248,473	73	Weighted Average
248,473		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
0.5	50	0.0600	1.71		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
9.2	693	0.0635	1.26		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
1.8	219	0.0868	2.06		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.2	153	0.0523	1.14		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
21.5	1,215	Total			

Summary for Subcatchment C:

Runoff = 1.85 cfs @ 12.25 hrs, Volume= 0.193 af, Depth= 1.01"
Routed to Link POA-C :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.24"

Area (sf)	CN	Description
74,691	74	>75% Grass cover, Good, HSG C
25,289	70	Woods, Good, HSG C
99,980	73	Weighted Average
99,980		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0900	0.14		**Sheet Flow, Sheet - Woods** Woods: Light underbrush n= 0.400 P2= 3.24"
0.1	13	0.1538	1.96		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
4.4	443	0.0587	1.70		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
16.2	556	Total			

Summary for Subcatchment D:

Runoff = 2.24 cfs @ 12.28 hrs, Volume= 0.248 af, Depth= 1.01"
Routed to Link POA-D :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.24"

Area (sf)	CN	Description
87,694	74	>75% Grass cover, Good, HSG C
40,687	70	Woods, Good, HSG C
128,381	73	Weighted Average
128,381		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0600	0.12		**Sheet Flow, Sheet - Woods** Woods: Light underbrush n= 0.400 P2= 3.24"
0.6	53	0.0755	1.37		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
0.3	46	0.1087	2.31		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.8	70	0.0857	1.46		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
1.6	187	0.0802	1.98		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.6	230	0.1174	2.40		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
18.7	686	Total			

Summary for Link POA-A:

Inflow Area = 34.837 ac, 0.00% Impervious, Inflow Depth = 0.85" for 2-yr event
Inflow = 20.87 cfs @ 12.31 hrs, Volume= 2.472 af
Primary = 20.87 cfs @ 12.31 hrs, Volume= 2.472 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-B:

Inflow Area = 5.704 ac, 0.00% Impervious, Inflow Depth = 1.01" for 2-yr event
Inflow = 4.10 cfs @ 12.33 hrs, Volume= 0.479 af
Primary = 4.10 cfs @ 12.33 hrs, Volume= 0.479 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-C:

Inflow Area =	2.295 ac,	0.00% Impervious,	Inflow Depth = 1.01"	for 2-yr event
Inflow =	1.85 cfs @	12.25 hrs,	Volume=	0.193 af
Primary =	1.85 cfs @	12.25 hrs,	Volume=	0.193 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-D:

Inflow Area =	2.947 ac,	0.00% Impervious,	Inflow Depth = 1.01"	for 2-yr event
Inflow =	2.24 cfs @	12.28 hrs,	Volume=	0.248 af
Primary =	2.24 cfs @	12.28 hrs,	Volume=	0.248 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Time span=6.00-30.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment A: Runoff Area=1,517,513 sf 0.00% Impervious Runoff Depth=2.10"
Flow Length=1,513' Tc=20.0 min CN=70 Runoff=56.51 cfs 6.106 af

Subcatchment B: Runoff Area=248,473 sf 0.00% Impervious Runoff Depth=2.35"
Flow Length=1,215' Tc=21.5 min CN=73 Runoff=10.17 cfs 1.118 af

Subcatchment C: Runoff Area=99,980 sf 0.00% Impervious Runoff Depth=2.35"
Flow Length=556' Tc=16.2 min CN=73 Runoff=4.57 cfs 0.450 af

Subcatchment D: Runoff Area=128,381 sf 0.00% Impervious Runoff Depth=2.35"
Flow Length=686' Tc=18.7 min CN=73 Runoff=5.57 cfs 0.577 af

Link POA-A: Inflow=56.51 cfs 6.106 af
Primary=56.51 cfs 6.106 af

Link POA-B: Inflow=10.17 cfs 1.118 af
Primary=10.17 cfs 1.118 af

Link POA-C: Inflow=4.57 cfs 0.450 af
Primary=4.57 cfs 0.450 af

Link POA-D: Inflow=5.57 cfs 0.577 af
Primary=5.57 cfs 0.577 af

Total Runoff Area = 45.784 ac Runoff Volume = 8.251 af Average Runoff Depth = 2.16"
100.00% Pervious = 45.784 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment A:

Runoff = 56.51 cfs @ 12.29 hrs, Volume= 6.106 af, Depth= 2.10"
Routed to Link POA-A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.09"

Area (sf)	CN	Description
204,104	61	>75% Grass cover, Good, HSG B
509,686	74	>75% Grass cover, Good, HSG C
328,384	80	>75% Grass cover, Good, HSG D
273,462	55	Woods, Good, HSG B
62,391	70	Woods, Good, HSG C
139,486	77	Woods, Good, HSG D
1,517,513	70	Weighted Average
1,517,513		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0700	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
2.1	200	0.0500	1.57		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
3.3	400	0.0825	2.01		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.3	189	0.1164	2.39		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.2	162	0.0988	2.20		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.4	61	0.2787	2.64		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
1.5	237	0.1435	2.65		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.6	164	0.1098	1.66		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
20.0	1,513	Total			

Summary for Subcatchment B:

Runoff = 10.17 cfs @ 12.31 hrs, Volume= 1.118 af, Depth= 2.35"
Routed to Link POA-B :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.09"

Area (sf)	CN	Description
190,995	74	>75% Grass cover, Good, HSG C
19	80	>75% Grass cover, Good, HSG D
56,389	70	Woods, Good, HSG C
1,070	77	Woods, Good, HSG D
248,473	73	Weighted Average
248,473		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
0.5	50	0.0600	1.71		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
9.2	693	0.0635	1.26		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
1.8	219	0.0868	2.06		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.2	153	0.0523	1.14		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
21.5	1,215	Total			

Summary for Subcatchment C:

Runoff = 4.57 cfs @ 12.23 hrs, Volume= 0.450 af, Depth= 2.35"
Routed to Link POA-C :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.09"

Area (sf)	CN	Description
74,691	74	>75% Grass cover, Good, HSG C
25,289	70	Woods, Good, HSG C
99,980	73	Weighted Average
99,980		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0900	0.14		**Sheet Flow, Sheet - Woods** Woods: Light underbrush n= 0.400 P2= 3.24"
0.1	13	0.1538	1.96		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
4.4	443	0.0587	1.70		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
16.2	556	Total			

Summary for Subcatchment D:

Runoff = 5.57 cfs @ 12.27 hrs, Volume= 0.577 af, Depth= 2.35"
Routed to Link POA-D :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.09"

Area (sf)	CN	Description
87,694	74	>75% Grass cover, Good, HSG C
40,687	70	Woods, Good, HSG C
128,381	73	Weighted Average
128,381		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0600	0.12		**Sheet Flow, Sheet - Woods** Woods: Light underbrush n= 0.400 P2= 3.24"
0.6	53	0.0755	1.37		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
0.3	46	0.1087	2.31		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.8	70	0.0857	1.46		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
1.6	187	0.0802	1.98		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.6	230	0.1174	2.40		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
18.7	686	Total			

Summary for Link POA-A:

Inflow Area = 34.837 ac, 0.00% Impervious, Inflow Depth = 2.10" for 10-yr event
Inflow = 56.51 cfs @ 12.29 hrs, Volume= 6.106 af
Primary = 56.51 cfs @ 12.29 hrs, Volume= 6.106 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-B:

Inflow Area = 5.704 ac, 0.00% Impervious, Inflow Depth = 2.35" for 10-yr event
Inflow = 10.17 cfs @ 12.31 hrs, Volume= 1.118 af
Primary = 10.17 cfs @ 12.31 hrs, Volume= 1.118 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-C:

Inflow Area =	2.295 ac,	0.00% Impervious,	Inflow Depth = 2.35"	for 10-yr event	
Inflow =	4.57 cfs @	12.23 hrs,	Volume=	0.450 af	
Primary =	4.57 cfs @	12.23 hrs,	Volume=	0.450 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-D:

Inflow Area =	2.947 ac,	0.00% Impervious,	Inflow Depth = 2.35"	for 10-yr event	
Inflow =	5.57 cfs @	12.27 hrs,	Volume=	0.577 af	
Primary =	5.57 cfs @	12.27 hrs,	Volume=	0.577 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Time span=6.00-30.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment A: Runoff Area=1,517,513 sf 0.00% Impervious Runoff Depth=3.00"
Flow Length=1,513' Tc=20.0 min CN=70 Runoff=81.68 cfs 8.700 af

Subcatchment B: Runoff Area=248,473 sf 0.00% Impervious Runoff Depth=3.29"
Flow Length=1,215' Tc=21.5 min CN=73 Runoff=14.34 cfs 1.563 af

Subcatchment C: Runoff Area=99,980 sf 0.00% Impervious Runoff Depth=3.29"
Flow Length=556' Tc=16.2 min CN=73 Runoff=6.44 cfs 0.629 af

Subcatchment D: Runoff Area=128,381 sf 0.00% Impervious Runoff Depth=3.29"
Flow Length=686' Tc=18.7 min CN=73 Runoff=7.85 cfs 0.808 af

Link POA-A: Inflow=81.68 cfs 8.700 af
Primary=81.68 cfs 8.700 af

Link POA-B: Inflow=14.34 cfs 1.563 af
Primary=14.34 cfs 1.563 af

Link POA-C: Inflow=6.44 cfs 0.629 af
Primary=6.44 cfs 0.629 af

Link POA-D: Inflow=7.85 cfs 0.808 af
Primary=7.85 cfs 0.808 af

Total Runoff Area = 45.784 ac Runoff Volume = 11.700 af Average Runoff Depth = 3.07"
100.00% Pervious = 45.784 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment A:

Runoff = 81.68 cfs @ 12.28 hrs, Volume= 8.700 af, Depth= 3.00"
Routed to Link POA-A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.24"

Area (sf)	CN	Description
204,104	61	>75% Grass cover, Good, HSG B
509,686	74	>75% Grass cover, Good, HSG C
328,384	80	>75% Grass cover, Good, HSG D
273,462	55	Woods, Good, HSG B
62,391	70	Woods, Good, HSG C
139,486	77	Woods, Good, HSG D
1,517,513	70	Weighted Average
1,517,513		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0700	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
2.1	200	0.0500	1.57		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
3.3	400	0.0825	2.01		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.3	189	0.1164	2.39		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.2	162	0.0988	2.20		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.4	61	0.2787	2.64		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
1.5	237	0.1435	2.65		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.6	164	0.1098	1.66		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
20.0	1,513	Total			

Summary for Subcatchment B:

Runoff = 14.34 cfs @ 12.30 hrs, Volume= 1.563 af, Depth= 3.29"
Routed to Link POA-B :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.24"

Area (sf)	CN	Description
190,995	74	>75% Grass cover, Good, HSG C
19	80	>75% Grass cover, Good, HSG D
56,389	70	Woods, Good, HSG C
1,070	77	Woods, Good, HSG D
248,473	73	Weighted Average
248,473		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
0.5	50	0.0600	1.71		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
9.2	693	0.0635	1.26		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
1.8	219	0.0868	2.06		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.2	153	0.0523	1.14		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
21.5	1,215	Total			

Summary for Subcatchment C:

Runoff = 6.44 cfs @ 12.23 hrs, Volume= 0.629 af, Depth= 3.29"
Routed to Link POA-C :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.24"

Area (sf)	CN	Description
74,691	74	>75% Grass cover, Good, HSG C
25,289	70	Woods, Good, HSG C
99,980	73	Weighted Average
99,980		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0900	0.14		**Sheet Flow, Sheet - Woods** Woods: Light underbrush n= 0.400 P2= 3.24"
0.1	13	0.1538	1.96		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
4.4	443	0.0587	1.70		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
16.2	556	Total			

Summary for Subcatchment D:

Runoff = 7.85 cfs @ 12.26 hrs, Volume= 0.808 af, Depth= 3.29"
Routed to Link POA-D :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.24"

Area (sf)	CN	Description
87,694	74	>75% Grass cover, Good, HSG C
40,687	70	Woods, Good, HSG C
128,381	73	Weighted Average
128,381		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0600	0.12		**Sheet Flow, Sheet - Woods** Woods: Light underbrush n= 0.400 P2= 3.24"
0.6	53	0.0755	1.37		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
0.3	46	0.1087	2.31		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.8	70	0.0857	1.46		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
1.6	187	0.0802	1.98		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.6	230	0.1174	2.40		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
18.7	686	Total			

Summary for Link POA-A:

Inflow Area = 34.837 ac, 0.00% Impervious, Inflow Depth = 3.00" for 25-yr event
Inflow = 81.68 cfs @ 12.28 hrs, Volume= 8.700 af
Primary = 81.68 cfs @ 12.28 hrs, Volume= 8.700 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-B:

Inflow Area = 5.704 ac, 0.00% Impervious, Inflow Depth = 3.29" for 25-yr event
Inflow = 14.34 cfs @ 12.30 hrs, Volume= 1.563 af
Primary = 14.34 cfs @ 12.30 hrs, Volume= 1.563 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-C:

Inflow Area = 2.295 ac, 0.00% Impervious, Inflow Depth = 3.29" for 25-yr event
Inflow = 6.44 cfs @ 12.23 hrs, Volume= 0.629 af
Primary = 6.44 cfs @ 12.23 hrs, Volume= 0.629 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-D:

Inflow Area = 2.947 ac, 0.00% Impervious, Inflow Depth = 3.29" for 25-yr event
Inflow = 7.85 cfs @ 12.26 hrs, Volume= 0.808 af
Primary = 7.85 cfs @ 12.26 hrs, Volume= 0.808 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Time span=6.00-30.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment A:	Runoff Area=1,517,513 sf 0.00% Impervious Runoff Depth=4.48" Flow Length=1,513' Tc=20.0 min CN=70 Runoff=122.90 cfs 13.010 af
Subcatchment B:	Runoff Area=248,473 sf 0.00% Impervious Runoff Depth=4.83" Flow Length=1,215' Tc=21.5 min CN=73 Runoff=21.06 cfs 2.295 af
Subcatchment C:	Runoff Area=99,980 sf 0.00% Impervious Runoff Depth=4.83" Flow Length=556' Tc=16.2 min CN=73 Runoff=9.51 cfs 0.923 af
Subcatchment D:	Runoff Area=128,381 sf 0.00% Impervious Runoff Depth=4.83" Flow Length=686' Tc=18.7 min CN=73 Runoff=11.53 cfs 1.186 af
Link POA-A:	Inflow=122.90 cfs 13.010 af Primary=122.90 cfs 13.010 af
Link POA-B:	Inflow=21.06 cfs 2.295 af Primary=21.06 cfs 2.295 af
Link POA-C:	Inflow=9.51 cfs 0.923 af Primary=9.51 cfs 0.923 af
Link POA-D:	Inflow=11.53 cfs 1.186 af Primary=11.53 cfs 1.186 af

Total Runoff Area = 45.784 ac Runoff Volume = 17.414 af Average Runoff Depth = 4.56"
100.00% Pervious = 45.784 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment A:

Runoff = 122.90 cfs @ 12.28 hrs, Volume= 13.010 af, Depth= 4.48"
Routed to Link POA-A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.02"

Area (sf)	CN	Description
204,104	61	>75% Grass cover, Good, HSG B
509,686	74	>75% Grass cover, Good, HSG C
328,384	80	>75% Grass cover, Good, HSG D
273,462	55	Woods, Good, HSG B
62,391	70	Woods, Good, HSG C
139,486	77	Woods, Good, HSG D
1,517,513	70	Weighted Average
1,517,513		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0700	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
2.1	200	0.0500	1.57		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
3.3	400	0.0825	2.01		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.3	189	0.1164	2.39		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.2	162	0.0988	2.20		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.4	61	0.2787	2.64		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
1.5	237	0.1435	2.65		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.6	164	0.1098	1.66		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
20.0	1,513	Total			

Summary for Subcatchment B:

Runoff = 21.06 cfs @ 12.30 hrs, Volume= 2.295 af, Depth= 4.83"
Routed to Link POA-B :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.02"

Area (sf)	CN	Description
190,995	74	>75% Grass cover, Good, HSG C
19	80	>75% Grass cover, Good, HSG D
56,389	70	Woods, Good, HSG C
1,070	77	Woods, Good, HSG D
248,473	73	Weighted Average
248,473		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
0.5	50	0.0600	1.71		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
9.2	693	0.0635	1.26		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
1.8	219	0.0868	2.06		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.2	153	0.0523	1.14		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
21.5	1,215	Total			

Summary for Subcatchment C:

Runoff = 9.51 cfs @ 12.22 hrs, Volume= 0.923 af, Depth= 4.83"
Routed to Link POA-C :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.02"

Area (sf)	CN	Description
74,691	74	>75% Grass cover, Good, HSG C
25,289	70	Woods, Good, HSG C
99,980	73	Weighted Average
99,980		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0900	0.14		**Sheet Flow, Sheet - Woods** Woods: Light underbrush n= 0.400 P2= 3.24"
0.1	13	0.1538	1.96		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
4.4	443	0.0587	1.70		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
16.2	556	Total			

Summary for Subcatchment D:

Runoff = 11.53 cfs @ 12.26 hrs, Volume= 1.186 af, Depth= 4.83"
Routed to Link POA-D :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.02"

Area (sf)	CN	Description
87,694	74	>75% Grass cover, Good, HSG C
40,687	70	Woods, Good, HSG C
128,381	73	Weighted Average
128,381		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0600	0.12		**Sheet Flow, Sheet - Woods** Woods: Light underbrush n= 0.400 P2= 3.24"
0.6	53	0.0755	1.37		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
0.3	46	0.1087	2.31		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.8	70	0.0857	1.46		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
1.6	187	0.0802	1.98		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.6	230	0.1174	2.40		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
18.7	686	Total			

Summary for Link POA-A:

Inflow Area = 34.837 ac, 0.00% Impervious, Inflow Depth = 4.48" for 100-yr event
Inflow = 122.90 cfs @ 12.28 hrs, Volume= 13.010 af
Primary = 122.90 cfs @ 12.28 hrs, Volume= 13.010 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-B:

Inflow Area = 5.704 ac, 0.00% Impervious, Inflow Depth = 4.83" for 100-yr event
Inflow = 21.06 cfs @ 12.30 hrs, Volume= 2.295 af
Primary = 21.06 cfs @ 12.30 hrs, Volume= 2.295 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-C:

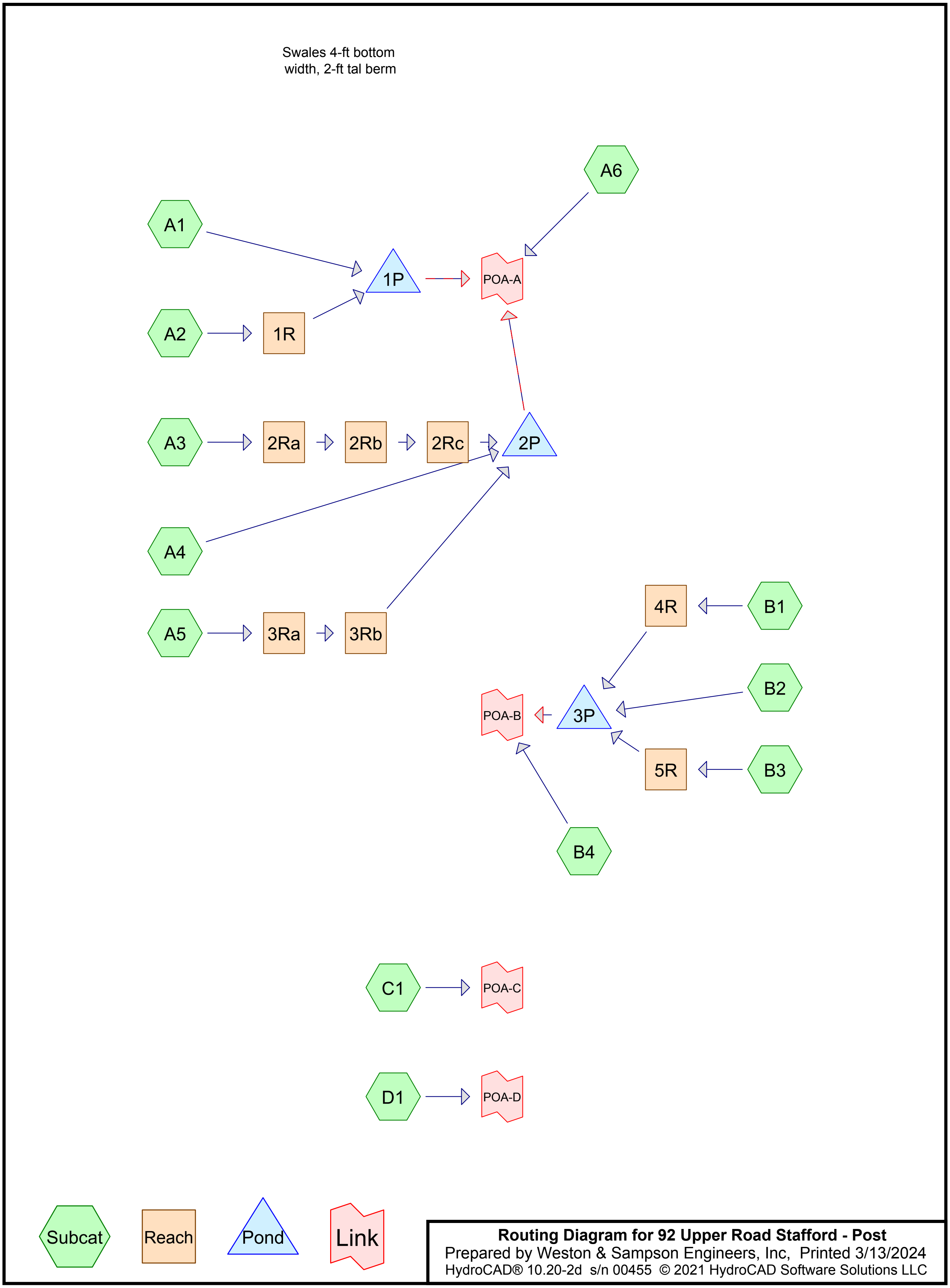
Inflow Area =	2.295 ac,	0.00% Impervious,	Inflow Depth = 4.83"	for 100-yr event	
Inflow =	9.51 cfs @	12.22 hrs,	Volume=	0.923 af	
Primary =	9.51 cfs @	12.22 hrs,	Volume=	0.923 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-D:

Inflow Area =	2.947 ac,	0.00% Impervious,	Inflow Depth = 4.83"	for 100-yr event	
Inflow =	11.53 cfs @	12.26 hrs,	Volume=	1.186 af	
Primary =	11.53 cfs @	12.26 hrs,	Volume=	1.186 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs



Routing Diagram for 92 Upper Road Stafford - Post
Prepared by Weston & Sampson Engineers, Inc, Printed 3/13/2024
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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.214	61	>75% Grass cover, Good, HSG B (A6)
5.073	74	>75% Grass cover, Good, HSG C (A6, C1, D1)
7.407	80	>75% Grass cover, Good, HSG D (A6)
0.104	89	Gravel roads, Compacted Site, HSG C (A4, A5)
0.188	89	Gravel roads, HSG C (A5, A6)
0.132	91	Gravel roads, HSG D (A6)
1.378	65	Meadow, Compacted Site, HSG B (A1, A2, A3)
12.456	75	Meadow, Compacted Site, HSG C (A1, A2, A3, A4, A5, B1, B2, B3)
1.094	58	Meadow, non-grazed, HSG B (A1, A2, A3)
3.914	71	Meadow, non-grazed, HSG C (A1, A2, A3, A4, A5, B1, B2, B3, B4)
0.000	78	Meadow, non-grazed, HSG D (B4)
0.050	98	Unconnected pavement, HSG C (A4, A5)
6.278	55	Woods, Good, HSG B (A1, A6)
2.268	70	Woods, Good, HSG C (A1, A6, B2, B3, B4, C1, D1)
3.227	77	Woods, Good, HSG D (A6, B4)
45.784	**71**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
10.963	HSG B	A1, A2, A3, A6
24.055	HSG C	A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, C1, D1
10.766	HSG D	A6, B4
0.000	Other	
45.784		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	2.214	5.073	7.407	0.000	14.694	>75% Grass cover, Good	A6, C1, D1
0.000	0.000	0.188	0.132	0.000	0.320	Gravel roads	A5, A6
0.000	0.000	0.104	0.000	0.000	0.104	Gravel roads, Compacted Site	A4, A5
0.000	1.378	12.456	0.000	0.000	13.834	Meadow, Compacted Site	A1, A2, A3, A4, A5, B1, B2, B3
0.000	1.094	3.914	0.000	0.000	5.009	Meadow, non-grazed	A1, A2, A3, A4, A5, B1, B2, B3, B4
0.000	0.000	0.050	0.000	0.000	0.050	Unconnected pavement	A4, A5
0.000	6.278	2.268	3.227	0.000	11.773	Woods, Good	A1, A6, B2, B3, B4, C1, D1
0.000	**10.963**	**24.055**	**10.766**	**0.000**	**45.784**	**TOTAL AREA**	

Time span=6.00-30.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment A1: Runoff Area=244,299 sf 0.00% Impervious Runoff Depth=0.66"
Flow Length=847' Tc=15.1 min CN=66 Runoff=2.64 cfs 0.310 af

Subcatchment A2: Runoff Area=73,166 sf 0.00% Impervious Runoff Depth=0.75"
Flow Length=702' Tc=14.3 min CN=68 Runoff=0.97 cfs 0.106 af

Subcatchment A3: Runoff Area=215,804 sf 0.00% Impervious Runoff Depth=1.06"
Flow Length=1,203' Tc=18.7 min CN=74 Runoff=4.02 cfs 0.439 af

Subcatchment A4: Runoff Area=114,227 sf 1.67% Impervious Runoff Depth=1.06"
Flow Length=947' Tc=15.6 min UI Adjusted CN=74 Runoff=2.28 cfs 0.233 af

Subcatchment A5: Runoff Area=61,969 sf 0.45% Impervious Runoff Depth=1.06"
Flow Length=326' Tc=10.8 min CN=74 Runoff=1.42 cfs 0.126 af

Subcatchment A6: Runoff Area=879,350 sf 0.00% Impervious Runoff Depth=0.90"
Flow Length=562' Tc=10.2 min CN=71 Runoff=16.71 cfs 1.518 af

Subcatchment B1: Runoff Area=65,982 sf 0.00% Impervious Runoff Depth=1.12"
Flow Length=752' Tc=14.4 min CN=75 Runoff=1.45 cfs 0.142 af

Subcatchment B2: Runoff Area=49,809 sf 0.00% Impervious Runoff Depth=1.06"
Flow Length=833' Tc=15.5 min CN=74 Runoff=1.00 cfs 0.101 af

Subcatchment B3: Runoff Area=87,472 sf 0.00% Impervious Runoff Depth=1.01"
Flow Length=990' Tc=18.6 min CN=73 Runoff=1.53 cfs 0.169 af

Subcatchment B4: Runoff Area=45,437 sf 0.00% Impervious Runoff Depth=0.90"
Flow Length=401' Tc=13.0 min CN=71 Runoff=0.79 cfs 0.078 af

Subcatchment C1: Runoff Area=97,003 sf 0.00% Impervious Runoff Depth=1.01"
Flow Length=532' Tc=11.4 min CN=73 Runoff=2.04 cfs 0.187 af

Subcatchment D1: Runoff Area=59,829 sf 0.00% Impervious Runoff Depth=1.01"
Flow Length=339' Tc=9.5 min CN=73 Runoff=1.33 cfs 0.115 af

Reach 1R: Avg. Flow Depth=0.13' Max Vel=1.65 fps Inflow=0.97 cfs 0.106 af
n=0.030 L=200.0' S=0.0187 '/' Capacity=153.09 cfs Outflow=0.95 cfs 0.106 af

Reach 2Ra: Avg. Flow Depth=0.22' Max Vel=3.92 fps Inflow=4.02 cfs 0.439 af
n=0.030 L=185.0' S=0.0574 '/' Capacity=268.10 cfs Outflow=3.99 cfs 0.439 af

Reach 2Rb: Avg. Flow Depth=0.18' Max Vel=4.96 fps Inflow=3.99 cfs 0.439 af
n=0.030 L=165.1' S=0.1183 '/' Capacity=385.03 cfs Outflow=3.97 cfs 0.439 af

Reach 2Rc: Avg. Flow Depth=0.27' Max Vel=2.98 fps Inflow=3.97 cfs 0.439 af
n=0.030 L=153.1' S=0.0256 '/' Capacity=179.13 cfs Outflow=3.94 cfs 0.439 af

Reach 3Ra: Avg. Flow Depth=0.12' Max Vel=2.63 fps Inflow=1.42 cfs 0.126 af
n=0.030 L=269.2' S=0.0530 '/' Capacity=257.66 cfs Outflow=1.37 cfs 0.126 af

Reach 3Rb: Avg. Flow Depth=0.10' Max Vel=3.18 fps Inflow=1.37 cfs 0.126 af
n=0.030 L=160.7' S=0.0999 '/' Capacity=353.90 cfs Outflow=1.34 cfs 0.126 af

Reach 4R: Avg. Flow Depth=0.13' Max Vel=2.63 fps Inflow=1.45 cfs 0.142 af
n=0.030 L=169.2' S=0.0510 '/' Capacity=252.83 cfs Outflow=1.43 cfs 0.142 af

Reach 5R: Avg. Flow Depth=0.13' Max Vel=2.72 fps Inflow=1.53 cfs 0.169 af
n=0.030 L=109.7' S=0.0524 '/' Capacity=256.30 cfs Outflow=1.52 cfs 0.169 af

Pond 1P: Peak Elev=703.72' Storage=6,257 cf Inflow=3.58 cfs 0.416 af
Discarded=0.56 cfs 0.416 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.56 cfs 0.416 af

Pond 2P: Peak Elev=674.33' Storage=5,078 cf Inflow=7.18 cfs 0.798 af
Discarded=0.20 cfs 0.149 af Primary=1.52 cfs 0.487 af Secondary=4.84 cfs 0.161 af Outflow=6.57 cfs 0.797 af

Pond 3P: Peak Elev=708.28' Storage=3,732 cf Inflow=3.89 cfs 0.412 af
Discarded=0.18 cfs 0.188 af Primary=2.95 cfs 0.210 af Secondary=0.00 cfs 0.000 af Outflow=3.13 cfs 0.398 af

Link POA-A: Inflow=17.98 cfs 2.166 af
Primary=17.98 cfs 2.166 af

Link POA-B: Inflow=3.48 cfs 0.288 af
Primary=3.48 cfs 0.288 af

Link POA-C: Inflow=2.04 cfs 0.187 af
Primary=2.04 cfs 0.187 af

Link POA-D: Inflow=1.33 cfs 0.115 af
Primary=1.33 cfs 0.115 af

Total Runoff Area = 45.784 ac Runoff Volume = 3.524 af Average Runoff Depth = 0.92"
99.89% Pervious = 45.734 ac 0.11% Impervious = 0.050 ac

Summary for Subcatchment A1:

Runoff = 2.64 cfs @ 12.25 hrs, Volume= 0.310 af, Depth= 0.66"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.24"

	Area (sf)	CN	Description
	39,640	58	Meadow, non-grazed, HSG B
	30,835	71	Meadow, non-grazed, HSG C
	60,945	55	Woods, Good, HSG B
	27,268	70	Woods, Good, HSG C
*	969	65	Meadow, Compacted Site, HSG B
*	84,642	75	Meadow, Compacted Site, HSG C
	244,299	66	Weighted Average
	244,299		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0600	0.18		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
2.3	236	0.0593	1.70		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.0	255	0.0941	2.15		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.0	166	0.1566	2.77		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.7	90	0.0889	2.09		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
15.1	847	Total			

Summary for Subcatchment A2:

Runoff = 0.97 cfs @ 12.23 hrs, Volume= 0.106 af, Depth= 0.75"
Routed to Reach 1R :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.24"

	Area (sf)	CN	Description
	7,809	58	Meadow, non-grazed, HSG B
	149	71	Meadow, non-grazed, HSG C
*	35,295	65	Meadow, Compacted Site, HSG B
*	29,913	75	Meadow, Compacted Site, HSG C
	73,166	68	Weighted Average
	73,166		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
2.5	313	0.0863	2.06		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.0	289	0.1211	2.44		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
14.3	702	Total			

Summary for Subcatchment A3:

Runoff = 4.02 cfs @ 12.28 hrs, Volume= 0.439 af, Depth= 1.06"
Routed to Reach 2Ra :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.24"

	Area (sf)	CN	Description
	221	58	Meadow, non-grazed, HSG B
	10,240	71	Meadow, non-grazed, HSG C
*	23,742	65	Meadow, Compacted Site, HSG B
*	181,601	75	Meadow, Compacted Site, HSG C
	215,804	74	Weighted Average
	215,804		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
4.9	552	0.0725	1.88		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.0	287	0.1185	2.41		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.0	264	0.0947	2.15		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
18.7	1,203	Total			

Summary for Subcatchment A4:

Runoff = 2.28 cfs @ 12.23 hrs, Volume= 0.233 af, Depth= 1.06"
Routed to Pond 2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.24"

	Area (sf)	CN	Adj	Description
	30,673	71		Meadow, non-grazed, HSG C
*	79,945	75		Meadow, Compacted Site, HSG C
*	1,696	89		Gravel roads, Compacted Site, HSG C
	1,913	98		Unconnected pavement, HSG C
	114,227	75	74	Weighted Average, UI Adjusted
	112,314			98.33% Pervious Area
	1,913			1.67% Impervious Area
	1,913			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0700	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
3.4	363	0.0634	1.76		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.3	279	0.0824	2.01		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.3	205	0.1317	2.54		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
15.6	947	Total			

Summary for Subcatchment A5:

Runoff = 1.42 cfs @ 12.16 hrs, Volume= 0.126 af, Depth= 1.06"
Routed to Reach 3Ra :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.24"

	Area (sf)	CN	Description
	37,315	71	Meadow, non-grazed, HSG C
*	20,053	75	Meadow, Compacted Site, HSG C
	1,475	89	Gravel roads, HSG C
*	2,847	89	Gravel roads, Compacted Site, HSG C
	279	98	Unconnected pavement, HSG C
	61,969	74	Weighted Average
	61,690		99.55% Pervious Area
	279		0.45% Impervious Area
	279		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0600	0.18		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
1.7	226	0.0973	2.18		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
10.8	326	Total			

Summary for Subcatchment A6:

Runoff = 16.71 cfs @ 12.16 hrs, Volume= 1.518 af, Depth= 0.90"
Routed to Link POA-A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.24"

Area (sf)	CN	Description
96,429	61	>75% Grass cover, Good, HSG B
89,079	74	>75% Grass cover, Good, HSG C
322,635	80	>75% Grass cover, Good, HSG D
212,517	55	Woods, Good, HSG B
6,745	70	Woods, Good, HSG C
139,486	77	Woods, Good, HSG D
6,710	89	Gravel roads, HSG C
5,749	91	Gravel roads, HSG D
879,350	71	Weighted Average
879,350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	100	0.1300	0.25		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
0.4	61	0.2787	2.64		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
1.5	237	0.1435	2.65		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.6	164	0.1098	1.66		**Shallow Concentrated Flow, Shallow - Meadow** Woodland Kv= 5.0 fps
10.2	562	Total			

Summary for Subcatchment B1:

Runoff = 1.45 cfs @ 12.21 hrs, Volume= 0.142 af, Depth= 1.12"
Routed to Reach 4R :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.24"

	Area (sf)	CN	Description
	7,415	71	Meadow, non-grazed, HSG C
*	58,567	75	Meadow, Compacted Site, HSG C
	65,982	75	Weighted Average
	65,982		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0700	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
5.8	652	0.0706	1.86		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
14.4	752	Total			

Summary for Subcatchment B2:

Runoff = 1.00 cfs @ 12.23 hrs, Volume= 0.101 af, Depth= 1.06"
Routed to Pond 3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.24"

	Area (sf)	CN	Description
	11,394	71	Meadow, non-grazed, HSG C
	27	70	Woods, Good, HSG C
*	38,388	75	Meadow, Compacted Site, HSG C
	49,809	74	Weighted Average
	49,809		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0600	0.18		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
6.4	733	0.0737	1.90		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
15.5	833	Total			

Summary for Subcatchment B3:

Runoff = 1.53 cfs @ 12.28 hrs, Volume= 0.169 af, Depth= 1.01"
Routed to Reach 5R :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.24"

	Area (sf)	CN	Description
	13,086	71	Meadow, non-grazed, HSG C
	24,906	70	Woods, Good, HSG C
*	49,480	75	Meadow, Compacted Site, HSG C
	87,472	73	Weighted Average
	87,472		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
0.5	50	0.0600	1.71		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
8.6	614	0.0570	1.19		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
0.6	79	0.1139	2.36		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.1	147	0.0952	2.16		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
18.6	990	Total			

Summary for Subcatchment B4:

Runoff = 0.79 cfs @ 12.20 hrs, Volume= 0.078 af, Depth= 0.90"
Routed to Link POA-B :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.24"

Area (sf)	CN	Description
29,407	71	Meadow, non-grazed, HSG C
19	78	Meadow, non-grazed, HSG D
14,941	70	Woods, Good, HSG C
1,070	77	Woods, Good, HSG D
45,437	71	Weighted Average
45,437		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
2.9	275	0.0509	1.58		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	26	0.0769	1.39		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
13.0	401	Total			

Summary for Subcatchment C1:

Runoff = 2.04 cfs @ 12.17 hrs, Volume= 0.187 af, Depth= 1.01"
Routed to Link POA-C :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.24"

Area (sf)	CN	Description
82,784	74	>75% Grass cover, Good, HSG C
14,219	70	Woods, Good, HSG C
97,003	73	Weighted Average
97,003		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.1100	0.23		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
4.2	432	0.0602	1.72		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
11.4	532	Total			

Summary for Subcatchment D1:

Runoff = 1.33 cfs @ 12.15 hrs, Volume= 0.115 af, Depth= 1.01"
Routed to Link POA-D :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.24"

Area (sf)	CN	Description
49,127	74	>75% Grass cover, Good, HSG C
10,702	70	Woods, Good, HSG C
59,829	73	Weighted Average
59,829		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
1.7	239	0.1172	2.40		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
9.5	339	Total			

Summary for Reach 1R:

Inflow Area = 1.680 ac, 0.00% Impervious, Inflow Depth = 0.75" for 2-yr event
Inflow = 0.97 cfs @ 12.23 hrs, Volume= 0.106 af
Outflow = 0.95 cfs @ 12.29 hrs, Volume= 0.106 af, Atten= 2%, Lag= 4.0 min
Routed to Pond 1P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.65 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.64 fps, Avg. Travel Time= 5.2 min

Peak Storage= 116 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.13' , Surface Width= 4.79'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 153.09 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 200.0' Slope= 0.0187 '/'
Inlet Invert= 706.94', Outlet Invert= 703.20'

‡

Summary for Reach 2Ra:

Inflow Area = 4.954 ac, 0.00% Impervious, Inflow Depth = 1.06" for 2-yr event
Inflow = 4.02 cfs @ 12.28 hrs, Volume= 0.439 af
Outflow = 3.99 cfs @ 12.31 hrs, Volume= 0.439 af, Atten= 1%, Lag= 1.5 min
Routed to Reach 2Rb :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.92 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.44 fps, Avg. Travel Time= 2.1 min

Peak Storage= 190 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.22' , Surface Width= 5.32'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 268.10 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 185.0' Slope= 0.0574 '/'
Inlet Invert= 704.03', Outlet Invert= 693.42'

‡

Summary for Reach 2Rb:

Inflow Area = 4.954 ac, 0.00% Impervious, Inflow Depth = 1.06" for 2-yr event
Inflow = 3.99 cfs @ 12.31 hrs, Volume= 0.439 af
Outflow = 3.97 cfs @ 12.32 hrs, Volume= 0.439 af, Atten= 1%, Lag= 0.9 min
Routed to Reach 2Rc :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.96 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.82 fps, Avg. Travel Time= 1.5 min

Peak Storage= 133 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.18' , Surface Width= 5.07'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 385.03 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 165.1' Slope= 0.1183 '/'
Inlet Invert= 693.42', Outlet Invert= 673.89'

‡

Summary for Reach 2Rc:

Inflow Area = 4.954 ac, 0.00% Impervious, Inflow Depth = 1.06" for 2-yr event
Inflow = 3.97 cfs @ 12.32 hrs, Volume= 0.439 af
Outflow = 3.94 cfs @ 12.35 hrs, Volume= 0.439 af, Atten= 1%, Lag= 1.7 min
Routed to Pond 2P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.98 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 2.3 min

Peak Storage= 203 cf @ 12.33 hrs
Average Depth at Peak Storage= 0.27' , Surface Width= 5.65'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 179.13 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 153.1' Slope= 0.0256 '/'
Inlet Invert= 673.89', Outlet Invert= 669.97'

‡

Summary for Reach 3Ra:

Inflow Area = 1.423 ac, 0.45% Impervious, Inflow Depth = 1.06" for 2-yr event
Inflow = 1.42 cfs @ 12.16 hrs, Volume= 0.126 af
Outflow = 1.37 cfs @ 12.22 hrs, Volume= 0.126 af, Atten= 3%, Lag= 3.2 min
Routed to Reach 3Rb :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.63 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 4.6 min

Peak Storage= 142 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.12' , Surface Width= 4.73'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 257.66 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 269.2' Slope= 0.0530 '/'
Inlet Invert= 700.50', Outlet Invert= 686.24'

‡

Summary for Reach 3Rb:

Inflow Area = 1.423 ac, 0.45% Impervious, Inflow Depth = 1.06" for 2-yr event
Inflow = 1.37 cfs @ 12.22 hrs, Volume= 0.126 af
Outflow = 1.34 cfs @ 12.25 hrs, Volume= 0.126 af, Atten= 2%, Lag= 1.7 min
Routed to Pond 2P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.18 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.28 fps, Avg. Travel Time= 2.1 min

Peak Storage= 68 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.10' , Surface Width= 4.59'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 353.90 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 160.7' Slope= 0.0999 '/'
Inlet Invert= 686.24', Outlet Invert= 670.18'

‡

Summary for Reach 4R:

Inflow Area = 1.515 ac, 0.00% Impervious, Inflow Depth = 1.12" for 2-yr event
Inflow = 1.45 cfs @ 12.21 hrs, Volume= 0.142 af
Outflow = 1.43 cfs @ 12.25 hrs, Volume= 0.142 af, Atten= 2%, Lag= 2.1 min
Routed to Pond 3P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.63 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 2.9 min

Peak Storage= 93 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.13' , Surface Width= 4.75'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 252.83 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 169.2' Slope= 0.0510 '/'
Inlet Invert= 718.48', Outlet Invert= 709.85'

‡

Summary for Reach 5R:

Inflow Area = 2.008 ac, 0.00% Impervious, Inflow Depth = 1.01" for 2-yr event
Inflow = 1.53 cfs @ 12.28 hrs, Volume= 0.169 af
Outflow = 1.52 cfs @ 12.30 hrs, Volume= 0.169 af, Atten= 1%, Lag= 1.3 min
Routed to Pond 3P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.72 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.04 fps, Avg. Travel Time= 1.8 min

Peak Storage= 62 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.13' , Surface Width= 4.77'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 256.30 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 109.7' Slope= 0.0524 '/'
Inlet Invert= 715.70', Outlet Invert= 709.95'

‡

Summary for Pond 1P:

Inflow Area = 7.288 ac, 0.00% Impervious, Inflow Depth = 0.68" for 2-yr event
Inflow = 3.58 cfs @ 12.27 hrs, Volume= 0.416 af
Outflow = 0.56 cfs @ 13.94 hrs, Volume= 0.416 af, Atten= 84%, Lag= 100.5 min
Discarded = 0.56 cfs @ 13.94 hrs, Volume= 0.416 af
Primary = 0.00 cfs @ 6.00 hrs, Volume= 0.000 af
Routed to Link POA-A :
Secondary = 0.00 cfs @ 6.00 hrs, Volume= 0.000 af
Routed to Link POA-A :

Routing by Stor-Ind method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 703.72' @ 13.94 hrs Surf.Area= 7,791 sf Storage= 6,257 cf

Plug-Flow detention time= 126.1 min calculated for 0.415 af (100% of inflow)
Center-of-Mass det. time= 126.0 min (1,023.7 - 897.8)

Volume	Invert	Avail.Storage	Storage Description
#1	702.00'	36,749 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
702.00	766	349.0	0	0	766
703.00	3,929	601.0	2,143	2,143	19,823
704.00	9,691	656.0	6,597	8,740	25,360
705.00	13,800	700.0	11,685	20,425	30,156
706.00	18,985	746.0	16,324	36,749	35,499

Device	Routing	Invert	Outlet Devices
#1	Secondary	705.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	702.00'	**1.020 in/hr Exfiltration over Wetted area**
#3	Primary	701.50'	**4.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 701.50' / 700.00' S= 0.0500 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#4	Device 3	704.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.56 cfs @ 13.94 hrs HW=703.72' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.56 cfs)

Primary OutFlow Max=0.00 cfs @ 6.00 hrs HW=702.00' (Free Discharge)
└─**3=Culvert** (Passes 0.00 cfs of 0.24 cfs potential flow)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 6.00 hrs HW=702.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P:

Inflow Area = 8.999 ac, 0.56% Impervious, Inflow Depth = 1.06" for 2-yr event
Inflow = 7.18 cfs @ 12.30 hrs, Volume= 0.798 af
Outflow = 6.57 cfs @ 12.41 hrs, Volume= 0.797 af, Atten= 9%, Lag= 6.6 min
Discarded = 0.20 cfs @ 12.41 hrs, Volume= 0.149 af
Primary = 1.52 cfs @ 12.41 hrs, Volume= 0.487 af
  Routed to Link POA-A :
Secondary = 4.84 cfs @ 12.41 hrs, Volume= 0.161 af
  Routed to Link POA-A :

Routing by Stor-Ind method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 674.33' @ 12.41 hrs Surf.Area= 3,826 sf Storage= 5,078 cf

Plug-Flow detention time= 40.4 min calculated for 0.797 af (100% of inflow)
Center-of-Mass det. time= 39.6 min (915.5 - 875.9)

Volume	Invert	Avail.Storage	Storage Description
#1	672.00'	7,900 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
672.00	367	178.0	0	0	367
673.00	2,107	284.0	1,118	1,118	4,271
674.00	3,456	350.0	2,754	3,872	7,616
675.00	4,630	399.0	4,029	7,900	10,560

Device	Routing	Invert	Outlet Devices
#1	Secondary	674.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Primary	671.50'	**6.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 671.50' / 665.00' S= 0.2167 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	673.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Discarded	672.00'	**1.020 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.20 cfs @ 12.41 hrs HW=674.33' (Free Discharge)
└─**4=Exfiltration** (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=1.52 cfs @ 12.41 hrs HW=674.33' (Free Discharge)
└─**2=Culvert** (Inlet Controls 1.52 cfs @ 7.73 fps)
  └─**3=Orifice/Grate** (Passes 1.52 cfs of 17.44 cfs potential flow)

Secondary OutFlow Max=4.81 cfs @ 12.41 hrs HW=674.33' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 4.81 cfs @ 1.46 fps)

Summary for Pond 3P:

Inflow Area = 4.666 ac, 0.00% Impervious, Inflow Depth = 1.06" for 2-yr event
Inflow = 3.89 cfs @ 12.26 hrs, Volume= 0.412 af
Outflow = 3.13 cfs @ 12.42 hrs, Volume= 0.398 af, Atten= 20%, Lag= 9.5 min
Discarded = 0.18 cfs @ 12.42 hrs, Volume= 0.188 af
Primary = 2.95 cfs @ 12.42 hrs, Volume= 0.210 af
Routed to Link POA-B :
Secondary = 0.00 cfs @ 6.00 hrs, Volume= 0.000 af
Routed to Link POA-B :

Routing by Stor-Ind method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 708.28' @ 12.42 hrs Surf.Area= 3,570 sf Storage= 3,732 cf

Plug-Flow detention time= 132.4 min calculated for 0.397 af (97% of inflow)
Center-of-Mass det. time= 115.1 min (988.2 - 873.1)

Volume	Invert	Avail.Storage	Storage Description
#1	705.00'	13,803 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
705.00	11	34.0	0	0	11
706.00	205	84.0	88	88	484
707.00	1,272	180.0	663	750	2,505
708.00	2,956	278.0	2,056	2,806	6,084
709.00	5,374	389.0	4,105	6,911	11,986
710.00	8,531	494.0	6,892	13,803	19,377

Device	Routing	Invert	Outlet Devices
#1	Secondary	709.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	705.00'	**1.020 in/hr Exfiltration over Wetted area**
#3	Primary	704.50'	**8.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 704.50' / 702.00' S= 0.0833 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#4	Device 3	708.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.18 cfs @ 12.42 hrs HW=708.28' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=3.07 cfs @ 12.42 hrs HW=708.28' (Free Discharge)
└─**3=Culvert** (Passes 3.07 cfs of 3.12 cfs potential flow)
  └─**4=Orifice/Grate** (Weir Controls 3.07 cfs @ 1.74 fps)

Secondary OutFlow Max=0.00 cfs @ 6.00 hrs HW=705.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link POA-A:

Inflow Area = 36.474 ac, 0.14% Impervious, Inflow Depth = 0.71" for 2-yr event
Inflow = 17.98 cfs @ 12.16 hrs, Volume= 2.166 af
Primary = 17.98 cfs @ 12.16 hrs, Volume= 2.166 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-B:

Inflow Area = 5.709 ac, 0.00% Impervious, Inflow Depth = 0.61" for 2-yr event
Inflow = 3.48 cfs @ 12.41 hrs, Volume= 0.288 af
Primary = 3.48 cfs @ 12.41 hrs, Volume= 0.288 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-C:

Inflow Area = 2.227 ac, 0.00% Impervious, Inflow Depth = 1.01" for 2-yr event
Inflow = 2.04 cfs @ 12.17 hrs, Volume= 0.187 af
Primary = 2.04 cfs @ 12.17 hrs, Volume= 0.187 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-D:

Inflow Area = 1.373 ac, 0.00% Impervious, Inflow Depth = 1.01" for 2-yr event
Inflow = 1.33 cfs @ 12.15 hrs, Volume= 0.115 af
Primary = 1.33 cfs @ 12.15 hrs, Volume= 0.115 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Time span=6.00-30.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment A1: Runoff Area=244,299 sf 0.00% Impervious Runoff Depth=1.79"
Flow Length=847' Tc=15.1 min CN=66 Runoff=8.45 cfs 0.836 af

Subcatchment A2: Runoff Area=73,166 sf 0.00% Impervious Runoff Depth=1.94"
Flow Length=702' Tc=14.3 min CN=68 Runoff=2.85 cfs 0.272 af

Subcatchment A3: Runoff Area=215,804 sf 0.00% Impervious Runoff Depth=2.44"
Flow Length=1,203' Tc=18.7 min CN=74 Runoff=9.72 cfs 1.006 af

Subcatchment A4: Runoff Area=114,227 sf 1.67% Impervious Runoff Depth=2.44"
Flow Length=947' Tc=15.6 min UI Adjusted CN=74 Runoff=5.53 cfs 0.532 af

Subcatchment A5: Runoff Area=61,969 sf 0.45% Impervious Runoff Depth=2.44"
Flow Length=326' Tc=10.8 min CN=74 Runoff=3.42 cfs 0.289 af

Subcatchment A6: Runoff Area=879,350 sf 0.00% Impervious Runoff Depth=2.18"
Flow Length=562' Tc=10.2 min CN=71 Runoff=43.82 cfs 3.675 af

Subcatchment B1: Runoff Area=65,982 sf 0.00% Impervious Runoff Depth=2.52"
Flow Length=752' Tc=14.4 min CN=75 Runoff=3.41 cfs 0.318 af

Subcatchment B2: Runoff Area=49,809 sf 0.00% Impervious Runoff Depth=2.44"
Flow Length=833' Tc=15.5 min CN=74 Runoff=2.42 cfs 0.232 af

Subcatchment B3: Runoff Area=87,472 sf 0.00% Impervious Runoff Depth=2.35"
Flow Length=990' Tc=18.6 min CN=73 Runoff=3.80 cfs 0.393 af

Subcatchment B4: Runoff Area=45,437 sf 0.00% Impervious Runoff Depth=2.18"
Flow Length=401' Tc=13.0 min CN=71 Runoff=2.08 cfs 0.190 af

Subcatchment C1: Runoff Area=97,003 sf 0.00% Impervious Runoff Depth=2.35"
Flow Length=532' Tc=11.4 min CN=73 Runoff=5.06 cfs 0.436 af

Subcatchment D1: Runoff Area=59,829 sf 0.00% Impervious Runoff Depth=2.35"
Flow Length=339' Tc=9.5 min CN=73 Runoff=3.29 cfs 0.269 af

Reach 1R: Avg. Flow Depth=0.25' Max Vel=2.39 fps Inflow=2.85 cfs 0.272 af
n=0.030 L=200.0' S=0.0187 '/' Capacity=153.09 cfs Outflow=2.79 cfs 0.272 af

Reach 2Ra: Avg. Flow Depth=0.36' Max Vel=5.23 fps Inflow=9.72 cfs 1.006 af
n=0.030 L=185.0' S=0.0574 '/' Capacity=268.10 cfs Outflow=9.63 cfs 1.006 af

Reach 2Rb: Avg. Flow Depth=0.29' Max Vel=6.68 fps Inflow=9.63 cfs 1.006 af
n=0.030 L=165.1' S=0.1183 '/' Capacity=385.03 cfs Outflow=9.59 cfs 1.006 af

Reach 2Rc: Avg. Flow Depth=0.45' Max Vel=3.96 fps Inflow=9.59 cfs 1.006 af
n=0.030 L=153.1' S=0.0256 '/' Capacity=179.13 cfs Outflow=9.54 cfs 1.006 af

Reach 3Ra: Avg. Flow Depth=0.20' Max Vel=3.59 fps Inflow=3.42 cfs 0.289 af
n=0.030 L=269.2' S=0.0530 '/' Capacity=257.66 cfs Outflow=3.31 cfs 0.289 af

Reach 3Rb: Avg. Flow Depth=0.17' Max Vel=4.40 fps Inflow=3.31 cfs 0.289 af
n=0.030 L=160.7' S=0.0999 '/' Capacity=353.90 cfs Outflow=3.27 cfs 0.289 af

Reach 4R: Avg. Flow Depth=0.21' Max Vel=3.56 fps Inflow=3.41 cfs 0.318 af
n=0.030 L=169.2' S=0.0510 '/' Capacity=252.83 cfs Outflow=3.35 cfs 0.318 af

Reach 5R: Avg. Flow Depth=0.22' Max Vel=3.73 fps Inflow=3.80 cfs 0.393 af
n=0.030 L=109.7' S=0.0524 '/' Capacity=256.30 cfs Outflow=3.77 cfs 0.393 af

Pond 1P: Peak Elev=704.99' Storage=20,285 cf Inflow=11.15 cfs 1.108 af
Discarded=0.71 cfs 0.731 af Primary=0.76 cfs 0.378 af Secondary=0.00 cfs 0.000 af Outflow=1.48 cfs 1.108 af

Pond 2P: Peak Elev=674.69' Storage=6,511 cf Inflow=17.53 cfs 1.827 af
Discarded=0.23 cfs 0.180 af Primary=1.62 cfs 0.888 af Secondary=15.35 cfs 0.757 af Outflow=17.19 cfs 1.826 af

Pond 3P: Peak Elev=709.25' Storage=8,315 cf Inflow=9.41 cfs 0.944 af
Discarded=0.32 cfs 0.223 af Primary=3.53 cfs 0.628 af Secondary=3.05 cfs 0.075 af Outflow=6.90 cfs 0.926 af

Link POA-A: Inflow=55.49 cfs 5.699 af
Primary=55.49 cfs 5.699 af

Link POA-B: Inflow=7.84 cfs 0.893 af
Primary=7.84 cfs 0.893 af

Link POA-C: Inflow=5.06 cfs 0.436 af
Primary=5.06 cfs 0.436 af

Link POA-D: Inflow=3.29 cfs 0.269 af
Primary=3.29 cfs 0.269 af

Total Runoff Area = 45.784 ac Runoff Volume = 8.450 af Average Runoff Depth = 2.21"
99.89% Pervious = 45.734 ac 0.11% Impervious = 0.050 ac

Summary for Subcatchment A1:

Runoff = 8.45 cfs @ 12.22 hrs, Volume= 0.836 af, Depth= 1.79"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.09"

	Area (sf)	CN	Description
	39,640	58	Meadow, non-grazed, HSG B
	30,835	71	Meadow, non-grazed, HSG C
	60,945	55	Woods, Good, HSG B
	27,268	70	Woods, Good, HSG C
*	969	65	Meadow, Compacted Site, HSG B
*	84,642	75	Meadow, Compacted Site, HSG C
	244,299	66	Weighted Average
	244,299		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0600	0.18		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
2.3	236	0.0593	1.70		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.0	255	0.0941	2.15		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.0	166	0.1566	2.77		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.7	90	0.0889	2.09		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
15.1	847	Total			

Summary for Subcatchment A2:

Runoff = 2.85 cfs @ 12.21 hrs, Volume= 0.272 af, Depth= 1.94"
Routed to Reach 1R :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.09"

	Area (sf)	CN	Description
	7,809	58	Meadow, non-grazed, HSG B
	149	71	Meadow, non-grazed, HSG C
*	35,295	65	Meadow, Compacted Site, HSG B
*	29,913	75	Meadow, Compacted Site, HSG C
	73,166	68	Weighted Average
	73,166		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
2.5	313	0.0863	2.06		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.0	289	0.1211	2.44		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
14.3	702	Total			

Summary for Subcatchment A3:

Runoff = 9.72 cfs @ 12.27 hrs, Volume= 1.006 af, Depth= 2.44"
Routed to Reach 2Ra :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.09"

	Area (sf)	CN	Description
	221	58	Meadow, non-grazed, HSG B
	10,240	71	Meadow, non-grazed, HSG C
*	23,742	65	Meadow, Compacted Site, HSG B
*	181,601	75	Meadow, Compacted Site, HSG C
	215,804	74	Weighted Average
	215,804		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
4.9	552	0.0725	1.88		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.0	287	0.1185	2.41		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.0	264	0.0947	2.15		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
18.7	1,203	Total			

Summary for Subcatchment A4:

Runoff = 5.53 cfs @ 12.22 hrs, Volume= 0.532 af, Depth= 2.44"
Routed to Pond 2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.09"

	Area (sf)	CN	Adj	Description
	30,673	71		Meadow, non-grazed, HSG C
*	79,945	75		Meadow, Compacted Site, HSG C
*	1,696	89		Gravel roads, Compacted Site, HSG C
	1,913	98		Unconnected pavement, HSG C
	114,227	75	74	Weighted Average, UI Adjusted
	112,314			98.33% Pervious Area
	1,913			1.67% Impervious Area
	1,913			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0700	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
3.4	363	0.0634	1.76		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.3	279	0.0824	2.01		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.3	205	0.1317	2.54		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
15.6	947	Total			

Summary for Subcatchment A5:

Runoff = 3.42 cfs @ 12.16 hrs, Volume= 0.289 af, Depth= 2.44"
Routed to Reach 3Ra :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.09"

	Area (sf)	CN	Description
	37,315	71	Meadow, non-grazed, HSG C
*	20,053	75	Meadow, Compacted Site, HSG C
	1,475	89	Gravel roads, HSG C
*	2,847	89	Gravel roads, Compacted Site, HSG C
	279	98	Unconnected pavement, HSG C
	61,969	74	Weighted Average
	61,690		99.55% Pervious Area
	279		0.45% Impervious Area
	279		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0600	0.18		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
1.7	226	0.0973	2.18		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
10.8	326	Total			

Summary for Subcatchment A6:

Runoff = 43.82 cfs @ 12.15 hrs, Volume= 3.675 af, Depth= 2.18"
Routed to Link POA-A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.09"

	Area (sf)	CN	Description
	96,429	61	>75% Grass cover, Good, HSG B
	89,079	74	>75% Grass cover, Good, HSG C
	322,635	80	>75% Grass cover, Good, HSG D
	212,517	55	Woods, Good, HSG B
	6,745	70	Woods, Good, HSG C
	139,486	77	Woods, Good, HSG D
	6,710	89	Gravel roads, HSG C
	5,749	91	Gravel roads, HSG D
	879,350	71	Weighted Average
	879,350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	100	0.1300	0.25		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
0.4	61	0.2787	2.64		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
1.5	237	0.1435	2.65		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.6	164	0.1098	1.66		**Shallow Concentrated Flow, Shallow - Meadow** Woodland Kv= 5.0 fps
10.2	562	Total			

Summary for Subcatchment B1:

Runoff = 3.41 cfs @ 12.20 hrs, Volume= 0.318 af, Depth= 2.52"
Routed to Reach 4R :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.09"

	Area (sf)	CN	Description
	7,415	71	Meadow, non-grazed, HSG C
*	58,567	75	Meadow, Compacted Site, HSG C
	65,982	75	Weighted Average
	65,982		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0700	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
5.8	652	0.0706	1.86		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
14.4	752	Total			

Summary for Subcatchment B2:

Runoff = 2.42 cfs @ 12.22 hrs, Volume= 0.232 af, Depth= 2.44"
Routed to Pond 3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.09"

	Area (sf)	CN	Description
	11,394	71	Meadow, non-grazed, HSG C
	27	70	Woods, Good, HSG C
*	38,388	75	Meadow, Compacted Site, HSG C
	49,809	74	Weighted Average
	49,809		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0600	0.18		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
6.4	733	0.0737	1.90		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
15.5	833	Total			

Summary for Subcatchment B3:

Runoff = 3.80 cfs @ 12.26 hrs, Volume= 0.393 af, Depth= 2.35"
Routed to Reach 5R :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.09"

	Area (sf)	CN	Description
	13,086	71	Meadow, non-grazed, HSG C
	24,906	70	Woods, Good, HSG C
*	49,480	75	Meadow, Compacted Site, HSG C
	87,472	73	Weighted Average
	87,472		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
0.5	50	0.0600	1.71		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
8.6	614	0.0570	1.19		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
0.6	79	0.1139	2.36		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.1	147	0.0952	2.16		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
18.6	990	Total			

Summary for Subcatchment B4:

Runoff = 2.08 cfs @ 12.19 hrs, Volume= 0.190 af, Depth= 2.18"
Routed to Link POA-B :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.09"

Area (sf)	CN	Description
29,407	71	Meadow, non-grazed, HSG C
19	78	Meadow, non-grazed, HSG D
14,941	70	Woods, Good, HSG C
1,070	77	Woods, Good, HSG D
45,437	71	Weighted Average
45,437		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
2.9	275	0.0509	1.58		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	26	0.0769	1.39		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
13.0	401	Total			

Summary for Subcatchment C1:

Runoff = 5.06 cfs @ 12.16 hrs, Volume= 0.436 af, Depth= 2.35"
Routed to Link POA-C :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.09"

Area (sf)	CN	Description
82,784	74	>75% Grass cover, Good, HSG C
14,219	70	Woods, Good, HSG C
97,003	73	Weighted Average
97,003		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.1100	0.23		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
4.2	432	0.0602	1.72		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
11.4	532	Total			

Summary for Subcatchment D1:

Runoff = 3.29 cfs @ 12.14 hrs, Volume= 0.269 af, Depth= 2.35"
Routed to Link POA-D :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.09"

Area (sf)	CN	Description
49,127	74	>75% Grass cover, Good, HSG C
10,702	70	Woods, Good, HSG C
59,829	73	Weighted Average
59,829		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
1.7	239	0.1172	2.40		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
9.5	339	Total			

Summary for Reach 1R:

Inflow Area = 1.680 ac, 0.00% Impervious, Inflow Depth = 1.94" for 10-yr event
Inflow = 2.85 cfs @ 12.21 hrs, Volume= 0.272 af
Outflow = 2.79 cfs @ 12.25 hrs, Volume= 0.272 af, Atten= 2%, Lag= 2.7 min
Routed to Pond 1P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.39 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.82 fps, Avg. Travel Time= 4.0 min

Peak Storage= 235 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.25' , Surface Width= 5.48'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 153.09 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 200.0' Slope= 0.0187 '/'
Inlet Invert= 706.94', Outlet Invert= 703.20'

‡

Summary for Reach 2Ra:

Inflow Area = 4.954 ac, 0.00% Impervious, Inflow Depth = 2.44" for 10-yr event
Inflow = 9.72 cfs @ 12.27 hrs, Volume= 1.006 af
Outflow = 9.63 cfs @ 12.28 hrs, Volume= 1.006 af, Atten= 1%, Lag= 1.1 min
Routed to Reach 2Rb :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.23 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.80 fps, Avg. Travel Time= 1.7 min

Peak Storage= 343 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.36' , Surface Width= 6.18'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 268.10 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 185.0' Slope= 0.0574 '/'
Inlet Invert= 704.03', Outlet Invert= 693.42'

‡

Summary for Reach 2Rb:

Inflow Area = 4.954 ac, 0.00% Impervious, Inflow Depth = 2.44" for 10-yr event
Inflow = 9.63 cfs @ 12.28 hrs, Volume= 1.006 af
Outflow = 9.59 cfs @ 12.30 hrs, Volume= 1.006 af, Atten= 0%, Lag= 0.8 min
Routed to Reach 2Rc :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.68 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.28 fps, Avg. Travel Time= 1.2 min

Peak Storage= 238 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.29' , Surface Width= 5.77'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 385.03 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 165.1' Slope= 0.1183 '/'
Inlet Invert= 693.42', Outlet Invert= 673.89'

‡

Summary for Reach 2Rc:

Inflow Area = 4.954 ac, 0.00% Impervious, Inflow Depth = 2.44" for 10-yr event
Inflow = 9.59 cfs @ 12.30 hrs, Volume= 1.006 af
Outflow = 9.54 cfs @ 12.32 hrs, Volume= 1.006 af, Atten= 1%, Lag= 1.1 min
Routed to Pond 2P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.96 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.37 fps, Avg. Travel Time= 1.9 min

Peak Storage= 371 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.45' , Surface Width= 6.71'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 179.13 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 153.1' Slope= 0.0256 '/'
Inlet Invert= 673.89', Outlet Invert= 669.97'

‡

Summary for Reach 3Ra:

Inflow Area = 1.423 ac, 0.45% Impervious, Inflow Depth = 2.44" for 10-yr event
Inflow = 3.42 cfs @ 12.16 hrs, Volume= 0.289 af
Outflow = 3.31 cfs @ 12.20 hrs, Volume= 0.289 af, Atten= 3%, Lag= 2.4 min
Routed to Reach 3Rb :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.59 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.15 fps, Avg. Travel Time= 3.9 min

Peak Storage= 253 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.20' , Surface Width= 5.22'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 257.66 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 269.2' Slope= 0.0530 '/'
Inlet Invert= 700.50', Outlet Invert= 686.24'

‡

Summary for Reach 3Rb:

Inflow Area = 1.423 ac, 0.45% Impervious, Inflow Depth = 2.44" for 10-yr event
Inflow = 3.31 cfs @ 12.20 hrs, Volume= 0.289 af
Outflow = 3.27 cfs @ 12.21 hrs, Volume= 0.289 af, Atten= 1%, Lag= 1.0 min
Routed to Pond 2P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.40 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 1.8 min

Peak Storage= 121 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.17' , Surface Width= 5.00'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 353.90 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 160.7' Slope= 0.0999 '/'
Inlet Invert= 686.24', Outlet Invert= 670.18'

‡

Summary for Reach 4R:

Inflow Area = 1.515 ac, 0.00% Impervious, Inflow Depth = 2.52" for 10-yr event
Inflow = 3.41 cfs @ 12.20 hrs, Volume= 0.318 af
Outflow = 3.35 cfs @ 12.23 hrs, Volume= 0.318 af, Atten= 2%, Lag= 1.3 min
Routed to Pond 3P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.56 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.17 fps, Avg. Travel Time= 2.4 min

Peak Storage= 162 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.21' , Surface Width= 5.24'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 252.83 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 169.2' Slope= 0.0510 '/'
Inlet Invert= 718.48', Outlet Invert= 709.85'

‡

Summary for Reach 5R:

Inflow Area = 2.008 ac, 0.00% Impervious, Inflow Depth = 2.35" for 10-yr event
Inflow = 3.80 cfs @ 12.26 hrs, Volume= 0.393 af
Outflow = 3.77 cfs @ 12.28 hrs, Volume= 0.393 af, Atten= 1%, Lag= 0.9 min
Routed to Pond 3P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.73 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.28 fps, Avg. Travel Time= 1.4 min

Peak Storage= 112 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.22' , Surface Width= 5.31'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 256.30 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 109.7' Slope= 0.0524 '/'
Inlet Invert= 715.70', Outlet Invert= 709.95'

‡

Summary for Pond 1P:

Inflow Area = 7.288 ac, 0.00% Impervious, Inflow Depth = 1.82" for 10-yr event
Inflow = 11.15 cfs @ 12.23 hrs, Volume= 1.108 af
Outflow = 1.48 cfs @ 13.54 hrs, Volume= 1.108 af, Atten= 87%, Lag= 78.6 min
Discarded = 0.71 cfs @ 13.54 hrs, Volume= 0.731 af
Primary = 0.76 cfs @ 13.54 hrs, Volume= 0.378 af
Routed to Link POA-A :
Secondary = 0.00 cfs @ 6.00 hrs, Volume= 0.000 af
Routed to Link POA-A :

Routing by Stor-Ind method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 704.99' @ 13.54 hrs Surf.Area= 13,754 sf Storage= 20,285 cf

Plug-Flow detention time= 182.6 min calculated for 1.108 af (100% of inflow)
Center-of-Mass det. time= 182.5 min (1,047.6 - 865.1)

Volume	Invert	Avail.Storage	Storage Description
#1	702.00'	36,749 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
702.00	766	349.0	0	0	766
703.00	3,929	601.0	2,143	2,143	19,823
704.00	9,691	656.0	6,597	8,740	25,360
705.00	13,800	700.0	11,685	20,425	30,156
706.00	18,985	746.0	16,324	36,749	35,499

Device	Routing	Invert	Outlet Devices
#1	Secondary	705.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	702.00'	**1.020 in/hr Exfiltration over Wetted area**
#3	Primary	701.50'	**4.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 701.50' / 700.00' S= 0.0500 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#4	Device 3	704.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.71 cfs @ 13.54 hrs HW=704.99' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.71 cfs)

Primary OutFlow Max=0.76 cfs @ 13.54 hrs HW=704.99' (Free Discharge)
└─**3=Culvert** (Barrel Controls 0.76 cfs @ 8.76 fps)
  └─**4=Orifice/Grate** (Passes 0.76 cfs of 15.05 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 6.00 hrs HW=702.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P:

Inflow Area = 8.999 ac, 0.56% Impervious, Inflow Depth = 2.44" for 10-yr event
Inflow = 17.53 cfs @ 12.27 hrs, Volume= 1.827 af
Outflow = 17.19 cfs @ 12.31 hrs, Volume= 1.826 af, Atten= 2%, Lag= 2.4 min
Discarded = 0.23 cfs @ 12.31 hrs, Volume= 0.180 af
Primary = 1.62 cfs @ 12.31 hrs, Volume= 0.888 af
  Routed to Link POA-A :
Secondary = 15.35 cfs @ 12.31 hrs, Volume= 0.757 af
  Routed to Link POA-A :

Routing by Stor-Ind method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 674.69' @ 12.31 hrs Surf.Area= 4,244 sf Storage= 6,511 cf

Plug-Flow detention time= 25.0 min calculated for 1.826 af (100% of inflow)
Center-of-Mass det. time= 24.6 min (874.6 - 850.0)

Volume	Invert	Avail.Storage	Storage Description
#1	672.00'	7,900 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
672.00	367	178.0	0	0	367
673.00	2,107	284.0	1,118	1,118	4,271
674.00	3,456	350.0	2,754	3,872	7,616
675.00	4,630	399.0	4,029	7,900	10,560

Device	Routing	Invert	Outlet Devices
#1	Secondary	674.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Primary	671.50'	**6.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 671.50' / 665.00' S= 0.2167 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	673.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Discarded	672.00'	**1.020 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.23 cfs @ 12.31 hrs HW=674.69' (Free Discharge)
└─**4=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=1.62 cfs @ 12.31 hrs HW=674.69' (Free Discharge)
└─**2=Culvert** (Inlet Controls 1.62 cfs @ 8.25 fps)
  └─**3=Orifice/Grate** (Passes 1.62 cfs of 19.64 cfs potential flow)

Secondary OutFlow Max=15.29 cfs @ 12.31 hrs HW=674.69' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 15.29 cfs @ 2.23 fps)

Summary for Pond 3P:

Inflow Area = 4.666 ac, 0.00% Impervious, Inflow Depth = 2.43" for 10-yr event
Inflow = 9.41 cfs @ 12.25 hrs, Volume= 0.944 af
Outflow = 6.90 cfs @ 12.43 hrs, Volume= 0.926 af, Atten= 27%, Lag= 11.0 min
Discarded = 0.32 cfs @ 12.43 hrs, Volume= 0.223 af
Primary = 3.53 cfs @ 12.43 hrs, Volume= 0.628 af
Routed to Link POA-B :
Secondary = 3.05 cfs @ 12.43 hrs, Volume= 0.075 af
Routed to Link POA-B :

Routing by Stor-Ind method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 709.25' @ 12.43 hrs Surf.Area= 6,081 sf Storage= 8,315 cf

Plug-Flow detention time= 69.6 min calculated for 0.924 af (98% of inflow)
Center-of-Mass det. time= 59.2 min (907.1 - 847.9)

Volume	Invert	Avail.Storage	Storage Description
#1	705.00'	13,803 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
705.00	11	34.0	0	0	11
706.00	205	84.0	88	88	484
707.00	1,272	180.0	663	750	2,505
708.00	2,956	278.0	2,056	2,806	6,084
709.00	5,374	389.0	4,105	6,911	11,986
710.00	8,531	494.0	6,892	13,803	19,377

Device	Routing	Invert	Outlet Devices
#1	Secondary	709.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	705.00'	**1.020 in/hr Exfiltration over Wetted area**
#3	Primary	704.50'	**8.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 704.50' / 702.00' S= 0.0833 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#4	Device 3	708.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.32 cfs @ 12.43 hrs HW=709.24' (Free Discharge)
└—**2=Exfiltration** (Exfiltration Controls 0.32 cfs)

Primary OutFlow Max=3.53 cfs @ 12.43 hrs HW=709.24' (Free Discharge)
└—**3=Culvert** (Inlet Controls 3.53 cfs @ 10.11 fps)
  └—**4=Orifice/Grate** (Passes 3.53 cfs of 16.86 cfs potential flow)

Secondary OutFlow Max=3.00 cfs @ 12.43 hrs HW=709.24' (Free Discharge)
└—**1=Broad-Crested Rectangular Weir** (Weir Controls 3.00 cfs @ 1.23 fps)

Summary for Link POA-A:

Inflow Area = 36.474 ac, 0.14% Impervious, Inflow Depth = 1.87" for 10-yr event
Inflow = 55.49 cfs @ 12.17 hrs, Volume= 5.699 af
Primary = 55.49 cfs @ 12.17 hrs, Volume= 5.699 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-B:

Inflow Area = 5.709 ac, 0.00% Impervious, Inflow Depth = 1.88" for 10-yr event
Inflow = 7.84 cfs @ 12.41 hrs, Volume= 0.893 af
Primary = 7.84 cfs @ 12.41 hrs, Volume= 0.893 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-C:

Inflow Area = 2.227 ac, 0.00% Impervious, Inflow Depth = 2.35" for 10-yr event
Inflow = 5.06 cfs @ 12.16 hrs, Volume= 0.436 af
Primary = 5.06 cfs @ 12.16 hrs, Volume= 0.436 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-D:

Inflow Area = 1.373 ac, 0.00% Impervious, Inflow Depth = 2.35" for 10-yr event
Inflow = 3.29 cfs @ 12.14 hrs, Volume= 0.269 af
Primary = 3.29 cfs @ 12.14 hrs, Volume= 0.269 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Time span=6.00-30.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment A1: Runoff Area=244,299 sf 0.00% Impervious Runoff Depth=2.62"
Flow Length=847' Tc=15.1 min CN=66 Runoff=12.71 cfs 1.224 af

Subcatchment A2: Runoff Area=73,166 sf 0.00% Impervious Runoff Depth=2.81"
Flow Length=702' Tc=14.3 min CN=68 Runoff=4.19 cfs 0.393 af

Subcatchment A3: Runoff Area=215,804 sf 0.00% Impervious Runoff Depth=3.39"
Flow Length=1,203' Tc=18.7 min CN=74 Runoff=13.60 cfs 1.399 af

Subcatchment A4: Runoff Area=114,227 sf 1.67% Impervious Runoff Depth=3.39"
Flow Length=947' Tc=15.6 min UI Adjusted CN=74 Runoff=7.74 cfs 0.740 af

Subcatchment A5: Runoff Area=61,969 sf 0.45% Impervious Runoff Depth=3.39"
Flow Length=326' Tc=10.8 min CN=74 Runoff=4.78 cfs 0.402 af

Subcatchment A6: Runoff Area=879,350 sf 0.00% Impervious Runoff Depth=3.09"
Flow Length=562' Tc=10.2 min CN=71 Runoff=62.72 cfs 5.204 af

Subcatchment B1: Runoff Area=65,982 sf 0.00% Impervious Runoff Depth=3.49"
Flow Length=752' Tc=14.4 min CN=75 Runoff=4.74 cfs 0.440 af

Subcatchment B2: Runoff Area=49,809 sf 0.00% Impervious Runoff Depth=3.39"
Flow Length=833' Tc=15.5 min CN=74 Runoff=3.38 cfs 0.323 af

Subcatchment B3: Runoff Area=87,472 sf 0.00% Impervious Runoff Depth=3.29"
Flow Length=990' Tc=18.6 min CN=73 Runoff=5.36 cfs 0.550 af

Subcatchment B4: Runoff Area=45,437 sf 0.00% Impervious Runoff Depth=3.09"
Flow Length=401' Tc=13.0 min CN=71 Runoff=2.98 cfs 0.269 af

Subcatchment C1: Runoff Area=97,003 sf 0.00% Impervious Runoff Depth=3.29"
Flow Length=532' Tc=11.4 min CN=73 Runoff=7.13 cfs 0.610 af

Subcatchment D1: Runoff Area=59,829 sf 0.00% Impervious Runoff Depth=3.29"
Flow Length=339' Tc=9.5 min CN=73 Runoff=4.63 cfs 0.376 af

Reach 1R: Avg. Flow Depth=0.31' Max Vel=2.73 fps Inflow=4.19 cfs 0.393 af
n=0.030 L=200.0' S=0.0187 '/' Capacity=153.09 cfs Outflow=4.10 cfs 0.393 af

Reach 2Ra: Avg. Flow Depth=0.44' Max Vel=5.82 fps Inflow=13.60 cfs 1.399 af
n=0.030 L=185.0' S=0.0574 '/' Capacity=268.10 cfs Outflow=13.48 cfs 1.399 af

Reach 2Rb: Avg. Flow Depth=0.36' Max Vel=7.44 fps Inflow=13.48 cfs 1.399 af
n=0.030 L=165.1' S=0.1183 '/' Capacity=385.03 cfs Outflow=13.43 cfs 1.399 af

Reach 2Rc: Avg. Flow Depth=0.54' Max Vel=4.39 fps Inflow=13.43 cfs 1.399 af
n=0.030 L=153.1' S=0.0256 '/' Capacity=179.13 cfs Outflow=13.36 cfs 1.399 af

Reach 3Ra: Avg. Flow Depth=0.25' Max Vel=4.03 fps Inflow=4.78 cfs 0.402 af
n=0.030 L=269.2' S=0.0530 '/' Capacity=257.66 cfs Outflow=4.62 cfs 0.402 af

Reach 3Rb: Avg. Flow Depth=0.20' Max Vel=4.94 fps Inflow=4.62 cfs 0.402 af
n=0.030 L=160.7' S=0.0999 '/' Capacity=353.90 cfs Outflow=4.58 cfs 0.402 af

Reach 4R: Avg. Flow Depth=0.25' Max Vel=3.99 fps Inflow=4.74 cfs 0.440 af
n=0.030 L=169.2' S=0.0510 '/' Capacity=252.83 cfs Outflow=4.68 cfs 0.440 af

Reach 5R: Avg. Flow Depth=0.27' Max Vel=4.19 fps Inflow=5.36 cfs 0.550 af
n=0.030 L=109.7' S=0.0524 '/' Capacity=256.30 cfs Outflow=5.33 cfs 0.550 af

Pond 1P: Peak Elev=705.34' Storage=25,387 cf Inflow=16.77 cfs 1.617 af
Discarded=0.75 cfs 0.830 af Primary=0.79 cfs 0.474 af Secondary=5.02 cfs 0.314 af Outflow=6.57 cfs 1.617 af

Pond 2P: Peak Elev=674.88' Storage=7,361 cf Inflow=24.59 cfs 2.541 af
Discarded=0.24 cfs 0.197 af Primary=1.67 cfs 1.095 af Secondary=22.23 cfs 1.247 af Outflow=24.15 cfs 2.539 af

Pond 3P: Peak Elev=709.43' Storage=9,512 cf Inflow=13.18 cfs 1.313 af
Discarded=0.35 cfs 0.237 af Primary=3.60 cfs 0.835 af Secondary=7.38 cfs 0.222 af Outflow=11.34 cfs 1.295 af

Link POA-A: Inflow=80.70 cfs 8.334 af
Primary=80.70 cfs 8.334 af

Link POA-B: Inflow=13.04 cfs 1.327 af
Primary=13.04 cfs 1.327 af

Link POA-C: Inflow=7.13 cfs 0.610 af
Primary=7.13 cfs 0.610 af

Link POA-D: Inflow=4.63 cfs 0.376 af
Primary=4.63 cfs 0.376 af

Total Runoff Area = 45.784 ac Runoff Volume = 11.930 af Average Runoff Depth = 3.13"
99.89% Pervious = 45.734 ac 0.11% Impervious = 0.050 ac

Summary for Subcatchment A1:

Runoff = 12.71 cfs @ 12.22 hrs, Volume= 1.224 af, Depth= 2.62"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.24"

	Area (sf)	CN	Description
	39,640	58	Meadow, non-grazed, HSG B
	30,835	71	Meadow, non-grazed, HSG C
	60,945	55	Woods, Good, HSG B
	27,268	70	Woods, Good, HSG C
*	969	65	Meadow, Compacted Site, HSG B
*	84,642	75	Meadow, Compacted Site, HSG C
	244,299	66	Weighted Average
	244,299		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0600	0.18		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
2.3	236	0.0593	1.70		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.0	255	0.0941	2.15		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.0	166	0.1566	2.77		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.7	90	0.0889	2.09		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
15.1	847	Total			

Summary for Subcatchment A2:

Runoff = 4.19 cfs @ 12.21 hrs, Volume= 0.393 af, Depth= 2.81"
Routed to Reach 1R :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.24"

	Area (sf)	CN	Description
	7,809	58	Meadow, non-grazed, HSG B
	149	71	Meadow, non-grazed, HSG C
*	35,295	65	Meadow, Compacted Site, HSG B
*	29,913	75	Meadow, Compacted Site, HSG C
	73,166	68	Weighted Average
	73,166		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
2.5	313	0.0863	2.06		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.0	289	0.1211	2.44		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
14.3	702	Total			

Summary for Subcatchment A3:

Runoff = 13.60 cfs @ 12.26 hrs, Volume= 1.399 af, Depth= 3.39"
Routed to Reach 2Ra :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.24"

	Area (sf)	CN	Description
	221	58	Meadow, non-grazed, HSG B
	10,240	71	Meadow, non-grazed, HSG C
*	23,742	65	Meadow, Compacted Site, HSG B
*	181,601	75	Meadow, Compacted Site, HSG C
	215,804	74	Weighted Average
	215,804		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
4.9	552	0.0725	1.88		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.0	287	0.1185	2.41		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.0	264	0.0947	2.15		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
18.7	1,203	Total			

Summary for Subcatchment A4:

Runoff = 7.74 cfs @ 12.22 hrs, Volume= 0.740 af, Depth= 3.39"
Routed to Pond 2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.24"

	Area (sf)	CN	Adj	Description
	30,673	71		Meadow, non-grazed, HSG C
*	79,945	75		Meadow, Compacted Site, HSG C
*	1,696	89		Gravel roads, Compacted Site, HSG C
	1,913	98		Unconnected pavement, HSG C
	114,227	75	74	Weighted Average, UI Adjusted
	112,314			98.33% Pervious Area
	1,913			1.67% Impervious Area
	1,913			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0700	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
3.4	363	0.0634	1.76		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.3	279	0.0824	2.01		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.3	205	0.1317	2.54		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
15.6	947	Total			

Summary for Subcatchment A5:

Runoff = 4.78 cfs @ 12.15 hrs, Volume= 0.402 af, Depth= 3.39"
Routed to Reach 3Ra :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.24"

	Area (sf)	CN	Description
	37,315	71	Meadow, non-grazed, HSG C
*	20,053	75	Meadow, Compacted Site, HSG C
	1,475	89	Gravel roads, HSG C
*	2,847	89	Gravel roads, Compacted Site, HSG C
	279	98	Unconnected pavement, HSG C
	61,969	74	Weighted Average
	61,690		99.55% Pervious Area
	279		0.45% Impervious Area
	279		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0600	0.18		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
1.7	226	0.0973	2.18		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
10.8	326	Total			

Summary for Subcatchment A6:

Runoff = 62.72 cfs @ 12.15 hrs, Volume= 5.204 af, Depth= 3.09"
Routed to Link POA-A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.24"

Area (sf)	CN	Description
96,429	61	>75% Grass cover, Good, HSG B
89,079	74	>75% Grass cover, Good, HSG C
322,635	80	>75% Grass cover, Good, HSG D
212,517	55	Woods, Good, HSG B
6,745	70	Woods, Good, HSG C
139,486	77	Woods, Good, HSG D
6,710	89	Gravel roads, HSG C
5,749	91	Gravel roads, HSG D
879,350	71	Weighted Average
879,350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	100	0.1300	0.25		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
0.4	61	0.2787	2.64		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
1.5	237	0.1435	2.65		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.6	164	0.1098	1.66		**Shallow Concentrated Flow, Shallow - Meadow** Woodland Kv= 5.0 fps
10.2	562	Total			

Summary for Subcatchment B1:

Runoff = 4.74 cfs @ 12.20 hrs, Volume= 0.440 af, Depth= 3.49"
Routed to Reach 4R :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.24"

	Area (sf)	CN	Description
	7,415	71	Meadow, non-grazed, HSG C
*	58,567	75	Meadow, Compacted Site, HSG C
	65,982	75	Weighted Average
	65,982		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0700	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
5.8	652	0.0706	1.86		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
14.4	752	Total			

Summary for Subcatchment B2:

Runoff = 3.38 cfs @ 12.22 hrs, Volume= 0.323 af, Depth= 3.39"
Routed to Pond 3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.24"

	Area (sf)	CN	Description
	11,394	71	Meadow, non-grazed, HSG C
	27	70	Woods, Good, HSG C
*	38,388	75	Meadow, Compacted Site, HSG C
	49,809	74	Weighted Average
	49,809		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0600	0.18		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
6.4	733	0.0737	1.90		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
15.5	833	Total			

Summary for Subcatchment B3:

Runoff = 5.36 cfs @ 12.26 hrs, Volume= 0.550 af, Depth= 3.29"
Routed to Reach 5R :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.24"

	Area (sf)	CN	Description
	13,086	71	Meadow, non-grazed, HSG C
	24,906	70	Woods, Good, HSG C
*	49,480	75	Meadow, Compacted Site, HSG C
	87,472	73	Weighted Average
	87,472		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
0.5	50	0.0600	1.71		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
8.6	614	0.0570	1.19		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
0.6	79	0.1139	2.36		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.1	147	0.0952	2.16		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
18.6	990	Total			

Summary for Subcatchment B4:

Runoff = 2.98 cfs @ 12.19 hrs, Volume= 0.269 af, Depth= 3.09"
Routed to Link POA-B :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.24"

Area (sf)	CN	Description
29,407	71	Meadow, non-grazed, HSG C
19	78	Meadow, non-grazed, HSG D
14,941	70	Woods, Good, HSG C
1,070	77	Woods, Good, HSG D
45,437	71	Weighted Average
45,437		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
2.9	275	0.0509	1.58		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	26	0.0769	1.39		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
13.0	401	Total			

Summary for Subcatchment C1:

Runoff = 7.13 cfs @ 12.16 hrs, Volume= 0.610 af, Depth= 3.29"
Routed to Link POA-C :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.24"

Area (sf)	CN	Description
82,784	74	>75% Grass cover, Good, HSG C
14,219	70	Woods, Good, HSG C
97,003	73	Weighted Average
97,003		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.1100	0.23		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
4.2	432	0.0602	1.72		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
11.4	532	Total			

Summary for Subcatchment D1:

Runoff = 4.63 cfs @ 12.14 hrs, Volume= 0.376 af, Depth= 3.29"
Routed to Link POA-D :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.24"

Area (sf)	CN	Description
49,127	74	>75% Grass cover, Good, HSG C
10,702	70	Woods, Good, HSG C
59,829	73	Weighted Average
59,829		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
1.7	239	0.1172	2.40		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
9.5	339	Total			

Summary for Reach 1R:

Inflow Area = 1.680 ac, 0.00% Impervious, Inflow Depth = 2.81" for 25-yr event
Inflow = 4.19 cfs @ 12.21 hrs, Volume= 0.393 af
Outflow = 4.10 cfs @ 12.24 hrs, Volume= 0.393 af, Atten= 2%, Lag= 2.3 min
Routed to Pond 1P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.73 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 0.91 fps, Avg. Travel Time= 3.7 min

Peak Storage= 306 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.31' , Surface Width= 5.86'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 153.09 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 200.0' Slope= 0.0187 '/'
Inlet Invert= 706.94', Outlet Invert= 703.20'

‡

Summary for Reach 2Ra:

Inflow Area = 4.954 ac, 0.00% Impervious, Inflow Depth = 3.39" for 25-yr event
Inflow = 13.60 cfs @ 12.26 hrs, Volume= 1.399 af
Outflow = 13.48 cfs @ 12.28 hrs, Volume= 1.399 af, Atten= 1%, Lag= 0.9 min
Routed to Reach 2Rb :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.82 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.97 fps, Avg. Travel Time= 1.6 min

Peak Storage= 432 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.44' , Surface Width= 6.63'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 268.10 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 185.0' Slope= 0.0574 '/'
Inlet Invert= 704.03', Outlet Invert= 693.42'

‡

Summary for Reach 2Rb:

Inflow Area = 4.954 ac, 0.00% Impervious, Inflow Depth = 3.39" for 25-yr event
Inflow = 13.48 cfs @ 12.28 hrs, Volume= 1.399 af
Outflow = 13.43 cfs @ 12.29 hrs, Volume= 1.399 af, Atten= 0%, Lag= 0.8 min
Routed to Reach 2Rc :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.44 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.49 fps, Avg. Travel Time= 1.1 min

Peak Storage= 299 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.36' , Surface Width= 6.14'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 385.03 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 165.1' Slope= 0.1183 '/'
Inlet Invert= 693.42', Outlet Invert= 673.89'

‡

Summary for Reach 2Rc:

Inflow Area = 4.954 ac, 0.00% Impervious, Inflow Depth = 3.39" for 25-yr event
Inflow = 13.43 cfs @ 12.29 hrs, Volume= 1.399 af
Outflow = 13.36 cfs @ 12.31 hrs, Volume= 1.399 af, Atten= 1%, Lag= 1.1 min
Routed to Pond 2P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.39 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.50 fps, Avg. Travel Time= 1.7 min

Peak Storage= 469 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.54' , Surface Width= 7.26'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 179.13 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 153.1' Slope= 0.0256 '/'
Inlet Invert= 673.89', Outlet Invert= 669.97'

‡

Summary for Reach 3Ra:

Inflow Area = 1.423 ac, 0.45% Impervious, Inflow Depth = 3.39" for 25-yr event
Inflow = 4.78 cfs @ 12.15 hrs, Volume= 0.402 af
Outflow = 4.62 cfs @ 12.19 hrs, Volume= 0.402 af, Atten= 3%, Lag= 2.1 min
Routed to Reach 3Rb :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.03 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.25 fps, Avg. Travel Time= 3.6 min

Peak Storage= 316 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.25' , Surface Width= 5.49'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 257.66 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 269.2' Slope= 0.0530 '/'
Inlet Invert= 700.50', Outlet Invert= 686.24'

‡

Summary for Reach 3Rb:

Inflow Area = 1.423 ac, 0.45% Impervious, Inflow Depth = 3.39" for 25-yr event
Inflow = 4.62 cfs @ 12.19 hrs, Volume= 0.402 af
Outflow = 4.58 cfs @ 12.21 hrs, Volume= 0.402 af, Atten= 1%, Lag= 0.9 min
Routed to Pond 2P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.94 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.56 fps, Avg. Travel Time= 1.7 min

Peak Storage= 150 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.20' , Surface Width= 5.22'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 353.90 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 160.7' Slope= 0.0999 '/'
Inlet Invert= 686.24', Outlet Invert= 670.18'

‡

Summary for Reach 4R:

Inflow Area = 1.515 ac, 0.00% Impervious, Inflow Depth = 3.49" for 25-yr event
Inflow = 4.74 cfs @ 12.20 hrs, Volume= 0.440 af
Outflow = 4.68 cfs @ 12.22 hrs, Volume= 0.440 af, Atten= 1%, Lag= 1.2 min
Routed to Pond 3P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.99 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 2.2 min

Peak Storage= 201 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.25' , Surface Width= 5.50'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 252.83 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 169.2' Slope= 0.0510 '/'
Inlet Invert= 718.48', Outlet Invert= 709.85'

‡

Summary for Reach 5R:

Inflow Area = 2.008 ac, 0.00% Impervious, Inflow Depth = 3.29" for 25-yr event
Inflow = 5.36 cfs @ 12.26 hrs, Volume= 0.550 af
Outflow = 5.33 cfs @ 12.27 hrs, Volume= 0.550 af, Atten= 1%, Lag= 0.7 min
Routed to Pond 3P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.19 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.40 fps, Avg. Travel Time= 1.3 min

Peak Storage= 140 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.27' , Surface Width= 5.60'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 256.30 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 109.7' Slope= 0.0524 '/'
Inlet Invert= 715.70', Outlet Invert= 709.95'

‡

Summary for Pond 1P:

Inflow Area = 7.288 ac, 0.00% Impervious, Inflow Depth = 2.66" for 25-yr event
Inflow = 16.77 cfs @ 12.22 hrs, Volume= 1.617 af
Outflow = 6.57 cfs @ 12.62 hrs, Volume= 1.617 af, Atten= 61%, Lag= 23.9 min
Discarded = 0.75 cfs @ 12.62 hrs, Volume= 0.830 af
Primary = 0.79 cfs @ 12.62 hrs, Volume= 0.474 af
Routed to Link POA-A :
Secondary = 5.02 cfs @ 12.62 hrs, Volume= 0.314 af
Routed to Link POA-A :

Routing by Stor-Ind method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 705.34' @ 12.62 hrs Surf.Area= 15,467 sf Storage= 25,387 cf

Plug-Flow detention time= 157.4 min calculated for 1.617 af (100% of inflow)
Center-of-Mass det. time= 157.4 min (1,011.0 - 853.7)

Volume	Invert	Avail.Storage	Storage Description
#1	702.00'	36,749 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
702.00	766	349.0	0	0	766
703.00	3,929	601.0	2,143	2,143	19,823
704.00	9,691	656.0	6,597	8,740	25,360
705.00	13,800	700.0	11,685	20,425	30,156
706.00	18,985	746.0	16,324	36,749	35,499

Device	Routing	Invert	Outlet Devices
#1	Secondary	705.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	702.00'	**1.020 in/hr Exfiltration over Wetted area**
#3	Primary	701.50'	**4.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 701.50' / 700.00' S= 0.0500 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#4	Device 3	704.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.75 cfs @ 12.62 hrs HW=705.34' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.75 cfs)

Primary OutFlow Max=0.79 cfs @ 12.62 hrs HW=705.34' (Free Discharge)
└─**3=Culvert** (Barrel Controls 0.79 cfs @ 9.08 fps)
  └─**4=Orifice/Grate** (Passes 0.79 cfs of 17.49 cfs potential flow)

Secondary OutFlow Max=4.97 cfs @ 12.62 hrs HW=705.34' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 4.97 cfs @ 1.47 fps)

Summary for Pond 2P:

Inflow Area = 8.999 ac, 0.56% Impervious, Inflow Depth = 3.39" for 25-yr event
Inflow = 24.59 cfs @ 12.26 hrs, Volume= 2.541 af
Outflow = 24.15 cfs @ 12.30 hrs, Volume= 2.539 af, Atten= 2%, Lag= 2.3 min
Discarded = 0.24 cfs @ 12.30 hrs, Volume= 0.197 af
Primary = 1.67 cfs @ 12.30 hrs, Volume= 1.095 af
  Routed to Link POA-A :
Secondary = 22.23 cfs @ 12.30 hrs, Volume= 1.247 af
  Routed to Link POA-A :

Routing by Stor-Ind method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 674.88' @ 12.30 hrs Surf.Area= 4,482 sf Storage= 7,361 cf

Plug-Flow detention time= 20.4 min calculated for 2.534 af (100% of inflow)
Center-of-Mass det. time= 20.6 min (860.7 - 840.1)

Volume	Invert	Avail.Storage	Storage Description
#1	672.00'	7,900 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
672.00	367	178.0	0	0	367
673.00	2,107	284.0	1,118	1,118	4,271
674.00	3,456	350.0	2,754	3,872	7,616
675.00	4,630	399.0	4,029	7,900	10,560

Device	Routing	Invert	Outlet Devices
#1	Secondary	674.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Primary	671.50'	**6.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 671.50' / 665.00' S= 0.2167 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	673.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Discarded	672.00'	**1.020 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.24 cfs @ 12.30 hrs HW=674.88' (Free Discharge)
└─**4=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=1.67 cfs @ 12.30 hrs HW=674.88' (Free Discharge)
└─**2=Culvert** (Inlet Controls 1.67 cfs @ 8.52 fps)
  └─**3=Orifice/Grate** (Passes 1.67 cfs of 20.74 cfs potential flow)

Secondary OutFlow Max=22.17 cfs @ 12.30 hrs HW=674.88' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 22.17 cfs @ 2.52 fps)

Summary for Pond 3P:

Inflow Area = 4.666 ac, 0.00% Impervious, Inflow Depth = 3.38" for 25-yr event
Inflow = 13.18 cfs @ 12.24 hrs, Volume= 1.313 af
Outflow = 11.34 cfs @ 12.35 hrs, Volume= 1.295 af, Atten= 14%, Lag= 6.9 min
Discarded = 0.35 cfs @ 12.35 hrs, Volume= 0.237 af
Primary = 3.60 cfs @ 12.35 hrs, Volume= 0.835 af
  Routed to Link POA-B :
Secondary = 7.38 cfs @ 12.35 hrs, Volume= 0.222 af
  Routed to Link POA-B :

Routing by Stor-Ind method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 709.43' @ 12.35 hrs Surf.Area= 6,653 sf Storage= 9,512 cf

Plug-Flow detention time= 54.7 min calculated for 1.295 af (99% of inflow)
Center-of-Mass det. time= 46.5 min (884.7 - 838.2)

Volume	Invert	Avail.Storage	Storage Description
#1	705.00'	13,803 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
705.00	11	34.0	0	0	11
706.00	205	84.0	88	88	484
707.00	1,272	180.0	663	750	2,505
708.00	2,956	278.0	2,056	2,806	6,084
709.00	5,374	389.0	4,105	6,911	11,986
710.00	8,531	494.0	6,892	13,803	19,377

Device	Routing	Invert	Outlet Devices
#1	Secondary	709.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	705.00'	**1.020 in/hr Exfiltration over Wetted area**
#3	Primary	704.50'	**8.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 704.50' / 702.00' S= 0.0833 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#4	Device 3	708.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.35 cfs @ 12.35 hrs HW=709.43' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.35 cfs)

Primary OutFlow Max=3.60 cfs @ 12.35 hrs HW=709.43' (Free Discharge)
└─**3=Culvert** (Inlet Controls 3.60 cfs @ 10.33 fps)
  └─**4=Orifice/Grate** (Passes 3.60 cfs of 18.10 cfs potential flow)

Secondary OutFlow Max=7.33 cfs @ 12.35 hrs HW=709.43' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 7.33 cfs @ 1.70 fps)

Summary for Link POA-A:

Inflow Area = 36.474 ac, 0.14% Impervious, Inflow Depth = 2.74" for 25-yr event
Inflow = 80.70 cfs @ 12.17 hrs, Volume= 8.334 af
Primary = 80.70 cfs @ 12.17 hrs, Volume= 8.334 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-B:

Inflow Area = 5.709 ac, 0.00% Impervious, Inflow Depth = 2.79" for 25-yr event
Inflow = 13.04 cfs @ 12.34 hrs, Volume= 1.327 af
Primary = 13.04 cfs @ 12.34 hrs, Volume= 1.327 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-C:

Inflow Area = 2.227 ac, 0.00% Impervious, Inflow Depth = 3.29" for 25-yr event
Inflow = 7.13 cfs @ 12.16 hrs, Volume= 0.610 af
Primary = 7.13 cfs @ 12.16 hrs, Volume= 0.610 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-D:

Inflow Area = 1.373 ac, 0.00% Impervious, Inflow Depth = 3.29" for 25-yr event
Inflow = 4.63 cfs @ 12.14 hrs, Volume= 0.376 af
Primary = 4.63 cfs @ 12.14 hrs, Volume= 0.376 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Time span=6.00-30.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment A1: Runoff Area=244,299 sf 0.00% Impervious Runoff Depth=4.02"
Flow Length=847' Tc=15.1 min CN=66 Runoff=19.83 cfs 1.881 af

Subcatchment A2: Runoff Area=73,166 sf 0.00% Impervious Runoff Depth=4.25"
Flow Length=702' Tc=14.3 min CN=68 Runoff=6.41 cfs 0.595 af

Subcatchment A3: Runoff Area=215,804 sf 0.00% Impervious Runoff Depth=4.94"
Flow Length=1,203' Tc=18.7 min CN=74 Runoff=19.83 cfs 2.041 af

Subcatchment A4: Runoff Area=114,227 sf 1.67% Impervious Runoff Depth=4.94"
Flow Length=947' Tc=15.6 min UI Adjusted CN=74 Runoff=11.28 cfs 1.080 af

Subcatchment A5: Runoff Area=61,969 sf 0.45% Impervious Runoff Depth=4.94"
Flow Length=326' Tc=10.8 min CN=74 Runoff=6.96 cfs 0.586 af

Subcatchment A6: Runoff Area=879,350 sf 0.00% Impervious Runoff Depth=4.60"
Flow Length=562' Tc=10.2 min CN=71 Runoff=93.45 cfs 7.733 af

Subcatchment B1: Runoff Area=65,982 sf 0.00% Impervious Runoff Depth=5.06"
Flow Length=752' Tc=14.4 min CN=75 Runoff=6.85 cfs 0.639 af

Subcatchment B2: Runoff Area=49,809 sf 0.00% Impervious Runoff Depth=4.94"
Flow Length=833' Tc=15.5 min CN=74 Runoff=4.93 cfs 0.471 af

Subcatchment B3: Runoff Area=87,472 sf 0.00% Impervious Runoff Depth=4.83"
Flow Length=990' Tc=18.6 min CN=73 Runoff=7.87 cfs 0.808 af

Subcatchment B4: Runoff Area=45,437 sf 0.00% Impervious Runoff Depth=4.60"
Flow Length=401' Tc=13.0 min CN=71 Runoff=4.44 cfs 0.400 af

Subcatchment C1: Runoff Area=97,003 sf 0.00% Impervious Runoff Depth=4.83"
Flow Length=532' Tc=11.4 min CN=73 Runoff=10.47 cfs 0.896 af

Subcatchment D1: Runoff Area=59,829 sf 0.00% Impervious Runoff Depth=4.83"
Flow Length=339' Tc=9.5 min CN=73 Runoff=6.79 cfs 0.553 af

Reach 1R: Avg. Flow Depth=0.39' Max Vel=3.13 fps Inflow=6.41 cfs 0.595 af
n=0.030 L=200.0' S=0.0187 '/' Capacity=153.09 cfs Outflow=6.28 cfs 0.595 af

Reach 2Ra: Avg. Flow Depth=0.54' Max Vel=6.53 fps Inflow=19.83 cfs 2.041 af
n=0.030 L=185.0' S=0.0574 '/' Capacity=268.10 cfs Outflow=19.72 cfs 2.041 af

Reach 2Rb: Avg. Flow Depth=0.44' Max Vel=8.37 fps Inflow=19.72 cfs 2.041 af
n=0.030 L=165.1' S=0.1183 '/' Capacity=385.03 cfs Outflow=19.59 cfs 2.041 af

Reach 2Rc: Avg. Flow Depth=0.67' Max Vel=4.90 fps Inflow=19.59 cfs 2.041 af
n=0.030 L=153.1' S=0.0256 '/' Capacity=179.13 cfs Outflow=19.50 cfs 2.041 af

Reach 3Ra: Avg. Flow Depth=0.31' Max Vel=4.57 fps Inflow=6.96 cfs 0.586 af
n=0.030 L=269.2' S=0.0530 '/' Capacity=257.66 cfs Outflow=6.74 cfs 0.586 af

Reach 3Rb: Avg. Flow Depth=0.25' Max Vel=5.61 fps Inflow=6.74 cfs 0.586 af
n=0.030 L=160.7' S=0.0999 '/' Capacity=353.90 cfs Outflow=6.68 cfs 0.586 af

Reach 4R: Avg. Flow Depth=0.31' Max Vel=4.51 fps Inflow=6.85 cfs 0.639 af
n=0.030 L=169.2' S=0.0510 '/' Capacity=252.83 cfs Outflow=6.78 cfs 0.639 af

Reach 5R: Avg. Flow Depth=0.33' Max Vel=4.75 fps Inflow=7.87 cfs 0.808 af
n=0.030 L=109.7' S=0.0524 '/' Capacity=256.30 cfs Outflow=7.84 cfs 0.808 af

Pond 1P: Peak Elev=705.68' Storage=30,906 cf Inflow=26.08 cfs 2.476 af
Discarded=0.80 cfs 0.936 af Primary=0.82 cfs 0.591 af Secondary=15.02 cfs 0.948 af Outflow=16.64 cfs 2.475 af

Pond 2P: Peak Elev=675.16' Storage=7,900 cf Inflow=35.94 cfs 3.707 af
Discarded=0.25 cfs 0.220 af Primary=1.75 cfs 1.369 af Secondary=33.60 cfs 2.117 af Outflow=35.59 cfs 3.706 af

Pond 3P: Peak Elev=709.64' Storage=10,952 cf Inflow=19.24 cfs 1.918 af
Discarded=0.39 cfs 0.258 af Primary=3.68 cfs 1.148 af Secondary=13.81 cfs 0.493 af Outflow=17.88 cfs 1.899 af

Link POA-A: Inflow=121.33 cfs 12.757 af
Primary=121.33 cfs 12.757 af

Link POA-B: Inflow=20.93 cfs 2.040 af
Primary=20.93 cfs 2.040 af

Link POA-C: Inflow=10.47 cfs 0.896 af
Primary=10.47 cfs 0.896 af

Link POA-D: Inflow=6.79 cfs 0.553 af
Primary=6.79 cfs 0.553 af

Total Runoff Area = 45.784 ac Runoff Volume = 17.681 af Average Runoff Depth = 4.63"
99.89% Pervious = 45.734 ac 0.11% Impervious = 0.050 ac

Summary for Subcatchment A1:

Runoff = 19.83 cfs @ 12.21 hrs, Volume= 1.881 af, Depth= 4.02"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.02"

	Area (sf)	CN	Description
	39,640	58	Meadow, non-grazed, HSG B
	30,835	71	Meadow, non-grazed, HSG C
	60,945	55	Woods, Good, HSG B
	27,268	70	Woods, Good, HSG C
*	969	65	Meadow, Compacted Site, HSG B
*	84,642	75	Meadow, Compacted Site, HSG C
	244,299	66	Weighted Average
	244,299		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0600	0.18		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
2.3	236	0.0593	1.70		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.0	255	0.0941	2.15		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.0	166	0.1566	2.77		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.7	90	0.0889	2.09		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
15.1	847	Total			

Summary for Subcatchment A2:

Runoff = 6.41 cfs @ 12.20 hrs, Volume= 0.595 af, Depth= 4.25"
Routed to Reach 1R :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.02"

	Area (sf)	CN	Description
	7,809	58	Meadow, non-grazed, HSG B
	149	71	Meadow, non-grazed, HSG C
*	35,295	65	Meadow, Compacted Site, HSG B
*	29,913	75	Meadow, Compacted Site, HSG C
	73,166	68	Weighted Average
	73,166		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
2.5	313	0.0863	2.06		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.0	289	0.1211	2.44		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
14.3	702	Total			

Summary for Subcatchment A3:

Runoff = 19.83 cfs @ 12.26 hrs, Volume= 2.041 af, Depth= 4.94"
Routed to Reach 2Ra :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.02"

	Area (sf)	CN	Description
	221	58	Meadow, non-grazed, HSG B
	10,240	71	Meadow, non-grazed, HSG C
*	23,742	65	Meadow, Compacted Site, HSG B
*	181,601	75	Meadow, Compacted Site, HSG C
	215,804	74	Weighted Average
	215,804		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
4.9	552	0.0725	1.88		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.0	287	0.1185	2.41		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.0	264	0.0947	2.15		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
18.7	1,203	Total			

Summary for Subcatchment A4:

Runoff = 11.28 cfs @ 12.21 hrs, Volume= 1.080 af, Depth= 4.94"
Routed to Pond 2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.02"

	Area (sf)	CN	Adj	Description
	30,673	71		Meadow, non-grazed, HSG C
*	79,945	75		Meadow, Compacted Site, HSG C
*	1,696	89		Gravel roads, Compacted Site, HSG C
	1,913	98		Unconnected pavement, HSG C
	114,227	75	74	Weighted Average, UI Adjusted
	112,314			98.33% Pervious Area
	1,913			1.67% Impervious Area
	1,913			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0700	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
3.4	363	0.0634	1.76		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.3	279	0.0824	2.01		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.3	205	0.1317	2.54		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
15.6	947	Total			

Summary for Subcatchment A5:

Runoff = 6.96 cfs @ 12.15 hrs, Volume= 0.586 af, Depth= 4.94"
Routed to Reach 3Ra :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.02"

	Area (sf)	CN	Description
	37,315	71	Meadow, non-grazed, HSG C
*	20,053	75	Meadow, Compacted Site, HSG C
	1,475	89	Gravel roads, HSG C
*	2,847	89	Gravel roads, Compacted Site, HSG C
	279	98	Unconnected pavement, HSG C
	61,969	74	Weighted Average
	61,690		99.55% Pervious Area
	279		0.45% Impervious Area
	279		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0600	0.18		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
1.7	226	0.0973	2.18		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
10.8	326	Total			

Summary for Subcatchment A6:

Runoff = 93.45 cfs @ 12.15 hrs, Volume= 7.733 af, Depth= 4.60"
Routed to Link POA-A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.02"

Area (sf)	CN	Description
96,429	61	>75% Grass cover, Good, HSG B
89,079	74	>75% Grass cover, Good, HSG C
322,635	80	>75% Grass cover, Good, HSG D
212,517	55	Woods, Good, HSG B
6,745	70	Woods, Good, HSG C
139,486	77	Woods, Good, HSG D
6,710	89	Gravel roads, HSG C
5,749	91	Gravel roads, HSG D
879,350	71	Weighted Average
879,350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	100	0.1300	0.25		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
0.4	61	0.2787	2.64		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
1.5	237	0.1435	2.65		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.6	164	0.1098	1.66		**Shallow Concentrated Flow, Shallow - Meadow** Woodland Kv= 5.0 fps
10.2	562	Total			

Summary for Subcatchment B1:

Runoff = 6.85 cfs @ 12.20 hrs, Volume= 0.639 af, Depth= 5.06"
Routed to Reach 4R :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.02"

	Area (sf)	CN	Description
	7,415	71	Meadow, non-grazed, HSG C
*	58,567	75	Meadow, Compacted Site, HSG C
	65,982	75	Weighted Average
	65,982		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0700	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
5.8	652	0.0706	1.86		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
14.4	752	Total			

Summary for Subcatchment B2:

Runoff = 4.93 cfs @ 12.21 hrs, Volume= 0.471 af, Depth= 4.94"
Routed to Pond 3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.02"

	Area (sf)	CN	Description
	11,394	71	Meadow, non-grazed, HSG C
	27	70	Woods, Good, HSG C
*	38,388	75	Meadow, Compacted Site, HSG C
	49,809	74	Weighted Average
	49,809		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.0600	0.18		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
6.4	733	0.0737	1.90		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
15.5	833	Total			

Summary for Subcatchment B3:

Runoff = 7.87 cfs @ 12.26 hrs, Volume= 0.808 af, Depth= 4.83"
Routed to Reach 5R :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.02"

	Area (sf)	CN	Description
	13,086	71	Meadow, non-grazed, HSG C
	24,906	70	Woods, Good, HSG C
*	49,480	75	Meadow, Compacted Site, HSG C
	87,472	73	Weighted Average
	87,472		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
0.5	50	0.0600	1.71		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
8.6	614	0.0570	1.19		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
0.6	79	0.1139	2.36		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.1	147	0.0952	2.16		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
18.6	990	Total			

Summary for Subcatchment B4:

Runoff = 4.44 cfs @ 12.18 hrs, Volume= 0.400 af, Depth= 4.60"
Routed to Link POA-B :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.02"

Area (sf)	CN	Description
29,407	71	Meadow, non-grazed, HSG C
19	78	Meadow, non-grazed, HSG D
14,941	70	Woods, Good, HSG C
1,070	77	Woods, Good, HSG D
45,437	71	Weighted Average
45,437		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
2.9	275	0.0509	1.58		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	26	0.0769	1.39		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
13.0	401	Total			

Summary for Subcatchment C1:

Runoff = 10.47 cfs @ 12.16 hrs, Volume= 0.896 af, Depth= 4.83"
Routed to Link POA-C :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.02"

Area (sf)	CN	Description
82,784	74	>75% Grass cover, Good, HSG C
14,219	70	Woods, Good, HSG C
97,003	73	Weighted Average
97,003		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.1100	0.23		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
4.2	432	0.0602	1.72		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
11.4	532	Total			

Summary for Subcatchment D1:

Runoff = 6.79 cfs @ 12.14 hrs, Volume= 0.553 af, Depth= 4.83"
Routed to Link POA-D :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.02"

Area (sf)	CN	Description
49,127	74	>75% Grass cover, Good, HSG C
10,702	70	Woods, Good, HSG C
59,829	73	Weighted Average
59,829		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.24"
1.7	239	0.1172	2.40		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
9.5	339	Total			

Summary for Reach 1R:

Inflow Area = 1.680 ac, 0.00% Impervious, Inflow Depth = 4.25" for 100-yr event
Inflow = 6.41 cfs @ 12.20 hrs, Volume= 0.595 af
Outflow = 6.28 cfs @ 12.23 hrs, Volume= 0.595 af, Atten= 2%, Lag= 2.0 min
Routed to Pond 1P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.13 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.02 fps, Avg. Travel Time= 3.3 min

Peak Storage= 409 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.39' , Surface Width= 6.36'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 153.09 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 200.0' Slope= 0.0187 '/'
Inlet Invert= 706.94', Outlet Invert= 703.20'

‡

Summary for Reach 2Ra:

Inflow Area = 4.954 ac, 0.00% Impervious, Inflow Depth = 4.94" for 100-yr event
Inflow = 19.83 cfs @ 12.26 hrs, Volume= 2.041 af
Outflow = 19.72 cfs @ 12.27 hrs, Volume= 2.041 af, Atten= 1%, Lag= 0.8 min
Routed to Reach 2Rb :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.53 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.17 fps, Avg. Travel Time= 1.4 min

Peak Storage= 561 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.54' , Surface Width= 7.24'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 268.10 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 185.0' Slope= 0.0574 '/'
Inlet Invert= 704.03', Outlet Invert= 693.42'

‡

Summary for Reach 2Rb:

Inflow Area = 4.954 ac, 0.00% Impervious, Inflow Depth = 4.94" for 100-yr event
Inflow = 19.72 cfs @ 12.27 hrs, Volume= 2.041 af
Outflow = 19.59 cfs @ 12.28 hrs, Volume= 2.041 af, Atten= 1%, Lag= 0.6 min
Routed to Reach 2Rc :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.37 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.75 fps, Avg. Travel Time= 1.0 min

Peak Storage= 388 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.44' , Surface Width= 6.65'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 385.03 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 165.1' Slope= 0.1183 '/'
Inlet Invert= 693.42', Outlet Invert= 673.89'

‡

Summary for Reach 2Rc:

Inflow Area = 4.954 ac, 0.00% Impervious, Inflow Depth = 4.94" for 100-yr event
Inflow = 19.59 cfs @ 12.28 hrs, Volume= 2.041 af
Outflow = 19.50 cfs @ 12.30 hrs, Volume= 2.041 af, Atten= 0%, Lag= 1.0 min
Routed to Pond 2P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.90 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.66 fps, Avg. Travel Time= 1.5 min

Peak Storage= 612 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.67' , Surface Width= 8.00'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 179.13 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 153.1' Slope= 0.0256 '/'
Inlet Invert= 673.89', Outlet Invert= 669.97'

‡

Summary for Reach 3Ra:

Inflow Area = 1.423 ac, 0.45% Impervious, Inflow Depth = 4.94" for 100-yr event
Inflow = 6.96 cfs @ 12.15 hrs, Volume= 0.586 af
Outflow = 6.74 cfs @ 12.18 hrs, Volume= 0.586 af, Atten= 3%, Lag= 1.8 min
Routed to Reach 3Rb :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.57 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 3.2 min

Peak Storage= 407 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.31' , Surface Width= 5.84'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 257.66 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 269.2' Slope= 0.0530 '/'
Inlet Invert= 700.50', Outlet Invert= 686.24'

‡

Summary for Reach 3Rb:

Inflow Area = 1.423 ac, 0.45% Impervious, Inflow Depth = 4.94" for 100-yr event
Inflow = 6.74 cfs @ 12.18 hrs, Volume= 0.586 af
Outflow = 6.68 cfs @ 12.20 hrs, Volume= 0.586 af, Atten= 1%, Lag= 0.9 min
Routed to Pond 2P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.61 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.71 fps, Avg. Travel Time= 1.6 min

Peak Storage= 193 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.25' , Surface Width= 5.51'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 353.90 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 160.7' Slope= 0.0999 '/'
Inlet Invert= 686.24', Outlet Invert= 670.18'

‡

Summary for Reach 4R:

Inflow Area = 1.515 ac, 0.00% Impervious, Inflow Depth = 5.06" for 100-yr event
Inflow = 6.85 cfs @ 12.20 hrs, Volume= 0.639 af
Outflow = 6.78 cfs @ 12.22 hrs, Volume= 0.639 af, Atten= 1%, Lag= 1.0 min
Routed to Pond 3P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.51 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.41 fps, Avg. Travel Time= 2.0 min

Peak Storage= 257 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.31' , Surface Width= 5.85'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 252.83 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 169.2' Slope= 0.0510 '/'
Inlet Invert= 718.48', Outlet Invert= 709.85'

‡

Summary for Reach 5R:

Inflow Area = 2.008 ac, 0.00% Impervious, Inflow Depth = 4.83" for 100-yr event
Inflow = 7.87 cfs @ 12.26 hrs, Volume= 0.808 af
Outflow = 7.84 cfs @ 12.27 hrs, Volume= 0.808 af, Atten= 0%, Lag= 0.6 min
Routed to Pond 3P :

Routing by Stor-Ind+Trans method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.75 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.55 fps, Avg. Travel Time= 1.2 min

Peak Storage= 182 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.33' , Surface Width= 5.99'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 256.30 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 109.7' Slope= 0.0524 '/'
Inlet Invert= 715.70', Outlet Invert= 709.95'

‡

Summary for Pond 1P:

Inflow Area = 7.288 ac, 0.00% Impervious, Inflow Depth = 4.08" for 100-yr event
Inflow = 26.08 cfs @ 12.22 hrs, Volume= 2.476 af
Outflow = 16.64 cfs @ 12.44 hrs, Volume= 2.475 af, Atten= 36%, Lag= 13.1 min
Discarded = 0.80 cfs @ 12.44 hrs, Volume= 0.936 af
Primary = 0.82 cfs @ 12.44 hrs, Volume= 0.591 af
Routed to Link POA-A :
Secondary = 15.02 cfs @ 12.44 hrs, Volume= 0.948 af
Routed to Link POA-A :

Routing by Stor-Ind method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 705.68' @ 12.44 hrs Surf.Area= 17,220 sf Storage= 30,906 cf

Plug-Flow detention time= 124.2 min calculated for 2.469 af (100% of inflow)
Center-of-Mass det. time= 124.3 min (965.5 - 841.1)

Volume	Invert	Avail.Storage	Storage Description
#1	702.00'	36,749 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
702.00	766	349.0	0	0	766
703.00	3,929	601.0	2,143	2,143	19,823
704.00	9,691	656.0	6,597	8,740	25,360
705.00	13,800	700.0	11,685	20,425	30,156
706.00	18,985	746.0	16,324	36,749	35,499

Device	Routing	Invert	Outlet Devices
#1	Secondary	705.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	702.00'	**1.020 in/hr Exfiltration over Wetted area**
#3	Primary	701.50'	**4.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 701.50' / 700.00' S= 0.0500 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#4	Device 3	704.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.80 cfs @ 12.44 hrs HW=705.68' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.80 cfs)

Primary OutFlow Max=0.82 cfs @ 12.44 hrs HW=705.68' (Free Discharge)
└─**3=Culvert** (Barrel Controls 0.82 cfs @ 9.38 fps)
  └─**4=Orifice/Grate** (Passes 0.82 cfs of 19.58 cfs potential flow)

Secondary OutFlow Max=14.96 cfs @ 12.44 hrs HW=705.68' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 14.96 cfs @ 2.22 fps)

Summary for Pond 2P:

Inflow Area = 8.999 ac, 0.56% Impervious, Inflow Depth = 4.94" for 100-yr event
Inflow = 35.94 cfs @ 12.25 hrs, Volume= 3.707 af
Outflow = 35.59 cfs @ 12.25 hrs, Volume= 3.706 af, Atten= 1%, Lag= 0.0 min
Discarded = 0.25 cfs @ 12.20 hrs, Volume= 0.220 af
Primary = 1.75 cfs @ 12.25 hrs, Volume= 1.369 af
Routed to Link POA-A :
Secondary = 33.60 cfs @ 12.25 hrs, Volume= 2.117 af
Routed to Link POA-A :

Routing by Stor-Ind method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 675.16' @ 12.25 hrs Surf.Area= 4,630 sf Storage= 7,900 cf

Plug-Flow detention time= 16.8 min calculated for 3.698 af (100% of inflow)
Center-of-Mass det. time= 17.1 min (846.0 - 828.9)

Volume	Invert	Avail.Storage	Storage Description
#1	672.00'	7,900 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
672.00	367	178.0	0	0	367
673.00	2,107	284.0	1,118	1,118	4,271
674.00	3,456	350.0	2,754	3,872	7,616
675.00	4,630	399.0	4,029	7,900	10,560

Device	Routing	Invert	Outlet Devices
#1	Secondary	674.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Primary	671.50'	**6.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 671.50' / 665.00' S= 0.2167 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	673.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Discarded	672.00'	**1.020 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.25 cfs @ 12.20 hrs HW=675.15' (Free Discharge)
└─**4=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=1.75 cfs @ 12.25 hrs HW=675.16' (Free Discharge)
└─**2=Culvert** (Inlet Controls 1.75 cfs @ 8.89 fps)
  └─**3=Orifice/Grate** (Passes 1.75 cfs of 22.23 cfs potential flow)

Secondary OutFlow Max=33.58 cfs @ 12.25 hrs HW=675.16' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 33.58 cfs @ 2.90 fps)

Summary for Pond 3P:

Inflow Area = 4.666 ac, 0.00% Impervious, Inflow Depth = 4.93" for 100-yr event
Inflow = 19.24 cfs @ 12.23 hrs, Volume= 1.918 af
Outflow = 17.88 cfs @ 12.31 hrs, Volume= 1.899 af, Atten= 7%, Lag= 4.4 min
Discarded = 0.39 cfs @ 12.31 hrs, Volume= 0.258 af
Primary = 3.68 cfs @ 12.31 hrs, Volume= 1.148 af
Routed to Link POA-B :
Secondary = 13.81 cfs @ 12.31 hrs, Volume= 0.493 af
Routed to Link POA-B :

Routing by Stor-Ind method, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 709.64' @ 12.31 hrs Surf.Area= 7,310 sf Storage= 10,952 cf

Plug-Flow detention time= 41.8 min calculated for 1.899 af (99% of inflow)
Center-of-Mass det. time= 35.9 min (863.1 - 827.2)

Volume	Invert	Avail.Storage	Storage Description
#1	705.00'	13,803 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
705.00	11	34.0	0	0	11
706.00	205	84.0	88	88	484
707.00	1,272	180.0	663	750	2,505
708.00	2,956	278.0	2,056	2,806	6,084
709.00	5,374	389.0	4,105	6,911	11,986
710.00	8,531	494.0	6,892	13,803	19,377

Device	Routing	Invert	Outlet Devices
#1	Secondary	709.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	705.00'	**1.020 in/hr Exfiltration over Wetted area**
#3	Primary	704.50'	**8.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 704.50' / 702.00' S= 0.0833 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#4	Device 3	708.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.39 cfs @ 12.31 hrs HW=709.64' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.39 cfs)

Primary OutFlow Max=3.68 cfs @ 12.31 hrs HW=709.64' (Free Discharge)
└─**3=Culvert** (Inlet Controls 3.68 cfs @ 10.55 fps)
  └─**4=Orifice/Grate** (Passes 3.68 cfs of 19.35 cfs potential flow)

Secondary OutFlow Max=13.72 cfs @ 12.31 hrs HW=709.64' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 13.72 cfs @ 2.15 fps)

Summary for Link POA-A:

Inflow Area = 36.474 ac, 0.14% Impervious, Inflow Depth = 4.20" for 100-yr event
Inflow = 121.33 cfs @ 12.18 hrs, Volume= 12.757 af
Primary = 121.33 cfs @ 12.18 hrs, Volume= 12.757 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-B:

Inflow Area = 5.709 ac, 0.00% Impervious, Inflow Depth = 4.29" for 100-yr event
Inflow = 20.93 cfs @ 12.29 hrs, Volume= 2.040 af
Primary = 20.93 cfs @ 12.29 hrs, Volume= 2.040 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-C:

Inflow Area = 2.227 ac, 0.00% Impervious, Inflow Depth = 4.83" for 100-yr event
Inflow = 10.47 cfs @ 12.16 hrs, Volume= 0.896 af
Primary = 10.47 cfs @ 12.16 hrs, Volume= 0.896 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA-D:

Inflow Area = 1.373 ac, 0.00% Impervious, Inflow Depth = 4.83" for 100-yr event
Inflow = 6.79 cfs @ 12.14 hrs, Volume= 0.553 af
Primary = 6.79 cfs @ 12.14 hrs, Volume= 0.553 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Appendix D – Operation and Maintenance Plan

Operations and Maintenance Plan

Stafford Solar One

Date:

March 2024

Prepared By:

Stafford Solar One, LLC

Table of Contents

VEROGY

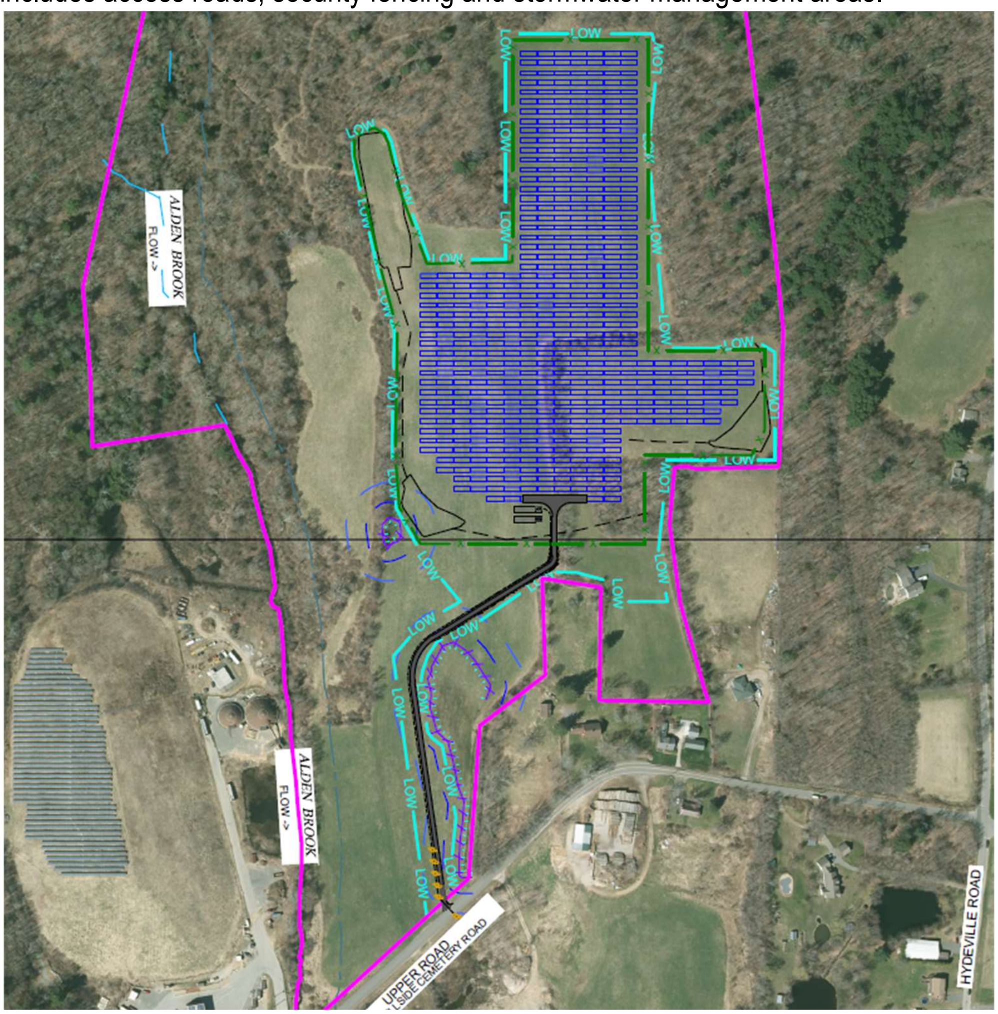
Operations and Maintenance Plan

1. Introduction

Stafford Solar One, LLC ("Owner") is responsible for maintaining and servicing the photovoltaic (PV) electric system as well as the related facilities during the operational phase of the project. Related facilities include fencing, lighting, grass, roads, storm water devices, etc. This O&M Plan describes the project components, commissioning procedures, monitoring system, Maintenance provisions and emergency response

2. Project Description

The proposed Project is a 4.0 MW AC ground mounted solar array located in Stafford, CT that will consist of solar modules, inverters, switchgear, transformers, and electrical systems interconnected to the utility grid along Upper Road. The Project also includes access roads, security fencing and stormwater management areas.



3. Contact Information

Table 1. Project Contact Information

Owner	Stafford Solar One, LLC 124 LaSalle Road, 2nd Floor West Hartford, CT 06107 (860)288-7215 development@verogy.com
O&M Service Provider	VCP EPC, LLC 124 LaSalle Road, 2nd Floor West Hartford, CT 06107 (860)288-7215 sdenino@verogy.com

4. Commissioning

Prior to the project reaching operation, the following inspections and tests will be performed by the O&M provider. The results will be included in the projects commissioning report.

- Full visual Inspection
- Mechanical inspection including torque verification of critical connections
- String Testing (IV curve test)
- Full System Production Evaluation
- Thermal Scanning

5. Monitoring

The O&M provider will utilize a continuous 24/7 remote monitoring system to provide alarm and performance data of the system. The monitoring system will include full site and inverter level production and alarms as well as site weather and irradiance data. The O&M provider will analyze performance data to make sure that the system is performing as designed and will be responsible for dispatching crews for system maintenance and repair related issues. The O&M provider will be contractually obligated to comply with this O&M Plan, as well as the conditions of all permits or regulatory approvals.

6. Maintenance

O&M services are outlined below. (The frequency of these services is outlined in Table 2)

6.1. Site Access

The solar array and all associated equipment shall be located behind a fence with gates as depicted on the construction drawings or as directed by permitting authorities. Access to that facility shall be granted to authorized personnel only. Access to that facility shall be arranged with the Owner or O&M provider as identified in table 1. Provisions will be in place for Emergency personnel to access the site via a universal key box (i.e. Knox Box) that will have that appropriate key(s) to access the facility.

6.2. Equipment Maintenance

The O&M provider and/or its authorized subcontractors will inspect and maintain electrical and PV equipment in accordance with the manufacturer's requirements to maintain proper operation and warranty status.

The O&M provider will also perform the following inspections. The results from these inspections/tests will be provided in an O&M inspection report.

- The operation of all safety devices will be reviewed and corrected to maintain proper function.
- Full visual Inspection of all equipment, subassemblies, wiring, connectors, etc.
- Thermal Scanning of electronic equipment, wiring terminations, connectors, etc.
- Mechanical inspection including torque verification of critical connections
- String Testing (IV curve test)
- Air filter elements

6.3. Site Maintenance

The O&M provider and/or its authorized subcontractors will visit the site monthly to assess site conditions and perform maintenance as needed. Signage and egress functionality will be inspected at this time and repaired, if necessary.

6.3.1. Grass Management

The primary means of vegetation management will come in the form of the Livestock Grazing Program to be deployed by Stafford Solar One, LLC in partnership with Hillview Farm of Connecticut. In Summary, the sheep grazing program will be used to control vegetation at the project site to achieve the following:

- Prevent panel shading from vegetation
- Control and remove invasive and unpalatable plant species
- Avoid the growth of brush and woody species under the solar panels
- Maintain a diverse forage population to support optimal sheep nutrition
- Encourage forage population to support optimal sheep nutrition
- Optimize sequestered soil carbon through increasing top-soil amount and root matter
- Control erosion

6.3.2. Panel Cleaning

Panel Cleaning is rarely necessary in the Northeast, but if the panels are to experience enough soiling to adversely affect production the panels will be cleaned using water and soft bristle brooms. No chemicals will be used.

6.3.3. Snow Maintenance

The O&M provider and/or its authorized subcontractors will clear snow from the access roads to all the electrical equipment pads as necessary. As required, snow will be plowed or removed in a manner to maintain emergency turnarounds. The Owner does not intend on removing snow from panels.

6.4. Long-Term Stormwater Maintenance Plan

The O&M team will provide maintenance in accordance with the approved stormwater maintenance plan produced by the engineer of record.

Table 2. Scheduled Maintenance Activity

Task	Frequency
Visual Array & Equipment Inspection	1x per year or per equipment manufacturer requirements
Mechanical and Electrical Inspections	1x per year or per equipment manufacturer requirements
Panel Cleaning	As Needed
Mowing and Trimming / Co-use Sheep Grazing	In accordance with livestock grazing Plan. Mowing and trimming as needed.
Snow Removal	As needed
Perimeter Fence Inspection	1x per year
Stormwater Management System Inspection	1x per year or per engineer's stormwater management plan

7. Emergency Response

The Owner will coordinate with the Town of Stafford police and fire departments regarding access to the facility and emergency shutoff switches. Table 3 provides an emergency contact list for the Town of Stafford. Each of the entrance gates will have a universal key lock (e.g. Knox lock) for emergency responders.

Table 3. Town of Stafford Emergency Contacts

Emergencies	Dial 911
Resident Trooper Sergeant Joseph Strogoff	2 Main St, Stafford Springs, CT 06076 Emergency Calls: 911 Routine Calls: (860)684-3777
Stafford Fire Department	Will Skene, Fire Marshall 9 Colburn Road Stafford Springs, CT 06076 Emergency Calls: 911 Routine Calls: (860)684-3612

Appendix E – Decommissioning and Restoration Plan

Decommissioning and Restoration Plan
Ground Mount PV Array
Stafford Solar One

Date:

March 2024

Prepared By:

Stafford Solar One, LLC

Table of Contents

Decommissioning and Restoration Plan

1. Overview

After the proposed Photovoltaic Facility has reached the end of its operational lifetime, Stafford Solar One, LLC and/or the future owners ("Owner") of the proposed Photovoltaic (PV) facility will be responsible to decommission the project. The Project is designed for an operational life of at least 35 years. It is anticipated that advances in technology and efficiency over that timeframe will create an economic advantage in replacing the project.

Decommissioning of a PV facility is the removal of all system components associated with the generating system and restoring the site to as close to pre-construction conditions as possible. Decommissioning procedures are developed to ensure environmental protection, public safety, and health, and that the work being performed is in compliance with all applicable regulations.

The Project Owner will be responsible for:

- All decommissioning costs
- Obtaining all permits required for the decommissioning, removal and legal disposal of system components prior to the start of decommissioning activities
- The complete decommissioning of the facility, including the removal and disposal of all equipment and restoration of the site in accordance with applicable permits and in compliance with all applicable rules and regulations in effect governing material disposal
- Any other measures that the Siting Council may require in its approval of this Project.

2. Estimated Costs

The industry generally recognizes that a PV facility is constructed of components that will remain valuable at the time of decommissioning. We expect that the value of the components of the array at the end of the project's useful life in either a salvage or re-sale scenario will be greater than the expected cost of decommissioning the facility.

3. Materials

3.1. PV Modules

PV Modules are constructed of glass, aluminum, plastic, semiconductor rigid silicon cells, internal electrical conductors, silver solder, plus a variety of micro materials. Glass typically makes up 80% of the weight of a module.

3.2. Metals

Steel from foundations, racking, conduits, electrical enclosures, fencing, equipment buildings, and storage containers; aluminum from racking, module frames, electrical wire, and transformers; stainless steel from fasteners, electrical enclosures, and racking; copper from electrical wire, transformers, and inverters.

3.3. Plastics

A limited amount of plastic materials are used in PV systems due to a system's continuous exposure to the elements and long operational lifetime. Plastics typically are found in PV facilities as wire insulation, electrical enclosures, control and monitoring equipment, and inverter components. Plastic laminate films are also used in most PV module assemblies.

3.4. Concrete

Equipment pads and footings. Includes both reinforced and non-reinforced concrete.

4. Decommissioning & Restoration Plan

4.1. Preparation & Mobilization

Prior to decommissioning the system, the Owner of the facility and the decommissioning contractors will begin the preparation and planning phase of the project. The decommissioning process shall be completed no later than 2 years following the discontinuation of operations of the facility. The onsite deconstruction and restoration effort may take up to six months to complete. Prior to decommissioning activity taking place a site assessment will take place to evaluate site conditions and put a protection plan together to protect surrounding natural resources. Upon site mobilization and prior to the start of the removal of any system components, proper erosion and sediment controls will be installed. The access roads and fencing will remain in place for use by the decommissioning and site restoration workers until decommissioning activities are completed unless the site owner requests that they remain in place. Debris will be placed in dumpsters on-site until transportation to proper disposal facilities is arranged.

4.2. Photovoltaic Equipment Removal

- The system will be de-energized from the utility power grid. The infrastructure connecting the facility to the utility power grid will be removed unless the landowner determines that the electrical service line will be beneficial for future use of the site, in which case the line may remain after decommissioning.
- All wirings, cables, conduits, panelboards, inverters, transformers and associated equipment will be uninstalled and recycled as applicable.
- PV modules will be uninstalled and recycled as applicable.
- The steel racking system will be disassembled and recycled as applicable
- Steel pilings which supported the module racking will be mechanically removed and recycled as applicable.
- The demolition debris and removed equipment may be cut or dismantled into smaller pieces that can be safely lifted or carried by the deconstruction equipment being used. Most of the glass and steel and

aluminum will be processed for transportation and delivery to an off-site recycling center. Minimal non-recyclable materials are anticipated; these will be properly disposed of at a qualified disposal facility.

4.3 Civil Restoration

- Any resulting holes from the removal of the steel piles will be backfilled with locally imported soil to match existing site soil conditions.
- The concrete transformer and interconnection equipment pads will be broken up and removed.
- The on-site access roads servicing the Project and the security fencing around the Project will remain in place during decommissioning activities to support the removal of equipment. Once removal activities are completed, discussion with the landowners will occur to determine if the roads or security fencing will be beneficial for future use of site. If the access roads or security fencing is determined to be beneficial for future use of site, these facilities may remain in place.
- Access roads that will not be utilized to support future use of the site will restored to preconstruction conditions. Aggregate base material of the roads will be removed, and the compacted base section will be filled with locally imported soil to match existing onsite soils. The areas will then be seeded to match existing onsite groundcover.
- If the security fencing is not to be used, it will be removed and transported to the nearest recycling facility.
- Once all Project equipment has been removed, additional activities will occur to return the property back to conditions similar to pre-construction. Reclamation will restore vegetative cover and hydrological function after the closure of the facility.
- As previously discussed, any excavated areas remaining after the removal of equipment pads, access road base materials, or fence posts will be backfilled with locally imported soil to match existing onsite soils.
- Storm Water Basins, if applicable, may remain if there is a benefit to the owner. If not, they will be removed and restored in a manner to minimize disturbance.
- Once landform features and soils are restored, a seed mix will be applied to disturbed areas to match the existing onsite groundcover.

5. Health and Safety Concerns

Site decommissioning will entail the use of heavy equipment, the handling of heavy and sharp objects and limited exposure to potentially live electrical components. A Health and Safety Plan will be created based on the individual characteristics of the site to minimize and eliminate all possible risks and hazards. The Health and Safety Plan will include a Job Hazard Analysis that will analyze each step of construction for hazards, along with any climate conditions or hazardous materials that may be seen or used throughout the duration of the job. The plan will outline steps to take if a hazard is identified and how to proceed with each hazard. Along with this, all workers will have training and personal protective equipment (PPE) in compliance with OSHA standards. A daily toolbox talk will be held where the foreman or supervisor will go over daily hazards and activities to be completed.

Appendix F – Abutting Property Owner List and Public Outreach Materials

STAFFORD SOLAR ONE - LIST OF ABUTTING PROPERTY OWNERS			
MBLU	OWNER NAME	SITE ADDRESS	MAILING ADDRESS
15-47	HATCH ROBERT L+CORALIE BURKE	152 HYDEVILLE RD	8 DUNAY RD STAFFORD SPRINGS, CT 06076
27-18	SLAVIK TRAVIS	114 HYDEVILLE RD	114 HYDEVILLE RD, STAFFORD SPRINGS, CT 06076
28-1	ANSELMO GENERO L JR+DEBRA G	100 UPPER RD	100 UPPER RD, STAFFORD SPRINGS, CT 06076
27-19	MORDASKY EDWINA ESTATE	101 UPPER RD	168 HYDEVILLE RD, STAFFORD SPRINGS, CT 06076
27-21.1	TALAMINI JAMES M+LAUREN N MCCARTHY	140 HYDDVILLE RD	140 HYDEVILLE RD, STAFFORD SPRINGS, CT 06076
15-18	MINERAL SPRINGS FAMILY CAMPGROUND INC	135 LEONARD RD	135 LEONARD RD, STAFFORD SPRINGS, CT 06076
27-7	CARTER MARK R + LYNN D	55 LEONARD RD	52 LEONARD RD, STAFFORD SPRINGS, CT 06076
27-20	MORDASKY JOHN+EDWINA J	92 UPPER RD	168 HYDEVILLE RD, STAFFORD SPRINGS, CT 06076
27-7.1	STAFFORD TOWN OF	80 UPPER RD	1 MAIN ST, STAFFORD SPRINGS, CT 06076
28-2	MORDASKY JUDITH A+ KURT F	108 UPPER RD	108 UPPER RD, STAFFORD SPRINGS, CT 06076
28-3	SATKOWSKI KAREN L+BRIAN A NORBUT	112 UPPER RD	112 UPPER RD, STAFFORD SPRINGS, CT 06076
27-20.02	MORDASKY KEVIN A + LINSLEY	0 DUNAY RD	40 DUNAY RD, STAFFORD SPRINGS, CT 06076

Stafford Solar One

Re: Stafford Solar One

Current Resident:

I am writing to introduce you to Stafford Solar One, developed by Verogy, a West Hartford-based renewable energy developer focused on operating Solar Farms for municipal and commercial clients. Our team has decades of experience in the development, financing, construction, and management of solar energy projects. We are currently pursuing a new solar project in Stafford. In addition to this letter, you will receive an official notice from our attorney that indicates our intent to file an application for a Certificate of Environmental Compatibility and Public Need with the Connecticut Siting Council.

The proposed project, Stafford Solar One, is located at 92 Upper Road. The project's design calls for a 4-megawatt system located on approximately 22 of the parcel's 59 acres. Once completed, Stafford Solar One is projected to generate enough energy to power approximately 829 homes for a year, while generating zero pollution or carbon emissions. Shared Clean Energy Facility (SCEF) projects such as this one result in credits applied to the bills of participating electric customers at no cost to them. Subscribers include low and moderate-income customers, as well as small business & municipal customers. The cumulative annual benefit to these customers is estimated to be $165,500. Additionally, Stafford Solar One will be an economic contributor to the town, generating new property tax revenues and creating jobs in the region. We also plan to employ sheep grazing within the fenced limits of this solar array to assist with vegetative maintenance of this facility.

Enclosed is a fact sheet with additional information and we have established a project website (www.verogy.com/Stafford-solar-one) which will be updated with the latest project information and available as a resource for you throughout this process. We hope you let us know if you have any comments or questions through the Contact Us section at the bottom of the page. We are looking forward to investing in Stafford and appreciate your feedback as we finalize our proposed project.

The Verogy team looks forward to connecting with neighbors as we work to develop Stafford Solar One. If you have any questions, please feel free to reach out.

Sincerely,

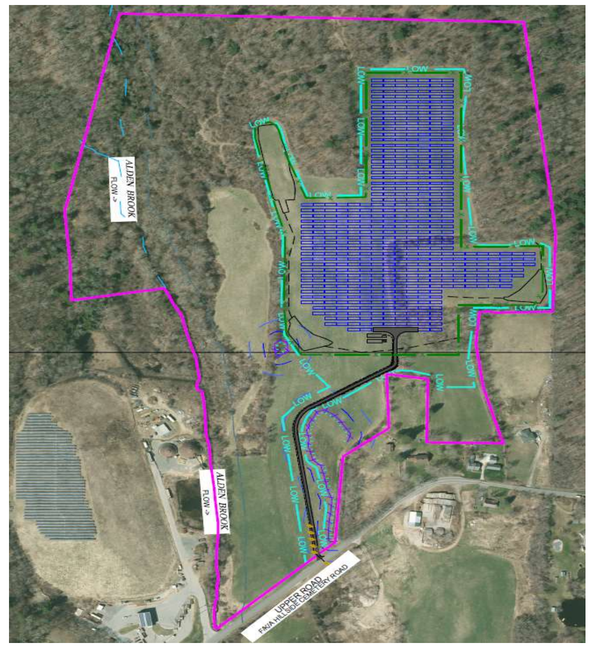
Bryan Fitzgerald
Co-Founder, Director of Development
Verogy | 124 LaSalle Road, 2nd Floor, West Hartford, CT 06107

PROJECT FACT SHEET

Stafford Solar One

PROJECT DESCRIPTION

- Stafford Solar One is a solar project located at 92 Upper Road in Stafford, Connecticut
- The 4 MW AC system will generate enough electricity to power 829 average homes for a year
- The project site is designed to have minimal environmental impacts with no disruption to wetlands or core forest



BENEFITS TO STAFFORD

- Increased new annual municipal tax revenues with no additional burden on town services
- Infrastructure upgrades that improve the reliability of Stafford's electrical grid
- Reduction in energy demand during peak usage will decrease energy costs for ratepayers statewide
- Strengthened renewable energy resources that produce electricity locally with zero pollution

ACHIEVING THE 100% ZERO CARBON TARGET BY 2040 & ENVIRONMENTAL BENEFITS

- As a Class I Renewable Energy Source, Stafford Solar One will help support the goals set forth in Governor Lamont's September 2019 Executive Order No. 3 100% zero carbon target for the electricity sector by 2040
- Once operational, the project will offset the equivalent of 4,200 metric tons of CO_2 annually, equal to the emissions from 412,607 gallons of gasoline consumed, or to the carbon sequestered by 69,453 tree seedlings grown for 10 years
- Shared Clean Energy Facility (SCEF) projects will result in credits that will be applied to the bills of participating electric customers at no cost to those customers. Subscribers include low-income customers and moderate-income customers, as well as Small Business & Municipal Customers
- When completed, the project will use an estimated 22 acres out of a total 59 acres, leaving the balance of the parcel to continue its prior land use characteristics

APPROVAL PROCESS

Verogy requires approval from the Connecticut State Siting Council, who has jurisdiction over projects like Stafford Solar One. We will also be working closely with municipal departments in Stafford throughout the development of this project. Stafford Solar One will also obtain a General / SWPP Permit from CT DEEP.

Truth in energy. | development@verogy.com | 860.288.7215 x701 VEROGY

PROJECT FACT SHEET

Stafford Solar One cont...

ESTIMATED PROJECT CALENDAR

WINTER	2023	Design phase completed
SPRING	2023	Project submitted to SCEF
WINTER	2024	Application submitted to Connecticut Siting Council
FALL	2024	Construction Begins
SUMMER	2025	Project Completion

CONTACT US

Verogy is committed to keeping members of the Stafford community informed about our projects, please feel free to contact us with questions or concerns. Residents with questions about the approval process can contact Verogy's Director of Development, Bryan Fitzgerald at development@verogy.com or 860-288-7215 x701.

PROJECT CONTACT:

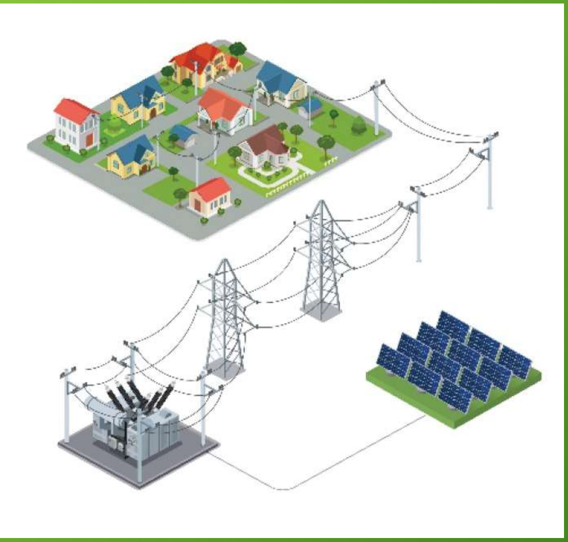
Bryan Fitzgerald

Director of Development

development@verogy.com

860-288-7215 x701.

FOR MORE INFO ON THIS PROJECT:



SOLAR ENERGY 101

1. Solar panels collect energy from the sun.
2. Inverters convert DC electricity to AC electricity.
3. Electricity is delivered to the circuit that connects to the substation through utility infrastructure.
4. Power is delivered to residential and business consumers through the local grid.

ABOUT VEROGY

Verogy is a Connecticut-based solar developer focused on commercial, industrial and small utility scale projects. Built on 75+ years of combined industry experience, the professionals at Verogy have developed, financed and constructed hundreds of solar projects across the United States.

Appendix G – List of Municipal Officials and Government Agencies and Sample Notice Letter

Appendix H – CT DEEP Correspondence – Core Forest

James Cerkanowicz

From:	Martin, Christopher <Christopher.Martin@ct.gov>
Sent:	Friday, December 29, 2023 9:48 AM
To:	James Cerkanowicz; Brad Parsons
Cc:	Bryan Fitzgerald
Subject:	RE: Core Forest Letter and Map for Stafford Solar One, LLC (4.0MW SCEF Project)

Hi James,

DEEP anticipates no material affect to core forest based upon the plans presented and supplemental information provided. Please let us know when a petition for a Declaratory Ruling has been filed before the Connecticut Siting Council for Stafford Solar One. DEEP can then issue a letter to such.

From: Martin, Christopher
Sent: Wednesday, December 27, 2023 2:18 PM
To: James Cerkanowicz <jcerkanowicz@verogy.com>; Brad Parsons <bparsons@verogy.com>
Cc: Bryan Fitzgerald <bfitzgerald@verogy.com>
Subject: RE: Core Forest Letter and Map for Stafford Solar One, LLC (4.0MW SCEF Project)

Thank you. I know some folks are taking some time off this week so it maybe a week or two for us to get back to you.

From: James Cerkanowicz <jcerkanowicz@verogy.com>
Sent: Wednesday, December 27, 2023 2:16 PM
To: Martin, Christopher <Christopher.Martin@ct.gov>; Brad Parsons <bparsons@verogy.com>
Cc: Bryan Fitzgerald <bfitzgerald@verogy.com>
Subject: RE: Core Forest Letter and Map for Stafford Solar One, LLC (4.0MW SCEF Project)

Christopher, I can now confirm that the size of the tree clearing that overlaps the core forest designation is approximately 9,700 square feet.

James Cerkanowicz, PE
Manager of Permitting
Verogy | 124 LaSalle Road, 2nd Floor
West Hartford, CT 06107
M: 860.335.1971

From: James Cerkanowicz
Sent: Tuesday, December 26, 2023 1:26 PM
To: Martin, Christopher <Christopher.Martin@ct.gov>; Brad Parsons <bparsons@verogy.com>

Cc: Bryan Fitzgerald <bfitzgerald@verogy.com>
Subject: RE: Core Forest Letter and Map for Stafford Solar One, LLC (4.0MW SCEF Project)

Christopher, thank you for the prompt review & response. I am reaching out to our engineering consultant that prepared the figure & will advise when I hear back from them regarding the size of the small area of tree clearing. I can confirm that we do not anticipate any tree clearing associated with the interconnection to the grid as currently designed. Thanks.

Best regards,

James Cerkanowicz, PE
Manager of Permitting
Verogy | 124 LaSalle Road, 2nd Floor
West Hartford, CT 06107
M: 860.335.1971

From: Martin, Christopher <Christopher.Martin@ct.gov>
Sent: Tuesday, December 26, 2023 12:49 PM
To: James Cerkanowicz <jcerkanowicz@verogy.com>; Brad Parsons <bparsons@verogy.com>
Cc: Bryan Fitzgerald <bfitzgerald@verogy.com>
Subject: RE: Core Forest Letter and Map for Stafford Solar One, LLC (4.0MW SCEF Project)

Thank you James. Can you inform us on the size of the tree clearing for the second small area of overlap in the southeast corner? Also is there any necessary tree removal associated with the interconnection to the grid?

From: James Cerkanowicz <jcerkanowicz@verogy.com>
Sent: Tuesday, December 26, 2023 12:29 PM
To: Brad Parsons <bparsons@verogy.com>; Martin, Christopher <Christopher.Martin@ct.gov>
Cc: Bryan Fitzgerald <bfitzgerald@verogy.com>
Subject: Core Forest Letter and Map for Stafford Solar One, LLC (4.0MW SCEF Project)

Mr. Martin,

On behalf of Brad Parsons, I am sending you the attached letter and forestland habitat impact map (via email only) for a proposed 4.0 MW Ground Mounted Solar PV project to be developed and constructed in Stafford, Connecticut. This request is to comply with Sec. 16-50k of the C.G.S. for the ability to submit the project as a Petition for Declaratory Ruling to the Connecticut Siting Council.

Additionally, please note that Verogy does not yet have a Petition for a Declaratory Ruling, filed before the Connecticut Siting Council for Stafford Solar One, LLC. It is our Intention to have a Petition filed in early 2024. If you wouldn't mind copying myself and my colleagues listed on this email, in any correspondences, we would appreciate it.

Please let me know if you or your staff have any questions or would like to discuss further. Thanks.

Best regards,

James Cerkanowicz, PE
Manager of Permitting
Verogy | 124 LaSalle Road, 2nd Floor
West Hartford, CT 06107
M: 860.335.1971

Stafford Solar One, LLC
124 LaSalle Road, 2nd Floor
West Hartford, CT 06107
Verogy.com

December 26, 2023

VIA ELECTRONIC MAIL

Christopher Martin, State Forester
Bureau of Natural Resources
Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106

RE: Stafford Solar One, LLC (4.0 MW SCEF Solar Photovoltaic Generating Facility)

Dear Mr. Martin:

Stafford Solar One, LLC ("Stafford Solar One") is writing to notify the department of a planned solar photovoltaic electric generating facility of four megawatts (4.0MW) (the "Project"). The Project will be located on land located at 92 Upper Road in Stafford Connecticut.

The Project was awarded a contract in the Year-Four Shared Clean Energy Facility RFP administered by the Department of Energy and Environmental Protection. Stafford Solar One intends to file a petition for declaratory ruling with the Connecticut Siting Council, Pursuant to Conn. Gen. Stat. §§ 4-176 and 16-50k(a) and Regs. Conn. State Agencies §§ 16-50j-38 et seq. for the proposed construction, operation and maintenance of the Project.

Pursuant to Sec. 16-50k of the Connecticut General Statutes, Stafford Solar One respectfully requests that the Department of Energy and Environmental Protection review the proposed project and offer their determination as it relates to any potential impacts to Core Forest.

Attached for your review is the Forestland Habitat Impact Map for the Project with the proposed project limits depicted. The Forestland Habitat Impact Map shows forestland around the project limits and two small areas that overlap the proposed limits of disturbance. However, at the small overlap in the northeast corner of the proposed solar array, the construction is occurring entirely within open field that is not forested and therefore this will not result in the removal of any trees there. The second small area of overlap in the southeast corner will result in a minor amount of tree removal to reduce shading on the array.

Thank you very much for your time and consideration, should you have any questions or comments please feel free to contact me at bparsons@verogy.com or (203) 814-6866.

Sincerely,

Bradley J. Parsons, PE
Director of Design and Permitting

Cc: James Cerkanowicz (jcerkanowicz@verogy.com)
Bryan Fitzgerald (bfitzgerald@verogy.com)

EXISTING LEGEND:

- PROPERTY LINE
- 720 MAJOR CONTOUR
- MINOR CONTOUR
- CORE FOREST AREA

PROPOSED LEGEND:

- LOD LIMIT OF DISTURBANCE
- GRAVEL ACCESS ROAD
- CONSTRUCTION ENTRANCE
- SOLAR PV PANEL

NOTE:
1. CORE FOREST AREA WITHIN THE LIMIT OF DISTURBANCE = 64,536 SF / 1.48 ACRES

0 50' 100' 200'
1" = 100' HORIZONTAL

NOT FOR CONSTRUCTION

Project:
GROUND MOUNT SOLAR PV DEVELOPMENT

92 UPPER ROAD
STAFFORD, CT 06076

Weston & Sampson
WESTON & SAMPSON ENGINEERS, INC.
712 BROOK STREET, SUITE 103
ROCKY HILL, CT 06067
860.513.1473 800.SAMPSON
www.westonandsampson.com

Applicant:
VEROGY
STAFFORD SOLAR ONE, LLC
150 TRUMBULL STREET
4TH FLOOR
HARTFORD, CT 06103
TEL: (860) 288-7215
WWW.VEROGY.COM

Revisions:

No.	Date	Description
0	12/20/2023	ISSUED FOR PERMITTING

Seal:

Issued For:
PERMITTING

Scale:	AS SHOWN
Date Created:	12/20/2023
Drawn By:	DED
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG23-3034
W&S File No.:	VEROGY STAFFORD

Drawing Title:
CORE FOREST AREA

Sheet Number:
1

Appendix I – USFWS and NDDB Compliance Statement

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To: February 01, 2024
Project code: 2024-0043730
Project Name: Stafford Ground Mount Solar PV Development

Federal Action Agency (if applicable):

Subject: Record of project representative's no effect determination for 'Stafford Ground Mount Solar PV Development'

Dear Marissa Sewell:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on February 01, 2024, for 'Stafford Ground Mount Solar PV Development' (here forward, Project). This project has been assigned Project Code 2024-0043730 and all future correspondence should clearly reference this number. **Please carefully review this letter.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project.

Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat Rangewide Determination Key (Dkey), invalidates this letter. ***Answers to certain questions in the DKey commit the project proponent to implementation of conservation measures that must be followed for the ESA determination to remain valid.***

Determination for the Northern Long-Eared Bat

Based upon your IPaC submission and a standing analysis, your project has reached the determination of "No Effect" on the northern long-eared bat. To make a no effect determination, the full scope of the proposed project implementation (action) should not have any effects (either positive or negative), to a federally listed species or designated critical habitat. Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (See § 402.17).

Under Section 7 of the ESA, if a federal action agency makes a no effect determination, no consultation with the Service is required (ESA §7). If a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required except when the Service concurs, in writing, that a proposed action "is not likely to adversely affect" listed species or designated critical habitat [50 CFR §402.02, 50 CFR§402.13].

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination for the northern long-eared bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Monarch Butterfly *Danaus plexippus* Candidate

You may coordinate with our Office to determine whether the Action may affect the animal species listed above and, if so, how they may be affected.

Next Steps

Based upon your IPaC submission, your project has reached the determination of “No Effect” on the northern long-eared bat. If there are no updates on listed species, no further consultation/ coordination for this project is required with respect to the northern long-eared bat. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated. If any of the above conditions occurs, additional coordination with the Service should take place to ensure compliance with the Act.

If you have any questions regarding this letter or need further assistance, please contact the New England Ecological Services Field Office and reference Project Code 2024-0043730 associated with this Project.

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Stafford Ground Mount Solar PV Development

2. Description

The following description was provided for the project 'Stafford Ground Mount Solar PV Development':

> Proposed project is located at 92 Upper Road, Stafford, Connecticut on parcels that are currently agricultural meadows. The proposed project consists of an approximately 5.2 MW DC Solar PV array over an area of approximately 22.3 acres. The project also includes the installation of a gravel access road, concrete equipment pads, and stormwater management features. The project is proposed to start in the later summer or early fall of 2024.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.999159000000006,-72.28116185753774,14z

DETERMINATION KEY RESULT

Based on the information you provided, you have determined that the Proposed Action will have no effect on the Endangered northern long-eared bat (Myotis septentrionalis). Therefore, no consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required for those species.

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of the northern long-eared bat or any other listed species?

   Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

   No

2. The proposed action does not intersect an area where the northern long-eared bat is likely to occur, based on the information available to U.S. Fish and Wildlife Service as of the most recent update of this key. If you have data that indicates that northern long-eared bats are likely to be present in the action area, answer "NO" and continue through the key.

   Do you want to make a no effect determination?

   Yes

PROJECT QUESTIONNAIRE

IPAC USER CONTACT INFORMATION

Agency:	Weston & Sampson
Name:	Marissa Sewell
Address:	100 International Drive #152
City:	Portsmouth
State:	NH
Zip:	03801
Email	sewell.marissa@wseinc.com
Phone:	2073374350

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To: February 01, 2024
Project Code: 2024-0043730
Project Name: Stafford Ground Mount Solar PV Development

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

Updated 4/12/2023 - Please review this letter each time you request an Official Species List, we will continue to update it with additional information and links to websites may change.

About Official Species Lists

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Federal and non-Federal project proponents have responsibilities under the Act to consider effects on listed species.

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested by returning to an existing project's page in IPaC.

Endangered Species Act Project Review

Please visit the "**New England Field Office Endangered Species Project Review and Consultation**" website for step-by-step instructions on how to consider effects on listed species and prepare and submit a project review package if necessary:

https://www.fws.gov/office/new-england-ecological-services/endangered-species-project-review

NOTE Please do not use the **Consultation Package Builder** tool in IPaC except in specific situations following coordination with our office. Please follow the project review guidance on our website instead and reference your **Project Code** in all correspondence.

Northern Long-eared Bat - (**Updated 4/12/2023**) The Service published a final rule to reclassify the northern long-eared bat (NLEB) as endangered on November 30, 2022. The final rule went into effect on March 31, 2023. You may utilize the **Northern Long-eared Bat Rangewide Determination Key** available in IPaC. More information about this Determination Key and the Interim Consultation Framework are available on the northern long-eared bat species page:

https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis

For projects that previously utilized the 4(d) Determination Key, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective. If your project was not completed by March 31, 2023, and may result in incidental take of NLEB, please reach out to our office at newengland@fws.gov to see if reinitiation is necessary.

Additional Info About Section 7 of the Act
Under section 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether projects may affect threatened and endangered species and/or designated critical habitat. If a Federal agency, or its non-Federal representative, determines that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Federal agency also may need to consider proposed species and proposed critical habitat in the consultation. 50 CFR 402.14(c)(1) specifies the information required for consultation under the Act regardless of the format of the evaluation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/service/section-7-consultations

In addition to consultation requirements under Section 7(a)(2) of the ESA, please note that under sections 7(a)(1) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Please contact NEFO if you would like more information.

Candidate species that appear on the enclosed species list have no current protections under the ESA. The species' occurrence on an official species list does not convey a requirement to consider impacts to this species as you would a proposed, threatened, or endangered species. The ESA does not provide for interagency consultations on candidate species under section 7, however, the Service recommends that all project proponents incorporate measures into projects to benefit candidate species and their habitats wherever possible.

Migratory Birds

In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see:

https://www.fws.gov/program/migratory-bird-permit

https://www.fws.gov/library/collections/bald-and-golden-eagle-management

Please feel free to contact us at **newengland@fws.gov** with your **Project Code** in the subject line if you need more information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat.

Attachment(s): Official Species List

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

PROJECT SUMMARY

Project Code: 2024-0043730
Project Name: Stafford Ground Mount Solar PV Development
Project Type: Power Gen - Solar
Project Description: Proposed project is located at 92 Upper Road, Stafford, Connecticut on parcels that are currently agricultural meadows. The proposed project consists of an approximately 5.2 MW DC Solar PV array over an area of approximately 22.3 acres. The project also includes the installation of a gravel access road, concrete equipment pads, and stormwater management features. The project is proposed to start in the later summer or early fall of 2024.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.999159000000006,-72.28116185753774,14z

Counties: Tolland County, Connecticut

ENDANGERED SPECIES ACT SPECIES

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency: Weston & Sampson
Name: Marissa Sewell
Address: 100 International Drive #152
City: Portsmouth
State: NH
Zip: 03801
Email sewell.marissa@wseinc.com
Phone: 2073374350

Connecticut Department of
ENERGY & ENVIRONMENTAL PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

Generated by eNDDB on:
2/29/2024

Nick Ames
Stafford Solar One, LLC
124 Lasalle Rd
West Hartford, CT 06107
amesn@wseinc.com

Subject: Stafford CT Solar PV Development Project
Filing # 107407
NDDB – New Determination Number: 202402410
92 Upper Road
Stafford

Expiration Date: 2/28/2026

Current data maintained by the Natural Diversity Database (NDDB) and housed in the DEEP ezFile portal indicates that populations of the following State Endangered, Threatened, or Special Concern species (RCA Sec. 26-306) have been documented within the project area or in close proximity to the proposed Energy and Utility Production Facilities and Distribution Infrastructure/Solar Energy, Stafford CT Solar PV Development Project.

Whip-poor-will (*Caprimulgus vociferus*)

In accordance with the project information provided in your request submittal, implementation of the following Best Management Practices will avoid negative impacts to listed species:

Common Name	Whip-poor-will
Scientific Name	*Caprimulgus vociferus*
Taxa	bird
Status[1]	SC
General Ecology	The whip-poor-will is a bird that nests in forest habitat with an open understory, often adjacent to areas of shrubby or herbaceous habitat. They are ground-nesting birds that breed between April 20- July 30. They consume aerial invertebrates, especially Lepidoptera and Coleoptera.
Best Management Practice	**Avoid creating collision hazards for Birds and Bats. Glass collisions including residential windows indiscriminately kill 1 billion birds a year. Develop or renovate your building façade and site design strategy to make the building and site structures visible barriers to birds. Bat collisions are less well understood, but smooth vertical surfaces affect bats' abilities to avoid collisions.** **Limit interior and exterior night lighting. Lighting, temporary or permanent should not be directed towards suitable bat habitats. Security lighting should always be down-shielded to keep light within the boundaries of the site.**

	Take steps necessary to assure that construction is designed, built, and operated in accordance with the standards and requirements of the LEED Green Building Rating System Pilot Credit #55. The USGBC releases revised versions of the LEED Building Rating System on a regular basis, and you should refer to the most current version when beginning a new building or construction project or renovation. **Visit American Bird Conservancy website for more guidance: https://abcbirds.org/program/glass-collisions/** **To reduce the potential for collision, towers and antennas should meet USFWS guidelines with regard to height, guy wires, lighting, and maintenance:** **https://www.fws.gov/media/recommended-best-practices-communication-tower-design-siting-construction-op** **Do not begin to cut, clear, remove trees or shrubs, or disturb forest floor between May 1-July 30 within 200m of nesting locations.** **Whip-poor-will will benefit from structurally diverse forests. Whip-poor-will are specifically most often found in areas with 60 square feet of trees per acre of forest.**

[1]E = State Endangered, T = State Threatened, SC = State Special Concern, FE = Federally Endangered, FT = Federally Threatened, NA = Not applicable.

Your submission information indicates that your project requires a state permit, license, registration, or authorization, or utilizes state funding or involves state agency action. This NDDB – New determination may be utilized to fulfill the Endangered and Threatened Species requirements for state-issued permit applications, licenses, registration submissions, and authorizations.

Please be aware of the following limitations and conditions:

Natural Diversity Database information includes all information regarding listed species available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey and cooperating units of DEEP, land owners, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as enhance existing data. Such new information is incorporated into the Database and accessed through the ezFile portal as it becomes available. New information may result in additional review, and new or modified restrictions or conditions may be necessary to remain in compliance with certain state permits.

- During your work listed species may be encountered on site. A report must be submitted by the observer to the Natural Diversity Database promptly and additional review and restrictions or conditions may be necessary to remain in compliance with certain state permits. Please fill out the appropriate survey form and follow the instructions for submittal.
- Your project involves the state permit application process or other state involvement, including state funding or state agency actions; please note that consultations with your permit analyst or the agency may result in modifications or additional requirements. In this situation, additional evaluation of the proposal by the DEEP Wildlife Division may be necessary and additional information, including but not limited to species-specific site surveys, may be required.
- If your project involves preparing an Environmental Impact Assessment, this NDDB consultation and determination should not be substituted for conducting biological field surveys assessing on-site habitat and species presence.

- This determination applies only to the project as described in the submission and summarized at the end of this letter. Please re-submit an updated Request for Review if the project's scope of work and/or timeframe changes, including if work has not begun by 2/28/2026.
- If biological surveys have been conducted in accordance with Best Management Practices provided, please forward a copy of the results to the address listed at the end of this letter. Include the Project Name and Determination Number on all correspondence.

The NDDB – New determination for the Stafford CT Solar PV Development Project at 92 Upper Road, Stafford, as described in the submitted information and summarized at the end of this document is valid until 2/28/2026. This determination applies only to the project as described in the submission and summarized at the end of this letter. Please re-submit an updated Request for Review if the project's scope of work and/or timeframe changes, including if work has not begun by 2/28/2026.

This letter is computer generated and carries no signature. If however, any clarification is needed, or, if you have further questions, please contact the following:

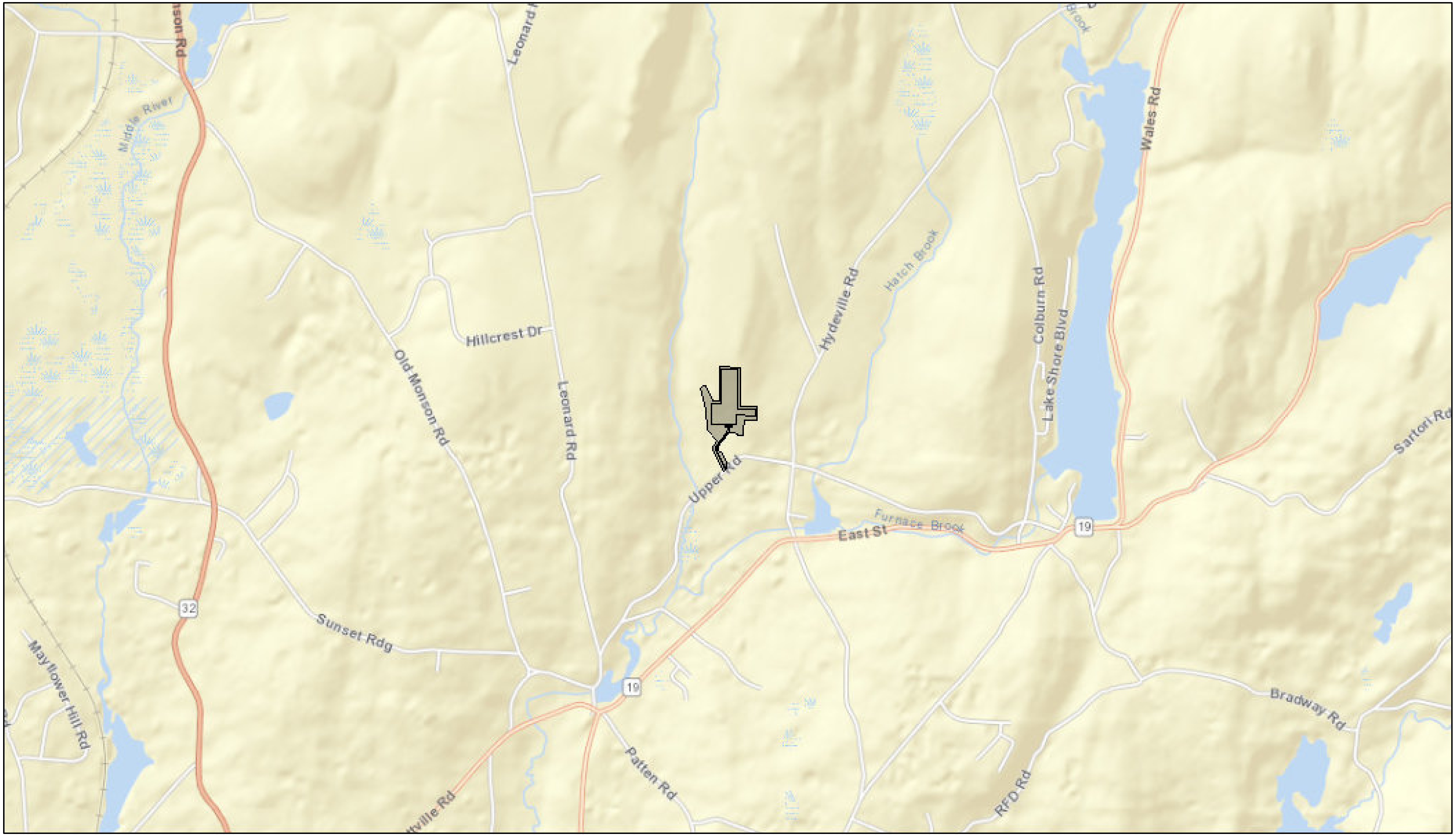
CT DEEP Bureau of Natural Resources
Wildlife Division
Natural Diversity Database, 6th floor
79 Elm Street,
Hartford, CT 06106-5127
(860) 424-3011
deep.nddbrequest@ct.gov

Please reference the Determination Number provided in this letter when you e-mail or write. Thank you for submitting your project through DEEP's ezFile portal for Natural Diversity Database reviews.

Application Details:

Project involves federal funds or federal permit:	No
Project involves state funds, state agency action, or relates to CEPA request:	No
Project requires state permit, license, registration, or authorization:	Yes
DEEP enforcement action related to project:	
Project Type:	Energy and Utility Production Facilities and Distribution Infrastructure
Project Sub-type:	Solar Energy
Project Name:	Stafford CT Solar PV Development Project
Project Description:	

Stafford CT Solar PV Development Project Map



February 29, 2024

1:38,389

0 0.325 0.65 1.3 mi

0 0.5 1 2 km

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Filing #107407 ezFile NDDB System

February 07, 2024

712 Brook Street, Suite 103, Rocky Hill, CT 06067
Tel: 860.513.1473

NBBD, Wildlife Division
Department of Energy and Environmental Protection
79 Elm St., 6th Floor
Harford, CT 06106-5127

Re: **Natural Diversity Date Base Review**
Ground Mount Solar PV Development
92 Upper Road, Stafford, CT 06076

To whom it may concern:

Weston & Sampson Engineers, Inc. (Weston & Sampson) is submitting this request for Natural Diversity Data Base (NDDB) State-listed species review on behalf of VCP Stafford, LLC (Verogy) for the above referenced project. The project includes the development of a ground-mounted solar photovoltaic (PV) array at 92 Upper Road in Stafford, Connecticut. Based on a review of the Natural Diversity Database (NDDB), the site is not within a critical habitat area or area within a State and Federal Listed Species polygon.

Site Description and Background

The proposed solar PV array and associated improvements are located on a 59 acre parcel of privately owned land. The property is owned by Edwina J Mordasky. The site is primarily a cleared meadow with some wooded areas. The site is bounded by undeveloped woodland to the north, northeast, and northwest, Arden Brook runs along the western boundary of the parcel and the lower western boundary of the parcel is neighbored by the Town of Stafford Transfer Station and Landfill. The site is bounded by Upper Road and some residential properties to the south. The site is neighbored by a swath of undeveloped woodland and a few residential properties to the east. An existing conditions plan is included as an attachment to this request.

Proposed Project

The proposed project includes the construction of a ground-mounted solar PV array and an equipment pad. The solar PV array will be mounted on a post-driven racking system. The solar modules will be connected via electric utility which will be buried under ground and lead to a transformer pad located at the end of the access road. Electrical conduit will run south from the transformer underground along the proposed gravel access road to a riser pole where it will connect aboveground to new utility poles ultimately connecting to the existing electrical infrastructure located on Upper Road.

Chain link fence will be used to provide security and separation of any unqualified personnel from any electrical conductors, as require by the National Electric Code (NEC). There is an estimated 4,250 linear feet of new fencing that will be installed to surround and enclose the solar array and equipment pad. The total area within the fence limits is approximately 14.2 acres. The general layout of the solar PV array and interconnection route is depicted on the attached photograph log, Figure 1.

<u>Proposed Schedule</u>

This schedule is contingent upon permit approvals through the local municipality, Eversource construction schedule, weather, and the availability of all materials including the modules, rack assemblies, and medium voltage equipment. Pending permitting approvals, construction is anticipated to begin in early spring 2025 and be completed by winter 2025.

Should you have any questions or require additional information, please contact me at (978)532-1900 or Costello.Melinda@wseinc.com or Bukowski.Rob@wseinc.com.

Sincerely,

WESTON & SAMPSON ENGINEERS, INC.

Melinda Costello, P.E. (MA)
Project Manager

Robert J. Bukowski, PE
Principal Engineer

Attachments:
1 – NDDB Areas Map
2 – Existing Conditions Plan
3 – Proposed Site Plan and Photograph Log

Attachment 1 - NDDB Areas Map

Natural Diversity Data Base Areas

STAFFORD, CT

December 2023

State and Federal Listed Species

Critical Habitat

Town Boundary

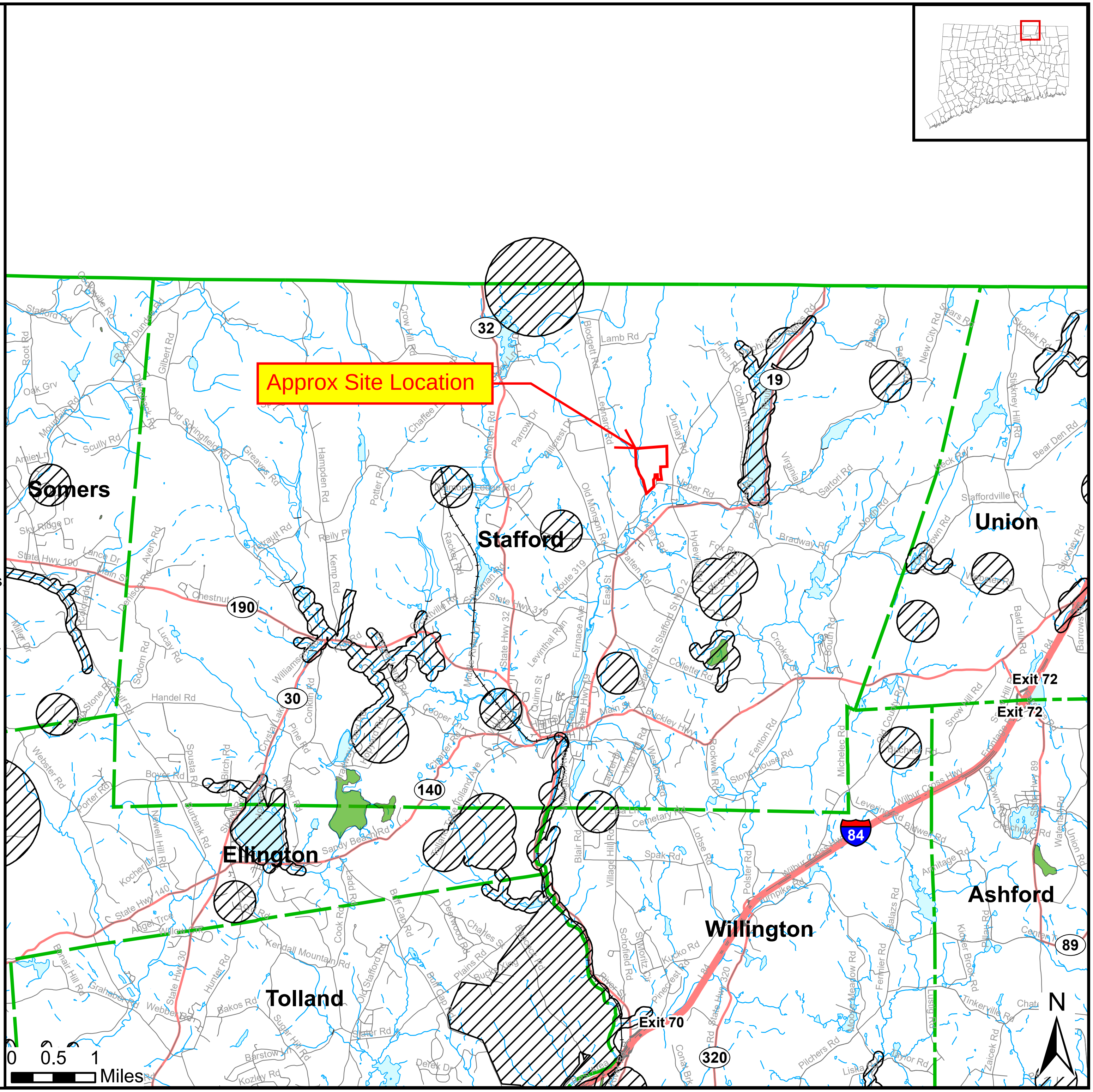
NOTE: This map shows known locations of State and Federal Listed Species and Critical Habitats. Information on listed species is collected and compiled by the Natural Diversity Data Base (NDDB) from a variety of data sources . Exact locations of species have been buffered to produce the generalized locations.

This map is intended for use as a preliminary screening tool for conducting a Natural Diversity Data Base Review Request. To use the map, locate the project boundaries and any additional affected areas If the project is within a hatched area there may be a potential conflict with a listed species. For more information, use DEEP ezFile https://filings.deep.ct.gov/DEEPPortal/ to submit a Request for Natural Diversity Data Base State Listed Species Review or Site Assessment. More detailed instructions are provided along with the request form on our website. https://portal.ct.gov/deep-nddbrequest

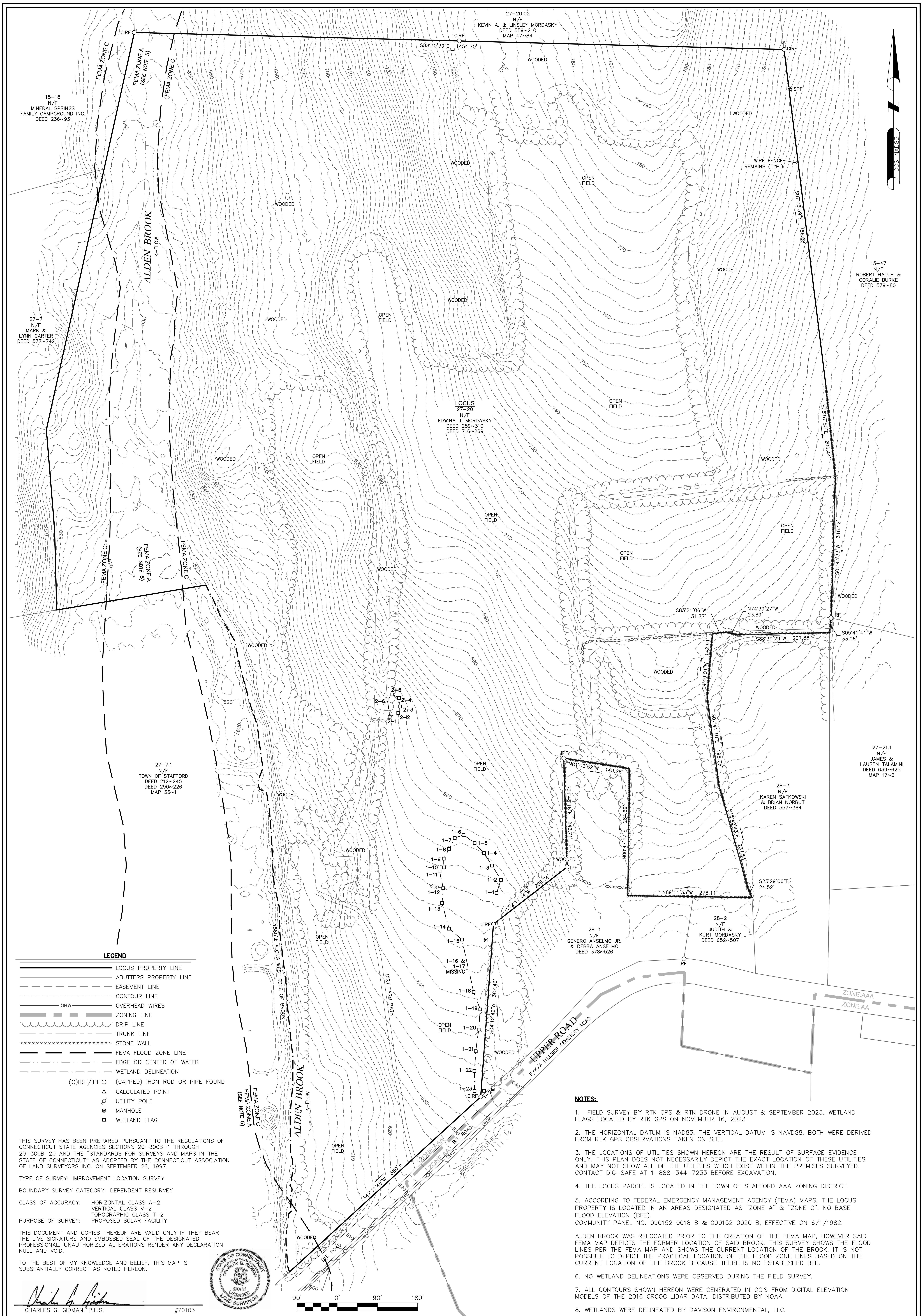
Use the CTECO Interactive Map Viewers at http://cteco.uconn.edu to more precisely search for and locate a site and to view aerial imagery with NDDB Areas.

QUESTIONS: Department of Energy and Environmental Protection (DEEP)
79 Elm St, Hartford, CT 06106
email: deep.nddbrequest@ct.gov
Phone: (860) 424-3011

Connecticut Department of Energy & Environmental Protection



Attachment 2 - Existing Conditions Plan



LEGEND

- LOCUS PROPERTY LINE
- ABUTTERS PROPERTY LINE
- EASEMENT LINE
- CONTOUR LINE
- OHW — OVERHEAD WIRES
- ZONING LINE
- DRIP LINE
- TRUNK LINE
- STONE WALL
- FEMA FLOOD ZONE LINE
- EDGE OR CENTER OF WATER
- WETLAND DELINEATION
- (C)IRF/IPF — (CAPPED) IRON ROD OR PIPE FOUND
- CALCULATED POINT
- UTILITY POLE
- MANHOLE
- WETLAND FLAG

THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300B-1 THROUGH 20-300B-20 AND THE "STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS INC. ON SEPTEMBER 26, 1997.

TYPE OF SURVEY: IMPROVEMENT LOCATION SURVEY

BOUNDARY SURVEY CATEGORY: DEPENDENT RESURVEY

CLASS OF ACCURACY: HORIZONTAL CLASS A-2
VERTICAL CLASS V-2
TOPOGRAPHIC CLASS T-2

PURPOSE OF SURVEY: PROPOSED SOLAR FACILITY

THIS DOCUMENT AND COPIES THEREOF ARE VALID ONLY IF THEY BEAR THE LIVE SIGNATURE AND EMBOSSED SEAL OF THE DESIGNATED PROFESSIONAL. UNAUTHORIZED ALTERATIONS RENDER ANY DECLARATION NULL AND VOID.

TO THE BEST OF MY KNOWLEDGE AND BELIEF, THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

CHARLES G. GIDMAN, P.L.S. #70103

STATE OF CONNECTICUT CHARLES G. GIDMAN #70103 LICENSED LAND SURVEYOR

NOTES:

1. FIELD SURVEY BY RTK GPS & RTK DRONE IN AUGUST & SEPTEMBER 2023. WETLAND FLAGS LOCATED BY RTK GPS ON NOVEMBER 16, 2023

2. THE HORIZONTAL DATUM IS NAD83. THE VERTICAL DATUM IS NAVD88. BOTH WERE DERIVED FROM RTK GPS OBSERVATIONS TAKEN ON SITE.

3. THE LOCATIONS OF UTILITIES SHOWN HEREON ARE THE RESULT OF SURFACE EVIDENCE ONLY. THIS PLAN DOES NOT NECESSARILY DEPICT THE EXACT LOCATION OF THESE UTILITIES AND MAY NOT SHOW ALL OF THE UTILITIES WHICH EXIST WITHIN THE PREMISES SURVEYED. CONTACT DIG-SAFE AT 1-888-344-7233 BEFORE EXCAVATION.

4. THE LOCUS PARCEL IS LOCATED IN THE TOWN OF STAFFORD AAA ZONING DISTRICT.

5. ACCORDING TO FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) MAPS, THE LOCUS PROPERTY IS LOCATED IN AN AREAS DESIGNATED AS "ZONE A" & "ZONE C". NO BASE FLOOD ELEVATION (BFE).
COMMUNITY PANEL NO. 090152 0018 B & 090152 0020 B, EFFECTIVE ON 6/1/1982.

ALDEN BROOK WAS RELOCATED PRIOR TO THE CREATION OF THE FEMA MAP, HOWEVER SAID FEMA MAP DEPICTS THE FORMER LOCATION OF SAID BROOK. THIS SURVEY SHOWS THE FLOOD LINES PER THE FEMA MAP AND SHOWS THE CURRENT LOCATION OF THE BROOK. IT IS NOT POSSIBLE TO DEPICT THE PRACTICAL LOCATION OF THE FLOOD ZONE LINES BASED ON THE CURRENT LOCATION OF THE BROOK BECAUSE THERE IS NO ESTABLISHED BFE.

6. NO WETLAND DELINEATIONS WERE OBSERVED DURING THE FIELD SURVEY.

7. ALL CONTOURS SHOWN HEREON WERE GENERATED IN QGIS FROM DIGITAL ELEVATION MODELS OF THE 2016 CRCOG LIDAR DATA, DISTRIBUTED BY NOAA.

8. WETLANDS WERE DELINEATED BY DAVISON ENVIRONMENTAL, LLC.

SHEET NO. 1 OF 1

PLAN OF LAND IN STAFFORD, CT

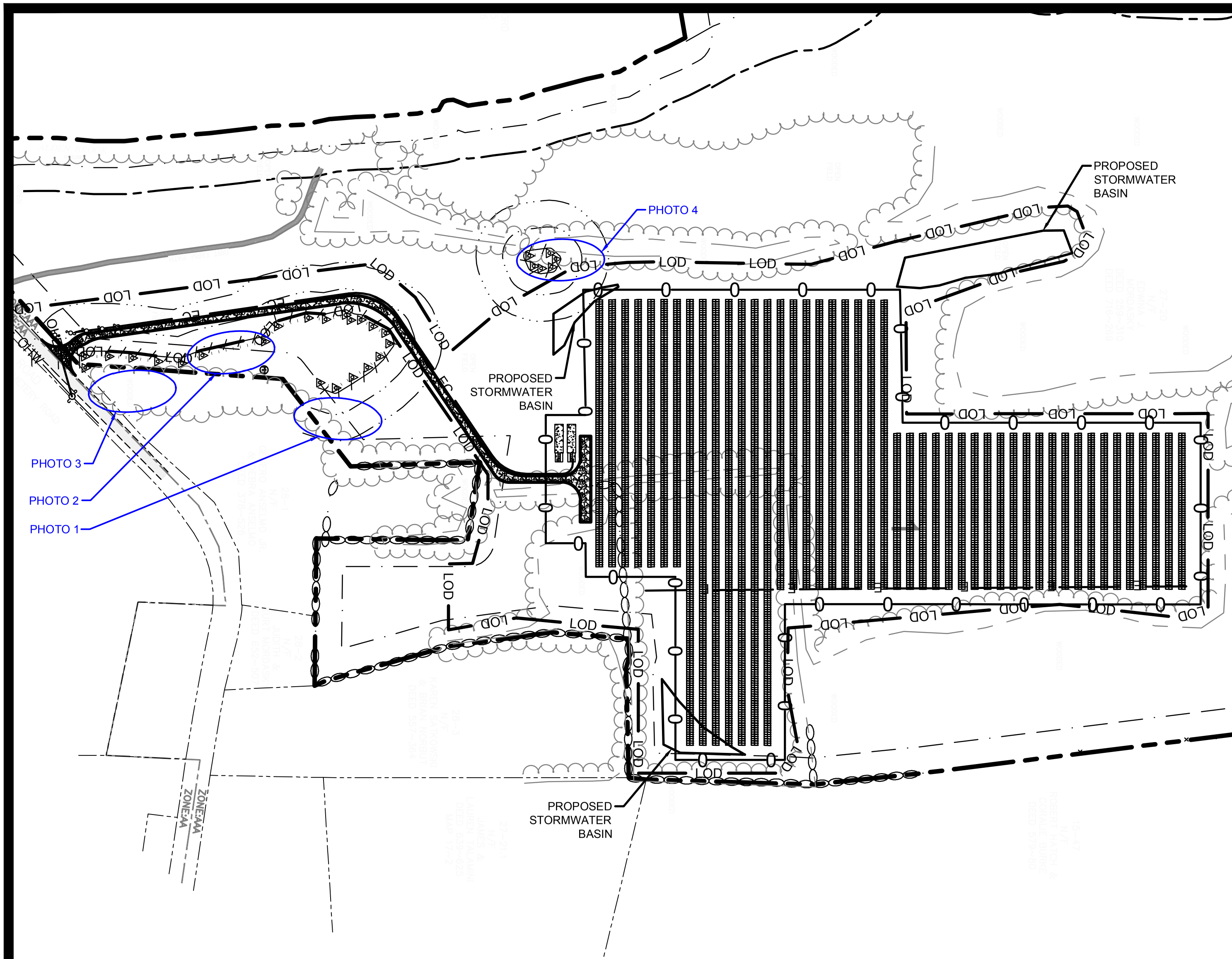
PREPARED FOR
VEROGY

SURVEYOR:	CGG	ENGINEER:	–
DRAFTING:	JDG	DESIGN:	–
FIELD WORK:	NAE NMC CRC	HORZ. SCALE:	1"=90'
PROJECT NUMBER:	23-156	VERT. SCALE:	–
DRAWING NAME:	23-156.DWG	DATE:	11-16-2023

BOUNDARY SURVEY & LIDAR CONTOURS

NORTHEAST SURVEY CONSULTANTS
3 FERRY STREET
STUDIO 1 EAST
EASTHAMPTON, MA 01027
(413) 203-5144

Attachment 3 - Proposed Site Plan and Photograph Log



PROPOSED LEGEND:

SOLAR PV RACK	
CONCRETE PAD	
UTILITY POLE	
OHE	OVERHEAD ELECTRIC
EC	ELECTRIC CONDUIT
	FENCE
LOW	LIMIT OF WORK

NOTE:

1. PROPOSED CONDITIONS INDICATED ON THIS FIGURE ARE PROVIDED FOR GRAPHICAL PURPOSES ONLY.

FIGURE 1
92 UPPER ROAD, STAFFORD, CT
GROUND MOUNT SOLAR PV DEVELOPMENT
PHOTOGRAPH LOCATIONS

SCALE: 1"=300'

0 300 600

Weston & Sampson SM

Rev: 0 Date: 01/31/2024

P:\Private\Verogy Solar\233034-Verogy Stafford CT\06-BIM-CAD\01-Civil-Survey\01 Permitting Set\03 Sheets\Figure 1 Photo Locations - Stafford C101.dwg

Photo 1: View north of Wetland 1.

Photo 2: View of forested area of Wetland 1, looking south.

Photo 3: View north of Wetland 1 from culvert inlet headwall at Upper Road.

Photo 4: View across Wetland 2, looking south.

Appendix J – Phase 1A Cultural Resource Assessment and Survey

FEBRUARY 2024

PHASE IA CULTURAL RESOURCES ASSESSMENT SURVEY FOR THE PROPOSED STAFFORD SOLAR ONE PROJECT ALONG UPPER ROAD IN STAFFORD, CONNECTICUT

PREPARED FOR:

Weston & Sampson

712 BROOK STREET, SUITE 103
ROCKY HILL, CONNECTICUT 06067

PREPARED BY:

HERITAGE CONSULTANTS

BERLIN, CONNECTICUT 06037

ABSTRACT

This report presents the results of a Phase IA cultural resources assessment survey of the proposed Stafford Solar One Facility and associated infrastructure along Upper Road in Stafford, Connecticut. The facility will encompass approximately 11.2 acres within a larger 17.4 acre parcel of land. The current investigation consisted of: 1) preparation of an overview of the region's precontact, post-European Contact period, and natural settings; 2) a literature search to identify and discuss previously recorded cultural resources in the region; 3) a review of readily available maps and aerial imagery depicting the solar facility to identify potential post-European Contact period resources and/or areas of past disturbance; and 4) pedestrian survey and photo-documentation of the project area to determine its archaeological sensitivity. The results of the pedestrian survey indicate that the Facility area contains relatively flat topography, well-drained soils, and is located in close proximity to several sources of fresh water including Alden Brook, Hatch Brook, Hydeville Pond, and Furnace Brook. In addition, there are two previously identified archaeological sites, Site 134-19 (Valley Cotton Mill Site), Site 134-6 (Hydeville Rockshelter Site), and a single National Register of Historic Places district (Stafford Hollow Historic District) within 1.6 km (1 mi) of the facility. Based on this combined information, the project area is deemed to possess moderate/high archaeological sensitivity for intact archaeological deposits. Finally, there are many single dry laid stonewalls within the project area that were identified during the pedestrian survey. Some have partially collapsed and some remain intact. It is recommended that, to the extent practicable, these stonewalls be left in place and that they be included on construction maps and marked with high visibility fencing in the field so that they are not impacted during construction.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF PHOTOS

CHAPTER I
INTRODUCTION

This report presents the results of a Phase IA cultural resources assessment survey for the proposed Stafford Solar One Facility (the Facility) along Upper Road in Stafford, Connecticut (Figure 1). Weston & Sampson requested that Heritage Consultants, LLC (Heritage) complete the Phase IA assessment survey as part of the planning process for the proposed Facility. Heritage completed this investigation in January of 2024. All work associated with this project was performed in accordance with the *Environmental Review Primer for Connecticut's Archaeological Resources* (Poirier 1987) promulgated by the Connecticut State Historic Preservation Office (CT-SHPO).

Project Description and Methods Overview

The Facility will be located along Upper Road in Stafford, Connecticut. It will encompass 11.2 acres of a larger 17.4 acre parcel of land that is situated at elevations ranging between 208 to 234 m (682 to 767 ft) NGVD. The Facility will contain a solar array, equipment areas, access road, fencing, and associated infrastructure (Figure 2). The Phase IA cultural resources assessment survey consisted of the completion of the following tasks: 1) a contextual overview of the region's precontact, post-European Contact period, and natural settings (e.g., soils, ecology, hydrology, etc.); 2) a literature search to identify and discuss previously completed cultural resource surveys and previously recorded cultural resources in the region encompassing the Facility; 3) a review of readily available maps and aerial imagery depicting the project area in order to identify potential post-European Contact period resources and/or areas of past disturbance; and 4) pedestrian survey and photo-documentation of the Facility area in order to determine its archaeological sensitivity.

Project Results and Management Recommendations Overview

The review of maps and aerial images depicting the study area, as well as files maintained by the CT-SHPO, resulted in the detection of two previously identified archaeological sites, Site 134-19 (Valley Cotton Mill Site) and Site 134-6 (Hydeville Rockshelter Site), as well as a single National Register of Historic Places district (Stafford Hollow Historic District), within 1.6 km (1 mi) of the Facility. These cultural resources are discussed in Chapter V. Finally, Heritage also combined data from map and aerial image analyses, as well as a study of local soil conditions and a pedestrian survey, to stratify the project parcel area into zones of no/low and/or moderate/high archaeological sensitivity.

The results of the pedestrian survey indicate that the Facility area contains relatively flat topography, well-drained soils, and is located in close proximity to several sources of fresh water including Alden Brook, Hatch Brook, Hydeville Pond, and Furnace Brook. Based on this combined information, the entirety of the project area is determined to be archaeologically sensitive. It is recommended that a Phase IB Cultural Resources Reconnaissance survey be completed prior to construction of the solar facility. Finally, there are several single dry laid stonewalls within the Facility area that were identified during the pedestrian survey. It is recommended that, to the extent practicable, these stonewalls be left in place and that they be included on construction maps and marked with high visibility fencing in the field so that they are not impacted during construction.

Project Personnel

Heritage Personnel who contributed to the project include David R. George, M.A., RPA, (Principal Investigator), Antonio Medina, B.A. (Operations Manager), Sean Buckley, B.A. (GIS Specialist), and Nita Vitaliano, M.A. (Historian).

CHAPTER II
NATURAL SETTING

Introduction

This chapter provides a brief overview of the natural setting of the region containing the solar project in Stafford, Connecticut. Previous archaeological research has documented that a few specific environmental factors can be associated with both precontact era and post-European Contact period site selection. These include general ecological conditions, as well as types of fresh water sources and soils present. The remainder of this section provides a brief overview of the ecology, hydrological resources, and soils present within the project area and the larger region in general.

Ecoregions of Connecticut

Throughout the Pleistocene and Holocene Periods, Connecticut has undergone numerous environmental changes. Variations in climate, geology, and physiography have led to the "regionalization" of Connecticut's modern environment. It is clear, for example, that the northwestern portion of the state has very different natural characteristics than the coastline. Recognizing this fact, Dowhan and Craig (1976), as part of their study of the distribution of rare and endangered species in Connecticut, subdivided the state into various ecoregions. Dowhan and Craig (1976:27) defined an ecoregion as:

> "an area characterized by a distinctive pattern of landscapes and regional climate as expressed by the vegetation composition and pattern, and the presence or absence of certain indicator species and species groups. Each ecoregion has a similar interrelationship between landforms, local climate, soil profiles, and plant and animal communities. Furthermore, the pattern of development of plant communities (chronosequences and toposequences) and of soil profile is similar in similar physiographic sites. Ecoregions are thus natural divisions of land, climate, and biota."

Dowhan and Craig defined nine major ecoregions for the State of Connecticut. They are based on regional diversity in plant and animal indicator species (Dowhan and Craig 1976). Only one of the ecoregions is germane to the current investigation: Northeast Uplands Ecoregion. A brief summary of this ecoregion is presented below. It is followed by a discussion of the hydrology and soils found in and adjacent to the project area.

<u>Northeast Uplands Ecoregion</u>

The Northeast Uplands ecoregion consists of a variable hilly upland terrain located between approximately 64.3-80.4 km (40-50 mi) to the north of Long Island Sound (Dowhan and Craig 1976). Elevations are generally above 213 m (700 ft) and range to over 396 m (1,300 ft) near the Massachusetts border, the highest found in eastern Connecticut. "The bedrock is primarily metamorphic: Paleozoic gneisses and schists, complexly folded into north-trending belts. Soils are developed on glacial till in the upland areas and on local deposits of stratified sand, gravel, and silt in the valleys" (Dowhan and Craig 1976).

Hydrology in the Vicinity of the Project Area

The solar project location is situated within close proximity to several sources of freshwater, including Alden Brook, Hatch Brook, Hydeville Pond, and Furnace Brook. Small, unnamed bodies of water are also nearby. Previously completed archaeological investigations in Connecticut have demonstrated that streams, rivers, and wetlands were focal points for precontact era occupations because they provided access to transportation routes, sources of freshwater, and abundant faunal and floral resources.

Soils Comprising the Project Area

Soil formation is the direct result of the interaction of a number of variables, including climate, vegetation, parent material, time, and organisms present (Gerrard 1981). Once archaeological deposits are buried within the soil, they are subject to a number of diagenetic processes. Different classes of artifacts may be preferentially protected, or unaffected by these processes, whereas others may deteriorate rapidly. Cyclical wetting and drying, freezing and thawing, and compression can accelerate chemically and mechanically the decay processes for animal bones, shells, lithics, ceramics, and plant remains. Lithic and ceramic artifacts are largely unaffected by soil pH, whereas animal bones and shells decay more quickly in acidic soils such as those that are present within the current project area. In contrast, acidic soils enhance the preservation of charred plant remains.

The project parcel is characterized by the presence of Canton and Charlton Soils and Paxton and Montauk Soils (Figure 3), which are characterized as very deep well drained loamy soils. Where they are not disturbed, these types of soils are generally well correlated with both post-European Contact period and precontact era archaeological site locations. A descriptive profile for each soil type is presented below; they were gathered from the National Resources Conservation Service.

Canton and Charlton Soils (Soil Code: 60D)

The Canton series consists of very deep, well drained soils formed in a loamy mantle underlain by sandy till. They are found on nearly level to very steep moraines, hills, and ridges. Slope ranges from 0 to 45 percent. A typical profile associated with Canton soils is as follows: **Oi**--0 to 5 cm; slightly decomposed plant material; **A**--5 to 13 cm; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; friable; common fine roots; 5 percent gravel; very strongly acid (pH 4.6); abrupt smooth boundary. **Bw1**--13 to 30 cm; yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; 5 percent gravel; very strongly acid (pH 4.6); clear smooth boundary. **Bw2**--30 to 41 cm; yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; 5 percent gravel; strongly acid (pH 5.1); clear smooth boundary. **Bw3**--41 to 56 cm; yellowish brown (10YR 5/4) gravelly fine sandy loam; weak medium subangular blocky; friable; common fine and medium roots; 15 percent gravel; strongly acid (pH 5.1); abrupt smooth boundary. **2C**--56 to 170 cm; grayish brown (2.5Y 5/2) gravelly loamy sand; massive; friable; 25 percent gravel; moderately acid (pH 5.6).

The Charlton series consists of very deep, well drained soils formed in loamy melt-out till. They are nearly level to very steep soils on moraines, hills, and ridges. Slope ranges from 0 to 60 percent. A typical profile associated with Charlton soils is as follows: **Oe**--0 to 4 cm; black (10YR 2/1) moderately decomposed forest plant material. **A**--4 to 10 cm; dark brown (10YR 3/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; 5 percent gravel; very strongly acid; abrupt smooth boundary. **Bw1**--10 to 18 cm; brown (7.5YR 4/4) fine sandy loam; weak coarse granular structure; very friable; many fine and medium roots; 5 percent gravel; very strongly acid; clear wavy boundary. **Bw2**--18 to 48 cm; yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; common fine and medium roots; 10 percent gravel and cobbles; very strongly acid; clear wavy boundary. **Bw3**--48 to 69 cm; light olive brown (2.5Y 5/4) gravelly fine sandy loam; massive; very friable; few medium roots; 15 percent gravel and cobbles; very strongly acid; abrupt wavy boundary. **C**--69 to 165 cm; grayish brown (2.5Y 5/2) gravelly fine sandy loam with thin lenses of loamy sand; massive; friable, some lenses firm; few medium roots; 25 percent gravel and cobbles; strongly acid.

Paxton and Montauk Soils (Soil Codes: 84B and 84C)
The Paxton series consists of well drained loamy soils formed in lodgment till. The soils are very deep to bedrock and moderately deep to a densic contact. They are found on nearly level to steep soils on hills, drumlins, till plains, and ground moraines. Slope associated with these soils range from 0 to 45 percent. A typical profile associated with Paxton soils is as follows: **Ap**--0 to 20 cm; dark brown (10YR 3/3) fine sandy loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many fine roots; 5 percent gravel; strongly acid; abrupt smooth boundary; **Bw1**--20 to 38 cm; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; common fine roots; 5 percent gravel; few earthworm casts; strongly acid; gradual wavy boundary; **Bw2**--38 to 66 cm; olive brown (2.5Y 4/4) fine sandy loam; weak medium subangular blocky structure; friable; few fine roots; 10 percent gravel; strongly acid; clear wavy boundary; and **Cd**--66 to 165 cm; olive (5Y 5/3) gravelly fine sandy loam; medium plate-like divisions; massive; very firm, brittle; 25 percent gravel; many dark coatings on plates; strongly acid.

The Montauk series consists of well drained soils formed in lodgment or flow till derived primarily from granitic materials with lesser amounts of gneiss and schist. The soils are very deep to bedrock and moderately deep to a densic contact. These soils are on upland hills and moraines. Slopes associated with these soils ranges from 0 to 35 percent. A typical profile associated with Montauk soils is as follows: **Ap**--0 to 10 cm; very dark gray (10YR 3/1) loam; moderate fine granular structure; very friable; many very fine, fine, medium, and coarse roots; 2 percent gravel, 1 percent cobbles, and 1 percent stones; extremely acid (pH 4.1); clear smooth boundary.; **BA**--10 to 34 cm; brown (10YR 4/3) loam; moderate medium and coarse subangular blocky structure; friable; many fine, medium, and coarse roots; many fine and medium pores; 4 percent gravel, 1 percent cobbles, and 1 percent stones; extremely acid (pH 4.3); clear wavy boundary; **Bw1**--34 to 65 cm; dark yellowish brown (10YR 4/6) loam; moderate coarse subangular blocky structure; friable; many fine, medium, and coarse roots; many fine and medium pores; 6 percent gravel, 1 percent cobbles, and 1 percent stones; extremely acid (pH 4.3); clear wavy boundary; **Bw2**--65 to 87 cm; yellowish brown (10YR 5/6) sandy loam; moderate medium and coarse subangular blocky structure; friable; many very fine, fine, and coarse roots; many fine and medium pores; 5 percent gravel and 1 percent cobbles; extremely acid (pH 4.3); clear smooth boundary; **2Cd1**--87 to 101 cm; strong brown (7.5YR 5/6) gravelly loamy sand; moderate medium plates; firm; few fine roots; many fine pores; 10 percent gravel, 5 percent cobbles, and 1 percent stones; very strongly acid (pH 4.7); clear wavy boundary; and **2Cd2**--101 to 184 cm; dark yellowish brown (10YR 4/6) gravelly loamy sand; moderate medium plates; firm; many fine pores; 10 percent gravel, 5 percent cobbles, and 1 percent stones; strongly acid (pH 5.1).

Summary
The natural setting of the area containing the Project area is common throughout the Northeast Uplands ecoregion. The landscape is dominated by moderate slopes between ridges and broad lowland areas. In general, the region was well suited to Native American occupation throughout the precontact era. This portion of Stafford was also used throughout the or post-European Contact period, as evidenced by the presence of numerous or post-European Contact period residences, barns, outbuildings, and agricultural fields throughout the region; thus, archaeological deposits dating from the precontact era and or post-European Contact period may be expected near or within the proposed Project area.

Chapter III
Precontact Era Setting

Introduction
Prior to the late 1970s and early 1980s, very few systematic archaeological surveys of large portions of the State of Connecticut had been undertaken. Rather, the precontact era occupation of the region was studied at the site level. Sites chosen for excavation were highly visible and they were in such areas as the coastal zone, e.g., shell middens, and Connecticut River Valley. As a result, a skewed interpretation of the precontact era occupation of Connecticut was developed. It was suggested that the upland portions of the state, i.e., the northeastern and northwestern hills ecoregions, were little used and rarely occupied by precontact era Native Americans, while the coastal zone, i.e., the eastern and western coastal and the southeastern and southwestern hills ecoregions, was the focus of settlements and exploitation. This interpretation remained unchallenged until the 1970s and 1980s when several town-wide and regional archaeological studies were completed. These investigations led to the creation of several archaeological phases that subsequently were applied to understand the precontact period of Connecticut. The remainder of this chapter provides an overview of the precontact era setting of the region encompassing the Facility.

Paleo-Indian Period (12,000 to 10,000 Before Present [B.P.])
The earliest inhabitants of the area encompassing the State of Connecticut, who have been referred to as Paleo-Indians, arrived in the area by ca., 13,000 B.P. (Gramly and Funk 1990; Snow 1980). Due to the presence of large Pleistocene mammals at that time and the ubiquity of large fluted projectile points in archaeological deposits of this age, Paleo-Indians often have been described as big-game hunters (Ritchie and Funk 1973; Snow 1980); however, as discussed below, it is more likely that they hunted a broad spectrum of animals. While there have been over 50 surface finds of Paleo-Indian projectile points throughout the State of Connecticut, only three sites, the Templeton Site (6-LF-21) in Washington, Connecticut, the Hidden Creek Site (72-163) in Ledyard, Connecticut, and the Brian D. Jones Site (4-10B) in Avon, Connecticut have been studied in detail and dated using the radiocarbon method (Jones 1997; Moeller 1980; Singer 2017a; Leslie et al. 2020).

The Templeton Site (6-LF-21) in Washington, Connecticut was occupied between 10,490 and 9,890 years ago (Moeller 1980). In addition to a single large and two small, fluted points, the Templeton Site produced a stone tool assemblage consisting of gravers, drills, core fragments, scrapers, and channel flakes, which indicates that the full range of stone tool production and maintenance took place at the site (Moeller 1980). Moreover, the use of both local and non-local raw materials was documented in the recovered tool assemblage, suggesting that not only did the site's occupants spend some time in the area, but they also had access to distant stone sources, the use of which likely occurred during movement from region to region. More recently, the site has undergone re-investigation by Singer (2017a and 2017b), who has determined that the overwhelming majority of tools and debitage are exotic and were quarried directly from the Hudson River Valley. Recent research has focused on task-specific loci at the Templeton Site, particularly the production of numerous Michaud-Neponset projectile points, as identified through remnant channel flakes.

The Hidden Creek Site (72-163) is situated on the southeastern margin of the Great Cedar Swamp on the Mashantucket Pequot Reservation in Ledyard, Connecticut (Jones 1997). While excavation of the Hidden Creek Site produced evidence of Terminal Archaic and Woodland Period components (see below) in the upper soil horizons, the lower levels of the site yielded artifacts dating from the Paleo-Indian era. Recovered Paleo-Indian artifacts included broken bifaces, side-scrapers, a fluted preform, gravers, and end-scrapers. Based on the types and number of tools present, Jones (1997:77) has hypothesized that the Hidden Creek Site represented a short-term occupation, and that separate stone tool reduction and rejuvenation areas were present.

The Brian D. Jones Site (4-10B) was identified in a Pleistocene levee on the Farmington River in Avon, Connecticut; it was buried under 1.5 m (3.3 ft) of alluvium (Leslie et al. 2020). The Brian D. Jones Site was identified by Archaeological and Historical Services, Inc., in 2019 during a survey for the Connecticut Department of Transportation preceding a proposed bridge construction project. It is now the oldest known archaeological site in Connecticut at +12,500 years old. The site also provides a rare example of a Paleo-Indian site on a river rather than the more common upland areas or on the edges of wetlands. Ground-penetrating radar survey revealed overbank flooding and sedimentation that resulted in the creating of a stable ancient river levee with gentle, low-energy floods. Archaeological deposits on the levee were therefore protected.

Excavations at the Brian D. Jones Site revealed 44 soil anomalies, 27 of which were characterized as cultural features used as hearths and post holes, among other uses. Of these, one hearth has been dated thus far (10,520 ± 30 14C yr BP; charred Pinus; 2-sigma 12,568 to 12,410 CAL BP) (Leslie et al. 2020:4). Further radiocarbon testing will be completed in the future. Artifact concentrations surrounded these features and were separated in two stratigraphic layers representing at least two temporally discrete Paleo-Indian occupations. The recovered lithic artifacts are fashioned from Normanskill chert, Hardyston jasper, Jefferson/Mount Jasper rhyolite, chalcedony, siltstone, and quartz. They include examples of a fluted point base, preforms, channel flakes, pièces esquillées, end scrapers, side scrapers, grinding stones, bifaces, utilized flakes, gravers, and drilled stone pendant fragments. Lithic tools numbered over 100, while toolmaking debris was in the thousands. The channel flakes represent the production of spear points used in hunting. Scrapers, perforators, and grinding stones indicate animal butchering, plant food grinding, the production of wood and bone tools, and the processing of animal skins for clothing and tents. Other collected cultural materials included charred botanicals and calcined bone. Botanical specimens recovered in hearth features included burned remains of cattail, pin cherry, strawberry, acorn, sumac, water lily, and dogwood. Approximately 15,000 artifacts were collected in total.

The scarcity of identified Paleo-Indian sites suggests a low population density during this period. The small size of most Paleo-Indian sites, their likely inundation by rising sea levels, and the high degree of landscape disturbance over the past 10,000 years likely contribute to poor site visibility, although the presence of two deeply alluvially buried Paleo-Indian sites in Connecticut suggests that other sites may be located along stable rivers (Leslie et al. 2021).

Archaic Period (10,000 to 2,700 B.P.)

The Archaic Period, which succeeded the Paleo-Indian Period, began by ca., 10,000 B.P. (Ritchie and Funk 1973; Snow 1980), and it has been divided into three subperiods: Early Archaic (10,000 to 8,000 B.P.), Middle Archaic (8,000 to 6,000 B.P.), and Late Archaic (6,000 to 3,400 B.P.). These periods were devised to describe all non-farming, non-ceramic producing populations in the area. Regional archeologists recently have recognized a final “transitional” Archaic Period, the Terminal Archaic Period (3,400-2,700 B.P.), which was meant to describe those groups that existed just prior to the onset of the Woodland Period and the widespread adoption of ceramics into the toolkit (Snow 1980; McBride 1984; Pfeiffer 1984, 1990; Witthoft 1949, 1953).

Early Archaic Period (10,000 to 8,000 B.P.)

To date, very few Early Archaic sites have been identified in southern New England. As a result, researchers such as Fitting (1968) and Ritchie (1969), have suggested a lack of these sites likely is tied to cultural discontinuity between the Early Archaic and preceding Paleo-Indian Period, as well as a population decrease from earlier times. However, with continued identification of Early Archaic sites in the region, and the recognition of the problems of preservation, it is difficult to maintain the discontinuity hypothesis (Curran and Dincauze 1977; Snow 1980).

Like their Paleo-Indian predecessors, Early Archaic sites tend to be very small and produce few artifacts, most of which are not temporally diagnostic. While Early Archaic sites in other portions of the United States are represented by projectile points of the Kirk series (Ritchie and Funk 1973) and by Kanawha types (Coe 1964), sites of this age in southern New England are identified on the basis of a series of ill-defined bifurcate-based projectile points. These projectile points are identified by the presence of their characteristic bifurcated base, and they generally are made from high quality raw materials. Moreover, finds of these projectile points have rarely been in stratified contexts. Rather, they occur commonly either as surface expressions or intermixed with artifacts representative of later periods. Early Archaic occupations, such as the Dill Farm Site and Sites 6LF64 and 6LF70 in Litchfield County, are represented by camps that were relocated periodically to take advantage of seasonally available resources (McBride 1984; Pfeiffer 1986). In this sense, a foraging type of settlement pattern was employed during the Early Archaic Period.

Another localized cultural tradition, the Gulf of Maine Archaic, which lasted from ca. 9,500 to 6,000 14C B.P., is beginning to be recognized in Southern New England (Petersen and Putnam 1992). It is distinguished by its microlithic industry, which may be associated with the production of compound tools (Robinson and Peterson 1993). Assemblages from Maine (Petersen et al. 1986; Petersen 1991; Sanger et al. 1992), Massachusetts (Strauss 2017; Leslie et al. 2022), and Connecticut (Forrest 1999) reflect the selection of local, coarse-grained stones. Large choppers and hoe-like forms from southeastern Connecticut's Sandy Hill Site likely functioned as digging implements. Woodworking tools, including adzes, celts, and gull-channeled gouges recovered at the Brigham and Sharrow sites in Maine (Robinson and Petersen 1993:68), may have been used for dugout canoe manufacture. The deeply stratified Sandy Hill (Forrest 1999; Jones and Forrest 2003) and Sharrow sites (Petersen 1991), with their overlapping lenses of "black sand" floor deposits, suggest intensive site re-occupations according to an adaptation that relied, in part, on seasonally available wetland resources. Thus far, sites from this tradition have only been identified within coastal and near-coastal territories along the Gulf of Maine, in southeastern Connecticut, and in Massachusetts.

Middle Archaic Period (8,000 to 6,000 B.P.)

By the onset of the Middle Archaic Period modern deciduous forests had developed in the region (Davis 1969). Increased numbers and types of sites associated with this period are noted in Connecticut (McBride 1984). The most well-known Middle Archaic site in New England is the Neville Site in Manchester, New Hampshire studied by Dincauze (1976). Careful analysis of the Neville Site indicated that the Middle Archaic occupation dated from between 7,700 and 6,000 years ago. In fact, Dincauze obtained several radiocarbon dates from the Middle Archaic component of the Neville Site associated with the then-newly named Neville type projectile point, ranging from 7,740±280 and 7,015±160 B.P. (Dincauze 1976).

In addition to Neville points, Dincauze (1976) described two other projectile points styles that are attributed to the Middle Archaic Period: Stark and Merrimac projectile points. While no absolute dates were recovered from deposits that yielded Stark points, the Merrimac type dated from 5,910±180 B.P. Dincauze argued that both the Neville and later Merrimac and Stark occupations were established to take advantage of the excellent fishing that the falls situated adjacent to the site area would have afforded Native American groups. Thus, based on the available archaeological evidence, the Middle Archaic Period is characterized by continued increases in diversification of tool types and resources exploited, as well as by sophisticated changes in the settlement pattern to include different site types, including both base camps and task-specific sites (McBride 1984:96).

Late Archaic Period (6,000 to 3,700 B.P.)

The Late Archaic Period in southern New England is divided into two major cultural traditions that appear to have coexisted. They include the Laurentian and Narrow-Stemmed Traditions (Funk 1976; McBride 1984; Ritchie 1969a and b). Artifacts assigned to the Laurentian Tradition include ground stone axes, adzes, gouges, ulus (semi-lunar knives), pestles, atlatl weights, and scrapers. The diagnostic projectile point forms of this time period in southern New England include the Brewerton Eared-Notched, Brewerton Eared and Brewerton Side-Notched varieties (McBride 1984; Ritchie 1969a; Thompson 1969). In general, the stone tool assemblage of the Laurentian Tradition is characterized by flint, felsite, rhyolite, and quartzite, while quartz was largely avoided for stone tool production.

In terms of settlement and subsistence patterns, archaeological evidence in southern New England suggests that Laurentian Tradition populations consisted of groups of mobile hunter-gatherers. While a few large Laurentian Tradition occupations have been studied, sites of this age generally encompass less than 500 m^2 (5,383 ft^2). These base camps reflect frequent movements by small groups of people in search of seasonally abundant resources. The overall settlement pattern of the Laurentian Tradition was dispersed in nature, with base camps located in a wide range of microenvironments, including riverine as well as upland zones (McBride 1978, 1984:252). Finally, subsistence strategies of Laurentian Tradition focused on hunting and gathering of wild plants and animals from multiple ecozones.

The second Late Archaic tradition, known as the Narrow-Stemmed Tradition, is unlike the Laurentian Tradition, and it likely represents a different cultural adaptation. The Narrow-Stemmed Tradition is recognized by the presence of quartz and quartzite narrow stemmed projectile points, triangular quartz Squibnocket projectile points, and a bipolar lithic reduction strategy (McBride 1984). Other tools found in Narrow-Stemmed Tradition artifact assemblages include choppers, adzes, pestles, antler and bone projectile points, harpoons, awls, and notched atlatl weights. Many of these tools, notably the projectile points and pestles, indicate a subsistence pattern dominated by hunting and fishing, as well the collection of a wide range of plant foods (McBride 1984; Snow 1980:228).

Terminal Archaic Period (3,700 to 2,700 B.P.)

The Terminal Archaic, which lasted from ca., 3,700 to 2,700 B.P., is perhaps the most interesting, yet confusing of the Archaic Periods in southern New England precontact period. Originally termed the "Transitional Archaic" by Witthoft (1953) and recognized by the introduction of technological innovations, e.g., broadspear projectile points and soapstone bowls, the Terminal Archaic has long posed problems for regional archeologists. While the Narrow-Stemmed Tradition persisted through the Terminal Archaic and into the Early Woodland Period, the Terminal Archaic is coeval with what appears to be a different technological adaptation, the Susquehanna Tradition (McBride 1984; Ritchie 1969b). The Susquehanna Tradition is recognized in southern New England by the presence of a new stone tool industry that was based on the use of high-quality raw materials for stone tool production and a settlement pattern different from the "coeval" Narrow-Stemmed Tradition.

The Susquehanna Tradition is based on the classification of several Broadspear projectile point types and associated artifacts. There are several local sequences within the tradition, and they are based on projectile point type chronology. Temporally diagnostic projectile points of these sequences include the Snook Kill, Susquehanna Broadspear, Mansion Inn, and Orient Fishtail types (Lavin 1984; McBride 1984; Pfeiffer 1984). The initial portion of the Terminal Archaic Period (ca., 3,700-3,200 B.P.) is characterized by the presence of Snook Kill and Susquehanna Broadspear projectile points while the latter Terminal Archaic (3,200-2,700 B.P.) is distinguished by Orient Fishtail projectile points (McBride 1984:119; Ritchie 1971).

In addition, it was during the late Terminal Archaic that interior cord marked, grit tempered, thick-walled ceramics with conoidal (pointed) bases made their initial appearance in the Native American toolkit. These are the first ceramics in the region, and they are named Vinette I (Ritchie 1969a; Snow 1980:242); this type of ceramic vessel appears with much more frequency during the ensuing Early Woodland Period. In addition, the adoption and widespread use of soapstone bowls, as well as the implementation of subterranean storage, suggests that Terminal Archaic groups were characterized by reduced mobility and longer-term use of established occupation sites (Snow 1980:250).

Finally, while settlement patterns appeared to have changed, Terminal Archaic subsistence patterns were analogous to earlier patterns. The subsistence pattern was still diffuse in nature, and it was scheduled carefully. Typical food remains recovered from sites of this period consist of fragments of white-tailed deer, beaver, turtle, fish, and various small mammals. Botanical remains recovered from the site area consisted of *Chenopodium* sp., hickory, butternut, and walnut (Pagoulatos 1988:81). Such diversity in food remains suggests at least minimal use of a wide range of microenvironments for subsistence purposes.

Woodland Period (2,700 to 350 B.P.)

Traditionally, the advent of the Woodland Period in southern New England has been associated with the introduction of pottery; however, as mentioned above, early dates associated with pottery now suggest the presence of Vinette I ceramics appeared toward the end of the preceding Terminal Archaic Period (Ritchie 1969a; McBride 1984). Like the Archaic Period, the Woodland Period has been divided into three subperiods: Early, Middle, and Late Woodland. The various subperiods are discussed below.

Early Woodland Period (ca., 2,700 to 2,000 B.P.)

The Early Woodland Period of the northeastern United States dates from ca., 2,700 to 2,000 B.P., and it was thought to have been characterized by the advent of farming, the initial use of ceramic vessels, and increasingly complex burial ceremonialism (Griffin 1967; Ritchie 1969a and 1969b; Snow 1980). In the Northeast, the earliest ceramics of the Early Woodland Period are thick walled, cord marked on both the interior and exterior, and possess grit temper. Archaeological investigations of Early Woodland sites in southern New England resulted in the recovery of narrow stemmed projectile points in association with ceramic sherds and subsistence remains, including specimens of white-tailed deer, soft and hard-shell clams, and oyster shells (Lavin and Salwen 1983; McBride 1984:296-297; Pope 1952). McBride (1984) has argued that the combination of the subsistence remains and the recognition of multiple superimposed cultural features at various sites indicates that Early Woodland Period settlement patterns were characterized by multiple re-use of the same sites on a seasonal basis by small co-residential groups.

Middle Woodland Period (2,000 to 1,200 B.P.)

The Middle Woodland Period is marked by an increase in the number of ceramic types and forms utilized (Lizee 1994a), as well as an increase in the amount of exotic lithic raw material used in stone tool manufacture (McBride 1984). The latter suggests that regional exchange networks were established, and that they were used to supply local populations with necessary raw materials (McBride 1984; Snow 1980). The Middle Woodland Period is represented archaeologically by narrow stemmed and Jack's Reef projectile points; increased amounts of exotic raw materials in recovered lithic assemblages, including chert, argillite, jasper, and hornfels; and conoidal ceramic vessels decorated with dentate stamping. Ceramic types that are indicative of the Middle Woodland Period include Linear Dentate, Rocker Dentate, Windsor Cord Marked, Windsor Brushed, Windsor Plain, and Hollister Stamped (Lizee 1994a:200).

In terms of settlement patterns, the Middle Woodland Period is characterized by the occupation of village sites by large co-residential groups that utilized native plant and animal species for food and raw materials in tool making (George 1997). These sites were the principal place of occupation, and they were positioned close to major river valleys, tidal marshes, estuaries, and the coastline, all of which would have supplied an abundance of plant and animal resources (McBride 1984:309). In addition to villages, numerous temporary and task-specific sites were utilized in the surrounding upland areas, as well as in closer ecozones such as wetlands, estuaries, and floodplains. The use of temporary and task-specific sites to support large village populations indicates that the Middle Woodland Period was characterized by a resource acquisition strategy that can best be termed as logistical collection (McBride 1984:310).

<u>Late Woodland Period (ca., 1,200 to 350 B.P.)</u>

The Late Woodland Period in southern New England dates from ca., 1,200 to 350 B.P., and it is characterized by the earliest evidence for the use of corn in the lower Connecticut River Valley (Bendremer 1993; Bendremer and Dewar 1993; Bendremer et al. 1991; George 1997; McBride 1984); an increase in the frequency of exchange of non-local lithics (Feder 1984; George and Tryon 1996; McBride 1984; Lavin 1984); increased variability in ceramic form, function, surface treatment, and decoration (Lavin 1980, 1986, 1987; Lizee 1994a, 1994b); and a continuation of a trend towards larger, more permanent settlements in riverine, estuarine, and coastal ecozones (Dincauze 1974; McBride 1984; Snow 1980).

Stone tool assemblages associated with Late Woodland occupations, especially village-sized sites, are functionally variable and they reflect plant and animal resource processing and consumption on a large scale. Finished stone tools recovered from Late Woodland sites include Levanna and Madison projectile points; drills; side-, end-, and thumbnail scrapers; mortars and pestles; nutting stones; netsinkers; and celts, adzes, axes, and digging tools. These tools were used in activities ranging from hide preparation to plant processing to the manufacture of canoes, bowls, and utensils, as well as other settlement and subsistence-related items (McBride 1984; Snow 1980). Finally, ceramic assemblages recovered from Late Woodland sites are as variable as the lithic assemblages. Ceramic types identified include Windsor Fabric Impressed, Windsor Brushed, Windsor Cord Marked, Windsor Plain, Clearview Stamped, Sebonac Stamped, Selden Island, Hollister Plain, Hollister Stamped, and Shantok Cove Incised (Lavin 1980, 1988a, 1988b; Lizee 1994a; Pope 1953; Rouse 1947; Salwen and Ottesen 1972; Smith 1947). These types are more stylistically diverse than their predecessors with incision, shell stamping, punctation, single point, linear dentate, rocker dentate stamping, and stamp and drag impressions common (Lizee 1994a:216).

Summary of Connecticut's Precontact Era

The precontact era of Connecticut spans from ca. 13,000 to 350 B.P., and it is characterized by numerous changes in tool types, subsistence patterns, and land use strategies. Much of this era is characterized by local Native American groups who practiced a subsistence pattern based on a mixed economy of hunting and gathering plant and animal resources. It is not until the Late Woodland Period that incontrovertible evidence for the use of domesticated species is available. Further, settlement patterns throughout the precontact period shifted from seasonal occupations of small co-residential groups to large aggregations of people in riverine, estuarine, and coastal ecozones. In terms of the region that includes the proposed project area, a variety of precontact site types may be expected, ranging from seasonal camps utilized by Paleo-Indian and Archaic populations to temporary and task-specific sites of the Woodland era.

CHAPTER IV
POST-EUROPEAN CONTACT PERIOD OVERVIEW

Introduction

The proposed Facility is located on Upper Road in Stafford, which is located in Tolland County, Connecticut. This chapter provides an overview of Tolland County and the Town of Stafford with a focus on the Facility area. Like most Connecticut towns, Stafford originated as Native American settlement before being incorporated as an English colonial village in 1719 (Barry 1985). Through the nineteenth and twentieth centuries most Tolland County towns functioned as agricultural hubs with manufacturing powered by local waterways, as was the case with Stafford. Due to the absence of any major city, port, or waterway near the town, its farmers relied on markets in nearby towns such as Rockville and East Windsor, Connecticut as well as Springfield and Southbridge, Massachusetts while later shipping goods to larger urban areas by road and rail. The presence of naturally occurring mineral springs attracted visitors in the nineteenth century while the automobile culture of the twentieth century connected the Town of Stafford to nearby cities, yet it largely remained rural with areas of residential and commercial development.

Tolland County

Tolland County is located in Connecticut's eastern upland region, extending from the Massachusetts state border on the north to New London County on the south. Tolland County is bounded to the east by Windham County and to the west by Hartford County. Tolland County was formed in 1785 from portions of eastern Hartford County and western Windham County. Its landscape includes rich farmlands and numerous freshwater rivers and streams including the Willimantic River which provided an important source of waterpower. Other important waterways include the Hockanum River, Hop River, Middle River, Skungamaug River, and Tankerhoosen River (Connecticut 2023a). During the industrializing period, development varied throughout Tolland County, but no large urban areas developed although a few substantial industrial villages appeared. As a result of this lack of urbanization, most of the county was too distant from Connecticut's large urban areas to be strongly affected by the suburbanization trend. The construction of Interstate 84 during the latter part of the twentieth century brought some development but did not result in the creation of large residential areas. In the twenty-first century the three largest population centers in Tolland County include the towns of Vernon, Mansfield, and Ellington (Connecticut 2023a).

Woodland Period to Seventeenth Century

During the Woodland Period of northeastern North American history (ca., 3000 to 500 years ago) the Indigenous peoples who resided in present-day southern New England were part of the greater Algonquian culture of northeastern North America (Lavin 2013). They spoke local variations of Southern New England Algonquian languages and resided in extended kinship groups on lands they maintained for a variety of horticultural and resource extraction purposes (Goddard 1978). Native people in the region practiced subsistence activities including hunting, fowling, and fishing, along with the cultivation of various crops, the most important of which were maize, squash, and beans. They supplemented these foods seasonally by collecting shellfish, fruits, and plants during warmer periods, and gathering nuts, roots, and tubers during colder times (Lavin 2013). In addition, these communities came together in large groups to hunt deer in the fall and winter. Indigenous peoples lived with their immediate or extended families in large settlements often concentrated along rivers and/or wetlands. Some villages were fortified by wooden palisades. Their habitations, known as a *weetu* or *wigwam,* were generally constructed of a tree sapling frame and covered in reed matting during warm months and tree bark throughout the winter. These varied in size from a small, individual dwelling to an expansive "long house" which could accommodate several families. Native communities commonly traded among both their immediate neighbors and often maintained long-distance networks as well (Lavin 2013). At the time of the arrival of Europeans some of the prominent Native nations, within the present-day bounds of Tolland County, included the Mohegan, Podunk, and Nipmuc people. The Indigenous people who resided at present-day Stafford were likely part of the Nipmuc community (DeForest 1852; Lavin 2013).

Seventeenth Century through Eighteenth Century

As Indigenous communities maintained oral tradition rather than a written record, most surviving information of the Indigenous people of present-day Connecticut was recorded by European observers (Lavin 2013). The earliest Europeans known to have sailed along Long Island Sound and the Connecticut River were the Dutch in ca., 1614 (Love 1903). The Dutch developed trade relationships with local Native communities. By the early 1620s, Dutch traders entered into an agreement with the Pequot of present-day southeastern Connecticut in which the Pequot supplied wampum (polished shells) and furs in return for European goods. In 1624, the Dutch West India Company formally established New Netherland Colony centered around Manhattan and the Hudson River with its eastern bounds extending as far as Cape Cod, including much of present-day Connecticut (Jacobs 2009). Through their relationship with the Dutch, the Pequot accessed a variety of trade goods they distributed to tributaries and traded with other groups in the region. The Pequot extended their dominance over the region, bringing all the Native nations in the area into a tributary relationship under their leadership (Hauptman and Wherry 2009; McBride 2013).

In 1633, the Pequot allowed the Dutch to build a fortified trading post, the *Huys de Hoop,* on the Connecticut River at the site of present-day Hartford to further cement both parties' domination over the flow of wampum, fur, and trade goods. To break from the Pequot, several Connecticut River sachems invited the English to the valley who then settled Windsor (1633), Wethersfield (1634), and Hartford (1635), as well as Saybrook Colony (1635) at the mouth of the river (Trumbull 1886; Van Dusen 1961). Increased European interaction resulted in exposure to diseases and epidemics Indigenous people had never encountered and to which they had no natural immunity. Illnesses such as smallpox, measles, tuberculosis, and cholera devastated Native communities. In 1633, an epidemic spread from Plimoth Colony to Connecticut, impacting the Pequot and the people of the Connecticut River Valley in 1634 (Trumbull 1886). Tensions between Native and European groups in the region resulted in the death of several English traders in 1634 and 1636, which were blamed on the Pequot. In retaliation, English forces from Massachusetts Bay destroyed Pequot and Niantic villages on the Pequot (Thames) River in August of 1636, which began the Pequot War. The Pequot laid siege to Saybrook Fort at the mouth of the Connecticut River during the winter of 1636-1637 and attacked Wethersfield in April of 1637. The Connecticut Colony declared war on the Pequot and was joined by Native warriors from the Connecticut River and Mohegans under the Sachem Uncas (Oberg 2006). In May of 1637, English allied forces destroyed the fortified Pequot village at Mistick and in July they pursued refugees west. The Pequot were defeated in present-day Fairfield and the war soon ended (Cave 1996).

In the aftermath of the Pequot War, the Sachem Uncas claimed much of the land situated in northeastern Connecticut Colony, the lands of former Pequot tributaries, as Mohegan lands through both right of conquest and hereditary claims (Oberg 2006). These claims often put the Mohegan in contention with Podunk groups who inhabited lands as far east as present-day Bolton and Nipmuc communities who resided in present-day Stafford (Cole 1888). During the upheaval of King Philip's War (1675-1676) much of present-day Tolland County was depopulated of Nipmuc communities or they fell in with the Mohegan who claimed most of those lands as their own (Oberg 2006). Disputes between Massachusetts Bay Colony and Connecticut Colony over their border occurred through the 1680s as a result of conflicting Nipmuc land sales following King Philip's War but was finally settled by joint commissioners of the colonies in 1713 (Cole 1888). Soon after, the English settlement of Stafford occurred when Captain James Fitch purchased land from the local Nipmucks (Stafford 2022). Stafford was incorporated as a town within Hartford County a few years later in 1719.

Stafford grew as an agricultural community upon the tributaries of the Willimantic River. Water-powered agricultural industries including sawmills and grist mills supplied the region (Cole 1888) Stafford continued to develop into an agricultural town producing a variety of crops such as corn, oats, and barley while others turned to raising livestock including cattle, sheep, and pigs. Around 1765, Stafford became increasingly well known for its mineral water springs, so much so that in 1771 future president John Adams visited Stafford Springs for two weeks seeking to improve his health (Cole 1888). This was facilitated by a direct stage coach route between Boston and Stafford Springs which allowed tourists to visit the springs. Consequently, small hotels and additional infrastructure were built to support Stafford as a proto-resort town in colonial America (Stafford 2022).

Slavery had existed in the region since the seventeenth century and by the eighteenth century it was primarily practiced by wealthy families, merchants, and ministers in larger towns. The 1774 Connecticut colonial census recorded a "White" population of 1,333, a "Black" population of 1, and no recorded Native Americans in Stafford, making no distinction between free or enslaved people (Hoadly 1887). It would not be until 1784 that the State passed a gradual manumission law, but slavery was not fully abolished until 1848 (Normen 2013). During the American Revolution (1775-1783) Stafford recruited soldiers, suppled food stores, and provided military goods for the war effort. In 1779 an iron furnace was constructed in the village of Stafford Hollow which cast pig iron from ore-beds of bog iron found in town and produced cannons and cannonballs for the patriot forces (Cole 1888; Stafford 2022). After the Revolution, the town recovered from wartime economic disruptions thanks to its robust agricultural production and its iron works. In 1785 Tolland County was formed from combined sections of Hartford and Windham Counties which now included the Town of Stafford (Cole 1888). On January 9, 1788, Connecticut ratified the U.S. Constitution to become the fifth state (Van Dusen 1961).

Nineteenth Century through the Twenty-first Century

During the early 1800s Stafford experienced slow population growth until the 1830s, and although there was some manufacturing in town the community remained agricultural (Cole 1888; Table 1). The 1819 *Gazetteer of the States of Connecticut and Rhode-Island* reported that Stafford's land was best adapted to grazing and there was little cultivation of grains. One important resource remained the bog iron quality in town which was of excellent quality and ideal for casting; however, this resource was depleted by 1830, such that the iron industry could no longer function (Stafford 2022). In its place, textile manufacturing became an important industry in Stafford, particularly with the advent of new metal-products to manufacture textiles, invented by Stafford natives like Eli Horton. This was in addition to more traditional water powered textile mills in town. Agriculture remained important to the economy of Stafford as well. The town of Stafford was located at the crossroads of several important turnpike roads which afforded local farmers access to surrounding markets in Tolland, Woodstock, Norwich and Worcester (Pease and Niles 1819). During the Civil War (1861-1865), many Connecticut towns directly provided men and resources for the Union Army. From Stafford, 296 men served in the military (Hines 2002). Following the war, manufacturing grew along Stafford's waterways which included textile mills, iron works, and even a button factory. The town's population steadily grew which corresponded with industrialization expansion (Cole 1888; Table 1). By the late 1870s the town consisted of the villages of

Stafford Springs, Crystal Lake, Ellithorpe, Hydeville, Orcuttsville, Staffordville, Stafford Hollow, Village Hill, and West Stafford.

At the beginning of the twentieth century Stafford had a population of 4,297 residents, a number that continued to rise to 5,949 residents by 1930 (Connecticut 2023d). Stafford became an important location in Connecticut as the country addressed the Great Depression. The Civilian Conservation Corps (CCC), established to help young men find stable work, had bases throughout Connecticut including Camp Conner at Shenipsit State Forest in Stafford Springs. Established in 1935, Camp Conner housed young men who worked on infrastructure and forestry tasks including constructing roads, treating the land for gypsy moths, and forest fire prevention work among other tasks (Podskoch 2016). During the Connecticut River Flood of 1936, CCC members from Stafford were mobilized to help with clean-up and recovery efforts along the Connecticut River. In 1941 Camp Conner closed after five years of service. After the attack on Pearl Harbor in 1941, Camp Conner was given over to the Federal Security Administration for agricultural work for New York famers who had low production on their own farms, although the site was later transferred back to the State Forrest Service (Podskoch 2016).

The town's population steadily rose from 5,835 people in 1940 to 8,680 residents by 1970 (Table 1; Connecticut 2023d-e). The population growth in the early twentieth century may have resulted from post-World War II development and Stafford's proximity to Springfield, Willimantic, Manchester and Hartford. Stafford's industrial base declined following the Second World War but did not disappear completely while significant areas of town remained under agricultural cultivation. In the twenty-first century, Stafford remains largely a rural landscape with significant pockets of residential housing, industrial development, and commercial development, particularly in the villages of Stafford Springs and Hydeville. As of 2021, the 11,472 people lived in Stafford (AdvanceCT and CTData Collaborative 2023). In 2021, the top industries in town were finance and insurance, and professional, scientific, and technical services. Key employers in 2023 included Johnson Memorial Hospital, TTM Technologies Inc., and 3M Co. (AdvanceCT and CTData Collaborative 2023). According to Stafford's drafted Plan of Conservation and Development, Stafford is prepared for additional development. Currently, 29 percent of Stafford is dedicated to open space; other parcels in town can be developed without jeopardizing the open space resources the town has to offer (Stafford 2022).

Table 1: Population of Stafford, Tolland County, Connecticut 1790-2020 (Connecticut 2023b-e)

Town	1790	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900
Stafford, Tolland County	1,885	2,345	2,235	2,269	2,515	2,469	2,940	3,397	3,405	4,455	4,535	4,297
	1910	**1920**	**1930**	**1940**	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**	**2010**	**2021**
	5,233	5,407	5,949	5,835	6,471	7,476	8,680	9,268	11,091	11,307	12,087	11,472

History of the Project Area

The proposed Facility is located in the Town of Stafford, Connecticut. The 1857 Tolland County map of Stafford depicts the Facility area in central Stafford and to the north of the Hydeville area (Figure 4; 1857 Map). No property owners were present within the project parcel, although a stream is depicted running through the western portion of the parcel. The closest properties were to the south and owned by A. Alden and H. Alden, likely Hannibal Alden, a farmer (USCB 1860). Due to the number of Aldens in the documentary record for Stafford it is not possible to determine which A. Alden was the property owner in this area. Similarly, the 1869 Beers *Atlas* of Stafford depicts the project area without any property owners and the stream still crossing through the project area (Figure 5; 1869 Map). A school was present to the east of the Facility area, while to the south were the properties of Dale, likely George

Dale, a farmer, and J. Alden, likely Joseph Alden, who died in 1870 (USCB 1870a, 1870b). Further to the south the Phoenix Woolen Company and other residences were present.

Throughout the twentieth and twenty-first century, the landscape near the Facility area remained largely rural. Aerial photographs from a 1934, the first year in which such images were available, show that the project parcel and surrounding environment were largely open agricultural lands, although some forested land was present to the west of the project area (Figure 6; 1934 Aerial). The present day road alignment was already in place at that time. By 1970, few changes were evident. The entirety of the project area was cleared, yet much of the land to the north and west remained forested (Figure 7; 1970 Aerial). A number of small detention ponds were present to the west, south, and east of the Facility area. In 2019, the project parcel was still cleared, although a wall of trees was present (Figure 8; 2019 Aerial). Minimal development was evident on the two roads nearest the parcel in the form of single family homes.

Conclusions

The documentary review indicates that the proposed Facility has the potential to be associated with cultural resources. In the portion that was agricultural fields, there is the possibility of encountering evidence of post-European Contact period farming activities that may be important as a component of a rural historic landscape (*sensu* McClelland et al. 1999).

CHAPTER V
PREVIOUS INVESTIGATIONS

Introduction

This chapter presents an overview of previous cultural resources research completed within the vicinity of the Facility in Stafford, Connecticut. This discussion provides the comparative data necessary for assessing the results of both the Phase IA and Phase IB surveys, and it ensures that the potential impacts to all previously recorded cultural resources located within and adjacent to the Facility area are taken into consideration. Specifically, this chapter reviews previously identified archaeological sites, National/State Register of Historic Places properties, and inventoried standing structures over 50 years old situated in the project region (Figures 9 and 10). The discussions presented below are based on information currently on file at the CT-SHPO in Hartford, Connecticut. In addition, the electronic site files maintained by Heritage were examined. Both the quantity and quality of the information contained in the original cultural resources survey reports and State of Connecticut archaeological site forms are reflected below.

Previously Recorded Archaeological Sites and National/State Register of Historic Places Properties

A review of data currently on file at the Connecticut State Historic Preservation Office, as well as the electronic site files maintained by Heritage resulted in the identification of one previously identified post-European Contact period site (134-19), one precontact era site (134-6), and a single National Register of Historic Places district (Stafford Hollow Historic District) 1.6 km (1 mi) of the Facility area (Figure 10 and 11). A brief discussion of the identified cultural resources is provided below.

Site 134-6

Site 134-6 is called the Hydeville Rockshelter Site, and it is situated on private land approximately 200 meters to the west of the intersection of Hydeville Road and Furnace Brook in Stafford, Connecticut (Figure 9). The precontact era site was recorded by Dr. Kevin McBride at an unknown date. Dr. McBride noted that Ray Marin and Ray Irons had previously pot hunted the site and the artifacts that were collected remained in the private collection of Ray Marin. Artifacts recovered by Ray Marin included miscellaneous projectile points that were assigned to the Late Archaic period. Site 134-6 has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). It is located approximately 0.8 km (0.5 m) to the south of the Facility area; no direct or indirect impacts to the site are anticipated by the proposed construction.

Site 134-19

Site 134-19 is also known as the Valley Cotton Mill Site, and it is a contributing property within the Stafford Hollow Historic District. It is located off of Pinney School Road on the northern side of Furnace Brook in Stafford, Connecticut (Figure 9). The nineteenth century industrial site was recorded by DR. David A. Poirier in August of 1992. Dr. Poirier noted that the standing ruins of the cotton mill were in fair condition at the time it was recorded, and that there were extensive stone walls and a possible arched tailrace opening present. Site 134-19 has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). It is located approximately 1.2 km (0.75 m) to the south of the Facility area; no direct or indirect impacts to the site are anticipated by the proposed construction.

Stafford Hollow Historic District

The Stafford Hollow Historic District is a village within the town of Stafford; it is located at the junction of Route 19 and Route 319. Stafford Hollow was the town center of Stafford during the eighteenth and nineteenth centuries before the growth of the village of Stafford Springs. A 0.26 mi^2 (0.67 km^2) area of the village has been designated the Stafford Hollow Historic District, which includes Colonial Revival, Greek Revival, and Late Victorian architecture (Figure 10). As early as 1779, Stafford Hollow was the site of the Phelps blast furnace that processed bog iron ores. The Phelps furnace is believed to have produced cannon and cannonballs, kettles, and pots for the Continental Army. The furnace operated until 1840, when the local ore supply had been used up. Stafford Hollow Historic District was listed on the NRHP in October of 1987. The Stafford Hollow Historic District includes five of the Town of Stafford's most significant buildings including the Pinney School building, a Queen Anne style structure from 1895, and the Valley Cotton Mill site, which was destroyed in 1900 and is now ruins. Due to its distance from the Facility area, no impacts are expected to occur to the Stafford Hollow Historic District as a result of the proposed construction.

CHAPTER VI
METHODS

Introduction

This chapter describes the research design and field methodology used to complete the Phase IA cultural resources assessment survey of the Facility in Stafford, Connecticut. The following tasks were completed during this investigation: 1) study of the region's precontact era, post-European Contact period, and natural settings; 2) a literature search to identify and discuss previously recorded cultural resources in the area encompassing the Facility; 3) a review of post-European Contact period maps, topographic quadrangles, and aerial imagery depicting the Facility in order to identify potential post-European Contact period resources and/or areas of past disturbance; and 4) the pedestrian survey and photo-documentation of the Facility in order to determine its archaeological sensitivity. These methods are in keeping with those required by the Connecticut State Historic Preservation Office in the document entitled: *Environmental Review Primer for Connecticut's Archaeological Resources* (Poirier 1987).

Research Framework

The current Phase IA cultural resources assessment survey was designed to identify and assess the archaeological sensitivity of the Facility, as well as to visually examine the area and record any previously unidentified cultural resources during the pedestrian survey. The undertaking was comprehensive in nature, and project planning took into consideration the distribution of previously recorded cultural resources located within the Facility region, as well as the visual assessment of the Facility area. The methods used to complete this investigation were designed to provide coverage of all portions of the Facility. The fieldwork portion of this undertaking entailed pedestrian survey, photo-documentation, and mapping (see below).

Archival Research & Literature Review

Background research for this project included a review of a variety of maps depicting the Facility area; an examination of USGS 7.5' series topographic quadrangles; an examination of aerial images dating from 1934 through 2019; and a review of all archaeological sites, National and State Register of Historic Places, and inventoried historic standing structures on file with the CT-SHPO, as well as electronic cultural resources data maintained by Heritage. The intent of this review was to identify all previously recorded cultural resources situated within and immediately adjacent to the Facility area and to provide a natural and cultural context for the study region. This information was used to develop the archaeological context of the Facility area and to assess its sensitivity with respect to the potential for producing intact cultural resources.

Field Methodology and Data Synthesis

Heritage performed fieldwork for the Phase IA cultural resources assessment survey of the parcel associated with the proposed Facility project in Stafford, Connecticut in January of 2024. This included a pedestrian survey, photo-documentation, and mapping. During the completion of the pedestrian survey, representatives from Heritage photo-documented the Facility of impact using digital media.

CHAPTER VII
RESULTS OF THE INVESTIGATION & MANAGEMENT RECOMMENDATIONS

Introduction

This chapter presents the results of the Phase IA cultural resources assessment survey of the Facility in Stafford, Connecticut. As stated in the introductory section of this report, the investigation involved the following tasks: 1) a contextual overview of the region's precontact, post-European Contact, and natural settings (e.g., soils, ecology, hydrology, etc.); 2) a literature search to identify and discuss previously recorded archaeological and cultural resources in the Facility region; 3) a review of readily available maps and aerial imagery depicting the Facility area in order to identify potential post-European Contact period resources and/or areas of past disturbance; 4) pedestrian survey and photo-documentation of the Facility area to determine its archaeological sensitivity; and 5) preparation of the current Phase IA cultural resources assessment survey report.

Overall Sensitivity of the Proposed Facility

The field data associated with soils, slopes, aspect, distance to water, and previous disturbance collected during the pedestrian survey and presented above was used in conjunction with the analysis of maps, aerial images, and data regarding previously identified archaeological sites and National/State Register of Historic Places properties, and inventoried historical standing structures to stratify the project area and the Facility into zones of no/low or moderate/high archaeological sensitivity. In general, post-European Contact period archaeological sites are relatively easy to identify on the current landscape because the features associated with them tend to be relatively permanent constructions that extend above the ground surface (i.e., stone foundations, pens, wells, privies, etc.). Archaeological sites dating from the precontact era, in contrast, are less often identified during pedestrian survey because they are buried, and predicting their locations relies more on the analysis and interpretation of environmental factors that would have informed Native American site choices.

With respect to the potential for identifying precontact era archaeological sites, the Facility parcel was divided into areas of no/low and moderate/high archaeological potential by analyzing the landform types, slope, aspect, soils contained within them, and their distance to water. In general, areas located less than 300 meters (1,000 feet) from a freshwater source and that contain slopes of less than 8 percent and well-drained soils possess a high potential for producing precontact era archaeological deposits. Those areas located between 300 and 600 meters (1,000 and 2,000 feet) from a freshwater source and well drained soils are considered moderate probability areas. This is in keeping with broadly based interpretations of precontact era settlement and subsistence models that are supported by decades of previous archaeological research throughout the region. It is also expected that there may be variability of precontact site types found in the moderate/high sensitivity zones. For example, large Woodland period village sites and Archaic period seasonal camps may be expected along large river floodplains and near stream/river confluences, while smaller temporary or task specific sites may be expected on level areas with well-drained soils that are situated more than 300 meters (1,000 feet) but less than 600 meters (2,000 feet) from a water source. Finally, steeply sloping areas, poorly drained soils, or areas of previous disturbance are generally deemed to retain a no/low archaeological sensitivity with respect to their potential to contain precontact era archaeological sites.

In addition, the potential for a given area to yield evidence of post-European Contact period archaeological deposits is based not only the above-defined landscape features but also on the presence or absence of previously identified post-European Contact period archaeological resources as identified during previous archaeological surveys, recorded on historical maps, or captured in aerial images of the region under study. In this case, proposed development areas that are situated within 100 meters (328 feet) of a previously identified post-European Contact period archaeological site, a National or State Register of Historic Places district/individually listed property, or an area that contains known post-European Contact period buildings also may be deemed to retain a moderate/high archaeological sensitivity. In contrast, those areas situated over 100 meters (328 feet) from any of the above-referenced properties would be considered to retain a no/low post-European Contact period archaeological sensitivity.

Results of Phase IA Survey and Management Recommendations

Heritage personnel conducted a pedestrian survey of the proposed project parcel and Facility area in January of 2024. The pedestrian survey was supplemented by mapping and photo-documentation (Figure 11 and Photos 1 through 14). The Facility is situated at elevations ranging between 208 to 234 m (682 to 767 ft) NGVD. The predominant soil types located throughout the project parcel are Canton-Charlton, and Paxton-Montauk soils which are well drained loamy soils. Where they are not disturbed, these types of soils are generally well correlated with both post-European Contact period and precontact era archaeological site locations. The project area currently consists of cleared land that was used during the post-European Contact period as agricultural fields. At the time of the pedestrian survey, the area was accessed via Upper Road, and consisted of fallow fields, secondary growth, wetlands, and wooded areas.

The results of the pedestrian survey indicate that the Facility area contains well-drained soils and is located in close proximity to several sources of fresh water, including Alden Brook, Hatch Brook, Hydeville Pond, and Furnace Brook. In addition, there are two previously identified archaeological sites, Site 134-19 (Valley Cotton Mill Site), Site 134-6 (Hydeville Rockshelter Site), and a single National Register of Historic Places district (Stafford Hollow Historic District) within 1.6 km (1 mi) of the Facility. Based on this information, the entirety of the Facility area was deemed to possess moderate/high archaeological sensitivity for intact archaeological deposits, and it is recommended that it be subjected to Phase IB cultural resources survey prior to the construction of the proposed solar center.

Finally, several single dry laid stonewalls were identified within the project area during the pedestrian survey (Figure 11 and Photos 15 through 20). Some have partially collapsed and others are intact. It is recommended that, to the extent practicable, these stonewalls be left in place and that they be included on construction maps and marked with high visibility fencing in the field so that they are not impacted during construction.

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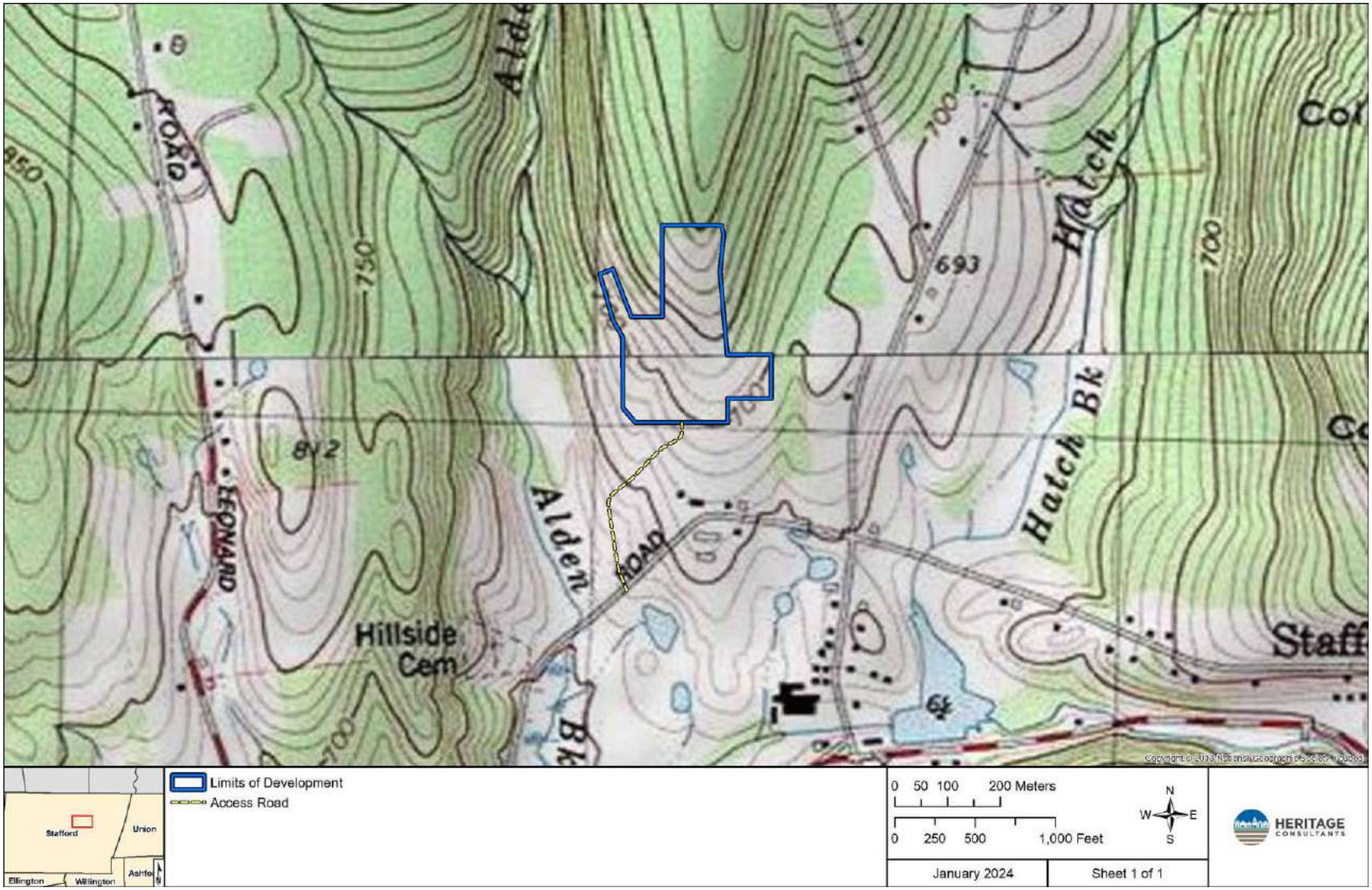


Figure 1. Excerpt from a USGS 7.5' series topographic quadrangle image showing the location of the project parcel in Stafford, Connecticut.

Figure 2. Proposed project plans for Stafford Solar One Project along Upper Road in Stafford, Connecticut.

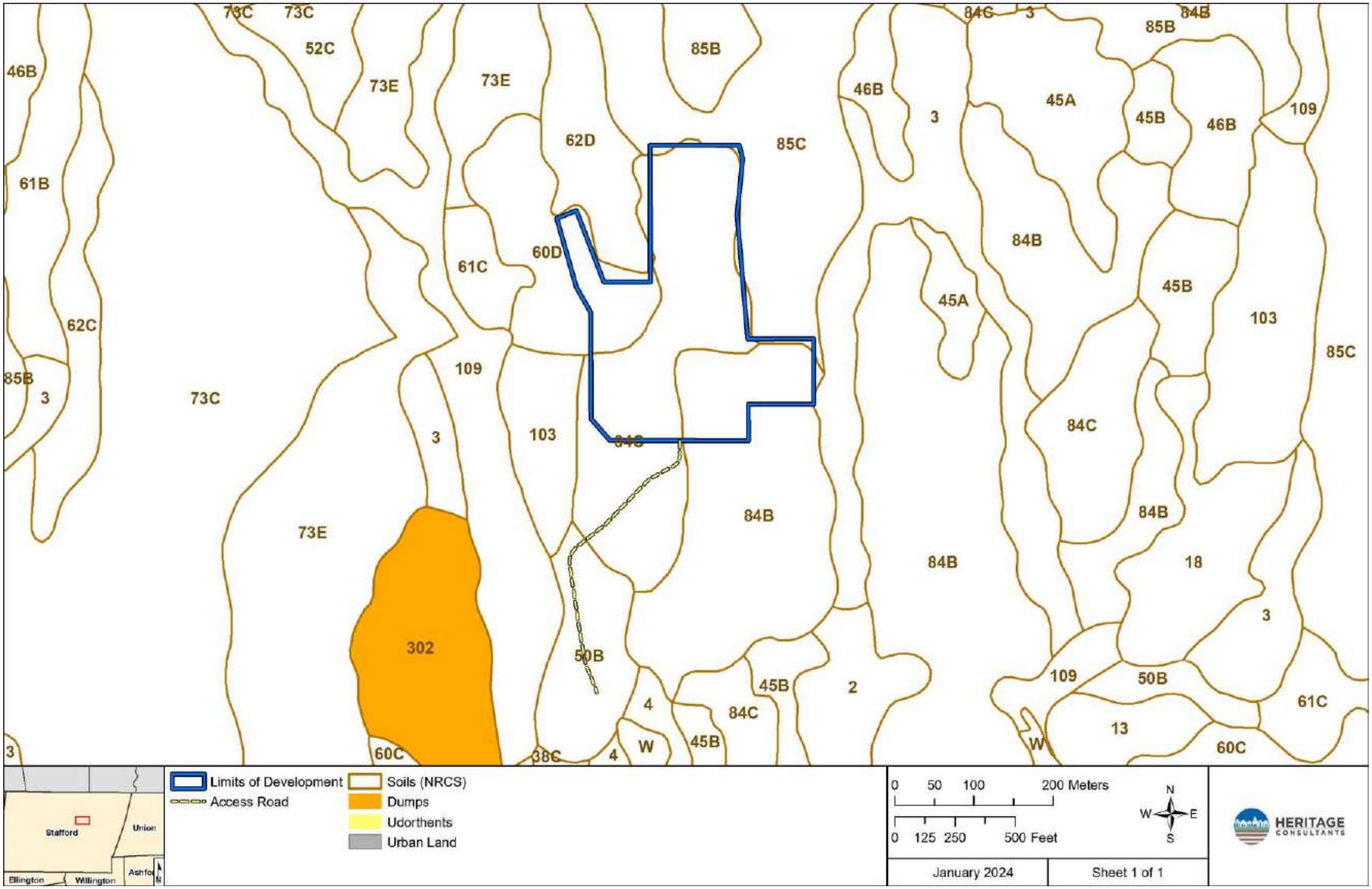


Figure 3. Digital map depicting the soil types present in the vicinity of the project parcel in Stafford, Connecticut.

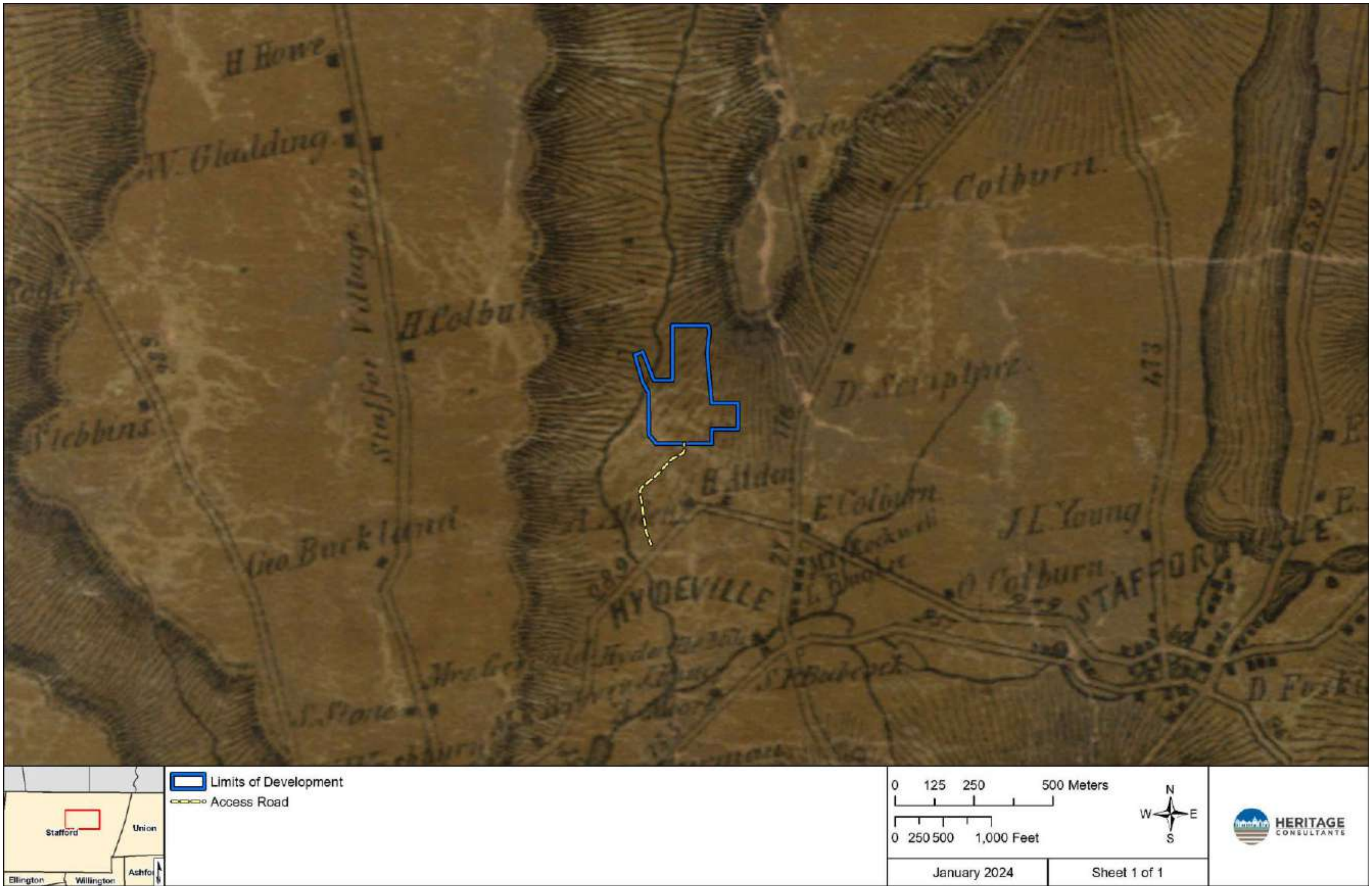


Figure 4. Excerpt from an 1857 map showing the location of the project parcel in Stafford, Connecticut.

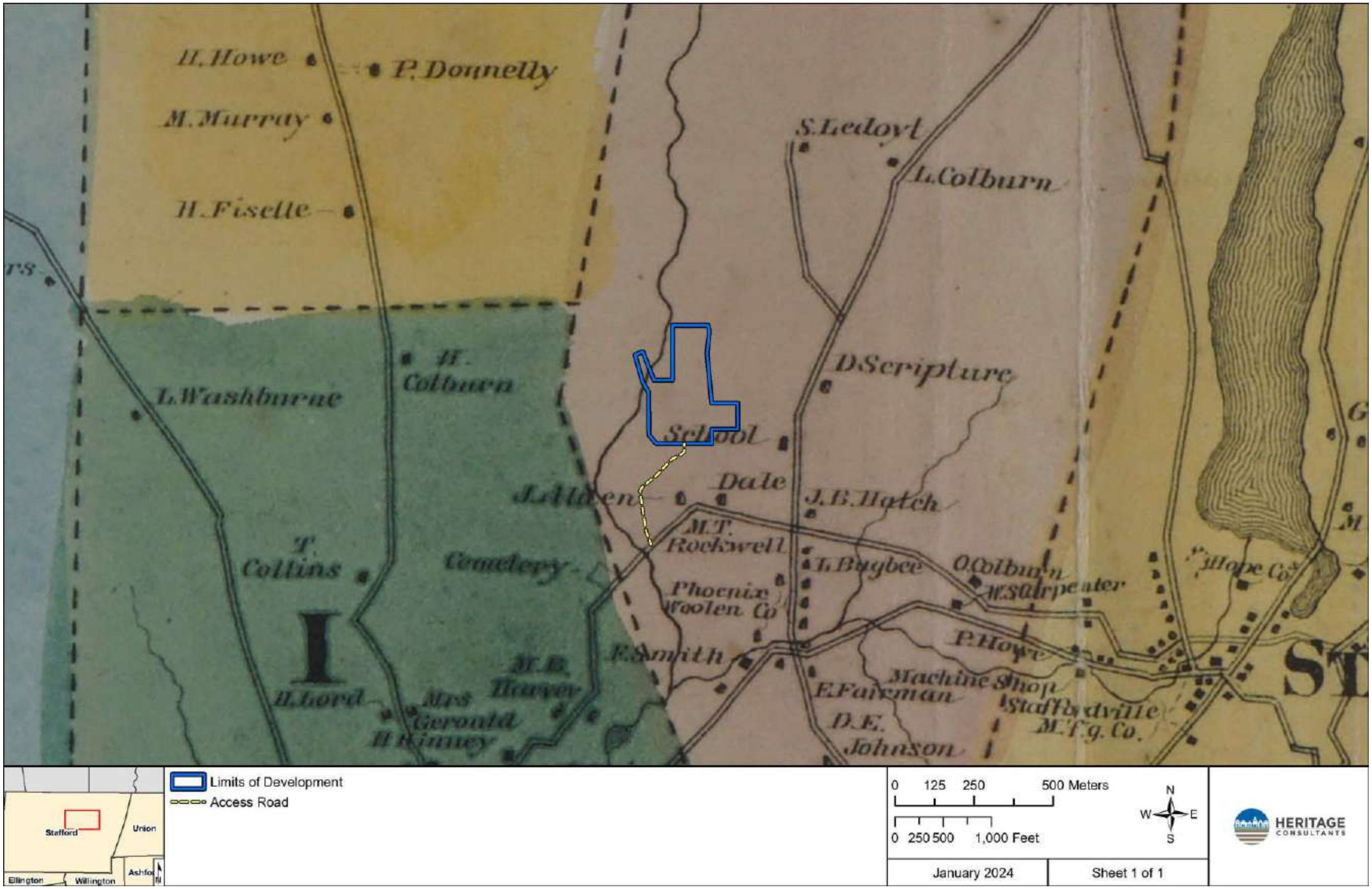


Figure 5. Excerpt from an 1869 map showing the location of the project parcel in Stafford, Connecticut.

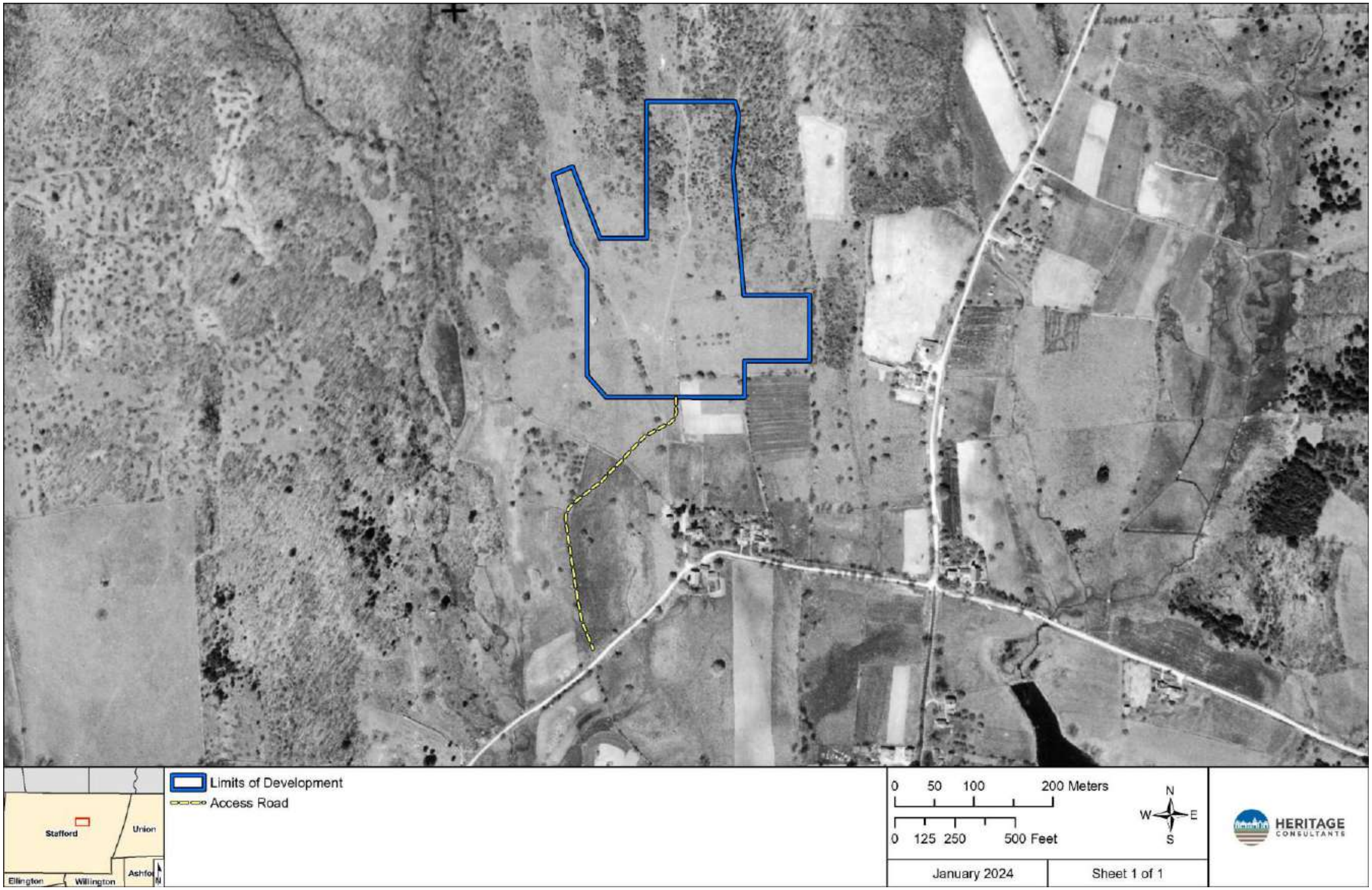


Figure 6. Excerpt from a 1934 aerial photograph showing the location of the project parcel in Stafford, Connecticut.

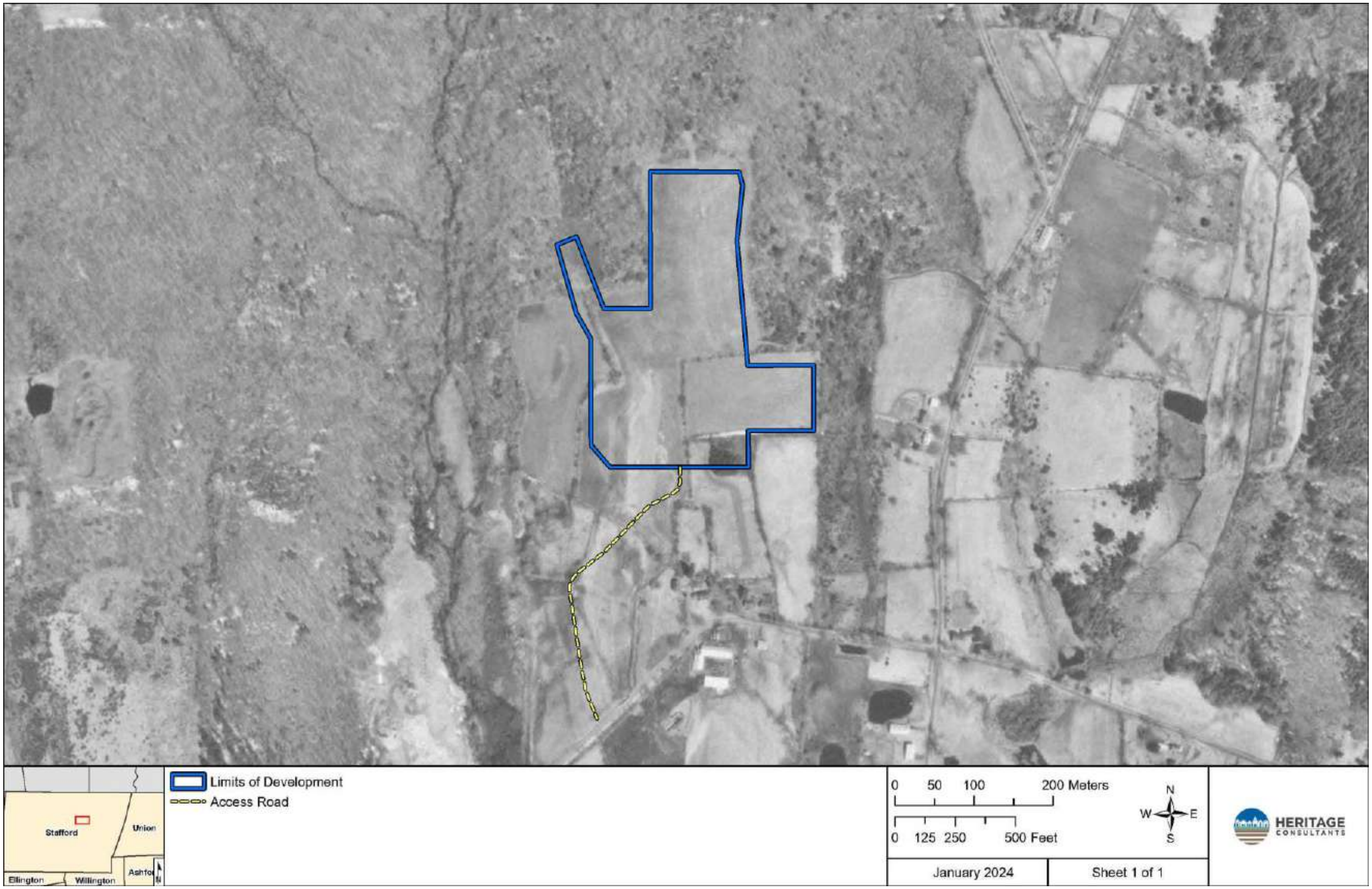


Figure 7. Excerpt of a 1970 aerial photograph showing the location of the project parcel in Stafford, Connecticut.

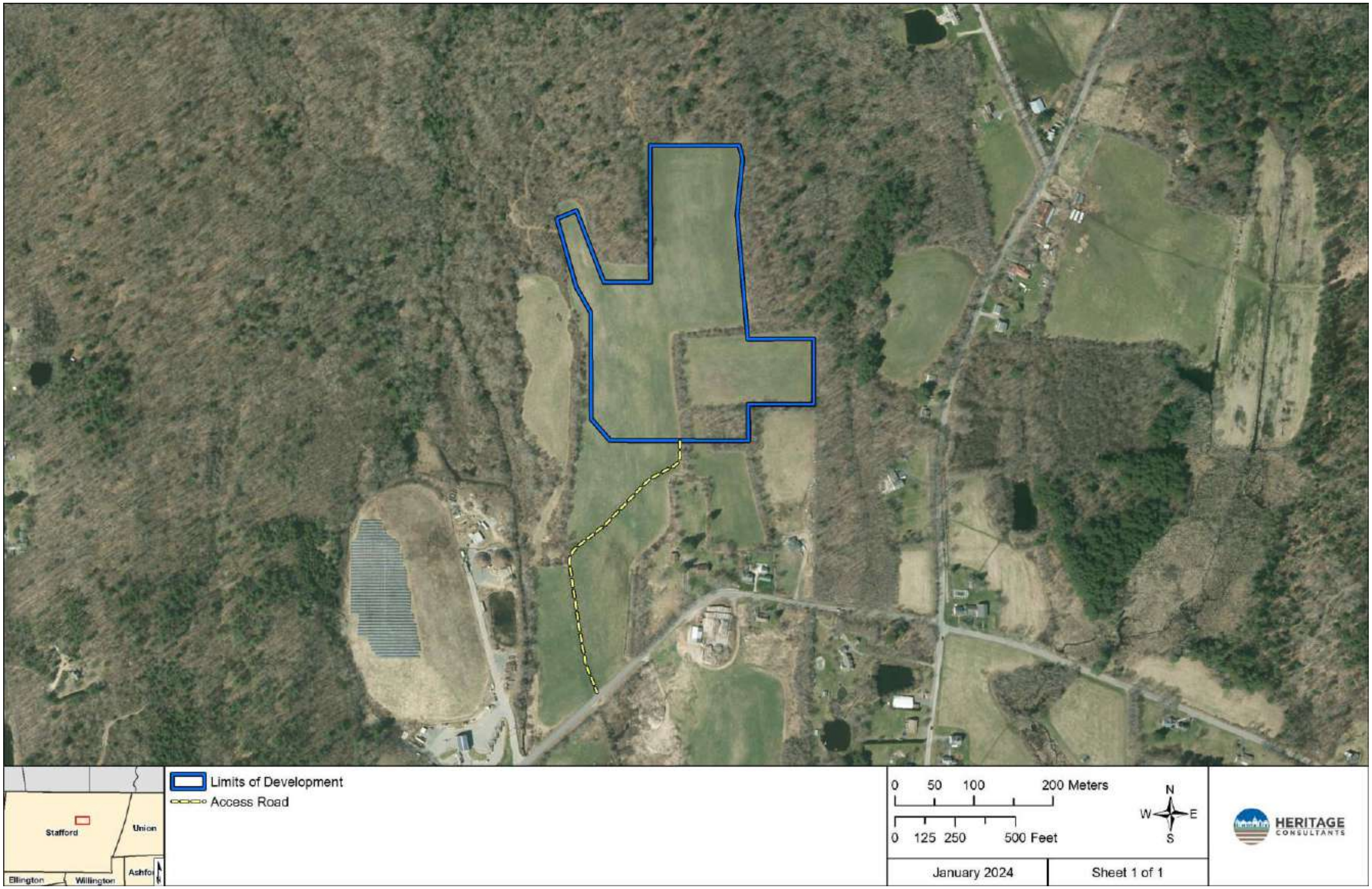


Figure 8. Excerpt of a 2019 aerial photograph showing the location of the project parcel in Stafford, Connecticut.

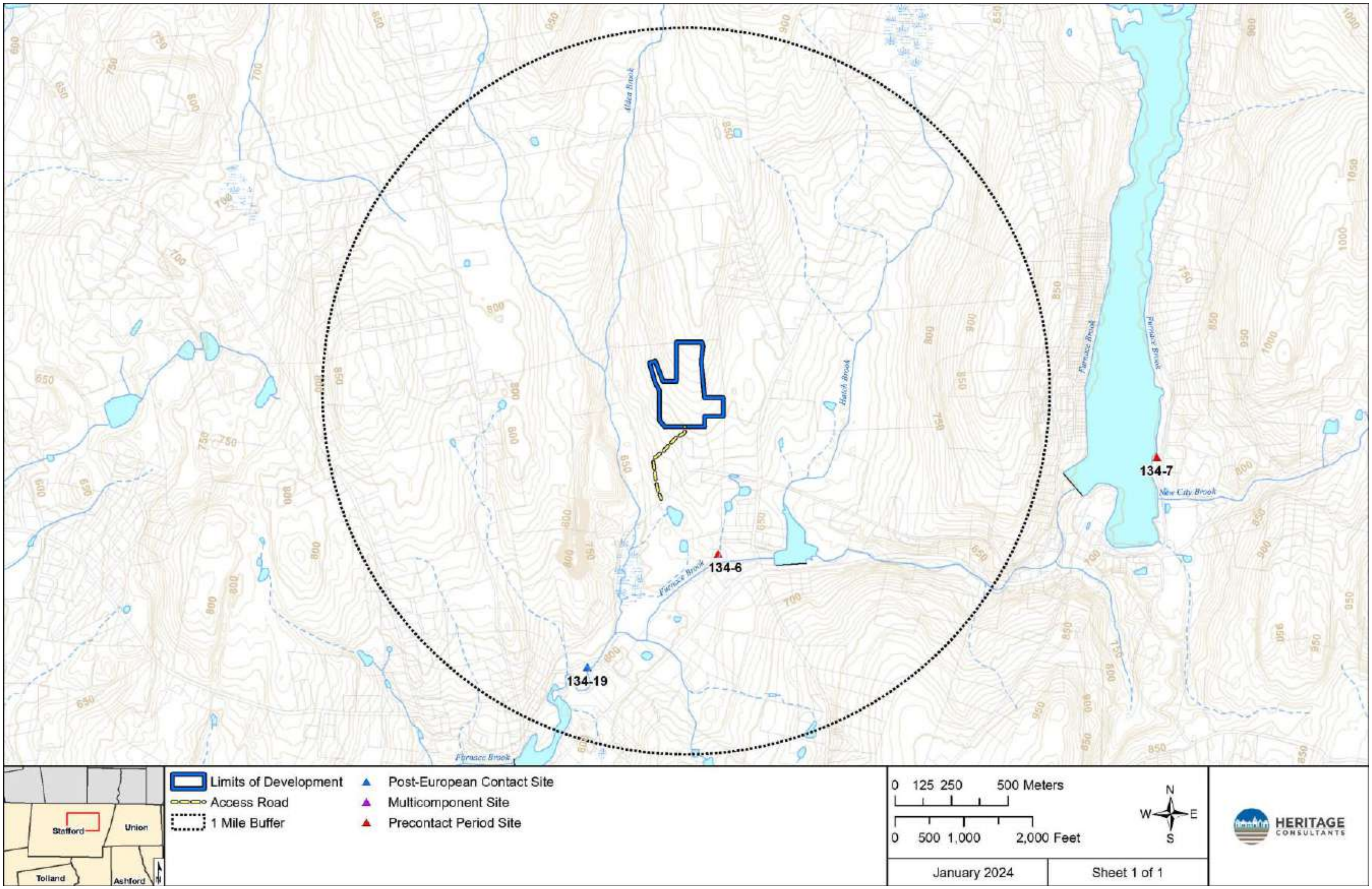


Figure 9. Digital map depicting the locations of the previously identified archaeological sites in the vicinity of the project parcel in Stafford, Connecticut.

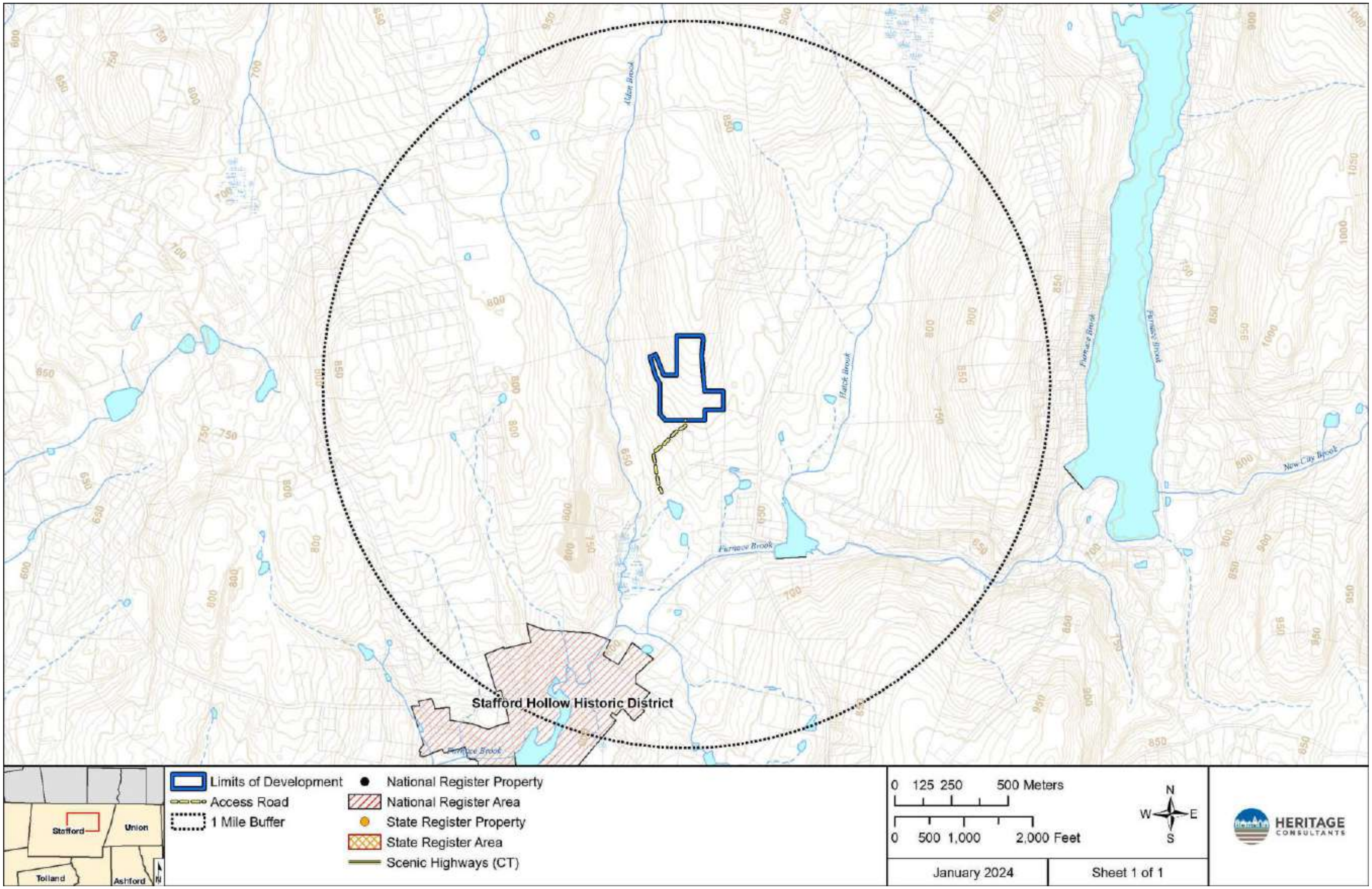


Figure 10. Digital map depicting the locations of the previously identified National Register of Historic Places and State Register of Historic Places properties in the vicinity of the project parcel in Stafford, Connecticut.

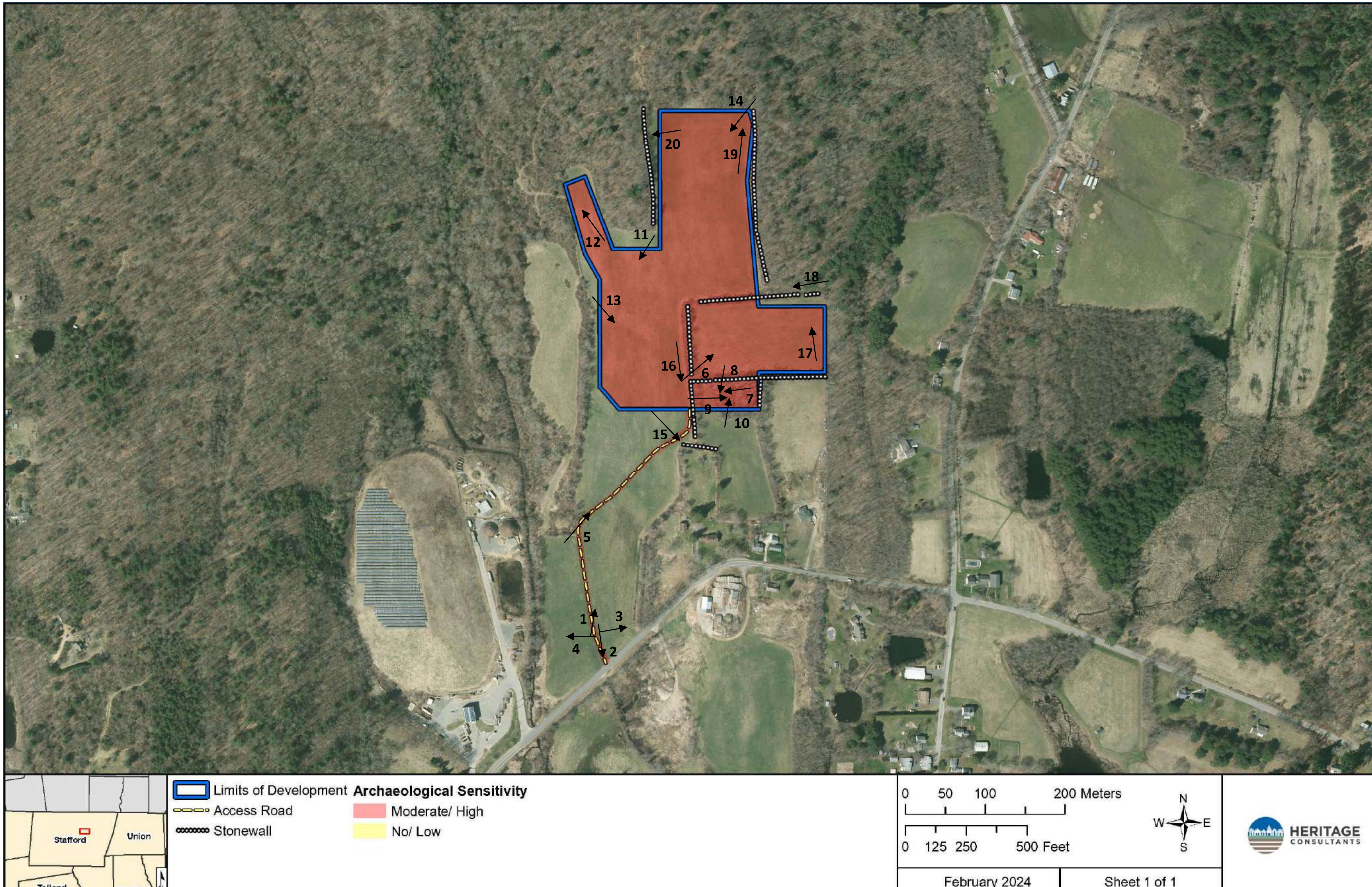


Figure 11. Excerpt from a 2019 aerial photograph showing areas of Moderate/High and No/Low Archaeological Sensitivity with directional arrows of photos taken for the proposed solar facility along Upper Road in Stafford, Connecticut.

Photo 1. Overview of proposed access road. Photo taken facing north.

Photo 2. Overview photo from project area facing Upper Road. Photo taken facing south.

Photo 3. Overview photo of proposed access road. Photo taken facing east.

Photo 4. Overview photo of proposed access road. Photo taken facing west. Note recycling center complex in background.

Photo 5. Overview photo of proposed access road. Photo taken facing northeast.

Photo 6. Overview photo of project area. Photo taken facing northeast.

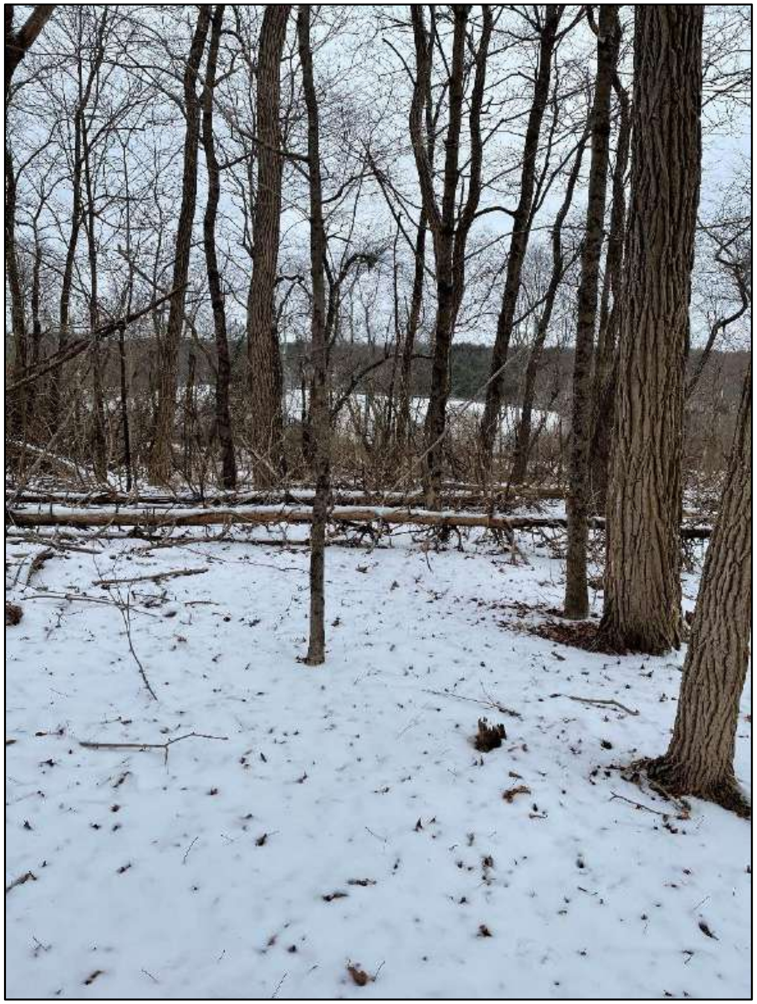


Photo 7. Overview photo of wooded area. Photo taken facing west.

Photo 8. Overview photo of wooded area. Photo taken facing south.

Photo 9. Overview photo of wooded area. Photo taken facing east.

Photo 10. Overview photo of wooded area. Photo taken facing north.

Photo 11. Overview of project area. Photo taken facing southwest.

Photo 12. Overview of northwest field of project area. Photo taken facing northwest.

Photo 13. Overview of project area. Photo taken facing southeast.

Photo 14. Overview of northern field within project area. Photo taken facing southwest.

Photo 15. Overview of corner of stone wall. Photo taken facing southeast.

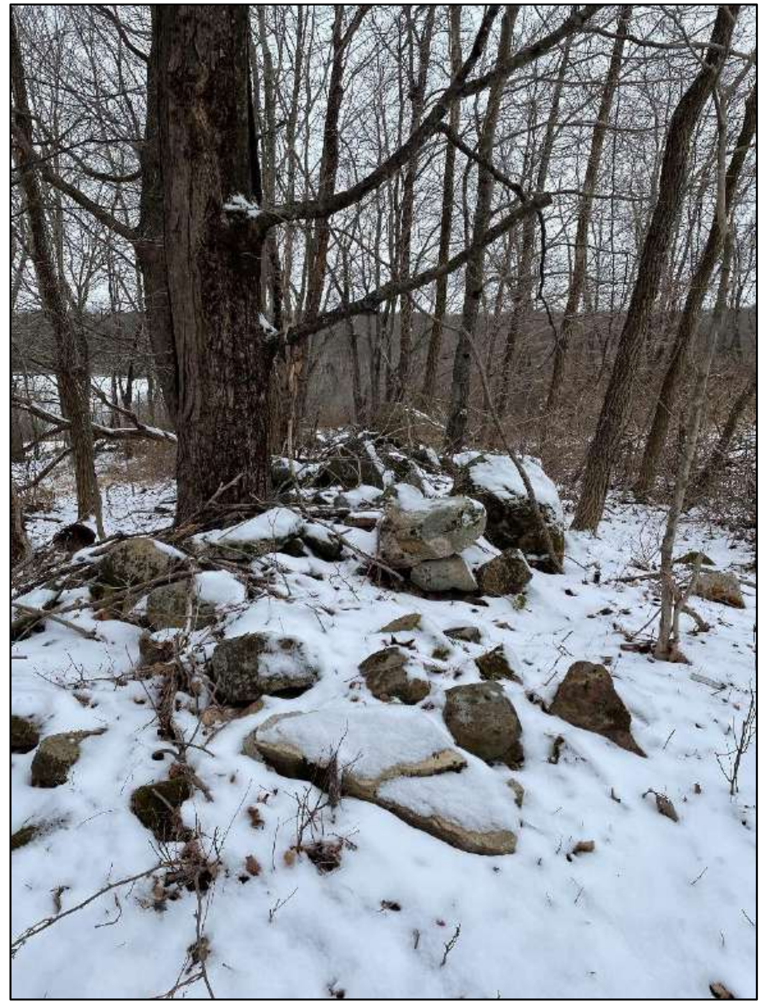


Photo 16. Overview of corner of stone wall. Photo taken facing south.

Photo 17. Overview of stone wall. Photo taken facing north.

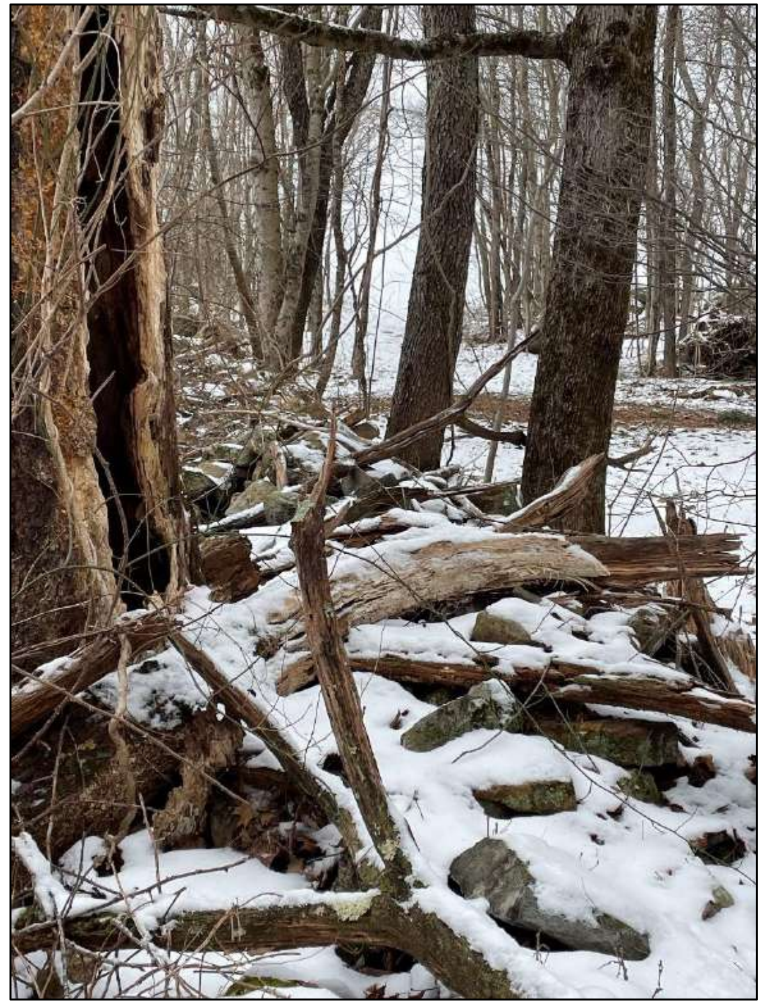


Photo 18. Overview of stone wall. Photo taken facing west.

Photo 19. Overview of stone wall that extends past the project area. Photo taken facing north.

Photo 20. Overview of stone wall from northwest corner of project area. Photo taken facing west.

Appendix K – FAA Determination

Federal Aviation Administration

« OE/AAA

Notice Criteria Tool

Notice Criteria Tool - Desk Reference Guide V_2018.2.0

The requirements for filing with the Federal Aviation Administration for proposed structures vary based on a number of factors: height, proximity to an airport, location, and frequencies emitted from the structure, etc. For more details, please reference CFR Title 14 Part 77.9.

You must file with the FAA at least 45 days prior to construction if:

- your structure will exceed 200ft above ground level
- your structure will be in proximity to an airport and will exceed the slope ratio
- your structure involves construction of a traverseway (i.e. highway, railroad, waterway etc...) and once adjusted upward with the appropriate vertical distance would exceed a standard of 77.9(a) or (b)
- your structure will emit frequencies, and does not meet the conditions of the FAA Co-location Policy
- your structure will be in an instrument approach area and might exceed part 77 Subpart C
- your proposed structure will be in proximity to a navigation facility and may impact the assurance of navigation signal reception
- your structure will be on an airport or heliport
- filing has been requested by the FAA

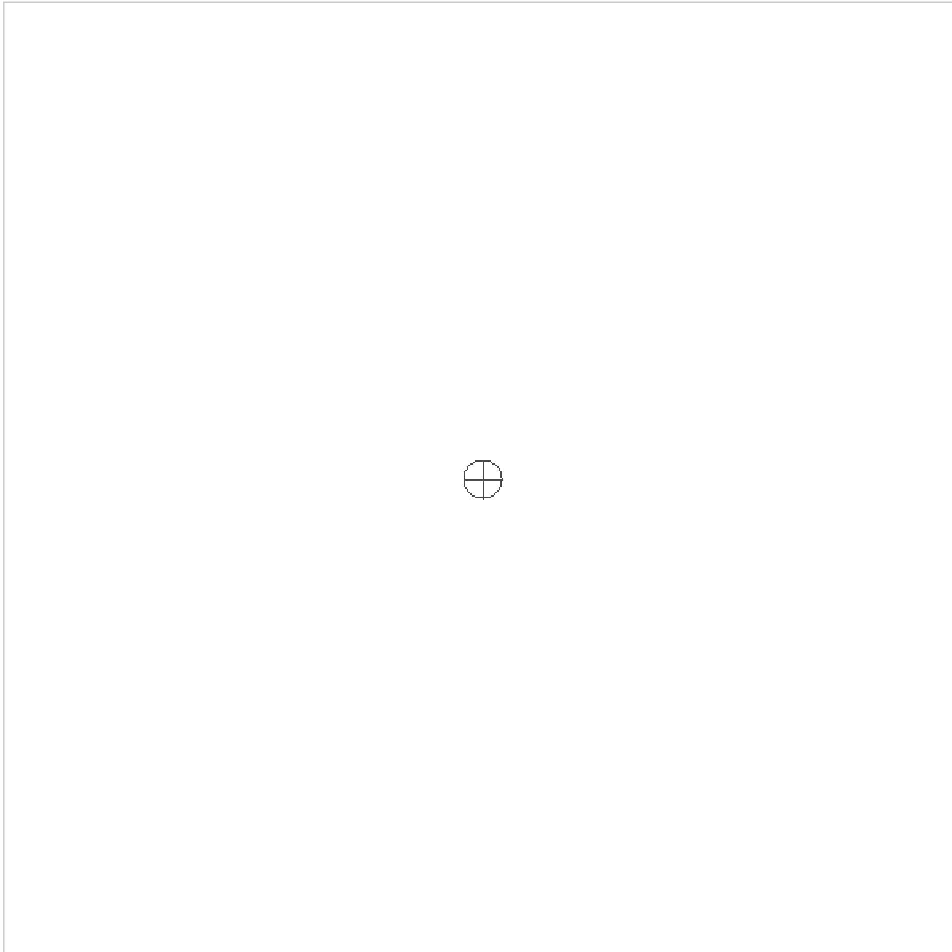
If you require additional information regarding the filing requirements for your structure, please identify and contact the appropriate FAA representative using the Air Traffic Areas of Responsibility map for Off Airport construction, or contact the FAA Airports Region / District Office for On Airport construction.

The tool below will assist in applying Part 77 Notice Criteria.

*** Structure Type:**	SOLAR | Solar Panel Please select structure type and complete location point information.
Latitude:	42 Deg 00 M 00.6 S N
Longitude:	72 Deg 16 M 51.9 S W
Horizontal Datum:	NAD83
Site Elevation (SE):	780 (nearest foot)
Structure Height :	12 (nearest foot)
Is structure on airport:	(●) No ( ) Yes

Results

You do not exceed Notice Criteria.



Federal Aviation Administration

« OE/AAA

Notice Criteria Tool

Notice Criteria Tool - Desk Reference Guide V_2018.2.0

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- your structure will emit frequencies, and does not meet the conditions of the FAA Co-location Policy
- your structure will be in an instrument approach area and might exceed part 77 Subpart C
- your proposed structure will be in proximity to a navigation facility and may impact the assurance of navigation signal reception
- your structure will be on an airport or heliport
- filing has been requested by the FAA

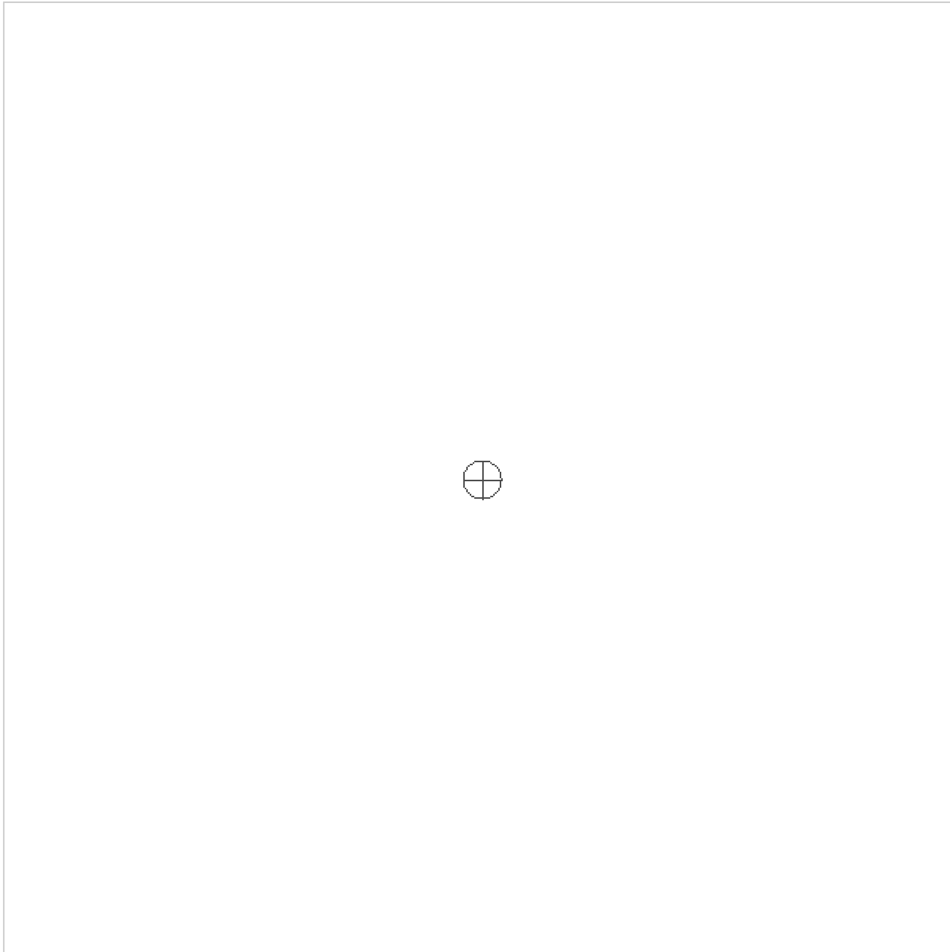
If you require additional information regarding the filing requirements for your structure, please identify and contact the appropriate FAA representative using the Air Traffic Areas of Responsibility map for Off Airport construction, or contact the FAA Airports Region / District Office for On Airport construction.

The tool below will assist in applying Part 77 Notice Criteria.

*** Structure Type:**	CRANE | Mobile Crane Please select structure type and complete location point information.
Latitude:	42 Deg 00 M 00.6 S N
Longitude:	72 Deg 16 M 51.9 S W
Horizontal Datum:	NAD83
Site Elevation (SE):	780 (nearest foot)
Structure Height :	40 (nearest foot)
Is structure on airport:	(●) No ( ) Yes

Results

You do not exceed Notice Criteria.



Appendix L – Wetland Delineation Report

November 13, 2023

Rob Bukowski
Weston & Sampson
712 Brook St Suite 103
Rocky Hill, CT 06067

RE: Wetland and Watercourse Delineation
Upper Road, Stafford

Mr. Bukowski,

At your request, Davison Environmental Connecticut Registered Soil Scientists delineated the Connecticut jurisdictional wetlands on the above-referenced property on November 8, 2023. The limits of the delineation area were provided by Weston & Sampson as illustrated on attached Figure 1.

Regulatory Requirements

The Connecticut jurisdictional wetlands and watercourses delineation was conducted by a soil scientist according to the requirements of the Connecticut Inland Wetlands and Watercourses Act (P.A. 155). Inland wetlands include soil types designated as poorly drained, very poorly drained, alluvial, and floodplain by the National Cooperative Soils Survey as may be amended from time to time, of the National Resources Conservation Service (NRCS). Watercourses means rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, vernal or intermittent. Intermittent watercourses shall be delineated by a defined permanent channel and bank and the occurrence of two or more of the following characteristics: *(A) Evidence of scour or deposits of recent alluvium or detritus, (B) the presence of standing or flowing water for a duration longer than a particular storm incident, and (C) the presence of hydrophytic vegetation*.

Methods

Soils, vegetation and hydrology were examined per the aforementioned regulatory requirements. Along each wetland boundary, a hand auger was used to investigate the soil profiles to a minimum depth of 20 inches. This was necessary to determine the U.S. Department of Agriculture drainage class (per State requirements) as well as the presence of hydric soil indicators per the USACE requirements (e.g., reduced matrix, redoximorphic features). Soil profiles were reviewed approximately every 15-30 feet along the boundary, typically digging one hole on either side of the defining boundary to confirm the wetland limit.

Results and Wetland Descriptions

Two wetlands were delineated. Both wetlands lie within a hayfield (see Figure 1). Wetland 1, delineated by flags 1-1 through 1-25, lies at the toe of a steep west facing slope. The wetland drains east then south into a drainageway with an embedded intermittent stream. At the southern terminus of the wetland adjacent to flag 1-25, it drains into a culver inlet at Upper Road. Wetland 2, delineated by flags 2-1 through 2-6, is a small, isolated wetland, also located within the hayfield at the toe of the slope. It is a small depressional feature that captures groundwater discharge from the bordering till ridge. Vegetation within both wetlands was dominated by hayfield grasses, which are cool season introduced Eurasian feed grasses. Some hydrophytic herbaceous vegetation was present, primarily soft rush (*Juncus effusus*) and the invasive reed canarygrass (*Phalaris arundinacea*). Where Wetland 1 transitions to the edge of the hayfield it is forested. This area has a red maple (*Acer rubrum*) tree canopy, with spicebush (*Lindera benzoin*) and highbush blueberry (*Vaccinium corymbosum*) understory.

Wetland soils consist of the Ridgebury, Leicester and Whitman complex. This is an undifferentiated mapping unit consisting of two poorly drained (Ridgebury and Leicester) and one very poorly drained (Whitman) soil developed on glacial till in depressions and drainageways in uplands and valleys. Their use interpretations are very similar, and they typically are so intermingled on the landscape that separation is not practical. The Ridgebury and Leicester series have a seasonal high water table at or near the surface (0-6") from fall through spring. They differ in that the Leicester soil has a more friable compact layer or hardpan, while the Ridgebury soils have a dense to very dense compact layer. The Whitman soil has a high water table for much of the year and may frequently be ponded.

Upland (non-wetland) Soil Types Observed

Digitally available soil survey information was obtained from the Natural Resources Conservation Service to classify the non-wetland soil types present. Note that the NRCS digital soil mapping is not precise to the site scale. Rather, the soil types are representative of the soil catena that would be present in the region in which the site occurs and is therefore a useful reference for onsite wetland soil identification.

The non-wetland soils were not examined in detail, except as was necessary to identify the wetland boundary. They generally consist of the Sutton series, Paxton and Montauk complex, and the Canton-Charlton complex. The Sutton series consists of very deep, moderately well drained loamy soils formed in friable till. They are nearly level to strongly sloping soils on till plains and low ridges, typically in mid to low slope positions. Sutton soils have a seasonal high water table at a depth of about 18-42" from mid-fall through mid-spring.

The Paxton series consists of well drained loamy soils formed in subglacial till. The soils are very deep to bedrock and moderately deep to a densic contact (known locally as hardpan). They are nearly level to steep soils on till plains, hills, and drumlins. The depth to the densic contact and material is commonly 20 to 40 inches but the range includes 18 to 40 inches. Depth to bedrock is commonly more than 6 feet. Rock fragments range from 5 to 35 percent by volume.

The Montauk series consists of very deep, well drained soils formed in glacial till derived primarily from granitic materials. These soils are on upland till plains and moraines. The landscape in some areas has many closed depressions, some of which are filled by perennial ponds or wet spots. The soils formed in thick moderately coarse or medium textured glacial till mantles underlain by firm sandy till. Some areas have very stony or extremely stony surfaces. The potential for runoff is low to high. Permeability is moderate or moderately rapid in the solum and slow or moderately slow in the substratum.

The Canton series consists of very deep, well drained soils formed in a loamy mantle underlain by sandy glacial till. They are on nearly level to very steep glaciated plains, hills, and ridges. Permeability is moderately rapid in the solum and rapid in the substratum. The soils developed in a fine sandy loam mantle over acid sandy glacial till of Wisconsin age derived mainly from granite and gneiss and some fine-grained sandstone.

The Charlton series is a very deep, well drained loamy soil formed in friable till. They are nearly level to very steep soils on till plains and hills. Depth to bedrock and the seasonal high water table is commonly more than 6 feet.

If you have any questions regarding these findings, please feel free to contact me.

Respectfully submitted,

Eric Davison

Eric Davison
Registered Soil Scientist
eric@davisonenvironmental.com
www.davisonenvironmental.com

Attachments: (1) Figure 1 – Wetlands Map
(2) Site Photographs

FIGURE 1 – WETLANDS MAP

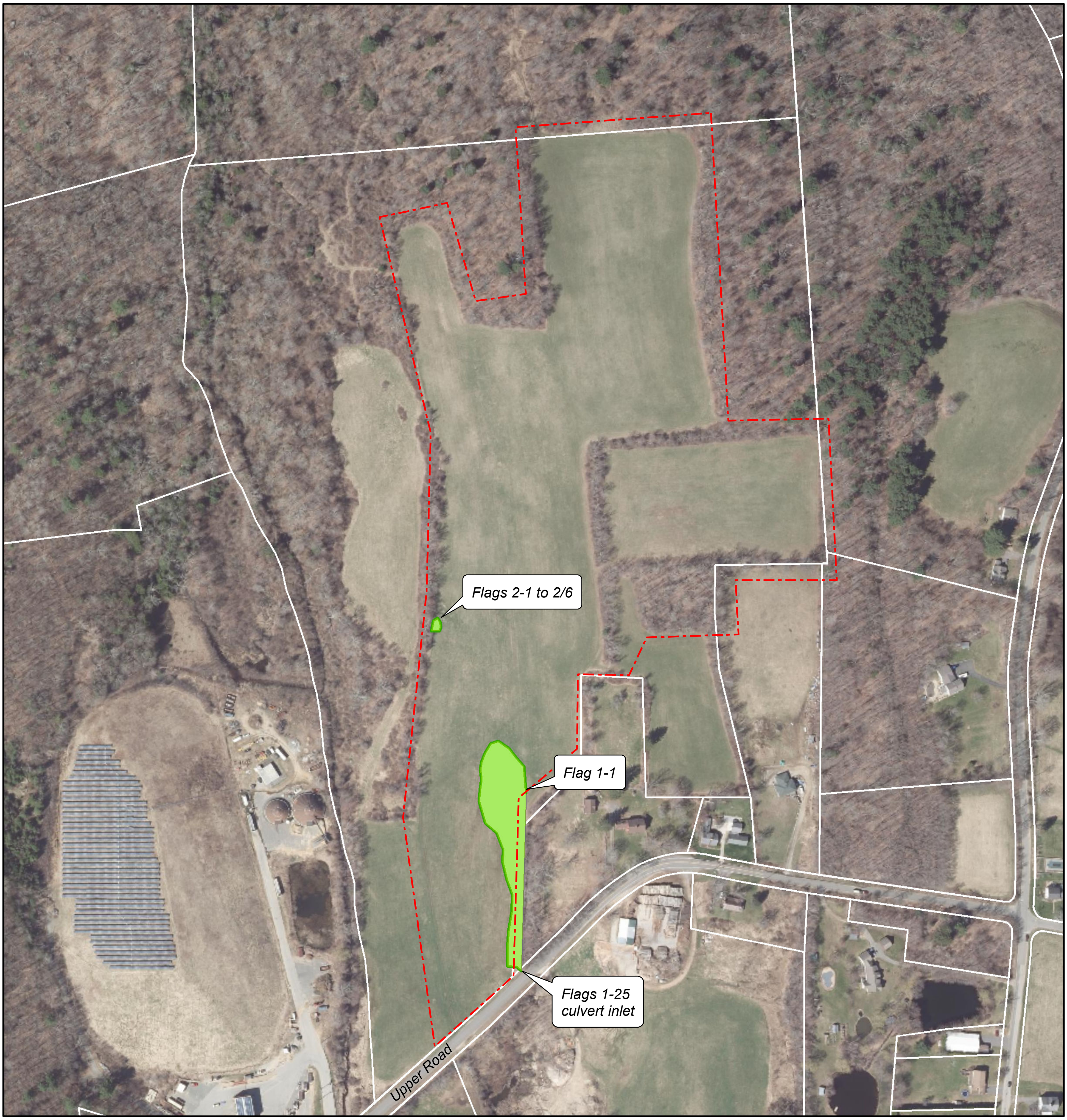


FIGURE 1
Wetlands Map
Upper Road
Stafford

Legend

Wetland Area

Wetland Boundary

Survey Area

Map Description: 2019 aerial photograph (source CT ECO) showing approximate wetland boundary. This map is intended for general planning purposes only.

SCALE
0 125 250 Feet

N

DAVISON ENVIRONMENTAL

Davison Environmental, LLC
10 Maple Street
Chester, CT
www.davisonenvironmental.com

SITE PHOTOGRAPHS

Photo 1: View north of Wetland 1.

Photo 2: View of forested area of Wetland 1, looking south.

Photo 3: View north of Wetland 1 from culvert inlet headwall at Upper Road.

Photo 4: View across Wetland 2, looking south.