Office of Town Clerk
11:54 am
JAN 21 2026
Received TOWN OF TRURO
By:

Truro Planning Board
Notice of Hybrid Public Hearing

Wednesday, February 18, 2026 at 5:00 pm

2026-002/SPR and 2026-002/PB NextGrid Pecan LLC for property located at 2 Sand Pit Road and 9 Noons Drive (Atlas Map 39, Parcel 107, 108). Applicant seeks Commercial Site Plan Approval under §70.3 of the Zoning Bylaw and a Special Permit under §40.7 of the Zoning Bylaw, Large-Scale Ground-Mounted Photovoltaic Arrays, to allow for construction of an approximately 7.68 megawatts (MW) direct current (DC) ground-mounted solar photovoltaic with associated battery storage system, with related improvements, on a portion of the above properties located in the Residential and Route 6 General Business District.

In person: 24 Town Hall Road, Truro, MA
Join Zoom: **https://us02web.zoom.us/j/88192369351**
Meeting ID: 881 9236 9351
Passcode: 599458
Dial in: +1-646-931-3860

Citizens can join the meeting to listen and provide public comment by entering the meeting link; clicking on the agenda's highlighted link; clicking on the meeting date in the Event Calendar; or by calling in toll free and entering the access code.

Contact the Planning Department Assistant at (508) 214-0935 or *esturdy@truro-ma.gov* to provide written comment via postal mail or email, or if you have any questions. To review applications and plans, please see News & Announcements on the Planning Board webpage.

Ellery Althaus, Chair

Weston & Sampson

westonandsampson.com

55 Walkers Brook Drive, Suite 100
Reading, MA 01867
tel: 978.532.1900

Site Plan Review & Special Permit Application

January 2026

TRURO SOLAR PHOTOVOLTAIC DEVELOPMENT

9 NOONS DRIVE, TRURO, MA

PREPARED FOR: NEXTGRID PECAN LLC

SUBMITTED TO: TOWN OF TRURO PLANNING BOARD

55 Walkers Brook Drive, Suite 100, Reading, MA 01867
Tel: 978.532.1900

January 19, 2026

Ms. Virginia Frazier
Clerk, Town of Truro Planning Board
24 Town Hall Road
P.O. Box 2030
Truro, MA 02666
cc: Planning Department Assistant, esturdy@truro-ma.gov

Re: **Site Plan Review and Special Permit Application**
Truro Solar Photovoltaic Development
9 Noons Drive, Truro, MA 02666

Dear Ms. Frazier:

Weston & Sampson Engineers, Inc. (Weston & Sampson) is submitting this package, which includes a Site Plan Review Application, Special Permit Application, and related appendices as a combined application package, to be filed with the Town of Truro Planning Board for the above-mentioned project on behalf of NextGrid Pecan LLC (the Applicant). The Applicant proposes to develop the project, an approximately 7.68 megawatts (MW) direct current (DC) ground-mounted solar photovoltaic with associated battery storage system (BESS), at the site located at 9 Noons Drive in Truro, Massachusetts.

The project will consist of solar photovoltaic panels connected to a post driven racking system, a BESS and associated equipment pads. There is a proposed gravel access road to allow for site access and maintenance. The solar array will be surrounded by a 7 ft tall chain link fence as detailed in the attached site plans. The electricity generated by the PV modules will be exported to the electric grid in accordance with the utility's interconnection standards and regulations.

This Site Plan Review and Special Permit Application Package is being submitted in parallel to an Approval Not Required (ANR) Plan for a relocation of the lot line that splits 2 Sand Pit Road (Tax Map 39 Lot 107, 38.695 acres) and 9 Noons Drive (Tax Map 39 Lot 108, 17.2 acres) to allow for the proposed solar PV development to be located on its own parcel. The two parcels together total 55.895 acres; the ANR plan proposes to shift the property line splitting the two lots to the north increasing Lot 108 area; Proposed Lot 1 (Map39 Lot 108) area 39.2 acres and decreasing Lot 107; proposed lot 2 (Map 39 Lot 107) area 16.7 acres. This Site Plan Review and Special Permit Application Package are in reference to the parcel lines and areas associated with the proposed ANR Plan for 9 Noons Drive (Map 39 Lot 108).

This application package includes the following attachments.

- Appendix A – Application Forms
- Appendix B – Project Narrative
- Appendix C – Site Plans
- Appendix D – Stormwater Report
- Appendix E – Copy of Proposed ANR Plan
- Appendix F – Criteria Review
- Appendix G – Certified Abutters List
- Appendix H – Electrical Documents
- Appendix I – Solar and BESS Operation & Maintenance Plan
- Appendix J – Certificate of Insurance
- Appendix K – Decommissioning Cost Estimate

Filing fees associated with this combined Site Plan Review and Special Permit Application are included with the hard copy deliverable package; Site Plan Review Application Fee ($250.00 Check 167302), Special Permit Review Fee ($200.00 Check 167301), and Large Scale Solar Review Fee ($50.00 Check 167303).

If you have any further questions or require any additional information, please feel free to contact me by phone at (978) 532-1900 or by email at costello.melinda@wseinc.com.

Sincerely,
WESTON & SAMPSON ENGINEERS, INC.

Melinda Costello

Tara Garani

Melinda Costello, P.E.
Senior Team Leader / Project Manager

Tara Garani
Engineer

cc: Daniel Serber, Senior Director of Land Development, NextGrid Pecan LLC

Appendix A – Application Forms & Checklist

Town of Truro Planning Board

P.O. Box 2030, Truro, MA 02666

APPLICATION FOR SPECIAL PERMIT

To the Town Clerk of the Town of Truro, MA Date 01/18/2026

The undersigned hereby files with specific grounds for this application:

1. General Information

Applicant seeks approval and authorization of uses under Section 40.7 of the Truro Zoning Bylaw concerning *(describe)*: the construction of a ground-mounted solar photovoltaic array and associated battery energy storage system encompassing approximately 24.72 acres of the approximately 55.9-acre site, located at 9 Noons Drive, Truro, MA. The project site is located in the Residential zoning district. The property is currently undeveloped and consists of a sand and gravel pit.

Property Address 2 Sand Pit Road / 9 Noons Drive, Truro, MA 02666 Map(s) and Parcel(s) Map 39, Parcels 107 & 108

Registry of Deeds title reference: Book 279 / 1083, Page 034 / 307, or Certificate of Title Number _____ and Land Ct. Lot # _____ and Plan # _____

Applicant's Name NextGrid Pecan LLC

Applicant's Legal Mailing Address 68 Harrison Ave, Suite 605, PMB 73069

Applicant's Phone(s), Fax and Email 855-636-6100, daniel@nextgrid.com

Applicant is one of the following: *(please check appropriate box)* *Written Permission of the owner is required for submittal of this application.

☐ Owner ☒ Prospective Buyer* ☐ Other*

Owner's Name Paula A. Noons and Jeffery W. Rose, as Trustees of The Donald W. Noons Trust

Owner's Address 2 Sandpit Road, Truro MA 02666

Representative's Name and Address Weston & Sampson Engineers, Inc. Melinda Costello, 55 Walkers Brook Drive, Reading, MA 01867

Representative's Phone(s), Fax and Email _____

2. The completed application **shall also** be submitted **electronically** to the Planning Department Assistant at ***esturdy@truro-ma.gov*** in its entirety (including all plans and attachments).

- The applicant is ***advised*** to consult with the Building Commissioner, Planning Department, Conservation Department, and/or Health Department prior to submitting this application.

Signature(s)

Daniel Serber - NextGrid
Applicant(s)/Representative *Printed* Name(s)

Daniel Serber
Applicant(s)/Representative Signature

Paula A. Noons - Trustee
Owner(s) *Printed* Name(s) or written permission

Jeffery Rose Trustee
Owner(s) Signature or written permission

Your signature on this application authorizes the Members of the Planning Board and town staff to visit and enter upon the subject property

Town of Truro Planning Board

P.O. Box 2030, Truro, MA 02666

APPLICATION FOR COMMERCIAL SITE PLAN REVIEW

To the Town Clerk and the Planning Board of the Town of Truro, MA Date 01/18/2026

The undersigned hereby files an application with the Truro Planning Board for the following:

☒ ***Site Plan Review*** pursuant to §70 of the Truro Zoning Bylaw

☐ ***Waiver of Site Plan Review*** pursuant to §70.9 of the Truro Zoning Bylaw
(Note: Site Plan Review shall <u>not</u> be waived in the Seashore District)

1. General Information

Description of Property and Proposed Project The Applicant proposes to construct a ground mounted solar photovoltaic array and battery energy storage system encompassing approximately 24.72 acres of the approximately 55.9-acre site, located at 9 Noons Drive, Truro, MA. The property is in the Residential district and contains a sand and gravel pit.

Property Address 2 Sand Pit Road / 9 Noons Drive, Truro, MA 02666 Map(s) and Parcel(s) Map 39, Parcels 107 & 108

Registry of Deeds title reference: Book 279 / 1083, Page 034 / 307, or Certificate of Title Number _____ and Land Ct. Lot # _____ and Plan # _____

Applicant's Name NextGrid Pecan LLC

Applicant's Legal Mailing Address 68 Harrison Ave, Suite 605, PMB 73069

Applicant's Phone(s), Fax and Email 855-636-6100, daniel@nextgrid.com

Applicant is one of the following: *(please check appropriate box)* *Written Permission of the owner is required for submittal of this application.

☐ Owner ☒ Prospective Buyer* ☐ Other*

Owner's Name and Address Paula A. Noons and Jeffery W. Rose, as Trustees of The Donald W. Noons Trust, 2 Sandpit Road, Truro MA 02666

Representative's Name and Address Weston & Sampson Engineers, Inc. Melinda Costello, 55 Walkers Brook Drive, Reading, MA 01867

Representative's Phone(s), Fax and Email 781-315-4662 costello.melinda@wseinc.com

2. Waiver(s) Request – The Planning Board may, upon the request of the applicant, pursuant to §70.3.E, waive requirements of §70.3.D, provided that in the opinion of the Planning Board such a waiver would not be detrimental to the public interest, cause the Town any expense, or be inconsistent with the intent and purpose of this Bylaw. A request for a waiver by the applicant shall be accompanied by a reasonable explanation as to why the waiver is being requested. If multiple waivers are requested, the applicant shall explain why each waiver is requested.

- The applicant is ***advised*** to consult with the Building Commissioner, Planning Department, Conservation Department, and/or Health Department prior to submitting this application.

Signature(s)

Daniel Serber - NextGrid
Applicant(s)/Representative *Printed* Name(s)

Daniel Serber
Applicant(s)/Representative *Signature(s)*

Paula A. Noons - trustee
Owner(s) *Printed* Name(s) or written permission

Jeffery W. Rose TRUSTEE
Owner(s) *Signature(s)* or written permission

Your signature on this application authorizes the Members of the Planning Board and town staff to visit and enter upon the subject property.

70.3 - COMMERCIAL SITE PLAN REVIEW CHECKLIST - Applicant

Address: 9 Noons Drive **Applicant Name:** NextGrid Pecan LLC **Date:** 12/31/2025.

No.	Requirement	Included	Not Included	Explanation, if needed
D. Procedures and Plan Requirements				
1a.	An original and 9 copies of the Application for Site Plan Review	x		Appendix A
1b.	10 copies of the required plans and other required information including this Checklist	x		App C, 12 copies per section 40.7
1c.	Completed Criteria Review	x		Appendix F
1d.	Certified copy of the abutters list obtained from the Truro Assessors Office	x		Appendix G
1e.	3 copies of drainage calculations stamped by a Professional Engineer	x		Appendix D
1f.	Applicable filing fee	x		
1g.	Any other information that may be applicable or required by the Planning Board			
	Site Plans			
2a.	Site Plans shall be prepared, signed and stamped by a Registered Land Surveyor and Professional Engineer	x		Appendix C
2b.	Site Plans shall be prepared at a scale of one inch equals forty feet (1"=40') or larger	x		
3a.	General - Submitted plans shall contain the following:			
3a. 1	North Arrow/Location Map: A north arrow and a locus plan containing sufficient information to locate the subject property, such as streets bounding or providing access to the property.	x		Locus plan included on G001
3a. 2	Zoning Information: All applicable Zoning Bylaw information regarding the site's development, both existing and proposed. This information shall be placed in a table format which must list all parking; setbacks; percent of lot coverage, broken down by parking, walkways, building(s), etc.; number of dwelling units; total amount of square feet; size of signs, and any other applicable zoning information necessary for the proper review of the site plan.	x		Zoning Summary Table included on G001
	Existing:			
	All parking	x		
	All setbacks	x		
	Percent (%) of lot coverage broken down by parking, walkways, building(s), etc.			
	Number of dwelling units			
	Total amount of square feet			not applicable

70.3 - COMMERCIAL SITE PLAN REVIEW CHECKLIST - Applicant

Address: 9 Noons Drive **Applicant Name:** NextGrid Pecan LLC **Date:** 12/31/2025.

No.	Requirement	Included	Not Included	Explanation, if needed
	Size of signs			not applicable
	Any other applicable zoning information necessary for the proper review of the site plan			
	Proposed:			
	All parking			none proposed
	All setbacks	x		
	Percent (%) of lot coverage broken down by parking, walkways, building(s), etc.			
	Number of dwelling units			no new dwellings proposed
	Total amount of square feet	x		
	Size of signs	x		
	Any other applicable zoning information necessary for the proper review of the site plan	x		
3a. 3	Assessor and Deed Information: The Truro Assessors Atlas Map(s) and Parcel(s) numbers and all plan and deed references.	x		
3a. 4	Graphic Scale	x		
3a. 5	Title Block - Including:			
	Name and description of the project	x		
	Address of the property	x		
	Names of the record owner(s) and the applicant(s)	x		
	Date of the preparation of the plan(s) and subsequent revision dates	x		
3a. 6	Legend of all symbols	x		
3b.	Existing Conditions Plan - showing the following:			
3b. 1	Total area and dimensions of the lot shown on a surveyed plan conforming to the requirements of the Barnstable County Registry of Deeds.	x		
3b. 2	Location of existing buildings (including the number of stories, overall height in feet, and gross floor area in square feet of all existing buildings), parking, drives, walks, lighting service areas, all utilities, drainage facilities, easements, and other appurtenances, including setbacks from property lines.	x		
	Location of existing buildings	x		
	Number of stories			

70.3 - COMMERCIAL SITE PLAN REVIEW CHECKLIST - Applicant

Address: 9 Noons Drive **Applicant Name:** NextGrid Pecan LLC **Date:** 12/31/2025.

No.	Requirement	Included	Not Included	Explanation, if needed
	Overall height in feet			
	Gross floor area in square feet			
	Parking			not applicable
	Drives	x		
	Walks	x		
	Lighting service areas			not applicable
	All utilities	x		
	Draining facilities			not applicable
	Easements	x		
	Other appurtenances	x		
	Setback from property lines	x		
3b. 3	Existing contours based on two foot (2') contour intervals.	x		
3b. 4	General location of trees having a caliper of ten (10) inches or more diameter at breast height (DBH), all resource areas as defined in M.G.L. Chapter 131, Section 40, landscaping and other significant natural features.	x		
3b. 5	Respective floor areas and/or square footage of existing uses of buildings and/or the property.			not applicable
3b. 6	Existing location(s) of any freestanding sign(s).			
3b. 7	National Flood Insurance Program flood hazard elevation.	x		
3b. 8	Massachusetts Natural Heritage Endangered Species Act jurisdiction.	x		
3c.	Proposed Conditions Plan - showing the following:			
3c. 1	Building Location: Identification of all building(s) to be located on the site. The number of stories, overall height in feet and gross floor area in square feet of all buildings shall be indicated.			not applicable
3c. 2	Building Elevation: A drawing(s) of the exterior of all building(s), as viewed from all sides, including dimensions, at a scale of no smaller than 1/8” = 1’-0”. This drawing must be at least 8" x 11" in size.			not applicable

70.3 - COMMERCIAL SITE PLAN REVIEW CHECKLIST - Applicant

Address: 9 Noons Drive **Applicant Name:** NextGrid Pecan LLC **Date:** 12/31/2025.

No.	Requirement	Included	Not Included	Explanation, if needed
3c. 3	Location of Parking/Walkways: Identification of the location of all parking and walkways, including curb cuts that will be used for site access from adjacent roadways or access points. Parking shall be consistent with the requirements outlined in §30.9.			not applicable
3c. 4	Easements/Legal Conditions: Identification of legal encumbrances(s), including easements, that are related to the site's physical development, and a listing of any condition(s) placed upon the site by the Zoning Board of Appeals, Planning Board, Conservation Commission, Board of Health or any other public body or agency with the authority to place conditions on the site's development.	x		
3c. 5	Stormwater Drainage: All storm water drainage facilities utilized by the site shall be shown on the site plan. Storm water drainage calculations, which support the design of the control facilities shown on the plan, shall be calculated using a 2, 10, and 50-year storm events.	x		not applicable
3c. 6	Grades: Topography and a grading plan of the site.	x		
3c. 7	Location of Walls: Identification of the location, height, length, and materials to be used for all retaining walls to be located on the site.			not applicable
3c. 8	Signs: Identification of the location, height and materials to be used for all signs to be located on the site. Signs will be reviewed using the Town of Truro Sign Code section of the zoning bylaw.	x		
3c. 9	Location of Streets/Drives: Identification of all streets and driveways including the type and dimensions of curbs and gutters. Distances to all the nearest streets and/or curb cuts shall be shown for both sides of any street which is adjacent to the site.	x		
3c. 10	Outdoor Storage/Display Areas: Identification of the location and type of outdoor storage and display areas on the site.	x		
3c. 11	Refuse Areas: Identification of the location of each outdoor refuse storage area, including the method of storage and screening. All refuse areas must be fully enclosed.			not applicable

70.3 - COMMERCIAL SITE PLAN REVIEW CHECKLIST - Applicant

Address: 9 Noons Drive **Applicant Name:** NextGrid Pecan LLC **Date:** 12/31/2025.

No.	Requirement	Included	Not Included	Explanation, if needed
3c. 12	Lighting Facilities: Identification of all illumination, including numbers and locations, indicating the direction and the degree of illumination offered by the lighting facilities and including specifications of the light fixture(s) to be used. (Also see General Bylaws Ch. IV §6.)			not applicable
3c. 13	Location of Wetlands and Other Resource Areas: All resource areas as defined in M.G.L. Chapter 131, Section 40. (If applicable, the applicant shall file a Notice of Intent with the Truro Conservation Commission concurrently with the application to the Planning Board for Site Plan Review.)	x		
3c. 14	Location and Description of Utilities. Identification of all utilities, including sewer line locations and profiles and storm drainage systems.	x		
3c. 15	Parking and Driveway Cross Section: a cross section identifying the proposed construction of driveways and parking areas on the site.	x		
3c. 16	Limit of work area (area to be disturbed during construction, including parking and storage of vehicles and equipment) and work staging area(s).	x		
3d.	Proposed landscape schedule for, and identification of, the location of all perimeter and interior landscaping – showing the following:	x		
	Proposed paving materials for walkways			
	Fences			
	Stonewalls			
	All planting materials to be placed on the site			
	All existing trees over 10 inches diameter at breast height (DBH) to be saved or removed shall be shown on the site plan			
3e.	Building Plans – at a scale of no less than 1/8" = 1'-0" showing the following:			not applicable
3e. 1	Elevations showing exterior materials and features including but not limited to doors, windows, trim, roof, lighting and including the height of the building(s).			
3e. 2	Floor plans with dimensions.			
3f.	Project Estimate:			Appendix H
	Estimated date of initiation	x		
	Estimated time required to complete the proposed project and any and all phases thereof	x		
	Written cost estimate with a breakdown of the building(s) and all site improvements	x		

Appendix B – Project Narrative

PROJECT NARRATIVE

Introduction

NextGrid Pecan LLC (the Applicant) proposes construction of a ground mounted solar photovoltaic (PV) array and battery energy storage system (BESS) encompassing approximately 24.72 acres of the approximately 39.2-acre site (proposed ANR lot size as described in the cover letter), located at 9 Noons Drive, Truro, MA (Map 39, Block 0, Parcel 108). The project site is located in the Residential District. The property is currently undeveloped and is operating as a sand and gravel pit.

This application package includes a Site Plan Review Application, Special Permit Application, and related appendices. The two local applications share many of the same appendices and so the physical hardcopy applications are packaged together for convenience. The application appendices can be referenced in the cover letter included in this package. The following narrative and documentation is hereby submitted to the Planning Board under Section 70 and Section 30.8 for Site Plan Reviews and Special Permits, respectively, of the Town of Truro Zoning Bylaw, adopted May 2024 (the "Bylaws").

Proposed Project

The proposed solar PV site will be accessed from Noons Drive. Large-scale ground-mounted solar photovoltaic arrays are a permitted use within the Residential zoning district via a Special Permit by the Planning Board.

As currently designed, the proposed ground mounted solar PV system has a capacity of 7.68 megawatts (MW) direct current (DC) with associated BESS. The solar array will be surrounded by a 7-foot tall chain link fence with access gates. A BESS is proposed within the fenced area of the array. There is a proposed gravel access road to allow for site access and maintenance, and a stormwater management system. The electricity generated by the PV modules will be exported to the electric grid in accordance with the local utility's interconnection standards and regulations. Site Plans for the proposed design are included in Appendix C. A stormwater report summarizing the proposed stormwater management system and it's associated caclulations is included in Appendix D.

This Site Plan Review and Special Permit Application Package is being submitted in parallel to an Approval Not Required (ANR) Plan for a relocation of the lot line that splits 2 Sand Pit Road (Tax Map 39 Lot 107, current lot size 38.695 acres) and 9 Noons Drive (Tax Map 39 Lot 108, current lot size 17.2 acres) to allow for the proposed solar PV development to be located on its own parcel. The two parcels together total 55.895 acres; the ANR plan proposes to shift the property line splitting the two lots to the north increasing Lot 108 area; Proposed Lot 1 (Map39 Lot 108) area 39.2 acres and decreasing Lot 107; proposed lot 2 (Map 39 Lot 107) area 16.7 acres. This Site Plan Review and Special Permit Application Package are in reference to the parcel lines and areas associated with the proposed ANR Plan for 9 Noons Drive (Map 39 Lot 108). A copy of the proposed ANR Plan is included In Appendix E for reference.

The name of the Project Developer is:

NextGrid Pecan LLC
68 Harrison Ave, Suite 605, PMB 73069
Boston, MA 02111
Contact: Daniel Serber
Phone: 559-731-4645
Email: daniel@nextgrid.com

The name and contact information of the Engineer authorized to represent the Project Developer:

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
Contact: Melinda Costello, P.E.
Phone: (978) 532-1900
e-mail: costello.melinda@wseinc.com

Compliance with Bylaws

On behalf of the developer, Weston & Sampson has developed a set of plans, attached in **Appendix C**, that are intended to meet requirements set forth in the Town of Truro Zoning Bylaw for the Residential zoning district in which the project is proposed.

Provisions of the Bylaws relative to the project, followed by an analysis of the project's compliance with applicable provisions (in underlined font), are listed below. The outlined regulations represent an analysis primarily applicable to Section 40.7, the Large-Scale Ground Mounted Photovoltaic Arrays portion of the Bylaws, and Section 30.8, the Special Permits portion of the Bylaws. Compliance with Section 70, the Site Plan Review portion of the Bylaws, is included in **Appendix F** as the required Criteria Review for the Site Plan Review Application.

A copy of the parcels certified abutters list is included in **Appendix G**. In accordance with the Site Plan Review requirements outlined is Section 70 of the Bylaws, the Applicant / Project Developer understands the Town will provide notice to the project abutters of the Site Plan Review / Special Permit Public Hearing.

§ 40.7 Large-Scale Ground-Mounted Photovoltaic Arrays

A. Purpose and Intent. The purpose of this bylaw is to promote the creation of new Large-Scale Ground-Mounted Solar Photovoltaic Installations (250kW or larger and covering at least one acres in size) by providing standards for the placement, design, construction, operation, monitoring, modification and removal of such installations to address public safety, minimize impacts on scenic, natural and historic resources, and provide adequate financial assurance for the eventual decommissioning of such installations.

   The provisions set forth in this section shall apply to the construction, operation, and/or repair of Large-Scale Ground-Mounted Solar Photovoltaic Installations.

   This section shall apply to Large-Scale Ground-Mounted Solar Photovoltaic Installations proposed for construction after the effective date of this section. This section shall also pertain to physical modifications that materially alter the type, configuration, or size of these installations or related equipment.

   Acknowledged, the proposed ground-mounted solar PV installation is 7.68 MW DC, classifying it as large-scale. The perimeter fence surrounding the PV array is approximately 24.7 acres.

B. Definitions
   1. As-of-Right Siting: As-of-Right Siting shall mean that development may proceed without the need for a special permit, variance, amendment, waiver, or other discretionary approval. As-of-Right development may be subject to Large Scale Solar Review to determine conformance with local zoning ordinances or bylaws. Projects subject to Large Scale Solar Review cannot be prohibited, but can be reasonably regulated by the building commissioner or local inspector.

2. Designated Location: The location[s] designated by the Zoning Bylaw, in accordance with Massachusetts General Laws Chapter 40A, section 5, where Large–Scale Ground-Mounted Solar Photovoltaic Installations may be sited As-of Right. Said location(s) are shown on the Zoning Map of Truro pursuant to Massachusetts General Laws Chapter 40A Section 4. This map is hereby made a part of this section and is on file in the Office of the Town Clerk.
3. Large-Scale Ground-Mounted Solar Photovoltaic Installation: A solar photovoltaic system that is structurally mounted on the ground and is not roof-mounted, and has a minimum nameplate capacity of 250 kW DC. All Large-Scale Ground-Mounted Solar Photovoltaic Installation shall be owned and operated by either the Town of Truro or under agreements with the Town of Truro.
4. Large Scale Solar Review: A review by the Planning Board to determine conformance with local zoning ordinances or bylaws.
5. On-Site Solar Photovoltaic Installation: A solar photovoltaic installation that is constructed at a location where other uses occur at the underlying property.
6. Nameplate Capacity: The maximum rated output of the electric power production of the photovoltaic system in Direct Current (DC).
7. Solar Photovoltaic Array: an arrangement of solar photovoltaic panels.

Acknowledged.

C. Large Scale Solar Review. Prior to construction, installation or modification, Large–Scale Ground Mounted Solar Photovoltaic Installations with 250 kW or larger nameplate capacity shall undergo Large Scale Solar Review by the Planning Board as provided below. In accordance with Section 22(c) of the Massachusetts Green Communities Act, Large Scale Solar Review shall be expedited and no decision shall be rendered more than one (1) year after the date of the application.

Acknowledged. An analysis of the project's compliance with applicable provisions (in underlined font) are listed below.

1. Compliance with Laws, Ordinances and Regulations. The construction and operation of all Large–Scale Ground-Mounted Solar Photovoltaic Installations shall be consistent with all applicable local, state and federal requirements, including but not limited to all applicable safety, construction, electrical, and communications requirements. All buildings and fixtures forming part of the installation shall be constructed in accordance with the State Building Code. No Large-Scale Ground- Mounted Solar Photovoltaic Installation shall be constructed, installed or modified without first obtaining a building permit.

   Acknowledged. A building permit will be obtained prior to construction of the proposed solar PV array. The construction and operation of the proposed solar PV installation will be consistent with local, state, and federal requirements.

2. Large Scale Solar Review Application and Plan Requirements.
   1.1 Two (2) copies of a properly executed application for Large Scale Solar Review shall be filled with the Planning Board, along with a filing fee of $50.00.

   Acknowledged. A total of twelve (12) copies of this Site Plan Review Application were submitted to the Planning Board with the required filing fee of $50.00.

   1.2 Twelve (12) copies of site plan(s), prepared by a Registered Land Surveyor licensed in the Commonwealth of Massachusetts, at a scale of one inch equals forty feet (1" = 40') shall be filed with the Planning Board, including:

   Acknowledged, the site plans are included in Appendix C.

a. North arrow and locus map;

Acknowledged, see Sheet G001 of the site plans for a locus map in **Appendix C**. All site plan sheets include a north arrow reference.

b. Property boundaries;

Acknowledged, see the site plans in **Appendix C**.

c. Name/Description of project;

Acknowledged, see the site plans in **Appendix C**.

d. Topography, both existing and proposed, including proposed drainage;

Acknowledged, existing and proposed topography are included on the site plans in **Appendix C**.

e. Zoning designation;

Acknowledged, see Sheet G001 of the site plans in **Appendix C**.

f. Location of proposed structures, drives, etc., including setbacks;

Acknowledged, see the site plans in **Appendix C**.

g. Sign(s) location(s);

Signage will be limited to the necessary perimeter fencing postings required to comply with the National Electric Code (NEC) Example signage is included with the chain link fence and gate detail within the site plans in **Appendix C**.

h. Landscaping, both existing and proposed;

Existing and proposed landscaping are included on the site plans in **Appendix C**.

i. Lighting, including locations, type and wattage.

There is no proposed lighting for this project.

1.3 Twelve (12) copies of plans or drawings of the Large-Scale Ground-Mounted Solar Photovoltaic Installation prepared by a Registered Professional Engineer licensed in the Commonwealth of Massachusetts, showing the proposed layout of the system and any potential shading from nearby structures.

The project plans are included in **Appendix C** and are sealed, signed, and prepared under the supervision of a Professional Engineer licensed to practice in the Commonwealth of Massachusetts.

1.4 Twelve (12) copies of the one or three line electrical diagram detailing the Large-Scale Ground- Mounted Solar Photovoltaic Installation, associated components, and

electrical interconnection methods, with all National Electrical Code compliant disconnects and overcurrent devices.

A copy of the one-line electrical diagram and associated components is included in Appendix H.

1.5 Twelve (12) copies of the documentation of the major system components to be used, including the PV panels, mounting system, and inverter(s);

Proposed equipment is included in Appendix H. This equipment is subject to final design and may change based on market availability at the time of construction.

1.6 Twelve (12) copies of the documentation of actual or prospective access and control of the project site sufficient to allow for construction and operation of the proposed installation.

The Applicant will be purchasing the portion of the property where the proposed solar PV development is located (Tax Map 39 Lot 108). Documentation of site control can be submitted to the Planning Board once finalized.

1.7 Twelve (12) copies of an operation and maintenance plan (see also Section 40.7 (D)).

The Solar and BESS Operation & Maintenance Plan is included in Appendix I.

1.8 Twelve (12) copies of proof of liability insurance.

The proof of liability insurance is included in Appendix J.

1.9 Twelve (12) copies of the description of financial surety that satisfies Section 40.7 (N)(3).

A Decommissioning Plan and Cost Estimate is included in Appendix K. The Plan and Cost Estimate were prepared to comply with Financial Surety requirements outlined in Section 40.7.L (Section 40.7 (N)(3) is not included with the Bylaws).

2. Waiver of Requirements: Upon written request submitted as part of the application, the Planning Board may waive any requirements.

Acknowledged. The Applicant not requesting waivers at this time.

D. For Large-Scale Ground-Mounted Solar Photovoltaic Installations that require a Special Permit, the Planning Board shall serve as the Special Permit Granting Authority. The Planning Board shall grant a special permit only if it finds that the proposal complies with the provisions of this section and section 30.8.

Acknowledged. The proposed project lies in the Residential zoning district, in which large-scale ground-mounted solar photovoltaic installations require a Special Permit. An analysis of the project's compliance with Section 30.8 of the Bylaws (in underlined font), are listed in the next section of this narrative.

E. Operation & Maintenance Plan. The project proponent shall submit a plan for the operation and maintenance of the Large-Scale Ground-Mounted Solar Photovoltaic Installation, which shall include measures for maintaining safe access to the installation, storm water controls, as well as general procedures for operational maintenance of the installation.

Acknowledged. An operation and maintenance plan for the ground-mounted solar energy system, which includes measures for maintaining safe access to the installation, stormwater controls, as well as general procedures for the operational maintenance of the solar energy system, is included in Appendix F.

F. No Large-Scale Ground –Mounted Solar Photovoltaic Installation shall be constructed until evidence has been given to the Planning Board that the utility company that operates the electrical grid where the installation is to be located has been informed of the installation owner or operator's intent to install an interconnected customer-owned generator. Off-grid systems shall be exempt from this requirement.

Acknowledged. A copy of the Interconnection Service Agreement between the Applicant and Eversource is included in Appendix D..

G. Dimension and Density Requirements.
1. Setbacks. Setbacks from all boundary lines shall be a minimum of fifty feet (50').

Acknowledged, all setbacks have been maintained and are shown on the plans in Appendix C.

2. Lot Size. Within the Solar Farm Overlay District and all other all other zoning districts where the use is permitted the minimum lots size shall be two (2) acres.

Acknowledged. The project is in the Residential zoning district, where large-scale ground-mounted solar PV installations are a permitted use via a Special Permit, and has a minimum lot size of two acres. The total size of the proposed Lot 108 is 39.2 acres.

3. Appurtenant Structures. All appurtenant structures to Large-Scale Ground-Mounted Solar Photovoltaic Installations shall be subject to reasonable regulations concerning the bulk and height of structures, lot area, setbacks, open space, parking and building coverage requirements. All such appurtenant structures, including but not limited to, equipment shelters, storage facilities, transformers, and substations, shall be architecturally compatible with each other. Whenever reasonable, structures should be shaded from view by vegetation and/or joined or clustered to avoid adverse visual impacts.

Acknowledged. All appurtenant structures will meet the regulations concerning the bulk and height of structures, lot area, setbacks, open space, parking and building coverage requirements.

H. Design Standards.
1. Lighting. Lighting of Large-Scale Ground-Mounted Solar Photovoltaic Installations shall be consistent with local, state and federal law. Lighting of other parts of the installation, such as appurtenant structures, shall be limited to that required for safety and operational purposes, and shall be reasonably shielded from abutting properties. Where feasible, lighting of the Large-Scale Ground-Mounted Solar Photovoltaic Installation shall be directed downward and shall incorporate full cut-off fixtures to reduce light pollution.

Not applicable, there is no lighting proposed for this project.

2. Signage. Signs on Large-Scale Ground-Mounted Solar Photovoltaic Installations shall comply with a Truro Sign Code. A sign that identifies the owner and provides a 24-hour emergency contact phone number shall be required.

   Acknowledged. The required signage will be posted on the perimeter fence. Refer to detail sheets C501 and C502 in the drawings included in Appendix C for the proposed signage. A 24-hour contact number will be posted to the perimeter fence. This number can be called for general information or emergencies related to the system.

   Large-Scale Ground-Mounted Solar Photovoltaic Installations shall not be used for displaying any advertising except for reasonable identification of the manufacturer or operator of the installation.

   Acknowledged, advertising will not be displayed anywhere at the site.

3. Utility Connections. Reasonable efforts, as determined by the Planning Board, shall be made to place all utility connections for the Large-Scale Ground-Mounted Solar Photovoltaic Installation underground, depending on appropriate soil conditions, shape, and topography of the site and any requirements of the utility provider. Electrical transformers for utility interconnections may be above ground if required by the utility provider.

   Acknowledged. The proposed solar energy system includes underground electrical lines from the panels to the equipment pads and electrical equipment housings. From the electrical equipment pad, an electrical line will run underground to the first new client-owned utility pole which will include a riser to bring electric utility above ground.

I. Safety and Environmental Standards.

1. Emergency Services. The Large–Scale Ground-Mounted Solar Photovoltaic Installation owner or operator shall provide a copy of the project summary, electrical schematic, and site plan to the Truro Fire Chief. Upon request, the owner or operator shall cooperate with local emergency services in developing an emergency response plan. All means of shutting down the installation shall be clearly marked. The owner or operator shall identify a responsible person for public inquiries throughout the life of the installation.

   Acknowledged. The owner and/or operator will submit a copy of the operation and maintenance plan, electrical schematic, and site plan to the Town's fire chief. A copy of the Operation and Maintenance Plan is included with this Application in Appendix I. An electrical one-line diagram is available in Appendix H. A site plan is included in the Site Plan Drawings located in Appendix C.

   Upon the town's request, the owner/operator will work with local emergency services to develop an emergency response plan. Emergency shutdown procedures will be clearly marked, and the owner/operator will identify and publicly list the contact number for a responsible person for public inquiries.

2. Land Clearing, Soil Erosion and Habitat Impacts. Clearing of natural vegetation shall be limited to what is necessary for the construction, operation and maintenance of the Large– Scale Ground-Mounted Solar Photovoltaic Installation or otherwise prescribed by applicable laws, regulations, and bylaws.

   Acknowledged. Clearing of natural vegetation will be limited to what is necessary for the construction, operation, and maintenance of the solar installation in an attempt to maintain natural screening of the solar energy system and appurtenant structures.

J. Monitoring and Maintenance.

1. Large-Scale Ground-Mounted Solar Photovoltaic Installation Conditions. The Large-Scale Ground- Mounted Solar Photovoltaic Installation owner or operator shall maintain the facility in good condition. Maintenance shall include, but not be limited to, painting, structural repairs, and integrity of security measures. Site access shall be maintained to a level acceptable to the Truro Fire Chief and Emergency Medical Services. The owner or operator shall be responsible for the cost of maintaining the installation and any access road(s), unless accepted as a public way.

   Acknowledged. The owner and/or operator will maintain the facility in good condition to a level acceptable to the Truro Fire Chief and Emergency Medical Services. A copy of the Operation and Maintenance Plan is included in Appendix I.

2. Modifications. All material modifications to a Large-Scale Ground-Mounted Solar Photovoltaic Installation made after issuance of the required building permit shall require approval by the Planning Board.

   Acknowledged, any material modifications made after issuance of the building permit will be submitted to the Planning Board for approval.

K. Abandonment and Decommissioning.

1. Removal Requirements. Any Large-Scale Ground-Mounted Solar Photovoltaic Installation which has reached the end of its useful life or has been abandoned consistent with Section 40.7(J)(2) shall be removed. The owner or operator shall physically remove the installation no more than 150 days after the date of discontinued operations. The owner or operator shall notify the Large Scale Solar Review Authority by certified mail of the proposed date of discontinued operations and plans for removal. Decommissioning shall consist of:
   - 1.1 Physical removal of all Large-Scale Ground-Mounted Solar Photovoltaic Installations, structures, equipment, security barriers and transmission lines from the site.
   - 1.2 Disposal of all solid and hazardous waste in accordance with local, state, and federal waste disposal regulations.
   - 1.3 Stabilization or re-vegetation of the site as necessary to minimize erosion. The Large Scale Solar Review Authority may allow the owner or operator to leave landscaping or designated below-grade foundations in order to minimize erosion and disruption to vegetation.
2. Abandonment. Absent notice of a proposed date of decommissioning or written notice of extenuating circumstances, the Large-Scale Ground-Mounted Solar Photovoltaic Installation shall be considered abandoned when it fails to operate for more than one (1) year without the written consent of the Planning Board. If the owner or operator of the large-Scale Ground- Mounted Solar Photovoltaic Installation fails to remove the installation in accordance with the requirements of this section within 150 days of abandonment or the proposed date of decommissioning, the town may enter the property and physically remove the installation.

   Acknowledged, A fully inclusive, detailed, and itemized Decommissioning Plan and Estimate of the Town's estimated cost associated with removal and full decommissioning of the facility and the site is included in Appendix K.

L. Financial Surety. Proponents of Large-Scale Ground-Mounted Solar Photovoltaic projects shall provide a form of surety, either through escrow account, bond or otherwise, to cover the cost of removal in the event the town must remove the installation and remediate the landscape, in an amount and form determined to be reasonable by Planning Board, but in no event to exceed more than 125 percent of the cost of removal and compliance with the additional requirements set forth herein, as determined by the project proponent. Such surety will not be required for municipally- or state-owned facilities. The project proponent shall submit a fully inclusive estimate of the costs associated with

removal, prepared by a qualified engineer. The amount shall include a mechanism for calculating increased removal costs due to inflation.

Acknowledged, The Applicant will work with the Town to provide a form of financial surety prior to construction based on the decommissioning estimate provided in Appendix K.

§ 30.8 Special Permits

A. Construction or operation under a building or special permit shall conform to any subsequent amendment of this bylaw unless the use or construction is commenced within a period of six months after the issuance of the permit and in cases involving construction, unless such construction is continued through to completion as continuously and expeditiously as is reasonable.

Acknowledged.

B. A special permit shall lapse after two years if a substantial use thereof has not sooner commenced except for good cause or, in the case of permit for construction, if construction has not begun by such date except for good cause. (5/24)

Acknowledged.

C. Special permits may be approved only after a finding by the Board of Appeals or Planning Board (as applicable, see use table) that the proposed use is in the opinion of the Board in harmony with the general public good and intent of this bylaw. The approval shall be subject to any other applicable provision of this bylaw and the Board may impose conditions, safeguards, and limitations on time and use, which in the Board's opinion are necessary to comply with the intent and purpose of this bylaw.

Acknowledged.

D. The Board of Appeals or Planning Board (as applicable) shall adopt and from time to time amend rules relative to the issuance of such permits, and shall file a copy of those rules in the office of the Town Clerk. Said rules shall describe the size, form, contents, style and number of copies of plans and specifications and the procedure for submission and approval of the permits.

Acknowledged.

E. Special permits may only be acted upon following public hearings conducted in accordance with the provisions of Massachusetts General Law, Chapter 40A or amendments thereto, within 65 days after filing with the Board the application for the permit. The Board shall act on the application for special permits within 90 days following the public hearing.

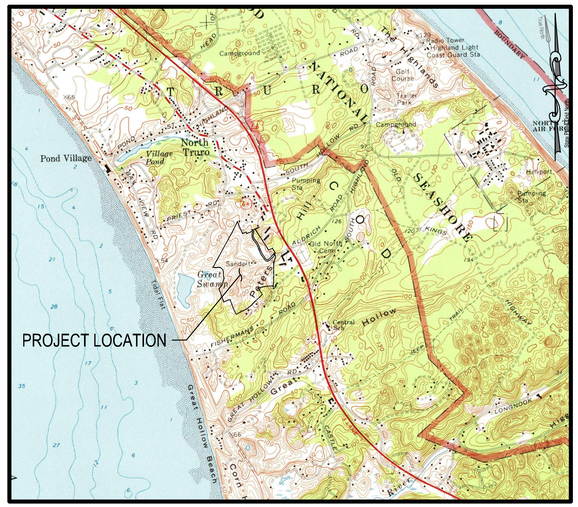
Acknowledged.

Appendix C – Site Plans

PROPOSED SOLAR PV DEVELOPMENT

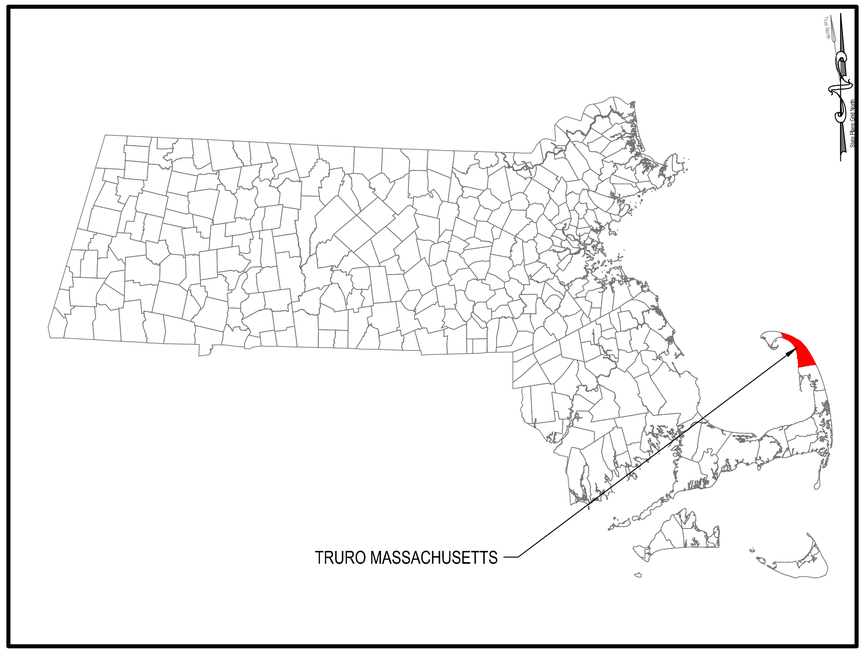
7.68 MW (DC) PHOTOVOLTIC SOLAR ARRAY WITH BATTERY ENERGY STORAGE SYSTEM (BESS)

9 NOONS DRIVE, TRURO, MASSACHUSETTS 02652



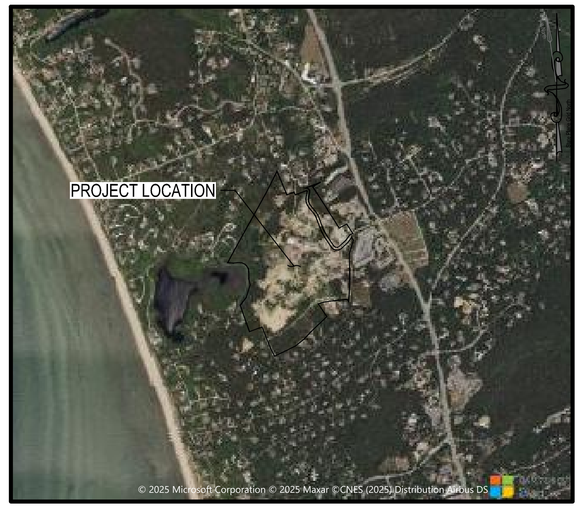
SITE LOCUS MAP

1" = 3,000'±



STATE MUNICIPAL MAP

NOT TO SCALE



SITE AERIAL MAP

1" = 2,000'

DRAWING INDEX

DRAWING NO.	DRAWING TITLE
General	
G001	COVER SHEET
G002	GENERAL NOTES
Survey	
–	EXISTING CONDITIONS - BOUNDARY SURVEY
Civil	
C001	NOTES AND SPECIFICATIONS
C101	SOIL EROSION AND SEDIMENTATION CONTROL PLAN
C102	OVERALL SITE PLAN
C103	SITE LAYOUT AND GRADING PLAN
C104	SITE LAYOUT AND GRADING PLAN
C105	SITE LAYOUT AND GRADING PLAN
C106	SITE LAYOUT AND GRADING PLAN
C501	SOIL EROSION AND SEDIMENTATION CONTROL DETAILS
C502	CIVIL DETAILS
C503	CIVIL DETAILS

ZONING ANALYSIS TABLE

ZONING DISTRICT:
ROUT 6 GENERAL BUSINESS, (Rt6) & RESIDENTIAL, (R) ZONES

ZONE CRITERIA	REQUIRED	EXISTING	PROPOSED
MINIMUM LOT AREA (SOLAR)	33,750 SF (2 ACRES)	7,234,787 SF	1,901,181 SF
MINIMUM LOT FRONTAGE	150 FEET	610 FEET (2)	610 FEET(2)
MIN. FRONT SETBACK (SOLAR)	25 FEET (50 FEET)	183 FEET	TBD
MIN. SIDE SETBACK (SOLAR)	25 FEET (50 FEET)	96 FEET	TBD
MIN. REAR SETBACK (SOLAR)	25 FEET (50 FEET)	172 FEET	TBD
MAX. BUILDING HEIGHT	30 FEET (2 STORIES)	2 STORIES	N/A

NOTES:
1) Zoning requirements for large-scale ground-mounted solar photovoltaic installations referenced in Town of Truro Zoning Bylaw Section 40.7 G.
2) FRONTAGE ON NOONS DRIVE.

NOT FOR CONSTRUCTION

Project:
PROPOSED SOLAR PV DEVELOPMENT
9 NOONS DRIVE, TRURO, MASSACHUSETTS 02652

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON

Client:
NextGrid
NEXTGRID PECAN, LLC
68 Harrison Ave, Suite 605, PMB 73089
Boston, MA 02111
tel: (855) 636-6100 www.Nextgrid.com

811 Know what's Below. Call before you dig.

No.	Description	Date
0	ISSUED FOR PERMITTING	12/31/25

Revisions

Seal:
COMMONWEALTH OF MASSACHUSETTS
MELINDA COSTELLO CIVIL No. 52956
PROFESSIONAL ENGINEER
Costello 12/31/2025

Issued For:
PERMITTING

Issued Date:	12/31/2025
Scale:	AS NOTED
Drawn By:	RJR
Reviewed By:	BMG
Approved By:	MRC
W&S Project No.:	ENG25-1122

Drawing Title:
COVER SHEET

Sheet Number:
G001

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CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL CALL DIG SAFE 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.
5. NOTHING SHOWN OR OMITTED FROM THE DOCUMENTS PROVIDED SHALL RELIEVE THE CONTRACTOR FROM FULL COMPLIANCE WITH ALL APPLICABLE CODES, REGULATIONS, BYLAWS, AND ORDINANCES.
6. CONTRACTOR SHALL VERIFY EXISTING SITE CONDITIONS, INCLUDING TOPOGRAPHY, PRIOR TO CONSTRUCTION. ANY DISCREPANCIES BETWEEN SITE CONDITIONS AND THE DESIGN PLANS SHALL BE REPORTED TO THE ENGINEER UPON DISCOVERY.
7. ELECTRICAL DESIGN, INCLUDING UTILITY POLES, BY OTHERS. POI UTILITY POLE LINE UP SHOWN ON THE PLANS FOR REFERENCE ONLY. SEE ELECTRICAL PLANS BY OTHERS FOR FINAL LOCATION AND CONFIGURATION OF POINT OF INTERCONNECTION (POI) UTILITY POLES. UTILITY POLE LOCATIONS ARE SUBJECT TO FINAL DESIGN AND MAY CHANGE FROM LOCATIONS SHOWN ON THIS PLAN. FINAL LOCATIONS SHALL BE SHOWN ON SITE PLANS INCLUDED WITH THE PROJECTS BUILDING PERMIT APPLICATION.
8. SOLAR ARRAY IS SUBJECT TO FINAL DESIGN BUT SHALL REMAIN WITHIN THE PROPOSED LIMIT OF WORK.
9. THE PROJECT SITE HAS A MASS DEP RELEASE TRACKING NUMBER (RTN) RTN-4-50366. ALL EARTHWORK OPERATIONS SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE REGULATIONS INCLUDING THE MASSACHUSETTS CONTINGENCY PLAN (MCP) 310CMR 40.0000. A LICENSED SITE PROFESSIONAL (LSP) SHALL OVERSEE CONSTRUCTION OPERATIONS ASSOCIATED WITH EARTHWORK OPERATIONS.

MATERIAL SPECIFICATIONS:

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.
1. WOVEN GEOTEXTILE:
   THE WOVEN GEOTEXTILE SHALL BE TENCATE MIRAFI HP270 FABRIC, 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.
2. NON-WOVEN GEOTEXTILE:
   THE NON-WOVEN GEOTEXTILE SHALL BE TENCATE MIRAFI 140N FABRIC, OR APPROVED EQUIVALENT. THE NONWOVEN FABRIC SHALL BE INERT TO BIOLOGICAL DEGRADATION AND RESIST NATURALLY ENCOUNTERED CHEMICALS, ALKALIS, AND ACIDS.

EARTHWORK MATERIALS:

1. MODIFIED ROCK FILL:
   MODIFIED ROCK FILL SHALL MEET THE REQUIREMENTS LISTED IN MASSDOT SPECIFICATION SECTION M2.02.4.

U.S. STANDARD SIEVE	PERCENT PASSING
8 INCH	95-100
4 INCH	0-25
2 1/2 INCH	0-5

2. CRUSHED STONE:
   2-3 INCH CRUSHED STONE SHALL BE USED FOR THE CONSTRUCTION ENTRANCE/EXIT AS SHOWN ON THE DRAWINGS, AND SHALL MEET THE REQUIREMENTS LISTED BELOW.

U.S. STANDARD SIEVE	PERCENT PASSING
4 INCH	95-100
3 INCH	0-25
2 INCH	0-5

3. GRAVEL BORROW:
   GRAVEL BORROW SHALL SATISFY THE REQUIREMENTS LISTED IN MASSDOT SPECIFICATION M1.03.0-TYPE B GRAVEL BORROW.

U.S. STANDARD SIEVE	PERCENT PASSING
3 INCH	100
1/2 INCH	50-85
NO. 4	40-75
NO. 50	8-28
NO. 200	0-10

   *3 INCH DIAMETER LARGEST DIMENSION

4. LOAM:
   4.1. LOAM SHALL SATISFY THE REQUIREMENTS LISTED IN MASSDOT SPECIFICATION M1.05.0: LOAM.

U.S. STANDARD SIEVE	PERCENT PASSING
NO. 10	85-100
NO. 40	35-85
NO. 200	10-35
<20 MICROMETER	<5

   4.2. LOAM SHALL BE A NATURAL, FERTILE, FRIABLE SOIL, TYPICAL OF PRODUCTIVE SOILS IN THE VICINITY, OBTAINED FROM NATURALLY WELL-DRAINED AREAS, NEITHER EXCESSIVELY ACID NOR ALKALINE, AND CONTAINING NO SUBSTANCES HARMFUL TO GRASS GROWTH. LOAM SHALL NOT BE DELIVERED TO THE SITE IN FROZEN OR MUDDY CONDITION AND SHALL BE REASONABLY FREE OF STUMPS, ROOTS, HEAVY OR STIFF CLAY, STONES LARGER THAN 1-INCH IN DIAMETER, LUMPS, COARSE SAND, NOXIOUS WEEDS, STICKS, BRUSH OR OTHER LITTER.
   4.3. LOAM SHALL CONTAIN NOT LESS THAN 4 PERCENT OR MORE THAN 10 PERCENT ORGANIC MATTER AS DETERMINED BY THE LOSS OF WEIGHT BY IGNITION OF OVEN-DRIED SAMPLES. TEST SAMPLES SHALL BE OVEN-DRIED TO A CONSTANT WEIGHT AT A TEMPERATURE OF 230 DEGREES F.
5. COMPACTED IMPERVIOUS MATERIAL:
   5.1. SHALL SATISFY THE REQUIREMENTS LISTED IN MASSDOT SPECIFICATION M1.08.0: IMPERVIOUS SOIL BORROW WHICH REFERENCES THE SPECIFICATION UNDER AASHTO M 145. THE IMPERVIOUS SOILS SHALL HAVE THE PHYSICAL CHARACTERISTICS OF ONE OF THE FOLLOWING:
   5.1.1. A-4, A-5, A-6, A-7 SOILS; OR
   5.1.2. A-2 SOILS CONTAINING MORE THAN 20% BY WEIGHT PASSING THE NO. 200 SIEVE.
   5.2. AASHTO SOIL CLASSIFICATION SYSTEM INFORMATION IS LISTED BELOW:

GROUP CLASSIFICATION	□ PASSING NO. 200 SIEVE	USUAL TYPES OF SIGNIFICANT CONSTITUENT MATERIALS
A-2	35□ OR LESS	SILTEY OR CLAYEY GRAVEL AND SAND
A-4	36□ MINIMUM	SILTY SOILS
A-5	36□ MINIMUM	SILTY SOILS
A-6	36□ MINIMUM	CLAYEY SOILS
A-7	36□ MINIMUM	CLAYEY SOILS

   5.3. MATERIAL SHALL BE THOROUGHLY COMPACTED AND SHALL BE FREE FROM DELETRIOUS, ORGANIC, ELASTIC OR FOREIGN MATTER.

SLOPE PROTECTION:

1. EROSION CONTROL BLANKET
   EROSION CONTROL BLANKET (ECB) SHALL BE NORTH AMERICAN GREEN, BIONET SC150BN OR APPROVED EQUAL. ECB SHALL BE INSTALLED USING STAPLE PATTERN C IN ACCORDANCE WITH THE INSTALLATION DETAIL INCLUDED ON SHEET C501.

BACKFILL MATERIALS:

1. GRANULAR BORROW:

EMBANKMENT FILL SHALL BE USED IN AREAS WHERE GRADE INCREASES ARE PROPOSED. FILL MATERIAL SHALL MEET THE REQUIREMENTS OF MASSDOT MATERIAL SPECIFICATION M1.01.0 ORDINARY BORROW WITH LESS THAN 15 PERCENT PASSING THE NO 200 SIEVE.

ON-SITE GRANULAR SOILS FROM CUT AREAS CONTAINING LESS THAN 20 PERCENT FINES AND FREE OF ORGANICS, CONTAMINATION (INCLUDING METALS, VOCS, SVOCS, ETC.,), AND OTHER DELETERIOUS MATERIALS MAY BE SUITABLE FOR USE AS EMBANKMENT FILL WITH PROPER MOISTURE CONDITIONS.

FILL MATERIALS SHALL BE PLACED IN MAXIMUM OF 12-INCH LOOSE LIFTS AND COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D1557 (MODIFIED PROCTOR) FOR THE SPECIFIC FILL MATERIAL.

BACKFILL PLACEMENT AND COMPACTION:

1. PRIOR TO BACKFILLING, THE CONTRACTOR SHALL COMPACT THE EXPOSED NATURAL SUBGRADE AS SPECIFIED HEREIN.
2. AFTER APPROVAL OF SUBGRADE BY THE ENGINEER, THE CONTRACTOR SHALL BACKFILL AREAS TO REQUIRED CONTOURS AND ELEVATIONS WITH SPECIFIED MATERIALS.
3. THE CONTRACTOR SHALL PLACE AND COMPACT MATERIALS IN CONTINUOUS HORIZONTAL LAYERS UNTIL FIRM. LIFT THICKNESS SHALL NOT EXCEED THE FOLLOWING THICKNESS:
   3.1. ACCESS ROADS - 6 INCHES
   3.2. EQUIPMENT PADS - 6 INCHES.
   3.3. SITE GRADING - 12 INCHES
4. IF THE MATERIAL REMOVED FROM THE EXCAVATION IS SUITABLE FOR BACKFILL WITH THE EXCEPTION THAT IT CONTAINS STONES LARGER THAN PERMITTED, THE CONTRACTOR HAS THE OPTION TO REMOVE THE OVERSIZED STONES AND USE THE MATERIAL FOR BACKFILL OR TO PROVIDE REPLACEMENT BACKFILL AT NO ADDITIONAL COST TO THE OWNER.

CLEARING NOTES:

1. INSTALL EROSION AND SEDIMENTATION CONTROLS PRIOR TO CLEARING.
2. ALL TREES, SAPLINGS, BRUSH, LOGS AND, DEAD TREES WITHIN THE LIMITS OF CLEARING SHALL BE REMOVED BY THE CONTRACTOR AND PROPERLY DISPOSED OF OFF SITE AT A LOCATION APPROVED TO RECEIVE SUCH MATERIALS. AS AN ALTERNATIVE, TREES, STUMPS, ROOTS CAN BE CHIPPED AND USED ON SITE IN EROSION CONTROL BERMS WITH PRIOR APPROVAL FROM THE OWNER.
3. CONTRACTOR SHALL REMOVE ALL STUMPS AND ROOTS WITHIN FENCED AREAS, 15 FEET OUTSIDE THE LIMITS OF PROPOSED GRADING AS SHOWN ON THE PLANS.
4. CONTRACTOR TO BACKFILL DEPRESSIONS FROM STUMP REMOVAL OR GRINDING USING EXISTING SITE SOILS AND MATCH GRADE. STUMP GRINDING TO BE STOCKPILED ON SITE FOR LAND OWNER'S USE. CONTRACTOR TO COORDINATE STOCKPILE LOCATION WITH OWNER.
5. CONTRACTOR SHALL LIMIT THE AREA OF LAND WHICH IS EXPOSED AND FREE FROM VEGETATION DURING CONSTRUCTION. IN AREAS WHERE THE PERIOD OF EXPOSURE WILL BE GREATER THIRTY (30) DAYS. MULCHING, EROSION CONTROL MATS, TEMPORARY SEEDING, OR OTHER PROTECTIVE MEASURES SHALL BE PROVIDED WITHIN 2 WEEKS OF INITIAL SOIL DISTURBANCE. THE CONTRACTOR SHALL TAKE ACCOUNT OF THE CONDITIONS OF THE SOIL WHERE EROSION CONTROL SEEDING WILL TAKE PLACE TO INSURE THAT MATERIALS USED FOR RE-VEGETATION ARE ADAPTIVE TO THE SEDIMENT CONTROL.

DUST CONTROL:

1. CONSTRUCTION ACTIVITIES SHALL BE SCHEDULED TO MINIMIZE AREAS OF DISTURBED SOIL 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.

TYPICAL SEQUENCE OF CONSTRUCTION:

PRIOR TO THE DEVELOPMENT OF THE SITE, EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED AS NOTED ON THE PLANS. SITE DEVELOPMENT SCHEDULING SHALL TAKE INTO CONSIDERATION THE GROWING SEASON, SUCH THAT BULK OF THE EARTHWORK IS NOT INITIATED DURING A PERIOD WHEN VEGETATIVE STABILIZATION CANNOT BE ACHIEVED WITHIN 14 DAYS OF COMPLETING THE EARTHWORK IN A GIVEN AREA. A TYPICAL SEQUENCE OF CONSTRUCTION IS:

1. CONTRACTOR SHALL CONFIRM FLAGGING FOR WETLANDS, BUFFERS, STREAMS, AND/OR OTHER CRITICAL AREAS. IF FLAGGING IS NOT AVAILABLE CONTRACTOR OR CONTRACTOR'S REPRESENTATIVE SHALL FLAG WETLANDS, BUFFERS, STREAMS, AND/OR OTHER CRITICAL AREAS PRIOR TO STARTING ANY WORK ON SITE.
2. PRIOR TO STARTING ANY WORK ON THE SITE, THE CONTRACTOR SHALL NOTIFY APPROPRIATE AGENCIES AND SHALL INSTALL EROSION AND SEDIMENTATION CONTROL MEASURES AS SHOWN ON THE PLANS. THE CONTRACTOR SHALL OBTAIN ALL PERMITS, NOTIFY APPROPRIATE OFFICIALS OF CONSTRUCTION COMMENCEMENT, AND SUBMIT CONSTRUCTION TIMETABLE.
3. ON-SITE CONSTRUCTION SHALL START WITH THE MINIMUM AMOUNT OF CLEARING REQUIRED TO INSTALL EROSION AND SEDIMENTATION CONTROL MEASURES AS NOTED ON SHEET C101. THIS INCLUDES SILT FENCE, CONSTRUCTION ENTRANCE/EXIT, EROSION CONTROL MIX BERMS, AND OTHER MEASURES NOTED ON THE PLAN. NO WORK SHALL TAKE PLACE UNTIL THE ENGINEER HAS INSPECTED AND APPROVED INSTALLED MEASURES.
4. CUT TREES WITHIN THE DEFINED CLEARING LIMITS AND REMOVE CUT WOOD. STUMPS SHALL BE REMOVED OR GROUND IN-PLACE AS SHOWN ON THE PLANS. EROSION CONTROL MIX BERMS SHALL BE INSTALLED ALONG DISTURBED SLOPES. CONTRACTOR TO COORDINATE STOCKPILE LOCATION WITH OWNER.
5. REMOVE AND STOCKPILE TOPSOIL AS REQUIRED FOR PROPOSED GRADING ACTIVITY. STOCKPILED TOPSOIL SHALL BE SEEDED AND MULCHED WHEN IT IS TO BE STORED MORE THAN 30 DAYS FROM TIME OF STOCKPILING. STOCKPILES SHALL NOT BE PLACED WITHIN THE WETLAND BUFFER ZONE. SEE SHEET C501 FOR A TYPICAL TEMPORARY STOCKPILE DETAIL.
6. CONSTRUCT GRAVEL ACCESS ROADS AND TEMPORARY CONSTRUCTION BMPS. INSTALL ADDITIONAL EROSION AND SEDIMENTATION CONTROL MEASURES AS REQUIRED TO PREVENT EROSION OF GRAVEL SURFACE AND STORMWATER MANAGEMENT FEATURES.
7. REMOVE AND STOCKPILE TOPSOIL IN AREAS OF PROPOSED GRADING TO ACHIEVE REQUIRED RACKING SYSTEM SLOPES. LOAM AND SEED DISTURBED AREAS WITH TEMPORARY SEEDING AND INSTALL INTERMEDIATE EROSION CONTROL MEASURES PARALLEL TO THE SLOPES IMMEDIATELY FOLLOWING COMPLETION OF GRADING.
8. IN AREAS OF PROPOSED GRADING WHERE SEEDING HAS TAKEN PLACE, ALLOW FOR ADEQUATE GROWTH TO ESTABLISH DENSE VEGETATION PRIOR TO SOLAR ARRAY CONSTRUCTION TO LIMIT RISK OF EROSION.
9. PROCEED WITH SOLAR PHOTOVOLTAIC (PV) SYSTEM INSTALLATION/CONSTRUCTION WORK.
10. CONVERT TEMPORARY CONSTRUCTION BMPS TO PERMANENT STORMWATER BMPS PER PLAN GRADING AND DETAILS.
11. REMOVE ALL TEMPORARY GRAVEL AREAS, REPAIR ALL DISTURBED AREAS, AND REAPPLY LOAM WHERE NECESSARY. INTER-ROW AREAS SHALL BE DECOMPACTED TO A DEPTH OF 12" WHILE ENSURING PROTECTION OF BURIED CONDUIT. REMOVE ANY ROCKS >2" TURNED UP DURING DECOMPACTION.
12. SEED ALL AREAS WITH PERMANENT SEED MIX AND STABILIZE SLOPES IN ACCORDANCE WITH THE CONSTRUCTION SITE PLAN DRAWINGS EROSION AND SEDIMENTATION CONTROL PLAN.
13. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL NOT BE REMOVED UNTIL AFTER THE SITE IS STABILIZED IN ACCORDANCE WITH THE SWPPP.

NOT FOR CONSTRUCTION

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Project:
PROPOSED SOLAR PV DEVELOPMENT
9 NOONS DRIVE, TRURO, MASSACHUSETTS 02652

Weston & Sampson
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55 Walkers Brook Drive, Suite 100
Reading, MA 01867
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No.	Description	Date
0	ISSUED FOR PERMITTING	12/31/25

Revisions

Seal:
COMMONWEALTH OF MASSACHUSETTS
MELINDA COSTELLO
CIVIL
No. 52956
PROFESSIONAL ENGINEER
12/31/2025

Issued For:
PERMITTING

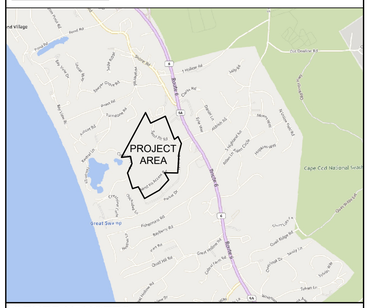
Issued Date:	12/31/2025
Scale:	N/A
Drawn By:	RJR
Reviewed By:	BMG
Approved By:	MRC
W&S Project No.:	ENG25-1122

Drawing Title:
GENERAL NOTES

Sheet Number:
G002

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VICINITY MAP: NOT TO SCALE



GENERAL NOTES:

1. OWNER OF RECORD: ESTATE OF DONALD W. NOONS BY VIRTUE OF RECORDED DEEDS WITHIN THE BARNSTABLE REGISTRY OF DEEDS FILED AS BOOK 279 – PAGE 034 AND BOOK 1083 – PAGE 307.

   THE TOWN OF TRURO HAS LISTED THESE PROPERTIES AS TAX MAP 039 – LOT 107 AND LOT 108. SURVEY FIELD WORK ON THIS SITE DATED AUGUST 2025.

2. THE HORIZONTAL DATUM IS BASED ON MASSACHUSETTS STATE GRID COORDINATE SYSTEM NAD83 (2011 – MAINLAND). VERTICAL DATUM IS REFERENCED TO NAVD 88. TOPOGRAPHY SHOWN WAS DEVELOPED UTILIZING ON THE GROUND DATA COLLECTION WITH SURVEY GRADE GPS, UAS DRONE W/LiDAR, AND OR ROBOTIC TOTAL STATION. THE CONTOUR INTERVAL SHOWN ON PLAN IS 1 – FOOT CONTOUR INTERVAL.

3. WETLANDS SHOWN ON THIS PLAN ARE A COMBINATION OF A FIELD DELINEATION DONE BY LEC ENVIRONMENTAL CONSULTANTS, INC. ON OCTOBER 22, 2025(SEE PLAN), AND MASS GIS ONLINE RECORDS.

4. PROPERTY IS LOCATED WITHIN THE "R" ZONING DISTRICT (RESIDENTIAL ZONE) UPDATED APRIL 03, 2025. SEE TOWN OF TRURO FOR SOLAR FARM OVERLAY DISTRICT / LARGE SCALE GROUND MOUNTED SOLAR PHOTOVOLTAIC INSTALLATIONS. SEE FOLLOWING TOWN'S DIMENSIONAL REQUIREMENTS PER ONLINE ZONING BYLAWS – 2024:

a. MINIMUM LOT SIZE	2 – ACRES
b. FRONT SETBACK	50 FT
c. SIDE SETBACK	50 FT
d. REAR SETBACK	50 FT

5. PROPERTY IS NOT LOCATED WITHIN OR AFFECTED BY A DESIGNATED FLOOD ZONE PER MAPS FLOOD HAZARD F.I.R.M. – FLOOD INSURANCE RATE MAP – COMMUNITY PANEL NUMBER 255222 – PANEL 0139 / MAP NUMBER 25001c0139l FOR THE TOWN OF TRURO, BARNSTABLE COUNTY, MASSACHUSETTS (ALL JURISDICTIONS), WITH AN EFFECTIVE DATE OF JULY 16, 2014. ZONE "X"IS DEFINED AS AREAS DETERMINED TO BE OUTSIDE THE 0.2% CHANCE FLOODPLAIN.

6. SGC ENGINEERING, LLC HAS NOT INDEPENDENTLY VERIFIED THE LOCATION, EXISTENCE, AND SERVICEABILITY OF ANY UTILITIES AND MAKES NO GUARANTEE TO THE COMPLETENESS OR THE ACCURACY OF ANY UTILITIES. UTILITIES SHOWN ON THIS PLAN WERE ABOVEGROUND AND VISUAL FOR FIELD LOCATES OR WERE SHOWN ON PLAN – MAP REFERENCES. ADDITIONAL UTILITIES MAY EXIST IN THE FIELD, WHICH ARE NOT SHOWN ON THIS PLAN. ACTUAL LOCATIONS MUST BE DETERMINED IN THE FIELD PRIOR TO EXCAVATION OR OTHER CONSTRUCTION ACTIVITIES. CALL "DIG SAFE" AT 1–888–344–7233 OR DIAL 811. SGC ENGINEERING, LLC ASSUMES NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN ON THIS PLAN.

7. THIS SURVEY WAS PREPARED FOR THE EXCLUSIVE USE OF THE PERSON, PERSONS, OR ENTITY NAMED IN THE CERTIFICATION AND TITLE BLOCK OF THIS PLAN. THIS SURVEY DOES NOT EXTEND TO ANY UNNAMED PERSON, PERSONS, OR ENTITY WITHOUT HAVING SGC ENGINEERING'S CONSENT IN WRITING.

8. NOONS DRIVE IS A 40 FOOT WIDE DEDICATED AND PRIVATE WAY AS SHOWN ON PLAN BOOK 241 PAGE 41 (SEE MAP REFERENCE 15 THIS PLAN). NOONS DRIVE HAS DEDICATED AND PUBLIC USE TO HIGHWAY ROUTE 6.

   SAND PIT ROAD AND PETERS POND ROAD ARE 40 FOOT WIDE DEDICATED AND UNIMPROVED PRIVATE WAYS – SEE PLAN BOOK 650 PAGE 60 AND OTHER MAP REFERENCES THIS PLAN.

LEGEND:

- LOCUS BOUNDARY LINE
- ADJACENT LOT LINE
- MAJOR CONTOUR
- MINOR CONTOUR
- EDGE OF GRAVEL
- SETBACK LINE
- EDGE OF PAVEMENT
- EDGE OF VEGETATION
- WETLAND DELINEATION
- ABANDONED VEHICLES
- DEBRIS
- STOCKPILE
- OVERHEAD WIRE — OHW —
- GRANITE BOUND
- REBAR
- SOLID SMOOTH ROD
- UTILITY POLE
- CANOPY HEIGHT ×104.4

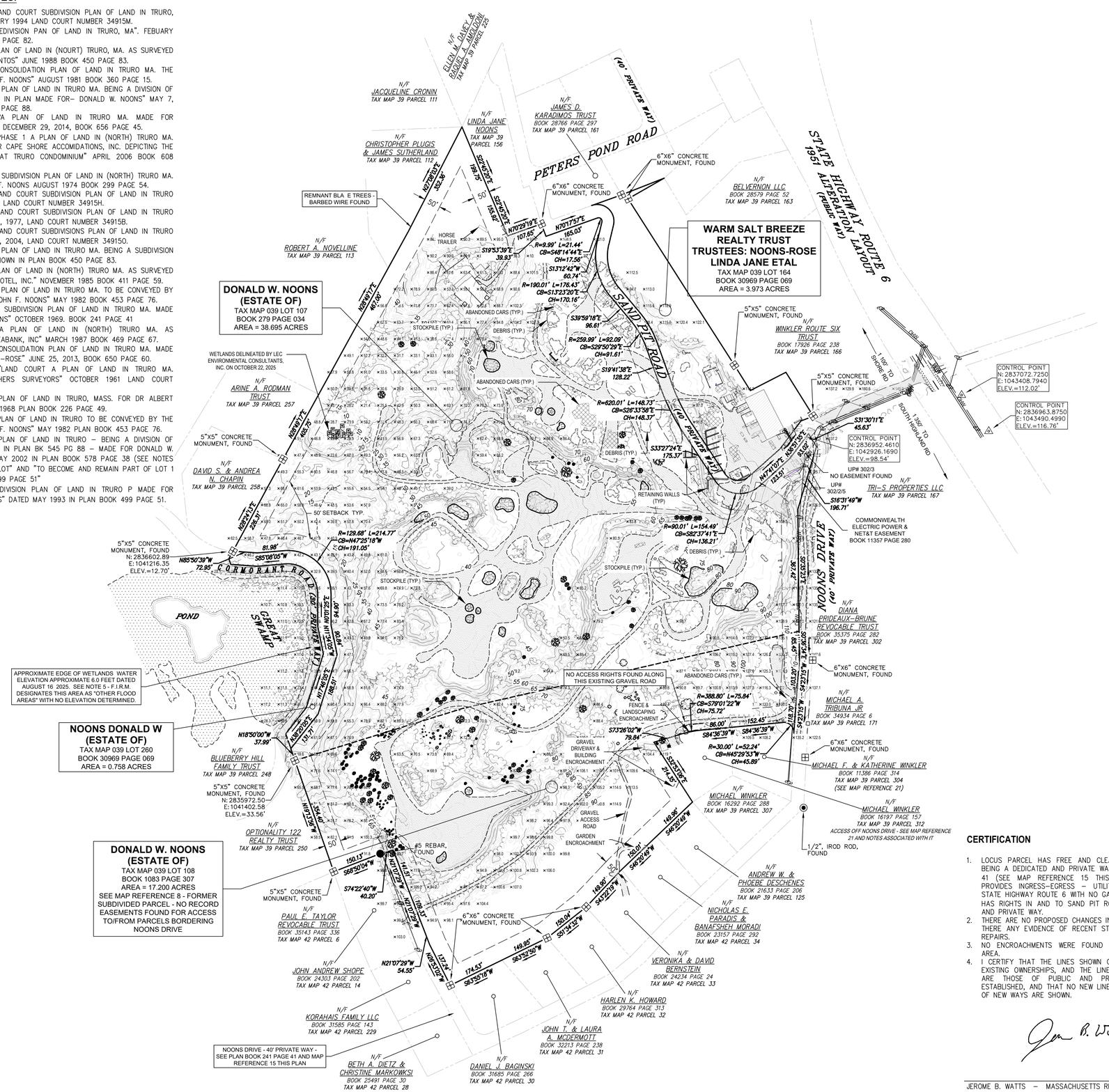
SCALE

0 75 150 300

1 INCH = 150 FEET

MAP REFERENCES:

1. PLAN ENTITLED "LAND COURT SUBDIVISION PLAN OF LAND IN TRURO, MA."DATED JANUARY 1994 LAND COURT NUMBER 34915M.
2. PLAN ENTITLED "REDIVISION PAN OF LAND IN TRURO, MA". FEBUARY 5,1993 BOOK 547 PAGE 82.
3. PLAN ENTITLED "PLAN OF LAND IN (NOURT) TRURO, MA. AS SURVEYED FOR JAMES F. SANTOS" JUNE 1988 BOOK 450 PAGE 83.
4. PLAN ENTITLED "CONSOLIDATION PLAN OF LAND IN TRURO MA. THE ESTATE OF JOHN F. NOONS" AUGUST 1981 BOOK 360 PAGE 15.
5. PLAN ENTITLED "A PLAN OF LAND IN TRURO MA. BEING A DIVISION OF LOT 3 AS SHOWN IN PLAN MADE FOR– DONALD W. NOONS" MAY 7, 2002, BOOK 545, PAGE 88.
6. PLAN ENTITLED "A PLAN OF LAND IN TRURO MA. MADE FOR BELVERNON", LLC. DECEMBER 29, 2014, BOOK 656 PAGE 45.
7. PLAN ENTITLED "PHASE 1 A PLAN OF LAND IN (NORTH) TRURO MA. AS SURVEYED FOR CAPE SHORE ACCOMIDATIONS, INC. DEPICTING THE STONE'S THROW AT TRURO CONDOMINIUM" APRIL 2006 BOOK 608 PAGE 86.
8. PLAN ENTITLED "A SUBDIVISION PLAN OF LAND IN (NORTH) TRURO MA. MADE FOR JOHN F. NOONS AUGUST 1974 BOOK 299 PAGE 54.
9. PLAN ENTITLED "LAND COURT SUBDIVISION PLAN OF LAND IN TRURO MA." AUGUST 1986 LAND COURT NUMBER 34915H.
10. PLAN ENTITLED "LAND COURT SUBDIVISION PLAN OF LAND IN TRURO MA". NOVEMBER 8, 1977, LAND COURT NUMBER 34915B.
11. PLAN ENTITLED "LAND COURT SUBDIVISIONS PLAN OF LAND IN TRURO MA." JANUARY 23, 2004, LAND COURT NUMBER 34915O.
12. PLAN ENTITLED "A PLAN OF LAND IN TRURO MA. BEING A SUBDIVISION OF LOT 5", AS SHOWN IN PLAN BOOK 450 PAGE 83.
13. PLAN ENTITLED "PLAN OF LAND IN (NORTH) TRURO MA. AS SURVEYED FOR CAPE VIEW MOTEL, INC." NOVEMBER 1985 BOOK 411 PAGE 59.
14. PLAN ENTITLED "A PLAN OF LAND IN TRURO MA. TO BE CONVEYED BY THE ESTATE OF JOHN F. NOONS" MAY 1982 BOOK 453 PAGE 76.
15. PLAN ENTITLED "A SUBDIVISION PLAN OF LAND IN TRURO MA. MADE FOR JOHN F. NOONS" OCTOBER 1969. BOOK 241 PAGE 41
16. PLAN ENTITLED "A PLAN OF LAND IN (NORTH) TRURO MA. AS SURVEYED FOR SEABANK, INC" MARCH 1987 BOOK 469 PAGE 67.
17. PLAN ENTITLED "CONSOLIDATION PLAN OF LAND IN TRURO MA. MADE FOR LINDA NOONS–ROSE" JUNE 25, 2013, BOOK 650 PAGE 60.
18. PLAN ENTITLED "LAND COURT A PLAN OF LAND IN TRURO MA. SCHOFIELD BROTHERS SURVEYORS" OCTOBER 1961 LAND COURT NUMBER 32446A.
19. PLAN ENTITLED "PLAN OF LAND IN TRURO, MASS. FOR DR ALBERT FREED" OCTOBER 1968 PLAN BOOK 226 PAGE 49.
20. PLAN ENTITLED "PLAN OF LAND IN TRURO TO BE CONVEYED BY THE ESTATE OF JOHN F. NOONS" MAY 1982 PLAN BOOK 453 PAGE 76.
21. PLAN ENTITLED "PLAN OF LAND IN TRURO – BEING A DIVISION OF LOT 3 AS SHOWN IN PLAN BK 545 PG 88 – MADE FOR DONALD W. NOONS" DATED MAY 2002 IN PLAN BOOK 578 PAGE 38 (SEE NOTES "NOT BUILDABLE LOT" AND "TO BECOME AND REMAIN PART OF LOT 1 OF PLAN BOOK 499 PAGE 51"
22. PLAN ENTITLED "DIVISION PLAN OF LAND IN TRURO P MADE FOR DONALD W. NOONS" DATED MAY 1993 IN PLAN BOOK 499 PAGE 51.



CERTIFICATION

1. LOCUS PARCEL HAS FREE AND CLEAR ACCESS IN AND TO NOONS DRIVE, BEING A DEDICATED AND PRIVATE WAY AS SHOWN ON PLAN BOOK 241 PAGE 41 (SEE MAP REFERENCE 15 THIS PLAN). ADDITIONALLY, NOONS DRIVE PROVIDES INGRESS–EGRESS – UTILITIES TO DEDICATED AND PUBLIC USE STATE HIGHWAY ROUTE 6 WITH NO GAPS AND GORES. LOCUST PARCEL ALSO HAS RIGHTS IN AND TO SAND PIT ROAD (SO CALLED) BEING A DEDICATED AND PRIVATE WAY.
2. THERE ARE NO PROPOSED CHANGES IN STREET LINE RIGHT OF WAYS NOR ARE THERE ANY EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION AND REPAIRS.
3. NO ENCROACHMENTS WERE FOUND WITHIN THE PROPOSED SOLAR ARRAY AREA.
4. I CERTIFY THAT THE LINES SHOWN ON THIS PLAN ARE THE LINES DIVIDING EXISTING OWNERSHIPS, AND THE LINES OF THE STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC AND PRIVATE STREETS OR WAYS ALREADY ESTABLISHED, AND THAT NO NEW LINES FOR DIVISION OF EXISTING OWNERSHIP OF NEW WAYS ARE SHOWN.

JEROME B. WATTS – MASSACHUSETTS RPLS 40409 – DECEMBER 23, 2025

COMMONWEALTH OF MASSACHUSETTS — JEROME B. WATTS — 40409 — REGISTERED PROFESSIONAL LAND SURVEYOR

REVISIONS:

NO.	DATE	
0	09-08-2025	SUBMITTED FOR COMMENT
1	09-22-2025	REVISED PER COMMENTS
2	12-23-2025	REVISED PER COMMENTS

COMMONWEALTH OF MASSACHUSETTS — JEROME B. WATTS — 40409 — REGISTERED PROFESSIONAL LAND SURVEYOR

ONLY VALID WITH ORIGINAL STAMP

SGC ENGINEERING, LLC
SURVEY AND MAPPING
501 COUNTY ROAD
WESTBROOK, MAINE 04092
PHONE: 207-347-8100 / FAX: 207-347-8101
WWW.SGCENG.COM

SHEET 1 OF 1

DWG:1985104 - TRURO
FILE:1985104 - TRURO

CALC: JBW
DRAWN: EGL
CHECK: MFM

DATE: 09-08-2025
SCALE: 1" = 150'

EXISTING CONDITIONS - BOUNDARY SURVEY
ON LAND OF THE ESTATE OF
DONALD W. NOONS
NOONS DRIVE, TRURO, BARNSTABLE COUNTY, MASSACHUSETTS
PREPARED FOR:
WESTON AND SAMPSON ENGINEERS, INC.
55 WALKERS BROOK DRIVE SUITE 100 READING MA 01867

FROST PROTECTION AND SNOW REMOVAL:

1. THE CONTRACTOR SHALL, AT ITS OWN EXPENSE, KEEP EARTHWORK OPERATIONS CLEAR AND FREE OF ACCUMULATIONS OF SNOW AS REQUIRED TO CARRY OUT THE WORK.
2. THE CONTRACTOR SHALL PROTECT THE SUBGRADE BENEATH NEW STRUCTURES AND PIPES FROM FROST PENETRATION WHEN FREEZING TEMPERATURES ARE EXPECTED.

DRAINAGE PIPE:

1. HIGH DENSITY POLYETHYLENE (HDPE) CORRUGATED PIPE WITH SMOOTH INTERIOR AND MITERED EDGE MEETING AASHTO M252, TYPE C.

SOIL STABILIZATION NOTES:

1. THE MAXIMUM ALLOWABLE SLOPE IS 2.5:1. ALL 2.5:1 SLOPES SHALL BE STABILIZED WITH A TEMPORARY EROSION CONTROL BLANKET (SEE SHEET C501).
2. ALL DISTURBED AREAS SHALL HAVE LOAM AND SEED AND STABILIZED WITH GRASS COVER (SEE SHEET C501).
3. IF SUFFICIENT STABILIZATION CANNOT BE ACCOMPLISHED AFTER SEEDING, AT THE CONTRACTOR'S SOLE EXPENSE, SHALL BE RESPONSIBLE FOR ADDING THE NECESSARY SOIL AMENDMENTS AND/OR LOAM UNTIL STABILIZATION IS ACHIEVED IN ACCORDANCE WITH THE REQUIREMENTS OF THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP).

GENERAL MAINTENANCE PLAN (DURING CONSTRUCTION):

1. ALL EROSION AND SEDIMENTATION CONTROL PRACTICES 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, IN ACCORDANCE WITH THE SWPPP.
2. IN THE EVENT WORK IS HALTED, ON SITE INSPECTIONS SHALL CONTINUE AT A REGULAR SCHEDULE, UNLESS TEMPORARY STABILIZATION IS ACHIEVED AND ALL BARE AREAS AND STOCKPILES HAVE INSTALLED STABILIZATION MEASURES.
3. IF CONSTRUCTION ACTIVITIES ARE ENTIRELY SUSPENDED DUE TO FROZEN CONDITIONS; INSPECTIONS MAY BE TEMPORARILY SUSPENDED ONSITE UNTIL THAWING CONDITIONS OCCUR AS LONG AS DISCHARGES ARE UNLIKELY TO OCCUR DUE TO FROZEN CONDITIONS THAT ARE LIKELY TO CONTINUE FOR THREE (3) MONTHS BASED ON HISTORIC DATA, LAND DISTURBANCES HAVE BEEN HALTED, AND ALL DISTURBED AREAS HAVE BEEN ADEQUATELY STABILIZED.
4. IF CONSTRUCTION ACTIVITIES CONTINUE DURING FROZEN CONDITIONS, INSPECTION FREQUENCY MAY BE REDUCED TO MONTHLY INSPECTIONS IF DISCHARGES ARE UNLIKELY TO OCCUR DUE TO FROZEN CONDITIONS THAT ARE LIKELY TO CONTINUE FOR THREE (3) MONTHS BASED ON HISTORIC DATA AND DISTURBED AREAS HAVE BEEN ADEQUATELY STABILIZED EXCEPT FOR AREAS IN WHICH ACTIVE CONSTRUCTION IS TAKING PLACE.
5. ACCUMULATED SEDIMENT SHALL BE REMOVED FROM BEHIND STRAW WATTLES WHEN IT BECOMES 4 INCHES DEEP OR WHEN ACCUMULATIONS HAVE ADVERSELY AFFECTED IT'S FUNCTION. STRAW WATTLES SHALL BE REPAIRED BY REMOVING SILT AND SEDIMENTS AND THEN TAMPING LOOSE SOIL ALONG BASE, REPLACING DAMAGED OR WEAKENED POSTS AND STAKES, OR AS NECESSARY TO MAINTAIN A BARRIER.
6. ALL DISTURBED AREAS SHALL BE STABILIZED PER THESE SPECIFICATIONS TO MAINTAIN VIGOROUS, DENSE VEGETATION. REPAIR ANY ERODED SLOPES, REAPPLY TOPSOIL, RESEED AND STABILIZE REPAIR AREA AS REQUIRED FOR PERMANENT OR TEMPORARY MEANS. REPAIR SOIL AREAS DAMAGED BY EROSION OR CONSTRUCTION EQUIPMENT.
7. IMMEDIATELY REPAIR ANY DAMAGE CAUSED BY CONSTRUCTION EQUIPMENT, MAINTENANCE OR OTHER ACTIVITY TO ANY EROSION AND SEDIMENTATION CONTROL MEASURE, OR BEST MANAGEMENT PRACTICE (BMP) OR DEVICE.
8. THE PRIME CONTRACTOR IS RESPONSIBLE FOR THE PERFORMANCE AND COMPLIANCE OF ITS SUBCONTRACTOR'S ACTIVITIES RELATING TO THE SWPPP. THEY SHALL MAKE FREQUENT INSPECTIONS OF THEIR WORK AND COORDINATE APPROPRIATE INSTALLATION AND MAINTENANCE OF EROSION AND SEDIMENTATION CONTROL AND WATER QUALITY DEVICES.
9. EMPLOY POLLUTION PREVENTION MEASURES TO CONTROL LITTER, CONSTRUCTION CHEMICALS, SEDIMENT, AND CONSTRUCTION DEBRIS INCLUDING, BUT NOT LIMITED TO THE FOLLOWING: SALVAGE AND REUSE OF MATERIALS, MINIMIZING PACKAGING WASTE, RECYCLING, PROPER DISPOSAL AT FREQUENT INTERVALS IN ACCORDANCE WITH PREVAILING LAWS, ONSITE INSTRUCTION REGARDING APPROPRIATE SEPARATION/HANDLING/RECYCLING, PERIODIC DEBRIS REMOVAL AT DRAINAGE STRUCTURES (GRATES AND SUMPS)/SEDIMENT TRAPS/ FOREBAY AND OTHER BMPS, PROPER MAINTENANCE OF SEDIMENT/ EROSION CONTROL SYSTEMS, ROUTINE AND EVENT RELATED INSPECTIONS OF DRAINAGE AND BMP SYSTEMS PER PERMIT REQUIREMENTS, PROVIDE APPROPRIATE SANITARY FACILITIES FOR ONSITE PERSONNEL, PICK UP TRASH AND DEBRIS FREQUENTLY AND USE WATER MIST, CALCIUM CHLORIDE, OR OTHER LEGAL MEANS TO LIMIT THE SPREAD OF DUST AND SOIL PARTICLES.
10. TRUCKS SHALL BE WASHED OUT IN LOCATIONS IDENTIFIED ON THE PLANS, AND IN ACCORDANCE WITH THE REQUIREMENTS OF THE SWPPP.

GENERAL SWPPP NOTES:

1. THE FOLLOWING NOTES ARE PROVIDED AS A SUMMARY REFERENCE FOR THE CONTRACTOR ONLY. THE REQUIREMENTS IN THE FULL SWPPP FOR THE PROJECT SHALL BE FOLLOWED BY THE CONTRACTOR. IN THE EVENT OF A CONFLICT BETWEEN THE DRAWINGS AND THE SWPPP, THE ENGINEER SHALL DETERMINE THE CORRECT REQUIREMENTS.
2. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE PERFORMED IN ACCORDANCE WITH THE MASSACHUSETTS EROSION AND SEDIMENTATION CONTROL GUIDELINES. THE CONTRACTOR SHALL OWN AND MAINTAIN A COPY OF THE GUIDELINES ON-SITE DURING CONSTRUCTION.
3. ALL DISTURBED AREAS SHALL BE KEPT TO A MINIMUM. FINAL GRADING AND RESTORATION SHALL BE ACCOMPLISHED AS SOON AS PRACTICAL.
4. EROSION AND SEDIMENTATION CONTROL STRUCTURES SHALL BE INSTALLED PRIOR TO SITE WORK.
5. SHOULD TRUCKS NEED TO BE WASHED OUT ONSITE; A CONCRETE WASHOUT BASIN SHALL BE INSTALLED. OTHERWISE TRUCKS MUST BE WASHED OUT OFFSITE.
6. ALL CONTROL STRUCTURES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND REMOVED WHEN STABILIZATION HAS BEEN ATTAINED, IF THE PROPOSED CONTROL MEASURES ARE NOT SATISFACTORY TO THE ENGINEER, ADDITIONAL CONTROL MEASURES SHALL BE TAKEN.
7. ALL RUNOFF FROM THE DISTURBED AREA SHALL BE CONTROLLED AND FILTERED. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED AS SHOWN ON THE DRAWINGS.
8. CONTRACTOR IS RESPONSIBLE FOR OBTAINING NPDES CONSTRUCTION GENERAL PERMIT FOR THE PROPOSED PROJECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE IMPLEMENTATION AND COMPLIANCE WITH THE APPROVED NPDES NOTICE OF INTENT (NOI) AND STORMWATER POLLUTION PREVENTION PLAN (SWPPP).
9. THE CONTRACTOR MUST OBTAIN COPIES OF SITE SPECIFIC PERMITS PRIOR TO THE START OF WORK.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTATION OF EROSION AND SEDIMENTATION CONTROL MEASURES. THIS RESPONSIBILITY INCLUDES THE ACQUISITION OF MATERIALS, INSTALLATION, AND MAINTENANCE OF EROSION AND SEDIMENTATION STRUCTURES, THE COMMUNICATION AND DETAILED EXPLANATION TO ALL PEOPLE INVOLVED IN THE SITE WORK OF THE REQUIREMENTS AND OBJECTIVE OF THE EROSION AND SEDIMENTATION CONTROL MEASURES.
11. TWO (2) WEEKS PRIOR TO THE START OF WORK, THE CONTRACTOR SHALL PROVIDE THE NAME AND PHONE NUMBER OF THE INDIVIDUAL RESPONSIBLE FOR IMPLEMENTATION OF THE EROSION & SEDIMENTATION CONTROL PLAN TO THE ENGINEER.
12. THE ENGINEER SHALL BE NOTIFIED OF ANY PROPOSED ALTERATION TO THE EROSION AND SEDIMENTATION CONTROL PLAN, PRIOR TO ALTERING, IN ORDER TO ENSURE THE FEASIBILITY OF THE ADDITION, SUBTRACTION, OR CHANGE IN THE PLAN.

SEEDING NOTES:

1. NO SEEDING OR SOIL PREPARATION SHALL BE DONE IF SOILS ARE MUDDY, DRY, AND/OR COMPACTED. BARE SOILS SHALL BE RAKED TO REMOVE SOIL CLODS, LUMPS, BRUSH, ROOTS, STUMP, LITTER AND OTHER FOREIGN MATTER. RUTS AND DEPRESSIONS SHALL BE FILLED WITH ADDITIONAL LOAM AND/OR COMPOST AND THE SOIL SHALL BE RE-GRADED TO A RELATIVELY SMOOTH FINISH CORRESPONDING TO THE REQUIRED GRADES.
2. ALL DISTURBED AREAS OUTSIDE OF PV DEVELOPMENT AREAS SHALL BE RESTORED WITH A VEGETATIVE STABILIZATION MATERIAL (GRASS).
3. AT SLOPES EXCEEDING 25% GRADE, AND IN AREAS DEPICTED WITHIN THE PLANS, SEEDING SHALL BE APPLIED IMMEDIATELY FOLLOWED BY THE INSTALLATION OF THE EROSION CONTROL BLANKET SPECIFIED ON SHEET G002 OR APPLIED VIA HYDROSEED WITH TACIFIER THAT MUST BE EITHER PLANT-BASED OR LIQUID OR DRY POLYMERIC EMULSION BLEND, TO BE APPROVED BY OWNERS ENGINEER PRIOR TO APPLICATION.
4. AT SLOPES EXCEEDING 25% GRADE, SEEDING SHALL OCCUR WITHIN 72 HOURS OF LOAM PLACEMENT TO PREVENT LOSS OF TOPSOIL.
5. ALL DISTURBED AREAS WITHIN THE PHOTOVOLTAIC DEVELOPMENT AREA SHALL BE SEEDED EITHER BY HAND, CYCLONE SEEDER, OR A CULTIPACKER TYPE SEEDER IN ACCORDANCE WITH THE FOLLOWING METHODS.
6. THE LIMING, FERTILIZING, AND SEEDING TO BE ACCOMPLISHED UNDER THIS SECTION SHALL BE DONE DURING A PERIOD OF TIME TO BE APPROVED BY THE ENGINEER OR LANDSCAPE ARCHITECT. CONTRACTOR SHALL NOTIFY THE ENGINEER OR ARCHITECT 30 DAYS PRIOR TO THE TIME THAT HE/SHE INTENDS TO BEGIN THIS WORK.
7. HEAVILY SCARIFYING THE EXISTING GROUND COVER AND OVER SEEDING WITH ADDITIONAL SEED MIX MAY BE NECESSARY IN SOME AREAS.
8. SEED SHALL BE INCORPORATED WITH THE MULCHING MATERIAL SO AS TO OBTAIN A MINIMUM SOWN COVERAGE OF 200 POUNDS OF THE SPECIFIED MIX PER ACRE. SEED SUBSTITUTIONS MAY REQUIRE RATE ADJUSTMENTS AS RECOMMENDED BY THE SEED SUPPLIERS, IF APPROVED BY THE ENGINEER OR LANDSCAPE ARCHITECT.
9. AT SLOPES EXCEEDING 25% GRADE, SEEDING AND/OR STABILIZATION SHALL OCCUR AS SOON AS IS REASONABLE GIVEN THE CONSTRUCTION ACTIVITIES OR SEQUENCING WILL PERMIT. REFERENCE SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS.
10. AFTER THE FINE GRADING AND PREPARATIONS FOR SEEDING ARE APPROVED BY THE ENGINEER OR LANDSCAPE ARCHITECT, THE CONTRACTOR SHALL SEED THE AREA INDICATED, AS SPECIFIED HEREIN. THE SEED SHALL BE INCORPORATED WITH MULCHING MATERIALS COMPOSED OF WOOD CELLULOSE FIBERS THAT WILL READILY DISPERSE IN WATER TO FORM A UNIFORM AND HOMOGENEOUS MIXTURE WHEN AGITATED.
11. NO EXPOSED STONES OR WOODY DEBRIS SHALL BE AT THE SURFACE TO IMPROVE SEEDING AND ELIMINATE RISK OF DAMAGE FROM THROWN PROJECTILES WHILE MOWING.

SEEDING MATERIALS:

1. LIME:
   LIME SHALL BE STANDARD COMMERCIAL GROUND LIMESTONE CONTAINING AT LEAST 50% TOTAL OXIDES (CALCIUM OXIDE AND MAGNESIUM OXIDE) AND 50% PERCENT OF THE MATERIAL MUST PASS THROUGH A #100 MESH SIEVE, WITH 98% PASSING A #20 MESH SIEVE.
2. FERTILIZER:
   FERTILIZER SHALL BE COMMERCIAL FERTILIZER 10-10-10 U.F. FERTILIZER MIXTURE CONTAINING AT LEAST 60% OF ORGANIC MATERIAL OR TYPE DETERMINED BY CHEMICAL SOIL ANALYSIS AS TESTED BY AN APPROVED LABORATORY. IT SHALL BE DELIVERED AT THE SITE IN THE ORIGINAL SEALED CONTAINERS WITH CONTENTS CLEARLY DESCRIBE.
3. SEED MIXES:
   THE ARRAY SHALL BE SEEDED WITH THREE DISTINCT SEED MIXES. THE TEMPORARY SEED MIX SHALL BE USED FOR SEEDING DURING CONSTRUCTION ACTIVITIES. THE GRASS SEED MIX SHALL BE USED IN THE FINAL SEEDING OF INTERIOR AND EXTERIOR PERIMETER AREAS AND INTER-ROW AREAS AFTER ARRAY CONSTRUCTION
4. MULCH:
   MULCH MATERIAL SHALL BE A MANUFACTURED PRODUCT OF NATURAL WOOD CELLULOSE FIBERS. MATERIAL SHALL BE INTERNATIONAL PAPER COMPANY'S "TURFIBER;" WEYERHAEUSER COMPANY'S "SILVA-FIBER," OR APPROVED EQUAL AND CLEARLY PACKED IN ORIGINAL CONTAINERS, SEALED AND CLEARLY LABELED WITH BRAND NAME AND MANUFACTURER, IT SHALL HAVE A DELIVERED MOISTURE CONTENT OF NOT OVER 12%.
5. PERMANENT SEED:
   THE SEED SHALL BE APPLIED BY EITHER HAND, CYCLONE SEEDER, OR A CULTIPACKER TYPE SEEDER. SEED MIX SHALL BE ERNST NATIVE/NATURALIZED SOLAR FARM SEED MIX - ERNMX-186-1, NORTHEAST SOLAR POLLINATOR 3 MIX - ERNMX-612, OR APPROVED EQUAL. SUBMIT SUPPLIER'S SEED BLEND SPECIFICATIONS TO THE ENGINEER OR LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO COMMENCING WITH SEEDING OPERATIONS. SEEDING SHALL BE APPLIED AT A RATE OF 40 LB PER ACRE, OR 3-5 LB PER 1,000 SQFT. SEEDING SHALL BE COMPLETED BETWEEN APRIL 15 AND MAY 15 OR AUGUST 15 AND OCTOBER 15. ALL SEEDED AREAS SHALL BE MAINTAINED TO ENSURE PROPER GROWTH AND TO MINIMIZE EROSION. PERMANENT SEED MIX IS SUBJECT TO CHANGE BASED ON FINAL DESIGN BY THE ENGINEER OR LANDSCAPE ARCHITECT AND WILL BE SPECIFIED AS PART OF THE ISSUED FOR CONSTRUCTION PLANS.

   TEMPORARY SEED:
   THE SEED MIX WITHIN THE LIMITS OF THE TREE CLEARING, WHEN SEEDING OCCURS DURING SPRING/SUMMER MONTHS, SHALL BE GRAIN OATS (ERNMX-181-1) NATIVE STEEP SLOPE MIX WITH THE SPECIFICATIONS LISTED BELOW IN THE SEEDING TABLE, OR APPROVED EQUAL. THE SEED MIX WITHIN THE LIMITS OF THE TREE CLEARING, WHEN SEEDING OCCURS DURING WINTER MONTHS, SHALL BE THREE-WAY RYEGRASS MIX (ERNMX-149) WITH THE SPECIFICATIONS LISTED BELOW IN THE SEEDING TABLE, OR APPROVED EQUAL. SUBMIT SUPPLIER'S SEED BLEND SPECIFICATIONS TO THE ENGINEER OR LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO COMMENCING WITH THE SEEDING OPERATIONS. SEEDING SHALL BE APPLIED AT A RATE OF 7-10 LB PER 1,000 SQ FT.

NATIVE STEEP SLOPE MIX W/ GRAIN OATS (ERNMX-181-1)

ITEM #	BOTANICAL (LATIN) NAME	COMMON NAME	WEIGHT
1	AVENA SATIVA	OATS, VARIETY NOT STATED	40.00%
2	ANDROPOGEN GERARDII	BIG BLUESTEM, 'SOUTHLOW-MI ECOTYPE	19.12%
3	SORGHASTRUM NUTANS	INDIANGRASS, PA ECOTYPE	12.00%
4	ELYMUS VIRGINICUS	VIRGINIA WILDRYE, MADISON-NY ECOTYPE	10.72%
5	ELYMUS CANADENSIS	CANADA WILDRYE	5.28%
6	PANICUM VIRGATUM	SWITCHGRASS, 'SHAWNEE'	4.32%
7	AGROSTIS PERANNANS	AUTUMN BENTGRASS, ALBANY PINE BUSH-NY ECOTYPE	3.20%
8	PANICUM CLANDESTINUM	DEERTONGUE, TIOGA	2.24%
9	RUDBECKIA HIRTA	BLACKEYED SUSAN	0.80%
10	COREOPSIS LANCEOLATA	LANCELEAF COREOPSIS	0.56%
11	ECHINACEA PURPUREA	PURPLE CONEFLOWER	0.56%
12	HELIOPSIS HELIANTHOIDES	OXEYE SUNFLOWER, PA ECOTYPE	0.56%
13	ASTER PILOSUS	HEATH ASTER, PA ECOTYPE	0.16%
14	MONARDA FISTULOSA	WILD BERGAMOT	0.16%
15	SOLIDAGO RUGOSA	WRINKLELEAF GOLDENROD, PA ECOTYPE	0.16%
16	APOCYNUM CANNABINUM	INDIANHEMP, PA ECOTYPE	0.08%
17	ASCLEPIAS SYRIACA	COMMON MILKWEED	0.08%
TOTAL			100%

THREE-WAY RYGRASS MIX (ERNMX-149)

ITEM #	BOTANICAL (LATIN) NAME	COMMON NAME	WEIGHT
1	LOLIUM PERENNE, 'BIGLEAGUE'	PERENNIAL RYEGRASS	33%
2	LOLIUM PERENNE, 'AMAZING XL'	PERENNIAL RYEGRASS, (TURF TYPE)	33%
3	LOLIUM PERENNE, 'PASCO'	PERENNIAL RYEGRASS, (TURF TYPE)	33%
TOTAL			100%

MAINTENANCE OF SEEDED AREAS:

1. FOLLOWING THE FINAL SEEDING THE CONTRACTOR SHALL CONTINUE TO INSPECT EROSION AND SEDIMENTATION CONTROLS AT LEAST ONCE EVERY 7 CALENDAR DAYS, WITHIN 24 HOURS AFTER A STORM EVENT (RAINFALL OR EXCESS SNOWMELT). ALL MEASURES MUST BE MAINTAINED IN EFFECTIVE OPERATING CONDITION UNTIL AREAS ARE PERMANENTLY STABILIZED.
2. PERMANENT STABILIZATION IS ACHIEVED WHEN 70% MATURE VEGETATION COVER OF DESIRED SPECIES IS ACHIEVED IN ALL AREAS AND/OR PERMANENT NON-VEGETATIVE STABILIZATION MEASURES ARE IMPLEMENTED TO PROVIDE EFFECTIVE COVER OF ANY AREAS OF EXPOSED SOIL. IN THE EVENT OF ANY UNSATISFACTORY GROWTH, RESEEDING SHALL BE CARRIED OUT, WITH FOLLOW-UP INSPECTION.
3. THE CONTRACTOR SHALL MAINTAIN THE ENTIRE SEEDED AREAS UNTIL FINAL ACCEPTANCE AT THE COMPLETION OF THE PROJECT OR FOR 90 DAYS, WHICHEVER IS LONGER. MAINTENANCE SHALL INCLUDE WATERING ON AN AS-NEEDED BASIS SUCH THAT ESTABLISHMENT OF AT LEAST 70% OF THE SEEDED AREAS IS ACHIEVED AFTER ONE GROWING SEASON. MAINTENANCE SHALL ADDITIONALLY INCLUDE WEEDING, REMOVAL OF STONES WHICH MAY APPEAR, AND REGULAR CUTTINGS OF THE GRASS NO CLOSER THAN 10 DAYS APART. CONTRACTOR SHALL FURNISH ALL TEMPORARY PIPE AND CONNECTIONS FOR SPRINKLING. CONTRACTOR SHALL FURNISH ALL REQUIRED WATER AT NO EXPENSE TO THE OWNER.
4. ALL BARE SPOTS, WHICH BECOME APPARENT AS THE GRASS GERMINATES, SHALL BE RESEEDED BY THE CONTRACTOR AT HIS/HER OWN EXPENSE AS MANY TIMES AS NECESSARY TO SECURE AN ADEQUATE GROWTH, AND THE ENTIRE AREA SHALL BE MAINTAINED AND CUT UNTIL ALL WORK HAS BEEN COMPLETED AND FINAL ACCEPTANCE HAS OCCURRED. RESEEDING SHALL BE ACCOMPLISHED BY MECHANICAL MEANS AS DETERMINED BY THE AREA OF RESEEDING TO BE ACCOMPLISHED.
5. CONTRACTOR SHALL TAKE WHATEVER MEASURES ARE NECESSARY TO PROTECT THE GRASS WHILE IT IS GERMINATING. THESE MEASURES SHALL INCLUDE SPRINKLING STRAW OR WOOD FIBER MULCH TO COVER THE AREA, AND/OR FURNISHING OF WARNING SIGNS, BARRIERS, TEMPORARY FENCE OR ANY OTHER NECESSARY MEASURES OF PROTECTION.
6. CONTRACTOR SHALL FURNISH, PROTECT, AND MAINTAIN ALL TEMPORARY BARRIERS UNTIL FINAL ACCEPTANCE OF THE SEEDED AREAS BY THE OWNER AND SHALL REMOVE THEM UPON SUCH FINAL ACCEPTANCE, THE BARRIERS SHALL REMAIN THE PROPERTY OF CONTRACTOR AT ALL TIMES.
7. AFTER THE ENGINEER, OR LANDSCAPE ARCHITECT HAS DETERMINED THAT THE PROJECT AREA HAS STABILIZED (70% MATURE VEGETATION COVER ACHIEVED), THE CONTRACTOR SHALL REMOVE ALL SEDIMENT BARRIERS AND ANY OTHER TEMPORARY EROSION CONTROL MEASURES WITHIN 30 DAYS.

NOT FOR CONSTRUCTION

Project:
PROPOSED SOLAR PV DEVELOPMENT
9 NOONS DRIVE, TRURO, MASSACHUSETTS 02652

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
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978.532.1900 800.SAMPSON

Client:
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No.	Description	Date
0	ISSUED FOR PERMITTING	12/31/25

Revisions

Seal:
COMMONWEALTH OF MASSACHUSETTS
MELINDA COSTELLO
CIVIL
No. 52956
PROFESSIONAL ENGINEER
12/31/2025

Issued For:
PERMITTING

Issued Date:	12/31/2025
Scale:	N/A
Drawn By:	RJR
Reviewed By:	BMG
Approved By:	MRC
W&S Project No.:	ENG25-1122

Drawing Title:
NOTES AND SPECIFICATIONS

Sheet Number:
C001

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NOTES:

1. THIS PLAN IS SET TO MASSACHUSETTS STATE PLANE COORDINATED SYSTEM "MA83F" MAINLAND ZONE. ELECTRICAL RACKING SYSTEM AND MODULES DESIGNED TO TRUE NORTH.
2. ALL MONITORING WELLS WITHIN THE LIMITS OF WORK SHALL BE PROTECTED DURING CONSTRUCTION.
3. ACCESS ROAD AND ASSOCIATED GRADING IS SUBJECT TO FINAL DESIGN AND SHALL BE PROVIDED PRIOR TO CONSTRUCTION TO MEET UTILITY PROVIDER DESIGN REQUIREMENTS. REFER TO G002 FOR ADDITIONAL NOTES.

LEGEND

EXISTING

- LOCUS PROPERTY BOUNDARY
- PROPOSED PROPERTY BOUNDARY
- APROXIMATE ADJOINING PROPERTY BOUNDARY
- ASSESSOR BOUNDARY LINES
- EASEMENT UTILITY
- EASEMENT ACCESS
- RIGHT OF WAY
- ZONING SETBACK
- 420 MAJOR CONTOUR INTERVAL
- 421 MINOR CONTOUR INTERVAL
- EDGE OF PAVEMENT
- EDGE OF GRAVEL
- TREELINE
- STONE WALL
- WIRE FENCE
- CHAIN LINK FENCE
- GUARD RAIL
- OHU OVERHEAD UTILITY
- OHE OVERHEAD POWER
- UGE POWER CONDUIT
- BORDERING VEGETATIVE WETLAND (BVW)
- ISOLATED WETLAND (IW)
- 100' WETLAND BUFFER
- IRON PIN, PIPE OR MONUENT
- UTILITY POLE
- WF–A10 P WETLAND FLAG AND ID
- TB–A10 TOP OF BANK FLAG AND ID
- EOP (TYP) EDGE OF PAVEMENT TYPICAL
- CPP CORRUGATED PLASTIC PIPE
- INV INVERT ELEVATION
- EL ELEVATION
- × 123.45 SPOT ELEVATION
- GRAVEL SURFACE
- CONCRETE SURFACE
- APPROXIMATE PFAS CONTAMINATION SOURCE

PROPOSED

- 420 MAJOR CONTOUR INTERVAL
- 421 MINOR CONTOUR INTERVAL
- EDGE OF PAVEMENT
- EDGE OF GRAVEL
- TREELINE
- CHAIN LINK FENCE
- OHE OVERHEAD POWER
- UGE POWER CONDUIT
- LOW LIMIT OF WORK
- SF SILT FENCE
- SW STRAW WATTLE
- ASF AUGMENTED SILT FENCE
- UTILITY POLE
- SOLAR PANEL RACK AND MODULE
- CONCRETE SURFACE
- GRAVEL SURFACE
- RIPRAP SURFACE
- STABILIZED ROCK CONSTRUCTION EXIT
- TEMPORARY LAYDOWN AREA

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

NOT FOR CONSTRUCTION

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Seal: COMMONWEALTH OF MASSACHUSETTS — MELINDA COSTELLO — CIVIL — No. 52956 — PROFESSIONAL ENGINEER — 12/31/2025

Issued For: PERMITTING

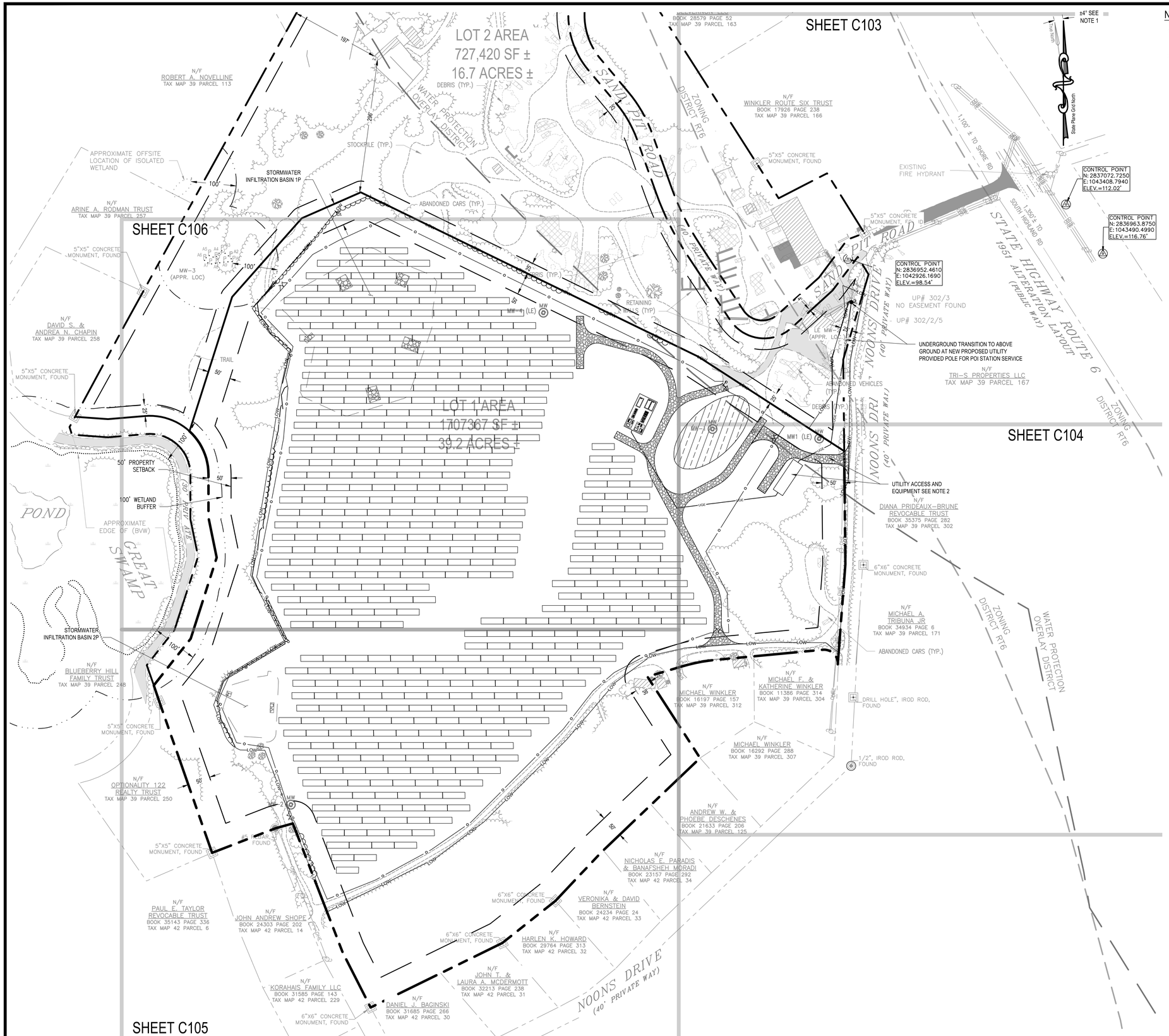
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Scale:	1" = 100'
Drawn By:	RJR
Reviewed By:	BMG
Approved By:	MRC
W&S Project No.:	ENG25-1122

Drawing Title:
SOIL EROSION AND SEDIMENTATION CONTROL PLAN

Sheet Number:
C101

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NOTES:

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- APROXIMATE ADJOINING PROPERTY BOUNDARY
- ASSESSOR BOUNDARY LINES
- EASEMENT UTILITY
- EASEMENT ACCESS
- RIGHT OF WAY
- ZONING SETBACK
- MAJOR CONTOUR INTERVAL (420)
- MINOR CONTOUR INTERVAL (421)
- EDGE OF PAVEMENT
- EDGE OF GRAVEL
- TREELINE
- STONE WALL
- WIRE FENCE
- CHAIN LINK FENCE
- GUARD RAIL
- OVERHEAD UTILITY (OHU)
- OVERHEAD POWER (OHE)
- POWER CONDUIT (UGE)
- BORDERING VEGETATIVE WETLAND (BVW)
- ISOLATED WETLAND (IW)
- 100' WETLAND BUFFER
- IRON PIN, PIPE OR MONUENT
- UTILITY POLE
- WETLAND FLAG AND ID (WF-A10 P)
- TOP OF BANK FLAG AND ID (TB-A10 ¤)
- EDGE OF PAVEMENT (EOP)
- TYPICAL (TYP)
- CORRUGATED PLASTIC PIPE (CPP)
- INVERT ELEVATION (INV)
- ELEVATION (EL)
- SPOT ELEVATION (× 123.45)
- GRAVEL SURFACE
- CONCRETE SURFACE
- APPROXIMATE PFAS CONTAMINATION SOURCE

PROPOSED

- MAJOR CONTOUR INTERVAL (420)
- MINOR CONTOUR INTERVAL (421)
- EDGE OF PAVEMENT
- EDGE OF GRAVEL
- TREELINE
- CHAIN LINK FENCE
- OVERHEAD POWER (OHE)
- POWER CONDUIT (UGE)
- LIMIT OF WORK (LOW)
- SILT FENCE (SF)
- STRAW WATTLE (SW)
- AUGMENTED SILT FENCE (ASF)
- UTILITY POLE
- SOLAR PANEL RACK AND MODULE
- CONCRETE SURFACE
- GRAVEL SURFACE
- RIPRAP SURFACE
- STABILIZED ROCK CONSTRUCTION EXIT

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

NOT FOR CONSTRUCTION

Project:
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Drawn By:	RJR
Reviewed By:	BMG
Approved By:	MRC
W&S Project No.:	ENG25-1122

Drawing Title:
OVERALL SITE PLAN

Sheet Number:
C102

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N/F
BELVERNON LLC
BOOK 28579 PAGE 52
TAX MAP 39 PARCEL 163

N/F
WINKLER ROUTE SIX TRUST
BOOK 17926 PAGE 238
TAX MAP 39 PARCEL 166

ZONING DISTRICT RT6

5"X5" CONCRETE MONUMENT, FOUND

5"X5" CONCRETE MONUMENT, FOUND

MATCH LINE C106

RETAINING WALLS (TYP)

EXISTING FIRE HYDRANT

1,100' ± TO SHORE RD

CONTROL POINT
N: 2837072.7250
E: 1043408.7940
ELEV.=112.02'

CONTROL POINT
N: 2836963.8750
E: 1043490.4990
ELEV.=116.76'

CONTROL POINT
N: 2836952.4610
E: 1042926.1690
ELEV.=98.54'

1,350'± TO SOUTH HIGHLAND RD

STATE HIGHWAY ROUTE 6
1951 ALTERATION LAYOUT
(PUBLIC WAY)

ROAD

PIT

SAND

UP# 302/3
NO EASEMENT FOUND

UP# 302/2/5

UNDERGROUND TRANSITION TO ABOVE GROUND AT NEW PROPOSED UTILITY PROVIDED POLE FOR POI STATION SERVICE

NOONS DRIVE
(40' PRIVATE WAY)

N/F
TRI-S PROPERTIES LLC
TAX MAP 39 PARCEL 167

ABANDONED VEHICLES (TYP.)

6 / C502 CHAIN LINK FENCE DOUBLE GATE

5 / C502 POST DRIVEN CHAIN LINK FENCE

DEBRIS (TYP.)

PROPOSED PROPERTY LINE IS LIMIT OF WORK

1 / C501 STABILIZED CONSTRUCTION EXIT

1 / C502 GRAVEL ACCESS ROAD

MATCH LINE C104

ZONING DISTRICT RT6

±4° SEE NOTE 1

State Plane Grid North

NOTES:

1. THIS PLAN IS SET TO MASSACHUSETTS STATE PLANE COORDINATED SYSTEM "MA83F" MAINLAND ZONE. ELECTRICAL RACKING SYSTEM AND MODULES DESIGNED TO TRUE NORTH.
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- APROXIMATE ADJOINING PROPERTY BOUNDARY
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- EASEMENT UTILITY
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- RIGHT OF WAY
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- 420 MAJOR CONTOUR INTERVAL
- 421 MINOR CONTOUR INTERVAL
- EDGE OF PAVEMENT
- EDGE OF GRAVEL
- TREELINE
- STONE WALL
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- GUARD RAIL
- OHU OVERHEAD UTILITY
- OHE OVERHEAD POWER
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- WF-A10 P WETLAND FLAG AND ID
- TB-A10 TOP OF BANK FLAG AND ID
- EDP EDGE OF PAVEMENT
- (TYP) TYPICAL
- CPP CORRUGATED PLASTIC PIPE
- INV INVERT ELEVATION
- EL ELEVATION
- × 123.45 SPOT ELEVATION
- GRAVEL SURFACE
- CONCRETE SURFACE
- APPROXIMATE PFAS CONTAMINATION SOURCE

PROPOSED

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- SW STRAW WATTLE
- ASF AUGMENTED SILT FENCE
- UTILITY POLE
- SOLAR PANEL RACK AND MODULE
- CONCRETE SURFACE
- GRAVEL SURFACE
- RIPRAP SURFACE
- STABILIZED ROCK CONSTRUCTION EXIT
- TEMPORARY LAYDOWN AREA
- EROSION CONTROL BLANKET

0 20' 40' 80'
1" = 40' HORIZONTAL

NOT FOR CONSTRUCTION

Project:
PROPOSED SOLAR PV DEVELOPMENT

9 NOONS DRIVE, TRURO, MASSACHUSETTS 02652

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W&S Project No.:	ENG25-1122

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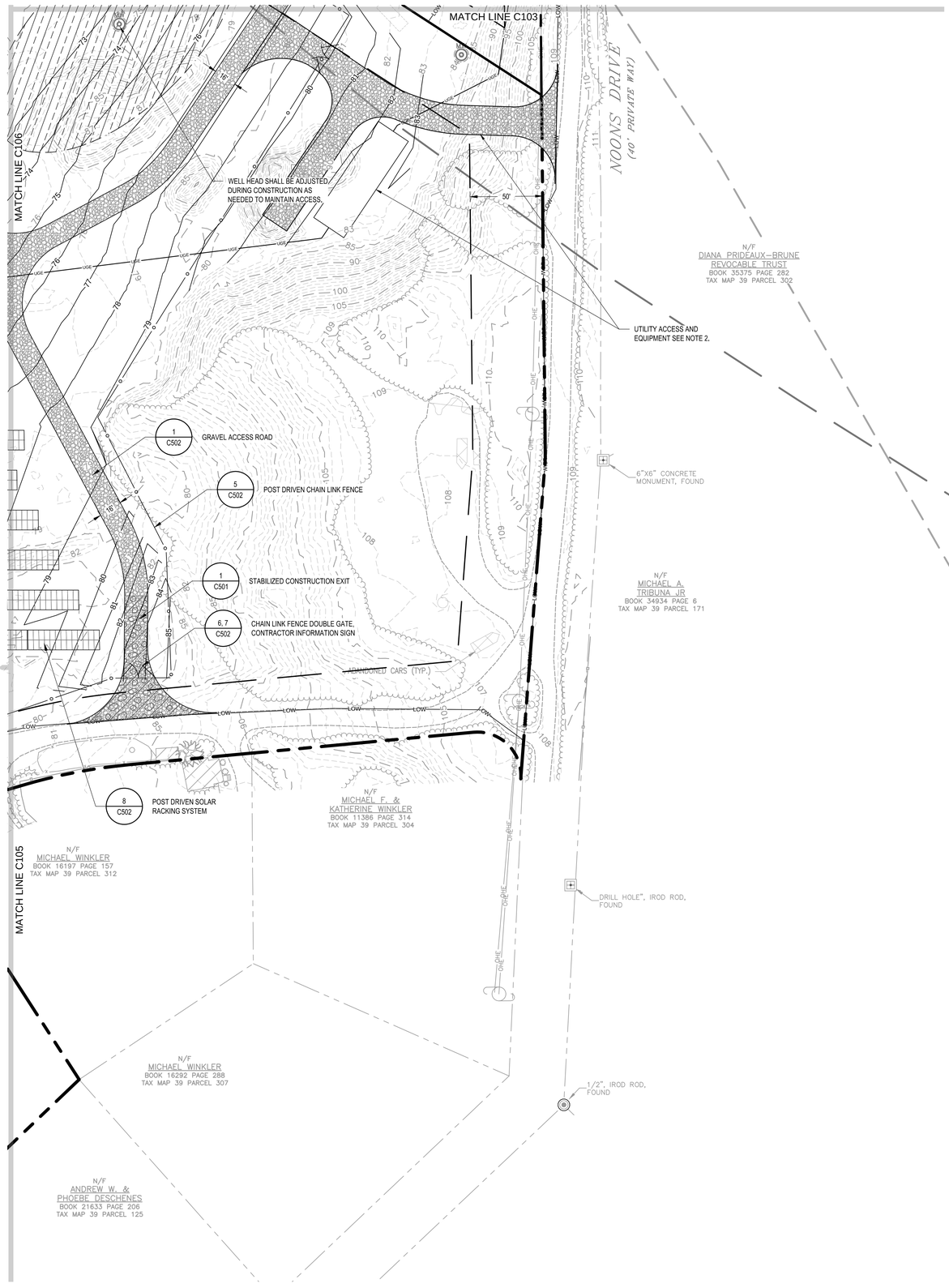
SITE LAYOUT AND GRADING PLAN

Sheet Number:

C103

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P:\Projects\gis\Arthurs Yard and pt 3 trees.shp\Boundaries\01-Landscape\03-Layouts\C107 Site Layout and Grading.mxd





NOTES:

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- CPP CORRUGATED PLASTIC PIPE
- INV INVERT ELEVATION
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- CONCRETE SURFACE
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- OHE OVERHEAD POWER
- UGE POWER CONDUIT
- LOW LIMIT OF WORK
- SF SILT FENCE
- SW STRAW WATTLE
- ASF AUGMENTED SILT FENCE
- UTILITY POLE
- SOLAR PANEL RACK AND MODULE
- CONCRETE SURFACE
- GRAVEL SURFACE
- RIPRAP SURFACE
- STABILIZED ROCK CONSTRUCTION EXIT
- TEMPORARY LAYDOWN AREA
- EROSION CONTROL BLANKET

0 20' 40' 80'
1" = 40' HORIZONTAL

NOT FOR CONSTRUCTION

Project:
PROPOSED SOLAR PV DEVELOPMENT
9 NOONS DRIVE, TRURO, MASSACHUSETTS 02652

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
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Client:
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No.	Description	Date
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Revisions

Seal:
COMMONWEALTH OF MASSACHUSETTS
MELINDA COSTELLO
CIVIL
No. 52956
PROFESSIONAL ENGINEER
12/31/2025

Issued For:
PERMITTING

Issued Date:	12/31/2025
Scale:	1" = 40'
Drawn By:	RJR
Reviewed By:	BMG
Approved By:	MRC
W&S Project No.:	ENG25-1122

Drawing Title:
SITE LAYOUT AND GRADING PLAN

Sheet Number:
C104

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MATCH LINE C106

MATCH LINE C104

SLOPE STABILIZATION (TYP) 3 C501

INFILTRATION BASIN 2P 3 C503

RIPRAP SPILLWAY
RIPRAP APRON AT SPILLWAY 1, 2 C503

POST DRIVEN
CHAIN LINK FENCE 3 C501

SEDIMENT FOREBAY 4 C503

8 C502 POST DRIVEN SOLAR RACKING SYSTEM

5"X5" CONCRETE MONUMENT, FOUND

#5 REBAR FOUND

N/F
OPTIONALITY 122 REALTY TRUST
TAX MAP 39 PARCEL 250

N/F
PAUL E. TAYLOR REVOCABLE TRUST
BOOK 35143 PAGE 336
TAX MAP 42 PARCEL 6

N/F
JOHN ANDREW SHOPE
BOOK 24303 PAGE 202
TAX MAP 42 PARCEL 14

N/F
KORAHAIS FAMILY LLC
BOOK 31585 PAGE 143
TAX MAP 42 PARCEL 229

N/F
DANIEL J. BAGINSKI
BOOK 31685 PAGE 266
TAX MAP 42 PARCEL 30

6"X6" CONCRETE MONUMENT, FOUND

N/F
JOHN T. & LAURA A. MCDERMOTT
BOOK 32213 PAGE 238
TAX MAP 42 PARCEL 31

6"X6" CONCRETE MONUMENT, FOUND

N/F
HARLEN K. HOWARD
BOOK 29764 PAGE 313
TAX MAP 42 PARCEL 32

5"X6" CONCRETE MONUMENT, FOUND

N/F
VERONIKA & DAVID BERNSTEIN
BOOK 24234 PAGE 24
TAX MAP 42 PARCEL 33

N/F
NICHOLAS E. PARADIS & BANAFSHEH MORADI
BOOK 23157 PAGE 292
TAX MAP 42 PARCEL 34

±4° SEE NOTE 1

True North

State Plane Grid North

LEGEND

EXISTING

- LOCUS PROPERTY BOUNDARY
- PROPOSED PROPERTY BOUNDARY
- APROXIMATE ADJOINING PROPERTY BOUNDARY
- ASSESSOR BOUNDARY LINES
- EASEMENT UTILITY
- EASEMENT ACCESS
- RIGHT OF WAY
- ZONING SETBACK
- 420 MAJOR CONTOUR INTERVAL
- 421 MINOR CONTOUR INTERVAL
- EDGE OF PAVEMENT
- EDGE OF GRAVEL
- TREELINE
- STONE WALL
- WIRE FENCE
- CHAIN LINK FENCE
- GUARD RAIL
- OHU OVERHEAD UTILITY
- OHE OVERHEAD POWER
- UGE POWER CONDUIT
- BORDERING VEGETATIVE WETLAND (BVW)
- ISOLATED WETLAND (IW)
- 100' WETLAND BUFFER
- IRON PIN, PIPE OR MONUENT
- UTILITY POLE
- WF–A10 P WETLAND FLAG AND ID
- TB–A10 TOP OF BANK FLAG AND ID
- EOP EDGE OF PAVEMENT
- (TYP) TYPICAL
- CPP CORRUGATED PLASTIC PIPE
- INV INVERT ELEVATION
- EL ELEVATION
- × 123.45 SPOT ELEVATION
- GRAVEL SURFACE
- CONCRETE SURFACE
- APPROXIMATE PFAS CONTAMINATION SOURCE

PROPOSED

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- 421 MINOR CONTOUR INTERVAL
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- EDGE OF GRAVEL
- TREELINE
- CHAIN LINK FENCE
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NOTES:

1. THIS PLAN IS SET TO MASSACHUSETTS STATE PLANE COORDINATED SYSTEM "MA83F" MAINLAND ZONE. ELECTRICAL RACKING SYSTEM AND MODULES DESIGNED TO TRUE NORTH.

0 20' 40' 80'
1" = 40' HORIZONTAL

NOT FOR CONSTRUCTION

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MELINDA COSTELLO
CIVIL
No. 52956
PROFESSIONAL ENGINEER

Melinda Costello 12/31/2025

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PERMITTING

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Drawing Title:

SITE LAYOUT AND GRADING PLAN

Sheet Number:

C105

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MATCH LINE INSET C106

MATCH LINE INSET C106

SEDIMENT FOREBAY (TYP) 4 C503

PROPERTY LINE IS LIMIT OF WORK

ABANDONED CARS (TYP.)

3 C501 EROSION CONTROL BLANKET (TYP)

±4° SEE NOTE 1

True North

State Plane Grid North

0 20' 40' 80'

1" = 40' HORIZONTAL

NOTES:

1. THIS PLAN IS SET TO MASSACHUSETTS STATE PLANE COORDINATED SYSTEM "MA83F" MAINLAND ZONE. ELECTRICAL RACKING SYSTEM AND MODULES DESIGNED TO TRUE NORTH.
2. TEMPORARY CONSTRUCTION GRAVEL TO BE REMOVED, SUBSURFACE SHALL BE SCARIFIED AND SEEDED PRIOR TO CONSTRUCTION COMPLETION.

100'

CHAIN LINK DOUBLE GATE CONTRACTOR INFORMATION SIGN 6, 7 C502

WELL HEAD SHALL BE ADJUSTED DURING CONSTRUCTION AS NEEDED TO MAINTAIN ACCESS.

5 C502 POST DRIVEN CHAIN LINK FENCE

MATCH LINE C103

STORMWATER INFILTRATION BASIN 1P 3 C503

RIPRAP SPILLWAY, RIPRAP APRON AT SPILLWAY 1, 2 C503

EROSION CONTROL BLANKET (TYP) 3 C501

50'

GRAVEL ACCESS ROAD 1 C502

BELOW GRADE CONDUIT 3 C502

CONTRACTOR LAYDOWN AREA

CONCRETE EQUIPMENT PAD (BY OTHERS) 4 C502

LOT 1 AREA
1707367 SF ±
39.2 ACRES ±

50' PROPERTY SETBACK

100' WETLAND BUFFER

MATCH LINE C104

MATCH LINE C105

NOT FOR CONSTRUCTION

LEGEND

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- APROXIMATE ADJOINING PROPERTY BOUNDARY
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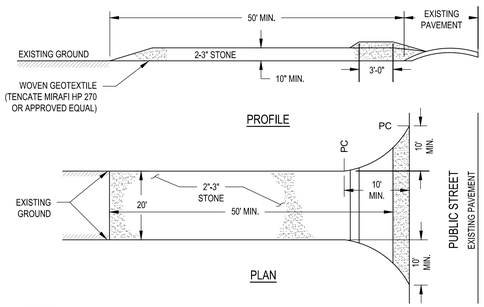
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SITE LAYOUT AND GRADING PLAN

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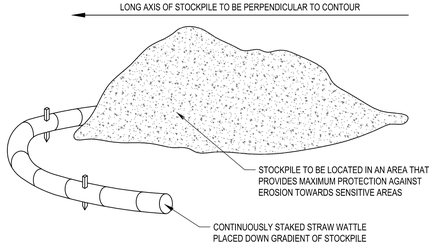


NOTES:

1. FILTER CLOTH - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
2. CONSTRUCTION MATERIAL PLACEMENT FOR EROSION AND SEDIMENT CONTROLS AND ANY MAINTENANCE THEREOF IS NOT TO BE COMPACTED.
3. 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.
4. 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 IMMEDIATELY.
5. 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.
6. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.
7. STONE SHALL BE REMOVED AT THE CONCLUSION OF PROJECT AND ACCUMULATED SEDIMENT DISPOSED OF IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL CODES AND REGULATIONS. REMOVAL OF STONE SHALL BE AT NO ADDITIONAL COST TO THE OWNER.

1 STABILIZED CONSTRUCTION EXIT

NOT TO SCALE

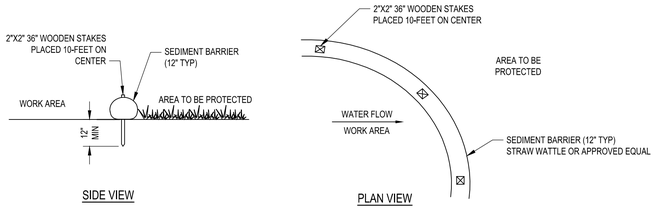


NOTES:

1. STOCKPILE AREAS SHALL BE LOCATED OUTSIDE OF NATURAL RESOURCE PROTECTION AREAS AND ASSOCIATED BUFFERS.

4 TEMPORARY STOCKPILE AREA

NOT TO SCALE

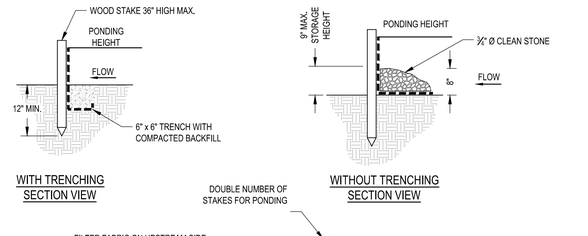


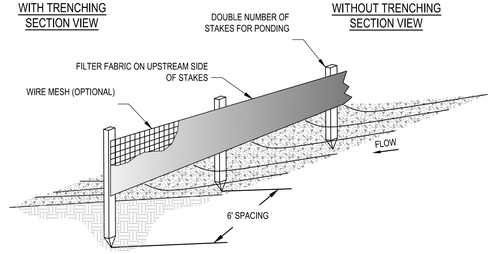
NOTES:

1. SEDIMENT BARRIER SHALL BE PLACED AS INTERMEDIATE SLOPE PROTECTION AND INSTALLED PARALLEL TO EXISTING GROUND CONTOURS.
2. SEDIMENT BARRIER SHALL NOT BE PLACED UP SLOPE, OR IN A MANNER THAT WILL CREATE CHANNELIZED FLOW.
3. SEDIMENT BARRIERS SHALL BE INSPECTED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AND IN ACCORDANCE WITH THE SITE EROSION AND SEDIMENTATION CONTROL PLAN.

7 STRAW WATTLE

NOT TO SCALE



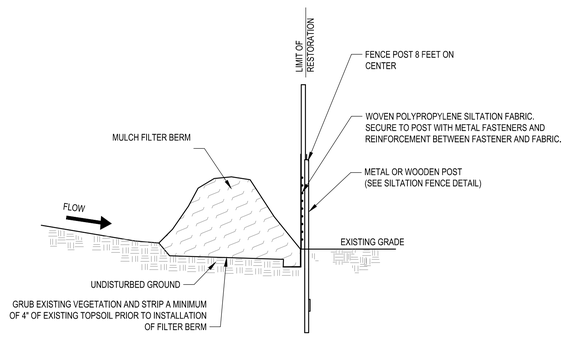


NOTES:

1. PREFABRICATED SILT FENCE MUST BE INSTALLED PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
2. THE FENCE SHALL BE ANCHORED TO RESIST PULL-OUT, AND BE STRETCHED TIGHTLY BETWEEN STAKES TO PREVENT SAGGING.
3. A 6-INCH WIDE AND 6-INCH DEEP TRENCH SHALL BE EXCAVATED UPGRADIENT OF THE FENCE LINE TO KEY THE "FLAP" OF THE FABRIC. THE TRENCH SHALL BE BACKFILLED AND COMPACTED.
4. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED BY WRAPPING END STAKES TOGETHER.
5. IN AREAS WHERE THE FLAP CANNOT BE KEYED PROPERLY (DUE TO FROZEN GROUND, BEDROCK, STONY SOIL, ROOTS NEAR A PROTECTED NATURAL RESOURCE, ETC.) THE SILT FENCE SHALL BE ANCHORED WITH AGGREGATE, CRUSHED STONE, EROSION CONTROL MIX, OR OTHER MATERIAL.

2 SILT FENCE

NOT TO SCALE

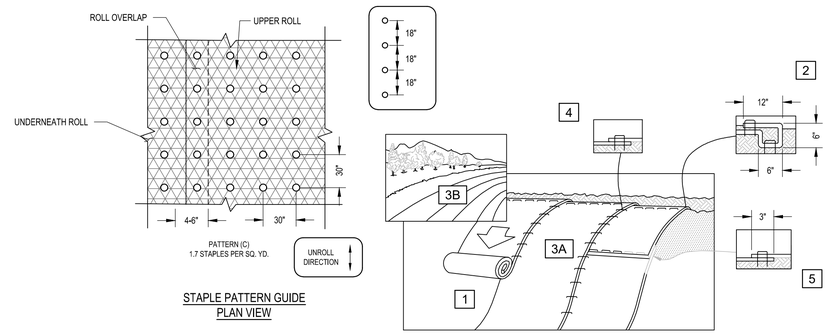


NOTES:

1. AUGMENTED SILT FENCE USING STRAW BALES SHALL BE USED AS ALTERNATIVE TO BERM AUGMENTED SILT FENCE WITH APPROVAL FROM ENGINEER.

5 BERM AUGMENTED SILT FENCE

NOT TO SCALE

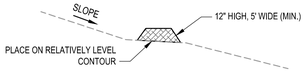


NOTES:

1. EROSION CONTROL BLANKET ECB SHALL BE NORTH AMERICAN GREEN BIONET SC150BN OR APPROVED EQUAL. ECB SHALL BE INSTALLED USING STAPLE PATTERN C IN ACCORDANCE WITH THE INSTALLATION DETAIL INCLUDED ON SHEET C501.
2. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS RECPS INCLUDING ANY NECESSARY APPLICATION OF LIME FERTILI ER AND SEED. GROUND SURFACE MUST BE FREE OF DEBRIS ROCKS CLAY CLODS AND RAKED SMOOTH SUFFICIENT TO ALLOW INTIMATE CONTACT OF THE RECP WITH THE SOIL OVER THE ENTIRETY OF THE INSTALLATION.
3. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECPS IN A 6" DEEP X 6" WIDE TRENCH. ANCHOR THE RECPS WITH A ROW OF STAPLES/STAKES/PINS SPACED AT 18" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING AND FOLD THE ROLL OVER DOWNSLOPE. SECURE RECPS OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES/PINS SPACED AT 18" APART ACROSS THE WIDTH OF THE RECPS.
4. ROLL THE RECPS A DOWN OR B HORI ONTALLY ACROSS THE SLOPE. WHEN LAYING RECPS HORI ONTAL A MAXIMUM OF TWO ROLL WIDTHS OR 16 FEET WHICHEVER IS LESS MAY BE APPLIED UP THE SLOPE. IF TWO ROLL WIDTHS OR 16 FT IS INSUFFICIENT TO COVER THE SLOPE MATERIAL SHALL BE PLACED VERTICALLY. RECPS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECPS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES/PINS IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. ROLLMAX RECPS AND ECBS SHOULD UTILI E STAPLE PATTERN C.
5. THE EDGES OF PARALLEL RECPS MUST BE STAPLED WITH APPROXIMATELY 4" - 6" OVERLAP.
6. CONSECUTIVE RECPS SPLICED DOWN THE SLOPE MUST OVERLAPPED WITH THE UPSTREAM MAT ATOP THE DOWNSTREAM MAT SHINGLE STYLE . THE OVERLAP SHOULD BE 4" - 6".
7. AT THE TERMINAL END SECURE EACH MAT ACROSS THE WIDTH WITH A ROW OF STAPLES/STAKES/PINS SPACED AT 18". IF EXPOSED TO FLOW FOOT TRAFFIC WIND UPLIFT OR OTHER DISRUPTION TRENCH THE TERMINAL END IN AS SHOWN IN DETAIL.
8. FASTENERS SHOULD PROVIDE A MINIMUM OF 20 LBS OF PULLOUT RESISTANCE. 6" X 1" 11 GAUGE STAPLES ARE TYPICALLY ADEQUATE. IN LOOSE SOILS LONGER STAPLES MAY BE NECESSARY TWIST PINS CAN PROVIDE THE GREATEST PULLOUT RESISTANCE. IN HARD OR ROCKY SOILS STRAIGHT PINS MAY BY USED WHERE STAPLES OR TWIST PINS ARE REFUSED PROVIDED THE MINIMUM PULLOUT REQUIREMENTS ARE MET.

3 EROSION CONTROL BLANKET

NOT TO SCALE



NOTES:

1. COMPOSITION OF BERM SHALL CONTAIN A WELL-GRADED MIXTURE OF PARTICLES SIZES AND MAY CONTAIN ROCKS LESS THAN 4" IN DIA. EROSION CONTROL MIX MUST BE FREE OF REFUSE, PHYSICAL CONTAMINANTS AND MATERIAL TOXIC TO PLANT GROWTH. THE MIX COMPOSITION SHALL MEET THE FOLLOWING STANDARDS:
   - ORGANIC MATTER CONTENT SHALL BE BETWEEN 80 AND 100% DRY WEIGHT BASIS.
   - PARTICLE SIZE BY WEIGHT SHALL BE 100% PASSING A 6" SCREEN AND A MIN. OF 70% MAX. OF 85%, PASSING A 0.75" SCREEN.
   - ORGANIC PORTION NEEDS TO BE FIBROUS AND ELONGATED.
   - LARGE PORTIONS OF SILTS, CLAYS OR FINE SANDS ARE NOT ACCEPTABLE IN THE MIX.
   - SOLUBLE SALTS CONTENT SHALL BE <4.0 MMHOS/CM.
   - PH SHOULD FALL BETWEEN 5.0 AND 8.0.

6 EROSION CONTROL MIX BERM

NOT TO SCALE

NOT FOR CONSTRUCTION

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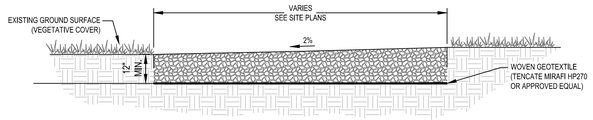
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Scale:	AS NOTED
Drawn By:	RJR
Reviewed By:	BMG
Approved By:	MRC
W&S Project No.:	ENG25-1122

Drawing Title:
SOIL EROSION AND SEDIMENTATION CONTROL DETAILS

Sheet Number:
C501

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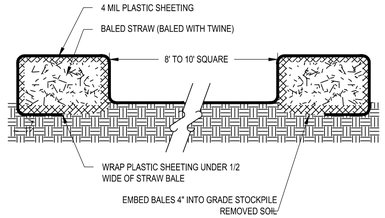


NOTES:

1. ACCESS ROAD TO BE CONSTRUCTED OF A MINIMUM 12" OF GRAVEL BORROW. SEE G002 FOR MATERIAL SPECIFICATIONS.
2. WOVEN GEOTEXTILE TO BE PLACED BETWEEN THE GROUND SURFACE AND THE GRAVEL BORROW.
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 WHERE AVAILABLE.

1 GRAVEL ACCESS ROAD

NOT TO SCALE

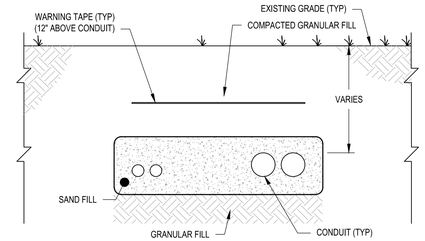


NOTES:

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.

2 CONCRETE WASHOUT BASIN

NOT TO SCALE

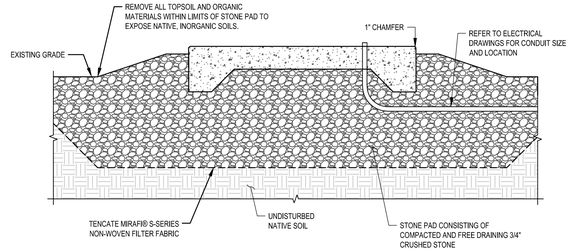


NOTES:

1. TRENCH SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. ELECTRICAL DESIGN AND CONFORMANCE WITH ELECTRICAL CODE REQUIREMENTS BY ELECTRICAL ENGINEER OF RECORD.
2. ALL SIDES OF CONDUITS SHALL HAVE A MINIMUM OF 6" OF SAND BEDDING OFFSET FROM ALL SIDES.
3. FINAL DESIGN TO BE PROVIDED IN ELECTRICAL ENGINEERING PLAN SET.

3 BELOW GRADE CONDUIT (TYP)

NOT TO SCALE

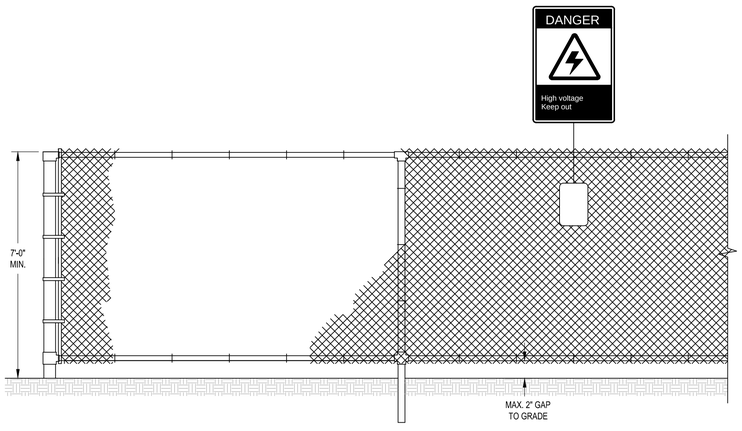


NOTES:

1. DETAIL SHOWN FOR ILLUSTRATIVE PURPOSES. FINAL EQUIPMENT PAD DESIGN TO BE PERFORMED BY OTHERS.

4 CONCRETE EQUIPMENT PAD SECTION (TYP)

NOT TO SCALE

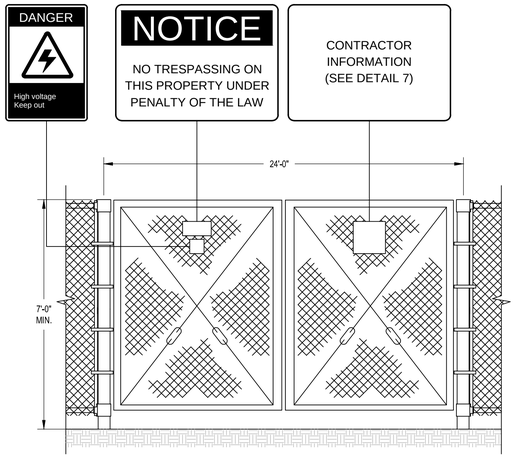


NOTES:

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 EQUIPMENT PADS 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 TRURO FIRE DEPARTMENT.
5. FENCE POST DESIGN BY OTHERS.

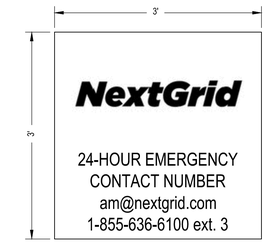
5 POST DRIVEN CHAIN LINK FENCE

NOT TO SCALE



6 CHAIN LINK DOUBLE GATE

NOT TO SCALE

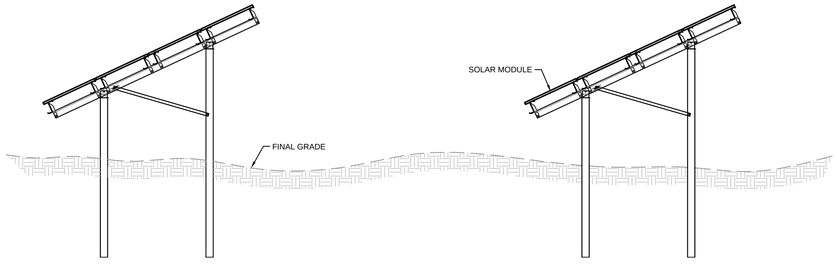


NOTE:

1. CONTRACTOR TO VERIFY EMERGENCY CONTACT INFORMATION.

7 CONTRACTOR INFORMATION SIGN

NOT TO SCALE



NOTE:

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

8 POST DRIVEN SOLAR RACKING SYSTEM

NOT TO SCALE

NOT FOR CONSTRUCTION

P:\Projects\eng\C502.dwg 12/30/2025 2:45:00pm RJR

Project:
PROPOSED SOLAR PV DEVELOPMENT
9 NOONS DRIVE, TRURO, MASSACHUSETTS 02652

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON

Client:
NextGrid
NEXTGRID PECAN, LLC
68 Harrison Ave, Suite 605, PMB 73069
Boston, MA 02111
tel: (855) 636-6100 www.Nextgrid.com

811 Know what's Below. Call before you dig.

No.	Description	Date
0	ISSUED FOR PERMITTING	12/31/25

Revisions

Seal:
COMMONWEALTH OF MASSACHUSETTS
MELINDA COSTELLO
CIVIL
No. 52956
PROFESSIONAL ENGINEER
12/31/2025

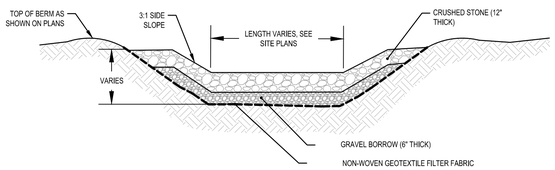
Issued For:
PERMITTING

Issued Date:	12/31/2025
Scale:	AS NOTED
Drawn By:	RJR
Reviewed By:	BMG
Approved By:	MRC
W&S Project No.:	ENG25-1122

Drawing Title:
CIVIL DETAILS

Sheet Number:
C502

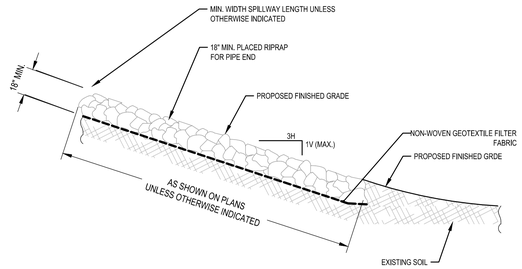
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BASIN SPILLWAY				
BASIN ID	ELEVATION	LENGTH (FT)	WIDTH (FT)	MULTIPLIER
1P	37.50	10.0	18.0	1
2P	52.50	10.0	11.0	1

1 RIPRAP SPILLWAY

NOT TO SCALE

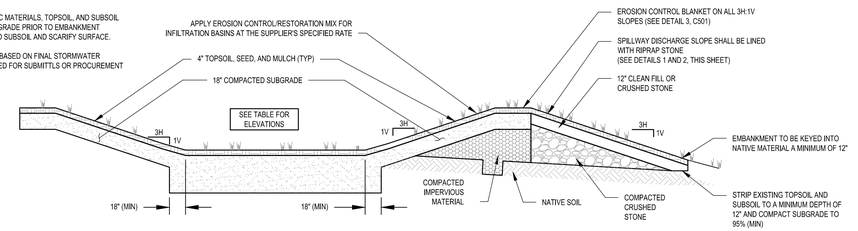


2 RIPRAP APRON AT SPILLWAY

NOT TO SCALE

NOTES:

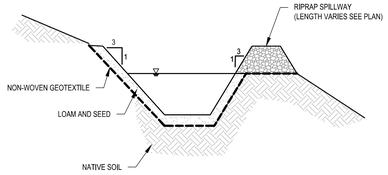
1. REMOVE VEGETATION, DEBRIS, ORGANIC MATERIALS, TOPSOIL, AND SUBSOIL TO A MINIMUM OF 12" BELOW EXISTING GRADE PRIOR TO EMBANKMENT CONSTRUCTION. COMPACTED EXPOSED SUBSOIL AND SCARIFY SURFACE.
2. ELEVATIONS ARE SUBJECT TO CHANGE BASED ON FINAL STORMWATER DESIGN. ELEVATIONS SHALL NOT BE USED FOR SUBMITTLS OR PROCUREMENT ITEMS.



STORMWATER BASIN			
BASIN ID	BOTTOM (ELEV FT)	TOP OF BERM (ELEV FT)	SPILLWAY (ELEV FT)
1P	35.00	38.00	37.50
2P	51.00	53.00	52.50

3 STORMWATER INFILTRATION BASIN

NOT TO SCALE



4 SEDIMENT FOREBAY

NOT TO SCALE

NOT FOR CONSTRUCTION

Project:

PROPOSED SOLAR PV DEVELOPMENT

9 NOONS DRIVE, TRURO, MASSACHUSETTS 02652

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
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No.	Description	Date
0	ISSUED FOR PERMITTING	12/31/25

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Seal:

COMMONWEALTH OF MASSACHUSETTS
MELINDA COSTELLO
CIVIL
No. 52956
PROFESSIONAL ENGINEER
12/31/2025

Issued For:

PERMITTING

Issued Date:	12/31/2025
Scale:	AS NOTED
Drawn By:	RJR
Reviewed By:	BMG
Approved By:	MRC
W&S Project No.:	ENG25-1122

Drawing Title:

CIVIL DETAILS

Sheet Number:

C503

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P:\Projects\eng\25-1122\civil_mep\1-plan\1-0 Survey Sheets\Boundary\03 Sheets\C503 Civil Details.dwg

Appendix D – Stormwater Report

Weston & Sampson SM

westonandsampson.com

55 Walkers Brook Drive, Suite 100
Reading, MA 01867
tel: 978.532.1900

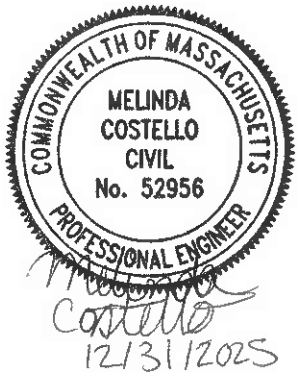
REPORT

December 2025

Truro Solar Photovoltaic Development

2 Sand Pit Road and 9 Noons Drive
Map 39, Lot 107 and Map 39, Lot 108
Truro, Massachusetts

Stormwater Report



STORMWATER REPORT

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Attachment D - Drainage Area Maps & HydroCAD Reports

Attachment E - Supporting Calculations

Attachment F - Long Term Pollution Prevention Plan

Attachment G - Stormwater Operation & Maintenance Plan

Attachment H - Critical Areas Map

Attachment I - Construction Period Pollution and Erosion and Sedimentation Control Plan

Attachment J - Illicit Discharge Statement

STORMWATER REPORT

Applicant/Project Name: NextGrid Pecan LLC
Truro Solar Photovoltaic Development

Project Location: 2 Sand Pit Road and 9 Noons Drive, Truro MA 02659

Application Prepared by:
Firm: Weston & Sampson Engineers, Inc.
Registered PE: Melinda Costello, P.E.

General

The proposed project is located at 2 Sand Pit Road (Map 39, Lot 107) and 9 Noons Drive (Map 39, Lot 108) in Truro, Massachusetts. The two lots have areas of approximately 38.7 acres and 17.2 acres, respectively, and are both owned by the Estate of Donald W. Noons. The project site currently exists as a sand and gravel pit.

The property is bounded by wooded areas and commercial buildings to the east, wooded area with residences to the north and south, and wooded areas, residences, and a pond to the west. A Locus Map is included in **Attachment A**.

The project is located in the Residential Zoning District. A wetland delineation was performed by LEC Environmental Consultants, Inc. on October 22, 2025, to identify the presence or absence of on-site and abutting Wetland Resource Areas protected under the Massachusetts Wetland Protection Act and Regulations (310 CMR 10.00) and the Truro Conservation Bylaw (Chapter VIII of the General By-Laws) and Truro Conservation Regulations. Two isolated wetlands have been identified: one along the western edge of Map 39, Lot 107 and one to the west of the property boundary of Map 39, Lot 107. Bordering vegetated wetlands have been identified to the west of the site. Proper setbacks from existing wetlands are maintained and no disturbance to wetlands or wetland buffers is proposed. A copy of the wetland delineation memo is included in **Attachment B**.

Project Description

The project proposes a ground mounted solar photovoltaic (PV) system with a capacity of approximately 7.68 megawatts (MW) direct current (DC) with associated battery energy storage (BESS) Access to the site is proposed via a proposed access road connecting to an existing access road off of Noons Drive. The solar array will be surrounded by a 7-foot tall chain link fence with access gates. The electricity generated by the PV modules is proposed to be exported to the electric grid in accordance with the utility's interconnection standards and regulations.

The total limit of work is approximately 29.2 acres consisting of the array area, tree clearing, stormwater management features, equipment pads, access road, fence, utility poles, underground electric conduits, and overhead wires. The total solar array footprint within the fence area is approximately 24.7 acres.

Site-wide grading is proposed for the PV array and stormwater management features. The area within the array footprint that currently exists as sand and gravel is proposed to be seeded with a grass mix to promote vegetation. Stormwater management, as discussed further below, is proposed via two vegetated infiltration basins, with pretreatment sediment forebays.

Stormwater Analysis

Pre- and post-development peak design flows were assessed using the United States Department of Agriculture National Resources Conservation Service (USDA NRCS) Technical Release 20 (TR-20) methodology. HydroCAD® version 10.20-5c stormwater modeling software was used to analyze and compare pre- and post-development stormwater conditions for the 2-, 10-, 50-, and 100-year 24-hour storm

events. It is a comprehensive hydrodynamic modeling program used to analyze systems such as, but not limited to, site hydrology, water conveyance infrastructure, and stormwater management systems.

According to the NRCS Web Soil Survey online soil mapping data, the site is comprised of soles of hydrologic soil group (HSG) A soils (Carver Coarse Sand and Sand and Gravel Pits). NRCS Web Soil Survey maps and reports for hydrologic soil group, depth to bedrock, and depth to water table are included in Attachment C. The land coverage curve number (CN) represents water retention and runoff capabilities of soil based on HSG and ground cover. CN for most land coverages is provided within the HydroCAD® software, however, sand is not. Therefore, the CN was calculated for the sand area. The CN calculation is provided in Attachment C.

The site is not located within any FEMA flood hazard zones. The FEMA FIRM map for the project site is included in Attachment C.

Rainfall data is referenced from NOAA Atlas 14, Volume 10, Version 3 for Truro, MA and is included in Attachment C.

A summary of the analysis is provided below. The full HydroCAD® reports for pre- and post-development conditions with associated drainage area maps are included in Attachment D.

Existing Hydrology

Under pre-development conditions, the site's topography as a sand and gravel pit consists of inconsistent soil piles and depressions, with all topography generally sloping from east to west across the site. The two low points include an isolated wetland to the northwest of the property and a bordering vegetated wetland to the west of the property. The southern portion of the site contains a pond-like depression that allows water to be retained and infiltrated on site.

The interior lot line between 2 Sand Pit Road and 9 Noons Drive, is proposed to be moved to allow for the proposed solar PV development to be located on it's own parcel. The stormwater analysis for this project was modeled using the proposed lot line referenced in an Approval Not Required Plan Dated December 10, 2025, prepared by SGC Engineering, LLC and a ridgeline on the southern portion of the site. All runoff flows via overland flow and no established channelization (i.e. swales either natural or manmade) was evident at the time this analysis was completed.

Based on the above site topography, the following point of analyses (POA) and drainage areas were analyzed. Figure 1 of Attachment D displays the limits of the pre-development conditions drainage area, time of concentration flow path, and existing land coverage.

- POA-1 – Isolated Wetland
- POA-2 – Bordering Vegetated Wetland
- POA-3 – Retained Onsite
- Drainage Area E-1 – Northwestern tip of the site draining toward the isolated wetland.
- Drainage Area E-2A – Large area in the center of the site containing one existing pond, draining west.
- Drainage Area E-2B – Center portion of site, draining toward the bordering vegetated wetland.
- Drainage Area E-3 – Southern portion of the site containing one existing pond, retaining water onsite.

Proposed Hydrology

Under post-development conditions, the site is proposed to be seeded within the array area and to have a more consistent slope from east to west across the site. There will be an increase in grass coverage, and a

decrease in woods, gravel, and sand coverage. There will also be an increase in impervious coverage due to the equipment pad and array racking posts.

The proposed stormwater management system consists of two vegetated infiltration basins with vegetated sediment forebays with one located in the northern corner of the site (basin 1P) and the other located toward the southwest corner of the site (basin 2P). The stormwater management system has been designed to reduce peak-flow runoff rate of the site area from pre- to post-development conditions. See Table 3 in Section 2 below for more information.

Figure 2 of Attachment D displays the limits of the post-development conditions drainage areas, time of concentration flow paths, and proposed land coverage. A description of the post-development point of analysis and drainage areas are included below.

- POA-1 – Isolated Wetland (same as pre-development conditions)
- POA-2 – Bordering Vegetated Wetland (same as pre-development conditions)
- Drainage Area P-1 – Northwestern tip of the site draining towards the isolated wetland.
- Drainage Area P-2A – Large northeastern portion of the site, draining towards infiltration basin 1P.
- Drainage Area P-2B – Western portion of the site, draining towards infiltration basin 2P.
- Drainage Area P-2C – Western portion of the site, draining toward the bordering vegetated wetland.

Test pits excavations have not been performed at the time this analysis was completed. Therefore, seasonal high ground water has not been confirmed. However, NRCS Web Soil Survey mapping data shows that there is greater than 6.5 feet to the water table. The proposed separation to groundwater from the bottom of the infiltration basins is greater than 4 feet.

Massachusetts Stormwater Management Standards

Below is a summary of the proposed stormwater management system's compliance with the Massachusetts Stormwater Management Standards 1-10.

Standard 1: No New Untreated Discharges

The proposed project is a new development. Compared to pre-development conditions, the post-development conditions have an increase in impervious coverage due to the proposed equipment pad and solar racking system support posts. The post-development conditions has an increase in grassed area and a decrease in sand and gravel area due to seeding within the array area. The site's overall curve number (CN) decreases from pre- to post-development conditions, therefore, no new untreated discharges area created. A summary of the discharge velocity from the site in included in Attachment E. The two infiltration basins are designed to mitigate the runoff from drainage areas P-1A and P-1B and propose no discharges from the basins for the 2-year, 24-hour storm; therefore, these areas are not included in the velocity summary table.

Standard 2: Peak Rate Attenuation

As shown in Tables 3 and 4 below, there is a net decrease in both peak flow runoff rate (cubic feet per second – cfs) and runoff discharge volume (acre feet – af) for all design storms due to the implementation of the stormwater management system for POA-2. POA-1 experiences a slight increase in peak discharge and volume due to tree clearing and grading, however, the amount is negligible. POA-3 is fully retained onsite in pre-development conditions, however, because of grading changes, this POA does not exist in post development conditions. The pre-development drainage area draining to POA-3 drains to POA-2 in post-development conditions and is mitigated by infiltration basin 2P.

Table 3 – Stormwater Peak Flow Rate Comparison

Point of Analysis	24 Hr Storm	Peak Discharge (cfs)		*Difference in Peak Runoff Rate (cfs)
		Pre-	Post-	
POA-1	2yr	0.0	0.0	0.0
	10yr	0.0	0.2	0.1
	50yr	0.1	0.7	0.6
	100yr	0.3	1.0	0.8
POA-2	2yr	0.9	0.0	-0.9
	10yr	6.9	0.1	-6.8
	50yr	18.3	0.6	-17.8
	100yr	24.5	1.2	-23.4
POA-3	2yr	0.4	0.0	-0.4
	10yr	2.0	0.0	-2.0
	50yr	4.5	0.0	-4.5
	100yr	5.9	0.0	-5.9

*Difference in peak runoff rates calculated based on HydroCAD® output values, then rounded to the nearest tenth.

Table 4 – Stormwater Runoff Discharge Volume Comparison

Point of Analysis	24 Hr Storm	Runoff Volume (af)		*Difference in Runoff Volume (af)
		Pre-	Post-	
POA-1	2yr	0.0	0.0	0.0
	10yr	0.0	0.0	0.0
	50yr	0.0	0.1	0.0
	100yr	0.0	0.1	0.0
POA-2	2yr	0.3	0.0	-0.3
	10yr	1.1	0.0	-1.0
	50yr	2.2	0.2	-2.1*
	100yr	2.9	0.3	-2.6
POA-3	2yr	0.1	0.0	-0.1
	10yr	0.3	0.0	-0.3
	50yr	0.6	0.0	-0.6
	100yr	0.8	0.0	-0.8

*Difference in runoff volumes calculated based on HydroCAD® output values, then rounded to the nearest tenth.

Standard 3: Recharge

Recharge calculations and drawdown times have been completed for each infiltration basin. Both basins are proposed within HSG-A soils with an NRCS map unit name of Carver Coarse Sand and Sand and Gravel Pits. Based on the MassDEP Stormwater Handbook Volume 3 Chapter 1 Table 2.3.3, the Rawls Rate for this soil type is 8.27 inches per hour (in/hr). As each basin is designed to exfiltrate to groundwater, the lowest outlet elevation used for the drawdown time calculations is the spillway from the sediment forebay into the basin, for each basin. The spillway is proposed at an elevation of 37.0-feet for basin 1P and 52 feet for basin 2P.

The drawdown time for basin 1P is 14.9 hours and the drawdown time for basin 2P is 1.5 hours. Both are lower than the 72-hour limit set by the MassDEP, therefore, the MassDEP groundwater recharge requirement is met.

Refer to **Attachment E** for recharge calculations.

Standard 4: Water Quality

Added impervious area for the project includes the equipment pads and solar array racking posts, and in accordance with the Massachusetts Stormwater Handbook Volume 3.1, these features do not qualify as impervious coverage requiring treatment. Therefore, the water quality volume and the total suspended solids (TSS) removal calculations are not required for this project. However, TSS calculations for the infiltration basins have been provided and are included in **Attachment E**.

Source control and pollution prevention measures are identified in the Long Term Pollution Prevention Plan (**Attachment F**) and best management practices (BMPs) will be maintained in accordance with the site-specific Stormwater Operation and Maintenance Plan (**Attachment G**).

Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs)

Not Applicable. There are no LUHPPLs in the work area.

Standard 6: Critical Areas

Not Applicable. There will be no new discharges to critical areas. There is a Zone II located in the northeast corner of the proposed limit of work, however, the topography of the site does not direct discharge to the Zone II. There are also Zone Is to the northwest of the project area. The Critical Area Map included in **Appendix H** shows the location of the Zone Is and Zone IIs.

Standard 7: Redevelopments and Other Projects Subject to the Standards Only to the Maximum Extent Practicable

Not applicable. This project is not a redevelopment project.

Standard 8: Construction Period Pollution Prevention and Erosion and Sediment Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan is included in **Attachment I**. To ensure that the work incorporates the performance standards recommended in MassDEP's Stormwater Management Policy, necessary erosion and sedimentation control measures will be utilized during construction as shown on the site plans.

The project will be covered under the National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP). A Notice of Intent and Stormwater Pollution Prevention Plan (SWPPP) will be prepared and submitted prior to land disturbance.

Standard 9: Operation and Maintenance Plan

A Stormwater Operation and Maintenance Plan for the proposed stormwater management system is provided with this report in **Attachment G**. The two infiltration basins will be maintained during and following construction in accordance with this plan.

Standard 10: Prohibition of Illicit Discharges

There will be no illicit discharges associated with the project. An Illicit Discharge Compliance Statement is included in Attachment J.

Attachment A - Locus Map



Legend

Proposed Solar PV Development Area

FIGURE 1

PORTION OF 2 SAND PIT ROAD / 9 NOONS DRIVE
TRURO, MASSACHUSETTS

LOCUS MAP

0 0.25 0.5 1 1.5 Miles

Weston & Sampson

Path: \\wse03.local\WSE\Projects\Private\NextGrid Inc\Truro, MA\2 Sand Pit - 9 Noons Drive\08-GIS\Phase_I_ESA\Phase_I_ESA.aprx **User:** Li.Esther **Saved:** 11/24/2025 1:29 PM **Opened:** 11/24/2025 1:35 PM

Attachment B - Wetland Delineation Memo

LEC WETLANDS WILDLIFE WATERWAYS

November 7, 2025

Email [Costello.melinda@wseinc.com]

Ms. Melinda Costello
Weston & Sampson
55 Walkers Brook Drive, Suite 100
Reading, MA 01887

Re: Wetland Resource Area Analysis [LEC File #: WS\25-424.01]
2 Sand Pit Road and 9 Noons Drive
Map 39, Parcels 107 and 108
Truro, Massachusetts

Dear Ms. Costello:

LEC Environmental Consultants, Inc., (LEC) conducted a site evaluation on October 22, 2025, to identify the presence or absence of on-site and abutting Wetland Resource Areas protected under the *Massachusetts Wetlands Protection Act* and *Regulations* (310 CMR 10.00) and the *Truro Conservation Bylaw* (Chapter VIII of the General By-Laws) and *Truro Conservation Regulations*.

LEC identified one (1) Isolated Wetland protected under the *Truro Conservation Bylaw* located on-site. Buffer Zone from off-site protectable Bordering Vegetated Wetlands (BVW) and a potential Isolated Wetland also extend onto the project site. The following provides a summary of these Resource Areas as depicted on the accompanying aerial orthophoto map (**Attachment A**).

Existing Conditions

The 56± acre site, comprised of two subject parcels, is occupied by a sand and gravel pit occurring west of Route 6, accessed off Noons Heights Road (**Attachment A**). Portions of the site are utilized for various commercial/industrial uses, including the storage/stockpile and/or sale of yard (organic) waste, soils, stone, shells, mulch, etc. The site is surrounded by residential development to the north and south with commercial development along Route 6 abutting to the east. Great Swamp is located west of the site and Cormorant Road, a subdivision roadway within the Shearwater residential neighborhood.

The site has been subject to past site excavation associated with the sand and gravel pit operation and generally contains rolling topography that primarily descends to the northwest. Under existing conditions, the only intact, naturally vegetated forested upland is limited to the outer perimeter of the site. Open, exposed areas within the interior contain variable, interstitial pockets of vegetation which have become established in the disturbed landscape, most notably occupied by black locust(*Robinia pseudoacacia*), autumn olive (*Elaeagnus umbellata*), multiflora rose (*Rosa multiflora*), bush honeysuckle

(*Lonicera* sp.), staghorn sumac (*Rhus typhina*), and Japanese knotweed (*Fallopia japonica*). These species occur around the perimeter of more recently disturbed areas along with pitch pine (*Pinus rigida*), black cherry (*Prunus serotina*), bayberry (*Myrica pensylvanica*), sweet fern (*Comptonia peregrina*), Pennsylvania sedge (*Carex pensylvanica*), little bluestem (*Schizachyrium scoparium*), wavy hairgrass (*Deschampsia flexuosa*), poison ivy (*Toxicodendron radicans*), dewberry (*Rubus flagellaris*), bearberry (*Arctostaphylos uva-ursi*), wild indigo (*Baptisia tinctoria*), false heather (*Hudsonia tomentosa*), and entanglements of Asiatic bittersweet (*Celastrus orbiculata*) and Japanese honeysuckle (*Lonicera japonica*).

Naturally vegetated forested upland around portions of the site perimeter is dominated by pitch pine with scattered black oak (*Quercus velutina*), scrub oak (*Quercus ilicifolia*), bayberry, and black huckleberry (*Gaylussacia baccata*) with the groundcover species listed above.

Floodplain Designation

According to the July 16, 2014 FEMA Flood Insurance Rate Map (FIRM) for Barnstable County (Map Number 25001C0139J), the site is located within Zone X, *Areas determined to be outside the 0.2% annual chance floodplain* (**Attachment B**).

Natural Heritage and Endangered Species Program Designation

According to the 15th Edition (effective August 1, 2021) of the *Massachusetts Natural Heritage Atlas* published by the Natural Heritage & Endangered Species Program (NHESP), the site is not located within a *Priority Habitat of Rare Species* and *Estimated Habitat of Rare Wildlife* (**Attachment A**).

MassGIS NHESP datalayers also confirm that no Certified Vernal Pools or Potential Vernal Pools are identified on or immediately abutting the site. The closest Certified Vernal Pool (CVP #7896) is located greater than 425 feet northwest of the site.

Wetlands

As depicted on the Aerial Orthophoto Map (**Attachment A**), an Isolated Wetland is present within the northwesterly portion of the subject parcel, representing the lowest topographic point on-site. The Isolated Wetland is approximately 960± square feet in size.

Based on Town of Truro GIS, an Isolated Wetland is located off-site on property having an address of 24 Turnstone Road (Map 39, Parcel 113), abutting to the north. The presence of the Isolated Wetland is corroborated by MassGIS topography (1-ft. Contours) and observations from the project site. The approximated boundary to the off-site Isolated Wetland is depicted on the Aerial Orthophoto Map (**Attachment A**).

Isolated Wetlands are protected under the *Truro Conservation Bylaw* and are defined under the *Truro Conservation Regulations* as *freshwater wetlands and may include wet meadows, marshes, swamps, bogs and vernal pools which do not border on any creek, river, stream, pond or lake. Isolated wetlands are areas where the soils are saturated and/or inundated such that they support a preponderance of wetland indicator plants, hydric soils or other indicators of hydrology.*

The on-site Isolated Wetland was demarcated in accordance with the *Truro Conservation Bylaw* and *Truro Conservation Regulations*, implementing principles stated within the *Massachusetts Handbook for Delineation of Bordering Vegetated Wetlands* (Second Edition, September 2022) and *Field Indicators for Identifying Hydric Soils in New England* (Version 4, June 2020). The IVW flags A1-A9 were GPS-located by LEC on October 30, 2025, as depicted on the aerial orthophoto map (**Attachment A**). Supporting Field Data Forms accompany this report (**Attachment C**).

The on-site IVW was observed to be saturated to the surface (following a rain event) and contained hydric (wetland) soils. Wetland vegetation consisting of sensitive fern (*Onoclea sensibilis*), meadowsweet (*Spirea alba*), and gypsywort (*Lycopus europaeus*) was observed in the interior, surrounded by a dense thicket of privet (*Ligustrum*), bush honeysuckle, multiflora rose, and Asiatic bittersweet entanglements. The IVW appears to be supported by groundwater and minimal surface runoff. Based on water marks, the IVW may hold a few inches of standing water (0-4± inches) following rain events and/or during the spring hydroperiod.

The on-site IVW does not appear to function as an Isolated Land Subject to Flooding (ILSF) under 310 CMR 10.57 (i.e., *an area which at least once a year confines standing water to a volume of at least ¼ acre-feet and to an average depth of at least six inches*) based on its small size and the presence of minimal standing water. The *Truro Conservation Regulations* do not separately define ILSF. As a result, the on-site IVW is not an Area Subject to Protection under the *Massachusetts Wetlands Protection Act* and *Regulations* (310 CMR 10.00).

A BVW is located off-site to the west of Cormorant Road, a subdivision roadway within the Shearwater residential neighborhood. The BVW is dominated by a cattail (*Typha latifolia*) marsh with two open water areas (approximately 9½± acre and ½± acre, respectively), identified locally as Great Swamp or Great Swamp Pond. The approximated boundary to the off-site BVW is depicted on the aerial orthophoto map (**Attachment A**). The BVW is protected under the *Massachusetts Wetlands Protection Act* and *Regulations* (310 CMR 10.00) and the *Truro Conservation Bylaw* (Chapter VIII of the General By-Laws) and *Truro Conservation Regulations*.

The 100-foot Buffer Zone to the on-site Isolated Wetland and approximated off-site BVW and Isolated Wetland are depicted on the aerial orthophoto map (**Attachment A**).

Summary

LEC identified one (1) on-site Isolated Wetland protected under the *Truro Conservation Bylaw* and *Truro Conservation Regulations*, while Buffer Zone from off-site protectable Bordering Vegetated Wetlands (BVW) and a potential off-site Isolated Wetland also extend onto the project site. Isolated Wetlands are protected under the *Truro Conservation Bylaw* and *Truro Conservation Regulations* and BVW is protected under the *Massachusetts Wetlands Protection Act* and *Regulations* (310 CMR 10.00) and the *Truro Conservation Bylaw* and *Truro Conservation Regulations*.

Any work proposed within the 100-foot Buffer Zone to these Resource Areas will require filing for the appropriate permits with the Town of Truro Conservation Commission and/or the Massachusetts Department of Environmental Protection.

If you have any questions or require additional information, please do not hesitate to contact me at bmadden@lecenvironmental.com.

Sincerely,

LEC Environmental Consultants, Inc.

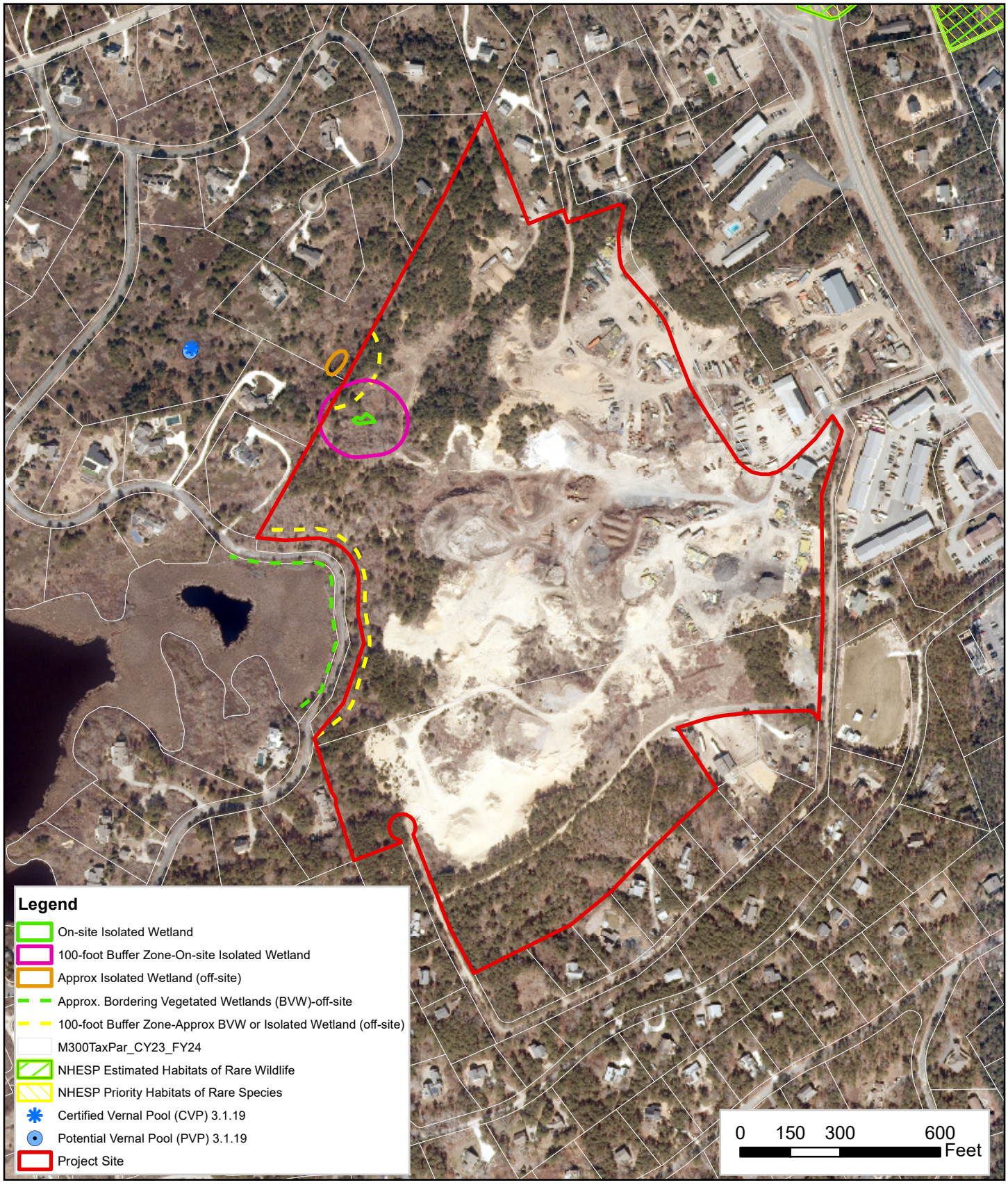


Brian T. Madden
Senior Wildlife/Wetland Scientist

Attachments

Attachment A

Aerial Orthophoto Map



LEC Environmental Consultants, Inc.
Plymouth, MA
508.746.9491
www.lecenvironmental.com

Aerial Orthophoto Map

2 Sand Pit Road & 9 Noons Drive
Truro, Massachusetts

N

November 3, 2025

Attachment B

FEMA Flood Insurance Rate Map



July 16, 2014 FEMA Flood Insurance Rate Map (FIRM) for Barnstable County (Map Number 25001C0139J

Attachment C

Bordering Vegetated Wetland Determination Forms

BORDERING VEGETATED WETLAND DETERMINATION FORM

Project/Site: 2 Sand Pit Road and 9 Noons Drive City/Town: Truro Sampling Date: 10/30/2025

Applicant/Owner: Weston & Sampson Sampling Point or Zone: A2 Upgradient 4'

Investigator(s): Nate Goshgarian w/LEC Environmental Consultants, Inc. Latitude / Longitude: 42.023708, -70.081673

Soil Map Unit Name: Carver coarse sand, 3 to 8 percent slopes NWI or DEP Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks)

Are Vegetation [ ], Soil [ ], or Hydrology [ ] significantly disturbed? (If yes, explain in Remarks)

Are Vegetation [ ], Soil [ ], or Hydrology [ ] naturally problematic? (If yes, explain in Remarks)

SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.

Wetland vegetation criterion met?	Yes [ ]	No [✓]	**Is the Sampled Area within a Wetland?** Yes [ ] No [✓]
Hydric Soils criterion met?	Yes [ ]	No [✓]	
Wetlands hydrology present?	Yes [ ]	No [✓]	

Remarks, Photo Details, Flagging, etc.:

HYDROLOGY

Field Observations:			
Surface Water Present?	Yes [ ]	No [✓]	Depth (inches)_____
Water Table Present?	Yes [ ]	No [✓]	Depth (inches)_____
Saturation Present (including capillary fringe)?	Yes [ ]	No [✓]	Depth (inches)_____

Wetland Hydrology Indicators

Reliable Indicators of Wetlands Hydrology	Indicators that can be Reliable with Proper Interpretation	Indicators of the Influence of Water
[ ] Water-stained leaves	[ ] Hydrological records	[ ] Direct observation of inundation
[ ] Evidence of aquatic fauna	[ ] Free water in a soil test hole	[ ] Drainage patterns
[ ] Iron deposits	[ ] Saturated soil	[ ] Drift lines
[ ] Algal mats or crusts	[ ] Water marks	[ ] Scoured areas
[ ] Oxidized rhizospheres/pore linings	[ ] Moss trim lines	[ ] Sediment deposits
[ ] Thin muck surfaces	[ ] Presence of reduced iron	[ ] Surface soil cracks
[ ] Plants with air-filled tissue (aerenchyma)	[ ] Woody plants with adventitious roots	[ ] Sparsely vegetated concave surface
[ ] Plants with polymorphic leaves	[ ] Trees with shallow root systems	[ ] Microtopographic relief
[ ] Plants with floating leaves	[ ] Woody plants with enlarged lenticels	[ ] Geographic position (depression, toe of slope, fringing lowland
[ ] Hydrogen sulfide odor		

Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

Form Revised July 2023

VEGETATION – Use both common and scientific names of plants.

Tree Stratum Plot size 30' radius

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. Norway maple	Acer platanoides	UPL	68.0	Yes	No
2. Eastern red cedar	Juniperus virginiana	FACU	10.5	No	
3.					
4.					
5.					
6.					
7.					
8.					
9.					

78.5 = Total Cover

Shrub/Sapling Stratum Plot size 15' radius

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. Japanese honeysuckle	Lonicera japonica	FACU	38.0	Yes	No
2. Japanese Knotweed	Reynoutria japonica	FACU	20.5	Yes	No
3. European privet	Ligustrum vulgare	FACU	10.5	No	
4. Black cherry	Prunus serotina	FACU	10.5	No	
5.					
6.					
7.					
8.					
9.					

79.5 = Total Cover

Herb Stratum Plot size 5' radius

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. Garlic mustard	Alliaria petiolata	FACU	10.5	Yes	No
2. European privet	Ligustrum vulgare	FACU	3.0	Yes	No
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

13.5 = Total Cover

VEGETATION – continued.

Woody Vine Stratum	Plot size 30' radius				
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. Asiatic bittersweet	Celastrus orbiculatus	UPL	10.5	Yes	No
2.					
3.					
4.					
			10.5 = Total Cover		

Rapid Test: Do all dominant species have an indicator status of OBL or FACW?				Yes ☐ No ☐
Dominance Test:	Number of dominant species	Number of dominant species that are wetland indicator plants		Do wetland indicator plants make up ≥ 50% of dominant plant species?
	6	0		Yes ☐ No ☑
Prevalence Index:		Total % Cover (all strata)	Multiply by:	Result
	OBL species		X 1	= 0.00
	FACW species		X 2	= 0.00
	FAC species		X 3	= 0.00
	FACU species		X 4	= 0.00
	UPL species		X 5	= 0.00
	Column Totals	(A) 0		(B) 0
Prevalence Index		B/A = 0.00		Is the Prevalence Index ≤ 3.0? Yes ☐ No ☐
Wetland vegetation criterion met?		**Yes** ☐ **No** ☑		

Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub / Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

Cover Ranges	
Range	Midpoint
1-5 %	3.0 %
6-15 %	10.5 %
15-25 %	20.5 %
26-50 %	38.0 %
51-75 %	63.0 %
76-95 %	85.5 %
96-100 %	98.0 %

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Location[2]		
0-14	10YR 3/3	100.00					FSL	^HTM/Fill
14-20	10YR 2/1						VFSL	Ab1-horizon
20-24	10YR 2/1	95.00	10YR 3/4	5.00	C	PL	VFSL	Ab2-horizon

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators (Check all that apply)		**Indicators for Problematic Hydric Soils**
☐ Histosol (A1)	☐ Polyvalue Below Surface (S8)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Thin Dark Surface (S9)	☐ 5 cm Mucky Peat or Peat (S3)
☐ Black Histic (A3)	☐ Loamy Gleyed Matrix (F2)	☐ Iron-Manganese Masses (F12)
☐ Hydrogen Sulfide (A4)	☐ Depleted Matrix (F3)	☐ Mesic Spodic (A17)
☐ Stratified Layers (A5)	☐ Redox Dark Surface (F6)	☐ Red Parent Material (F21)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Dark Surface (F7)	☐ Very Shallow Dark Surface (F22)
☐ Thick Dark Surface (A12)	☐ Redox Depressions (F8)	
☐ Sandy Mucky Mineral (S1)		
☐ Sandy Gleyed Matrix (S4)		
☐ Sandy Redox (S5)		☐ Other (Include Explanation in Remarks)
☐ Stripped Matrix (S6)		
☐ Dark Surface (S7)		

Restrictive Layer (if observed) Type: _____ Depth (inches): _____

Remarks: No saturation, no H20 in entire soil profile.

Hydric Soils criterion met? **Yes** ☐ **No** ☑

BORDERING VEGETATED WETLAND DETERMINATION FORM

Project/Site: 2 Sand Pit Road and 9 Noons Drive City/Town: Truro Sampling Date: 10/30/2025

Applicant/Owner: Weston & Sampson Sampling Point or Zone: A2 Downgradient 4'

Investigator(s): Nate Goshgarian w/LEC Environmental Consultants, Inc. Latitude / Longitude: 42.023708, -70.081673

Soil Map Unit Name: Carver coarse sand, 3 to 8 percent slopes NWI or DEP Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks)

Are Vegetation [ ], Soil [ ], or Hydrology [ ] significantly disturbed? (If yes, explain in Remarks)

Are Vegetation [ ], Soil [ ], or Hydrology [ ] naturally problematic? (If yes, explain in Remarks)

SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.

Wetland vegetation criterion met?	Yes [✓] No [ ]	**Is the Sampled Area within a Wetland?** **Yes [✓] No [ ]**
Hydric Soils criterion met?	Yes [✓] No [ ]	
Wetlands hydrology present?	Yes [✓] No [ ]	

Remarks, Photo Details, Flagging, etc.:

HYDROLOGY

Field Observations:			
Surface Water Present?	Yes [ ]	No [✓]	Depth (inches)
Water Table Present?	Yes [✓]	No [ ]	Depth (inches) 4.00
Saturation Present (including capillary fringe)?	Yes [✓]	No [ ]	Depth (inches) 0.00

Wetland Hydrology Indicators

Reliable Indicators of Wetlands Hydrology	Indicators that can be Reliable with Proper Interpretation	Indicators of the Influence of Water
[✓] Water-stained leaves	[ ] Hydrological records	[ ] Direct observation of inundation
[ ] Evidence of aquatic fauna	[✓] Free water in a soil test hole	[ ] Drainage patterns
[ ] Iron deposits	[✓] Saturated soil	[ ] Drift lines
[ ] Algal mats or crusts	[ ] Water marks	[ ] Scoured areas
[✓] Oxidized rhizospheres/pore linings	[ ] Moss trim lines	[ ] Sediment deposits
[ ] Thin muck surfaces	[✓] Presence of reduced iron	[ ] Surface soil cracks
[ ] Plants with air-filled tissue (aerenchyma)	[✓] Woody plants with adventitious roots	[ ] Sparsely vegetated concave surface
[ ] Plants with polymorphic leaves	[✓] Trees with shallow root systems	[ ] Microtopographic relief
[ ] Plants with floating leaves	[ ] Woody plants with enlarged lenticels	[✓] Geographic position (depression, toe of slope, fringing lowland
[✓] Hydrogen sulfide odor		

Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

Form Revised July 2023

VEGETATION – Use both common and scientific names of plants.

Tree Stratum Plot size 30' radius

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					

0.0 = Total Cover

Shrub/Sapling Stratum Plot size 15' radius

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. Eurpoean privet	Ligustrum vulgaris	FACU	10.5	Yes	No
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					

10.5 = Total Cover

Herb Stratum Plot size 5' radius

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. White meadowsweet	Spiraea alba	FACW	10.5	Yes	Yes
2. Sensitive fern	Onoclea sensibilis	FACW	10.5	Yes	Yes
3. Gypsywort	Lycopus europaeus	OBL	10.5	Yes	Yes
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

31.5 = Total Cover

VEGETATION – continued.

Woody Vine Stratum	Plot size 30' radius				
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. Asiatic bittersweet	Celastrus orbiculatus	UPL	3.0	Yes	No
2.					
3.					
4.					
			3.0 = Total Cover		

Rapid Test: Do all dominant species have an indicator status of OBL or FACW?				Yes ☐ No ☐
Dominance Test:	Number of dominant species	Number of dominant species that are wetland indicator plants		Do wetland indicator plants make up ≥ 50% of dominant plant species? Yes ☑ No ☐
	5	3		
Prevalence Index:		Total % Cover (all strata)	Multiply by:	Result
	OBL species		X 1	= 0.00
	FACW species		X 2	= 0.00
	FAC species		X 3	= 0.00
	FACU species		X 4	= 0.00
	UPL species		X 5	= 0.00
	Column Totals	(A) 0		(B) 0
Prevalence Index		B/A = 0.00		Is the Prevalence Index ≤ 3.0? Yes ☐ No ☐
Wetland vegetation criterion met?		**Yes** ☑ **No** ☐		

Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub / Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

Cover Ranges	
Range	Midpoint
1-5 %	3.0 %
6-15 %	10.5 %
15-25 %	20.5 %
26-50 %	38.0 %
51-75 %	63.0 %
76-95 %	85.5 %
96-100 %	98.0 %

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Location[2]		
0-4	10YR 2/2	95.00	10YR 3/4	5.00	C	PL	VFSL	^A-horizon
4-18	10YR 4/2	95.00	10YR 4/3	5.00	D	M	FSL	^Bg-horizon
18-24	10YR 2/1	95.00	10YR 4/3	5.00	C	M	FSL	A-horizon

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

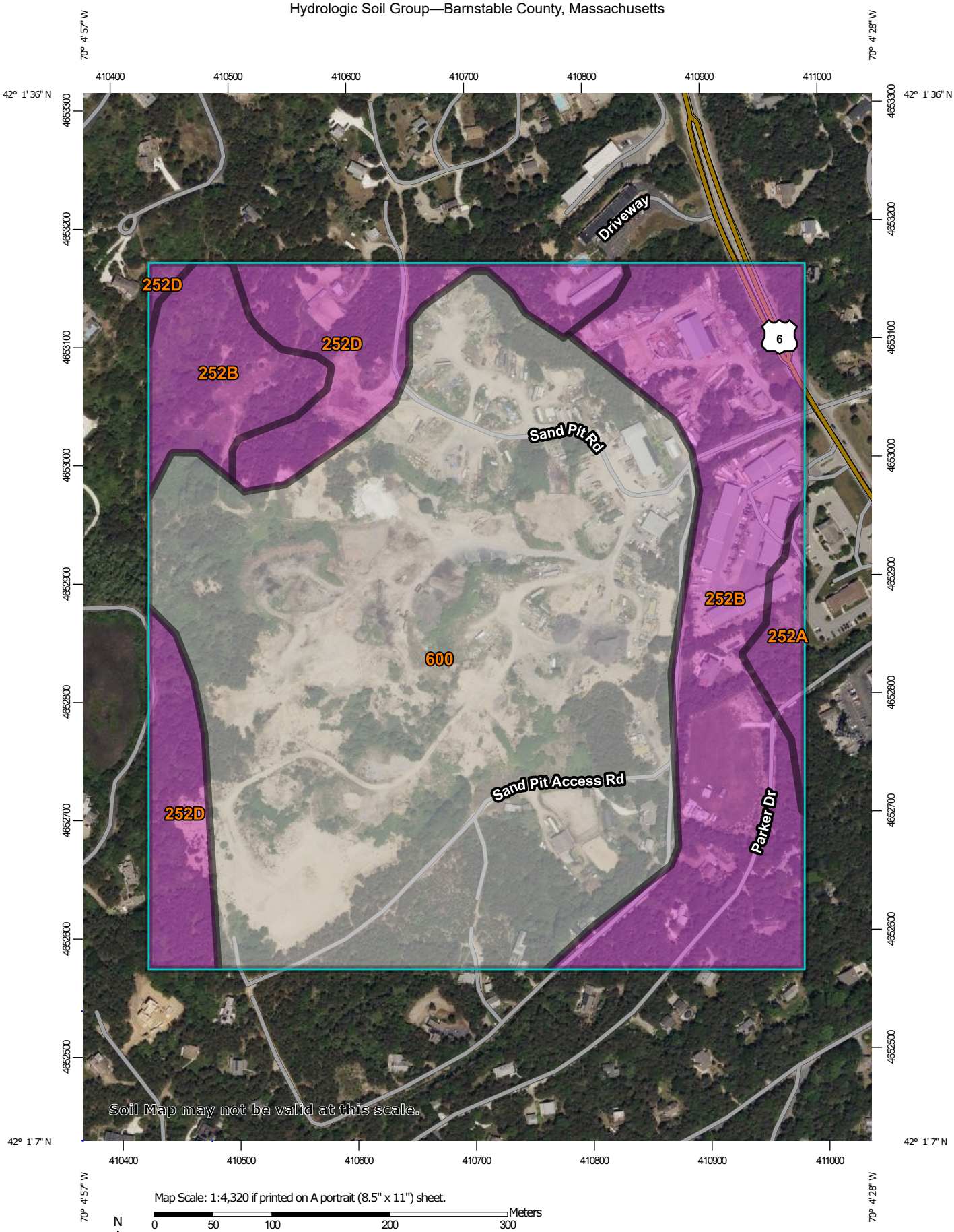
Hydric Soil Indicators (Check all that apply)		**Indicators for Problematic Hydric Soils**
☐ Histosol (A1)	☐ Polyvalue Below Surface (S8)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Thin Dark Surface (S9)	☐ 5 cm Mucky Peat or Peat (S3)
☐ Black Histic (A3)	☐ Loamy Gleyed Matrix (F2)	☐ Iron-Manganese Masses (F12)
☐ Hydrogen Sulfide (A4)	☐ Depleted Matrix (F3)	☐ Mesic Spodic (A17)
☐ Stratified Layers (A5)	☑ Redox Dark Surface (F6)	☐ Red Parent Material (F21)
☑ Depleted Below Dark Surface (A11)	☐ Depleted Dark Surface (F7)	☐ Very Shallow Dark Surface (F22)
☐ Thick Dark Surface (A12)	☐ Redox Depressions (F8)	
☐ Sandy Mucky Mineral (S1)		
☐ Sandy Gleyed Matrix (S4)		
☐ Sandy Redox (S5)		☐ Other (Include Explanation in Remarks)
☐ Stripped Matrix (S6)		
☐ Dark Surface (S7)		

Restrictive Layer (if observed) Type: N/A Depth (inches): _____

Remarks: Buried A-horizon and B-horizon. Redoximorphic features observed within entire soil profile.

Hydric Soils criterion met? **Yes** ☑ **No** ☐

Attachment C - NRCS Web Soil Survey Maps & Reports:
Hydrologic Soils Group, Depth to Bedrock, Depth to Water Table,
FEMA FIRMettes,
NOAA Atlas 14 Rainfall Data, CN Calculation



Map Scale: 1:4,320 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Barnstable County, Massachusetts
Survey Area Data: Version 24, Sep 5, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 10, 2022—Jun 30, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
252A	Carver coarse sand, 0 to 3 percent slopes	A	1.5	1.8%
252B	Carver coarse sand, 3 to 8 percent slopes	A	21.5	26.0%
252D	Carver coarse sand, 15 to 35 percent slopes	A	9.8	11.9%
600	Pits, sand and gravel		49.8	60.3%
Totals for Area of Interest			**82.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

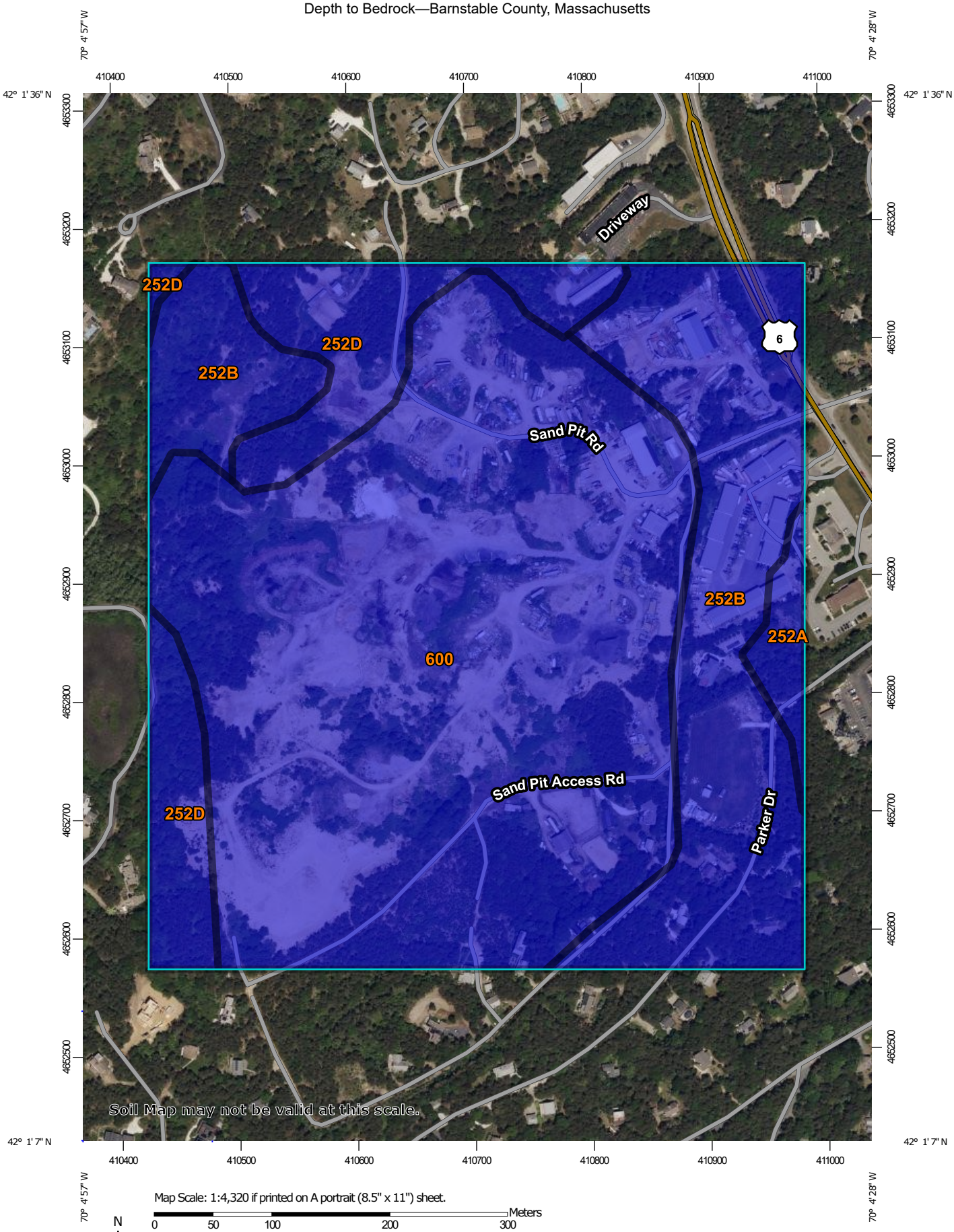
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Depth to Bedrock—Barnstable County, Massachusetts



Map Scale: 1:4,320 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Lines

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Points

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Barnstable County, Massachusetts
Survey Area Data: Version 24, Sep 5, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 10, 2022—Jun 30, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Depth to Bedrock

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
252A	Carver coarse sand, 0 to 3 percent slopes	>200	1.5	1.8%
252B	Carver coarse sand, 3 to 8 percent slopes	>200	21.5	26.0%
252D	Carver coarse sand, 15 to 35 percent slopes	>200	9.8	11.9%
600	Pits, sand and gravel	>200	49.8	60.3%
Totals for Area of Interest			**82.5**	**100.0%**

Description

The term bedrock in soil survey refers to a continuous root and water restrictive layer of rock that occurs within the soil profile.

There are many types of restrictions that can occur within the soil profile but this theme only includes the three restrictions that use the term bedrock. These are:

1) Lithic Bedrock

2) Paralithic Bedrock

3) Densic Bedrock

Lithic bedrock and paralithic bedrock are comprised of igneous, metamorphic, and sedimentary rocks, which are coherent and consolidated into rock through pressure, heat, cementation, or fusion. Lithic bedrock represents the hardest type of bedrock, with a hardness of strongly coherent to indurated. Paralithic bedrock has a hardness of extremely weakly coherent to moderately coherent. It can occur as a thin layer of weathered bedrock above harder lithic bedrock. Paralithic bedrock can also be much thicker, extending well below the soil profile.

Densic bedrock represents a unique kind of bedrock recognized within the soil survey. It is non-coherent and consolidated, dense root restrictive material, formed by pressure, heat, and dewatering of earth materials or sediments. Densic bedrock differs from densic materials, which formed under the compaction of glaciers, mudflows, and or human-caused compaction.

If more than one type of bedrock is described for an individual soil type, the depth to the shallowest one is given. If no bedrock is described in a map unit, it is represented by the "greater than 200" depth class.

Depth to bedrock is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

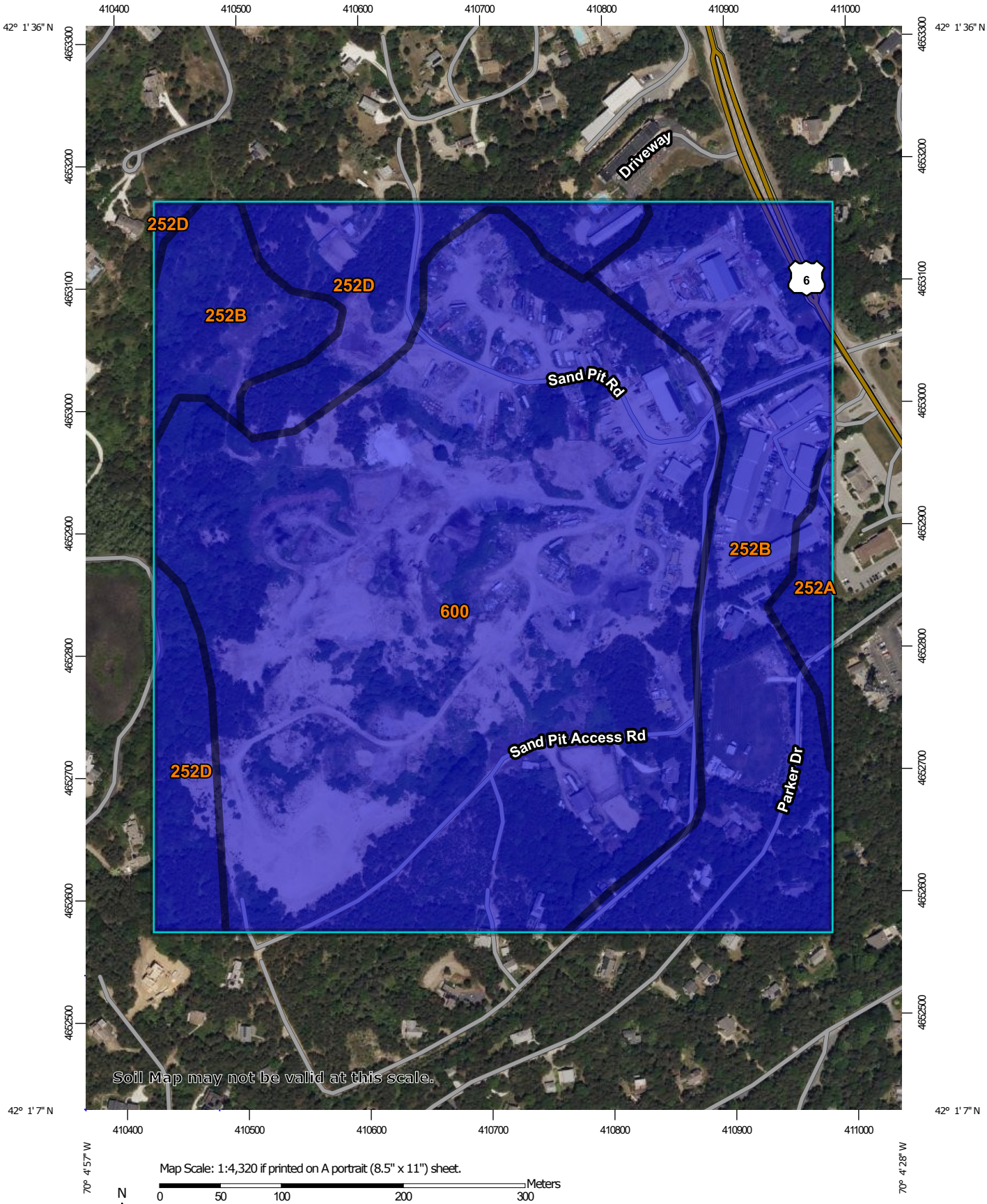
Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No



Map Scale: 1:4,320 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Lines

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Points

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Barnstable County, Massachusetts
Survey Area Data: Version 24, Sep 5, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 10, 2022—Jun 30, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Depth to Water Table

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
252A	Carver coarse sand, 0 to 3 percent slopes	>200	1.5	1.8%
252B	Carver coarse sand, 3 to 8 percent slopes	>200	21.5	26.0%
252D	Carver coarse sand, 15 to 35 percent slopes	>200	9.8	11.9%
600	Pits, sand and gravel	>200	49.8	60.3%
Totals for Area of Interest			**82.5**	**100.0%**

Description

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

NOAA Atlas 14, Volume 10, Version 3
Location name: Truro, Massachusetts, USA*
Latitude: 42.0213°, Longitude: -70.0783°
Elevation: 82 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.268** (0.206-0.347)	**0.338** (0.259-0.439)	**0.453** (0.346-0.589)	**0.549** (0.417-0.714)	**0.680** (0.503-0.918)	**0.777** (0.565-1.07)	**0.882** (0.628-1.25)	**1.01** (0.674-1.42)	**1.20** (0.772-1.73)	**1.36** (0.858-1.99)
10-min	**0.380** (0.291-0.492)	**0.479** (0.367-0.621)	**0.642** (0.490-0.833)	**0.777** (0.590-1.01)	**0.963** (0.712-1.30)	**1.10** (0.802-1.51)	**1.25** (0.889-1.77)	**1.43** (0.956-2.02)	**1.70** (1.10-2.45)	**1.92** (1.22-2.82)
15-min	**0.447** (0.343-0.579)	**0.564** (0.432-0.731)	**0.755** (0.577-0.980)	**0.914** (0.694-1.19)	**1.13** (0.838-1.53)	**1.30** (0.942-1.78)	**1.47** (1.05-2.08)	**1.68** (1.12-2.37)	**1.99** (1.29-2.88)	**2.26** (1.43-3.31)
30-min	**0.645** (0.495-0.836)	**0.811** (0.621-1.05)	**1.08** (0.827-1.40)	**1.31** (0.994-1.70)	**1.62** (1.20-2.19)	**1.85** (1.34-2.54)	**2.10** (1.50-2.97)	**2.40** (1.60-3.39)	**2.86** (1.85-4.14)	**3.25** (2.06-4.77)
60-min	**0.844** (0.647-1.09)	**1.06** (0.811-1.37)	**1.41** (1.08-1.83)	**1.70** (1.29-2.22)	**2.10** (1.56-2.84)	**2.40** (1.75-3.30)	**2.72** (1.94-3.86)	**3.12** (2.09-4.41)	**3.72** (2.41-5.39)	**4.25** (2.69-6.22)
2-hr	**1.14** (0.881-1.47)	**1.43** (1.10-1.84)	**1.90** (1.46-2.45)	**2.29** (1.75-2.96)	**2.83** (2.10-3.79)	**3.22** (2.36-4.39)	**3.65** (2.62-5.13)	**4.17** (2.81-5.85)	**4.96** (3.23-7.12)	**5.64** (3.59-8.18)
3-hr	**1.35** (1.04-1.73)	**1.68** (1.30-2.15)	**2.22** (1.71-2.85)	**2.67** (2.05-3.44)	**3.28** (2.45-4.38)	**3.74** (2.75-5.07)	**4.23** (3.04-5.91)	**4.82** (3.26-6.73)	**5.71** (3.72-8.14)	**6.46** (4.13-9.33)
6-hr	**1.76** (1.37-2.24)	**2.15** (1.68-2.74)	**2.80** (2.17-3.57)	**3.33** (2.58-4.27)	**4.07** (3.06-5.38)	**4.62** (3.41-6.20)	**5.21** (3.75-7.18)	**5.89** (4.01-8.15)	**6.90** (4.53-9.76)	**7.74** (4.98-11.1)
12-hr	**2.22** (1.75-2.81)	**2.67** (2.09-3.37)	**3.39** (2.65-4.30)	**3.99** (3.11-5.08)	**4.82** (3.64-6.31)	**5.44** (4.04-7.22)	**6.10** (4.40-8.30)	**6.84** (4.69-9.38)	**7.90** (5.23-11.1)	**8.78** (5.68-12.5)
24-hr	**2.69** (2.13-3.38)	**3.18** (2.51-3.99)	**3.98** (3.13-5.00)	**4.64** (3.63-5.85)	**5.55** (4.21-7.19)	**6.23** (4.64-8.18)	**6.95** (5.03-9.34)	**7.73** (5.34-10.5)	**8.84** (5.88-12.3)	**9.73** (6.33-13.7)
2-day	**3.14** (2.50-3.91)	**3.67** (2.92-4.57)	**4.54** (3.60-5.67)	**5.26** (4.15-6.59)	**6.25** (4.78-8.03)	**7.00** (5.25-9.11)	**7.78** (5.66-10.3)	**8.62** (5.99-11.6)	**9.77** (6.55-13.5)	**10.7** (7.01-14.9)
3-day	**3.44** (2.75-4.27)	**3.99** (3.18-4.95)	**4.88** (3.89-6.08)	**5.62** (4.45-7.02)	**6.64** (5.10-8.50)	**7.42** (5.58-9.60)	**8.22** (6.00-10.9)	**9.07** (6.33-12.2)	**10.2** (6.89-14.0)	**11.2** (7.34-15.5)
4-day	**3.70** (2.97-4.58)	**4.26** (3.41-5.27)	**5.16** (4.12-6.41)	**5.92** (4.70-7.36)	**6.96** (5.35-8.86)	**7.75** (5.84-9.98)	**8.56** (6.26-11.2)	**9.41** (6.59-12.6)	**10.6** (7.14-14.4)	**11.5** (7.58-15.9)
7-day	**4.36** (3.52-5.37)	**4.94** (3.98-6.09)	**5.90** (4.73-7.28)	**6.69** (5.34-8.28)	**7.77** (6.01-9.82)	**8.62** (6.51-11.0)	**9.45** (6.92-12.3)	**10.3** (7.25-13.6)	**11.4** (7.73-15.4)	**12.2** (8.09-16.8)
10-day	**4.97** (4.02-6.09)	**5.58** (4.51-6.85)	**6.58** (5.30-8.09)	**7.41** (5.94-9.14)	**8.55** (6.63-10.7)	**9.44** (7.16-12.0)	**10.3** (7.56-13.3)	**11.2** (7.89-14.7)	**12.2** (8.34-16.5)	**13.0** (8.65-17.8)
20-day	**6.77** (5.52-8.24)	**7.48** (6.09-9.11)	**8.63** (7.00-10.5)	**9.59** (7.74-11.7)	**10.9** (8.51-13.6)	**11.9** (9.11-15.0)	**12.9** (9.53-16.5)	**13.9** (9.88-18.1)	**15.0** (10.3-20.0)	**15.8** (10.6-21.4)
30-day	**8.28** (6.77-10.0)	**9.06** (7.41-11.0)	**10.3** (8.43-12.6)	**11.4** (9.25-13.9)	**12.9** (10.1-16.0)	**14.0** (10.7-17.5)	**15.1** (11.2-19.2)	**16.1** (11.5-21.0)	**17.4** (12.0-23.1)	**18.2** (12.2-24.5)
45-day	**10.2** (8.36-12.3)	**11.1** (9.07-13.4)	**12.5** (10.2-15.1)	**13.7** (11.1-16.6)	**15.3** (12.1-18.9)	**16.7** (12.8-20.7)	**17.9** (13.3-22.5)	**19.0** (13.6-24.6)	**20.3** (14.0-26.8)	**21.1** (14.3-28.3)
60-day	**11.8** (9.70-14.2)	**12.7** (10.5-15.3)	**14.3** (11.7-17.3)	**15.6** (12.7-18.9)	**17.4** (13.7-21.4)	**18.8** (14.5-23.3)	**20.2** (15.0-25.3)	**21.3** (15.4-27.5)	**22.7** (15.7-29.8)	**23.5** (15.9-31.4)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

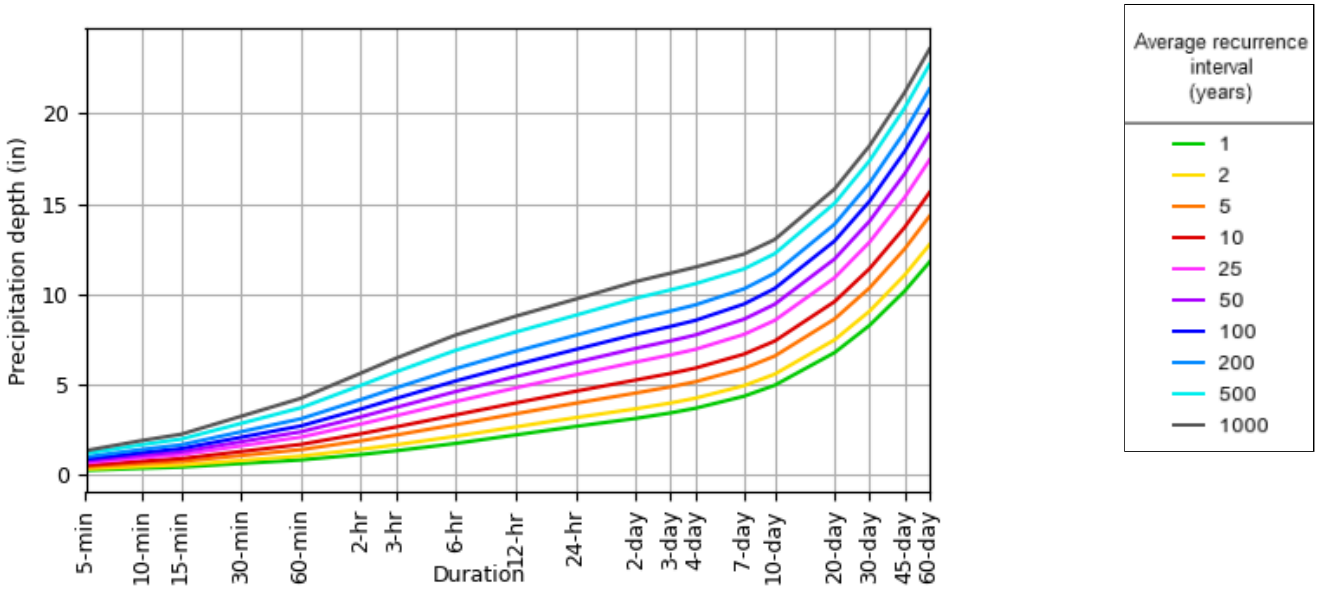
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

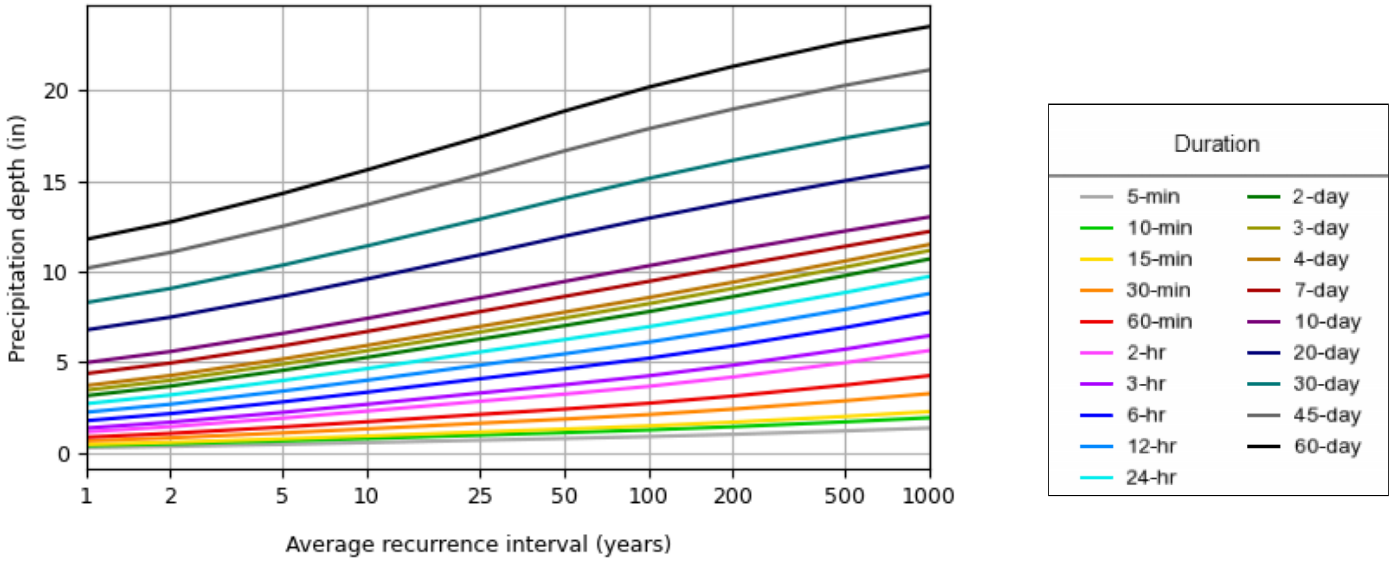
Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 42.0213°, Longitude: -70.0783°





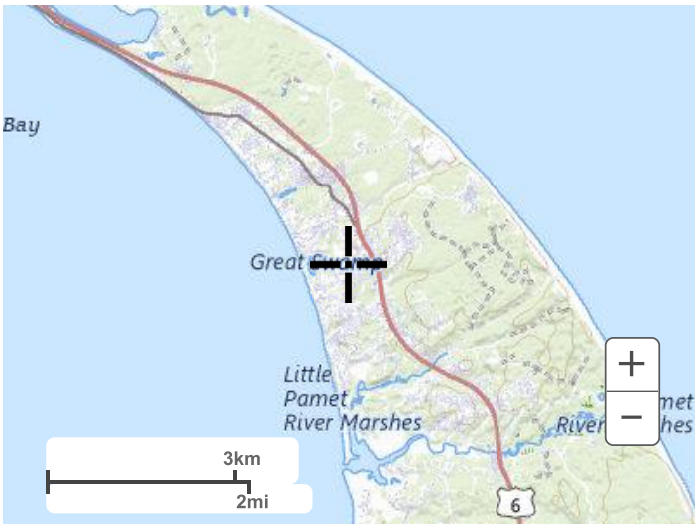
NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Tue Dec 9 19:14:13 2025

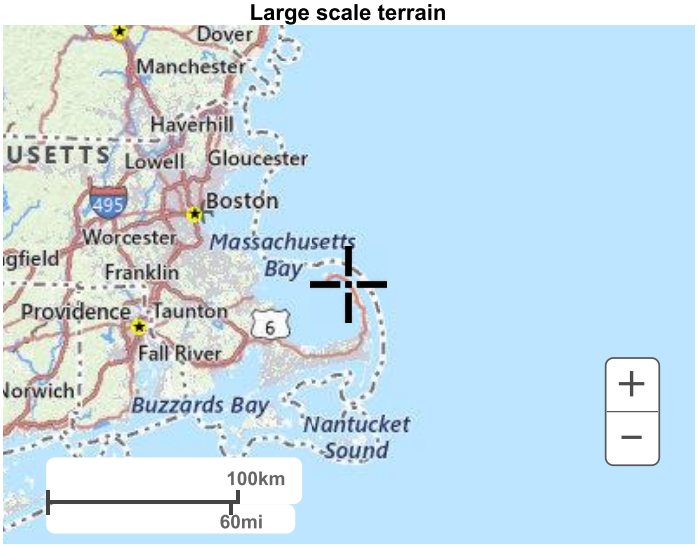
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Maps & aerials

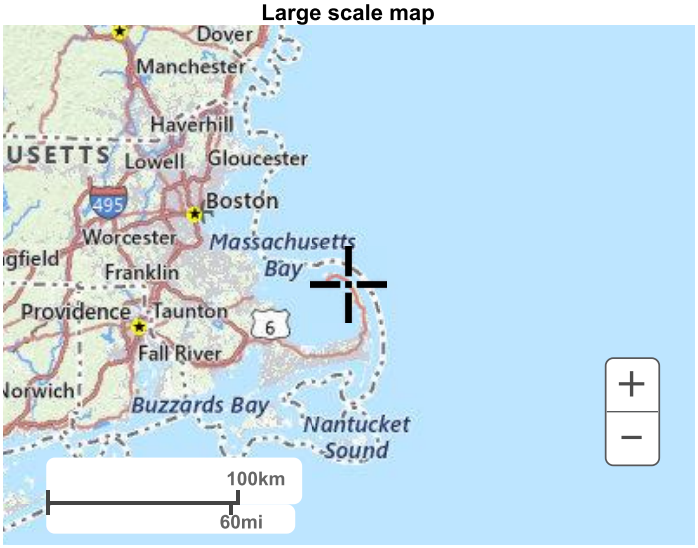
Small scale terrain



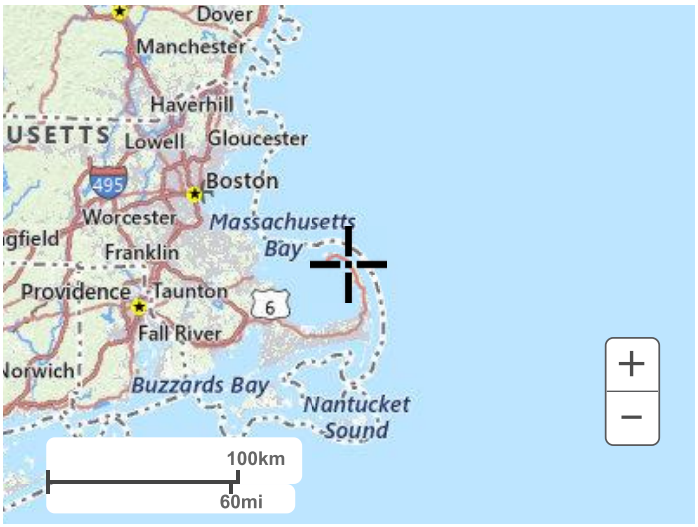
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

National Flood Hazard Layer FIRMette

FEMA

70°5'2"W 42°1'36"N



70°4'24"W 42°1'9"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/24/2025 at 7:17 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

NextGrid - Truro Solar Photovoltaic Development
Truro, MA
Date: 12/30/2025

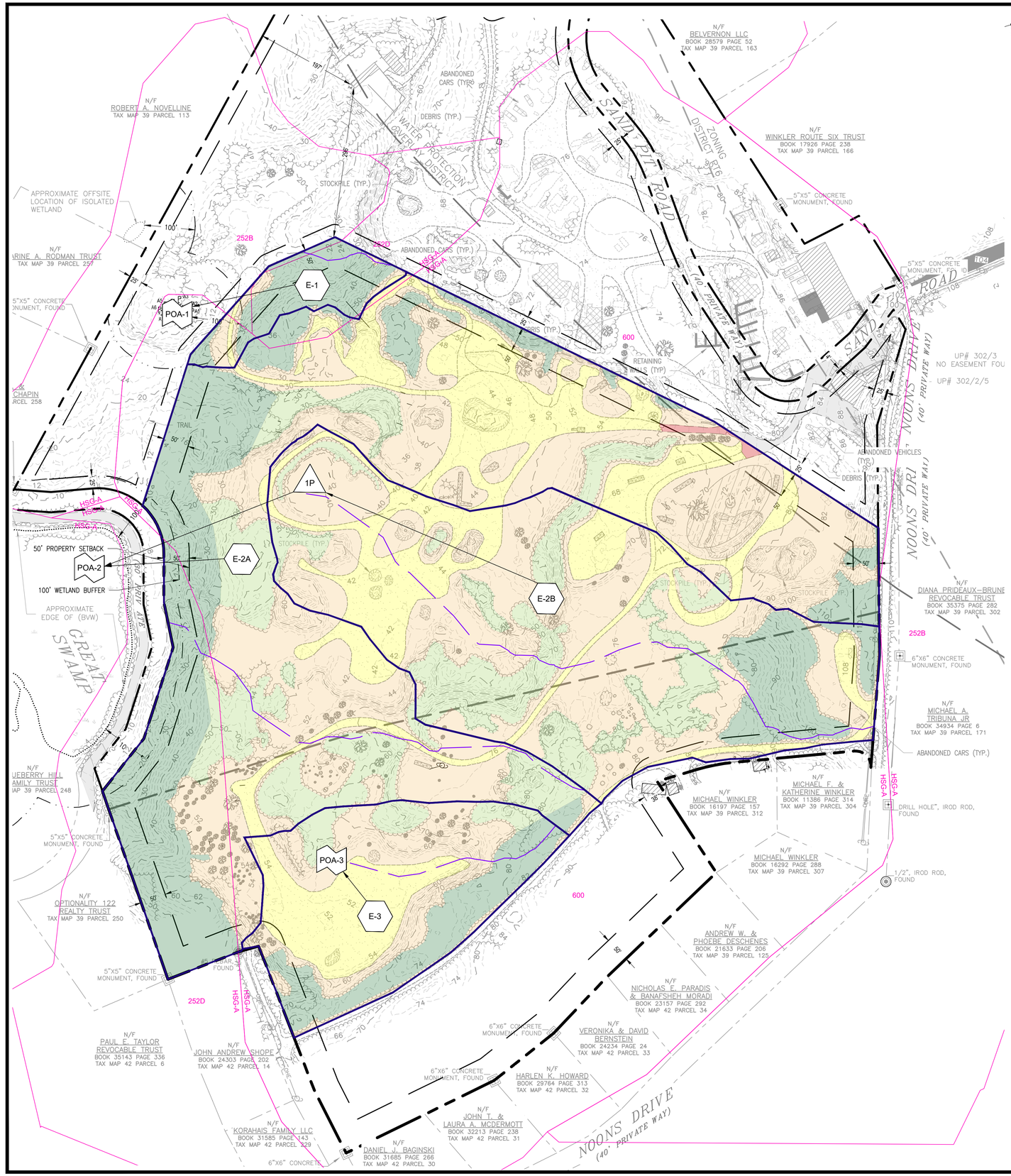
CN Estimation
SCS Potential Maxiumum Retention Equation

CN=1000/(S+10)
Where CN = Curve Number
S = Maximum Water Retention in section (inches)

Material	Depth (in)	Voids (%)	Voids (in)
Sand	24	30	7.2
		Total S =	7.2
		CN =	58

Sand revised CN to be used for pre- and post- development conditions

Attachment D - Drainage Area Maps & HydroCAD Reports



±4° SEE NOTE 1

True North

State Plane Grid North

NOTES:

1. THIS PLAN IS SET TO MASSACHUSETTS STATE PLANE COORDINATED SYSTEM "MA83F" MAINLAND ZONE. ELECTRICAL RACKING SYSTEM AND MODULES DESIGNED TO TRUE NORTH.

SOIL DATA		
Map Unit Symbol	Map Unit Name	HSG Rating
252B	Carver coarse sand, 3 to 8 percent slopes	A
252D	Carver coarse sand, 15 to 35 percent slopes	A
600	Pits, sand and gravel	A

PRE-DEVELOPMENT TC LIST				
DRAINAGE AREA	FLOW TYPE	GROUNDCOVER	LENGTH (FT)	SLOPE
E-1	SHEET	WOODS: DENSE	23	45.07%
	SHEET	SMOOTH SURFACE	27	35.55%
	SCF	WOODLAND	47	21.21%
	SCF	WOODLAND	90	4.95%
	DIRECT ENTRY - 1 MINUTE			
E-2A	SHEET	WOODS: LIGHT	50	14.47%
	SCF	WOODLAND	116	2.33%
	SCF	UNPAVED	142	0.10%
	SCF	UNPAVED	76	9.98%
	SCF	WOODLAND	159	6.48%
	SCF	UNPAVED	141	2.89%
	SCF	UNPAVED	17	51.47%
	SCF	WOODLAND	84	1.11%
	SCF	UNPAVED	79	0.94%
	SCF	WOODLAND	104	29.16%
E-2B	SHEET	SMOOTH SURFACE	48	1.44%
	SHEET	WOODS: DENSE	2	0.10%
	SCF	WOODLAND	81	0.10%
	SCF	UNPAVED	39	10.85%
	SCF	WOODLAND	58	18.45%
	SCF	WOODLAND	74	0.18%
	SCF	UNPAVED	75	4.69%
	SCF	WOODLAND	75	1.81%
	SCF	UNPAVED	268	1.53%
	SCF	WOODLAND	51	17.31%
	SCF	UNPAVED	76	23.67%
	SCF	UNPAVED	504	1.65%
E-3	SHEET	WOODLAND	50	1.94%
	SCF	WOODLAND	97	6.62%
	SCF	UNPAVED	64	0.10%
	SCF	UNPAVED	231	2.04%

LEGEND DRAINAGE AREA MAP:

HYDROLOGY:

- FLOW PATH / TIME OF CONCENTRATION
- E-X — SUBBASIN LABEL
- POA-X — POINT OF ANALYSIS
- XP — BASIN
- SAND
- WOODS GOOD COVER
- WOODS POOR COVER
- GRAVEL
- IMPERVIOUS
- WATERSHED BOUNDARY
- NRCS SOIL BOUNDARY
- HSG-A — HYDROLOGIC SOIL GROUP CLASSIFICATION
- 252B — HYDROLOGIC SOIL MAP UNIT SYMBOL

LEGEND

EXISTING

- LOCUS PROPERTY BOUNDARY
- APROXIMATE ADJOINING PROPERTY BOUNDARY
- ASSESSOR BOUNDARY LINES
- EASEMENT UTILITY
- EASEMENT ACCESS
- RIGHT OF WAY
- ZONING SETBACK
- 420 — MAJOR CONTOUR INTERVAL
- 421 — MINOR CONTOUR INTERVAL
- EDGE OF PAVEMENT
- EDGE OF GRAVEL
- TREELINE
- STONE WALL
- x — x — WIRE FENCE
- CHAIN LINK FENCE
- GUARD RAIL
- OHU — OVERHEAD UTILITY
- OHE — OVERHEAD POWER
- UGE — POWER CONDUIT
- BORDERING VEGETATIVE WETLAND (BVW)
- ISOLATED WETLAND (IW)
- 100' WETLAND BUFFER
- IRON PIN, PIPE OR MONUENT
- UTILITY POLE
- WF–A10 P — WETLAND FLAG AND ID
- TB–A10 ¤ — TOP OF BANK FLAG AND ID
- EOP — EDGE OF PAVEMENT
- (TYP) — TYPICAL
- CPP — CORRUGATED PLASTIC PIPE
- INV — INVERT ELEVATION
- EL — ELEVATION
- × 123.45 — SPOT ELEVATION
- GRAVEL SURFACE
- CONCRETE SURFACE
- APPROXIMATE PFAS CONTAMINATION SOURCE

0 50' 100' 200'

1" = 100' HORIZONTAL

NOT FOR CONSTRUCTION

Project:

PROPOSED SOLAR PV DEVELOPMENT

9 NOONS DRIVE, TRURO, MASSACHUSETTS 02652

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON

Client:

NextGrid

NEXTGRID PECAN, LLC

68 Harrison Ave, Suite 605, PMB 73069
Boston, MA 02111
tel: (855) 636-6100 www.Nextgrid.com

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No.	Description	Date
0	ISSUED FOR PERMITTING	12/31/25

Revisions

Seal:

COMMONWEALTH OF MASSACHUSETTS
MELINDA COSTELLO
CIVIL
No. 52956
PROFESSIONAL ENGINEER
12/31/2025

Issued For:

PERMITTING

Issued Date:	12/31/2025
Scale:	1" = 100'
Drawn By:	RJR
Reviewed By:	BMG
Approved By:	MRC
W&S Project No.:	ENG25-1122

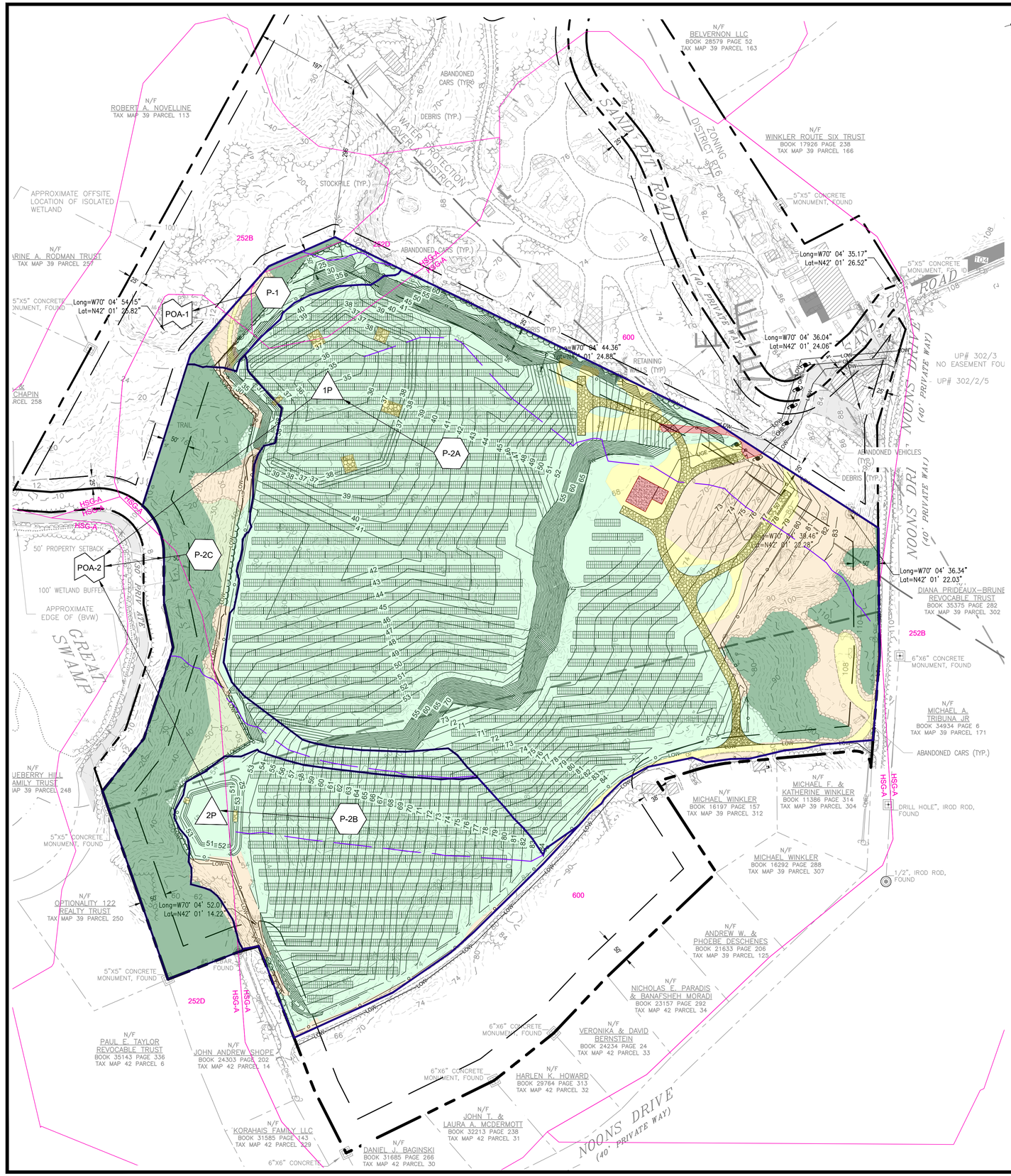
Drawing Title:

PRE-DEVELOPMENT DRAINAGE AREA MAP

Sheet Number:

FIGURE 1

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NOTES:

1. THIS PLAN IS SET TO MASSACHUSETTS STATE PLANE COORDINATED SYSTEM "MA83F" MAINLAND ZONE. ELECTRICAL RACKING SYSTEM AND MODULES DESIGNED TO TRUE NORTH.

SOIL DATA		
Map Unit Symbol	Map Unit Name	HSG Rating
252B	Carver coarse sand, 3 to 8 percent slopes	A
252D	Carver coarse sand, 15 to 35 percent slopes	A
600	Pits, sand and gravel	A

POST-DEVELOPMENT TC LIST				
DRAINAGE AREA	FLOW TYPE	GROUND COVER	LENGTH (FT)	SLOPE
P-1	SHEET	WOODS: DENSE	23	45.07%
	SHEET	SMOOTH SURFACE	27	34.74%
	SCF	UNPAVED	5	34.57%
	SCF	WOODLAND	43	19.92%
	SCF	WOODLAND	90	4.95%
	DIRECT ENTRY - 1 MINUTE			
P-2A	SHEET	WOODS: DENSE	50	7.89%
	SCF	WOODLAND	66	23.02%
	SCF	UNPAVED	13	0.10%
	SCF	UNPAVED	265	4.54%
	SCF	UNPAVED	239	1.92%
	SCF	SHORT GRASS PASTURE	37	23.79%
	SCF	UNPAVED	49	11.56%
	SCF	SHORT GRASS PASTURE	173	5.78%
	SCF	SHORT GRASS PASTURE	349	2.29%
P-2B	SHEET	GRASS: SHORT	50	4.47%
	SCF	SHORT GRASS PASTURE	568	5.05%
P-2C	SHEET	GRASS: SHORT	50	5.83%
	SCF	SHORT GRASS PASTURE	446	6.18%
	SCF	WOODLAND	110	0.10%
	SCF	WOODLAND	82	29.68%

LEGEND DRAINAGE AREA MAP:

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- POA-X — POINT OF ANALYSIS
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LEGEND

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- INV — INVERT ELEVATION
- EL — ELEVATION
- × 123.45 — SPOT ELEVATION
- GRAVEL SURFACE
- CONCRETE SURFACE
- APPROXIMATE PFAS CONTAMINATION SOURCE

PROPOSED

- 420 — MAJOR CONTOUR INTERVAL
- 421 — MINOR CONTOUR INTERVAL
- EDGE OF PAVEMENT
- EDGE OF GRAVEL
- TREELINE
- CHAIN LINK FENCE
- OHE — OVERHEAD POWER
- UGE — POWER CONDUIT
- LOW — LIMIT OF WORK
- SF — SILT FENCE
- SW — STRAW WATTLE
- UTILITY POLE
- SOLAR PANEL RACK AND MODULE
- CONCRETE SURFACE
- GRAVEL SURFACE
- RIPRAP SURFACE
- STABILIZED ROCK CONSTRUCTION EXIT
- TEMPORARY LAYDOWN AREA
- EROSION CONTROL BLANKET

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

NOT FOR CONSTRUCTION

Project:
PROPOSED SOLAR PV DEVELOPMENT
9 NOONS DRIVE, TRURO, MASSACHUSETTS 02652

Weston & Sampson
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68 Harrison Ave, Suite 605, PMB 73089
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No.	Description	Date
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Revisions

Seal:
COMMONWEALTH OF MASSACHUSETTS
MELINDA COSTELLO
CIVIL
No. 52956
PROFESSIONAL ENGINEER
Melinda Costello
12/31/2025

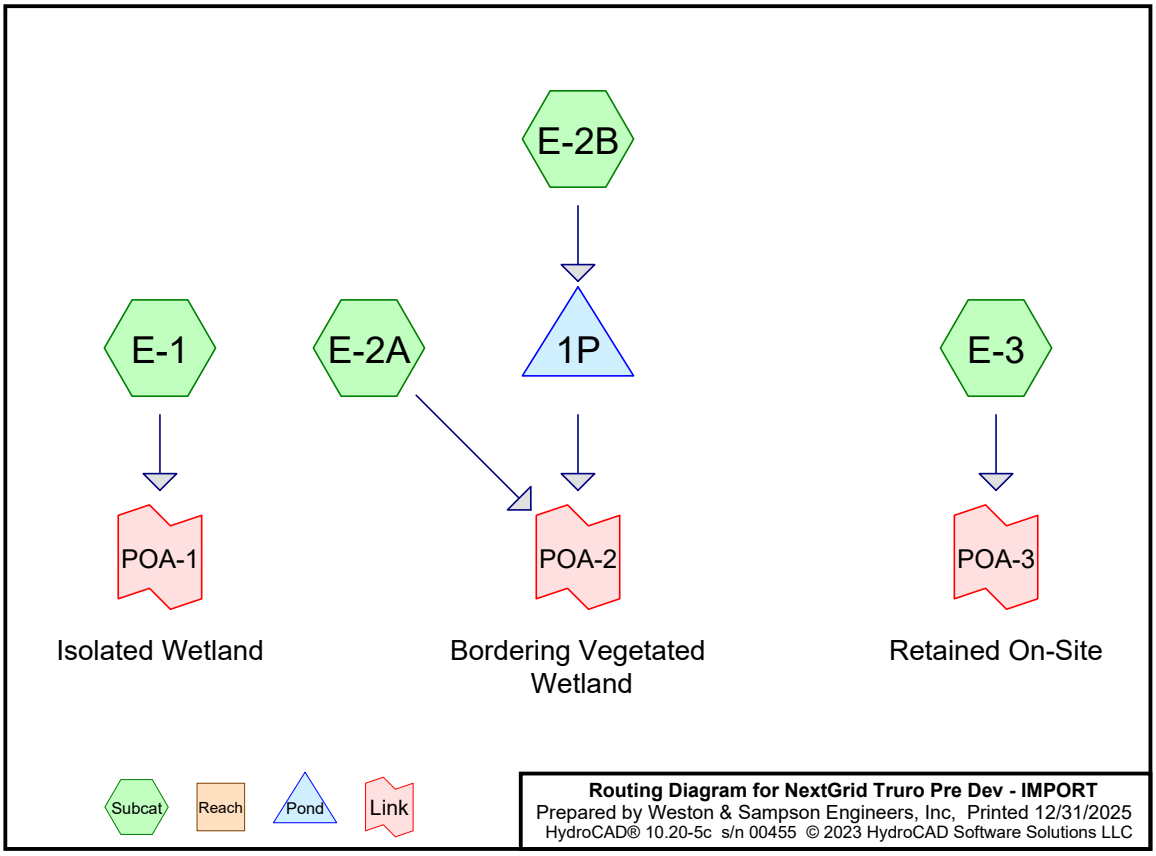
Issued For:
PERMITTING

Issued Date:	12/31/2025
Scale:	1" = 100'
Drawn By:	RJR
Reviewed By:	BMG
Approved By:	MRC
W&S Project No.:	ENG25-1122

Drawing Title:
POST-DEVELOPMENT DRAINAGE AREA MAP

Sheet Number:
FIGURE 2

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Type III 24-hr		Default	24.00	1	3.18	2
2	10-yr	Type III 24-hr		Default	24.00	1	4.64	2
3	50-yr	Type III 24-hr		Default	24.00	1	6.23	2
4	100-yr	Type III 24-hr		Default	24.00	1	6.95	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.527	76	Gravel roads, HSG A (E-1, E-2A, E-2B, E-3)
15.066	58	Sand, HSG A (E-1, E-2A, E-2B, E-3)
0.061	98	Unconnected pavement, HSG A (E-2A)
7.155	30	Woods, Good, HSG A (E-1, E-2A, E-2B, E-3)
5.001	45	Woods, Poor, HSG A (E-2A, E-2B, E-3)
33.810	**54**	**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE-1: Runoff Area=42,163 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=187' Tc=6.0 min CN=37 Runoff=0.00 cfs 0.000 af

SubcatchmentE-2A: Runoff Area=785,105 sf 0.34% Impervious Runoff Depth=0.19"
Flow Length=968' Tc=20.0 min CN=53 Runoff=0.94 cfs 0.289 af

SubcatchmentE-2B: Runoff Area=465,313 sf 0.00% Impervious Runoff Depth=0.27"
Flow Length=1,351' Tc=30.3 min CN=56 Runoff=0.94 cfs 0.243 af

SubcatchmentE-3: Runoff Area=180,174 sf 0.00% Impervious Runoff Depth=0.27"
Flow Length=442' Tc=26.9 min CN=56 Runoff=0.38 cfs 0.094 af

Pond 1P: Peak Elev=39.36' Storage=809 cf Inflow=0.94 cfs 0.243 af
Discarded=0.62 cfs 0.243 af Primary=0.00 cfs 0.000 af Outflow=0.62 cfs 0.243 af

Link POA-1: Isolated Wetland Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link POA-2: Bordering Vegetated Wetland Inflow=0.94 cfs 0.289 af
Primary=0.94 cfs 0.289 af

Link POA-3: Retained On-Site Inflow=0.38 cfs 0.094 af
Primary=0.38 cfs 0.094 af

Total Runoff Area = 33.810 ac Runoff Volume = 0.627 af Average Runoff Depth = 0.22"
99.82% Pervious = 33.749 ac 0.18% Impervious = 0.061 ac

Summary for Subcatchment E-1:

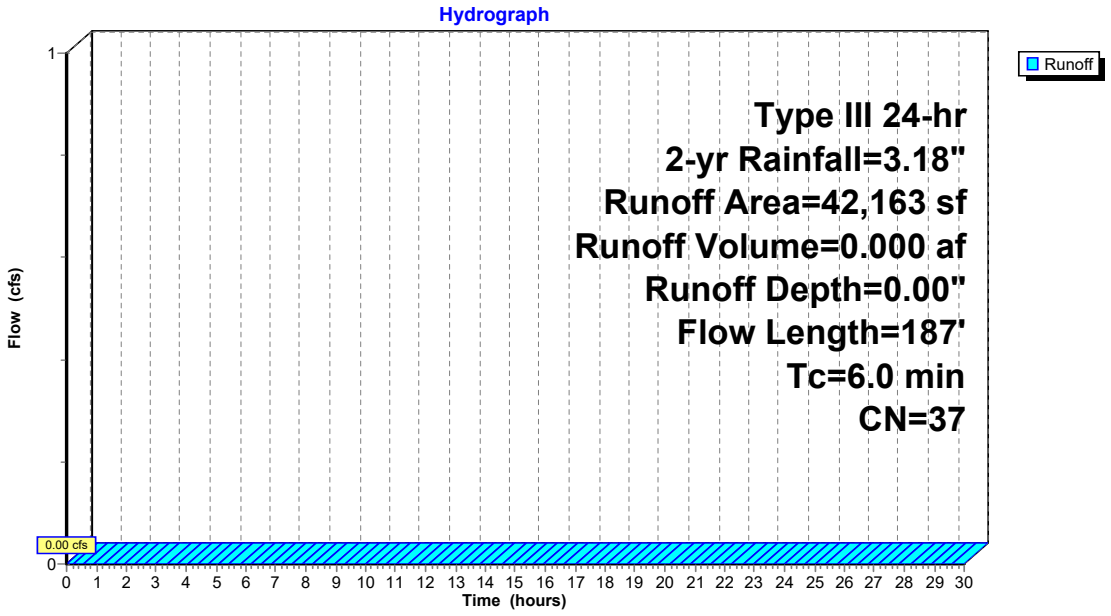
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link POA-1 : Isolated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.18"

	Area (sf)	CN	Description
*	7,776	58	Sand, HSG A
	1,578	76	Gravel roads, HSG A
	32,809	30	Woods, Good, HSG A
	42,163	37	Weighted Average
	42,163		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	23	0.4500	0.12		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
0.1	27	0.3555	3.34		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.18"
0.3	47	0.2121	2.30		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	90	0.0495	1.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0					**Direct Entry,**
6.0	187	Total			

Subcatchment E-1:



Summary for Subcatchment E-2A:

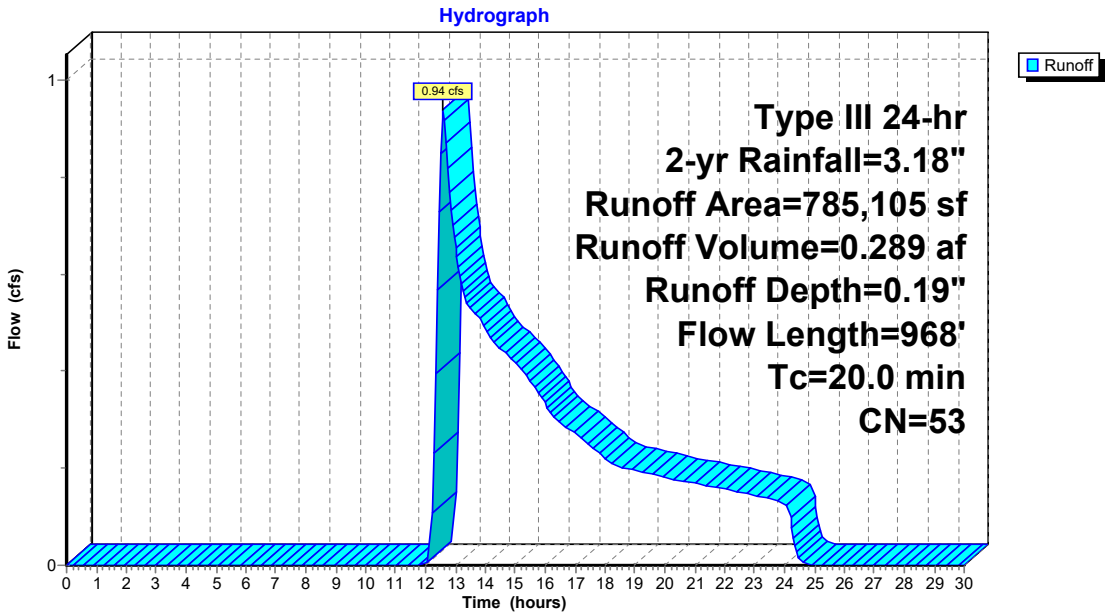
Runoff = 0.94 cfs @ 12.60 hrs, Volume= 0.289 af, Depth= 0.19"
Routed to Link POA-2 : Bordering Vegetated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.18"

	Area (sf)	CN	Description
*	346,526	58	Sand, HSG A
	137,998	76	Gravel roads, HSG A
	2,643	98	Unconnected pavement, HSG A
	190,947	30	Woods, Good, HSG A
	106,991	45	Woods, Poor, HSG A
	785,105	53	Weighted Average
	782,462		99.66% Pervious Area
	2,643		0.34% Impervious Area
	2,643		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.1447	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.18"
2.5	116	0.0233	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.6	142	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.2	76	0.0998	5.09		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.1	159	0.0648	1.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.9	141	0.0289	2.74		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	17	0.5147	11.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.7	84	0.0111	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	79	0.0094	1.56		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	104	0.2916	2.70		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.0	968	Total			

Subcatchment E-2A:



Summary for Subcatchment E-2B:

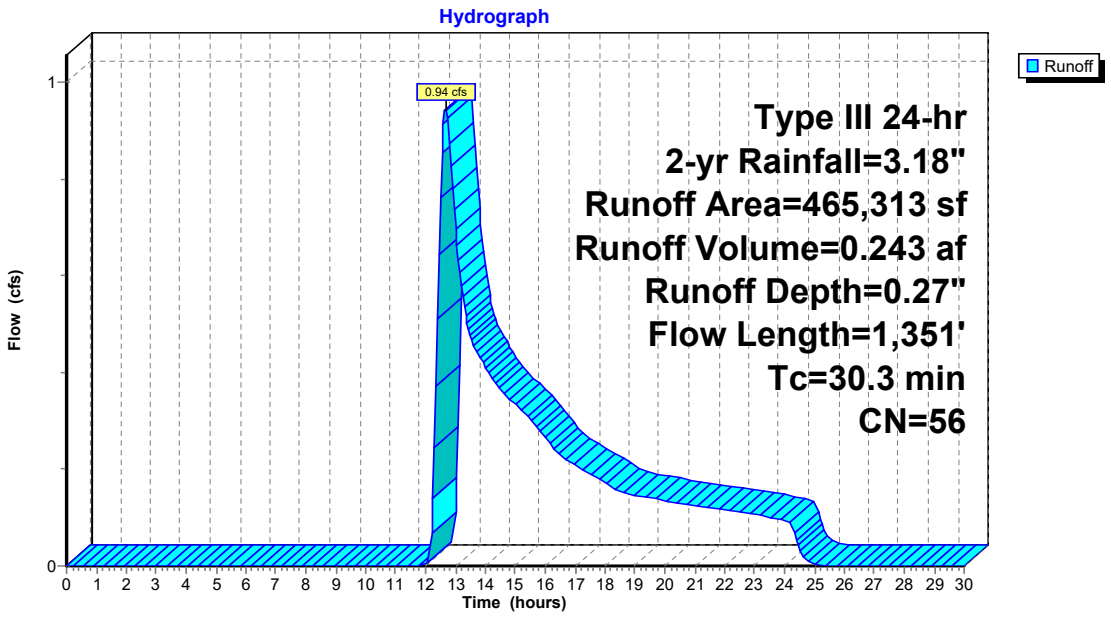
Runoff = 0.94 cfs @ 12.67 hrs, Volume= 0.243 af, Depth= 0.27"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.18"

	Area (sf)	CN	Description
*	236,523	58	Sand, HSG A
	89,848	76	Gravel roads, HSG A
	44,255	30	Woods, Good, HSG A
	94,687	45	Woods, Poor, HSG A
	465,313	56	Weighted Average
	465,313		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	48	0.0144	1.04		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.18"
5.4	2	0.0010	0.01		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
8.5	81	0.0010	0.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	39	0.1085	5.30		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.5	58	0.1845	2.15		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.8	74	0.0018	0.21		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	75	0.0469	3.49		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.9	75	0.0181	0.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	268	0.0153	1.99		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	51	0.1731	2.08		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	76	0.2367	7.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
4.1	504	0.0165	2.07		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
30.3	1,351	Total			

Subcatchment E-2B:



Summary for Subcatchment E-3:

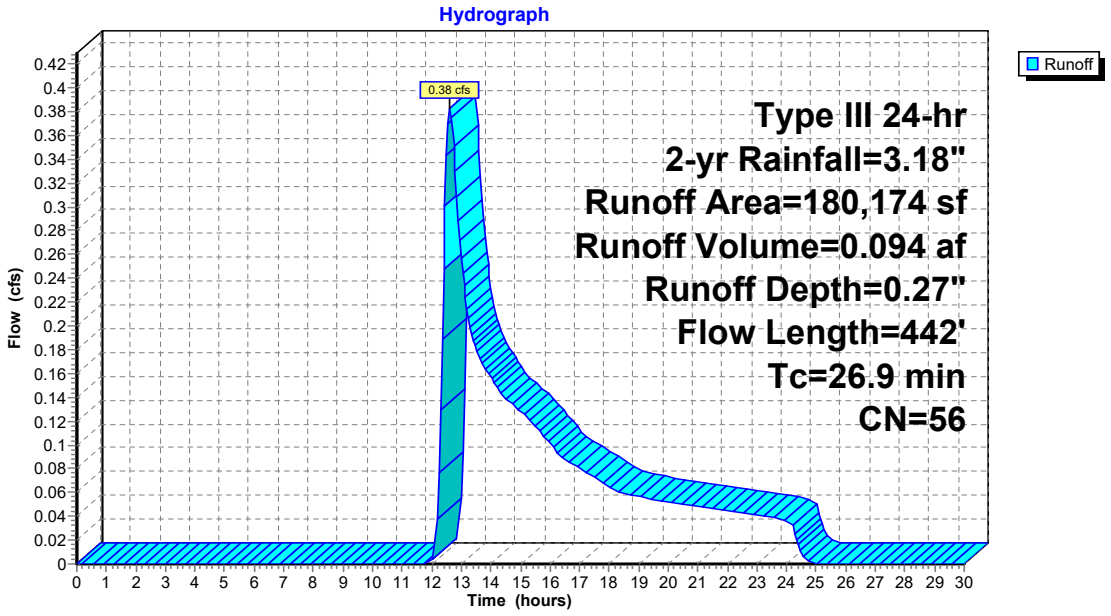
Runoff = 0.38 cfs @ 12.62 hrs, Volume= 0.094 af, Depth= 0.27"
Routed to Link POA-3 : Retained On-Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.18"

	Area (sf)	CN	Description
*	65,464	58	Sand, HSG A
	54,877	76	Gravel roads, HSG A
	43,662	30	Woods, Good, HSG A
	16,171	45	Woods, Poor, HSG A
	180,174	56	Weighted Average
	180,174		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	50	0.0194	0.04		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
1.3	97	0.0662	1.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.1	64	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	231	0.0204	2.30		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
26.9	442	Total			

Subcatchment E-3:



Summary for Pond 1P:

Inflow Area = 10.682 ac, 0.00% Impervious, Inflow Depth = 0.27" for 2-yr event
Inflow = 0.94 cfs @ 12.67 hrs, Volume= 0.243 af
Outflow = 0.62 cfs @ 13.12 hrs, Volume= 0.243 af, Atten= 34%, Lag= 26.8 min
Discarded = 0.62 cfs @ 13.12 hrs, Volume= 0.243 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link POA-2 : Bordering Vegetated Wetland

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 39.36' @ 13.12 hrs Surf.Area= 3,260 sf Storage= 809 cf

Plug-Flow detention time= 11.1 min calculated for 0.243 af (100% of inflow)
Center-of-Mass det. time= 11.0 min (982.0 - 971.0)

Volume	Invert	Avail.Storage	Storage Description
#1	39.00'	91,759 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

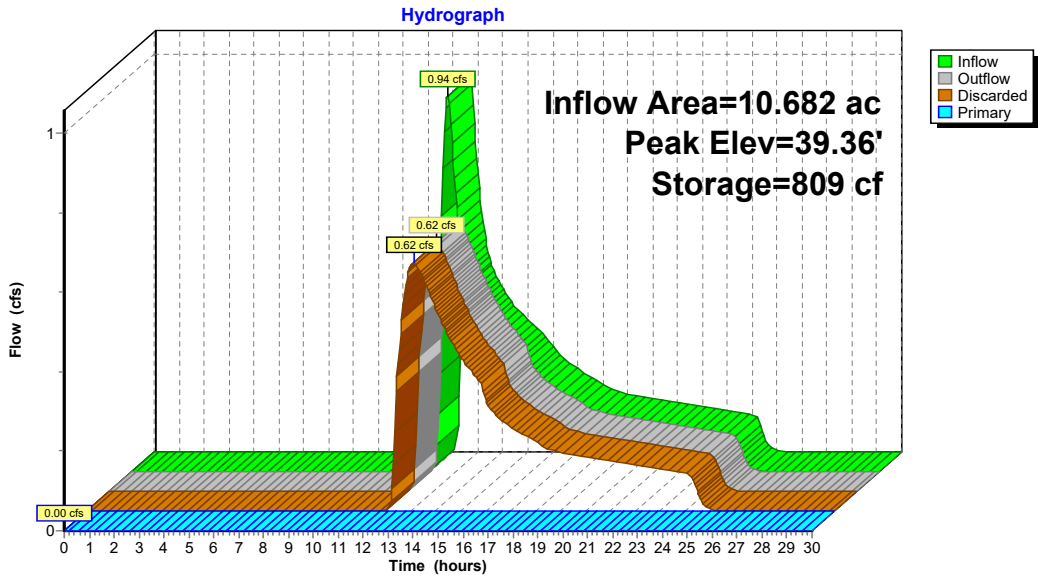
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
39.00	1,366	0	0	1,366
40.00	8,624	4,474	4,474	8,628
41.00	12,688	10,591	15,065	12,708
42.00	13,817	13,248	28,313	13,908
43.00	14,827	14,319	42,632	15,004
44.00	15,667	15,245	57,878	15,951
45.00	16,950	16,304	74,182	17,312
46.00	18,212	17,577	91,759	18,658

Device	Routing	Invert	Outlet Devices
#1	Discarded	39.00'	**8.270 in/hr Exfiltration over Wetted area**
#2	Primary	44.00'	**15.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.62 cfs @ 13.12 hrs HW=39.36' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.62 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=39.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 1P:



Stage-Area-Storage for Pond 1P:

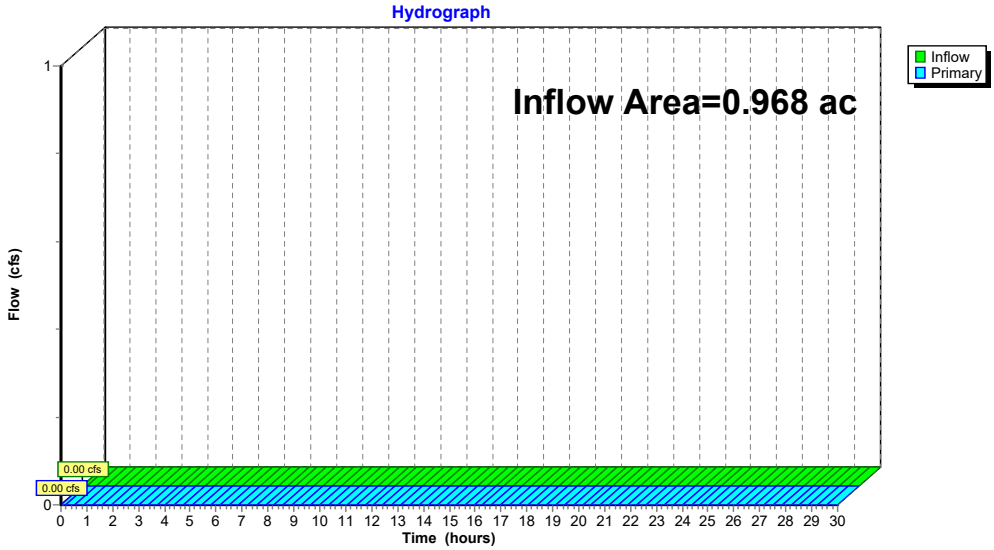
Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
39.00	1,366	1,366	0	42.60	14,419	14,561	36,783
39.10	1,811	1,811	158	42.70	14,520	14,671	38,230
39.20	2,318	2,318	364	42.80	14,622	14,782	39,688
39.30	2,887	2,888	624	42.90	14,724	14,893	41,155
39.40	3,519	3,520	944	43.00	14,827	15,004	42,632
39.50	4,214	4,215	1,330	43.10	14,910	15,097	44,119
39.60	4,971	4,972	1,788	43.20	14,993	15,191	45,614
39.70	5,790	5,792	2,326	43.30	15,077	15,285	47,118
39.80	6,672	6,675	2,949	43.40	15,160	15,380	48,630
39.90	7,617	7,620	3,663	43.50	15,244	15,474	50,150
40.00	8,624	8,628	4,474	43.60	15,328	15,569	51,679
40.10	8,995	9,000	5,355	43.70	15,413	15,664	53,216
40.20	9,374	9,381	6,273	43.80	15,497	15,760	54,761
40.30	9,761	9,769	7,230	43.90	15,582	15,855	56,315
40.40	10,156	10,166	8,226	44.00	15,667	15,951	57,878
40.50	10,558	10,570	9,261	44.10	15,793	16,085	59,450
40.60	10,969	10,982	10,338	44.20	15,920	16,219	61,036
40.70	11,387	11,401	11,455	44.30	16,047	16,354	62,634
40.80	11,813	11,829	12,615	44.40	16,174	16,489	64,245
40.90	12,246	12,265	13,818	44.50	16,302	16,625	65,869
41.00	12,688	12,708	15,065	44.60	16,431	16,761	67,506
41.10	12,799	12,826	16,339	44.70	16,560	16,898	69,155
41.20	12,910	12,944	17,625	44.80	16,689	17,035	70,818
41.30	13,022	13,063	18,921	44.90	16,819	17,173	72,493
41.40	13,134	13,182	20,229	45.00	16,950	17,312	74,182
41.50	13,246	13,302	21,548	45.10	17,074	17,444	75,883
41.60	13,360	13,422	22,878	45.20	17,199	17,577	77,597
41.70	13,473	13,543	24,220	45.30	17,324	17,710	79,323
41.80	13,587	13,664	25,573	45.40	17,449	17,844	81,061
41.90	13,702	13,786	26,937	45.50	17,575	17,979	82,813
42.00	13,817	13,908	28,313	45.60	17,702	18,114	84,577
42.10	13,916	14,016	29,700	45.70	17,829	18,249	86,353
42.20	14,016	14,124	31,097	45.80	17,956	18,385	88,142
42.30	14,116	14,233	32,503	45.90	18,084	18,521	89,944
42.40	14,217	14,342	33,920	46.00	**18,212**	**18,658**	**91,759**
42.50	14,318	14,451	35,347				

Summary for Link POA-1: Isolated Wetland

Inflow Area = 0.968 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-yr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-1: Isolated Wetland

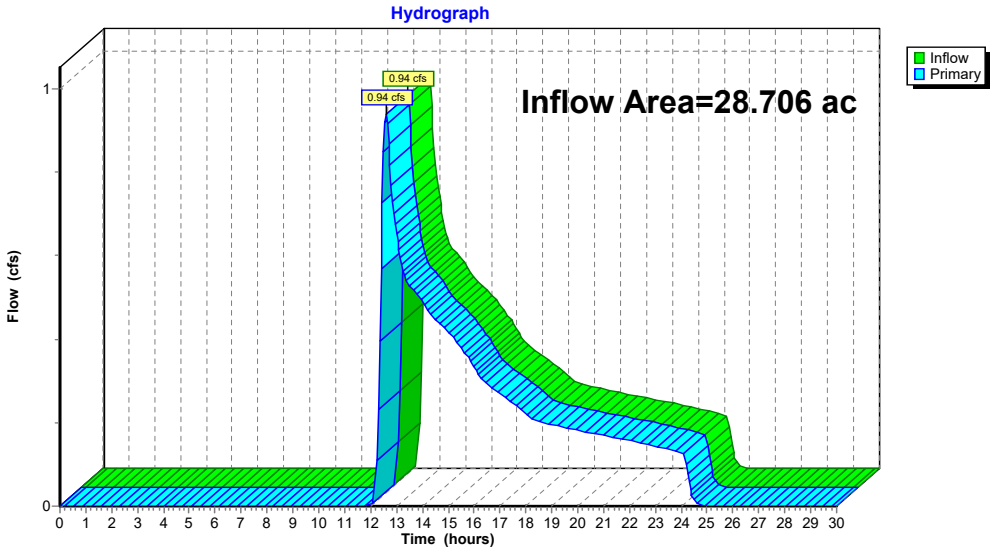


Summary for Link POA-2: Bordering Vegetated Wetland

Inflow Area = 28.706 ac, 0.21% Impervious, Inflow Depth = 0.12" for 2-yr event
Inflow = 0.94 cfs @ 12.60 hrs, Volume= 0.289 af
Primary = 0.94 cfs @ 12.60 hrs, Volume= 0.289 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-2: Bordering Vegetated Wetland

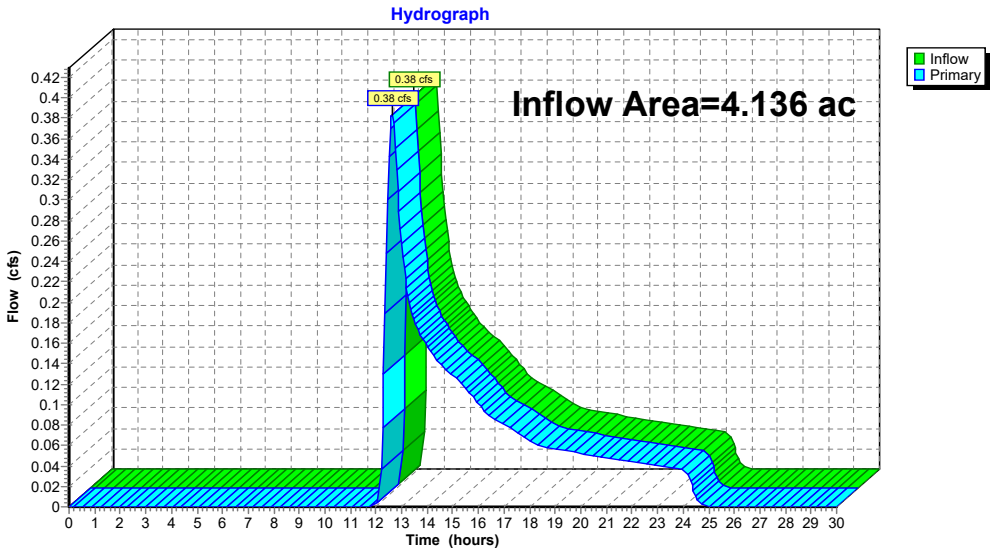


Summary for Link POA-3: Retained On-Site

Inflow Area = 4.136 ac, 0.00% Impervious, Inflow Depth = 0.27" for 2-yr event
Inflow = 0.38 cfs @ 12.62 hrs, Volume= 0.094 af
Primary = 0.38 cfs @ 12.62 hrs, Volume= 0.094 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-3: Retained On-Site



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE-1: Runoff Area=42,163 sf 0.00% Impervious Runoff Depth=0.08"
Flow Length=187' Tc=6.0 min CN=37 Runoff=0.01 cfs 0.007 af

SubcatchmentE-2A: Runoff Area=785,105 sf 0.34% Impervious Runoff Depth=0.70"
Flow Length=968' Tc=20.0 min CN=53 Runoff=6.88 cfs 1.052 af

SubcatchmentE-2B: Runoff Area=465,313 sf 0.00% Impervious Runoff Depth=0.86"
Flow Length=1,351' Tc=30.3 min CN=56 Runoff=4.81 cfs 0.767 af

SubcatchmentE-3: Runoff Area=180,174 sf 0.00% Impervious Runoff Depth=0.86"
Flow Length=442' Tc=26.9 min CN=56 Runoff=1.96 cfs 0.297 af

Pond 1P: Peak Elev=40.29' Storage=7,179 cf Inflow=4.81 cfs 0.767 af
Discarded=1.87 cfs 0.767 af Primary=0.00 cfs 0.000 af Outflow=1.87 cfs 0.767 af

Link POA-1: Isolated Wetland Inflow=0.01 cfs 0.007 af
Primary=0.01 cfs 0.007 af

Link POA-2: Bordering Vegetated Wetland Inflow=6.88 cfs 1.052 af
Primary=6.88 cfs 1.052 af

Link POA-3: Retained On-Site Inflow=1.96 cfs 0.297 af
Primary=1.96 cfs 0.297 af

Total Runoff Area = 33.810 ac Runoff Volume = 2.123 af Average Runoff Depth = 0.75"
99.82% Pervious = 33.749 ac 0.18% Impervious = 0.061 ac

Summary for Subcatchment E-1:

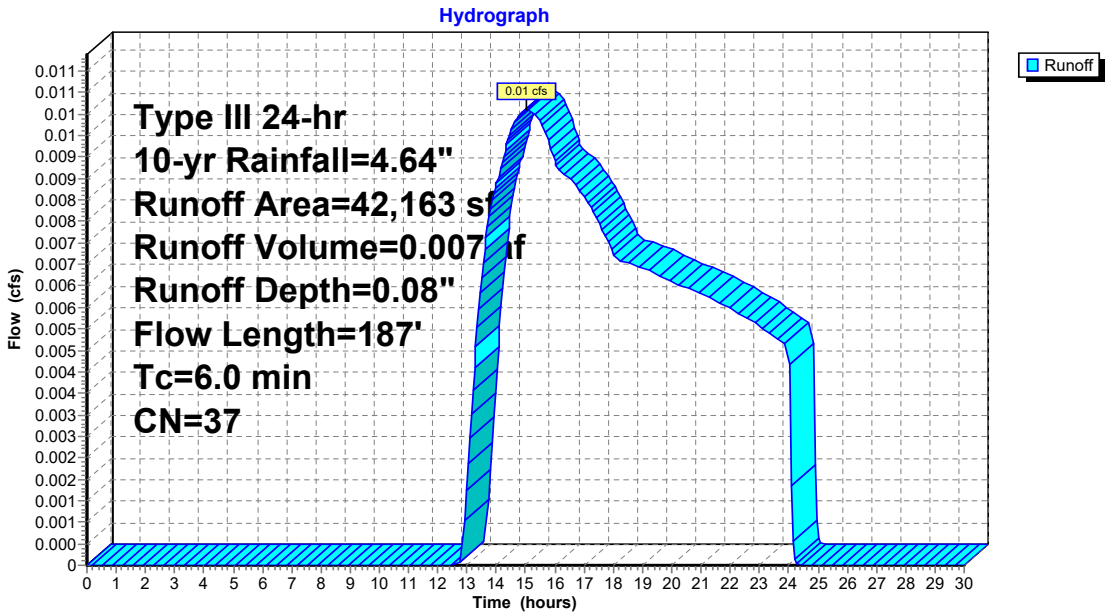
Runoff = 0.01 cfs @ 15.06 hrs, Volume= 0.007 af, Depth= 0.08"
Routed to Link POA-1 : Isolated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.64"

	Area (sf)	CN	Description
*	7,776	58	Sand, HSG A
	1,578	76	Gravel roads, HSG A
	32,809	30	Woods, Good, HSG A
	42,163	37	Weighted Average
	42,163		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	23	0.4500	0.12		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
0.1	27	0.3555	3.34		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.18"
0.3	47	0.2121	2.30		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	90	0.0495	1.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0					**Direct Entry,**
6.0	187	Total			

Subcatchment E-1:



Summary for Subcatchment E-2A:

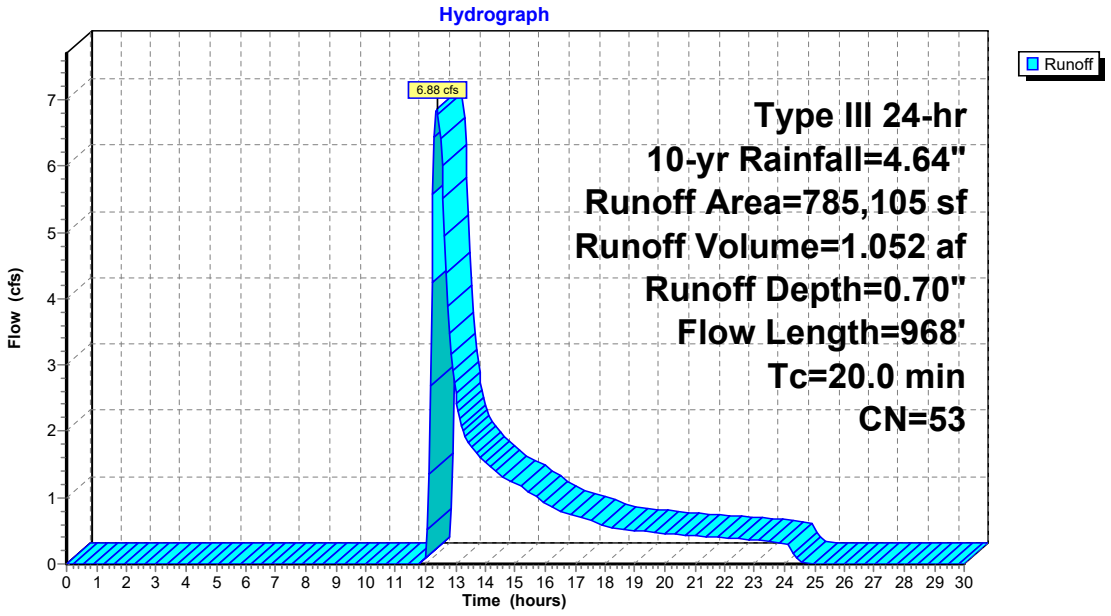
Runoff = 6.88 cfs @ 12.38 hrs, Volume= 1.052 af, Depth= 0.70"
Routed to Link POA-2 : Bordering Vegetated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.64"

	Area (sf)	CN	Description
*	346,526	58	Sand, HSG A
	137,998	76	Gravel roads, HSG A
	2,643	98	Unconnected pavement, HSG A
	190,947	30	Woods, Good, HSG A
	106,991	45	Woods, Poor, HSG A
	785,105	53	Weighted Average
	782,462		99.66% Pervious Area
	2,643		0.34% Impervious Area
	2,643		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.1447	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.18"
2.5	116	0.0233	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.6	142	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.2	76	0.0998	5.09		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.1	159	0.0648	1.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.9	141	0.0289	2.74		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	17	0.5147	11.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.7	84	0.0111	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	79	0.0094	1.56		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	104	0.2916	2.70		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.0	968	Total			

Subcatchment E-2A:



Summary for Subcatchment E-2B:

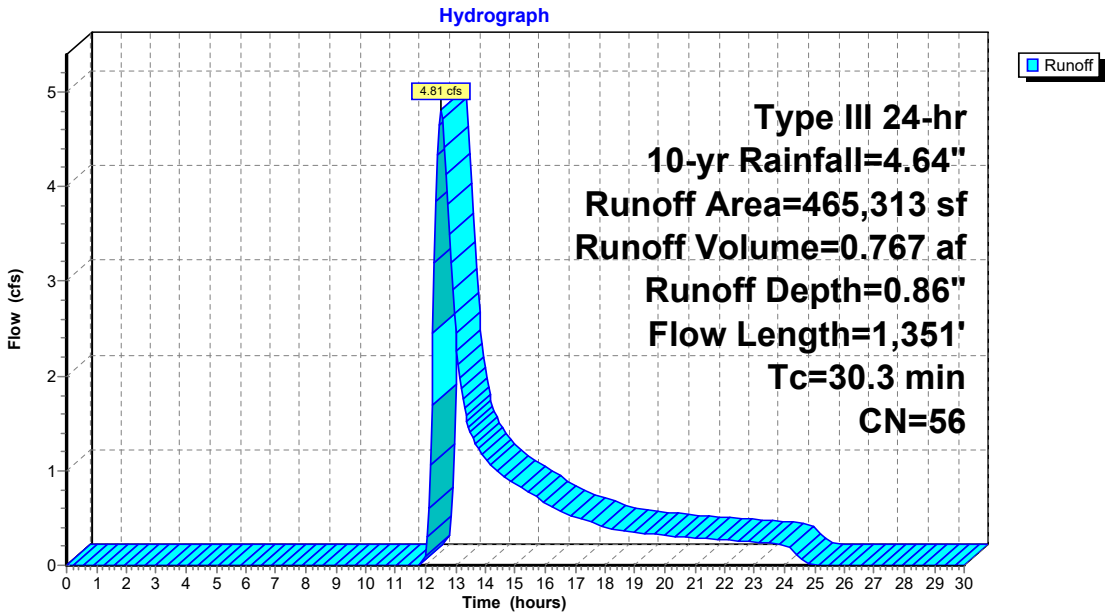
Runoff = 4.81 cfs @ 12.52 hrs, Volume= 0.767 af, Depth= 0.86"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.64"

	Area (sf)	CN	Description
*	236,523	58	Sand, HSG A
	89,848	76	Gravel roads, HSG A
	44,255	30	Woods, Good, HSG A
	94,687	45	Woods, Poor, HSG A
	465,313	56	Weighted Average
	465,313		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	48	0.0144	1.04		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.18"
5.4	2	0.0010	0.01		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
8.5	81	0.0010	0.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	39	0.1085	5.30		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.5	58	0.1845	2.15		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.8	74	0.0018	0.21		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	75	0.0469	3.49		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.9	75	0.0181	0.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	268	0.0153	1.99		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	51	0.1731	2.08		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	76	0.2367	7.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
4.1	504	0.0165	2.07		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
30.3	1,351	Total			

Subcatchment E-2B:



Summary for Subcatchment E-3:

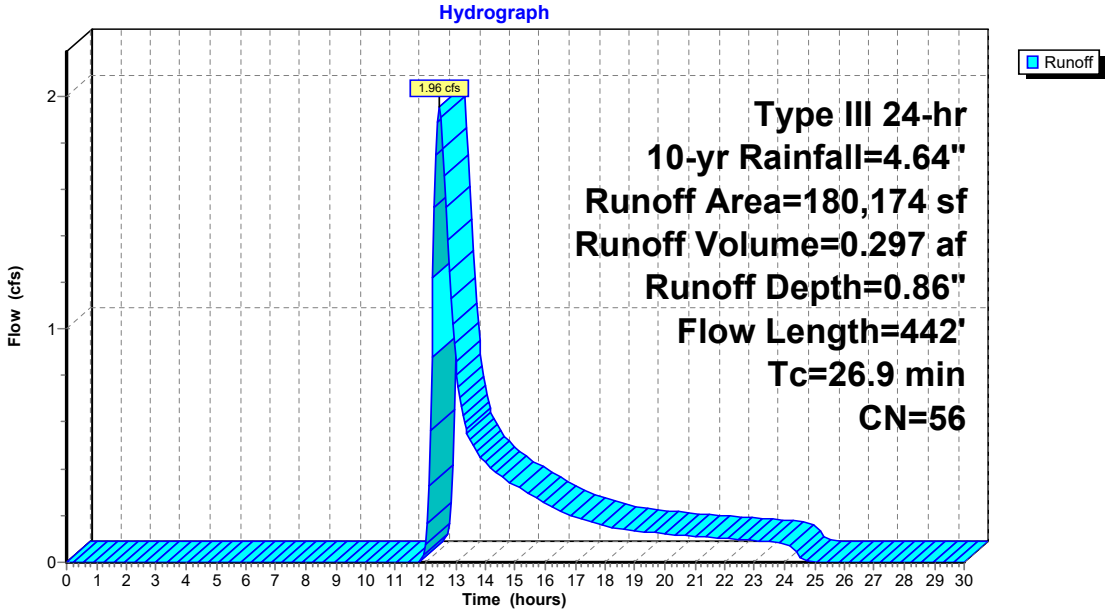
Runoff = 1.96 cfs @ 12.47 hrs, Volume= 0.297 af, Depth= 0.86"
Routed to Link POA-3 : Retained On-Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.64"

	Area (sf)	CN	Description
*	65,464	58	Sand, HSG A
	54,877	76	Gravel roads, HSG A
	43,662	30	Woods, Good, HSG A
	16,171	45	Woods, Poor, HSG A
	180,174	56	Weighted Average
	180,174		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	50	0.0194	0.04		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
1.3	97	0.0662	1.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.1	64	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	231	0.0204	2.30		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
26.9	442	Total			

Subcatchment E-3:



Summary for Pond 1P:

Inflow Area = 10.682 ac, 0.00% Impervious, Inflow Depth = 0.86" for 10-yr event
Inflow = 4.81 cfs @ 12.52 hrs, Volume= 0.767 af
Outflow = 1.87 cfs @ 13.20 hrs, Volume= 0.767 af, Atten= 61%, Lag= 40.7 min
Discarded = 1.87 cfs @ 13.20 hrs, Volume= 0.767 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link POA-2 : Bordering Vegetated Wetland

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 40.29' @ 13.20 hrs Surf.Area= 9,741 sf Storage= 7,179 cf

Plug-Flow detention time= 36.9 min calculated for 0.766 af (100% of inflow)
Center-of-Mass det. time= 36.9 min (955.4 - 918.5)

Volume	Invert	Avail.Storage	Storage Description
#1	39.00'	91,759 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

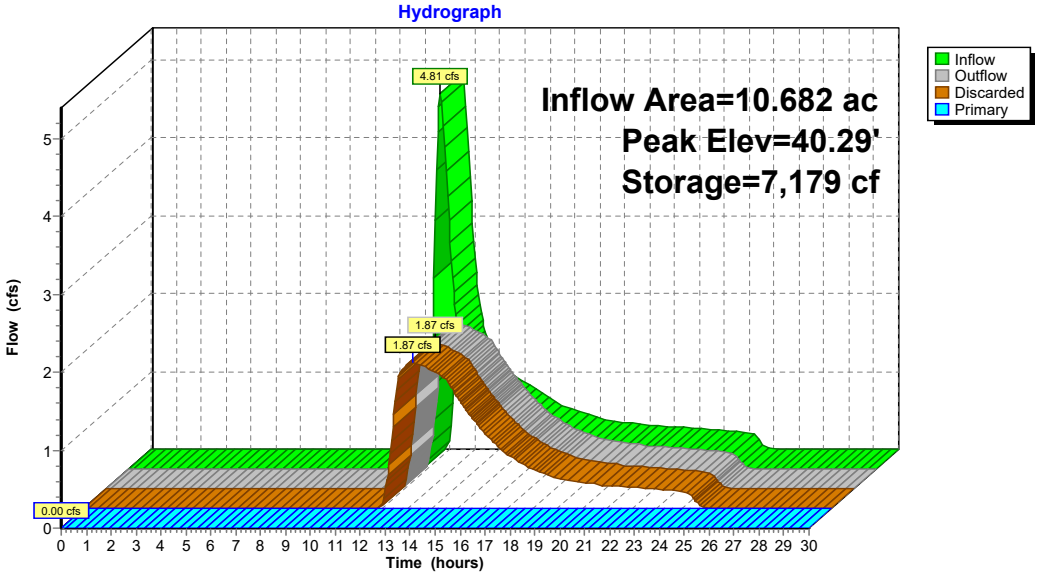
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
39.00	1,366	0	0	1,366
40.00	8,624	4,474	4,474	8,628
41.00	12,688	10,591	15,065	12,708
42.00	13,817	13,248	28,313	13,908
43.00	14,827	14,319	42,632	15,004
44.00	15,667	15,245	57,878	15,951
45.00	16,950	16,304	74,182	17,312
46.00	18,212	17,577	91,759	18,658

Device	Routing	Invert	Outlet Devices
#1	Discarded	39.00'	**8.270 in/hr Exfiltration over Wetted area**
#2	Primary	44.00'	**15.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=1.87 cfs @ 13.20 hrs HW=40.29' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 1.87 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=39.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 1P:



Stage-Area-Storage for Pond 1P:

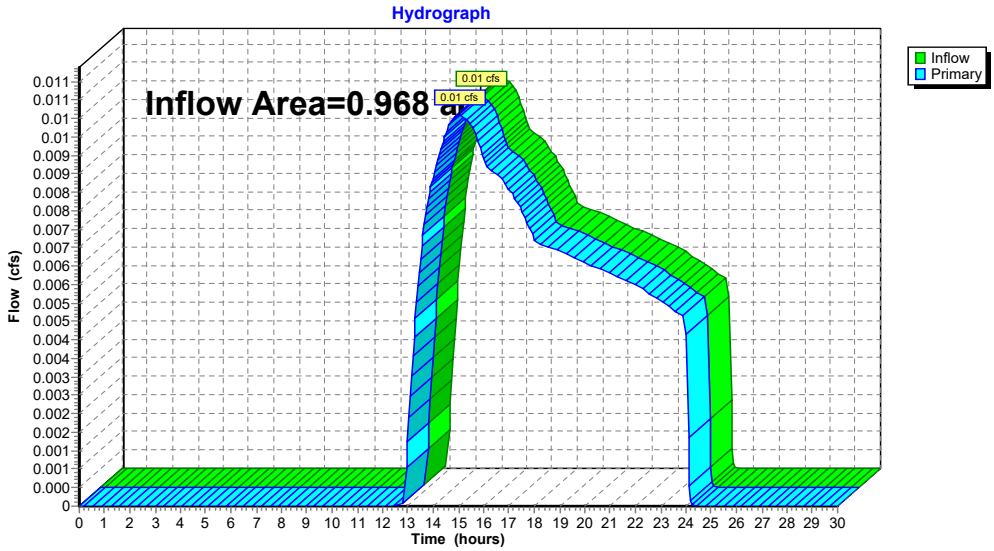
Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
39.00	1,366	1,366	0	42.60	14,419	14,561	36,783
39.10	1,811	1,811	158	42.70	14,520	14,671	38,230
39.20	2,318	2,318	364	42.80	14,622	14,782	39,688
39.30	2,887	2,888	624	42.90	14,724	14,893	41,155
39.40	3,519	3,520	944	43.00	14,827	15,004	42,632
39.50	4,214	4,215	1,330	43.10	14,910	15,097	44,119
39.60	4,971	4,972	1,788	43.20	14,993	15,191	45,614
39.70	5,790	5,792	2,326	43.30	15,077	15,285	47,118
39.80	6,672	6,675	2,949	43.40	15,160	15,380	48,630
39.90	7,617	7,620	3,663	43.50	15,244	15,474	50,150
40.00	8,624	8,628	4,474	43.60	15,328	15,569	51,679
40.10	8,995	9,000	5,355	43.70	15,413	15,664	53,216
40.20	9,374	9,381	6,273	43.80	15,497	15,760	54,761
40.30	9,761	9,769	7,230	43.90	15,582	15,855	56,315
40.40	10,156	10,166	8,226	44.00	15,667	15,951	57,878
40.50	10,558	10,570	9,261	44.10	15,793	16,085	59,450
40.60	10,969	10,982	10,338	44.20	15,920	16,219	61,036
40.70	11,387	11,401	11,455	44.30	16,047	16,354	62,634
40.80	11,813	11,829	12,615	44.40	16,174	16,489	64,245
40.90	12,246	12,265	13,818	44.50	16,302	16,625	65,869
41.00	12,688	12,708	15,065	44.60	16,431	16,761	67,506
41.10	12,799	12,826	16,339	44.70	16,560	16,898	69,155
41.20	12,910	12,944	17,625	44.80	16,689	17,035	70,818
41.30	13,022	13,063	18,921	44.90	16,819	17,173	72,493
41.40	13,134	13,182	20,229	45.00	16,950	17,312	74,182
41.50	13,246	13,302	21,548	45.10	17,074	17,444	75,883
41.60	13,360	13,422	22,878	45.20	17,199	17,577	77,597
41.70	13,473	13,543	24,220	45.30	17,324	17,710	79,323
41.80	13,587	13,664	25,573	45.40	17,449	17,844	81,061
41.90	13,702	13,786	26,937	45.50	17,575	17,979	82,813
42.00	13,817	13,908	28,313	45.60	17,702	18,114	84,577
42.10	13,916	14,016	29,700	45.70	17,829	18,249	86,353
42.20	14,016	14,124	31,097	45.80	17,956	18,385	88,142
42.30	14,116	14,233	32,503	45.90	18,084	18,521	89,944
42.40	14,217	14,342	33,920	46.00	**18,212**	**18,658**	**91,759**
42.50	14,318	14,451	35,347				

Summary for Link POA-1: Isolated Wetland

Inflow Area = 0.968 ac, 0.00% Impervious, Inflow Depth = 0.08" for 10-yr event
Inflow = 0.01 cfs @ 15.06 hrs, Volume= 0.007 af
Primary = 0.01 cfs @ 15.06 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-1: Isolated Wetland

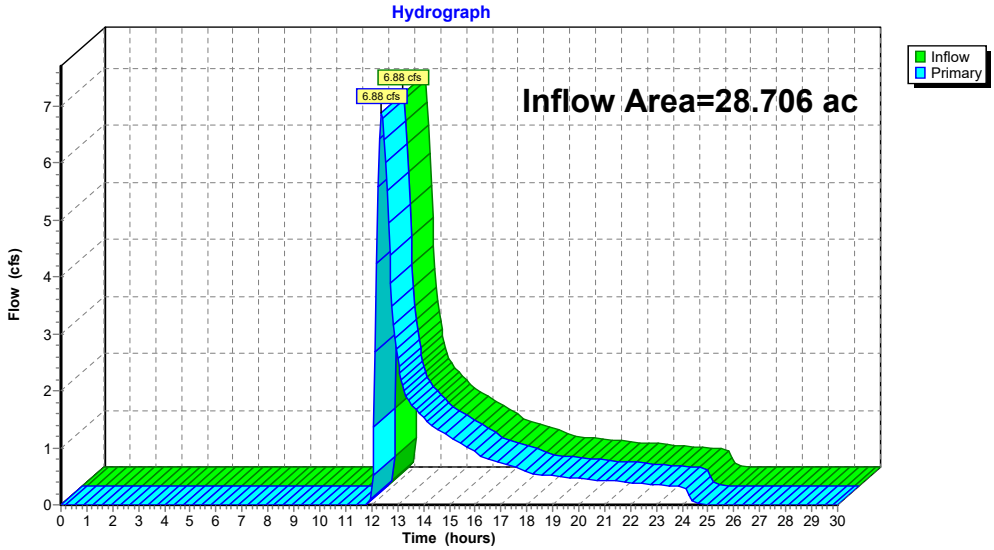


Summary for Link POA-2: Bordering Vegetated Wetland

Inflow Area = 28.706 ac, 0.21% Impervious, Inflow Depth = 0.44" for 10-yr event
Inflow = 6.88 cfs @ 12.38 hrs, Volume= 1.052 af
Primary = 6.88 cfs @ 12.38 hrs, Volume= 1.052 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-2: Bordering Vegetated Wetland

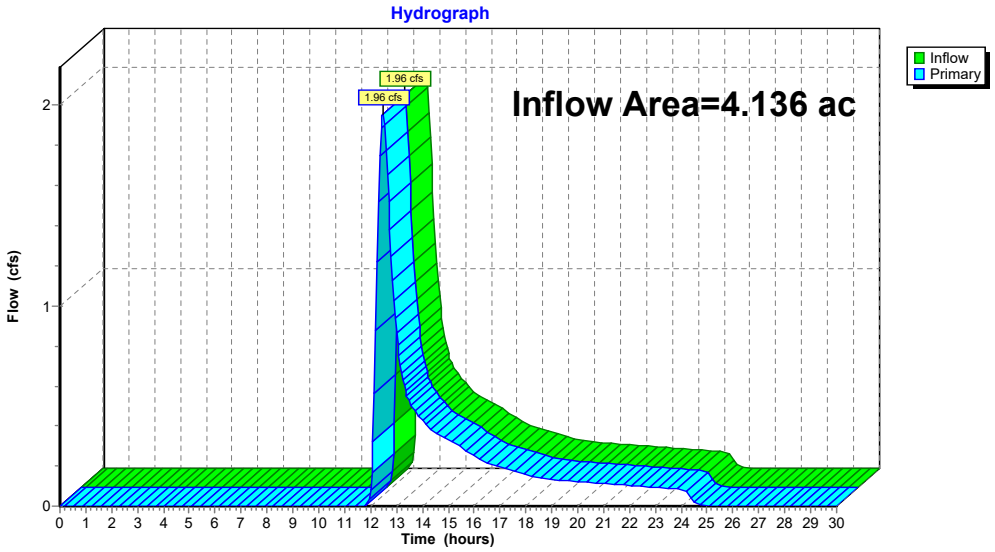


Summary for Link POA-3: Retained On-Site

Inflow Area = 4.136 ac, 0.00% Impervious, Inflow Depth = 0.86" for 10-yr event
Inflow = 1.96 cfs @ 12.47 hrs, Volume= 0.297 af
Primary = 1.96 cfs @ 12.47 hrs, Volume= 0.297 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-3: Retained On-Site



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE-1: Runoff Area=42,163 sf 0.00% Impervious Runoff Depth=0.40"
Flow Length=187' Tc=6.0 min CN=37 Runoff=0.14 cfs 0.032 af

SubcatchmentE-2A: Runoff Area=785,105 sf 0.34% Impervious Runoff Depth=1.49"
Flow Length=968' Tc=20.0 min CN=53 Runoff=18.34 cfs 2.239 af

SubcatchmentE-2B: Runoff Area=465,313 sf 0.00% Impervious Runoff Depth=1.73"
Flow Length=1,351' Tc=30.3 min CN=56 Runoff=11.15 cfs 1.544 af

SubcatchmentE-3: Runoff Area=180,174 sf 0.00% Impervious Runoff Depth=1.73"
Flow Length=442' Tc=26.9 min CN=56 Runoff=4.54 cfs 0.598 af

Pond 1P: Peak Elev=41.56' Storage=22,304 cf Inflow=11.15 cfs 1.544 af
Discarded=2.56 cfs 1.544 af Primary=0.00 cfs 0.000 af Outflow=2.56 cfs 1.544 af

Link POA-1: Isolated Wetland Inflow=0.14 cfs 0.032 af
Primary=0.14 cfs 0.032 af

Link POA-2: Bordering Vegetated Wetland Inflow=18.34 cfs 2.239 af
Primary=18.34 cfs 2.239 af

Link POA-3: Retained On-Site Inflow=4.54 cfs 0.598 af
Primary=4.54 cfs 0.598 af

Total Runoff Area = 33.810 ac Runoff Volume = 4.412 af Average Runoff Depth = 1.57"
99.82% Pervious = 33.749 ac 0.18% Impervious = 0.061 ac

Summary for Subcatchment E-1:

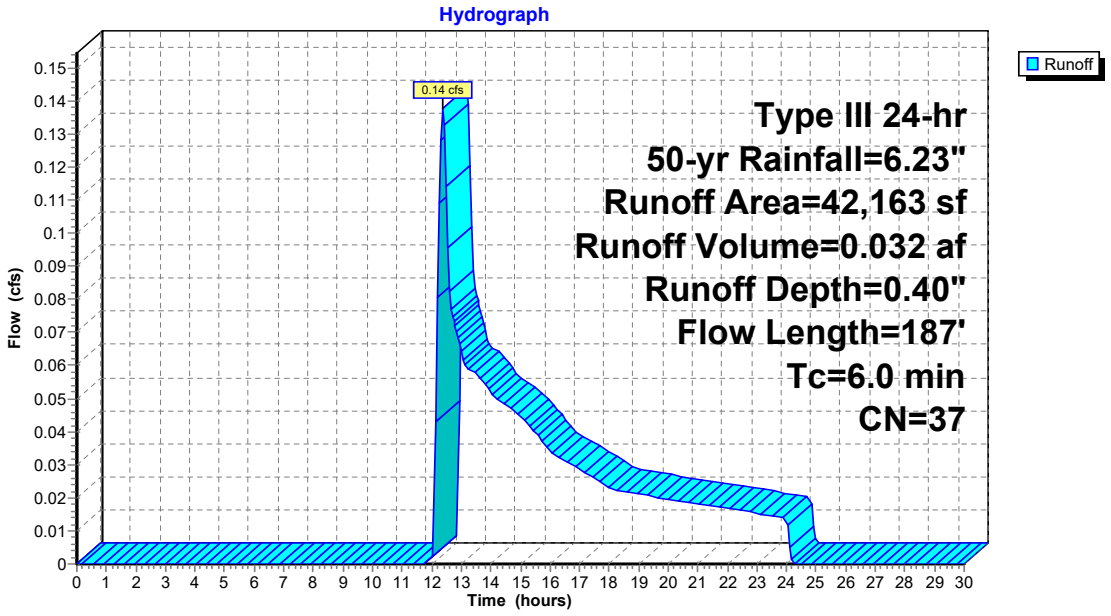
Runoff = 0.14 cfs @ 12.37 hrs, Volume= 0.032 af, Depth= 0.40"
Routed to Link POA-1 : Isolated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-yr Rainfall=6.23"

	Area (sf)	CN	Description
*	7,776	58	Sand, HSG A
	1,578	76	Gravel roads, HSG A
	32,809	30	Woods, Good, HSG A
	42,163	37	Weighted Average
	42,163		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	23	0.4500	0.12		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
0.1	27	0.3555	3.34		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.18"
0.3	47	0.2121	2.30		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	90	0.0495	1.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0					**Direct Entry,**
6.0	187	Total			

Subcatchment E-1:



Summary for Subcatchment E-2A:

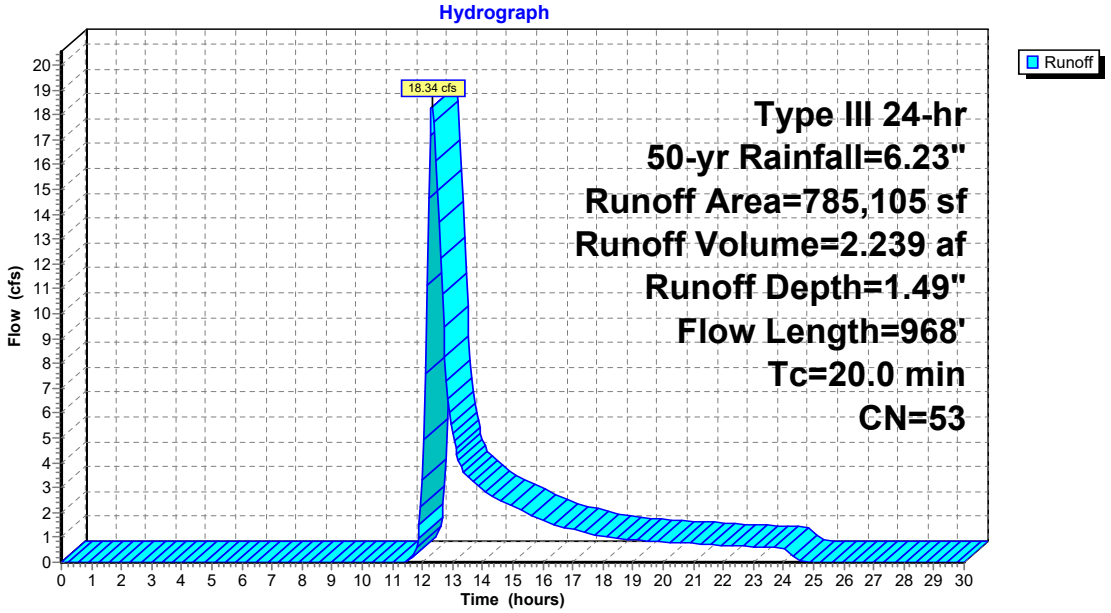
Runoff = 18.34 cfs @ 12.32 hrs, Volume= 2.239 af, Depth= 1.49"
Routed to Link POA-2 : Bordering Vegetated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-yr Rainfall=6.23"

	Area (sf)	CN	Description
*	346,526	58	Sand, HSG A
	137,998	76	Gravel roads, HSG A
	2,643	98	Unconnected pavement, HSG A
	190,947	30	Woods, Good, HSG A
	106,991	45	Woods, Poor, HSG A
	785,105	53	Weighted Average
	782,462		99.66% Pervious Area
	2,643		0.34% Impervious Area
	2,643		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.1447	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.18"
2.5	116	0.0233	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.6	142	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.2	76	0.0998	5.09		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.1	159	0.0648	1.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.9	141	0.0289	2.74		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	17	0.5147	11.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.7	84	0.0111	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	79	0.0094	1.56		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	104	0.2916	2.70		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.0	968	Total			

Subcatchment E-2A:



Summary for Subcatchment E-2B:

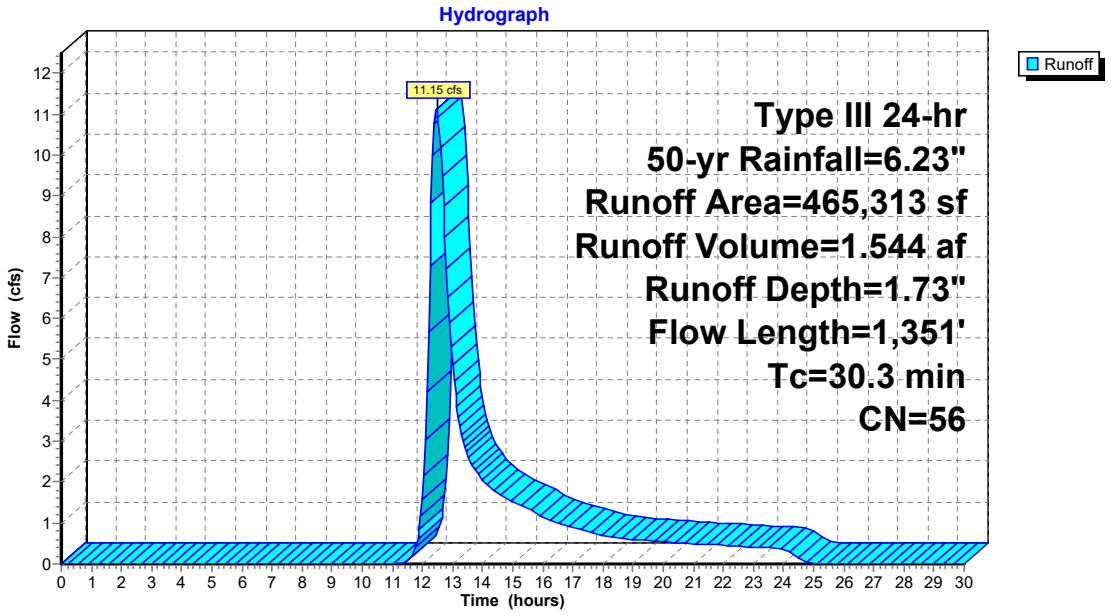
Runoff = 11.15 cfs @ 12.47 hrs, Volume= 1.544 af, Depth= 1.73"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-yr Rainfall=6.23"

	Area (sf)	CN	Description
*	236,523	58	Sand, HSG A
	89,848	76	Gravel roads, HSG A
	44,255	30	Woods, Good, HSG A
	94,687	45	Woods, Poor, HSG A
	465,313	56	Weighted Average
	465,313		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	48	0.0144	1.04		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.18"
5.4	2	0.0010	0.01		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
8.5	81	0.0010	0.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	39	0.1085	5.30		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.5	58	0.1845	2.15		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.8	74	0.0018	0.21		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	75	0.0469	3.49		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.9	75	0.0181	0.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	268	0.0153	1.99		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	51	0.1731	2.08		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	76	0.2367	7.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
4.1	504	0.0165	2.07		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
30.3	1,351	Total			

Subcatchment E-2B:



Summary for Subcatchment E-3:

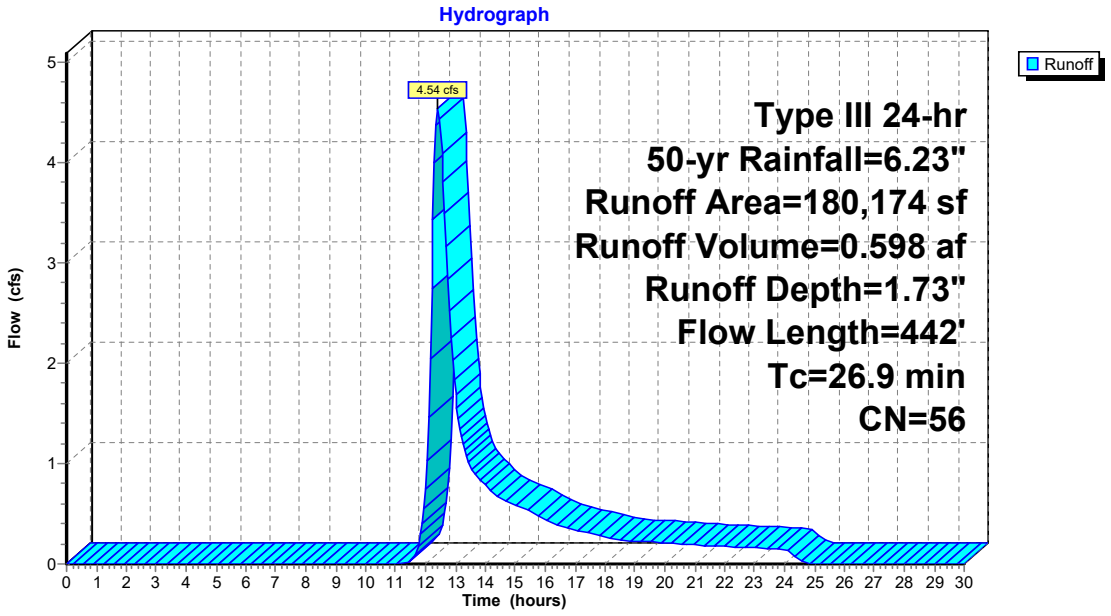
Runoff = 4.54 cfs @ 12.42 hrs, Volume= 0.598 af, Depth= 1.73"
Routed to Link POA-3 : Retained On-Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-yr Rainfall=6.23"

	Area (sf)	CN	Description
*	65,464	58	Sand, HSG A
	54,877	76	Gravel roads, HSG A
	43,662	30	Woods, Good, HSG A
	16,171	45	Woods, Poor, HSG A
	180,174	56	Weighted Average
	180,174		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	50	0.0194	0.04		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
1.3	97	0.0662	1.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.1	64	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	231	0.0204	2.30		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
26.9	442	Total			

Subcatchment E-3:



Summary for Pond 1P:

Inflow Area = 10.682 ac, 0.00% Impervious, Inflow Depth = 1.73" for 50-yr event
Inflow = 11.15 cfs @ 12.47 hrs, Volume= 1.544 af
Outflow = 2.56 cfs @ 13.54 hrs, Volume= 1.544 af, Atten= 77%, Lag= 63.9 min
Discarded = 2.56 cfs @ 13.54 hrs, Volume= 1.544 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link POA-2 : Bordering Vegetated Wetland

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 41.56' @ 13.54 hrs Surf.Area= 13,311 sf Storage= 22,304 cf

Plug-Flow detention time= 89.3 min calculated for 1.541 af (100% of inflow)
Center-of-Mass det. time= 89.1 min (983.0 - 893.9)

Volume	Invert	Avail.Storage	Storage Description
#1	39.00'	91,759 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

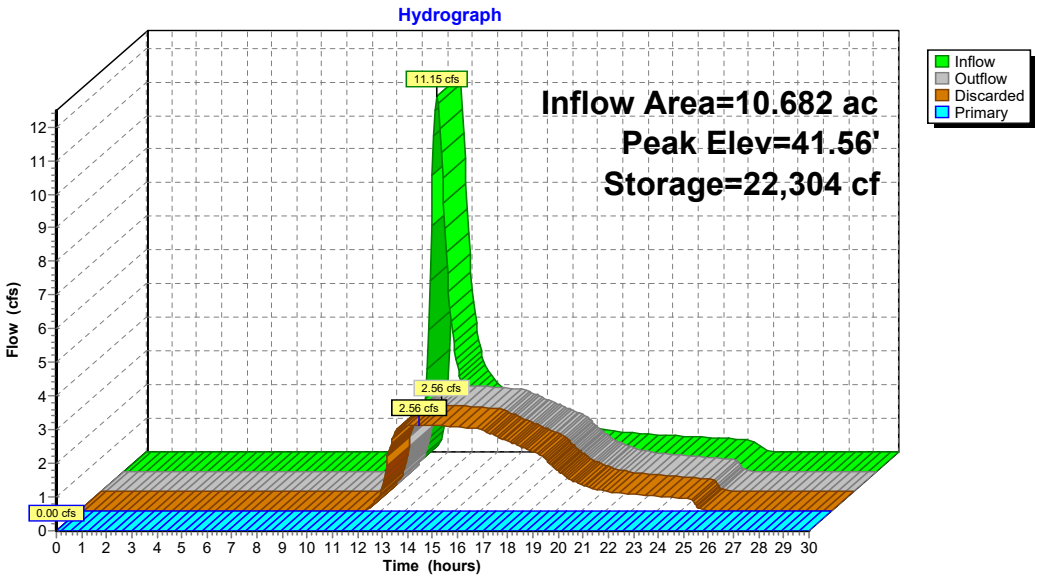
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
39.00	1,366	0	0	1,366
40.00	8,624	4,474	4,474	8,628
41.00	12,688	10,591	15,065	12,708
42.00	13,817	13,248	28,313	13,908
43.00	14,827	14,319	42,632	15,004
44.00	15,667	15,245	57,878	15,951
45.00	16,950	16,304	74,182	17,312
46.00	18,212	17,577	91,759	18,658

Device	Routing	Invert	Outlet Devices
#1	Discarded	39.00'	**8.270 in/hr Exfiltration over Wetted area**
#2	Primary	44.00'	**15.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=2.56 cfs @ 13.54 hrs HW=41.56' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 2.56 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=39.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 1P:



Stage-Area-Storage for Pond 1P:

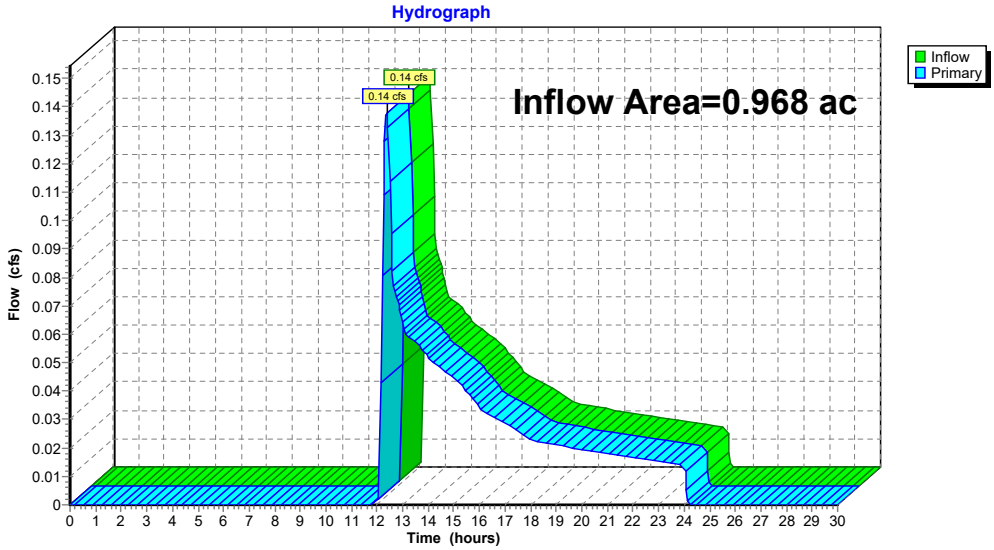
Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
39.00	1,366	1,366	0	42.60	14,419	14,561	36,783
39.10	1,811	1,811	158	42.70	14,520	14,671	38,230
39.20	2,318	2,318	364	42.80	14,622	14,782	39,688
39.30	2,887	2,888	624	42.90	14,724	14,893	41,155
39.40	3,519	3,520	944	43.00	14,827	15,004	42,632
39.50	4,214	4,215	1,330	43.10	14,910	15,097	44,119
39.60	4,971	4,972	1,788	43.20	14,993	15,191	45,614
39.70	5,790	5,792	2,326	43.30	15,077	15,285	47,118
39.80	6,672	6,675	2,949	43.40	15,160	15,380	48,630
39.90	7,617	7,620	3,663	43.50	15,244	15,474	50,150
40.00	8,624	8,628	4,474	43.60	15,328	15,569	51,679
40.10	8,995	9,000	5,355	43.70	15,413	15,664	53,216
40.20	9,374	9,381	6,273	43.80	15,497	15,760	54,761
40.30	9,761	9,769	7,230	43.90	15,582	15,855	56,315
40.40	10,156	10,166	8,226	44.00	15,667	15,951	57,878
40.50	10,558	10,570	9,261	44.10	15,793	16,085	59,450
40.60	10,969	10,982	10,338	44.20	15,920	16,219	61,036
40.70	11,387	11,401	11,455	44.30	16,047	16,354	62,634
40.80	11,813	11,829	12,615	44.40	16,174	16,489	64,245
40.90	12,246	12,265	13,818	44.50	16,302	16,625	65,869
41.00	12,688	12,708	15,065	44.60	16,431	16,761	67,506
41.10	12,799	12,826	16,339	44.70	16,560	16,898	69,155
41.20	12,910	12,944	17,625	44.80	16,689	17,035	70,818
41.30	13,022	13,063	18,921	44.90	16,819	17,173	72,493
41.40	13,134	13,182	20,229	45.00	16,950	17,312	74,182
41.50	13,246	13,302	21,548	45.10	17,074	17,444	75,883
41.60	13,360	13,422	22,878	45.20	17,199	17,577	77,597
41.70	13,473	13,543	24,220	45.30	17,324	17,710	79,323
41.80	13,587	13,664	25,573	45.40	17,449	17,844	81,061
41.90	13,702	13,786	26,937	45.50	17,575	17,979	82,813
42.00	13,817	13,908	28,313	45.60	17,702	18,114	84,577
42.10	13,916	14,016	29,700	45.70	17,829	18,249	86,353
42.20	14,016	14,124	31,097	45.80	17,956	18,385	88,142
42.30	14,116	14,233	32,503	45.90	18,084	18,521	89,944
42.40	14,217	14,342	33,920	46.00	**18,212**	**18,658**	**91,759**
42.50	14,318	14,451	35,347				

Summary for Link POA-1: Isolated Wetland

Inflow Area = 0.968 ac, 0.00% Impervious, Inflow Depth = 0.40" for 50-yr event
Inflow = 0.14 cfs @ 12.37 hrs, Volume= 0.032 af
Primary = 0.14 cfs @ 12.37 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-1: Isolated Wetland

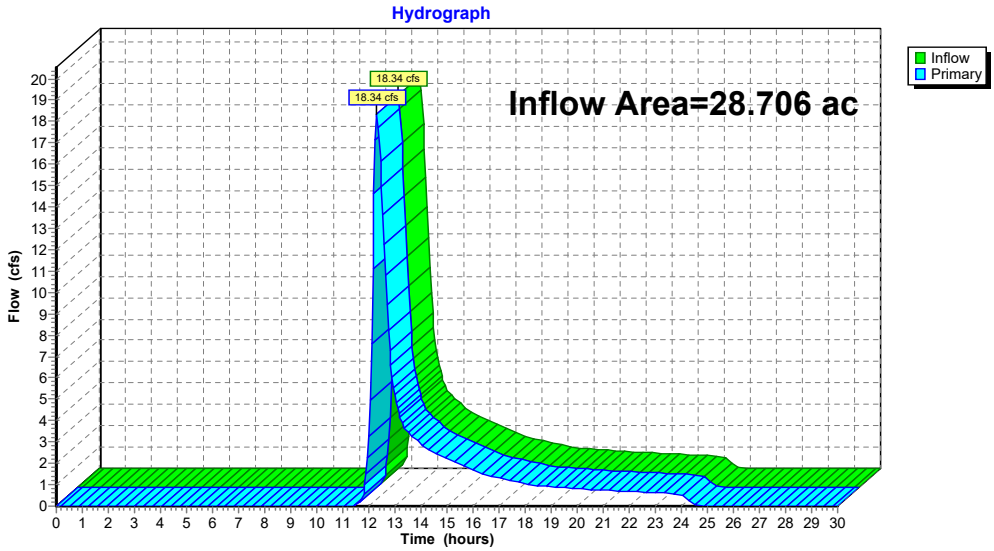


Summary for Link POA-2: Bordering Vegetated Wetland

Inflow Area = 28.706 ac, 0.21% Impervious, Inflow Depth = 0.94" for 50-yr event
Inflow = 18.34 cfs @ 12.32 hrs, Volume= 2.239 af
Primary = 18.34 cfs @ 12.32 hrs, Volume= 2.239 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-2: Bordering Vegetated Wetland

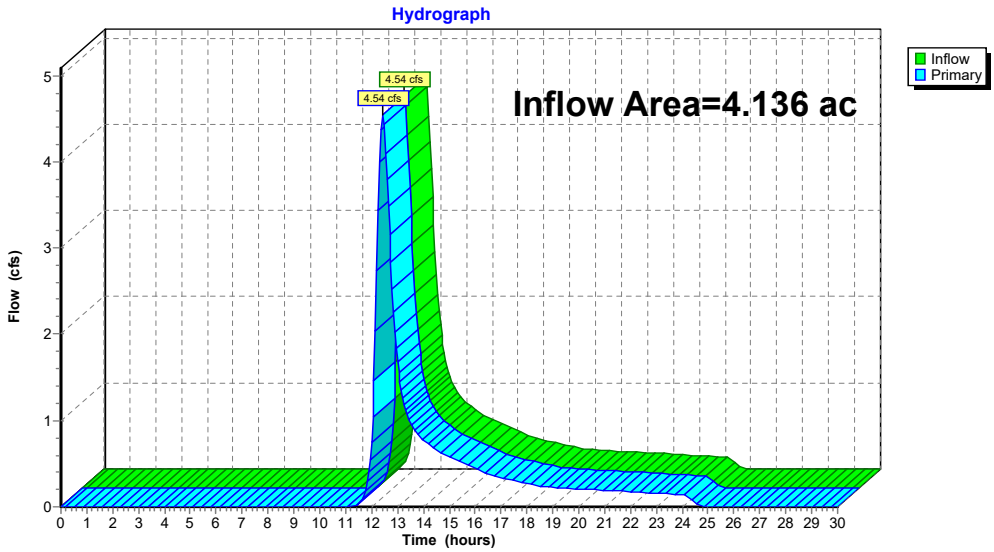


Summary for Link POA-3: Retained On-Site

Inflow Area = 4.136 ac, 0.00% Impervious, Inflow Depth = 1.73" for 50-yr event
Inflow = 4.54 cfs @ 12.42 hrs, Volume= 0.598 af
Primary = 4.54 cfs @ 12.42 hrs, Volume= 0.598 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-3: Retained On-Site



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE-1: Runoff Area=42,163 sf 0.00% Impervious Runoff Depth=0.61"
Flow Length=187' Tc=6.0 min CN=37 Runoff=0.26 cfs 0.049 af

SubcatchmentE-2A: Runoff Area=785,105 sf 0.34% Impervious Runoff Depth=1.91"
Flow Length=968' Tc=20.0 min CN=53 Runoff=24.50 cfs 2.866 af

SubcatchmentE-2B: Runoff Area=465,313 sf 0.00% Impervious Runoff Depth=2.19"
Flow Length=1,351' Tc=30.3 min CN=56 Runoff=14.45 cfs 1.946 af

SubcatchmentE-3: Runoff Area=180,174 sf 0.00% Impervious Runoff Depth=2.19"
Flow Length=442' Tc=26.9 min CN=56 Runoff=5.89 cfs 0.753 af

Pond 1P: Peak Elev=42.25' Storage=31,735 cf Inflow=14.45 cfs 1.946 af
Discarded=2.71 cfs 1.946 af Primary=0.00 cfs 0.000 af Outflow=2.71 cfs 1.946 af

Link POA-1: Isolated Wetland Inflow=0.26 cfs 0.049 af
Primary=0.26 cfs 0.049 af

Link POA-2: Bordering Vegetated Wetland Inflow=24.50 cfs 2.866 af
Primary=24.50 cfs 2.866 af

Link POA-3: Retained On-Site Inflow=5.89 cfs 0.753 af
Primary=5.89 cfs 0.753 af

Total Runoff Area = 33.810 ac Runoff Volume = 5.614 af Average Runoff Depth = 1.99"
99.82% Pervious = 33.749 ac 0.18% Impervious = 0.061 ac

Summary for Subcatchment E-1:

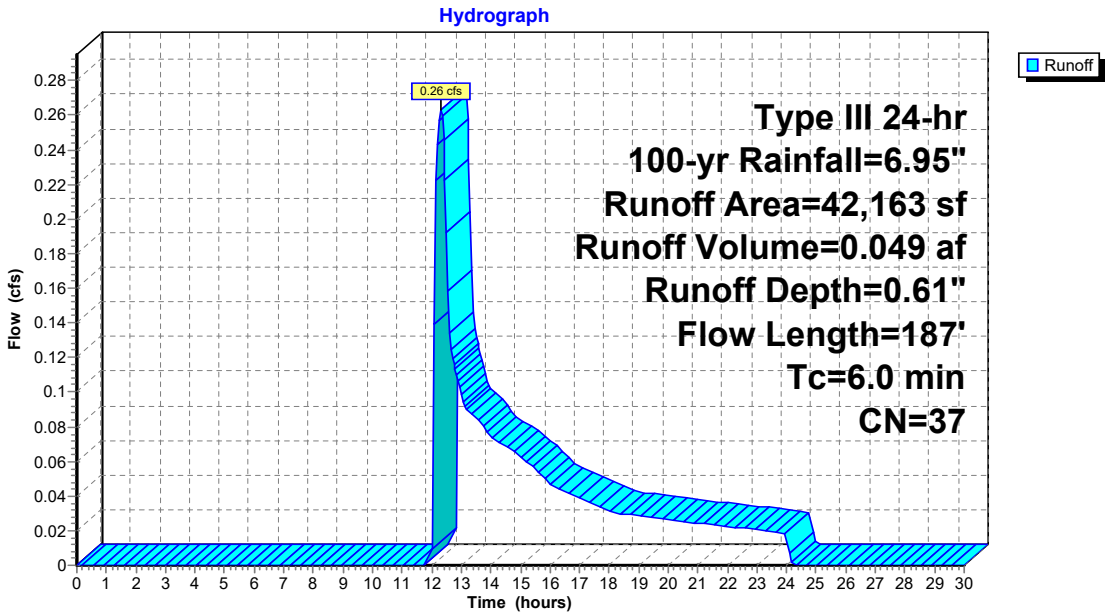
Runoff = 0.26 cfs @ 12.31 hrs, Volume= 0.049 af, Depth= 0.61"
Routed to Link POA-1 : Isolated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=6.95"

	Area (sf)	CN	Description
*	7,776	58	Sand, HSG A
	1,578	76	Gravel roads, HSG A
	32,809	30	Woods, Good, HSG A
	42,163	37	Weighted Average
	42,163		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	23	0.4500	0.12		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
0.1	27	0.3555	3.34		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.18"
0.3	47	0.2121	2.30		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	90	0.0495	1.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0					**Direct Entry,**
6.0	187	Total			

Subcatchment E-1:



Summary for Subcatchment E-2A:

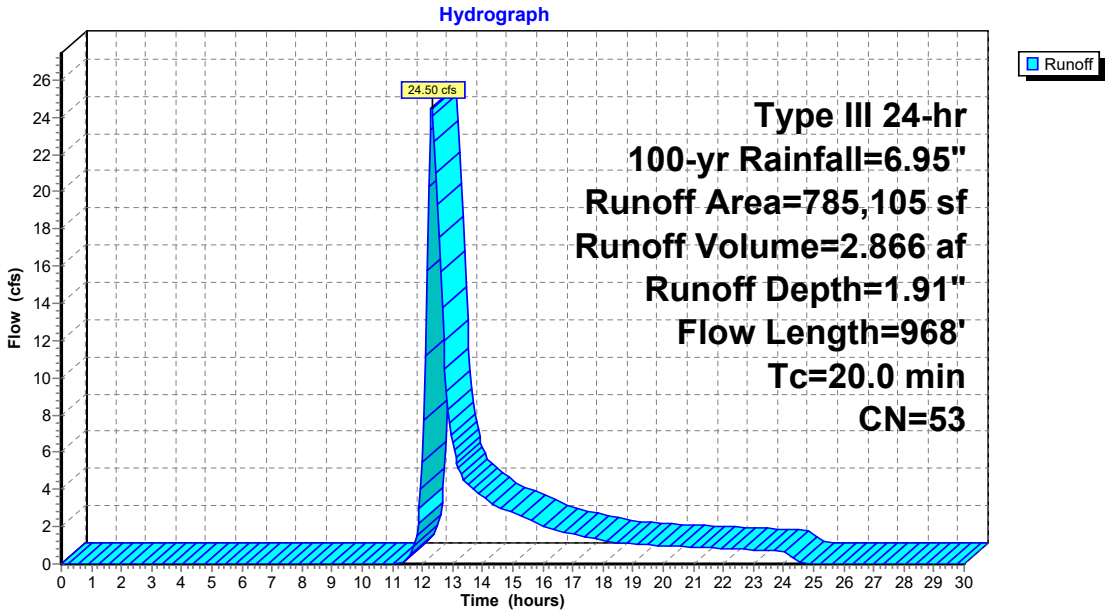
Runoff = 24.50 cfs @ 12.31 hrs, Volume= 2.866 af, Depth= 1.91"
Routed to Link POA-2 : Bordering Vegetated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=6.95"

	Area (sf)	CN	Description
*	346,526	58	Sand, HSG A
	137,998	76	Gravel roads, HSG A
	2,643	98	Unconnected pavement, HSG A
	190,947	30	Woods, Good, HSG A
	106,991	45	Woods, Poor, HSG A
	785,105	53	Weighted Average
	782,462		99.66% Pervious Area
	2,643		0.34% Impervious Area
	2,643		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.1447	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.18"
2.5	116	0.0233	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.6	142	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.2	76	0.0998	5.09		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.1	159	0.0648	1.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.9	141	0.0289	2.74		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	17	0.5147	11.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.7	84	0.0111	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	79	0.0094	1.56		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	104	0.2916	2.70		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.0	968	Total			

Subcatchment E-2A:



Summary for Subcatchment E-2B:

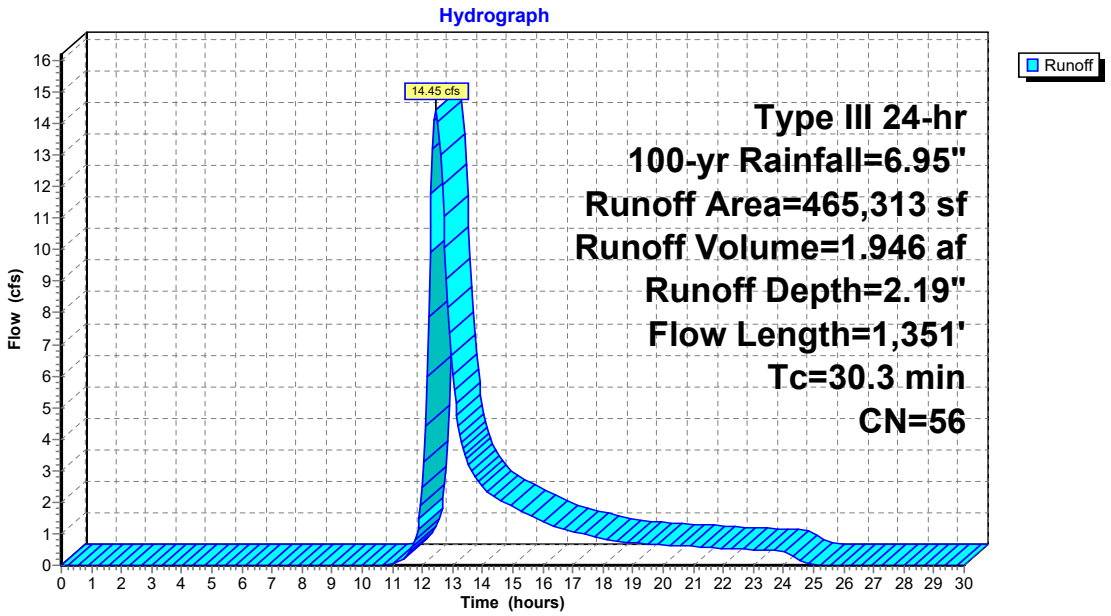
Runoff = 14.45 cfs @ 12.46 hrs, Volume= 1.946 af, Depth= 2.19"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=6.95"

	Area (sf)	CN	Description
*	236,523	58	Sand, HSG A
	89,848	76	Gravel roads, HSG A
	44,255	30	Woods, Good, HSG A
	94,687	45	Woods, Poor, HSG A
	465,313	56	Weighted Average
	465,313		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	48	0.0144	1.04		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.18"
5.4	2	0.0010	0.01		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
8.5	81	0.0010	0.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	39	0.1085	5.30		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.5	58	0.1845	2.15		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.8	74	0.0018	0.21		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	75	0.0469	3.49		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.9	75	0.0181	0.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	268	0.0153	1.99		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	51	0.1731	2.08		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	76	0.2367	7.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
4.1	504	0.0165	2.07		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
30.3	1,351	Total			

Subcatchment E-2B:



Summary for Subcatchment E-3:

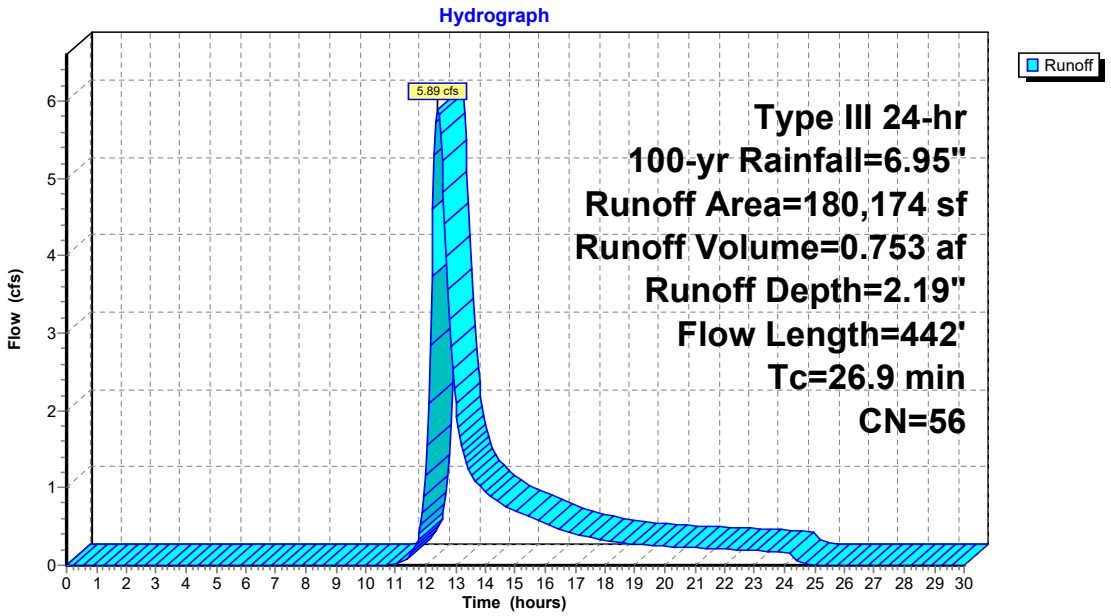
Runoff = 5.89 cfs @ 12.41 hrs, Volume= 0.753 af, Depth= 2.19"
Routed to Link POA-3 : Retained On-Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=6.95"

	Area (sf)	CN	Description
*	65,464	58	Sand, HSG A
	54,877	76	Gravel roads, HSG A
	43,662	30	Woods, Good, HSG A
	16,171	45	Woods, Poor, HSG A
	180,174	56	Weighted Average
	180,174		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	50	0.0194	0.04		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
1.3	97	0.0662	1.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.1	64	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	231	0.0204	2.30		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
26.9	442	Total			

Subcatchment E-3:



Summary for Pond 1P:

Inflow Area = 10.682 ac, 0.00% Impervious, Inflow Depth = 2.19" for 100-yr event
Inflow = 14.45 cfs @ 12.46 hrs, Volume= 1.946 af
Outflow = 2.71 cfs @ 13.80 hrs, Volume= 1.946 af, Atten= 81%, Lag= 80.3 min
Discarded = 2.71 cfs @ 13.80 hrs, Volume= 1.946 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link POA-2 : Bordering Vegetated Wetland

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 42.25' @ 13.80 hrs Surf.Area= 14,062 sf Storage= 31,735 cf

Plug-Flow detention time= 123.3 min calculated for 1.942 af (100% of inflow)
Center-of-Mass det. time= 123.1 min (1,009.6 - 886.5)

Volume	Invert	Avail.Storage	Storage Description
#1	39.00'	91,759 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

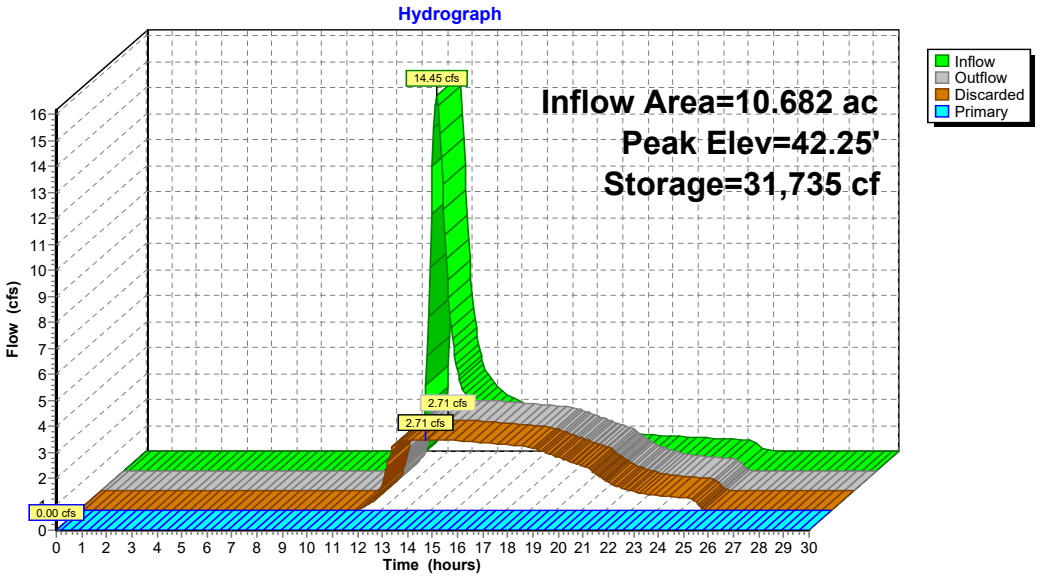
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
39.00	1,366	0	0	1,366
40.00	8,624	4,474	4,474	8,628
41.00	12,688	10,591	15,065	12,708
42.00	13,817	13,248	28,313	13,908
43.00	14,827	14,319	42,632	15,004
44.00	15,667	15,245	57,878	15,951
45.00	16,950	16,304	74,182	17,312
46.00	18,212	17,577	91,759	18,658

Device	Routing	Invert	Outlet Devices
#1	Discarded	39.00'	**8.270 in/hr Exfiltration over Wetted area**
#2	Primary	44.00'	**15.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=2.71 cfs @ 13.80 hrs HW=42.25' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 2.71 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=39.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 1P:



Stage-Area-Storage for Pond 1P:

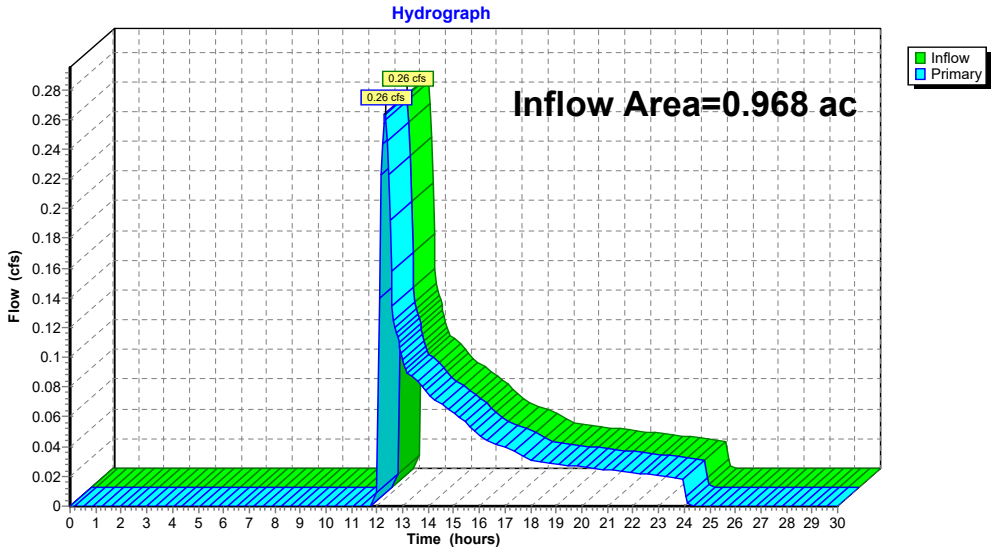
Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
39.00	1,366	1,366	0	42.60	14,419	14,561	36,783
39.10	1,811	1,811	158	42.70	14,520	14,671	38,230
39.20	2,318	2,318	364	42.80	14,622	14,782	39,688
39.30	2,887	2,888	624	42.90	14,724	14,893	41,155
39.40	3,519	3,520	944	43.00	14,827	15,004	42,632
39.50	4,214	4,215	1,330	43.10	14,910	15,097	44,119
39.60	4,971	4,972	1,788	43.20	14,993	15,191	45,614
39.70	5,790	5,792	2,326	43.30	15,077	15,285	47,118
39.80	6,672	6,675	2,949	43.40	15,160	15,380	48,630
39.90	7,617	7,620	3,663	43.50	15,244	15,474	50,150
40.00	8,624	8,628	4,474	43.60	15,328	15,569	51,679
40.10	8,995	9,000	5,355	43.70	15,413	15,664	53,216
40.20	9,374	9,381	6,273	43.80	15,497	15,760	54,761
40.30	9,761	9,769	7,230	43.90	15,582	15,855	56,315
40.40	10,156	10,166	8,226	44.00	15,667	15,951	57,878
40.50	10,558	10,570	9,261	44.10	15,793	16,085	59,450
40.60	10,969	10,982	10,338	44.20	15,920	16,219	61,036
40.70	11,387	11,401	11,455	44.30	16,047	16,354	62,634
40.80	11,813	11,829	12,615	44.40	16,174	16,489	64,245
40.90	12,246	12,265	13,818	44.50	16,302	16,625	65,869
41.00	12,688	12,708	15,065	44.60	16,431	16,761	67,506
41.10	12,799	12,826	16,339	44.70	16,560	16,898	69,155
41.20	12,910	12,944	17,625	44.80	16,689	17,035	70,818
41.30	13,022	13,063	18,921	44.90	16,819	17,173	72,493
41.40	13,134	13,182	20,229	45.00	16,950	17,312	74,182
41.50	13,246	13,302	21,548	45.10	17,074	17,444	75,883
41.60	13,360	13,422	22,878	45.20	17,199	17,577	77,597
41.70	13,473	13,543	24,220	45.30	17,324	17,710	79,323
41.80	13,587	13,664	25,573	45.40	17,449	17,844	81,061
41.90	13,702	13,786	26,937	45.50	17,575	17,979	82,813
42.00	13,817	13,908	28,313	45.60	17,702	18,114	84,577
42.10	13,916	14,016	29,700	45.70	17,829	18,249	86,353
42.20	14,016	14,124	31,097	45.80	17,956	18,385	88,142
42.30	14,116	14,233	32,503	45.90	18,084	18,521	89,944
42.40	14,217	14,342	33,920	46.00	**18,212**	**18,658**	**91,759**
42.50	14,318	14,451	35,347				

Summary for Link POA-1: Isolated Wetland

Inflow Area = 0.968 ac, 0.00% Impervious, Inflow Depth = 0.61" for 100-yr event
Inflow = 0.26 cfs @ 12.31 hrs, Volume= 0.049 af
Primary = 0.26 cfs @ 12.31 hrs, Volume= 0.049 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-1: Isolated Wetland

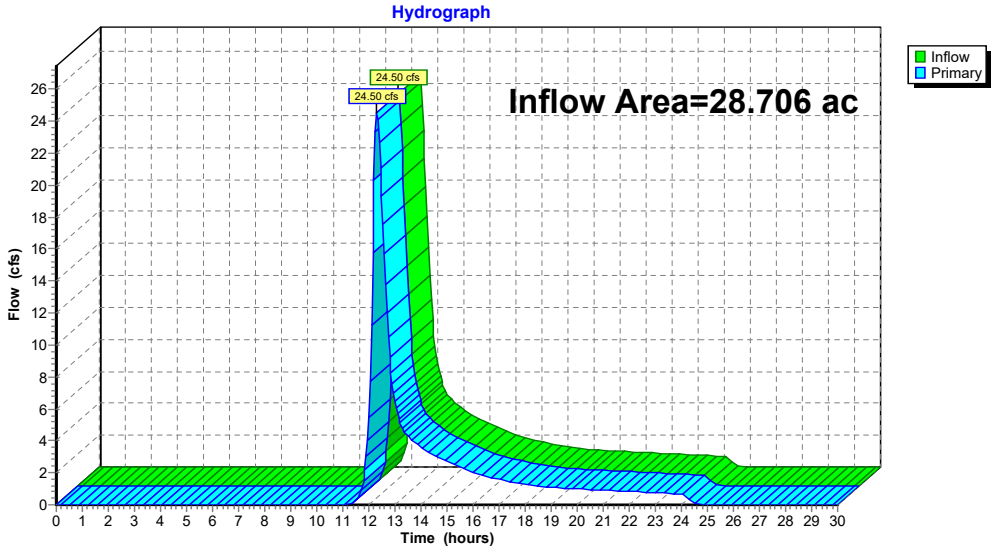


Summary for Link POA-2: Bordering Vegetated Wetland

Inflow Area = 28.706 ac, 0.21% Impervious, Inflow Depth = 1.20" for 100-yr event
Inflow = 24.50 cfs @ 12.31 hrs, Volume= 2.866 af
Primary = 24.50 cfs @ 12.31 hrs, Volume= 2.866 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-2: Bordering Vegetated Wetland

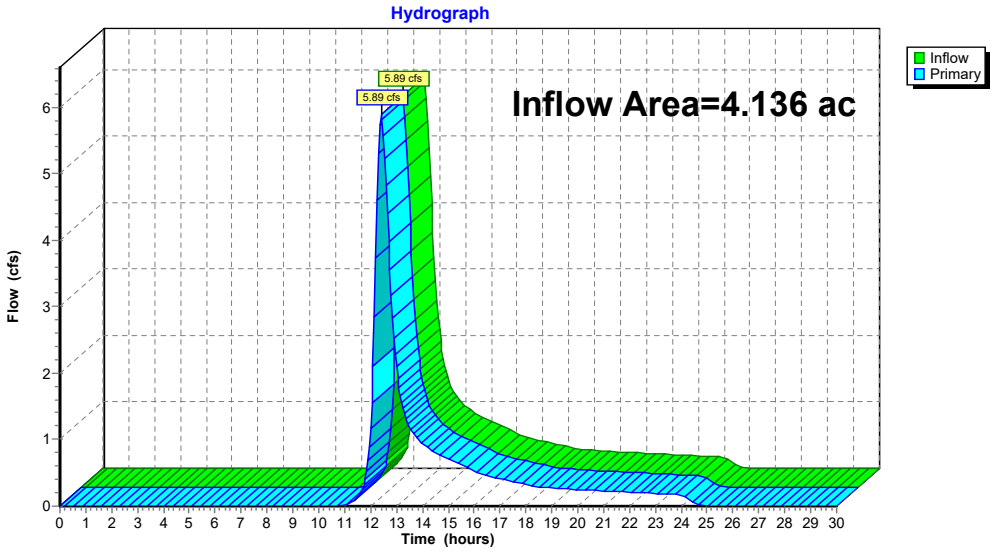


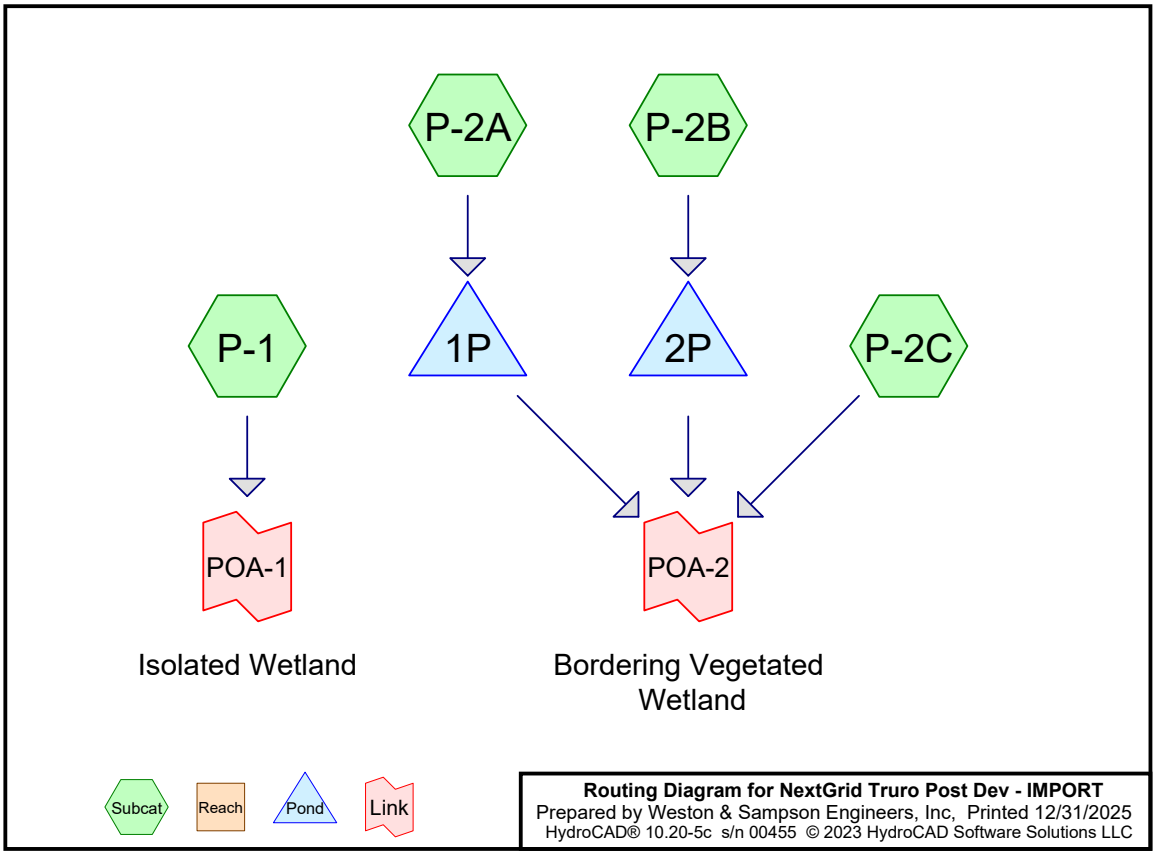
Summary for Link POA-3: Retained On-Site

Inflow Area = 4.136 ac, 0.00% Impervious, Inflow Depth = 2.19" for 100-yr event
Inflow = 5.89 cfs @ 12.41 hrs, Volume= 0.753 af
Primary = 5.89 cfs @ 12.41 hrs, Volume= 0.753 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-3: Retained On-Site





Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Type III 24-hr		Default	24.00	1	3.18	2
2	10-yr	Type III 24-hr		Default	24.00	1	4.64	2
3	50-yr	Type III 24-hr		Default	24.00	1	6.23	2
4	100-yr	Type III 24-hr		Default	24.00	1	6.95	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
23.767	49	50-75% Grass cover, Fair, HSG A (P-1, P-2A, P-2B, P-2C)
1.679	76	Gravel roads, HSG A (P-1, P-2A, P-2B, P-2C)
3.208	58	Sand, HSG A (P-1, P-2A, P-2B, P-2C)
0.134	98	Unconnected pavement, HSG A (P-2A, P-2B, P-2C)
4.647	30	Woods, Good, HSG A (P-1, P-2A, P-2B, P-2C)
0.375	45	Woods, Poor, HSG A (P-2C)
33.810	**49**	**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP-1: Runoff Area=35,172 sf 0.00% Impervious Runoff Depth=0.07"
Flow Length=188' Tc=6.0 min CN=47 Runoff=0.01 cfs 0.005 af

SubcatchmentP-2A: Runoff Area=971,403 sf 0.60% Impervious Runoff Depth=0.15"
Flow Length=1,241' Tc=23.9 min CN=51 Runoff=0.57 cfs 0.271 af

SubcatchmentP-2B: Runoff Area=251,078 sf 0.01% Impervious Runoff Depth=0.12"
Flow Length=618' Tc=10.1 min CN=50 Runoff=0.12 cfs 0.060 af

SubcatchmentP-2C: Runoff Area=215,102 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=688' Tc=20.1 min CN=37 Runoff=0.00 cfs 0.000 af

Pond 1P: Peak Elev=35.02' Storage=201 cf Inflow=0.57 cfs 0.271 af
Discarded=0.55 cfs 0.271 af Primary=0.00 cfs 0.000 af Outflow=0.55 cfs 0.271 af

Pond 2P: Peak Elev=51.00' Storage=12 cf Inflow=0.12 cfs 0.060 af
Discarded=0.12 cfs 0.060 af Primary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.060 af

Link POA-1: Isolated Wetland Inflow=0.01 cfs 0.005 af
Primary=0.01 cfs 0.005 af

Link POA-2: Bordering Vegetated Wetland Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 33.810 ac Runoff Volume = 0.335 af Average Runoff Depth = 0.12"
99.60% Pervious = 33.676 ac 0.40% Impervious = 0.134 ac

Summary for Subcatchment P-1:

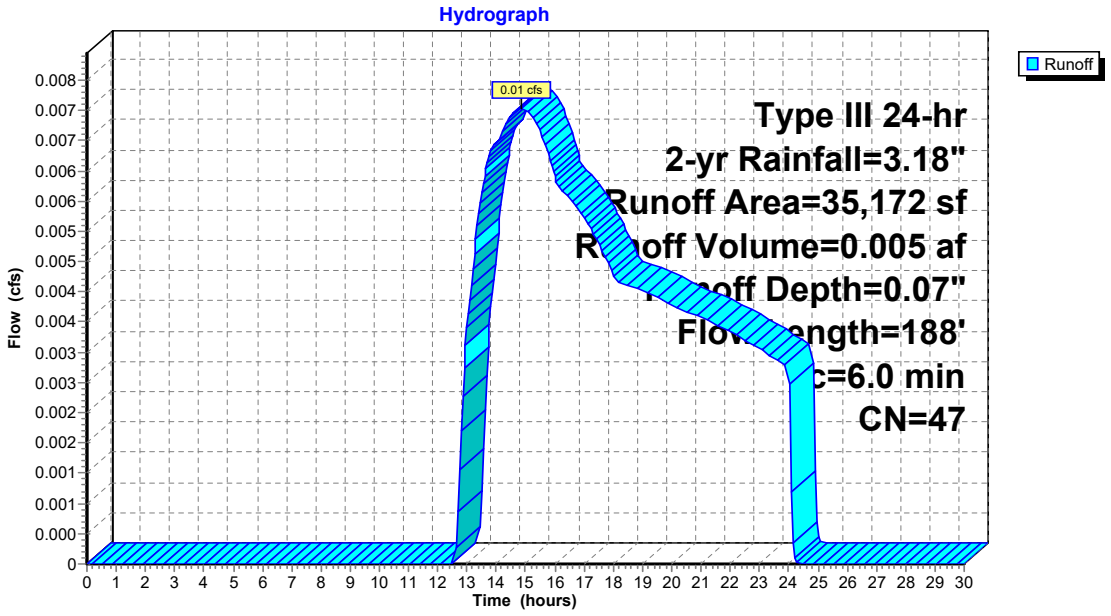
Runoff = 0.01 cfs @ 14.83 hrs, Volume= 0.005 af, Depth= 0.07"
Routed to Link POA-1 : Isolated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.18"

	Area (sf)	CN	Description
	18,968	49	50-75% Grass cover, Fair, HSG A
*	6,030	58	Sand, HSG A
	1,164	76	Gravel roads, HSG A
	9,010	30	Woods, Good, HSG A
	35,172	47	Weighted Average
	35,172		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	23	0.4507	0.12		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
0.1	27	0.3474	3.31		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.18"
0.0	5	0.3457	9.47		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	43	0.1992	2.23		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	90	0.0495	1.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0					**Direct Entry,**
6.0	188	Total			

Subcatchment P-1:



Summary for Subcatchment P-2A:

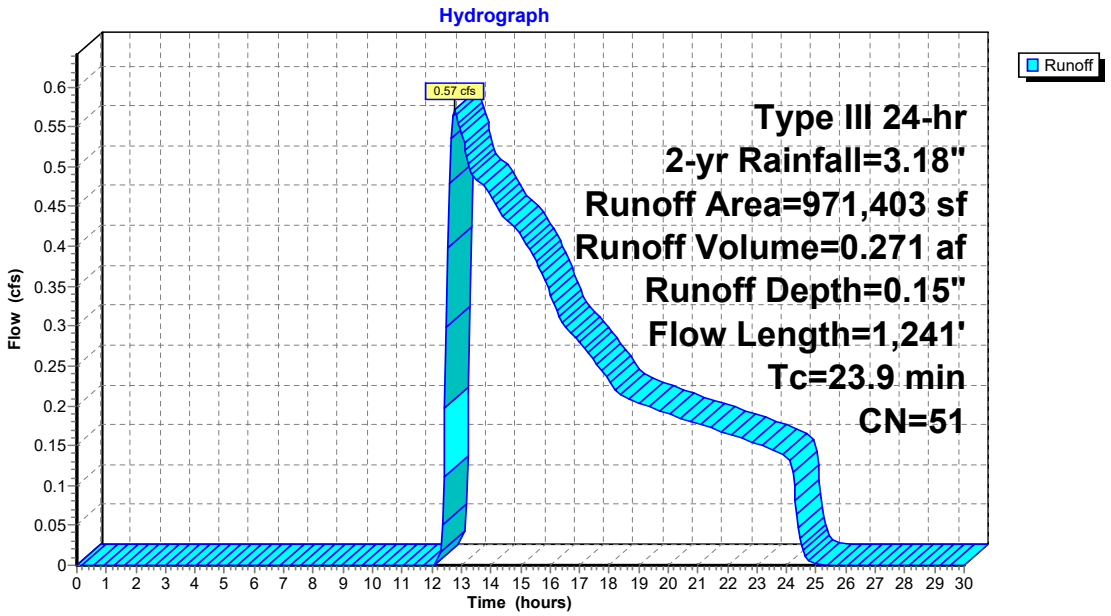
Runoff = 0.57 cfs @ 12.76 hrs, Volume= 0.271 af, Depth= 0.15"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.18"

	Area (sf)	CN	Description
	743,057	49	50-75% Grass cover, Fair, HSG A
*	99,012	58	Sand, HSG A
	71,562	76	Gravel roads, HSG A
	5,798	98	Unconnected pavement, HSG A
	51,974	30	Woods, Good, HSG A
	971,403	51	Weighted Average
	965,605		99.40% Pervious Area
	5,798		0.60% Impervious Area
	5,798		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	50	0.0789	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
0.5	66	0.2302	2.40		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	13	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.3	265	0.0454	3.43		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.8	239	0.0192	2.23		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.2	37	0.2379	3.41		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	49	0.1156	5.47		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	173	0.0578	1.68		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.5	349	0.0229	1.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.9	1,241	Total			

Subcatchment P-2A:



Summary for Subcatchment P-2B:

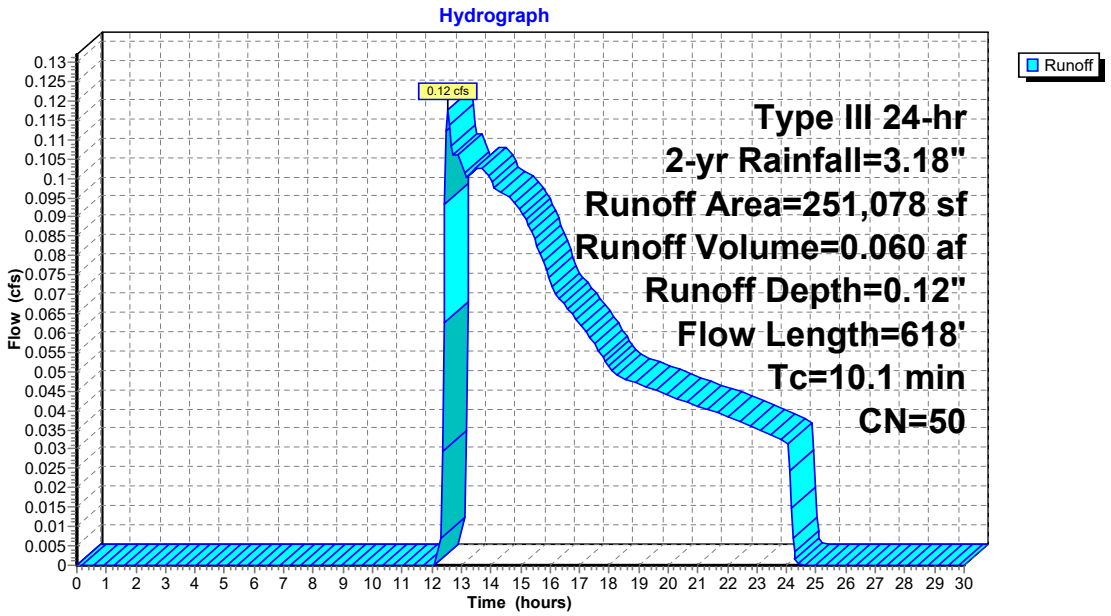
Runoff = 0.12 cfs @ 12.55 hrs, Volume= 0.060 af, Depth= 0.12"
Routed to Pond 2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.18"

	Area (sf)	CN	Description
	230,634	49	50-75% Grass cover, Fair, HSG A
*	19,541	58	Sand, HSG A
	309	76	Gravel roads, HSG A
	25	98	Unconnected pavement, HSG A
	569	30	Woods, Good, HSG A
	251,078	50	Weighted Average
	251,053		99.99% Pervious Area
	25		0.01% Impervious Area
	25		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0447	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.18"
6.0	568	0.0505	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.1	618	Total			

Subcatchment P-2B:



Summary for Subcatchment P-2C:

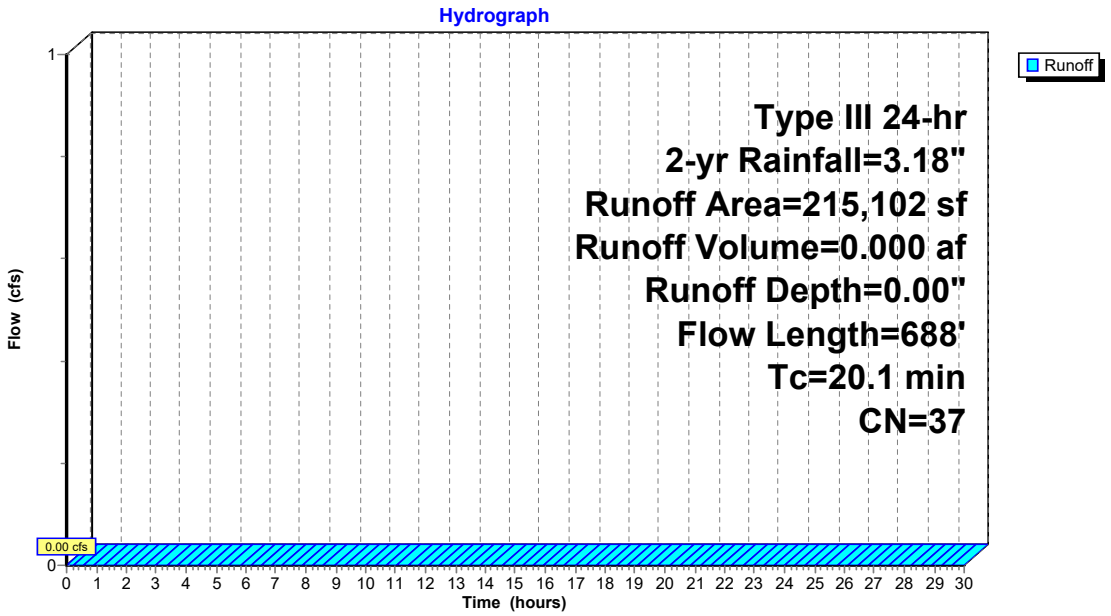
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link POA-2 : Bordering Vegetated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.18"

	Area (sf)	CN	Description
	42,646	49	50-75% Grass cover, Fair, HSG A
*	15,146	58	Sand, HSG A
	83	76	Gravel roads, HSG A
	2	98	Unconnected pavement, HSG A
	140,871	30	Woods, Good, HSG A
	16,354	45	Woods, Poor, HSG A
	215,102	37	Weighted Average
	215,100		100.00% Pervious Area
	2		0.00% Impervious Area
	2		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0583	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.18"
4.3	446	0.0618	1.74		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.6	110	0.0010	0.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	82	0.2968	2.72		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.1	688	Total			

Subcatchment P-2C:



Summary for Pond 1P:

Inflow Area = 22.300 ac, 0.60% Impervious, Inflow Depth = 0.15" for 2-yr event
Inflow = 0.57 cfs @ 12.76 hrs, Volume= 0.271 af
Outflow = 0.55 cfs @ 12.95 hrs, Volume= 0.271 af, Atten= 4%, Lag= 11.2 min
Discarded = 0.55 cfs @ 12.95 hrs, Volume= 0.271 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link POA-2 : Bordering Vegetated Wetland

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 35.02' @ 12.95 hrs Surf.Area= 3,788 sf Storage= 201 cf

Plug-Flow detention time= 6.1 min calculated for 0.270 af (100% of inflow)
Center-of-Mass det. time= 6.1 min (1,021.4 - 1,015.3)

Volume	Invert	Avail.Storage	Storage Description
#1	35.00'	87,163 cf	**Custom Stage Data (Irregular)** Listed below

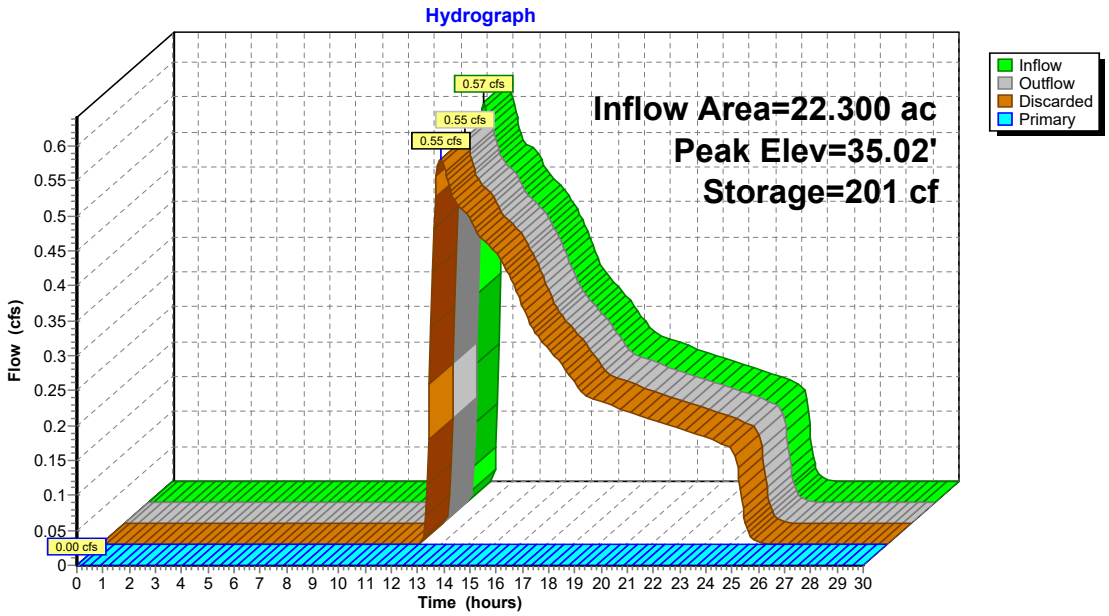
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
35.00	3,502	286.3	0	0	3,502
36.00	16,724	533.5	9,293	9,293	19,634
37.00	38,288	804.2	26,772	36,065	48,458
38.00	65,086	1,011.1	51,098	87,163	78,360

Device	Routing	Invert	Outlet Devices
#1	Discarded	35.00'	**8.270 in/hr Exfiltration over Wetted area**
#2	Primary	37.50'	**10.0' long x 18.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.74 cfs @ 12.95 hrs HW=35.02' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.74 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=35.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1P:



Stage-Area-Storage for Pond 1P:

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
35.00	3,502	3,502	0
35.05	4,163	4,309	465
35.10	4,824	5,115	929
35.15	5,485	5,922	1,394
35.20	6,146	6,728	1,859
35.25	6,808	7,535	2,323
35.30	7,469	8,342	2,788
35.35	8,130	9,148	3,253
35.40	8,791	9,955	3,717
35.45	9,452	10,761	4,182
35.50	10,113	11,568	4,646
35.55	10,774	12,375	5,111
35.60	11,435	13,181	5,576
35.65	12,096	13,988	6,040
35.70	12,757	14,794	6,505
35.75	13,419	15,601	6,970
35.80	14,080	16,408	7,434
35.85	14,741	17,214	7,899
35.90	15,402	18,021	8,364
35.95	16,063	18,827	8,828
36.00	16,724	19,634	9,293
36.05	17,802	21,075	10,632
36.10	18,880	22,516	11,970
36.15	19,959	23,958	13,309
36.20	21,037	25,399	14,647
36.25	22,115	26,840	15,986
36.30	23,193	28,281	17,325
36.35	24,271	29,722	18,663
36.40	25,350	31,164	20,002
36.45	26,428	32,605	21,340
36.50	27,506	34,046	22,679
36.55	28,584	35,487	24,018
36.60	29,662	36,928	25,356
36.65	30,741	38,370	26,695
36.70	31,819	39,811	28,034
36.75	32,897	41,252	29,372
36.80	33,975	42,693	30,711
36.85	35,053	44,134	32,049
36.90	36,132	45,576	33,388
36.95	37,210	47,017	34,727
37.00	38,288	48,458	36,065
37.05	39,628	49,953	38,620
37.10	40,968	51,448	41,175
37.15	42,308	52,943	43,730
37.20	43,648	54,438	46,285
37.25	44,988	55,933	48,840
37.30	46,327	57,429	51,395
37.35	47,667	58,924	53,950
37.40	49,007	60,419	56,504
37.45	50,347	61,914	59,059
37.50	51,687	63,409	61,614
37.55	53,027	64,904	64,169
37.60	54,367	66,399	66,724
37.65	55,707	67,894	69,279
37.70	57,047	69,389	71,834
37.75	58,387	70,884	74,389
37.80	59,726	72,379	76,944
37.85	61,066	73,875	79,499
37.90	62,406	75,370	82,053
37.95	63,746	76,865	84,608
38.00	**65,086**	**78,360**	**87,163**

Summary for Pond 2P:

Inflow Area = 5.764 ac, 0.01% Impervious, Inflow Depth = 0.12" for 2-yr event
Inflow = 0.12 cfs @ 12.55 hrs, Volume= 0.060 af
Outflow = 0.12 cfs @ 12.59 hrs, Volume= 0.060 af, Atten= 2%, Lag= 2.1 min
Discarded = 0.12 cfs @ 12.59 hrs, Volume= 0.060 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link POA-2 : Bordering Vegetated Wetland

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 51.00' @ 12.59 hrs Surf.Area= 8,051 sf Storage= 12 cf

Plug-Flow detention time= 1.7 min calculated for 0.060 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (1,017.7 - 1,016.0)

Volume	Invert	Avail.Storage	Storage Description
#1	51.00'	18,297 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

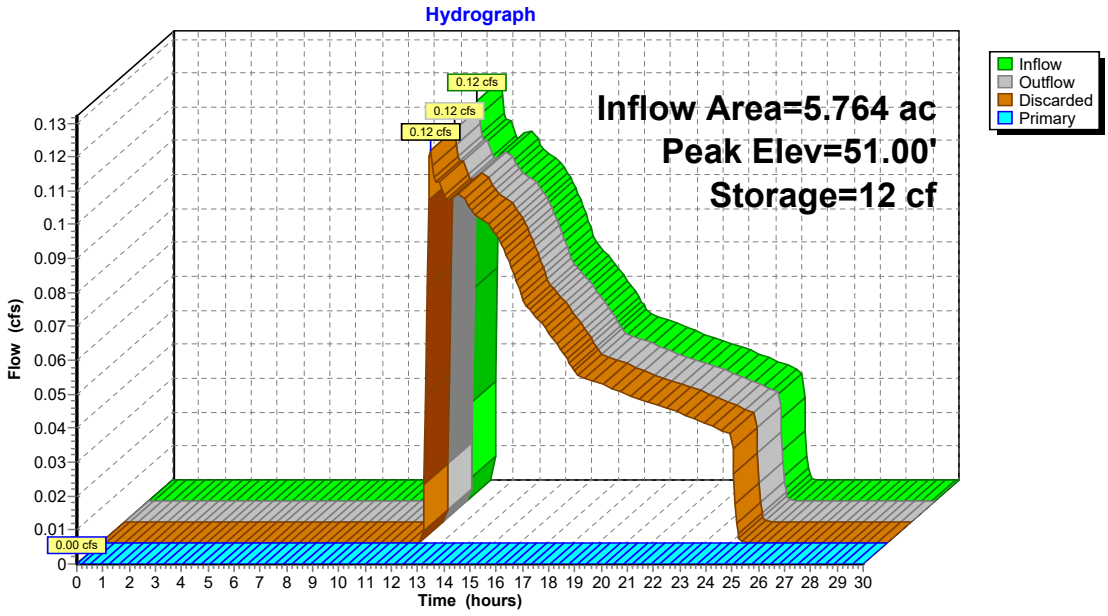
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
51.00	8,049	354.1	0	0	8,049
52.00	9,140	373.0	8,589	8,589	9,201
53.00	10,287	391.8	9,708	18,297	10,408

Device	Routing	Invert	Outlet Devices
#1	Discarded	51.00'	**8.270 in/hr Exfiltration over Wetted area**
#2	Primary	52.50'	**10.0' long x 11.0' 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) 2.53 2.59 2.70 2.68 2.67 2.68 2.66 2.64

Discarded OutFlow Max=1.54 cfs @ 12.59 hrs HW=51.00' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 1.54 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 2P:



Stage-Area-Storage for Pond 2P:

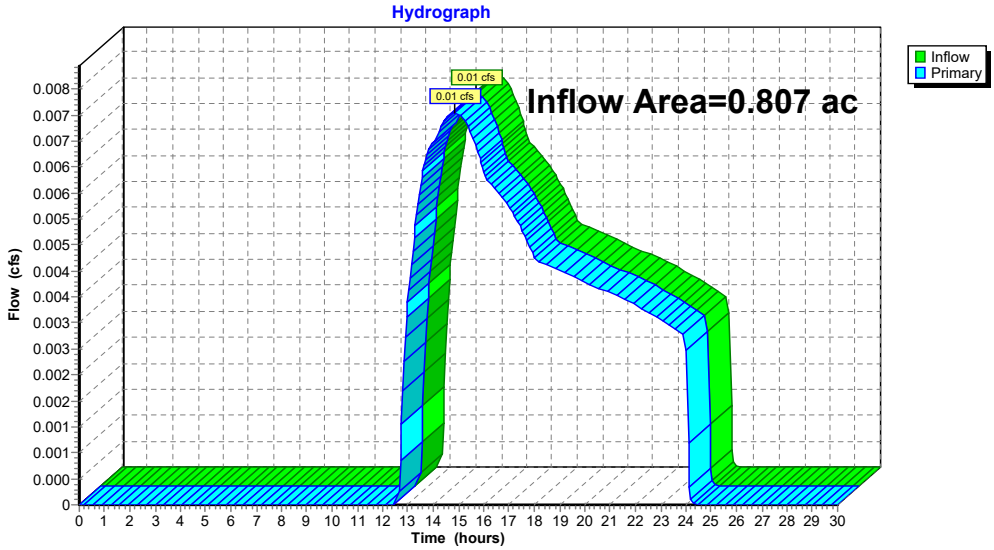
Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
51.00	8,049	8,049	0	52.80	10,052	10,162	16,263
51.05	8,102	8,105	404	52.85	10,111	10,223	16,767
51.10	8,155	8,162	810	52.90	10,169	10,285	17,274
51.15	8,208	8,218	1,219	52.95	10,228	10,346	17,784
51.20	8,262	8,275	1,631	53.00	**10,287**	**10,408**	**18,297**
51.25	8,315	8,331	2,045				
51.30	8,369	8,388	2,463				
51.35	8,423	8,446	2,882				
51.40	8,477	8,503	3,305				
51.45	8,531	8,560	3,730				
51.50	8,586	8,618	4,158				
51.55	8,640	8,675	4,589				
51.60	8,695	8,733	5,022				
51.65	8,750	8,791	5,458				
51.70	8,805	8,849	5,897				
51.75	8,861	8,908	6,339				
51.80	8,916	8,966	6,783				
51.85	8,972	9,025	7,230				
51.90	9,028	9,083	7,680				
51.95	9,084	9,142	8,133				
52.00	9,140	9,201	8,589				
52.05	9,196	9,260	9,047				
52.10	9,252	9,319	9,508				
52.15	9,308	9,379	9,972				
52.20	9,364	9,438	10,439				
52.25	9,420	9,497	10,909				
52.30	9,477	9,557	11,381				
52.35	9,534	9,617	11,856				
52.40	9,591	9,677	12,334				
52.45	9,648	9,737	12,815				
52.50	9,705	9,797	13,299				
52.55	9,762	9,858	13,786				
52.60	9,820	9,918	14,276				
52.65	9,878	9,979	14,768				
52.70	9,936	10,040	15,263				
52.75	9,994	10,101	15,762				

Summary for Link POA-1: Isolated Wetland

Inflow Area = 0.807 ac, 0.00% Impervious, Inflow Depth = 0.07" for 2-yr event
Inflow = 0.01 cfs @ 14.83 hrs, Volume= 0.005 af
Primary = 0.01 cfs @ 14.83 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-1: Isolated Wetland

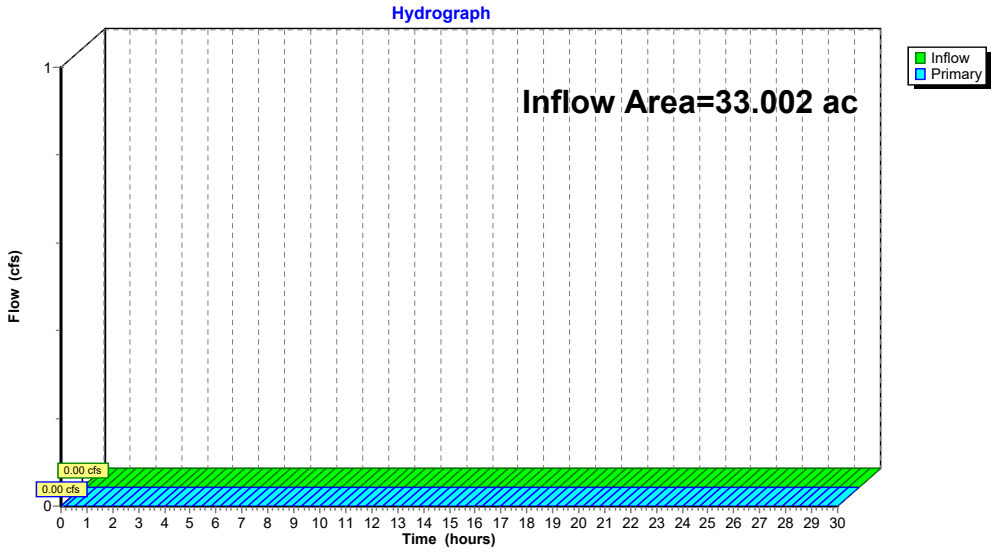


Summary for Link POA-2: Bordering Vegetated Wetland

Inflow Area = 33.002 ac, 0.41% Impervious, Inflow Depth = 0.00" for 2-yr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-2: Bordering Vegetated Wetland



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP-1: Runoff Area=35,172 sf 0.00% Impervious Runoff Depth=0.42"
Flow Length=188' Tc=6.0 min CN=47 Runoff=0.15 cfs 0.028 af

SubcatchmentP-2A: Runoff Area=971,403 sf 0.60% Impervious Runoff Depth=0.60"
Flow Length=1,241' Tc=23.9 min CN=51 Runoff=6.27 cfs 1.114 af

SubcatchmentP-2B: Runoff Area=251,078 sf 0.01% Impervious Runoff Depth=0.55"
Flow Length=618' Tc=10.1 min CN=50 Runoff=1.70 cfs 0.265 af

SubcatchmentP-2C: Runoff Area=215,102 sf 0.00% Impervious Runoff Depth=0.08"
Flow Length=688' Tc=20.1 min CN=37 Runoff=0.05 cfs 0.034 af

Pond 1P: Peak Elev=35.80' Storage=7,452 cf Inflow=6.27 cfs 1.114 af
Discarded=3.15 cfs 1.114 af Primary=0.00 cfs 0.000 af Outflow=3.15 cfs 1.114 af

Pond 2P: Peak Elev=51.03' Storage=239 cf Inflow=1.70 cfs 0.265 af
Discarded=1.55 cfs 0.265 af Primary=0.00 cfs 0.000 af Outflow=1.55 cfs 0.265 af

Link POA-1: Isolated Wetland Inflow=0.15 cfs 0.028 af
Primary=0.15 cfs 0.028 af

Link POA-2: Bordering Vegetated Wetland Inflow=0.05 cfs 0.034 af
Primary=0.05 cfs 0.034 af

Total Runoff Area = 33.810 ac Runoff Volume = 1.441 af Average Runoff Depth = 0.51"
99.60% Pervious = 33.676 ac 0.40% Impervious = 0.134 ac

Summary for Subcatchment P-1:

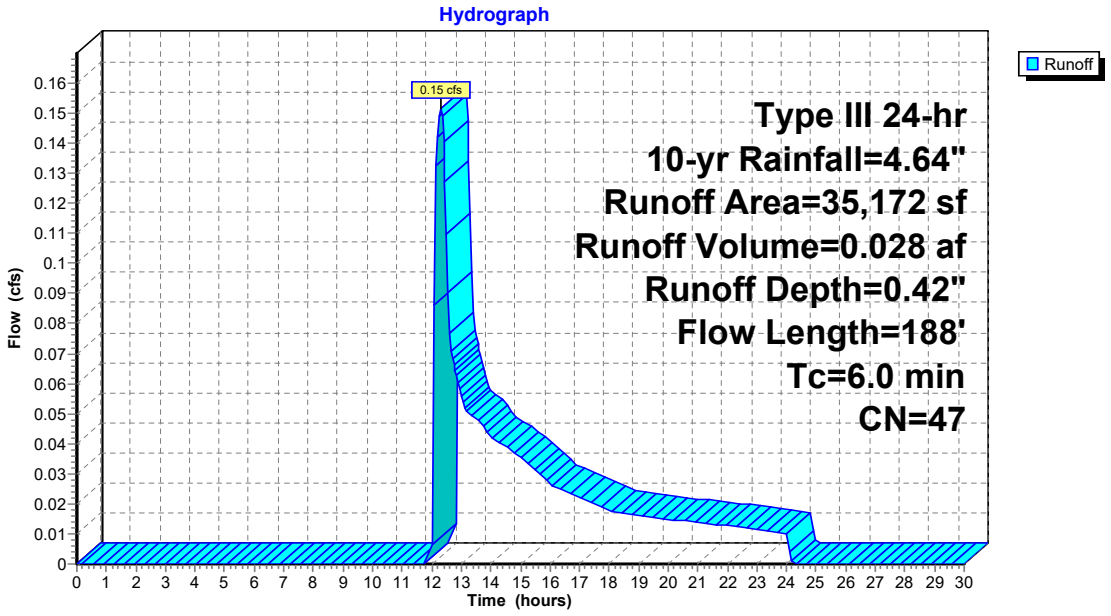
Runoff = 0.15 cfs @ 12.30 hrs, Volume= 0.028 af, Depth= 0.42"
Routed to Link POA-1 : Isolated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.64"

	Area (sf)	CN	Description
	18,968	49	50-75% Grass cover, Fair, HSG A
*	6,030	58	Sand, HSG A
	1,164	76	Gravel roads, HSG A
	9,010	30	Woods, Good, HSG A
	35,172	47	Weighted Average
	35,172		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	23	0.4507	0.12		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
0.1	27	0.3474	3.31		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.18"
0.0	5	0.3457	9.47		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	43	0.1992	2.23		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	90	0.0495	1.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0					**Direct Entry,**
6.0	188	Total			

Subcatchment P-1:



Summary for Subcatchment P-2A:

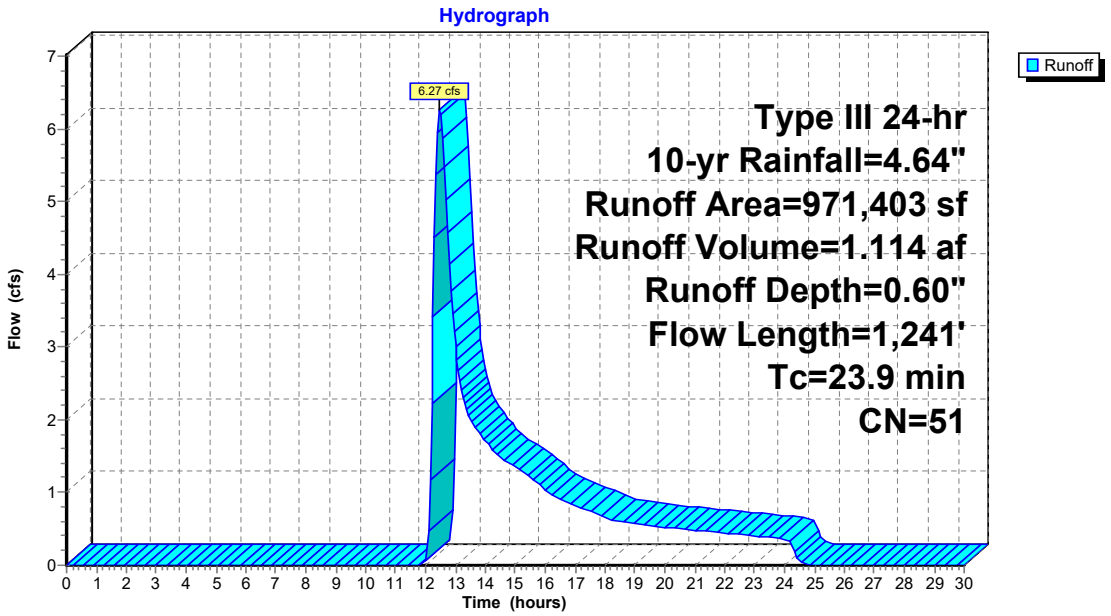
Runoff = 6.27 cfs @ 12.48 hrs, Volume= 1.114 af, Depth= 0.60"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.64"

	Area (sf)	CN	Description
	743,057	49	50-75% Grass cover, Fair, HSG A
*	99,012	58	Sand, HSG A
	71,562	76	Gravel roads, HSG A
	5,798	98	Unconnected pavement, HSG A
	51,974	30	Woods, Good, HSG A
	971,403	51	Weighted Average
	965,605		99.40% Pervious Area
	5,798		0.60% Impervious Area
	5,798		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	50	0.0789	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
0.5	66	0.2302	2.40		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	13	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.3	265	0.0454	3.43		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.8	239	0.0192	2.23		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.2	37	0.2379	3.41		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	49	0.1156	5.47		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	173	0.0578	1.68		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.5	349	0.0229	1.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.9	1,241	Total			

Subcatchment P-2A:



Summary for Subcatchment P-2B:

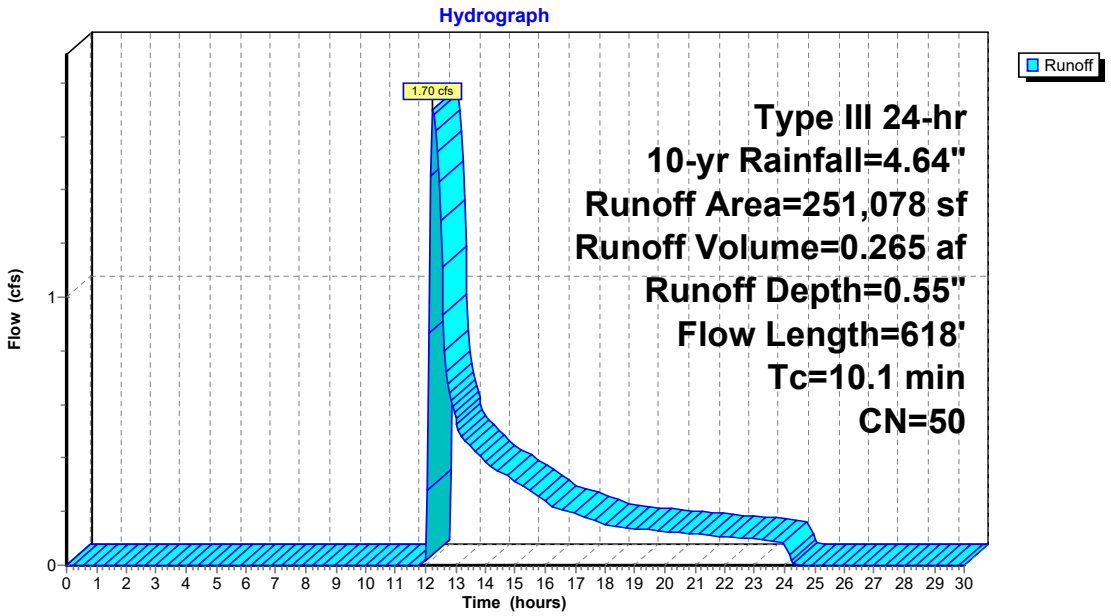
Runoff = 1.70 cfs @ 12.23 hrs, Volume= 0.265 af, Depth= 0.55"
Routed to Pond 2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.64"

	Area (sf)	CN	Description
	230,634	49	50-75% Grass cover, Fair, HSG A
*	19,541	58	Sand, HSG A
	309	76	Gravel roads, HSG A
	25	98	Unconnected pavement, HSG A
	569	30	Woods, Good, HSG A
	251,078	50	Weighted Average
	251,053		99.99% Pervious Area
	25		0.01% Impervious Area
	25		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0447	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.18"
6.0	568	0.0505	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.1	618	Total			

Subcatchment P-2B:



Summary for Subcatchment P-2C:

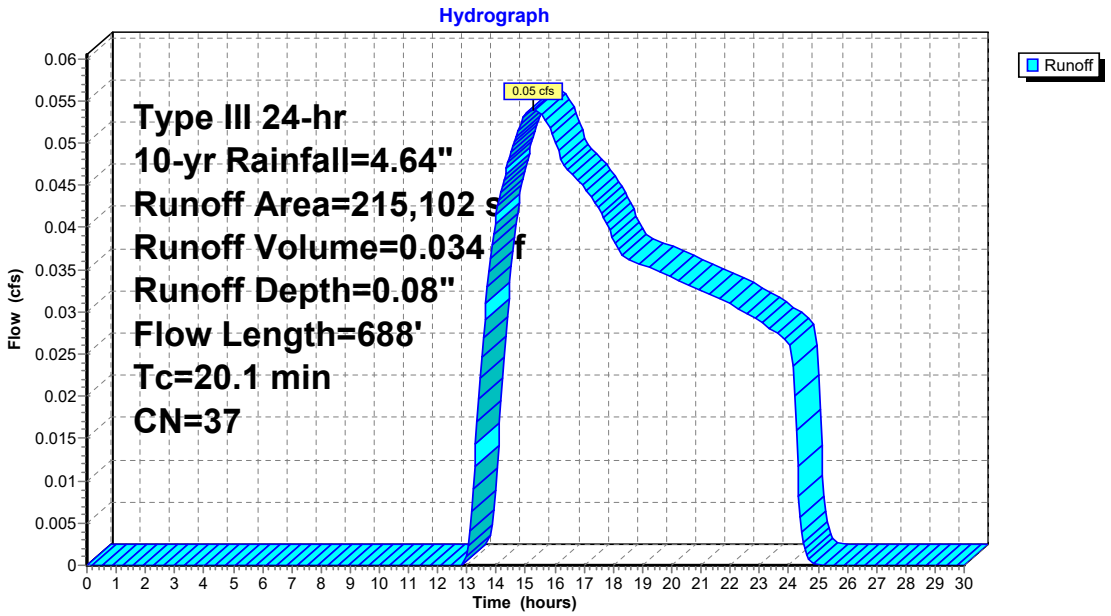
Runoff = 0.05 cfs @ 15.28 hrs, Volume= 0.034 af, Depth= 0.08"
Routed to Link POA-2 : Bordering Vegetated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.64"

	Area (sf)	CN	Description
	42,646	49	50-75% Grass cover, Fair, HSG A
*	15,146	58	Sand, HSG A
	83	76	Gravel roads, HSG A
	2	98	Unconnected pavement, HSG A
	140,871	30	Woods, Good, HSG A
	16,354	45	Woods, Poor, HSG A
	215,102	37	Weighted Average
	215,100		100.00% Pervious Area
	2		0.00% Impervious Area
	2		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0583	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.18"
4.3	446	0.0618	1.74		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.6	110	0.0010	0.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	82	0.2968	2.72		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.1	688	Total			

Subcatchment P-2C:



Summary for Pond 1P:

Inflow Area = 22.300 ac, 0.60% Impervious, Inflow Depth = 0.60" for 10-yr event
Inflow = 6.27 cfs @ 12.48 hrs, Volume= 1.114 af
Outflow = 3.15 cfs @ 12.97 hrs, Volume= 1.114 af, Atten= 50%, Lag= 28.9 min
Discarded = 3.15 cfs @ 12.97 hrs, Volume= 1.114 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link POA-2 : Bordering Vegetated Wetland

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 35.80' @ 12.97 hrs Surf.Area= 14,105 sf Storage= 7,452 cf

Plug-Flow detention time= 25.3 min calculated for 1.114 af (100% of inflow)
Center-of-Mass det. time= 25.2 min (961.3 - 936.1)

Volume	Invert	Avail.Storage	Storage Description
#1	35.00'	87,163 cf	**Custom Stage Data (Irregular)** Listed below

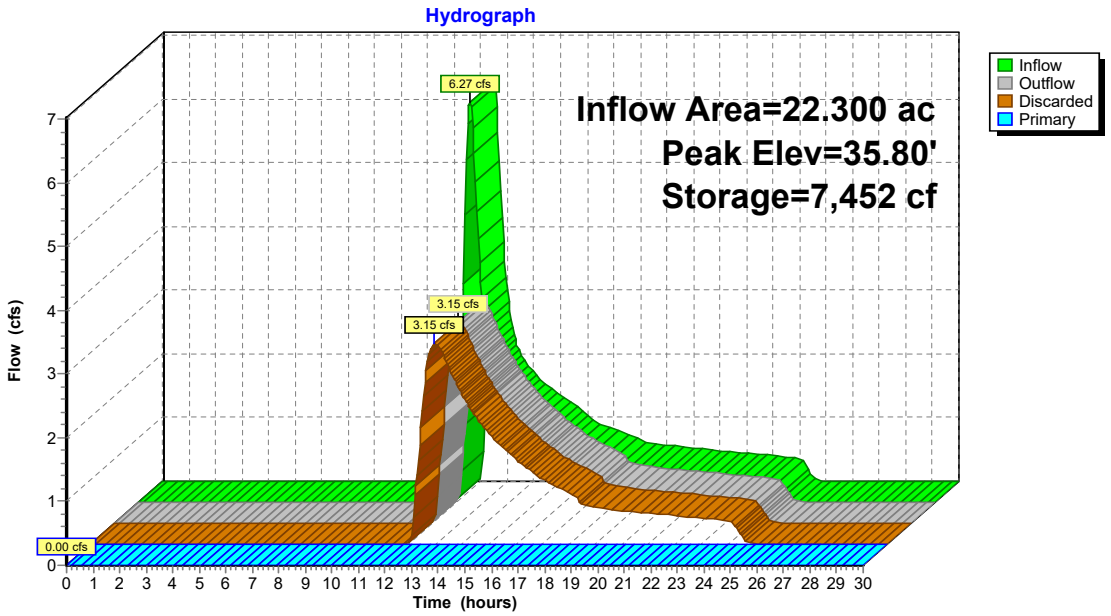
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
35.00	3,502	286.3	0	0	3,502
36.00	16,724	533.5	9,293	9,293	19,634
37.00	38,288	804.2	26,772	36,065	48,458
38.00	65,086	1,011.1	51,098	87,163	78,360

Device	Routing	Invert	Outlet Devices
#1	Discarded	35.00'	**8.270 in/hr Exfiltration over Wetted area**
#2	Primary	37.50'	**10.0' long x 18.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=3.15 cfs @ 12.97 hrs HW=35.80' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 3.15 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=35.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P:



Stage-Area-Storage for Pond 1P:

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
35.00	3,502	3,502	0
35.05	4,163	4,309	465
35.10	4,824	5,115	929
35.15	5,485	5,922	1,394
35.20	6,146	6,728	1,859
35.25	6,808	7,535	2,323
35.30	7,469	8,342	2,788
35.35	8,130	9,148	3,253
35.40	8,791	9,955	3,717
35.45	9,452	10,761	4,182
35.50	10,113	11,568	4,646
35.55	10,774	12,375	5,111
35.60	11,435	13,181	5,576
35.65	12,096	13,988	6,040
35.70	12,757	14,794	6,505
35.75	13,419	15,601	6,970
35.80	14,080	16,408	7,434
35.85	14,741	17,214	7,899
35.90	15,402	18,021	8,364
35.95	16,063	18,827	8,828
36.00	16,724	19,634	9,293
36.05	17,802	21,075	10,632
36.10	18,880	22,516	11,970
36.15	19,959	23,958	13,309
36.20	21,037	25,399	14,647
36.25	22,115	26,840	15,986
36.30	23,193	28,281	17,325
36.35	24,271	29,722	18,663
36.40	25,350	31,164	20,002
36.45	26,428	32,605	21,340
36.50	27,506	34,046	22,679
36.55	28,584	35,487	24,018
36.60	29,662	36,928	25,356
36.65	30,741	38,370	26,695
36.70	31,819	39,811	28,034
36.75	32,897	41,252	29,372
36.80	33,975	42,693	30,711
36.85	35,053	44,134	32,049
36.90	36,132	45,576	33,388
36.95	37,210	47,017	34,727
37.00	38,288	48,458	36,065
37.05	39,628	49,953	38,620
37.10	40,968	51,448	41,175
37.15	42,308	52,943	43,730
37.20	43,648	54,438	46,285
37.25	44,988	55,933	48,840
37.30	46,327	57,429	51,395
37.35	47,667	58,924	53,950
37.40	49,007	60,419	56,504
37.45	50,347	61,914	59,059
37.50	51,687	63,409	61,614
37.55	53,027	64,904	64,169
37.60	54,367	66,399	66,724
37.65	55,707	67,894	69,279
37.70	57,047	69,389	71,834
37.75	58,387	70,884	74,389
37.80	59,726	72,379	76,944
37.85	61,066	73,875	79,499
37.90	62,406	75,370	82,053
37.95	63,746	76,865	84,608
38.00	**65,086**	**78,360**	**87,163**

Summary for Pond 2P:

Inflow Area = 5.764 ac, 0.01% Impervious, Inflow Depth = 0.55" for 10-yr event
Inflow = 1.70 cfs @ 12.23 hrs, Volume= 0.265 af
Outflow = 1.55 cfs @ 12.40 hrs, Volume= 0.265 af, Atten= 9%, Lag= 9.7 min
Discarded = 1.55 cfs @ 12.40 hrs, Volume= 0.265 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link POA-2 : Bordering Vegetated Wetland

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 51.03' @ 12.40 hrs Surf.Area= 8,080 sf Storage= 239 cf

Plug-Flow detention time= 1.8 min calculated for 0.265 af (100% of inflow)
Center-of-Mass det. time= 1.8 min (930.9 - 929.0)

Volume	Invert	Avail.Storage	Storage Description
#1	51.00'	18,297 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

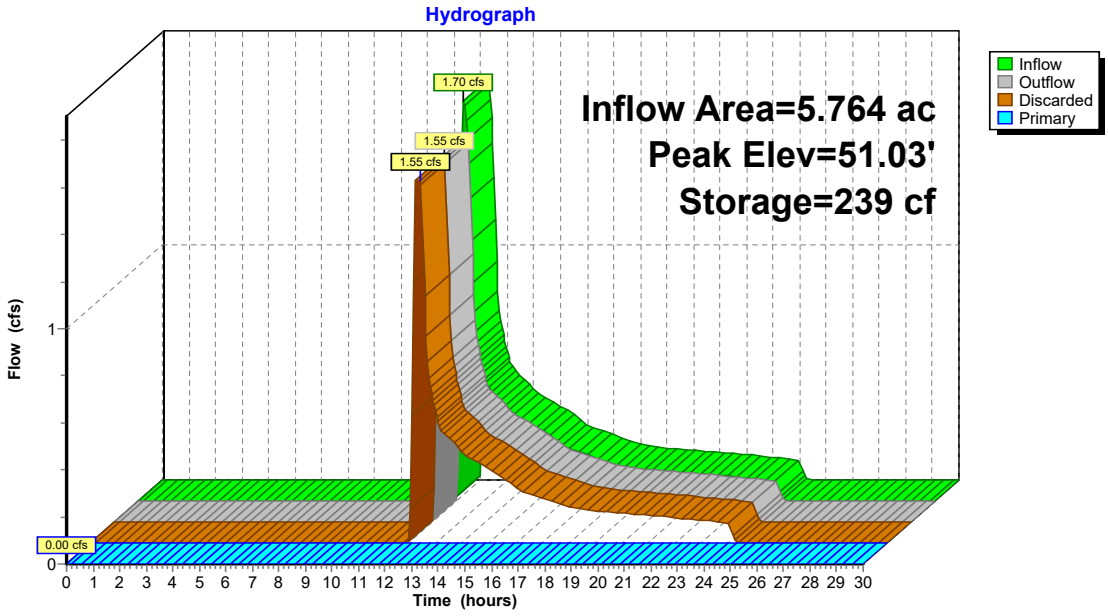
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
51.00	8,049	354.1	0	0	8,049
52.00	9,140	373.0	8,589	8,589	9,201
53.00	10,287	391.8	9,708	18,297	10,408

Device	Routing	Invert	Outlet Devices
#1	Discarded	51.00'	**8.270 in/hr Exfiltration over Wetted area**
#2	Primary	52.50'	**10.0' long x 11.0' 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) 2.53 2.59 2.70 2.68 2.67 2.68 2.66 2.64

Discarded OutFlow Max=1.55 cfs @ 12.40 hrs HW=51.03' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 1.55 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 2P:



Stage-Area-Storage for Pond 2P:

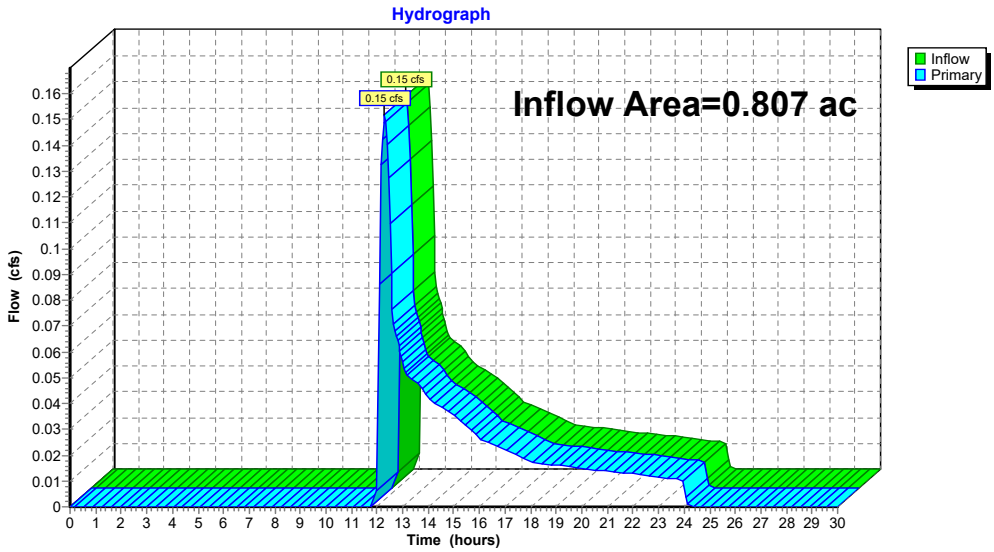
Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
51.00	8,049	8,049	0	52.80	10,052	10,162	16,263
51.05	8,102	8,105	404	52.85	10,111	10,223	16,767
51.10	8,155	8,162	810	52.90	10,169	10,285	17,274
51.15	8,208	8,218	1,219	52.95	10,228	10,346	17,784
51.20	8,262	8,275	1,631	53.00	**10,287**	**10,408**	**18,297**
51.25	8,315	8,331	2,045				
51.30	8,369	8,388	2,463				
51.35	8,423	8,446	2,882				
51.40	8,477	8,503	3,305				
51.45	8,531	8,560	3,730				
51.50	8,586	8,618	4,158				
51.55	8,640	8,675	4,589				
51.60	8,695	8,733	5,022				
51.65	8,750	8,791	5,458				
51.70	8,805	8,849	5,897				
51.75	8,861	8,908	6,339				
51.80	8,916	8,966	6,783				
51.85	8,972	9,025	7,230				
51.90	9,028	9,083	7,680				
51.95	9,084	9,142	8,133				
52.00	9,140	9,201	8,589				
52.05	9,196	9,260	9,047				
52.10	9,252	9,319	9,508				
52.15	9,308	9,379	9,972				
52.20	9,364	9,438	10,439				
52.25	9,420	9,497	10,909				
52.30	9,477	9,557	11,381				
52.35	9,534	9,617	11,856				
52.40	9,591	9,677	12,334				
52.45	9,648	9,737	12,815				
52.50	9,705	9,797	13,299				
52.55	9,762	9,858	13,786				
52.60	9,820	9,918	14,276				
52.65	9,878	9,979	14,768				
52.70	9,936	10,040	15,263				
52.75	9,994	10,101	15,762				

Summary for Link POA-1: Isolated Wetland

Inflow Area = 0.807 ac, 0.00% Impervious, Inflow Depth = 0.42" for 10-yr event
Inflow = 0.15 cfs @ 12.30 hrs, Volume= 0.028 af
Primary = 0.15 cfs @ 12.30 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-1: Isolated Wetland

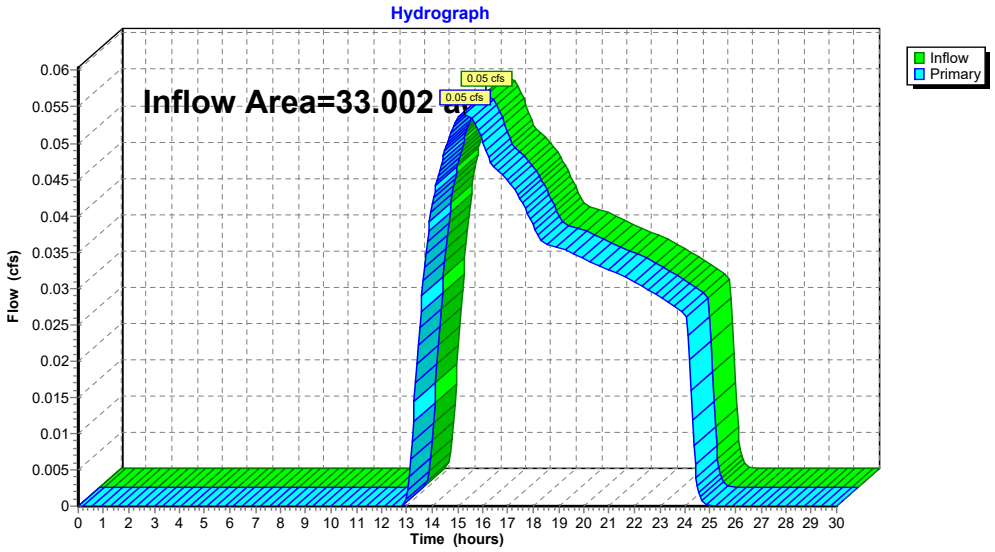


Summary for Link POA-2: Bordering Vegetated Wetland

Inflow Area = 33.002 ac, 0.41% Impervious, Inflow Depth = 0.01" for 10-yr event
Inflow = 0.05 cfs @ 15.28 hrs, Volume= 0.034 af
Primary = 0.05 cfs @ 15.28 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-2: Bordering Vegetated Wetland



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP-1: Runoff Area=35,172 sf 0.00% Impervious Runoff Depth=1.04"
Flow Length=188' Tc=6.0 min CN=47 Runoff=0.70 cfs 0.070 af

SubcatchmentP-2A: Runoff Area=971,403 sf 0.60% Impervious Runoff Depth=1.33"
Flow Length=1,241' Tc=23.9 min CN=51 Runoff=18.15 cfs 2.479 af

SubcatchmentP-2B: Runoff Area=251,078 sf 0.01% Impervious Runoff Depth=1.26"
Flow Length=618' Tc=10.1 min CN=50 Runoff=5.91 cfs 0.604 af

SubcatchmentP-2C: Runoff Area=215,102 sf 0.00% Impervious Runoff Depth=0.40"
Flow Length=688' Tc=20.1 min CN=37 Runoff=0.57 cfs 0.165 af

Pond 1P: Peak Elev=36.60' Storage=25,361 cf Inflow=18.15 cfs 2.479 af
Discarded=7.07 cfs 2.479 af Primary=0.00 cfs 0.000 af Outflow=7.07 cfs 2.479 af

Pond 2P: Peak Elev=51.63' Storage=5,274 cf Inflow=5.91 cfs 0.604 af
Discarded=1.68 cfs 0.604 af Primary=0.00 cfs 0.000 af Outflow=1.68 cfs 0.604 af

Link POA-1: Isolated Wetland Inflow=0.70 cfs 0.070 af
Primary=0.70 cfs 0.070 af

Link POA-2: Bordering Vegetated Wetland Inflow=0.57 cfs 0.165 af
Primary=0.57 cfs 0.165 af

Total Runoff Area = 33.810 ac Runoff Volume = 3.318 af Average Runoff Depth = 1.18"
99.60% Pervious = 33.676 ac 0.40% Impervious = 0.134 ac

Summary for Subcatchment P-1:

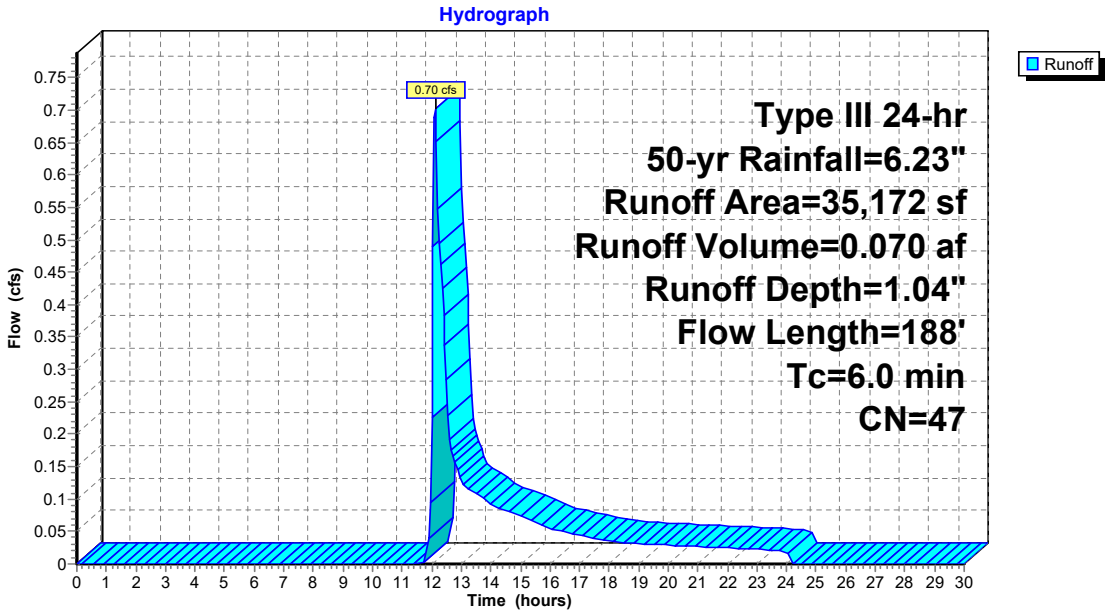
Runoff = 0.70 cfs @ 12.12 hrs, Volume= 0.070 af, Depth= 1.04"
Routed to Link POA-1 : Isolated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-yr Rainfall=6.23"

	Area (sf)	CN	Description
	18,968	49	50-75% Grass cover, Fair, HSG A
*	6,030	58	Sand, HSG A
	1,164	76	Gravel roads, HSG A
	9,010	30	Woods, Good, HSG A
	35,172	47	Weighted Average
	35,172		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	23	0.4507	0.12		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
0.1	27	0.3474	3.31		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.18"
0.0	5	0.3457	9.47		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	43	0.1992	2.23		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	90	0.0495	1.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0					**Direct Entry,**
6.0	188	Total			

Subcatchment P-1:



Summary for Subcatchment P-2A:

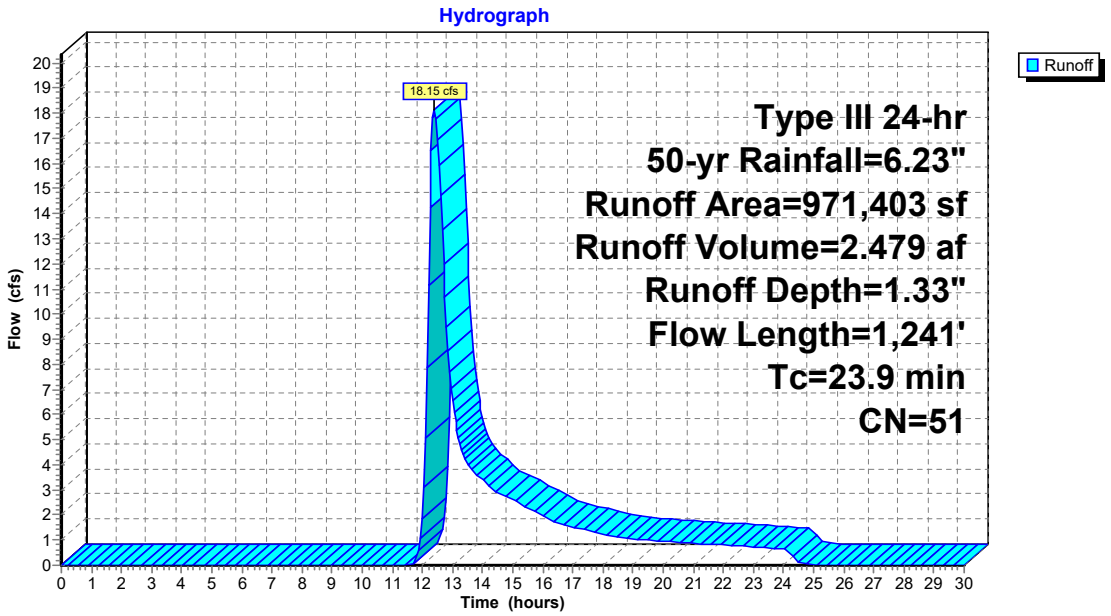
Runoff = 18.15 cfs @ 12.40 hrs, Volume= 2.479 af, Depth= 1.33"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-yr Rainfall=6.23"

	Area (sf)	CN	Description
	743,057	49	50-75% Grass cover, Fair, HSG A
*	99,012	58	Sand, HSG A
	71,562	76	Gravel roads, HSG A
	5,798	98	Unconnected pavement, HSG A
	51,974	30	Woods, Good, HSG A
	971,403	51	Weighted Average
	965,605		99.40% Pervious Area
	5,798		0.60% Impervious Area
	5,798		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	50	0.0789	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
0.5	66	0.2302	2.40		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	13	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.3	265	0.0454	3.43		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.8	239	0.0192	2.23		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.2	37	0.2379	3.41		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	49	0.1156	5.47		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	173	0.0578	1.68		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.5	349	0.0229	1.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.9	1,241	Total			

Subcatchment P-2A:



Summary for Subcatchment P-2B:

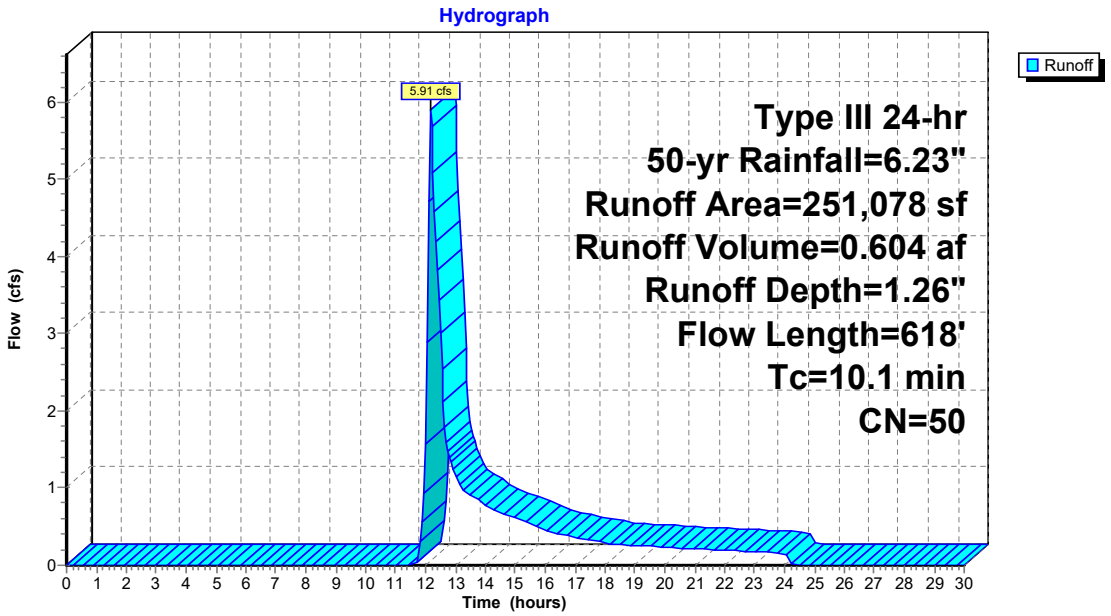
Runoff = 5.91 cfs @ 12.17 hrs, Volume= 0.604 af, Depth= 1.26"
Routed to Pond 2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-yr Rainfall=6.23"

	Area (sf)	CN	Description
	230,634	49	50-75% Grass cover, Fair, HSG A
*	19,541	58	Sand, HSG A
	309	76	Gravel roads, HSG A
	25	98	Unconnected pavement, HSG A
	569	30	Woods, Good, HSG A
	251,078	50	Weighted Average
	251,053		99.99% Pervious Area
	25		0.01% Impervious Area
	25		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0447	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.18"
6.0	568	0.0505	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.1	618	Total			

Subcatchment P-2B:



Summary for Subcatchment P-2C:

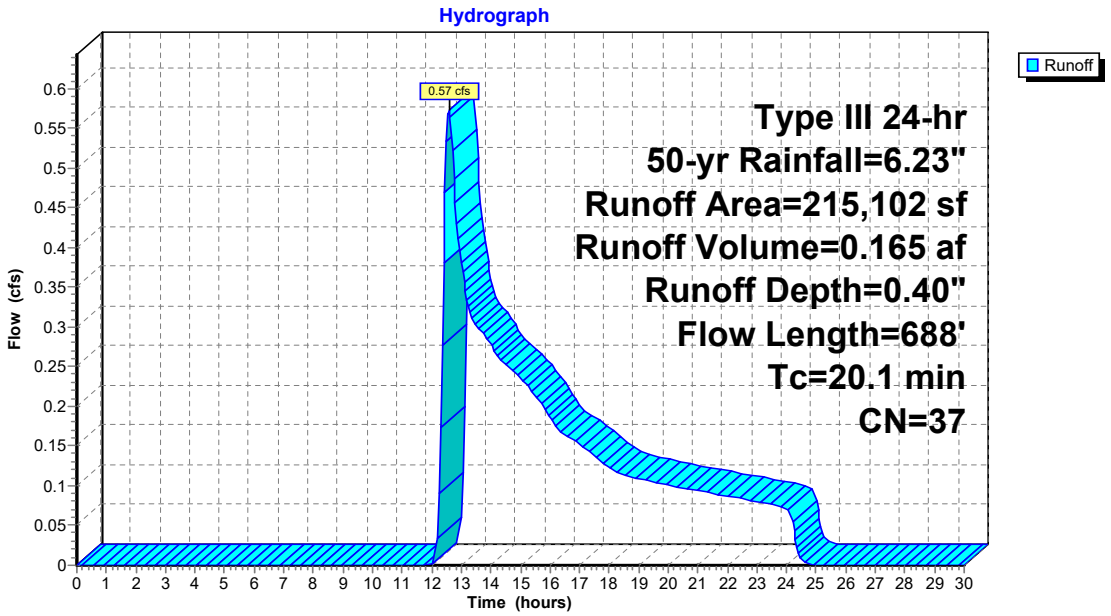
Runoff = 0.57 cfs @ 12.59 hrs, Volume= 0.165 af, Depth= 0.40"
Routed to Link POA-2 : Bordering Vegetated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-yr Rainfall=6.23"

	Area (sf)	CN	Description
	42,646	49	50-75% Grass cover, Fair, HSG A
*	15,146	58	Sand, HSG A
	83	76	Gravel roads, HSG A
	2	98	Unconnected pavement, HSG A
	140,871	30	Woods, Good, HSG A
	16,354	45	Woods, Poor, HSG A
	215,102	37	Weighted Average
	215,100		100.00% Pervious Area
	2		0.00% Impervious Area
	2		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0583	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.18"
4.3	446	0.0618	1.74		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.6	110	0.0010	0.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	82	0.2968	2.72		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.1	688	Total			

Subcatchment P-2C:



Summary for Pond 1P:

Inflow Area = 22.300 ac, 0.60% Impervious, Inflow Depth = 1.33" for 50-yr event
Inflow = 18.15 cfs @ 12.40 hrs, Volume= 2.479 af
Outflow = 7.07 cfs @ 12.95 hrs, Volume= 2.479 af, Atten= 61%, Lag= 33.2 min
Discarded = 7.07 cfs @ 12.95 hrs, Volume= 2.479 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link POA-2 : Bordering Vegetated Wetland

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 36.60' @ 12.95 hrs Surf.Area= 29,666 sf Storage= 25,361 cf

Plug-Flow detention time= 41.7 min calculated for 2.475 af (100% of inflow)
Center-of-Mass det. time= 41.7 min (945.5 - 903.8)

Volume	Invert	Avail.Storage	Storage Description
#1	35.00'	87,163 cf	**Custom Stage Data (Irregular)** Listed below

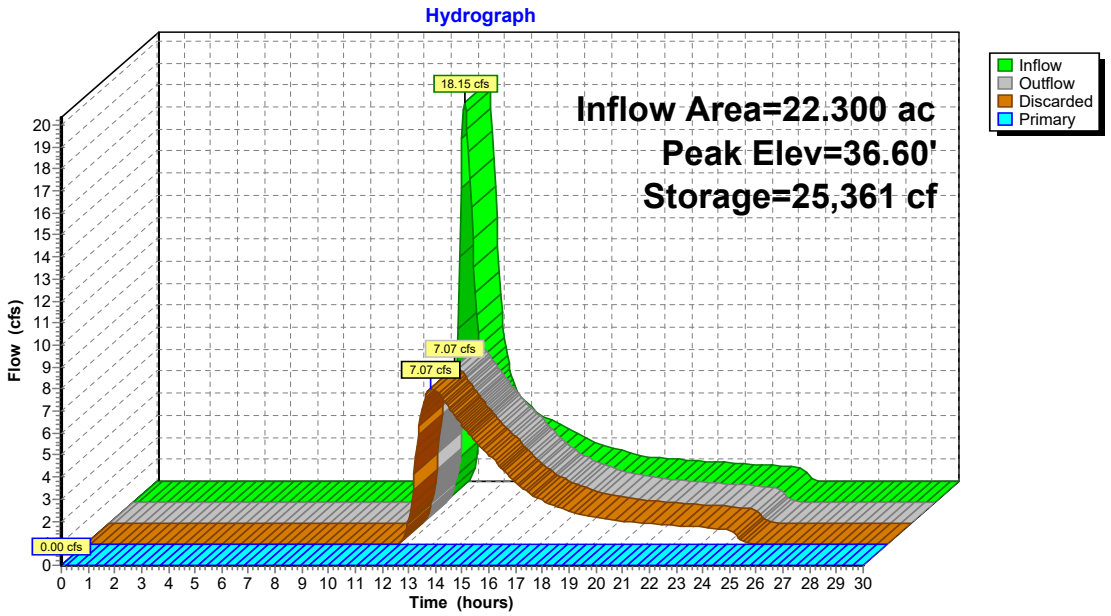
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
35.00	3,502	286.3	0	0	3,502
36.00	16,724	533.5	9,293	9,293	19,634
37.00	38,288	804.2	26,772	36,065	48,458
38.00	65,086	1,011.1	51,098	87,163	78,360

Device	Routing	Invert	Outlet Devices
#1	Discarded	35.00'	**8.270 in/hr Exfiltration over Wetted area**
#2	Primary	37.50'	**10.0' long x 18.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=7.07 cfs @ 12.95 hrs HW=36.60' (Free Discharge)
1=Exfiltration (Exfiltration Controls 7.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=35.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1P:



Stage-Area-Storage for Pond 1P:

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
35.00	3,502	3,502	0	36.80	33,975	42,693	30,711
35.05	4,163	4,309	465	36.85	35,053	44,134	32,049
35.10	4,824	5,115	929	36.90	36,132	45,576	33,388
35.15	5,485	5,922	1,394	36.95	37,210	47,017	34,727
35.20	6,146	6,728	1,859	37.00	38,288	48,458	36,065
35.25	6,808	7,535	2,323	37.05	39,628	49,953	38,620
35.30	7,469	8,342	2,788	37.10	40,968	51,448	41,175
35.35	8,130	9,148	3,253	37.15	42,308	52,943	43,730
35.40	8,791	9,955	3,717	37.20	43,648	54,438	46,285
35.45	9,452	10,761	4,182	37.25	44,988	55,933	48,840
35.50	10,113	11,568	4,646	37.30	46,327	57,429	51,395
35.55	10,774	12,375	5,111	37.35	47,667	58,924	53,950
35.60	11,435	13,181	5,576	37.40	49,007	60,419	56,504
35.65	12,096	13,988	6,040	37.45	50,347	61,914	59,059
35.70	12,757	14,794	6,505	37.50	51,687	63,409	61,614
35.75	13,419	15,601	6,970	37.55	53,027	64,904	64,169
35.80	14,080	16,408	7,434	37.60	54,367	66,399	66,724
35.85	14,741	17,214	7,899	37.65	55,707	67,894	69,279
35.90	15,402	18,021	8,364	37.70	57,047	69,389	71,834
35.95	16,063	18,827	8,828	37.75	58,387	70,884	74,389
36.00	16,724	19,634	9,293	37.80	59,726	72,379	76,944
36.05	17,802	21,075	10,632	37.85	61,066	73,875	79,499
36.10	18,880	22,516	11,970	37.90	62,406	75,370	82,053
36.15	19,959	23,958	13,309	37.95	63,746	76,865	84,608
36.20	21,037	25,399	14,647	38.00	**65,086**	**78,360**	**87,163**
36.25	22,115	26,840	15,986				
36.30	23,193	28,281	17,325				
36.35	24,271	29,722	18,663				
36.40	25,350	31,164	20,002				
36.45	26,428	32,605	21,340				
36.50	27,506	34,046	22,679				
36.55	28,584	35,487	24,018				
36.60	29,662	36,928	25,356				
36.65	30,741	38,370	26,695				
36.70	31,819	39,811	28,034				
36.75	32,897	41,252	29,372				

Summary for Pond 2P:

Inflow Area = 5.764 ac, 0.01% Impervious, Inflow Depth = 1.26" for 50-yr event
Inflow = 5.91 cfs @ 12.17 hrs, Volume= 0.604 af
Outflow = 1.68 cfs @ 12.68 hrs, Volume= 0.604 af, Atten= 72%, Lag= 30.6 min
Discarded = 1.68 cfs @ 12.68 hrs, Volume= 0.604 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link POA-2 : Bordering Vegetated Wetland

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 51.63' @ 12.68 hrs Surf.Area= 8,727 sf Storage= 5,274 cf

Plug-Flow detention time= 20.0 min calculated for 0.604 af (100% of inflow)
Center-of-Mass det. time= 20.0 min (914.7 - 894.6)

Volume	Invert	Avail.Storage	Storage Description
#1	51.00'	18,297 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

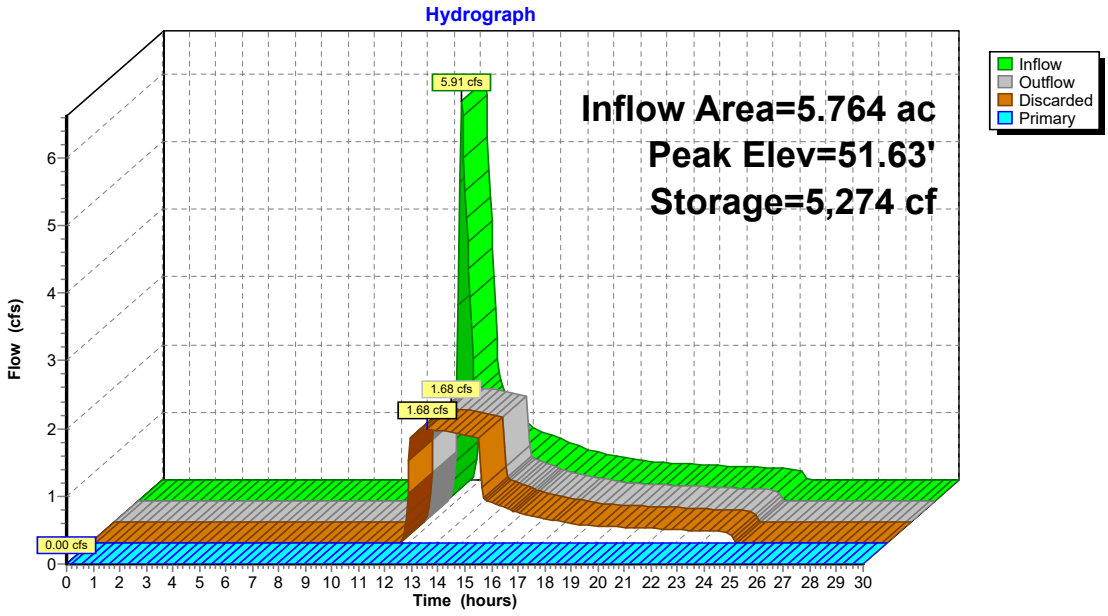
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
51.00	8,049	354.1	0	0	8,049
52.00	9,140	373.0	8,589	8,589	9,201
53.00	10,287	391.8	9,708	18,297	10,408

Device	Routing	Invert	Outlet Devices
#1	Discarded	51.00'	**8.270 in/hr Exfiltration over Wetted area**
#2	Primary	52.50'	**10.0' long x 11.0' 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) 2.53 2.59 2.70 2.68 2.67 2.68 2.66 2.64

Discarded OutFlow Max=1.68 cfs @ 12.68 hrs HW=51.63' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 1.68 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 2P:



Stage-Area-Storage for Pond 2P:

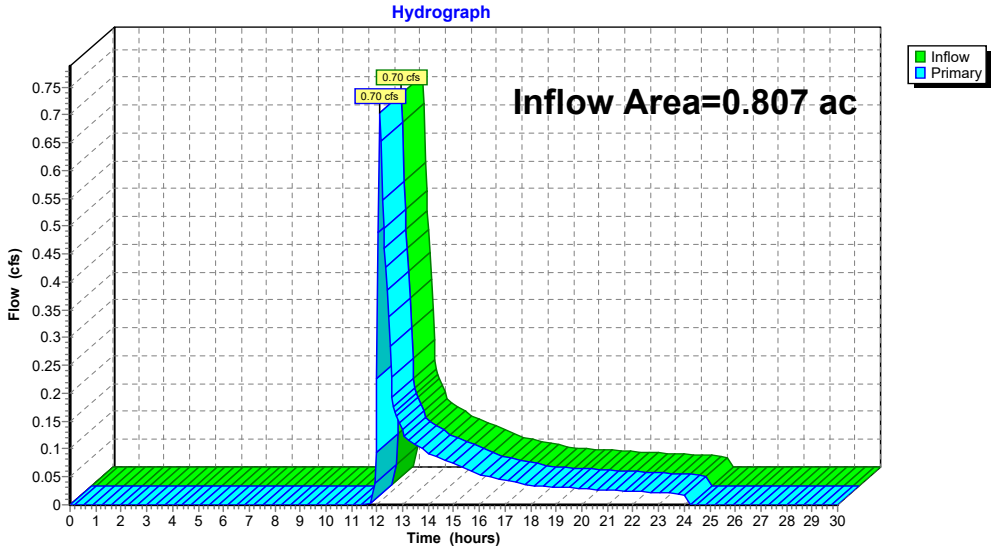
Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
51.00	8,049	8,049	0	52.80	10,052	10,162	16,263
51.05	8,102	8,105	404	52.85	10,111	10,223	16,767
51.10	8,155	8,162	810	52.90	10,169	10,285	17,274
51.15	8,208	8,218	1,219	52.95	10,228	10,346	17,784
51.20	8,262	8,275	1,631	53.00	**10,287**	**10,408**	**18,297**
51.25	8,315	8,331	2,045				
51.30	8,369	8,388	2,463				
51.35	8,423	8,446	2,882				
51.40	8,477	8,503	3,305				
51.45	8,531	8,560	3,730				
51.50	8,586	8,618	4,158				
51.55	8,640	8,675	4,589				
51.60	8,695	8,733	5,022				
51.65	8,750	8,791	5,458				
51.70	8,805	8,849	5,897				
51.75	8,861	8,908	6,339				
51.80	8,916	8,966	6,783				
51.85	8,972	9,025	7,230				
51.90	9,028	9,083	7,680				
51.95	9,084	9,142	8,133				
52.00	9,140	9,201	8,589				
52.05	9,196	9,260	9,047				
52.10	9,252	9,319	9,508				
52.15	9,308	9,379	9,972				
52.20	9,364	9,438	10,439				
52.25	9,420	9,497	10,909				
52.30	9,477	9,557	11,381				
52.35	9,534	9,617	11,856				
52.40	9,591	9,677	12,334				
52.45	9,648	9,737	12,815				
52.50	9,705	9,797	13,299				
52.55	9,762	9,858	13,786				
52.60	9,820	9,918	14,276				
52.65	9,878	9,979	14,768				
52.70	9,936	10,040	15,263				
52.75	9,994	10,101	15,762				

Summary for Link POA-1: Isolated Wetland

Inflow Area = 0.807 ac, 0.00% Impervious, Inflow Depth = 1.04" for 50-yr event
Inflow = 0.70 cfs @ 12.12 hrs, Volume= 0.070 af
Primary = 0.70 cfs @ 12.12 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-1: Isolated Wetland

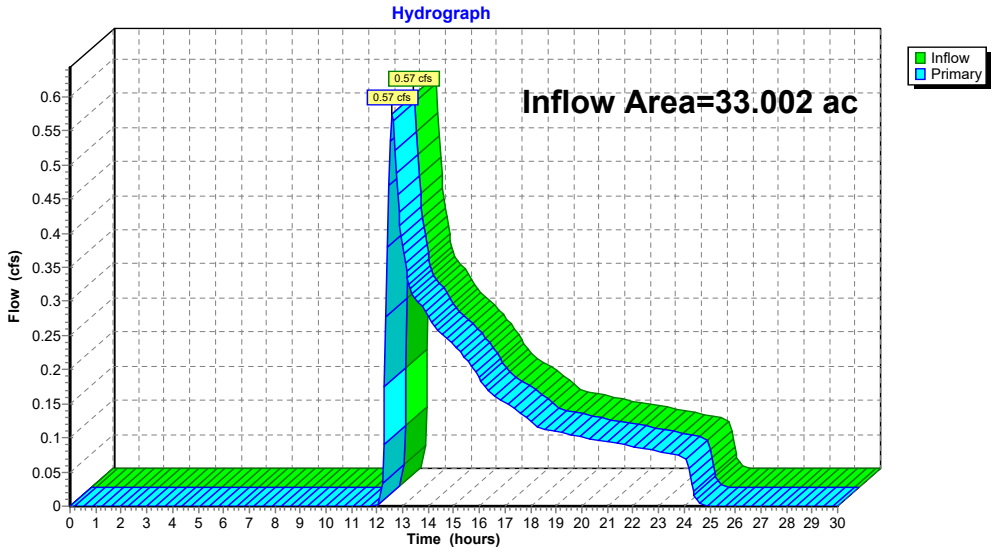


Summary for Link POA-2: Bordering Vegetated Wetland

Inflow Area = 33.002 ac, 0.41% Impervious, Inflow Depth = 0.06" for 50-yr event
Inflow = 0.57 cfs @ 12.59 hrs, Volume= 0.165 af
Primary = 0.57 cfs @ 12.59 hrs, Volume= 0.165 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-2: Bordering Vegetated Wetland



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP-1: Runoff Area=35,172 sf 0.00% Impervious Runoff Depth=1.38"
Flow Length=188' Tc=6.0 min CN=47 Runoff=1.04 cfs 0.093 af

SubcatchmentP-2A: Runoff Area=971,403 sf 0.60% Impervious Runoff Depth=1.73"
Flow Length=1,241' Tc=23.9 min CN=51 Runoff=24.78 cfs 3.210 af

SubcatchmentP-2B: Runoff Area=251,078 sf 0.01% Impervious Runoff Depth=1.64"
Flow Length=618' Tc=10.1 min CN=50 Runoff=8.24 cfs 0.787 af

SubcatchmentP-2C: Runoff Area=215,102 sf 0.00% Impervious Runoff Depth=0.61"
Flow Length=688' Tc=20.1 min CN=37 Runoff=1.15 cfs 0.251 af

Pond 1P: Peak Elev=37.00' Storage=35,972 cf Inflow=24.78 cfs 3.210 af
Discarded=9.26 cfs 3.210 af Primary=0.00 cfs 0.000 af Outflow=9.26 cfs 3.210 af

Pond 2P: Peak Elev=52.00' Storage=8,630 cf Inflow=8.24 cfs 0.787 af
Discarded=1.76 cfs 0.787 af Primary=0.00 cfs 0.000 af Outflow=1.76 cfs 0.787 af

Link POA-1: Isolated Wetland Inflow=1.04 cfs 0.093 af
Primary=1.04 cfs 0.093 af

Link POA-2: Bordering Vegetated Wetland Inflow=1.15 cfs 0.251 af
Primary=1.15 cfs 0.251 af

Total Runoff Area = 33.810 ac Runoff Volume = 4.342 af Average Runoff Depth = 1.54"
99.60% Pervious = 33.676 ac 0.40% Impervious = 0.134 ac

Summary for Subcatchment P-1:

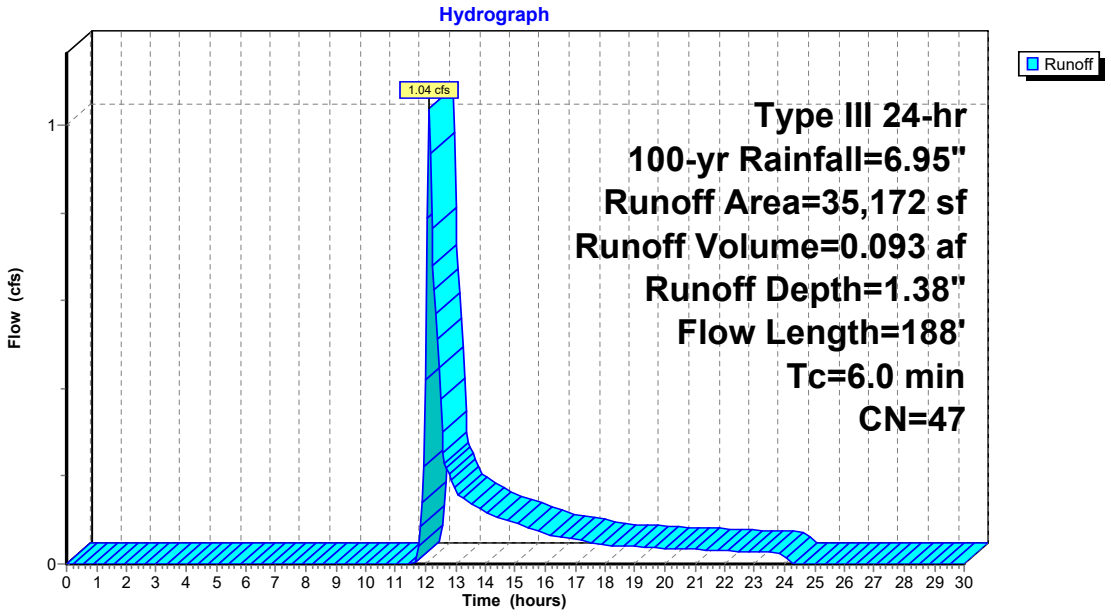
Runoff = 1.04 cfs @ 12.11 hrs, Volume= 0.093 af, Depth= 1.38"
Routed to Link POA-1 : Isolated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=6.95"

	Area (sf)	CN	Description
	18,968	49	50-75% Grass cover, Fair, HSG A
*	6,030	58	Sand, HSG A
	1,164	76	Gravel roads, HSG A
	9,010	30	Woods, Good, HSG A
	35,172	47	Weighted Average
	35,172		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	23	0.4507	0.12		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
0.1	27	0.3474	3.31		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.18"
0.0	5	0.3457	9.47		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	43	0.1992	2.23		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	90	0.0495	1.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0					**Direct Entry,**
6.0	188	Total			

Subcatchment P-1:



Summary for Subcatchment P-2A:

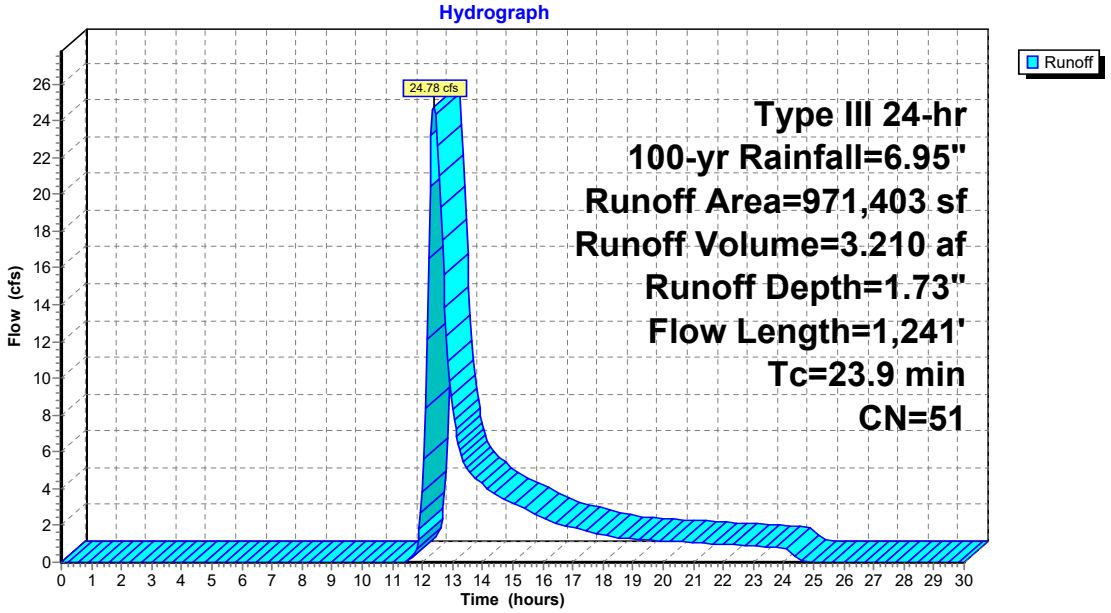
Runoff = 24.78 cfs @ 12.38 hrs, Volume= 3.210 af, Depth= 1.73"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=6.95"

	Area (sf)	CN	Description
	743,057	49	50-75% Grass cover, Fair, HSG A
*	99,012	58	Sand, HSG A
	71,562	76	Gravel roads, HSG A
	5,798	98	Unconnected pavement, HSG A
	51,974	30	Woods, Good, HSG A
	971,403	51	Weighted Average
	965,605		99.40% Pervious Area
	5,798		0.60% Impervious Area
	5,798		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	50	0.0789	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.18"
0.5	66	0.2302	2.40		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	13	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.3	265	0.0454	3.43		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.8	239	0.0192	2.23		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.2	37	0.2379	3.41		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	49	0.1156	5.47		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	173	0.0578	1.68		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.5	349	0.0229	1.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.9	1,241	Total			

Subcatchment P-2A:



Summary for Subcatchment P-2B:

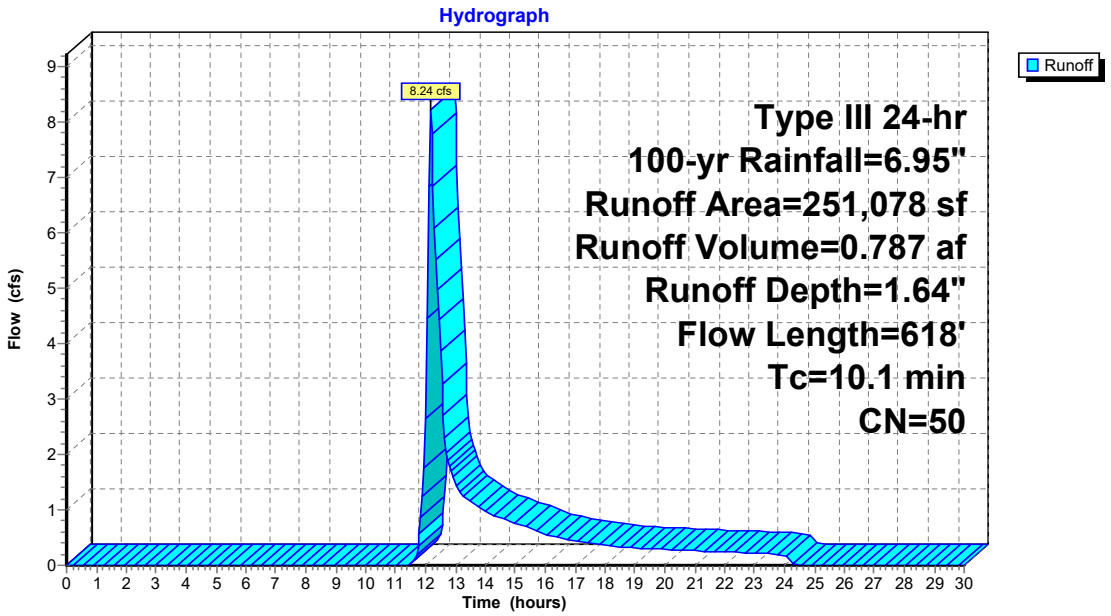
Runoff = 8.24 cfs @ 12.16 hrs, Volume= 0.787 af, Depth= 1.64"
Routed to Pond 2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=6.95"

	Area (sf)	CN	Description
	230,634	49	50-75% Grass cover, Fair, HSG A
*	19,541	58	Sand, HSG A
	309	76	Gravel roads, HSG A
	25	98	Unconnected pavement, HSG A
	569	30	Woods, Good, HSG A
	251,078	50	Weighted Average
	251,053		99.99% Pervious Area
	25		0.01% Impervious Area
	25		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0447	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.18"
6.0	568	0.0505	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.1	618	Total			

Subcatchment P-2B:



Summary for Subcatchment P-2C:

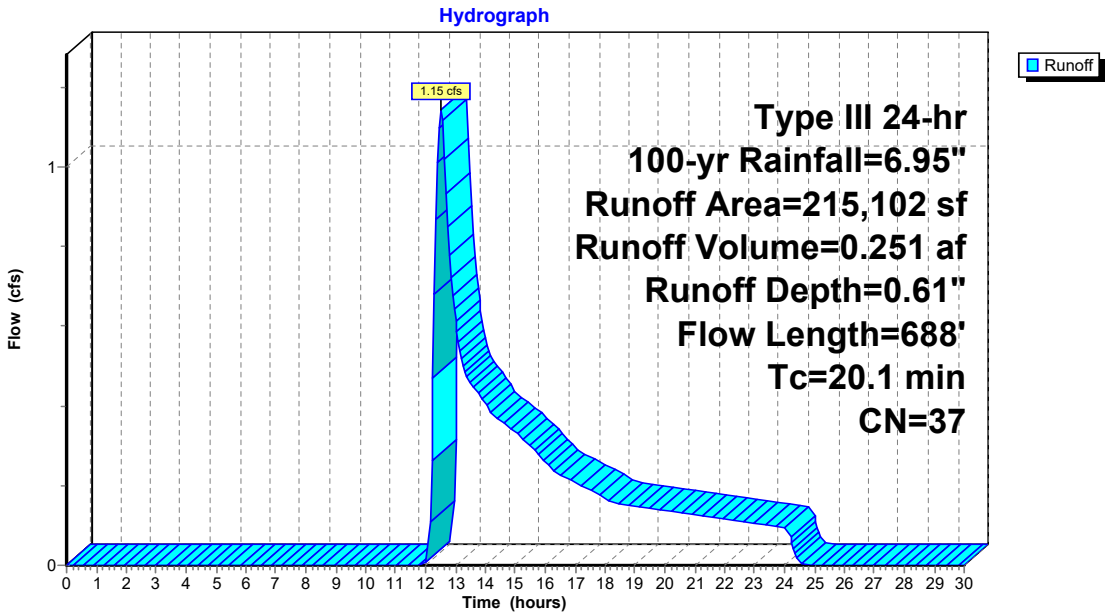
Runoff = 1.15 cfs @ 12.52 hrs, Volume= 0.251 af, Depth= 0.61"
Routed to Link POA-2 : Bordering Vegetated Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=6.95"

	Area (sf)	CN	Description
	42,646	49	50-75% Grass cover, Fair, HSG A
*	15,146	58	Sand, HSG A
	83	76	Gravel roads, HSG A
	2	98	Unconnected pavement, HSG A
	140,871	30	Woods, Good, HSG A
	16,354	45	Woods, Poor, HSG A
	215,102	37	Weighted Average
	215,100		100.00% Pervious Area
	2		0.00% Impervious Area
	2		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0583	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.18"
4.3	446	0.0618	1.74		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.6	110	0.0010	0.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	82	0.2968	2.72		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.1	688	Total			

Subcatchment P-2C:



Summary for Pond 1P:

Inflow Area = 22.300 ac, 0.60% Impervious, Inflow Depth = 1.73" for 100-yr event
Inflow = 24.78 cfs @ 12.38 hrs, Volume= 3.210 af
Outflow = 9.26 cfs @ 12.94 hrs, Volume= 3.210 af, Atten= 63%, Lag= 33.3 min
Discarded = 9.26 cfs @ 12.94 hrs, Volume= 3.210 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link POA-2 : Bordering Vegetated Wetland

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 37.00' @ 12.94 hrs Surf.Area= 38,213 sf Storage= 35,972 cf

Plug-Flow detention time= 47.6 min calculated for 3.205 af (100% of inflow)
Center-of-Mass det. time= 47.5 min (942.3 - 894.8)

Volume	Invert	Avail.Storage	Storage Description
#1	35.00'	87,163 cf	**Custom Stage Data (Irregular)** Listed below

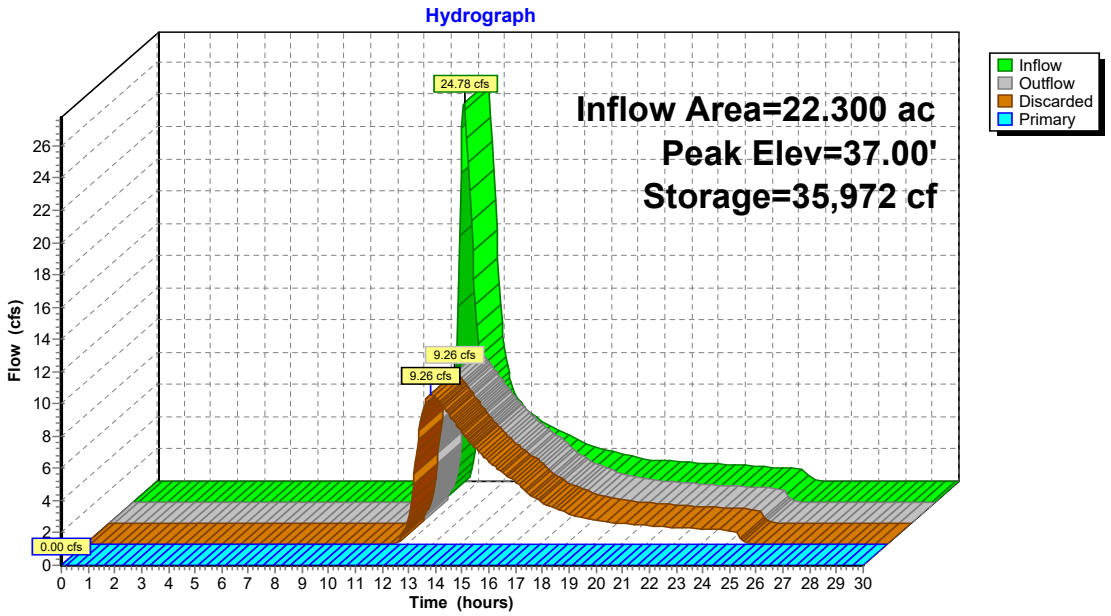
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
35.00	3,502	286.3	0	0	3,502
36.00	16,724	533.5	9,293	9,293	19,634
37.00	38,288	804.2	26,772	36,065	48,458
38.00	65,086	1,011.1	51,098	87,163	78,360

Device	Routing	Invert	Outlet Devices
#1	Discarded	35.00'	**8.270 in/hr Exfiltration over Wetted area**
#2	Primary	37.50'	**10.0' long x 18.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=9.25 cfs @ 12.94 hrs HW=37.00' (Free Discharge)
1=Exfiltration (Exfiltration Controls 9.25 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=35.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1P:



Stage-Area-Storage for Pond 1P:

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
35.00	3,502	3,502	0	36.80	33,975	42,693	30,711
35.05	4,163	4,309	465	36.85	35,053	44,134	32,049
35.10	4,824	5,115	929	36.90	36,132	45,576	33,388
35.15	5,485	5,922	1,394	36.95	37,210	47,017	34,727
35.20	6,146	6,728	1,859	37.00	38,288	48,458	36,065
35.25	6,808	7,535	2,323	37.05	39,628	49,953	38,620
35.30	7,469	8,342	2,788	37.10	40,968	51,448	41,175
35.35	8,130	9,148	3,253	37.15	42,308	52,943	43,730
35.40	8,791	9,955	3,717	37.20	43,648	54,438	46,285
35.45	9,452	10,761	4,182	37.25	44,988	55,933	48,840
35.50	10,113	11,568	4,646	37.30	46,327	57,429	51,395
35.55	10,774	12,375	5,111	37.35	47,667	58,924	53,950
35.60	11,435	13,181	5,576	37.40	49,007	60,419	56,504
35.65	12,096	13,988	6,040	37.45	50,347	61,914	59,059
35.70	12,757	14,794	6,505	37.50	51,687	63,409	61,614
35.75	13,419	15,601	6,970	37.55	53,027	64,904	64,169
35.80	14,080	16,408	7,434	37.60	54,367	66,399	66,724
35.85	14,741	17,214	7,899	37.65	55,707	67,894	69,279
35.90	15,402	18,021	8,364	37.70	57,047	69,389	71,834
35.95	16,063	18,827	8,828	37.75	58,387	70,884	74,389
36.00	16,724	19,634	9,293	37.80	59,726	72,379	76,944
36.05	17,802	21,075	10,632	37.85	61,066	73,875	79,499
36.10	18,880	22,516	11,970	37.90	62,406	75,370	82,053
36.15	19,959	23,958	13,309	37.95	63,746	76,865	84,608
36.20	21,037	25,399	14,647	38.00	**65,086**	**78,360**	**87,163**
36.25	22,115	26,840	15,986				
36.30	23,193	28,281	17,325				
36.35	24,271	29,722	18,663				
36.40	25,350	31,164	20,002				
36.45	26,428	32,605	21,340				
36.50	27,506	34,046	22,679				
36.55	28,584	35,487	24,018				
36.60	29,662	36,928	25,356				
36.65	30,741	38,370	26,695				
36.70	31,819	39,811	28,034				
36.75	32,897	41,252	29,372				

Summary for Pond 2P:

Inflow Area = 5.764 ac, 0.01% Impervious, Inflow Depth = 1.64" for 100-yr event
Inflow = 8.24 cfs @ 12.16 hrs, Volume= 0.787 af
Outflow = 1.76 cfs @ 12.81 hrs, Volume= 0.787 af, Atten= 79%, Lag= 38.8 min
Discarded = 1.76 cfs @ 12.81 hrs, Volume= 0.787 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link POA-2 : Bordering Vegetated Wetland

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 52.00' @ 12.81 hrs Surf.Area= 9,145 sf Storage= 8,630 cf

Plug-Flow detention time= 37.2 min calculated for 0.787 af (100% of inflow)
Center-of-Mass det. time= 37.2 min (922.3 - 885.1)

Volume	Invert	Avail.Storage	Storage Description
#1	51.00'	18,297 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

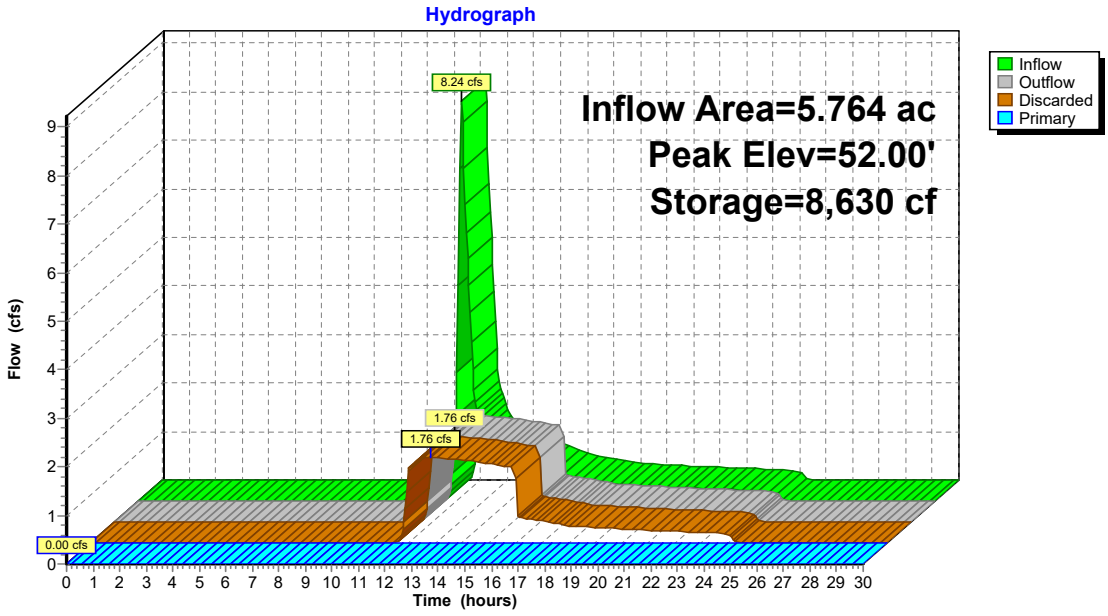
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
51.00	8,049	354.1	0	0	8,049
52.00	9,140	373.0	8,589	8,589	9,201
53.00	10,287	391.8	9,708	18,297	10,408

Device	Routing	Invert	Outlet Devices
#1	Discarded	51.00'	**8.270 in/hr Exfiltration over Wetted area**
#2	Primary	52.50'	**10.0' long x 11.0' 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) 2.53 2.59 2.70 2.68 2.67 2.68 2.66 2.64

Discarded OutFlow Max=1.76 cfs @ 12.81 hrs HW=52.00' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 1.76 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 2P:



Stage-Area-Storage for Pond 2P:

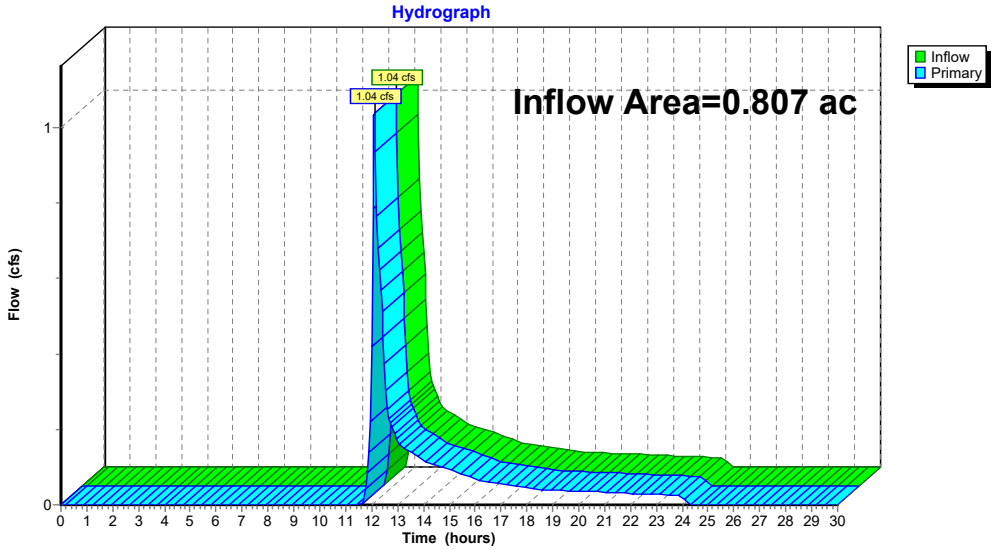
Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
51.00	8,049	8,049	0	52.80	10,052	10,162	16,263
51.05	8,102	8,105	404	52.85	10,111	10,223	16,767
51.10	8,155	8,162	810	52.90	10,169	10,285	17,274
51.15	8,208	8,218	1,219	52.95	10,228	10,346	17,784
51.20	8,262	8,275	1,631	53.00	**10,287**	**10,408**	**18,297**
51.25	8,315	8,331	2,045				
51.30	8,369	8,388	2,463				
51.35	8,423	8,446	2,882				
51.40	8,477	8,503	3,305				
51.45	8,531	8,560	3,730				
51.50	8,586	8,618	4,158				
51.55	8,640	8,675	4,589				
51.60	8,695	8,733	5,022				
51.65	8,750	8,791	5,458				
51.70	8,805	8,849	5,897				
51.75	8,861	8,908	6,339				
51.80	8,916	8,966	6,783				
51.85	8,972	9,025	7,230				
51.90	9,028	9,083	7,680				
51.95	9,084	9,142	8,133				
52.00	9,140	9,201	8,589				
52.05	9,196	9,260	9,047				
52.10	9,252	9,319	9,508				
52.15	9,308	9,379	9,972				
52.20	9,364	9,438	10,439				
52.25	9,420	9,497	10,909				
52.30	9,477	9,557	11,381				
52.35	9,534	9,617	11,856				
52.40	9,591	9,677	12,334				
52.45	9,648	9,737	12,815				
52.50	9,705	9,797	13,299				
52.55	9,762	9,858	13,786				
52.60	9,820	9,918	14,276				
52.65	9,878	9,979	14,768				
52.70	9,936	10,040	15,263				
52.75	9,994	10,101	15,762				

Summary for Link POA-1: Isolated Wetland

Inflow Area = 0.807 ac, 0.00% Impervious, Inflow Depth = 1.38" for 100-yr event
Inflow = 1.04 cfs @ 12.11 hrs, Volume= 0.093 af
Primary = 1.04 cfs @ 12.11 hrs, Volume= 0.093 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-1: Isolated Wetland

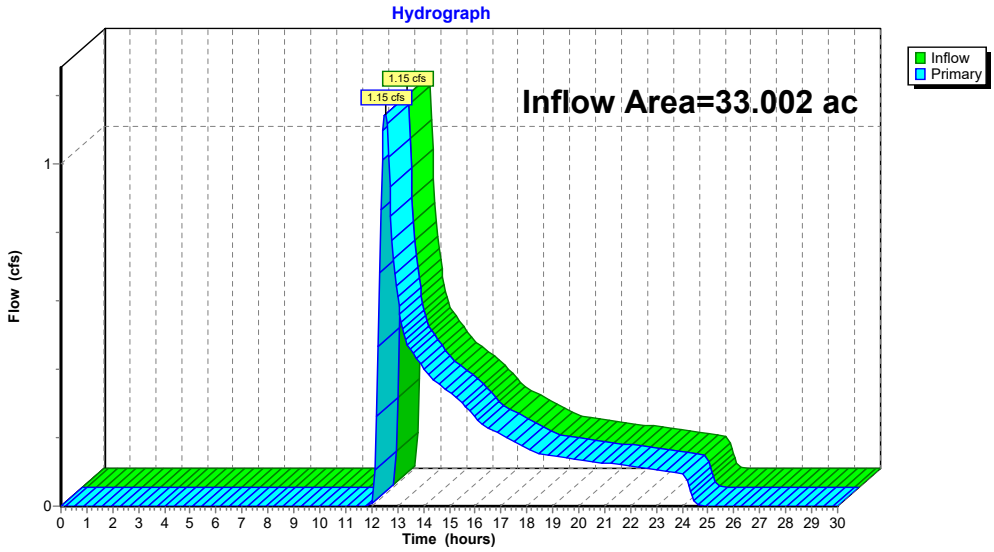


Summary for Link POA-2: Bordering Vegetated Wetland

Inflow Area = 33.002 ac, 0.41% Impervious, Inflow Depth = 0.09" for 100-yr event
Inflow = 1.15 cfs @ 12.52 hrs, Volume= 0.251 af
Primary = 1.15 cfs @ 12.52 hrs, Volume= 0.251 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POA-2: Bordering Vegetated Wetland



Attachment E - Supporting Calculations

NextGrid - Truro Solar Photovoltaic Development
Truro, MA
Date: 12/31/2025

Standard 1: No New Untreated Discharges

Subcatchment	2-yr 24-hr Discharge Velocity (fps)	Discharge Location	Point of Analysis	Permissible Velocity (fps)
P-1	1.11	Isolated Wetland	1	3
P-2C	2.72	Bordering Vegetated Wetland	2	3

Notes:
1. Velocities calculated using HydroCAD modeling software.

2. Permissible Velocities referenced from the Massachusetts Stormwater Handbook Volume 3 Table 2.3.1 Example of Permissible Velocity Table for slopes between 0-5%, slopes between 5-10%, and slopes greater than 10%.

NextGrid - Truro Solar Photovoltaic Development
Truro, MA
Date: 12/31/2025

Standard 3: Recharge Calculations (Static Method)

Drainage Area P-2A

	A	B	C	D		
Hydrologic Soils Group:						
Total Proposed Increase Impervious Area:	3155.00	0.00	0.00	0.00	3155.00	SF
Target Factor:	0.60	0.35	0.25	0.10		
DA-P-2A Required Recharge Volume:	158	0	0	0	*158*	*CF*

Storage Volume In Infiltraion Basin 1P Below Lowest Outlet	61,614	CF
Lowest Outlet: Spillway w/ El. = 37.5 FT		
DA-P-2A Total Recharge Volume Provided:	*61,614*	*CF*

Determine Drawdown Time

Saturated Hydraulic Conductivity (Rawls Rate):	8.27	IN/HR
Bottom Area of Infiltration Basin 1P	3,502	SF
Drawdown Time 1P	*25.5*	*HRS*

Drainage Area P2B

	A	B	C	D		
Hydrologic Soils Group:						
Total Proposed Increase Impervious Area:	27.00	0.00	0.00	0.00	27.00	SF
Target Factor:	0.60	0.35	0.25	0.10		
DA-P-2B Required Recharge Volume:	1	0	0	0	*1*	*CF*

Storage Volume In Infiltraion Basin 2P Below Lowest Outlet	13,299	CF
Lowest Outlet: Spillway w/ El. = 52.5 FT		
DA-P2B Total Recharge Volume Provided:	*13,299*	*CF*

Determine Drawdown Time

Saturated Hydraulic Conductivity (Rawls Rate):	8.27	IN/HR
Bottom Area of Infiltration Basin 2P	8,049	SF
Drawdown Time 2P	*2.4*	*HRS*

INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Location: Basin 1P

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Infiltration Basin	**0.80**	**1.00**	**0.80**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**

Total TSS Removal = **80%**

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: NextGrid Truro Solar Photovoltaic Development

Prepared By: TLG

Date: 12/31/2025

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Location: Basin 2P

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Infiltration Basin	**0.80**	**1.00**	**0.80**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**

Total TSS Removal = **80%**

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: NextGrid Truro Solar Photovoltaic Development

Prepared By: TLG

Date: 12/31/2025

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1

Attachment F - Long Term Pollution Prevention Plan

Long Term Pollution Prevention Plan

To meet the requirements of Standard 4 of the Massachusetts Stormwater Handbook, this Long Term Pollution Prevention Plan is provided to identify the proper procedures and practices for source control and pollution prevention.

Storage and Handling of Oil and other Hazardous Materials

There will be no hazardous materials stored or handled onsite with the exception of fuel for construction equipment. Fuel will be stored in approved storage containers, outside of wetland resource areas and associated buffer zones.

Operation and Maintenance of Stormwater Control Structures

Included in Attachment F is the Operation and Maintenance plan for this site, which includes maintenance requirements of the stormwater BMPs. The owner—NextGrid Pecan LLC—or their Contractor, will be responsible for the implementation of the plan.

Landscaping

After the completion of construction, including final seeding, landscaped areas will be maintained by the owner. There is no intent to use herbicides or pesticides for this project, nor will they be stored on site.

Septic System

There will be no septic system or wastewater produced on site.

Snow Management

Following construction, the solar system will be monitored remotely, and routine site visits will be performed 1-2 times per year. Snow removal will be performed as needed along the gravel access road for site access to the entry gate and equipment pads. Salt and/or sand will not be stored on-site.

Non-Hazardous Waste Management/Good Housekeeping Practices

All non-hazardous waste is to be stored in designated trash or recycling containers onsite for periodic collection by the local trash collector, or Contractor during construction. Following construction all non-hazardous waste should not be stored onsite. The owner's maintenance staff should inspect the site during maintenance visits, if trash is observed it should be collected and removed from the site.

Prohibition of Illicit Discharges

Illicit discharges to the on-site stormwater management system are strictly prohibited. Illicit discharges are defined as any direct or indirect non-stormwater discharge to the on-site stormwater system. There are no illicit discharges associated with the project.

Contact Information/Responsible Parties

Owner/Operator:
NextGrid Pecan LLC
Daniel Serber, Senior Director of Land Development
68 Harrison Avenue, Suite 605, PMB 73069
Boston, MA 02111

Attachment G - Stormwater Operation & Maintenance Plan

Stormwater Operation and Maintenance Plan

1.0 Introduction

The following document has been written to comply with the stormwater guidelines set forth by the Massachusetts Department of Environmental Protection (MassDEP). The intent of these guidelines is to encourage Low Impact Development techniques to improve the quality of the stormwater runoff. These techniques, also known as Best Management Practices (BMPs) collect, store, and treat the runoff before discharging to adjacent environmental resources.

2.0 Purpose

This Operation and Maintenance Plan (O&M Plan) is intended to provide a mechanism for the consistent inspection and maintenance of each BMP installed on the project site. Included in this O&M Plan is a description and an inspection form for each BMP type. NextGrid Pecan LLC is the owner and operator of the system and is responsible for its upkeep and maintenance. This work will be funded on an annual basis through the owner's operating budget.

Owner/Operator:
NextGrid Pecan LLC
Daniel Serber, Senior Director of Land Development
68 Harrison Avenue, Suite 650, PMB 73069
Boston, MA 02111

In the event the Owner sells the property, it is the Owner's responsibility to transfer this plan as well as the past three years of operation and maintenance records to the new property owner.

3.0 BMP Descriptions and Locations

Proposed stormwater BMPs are identified on the attached Site Plan and described below.

3.1 Stormwater Infiltration Basin

Stormwater basins on-site will receive runoff from the developed site area. The basins will provide infiltration to attenuate peak rates of runoff leaving the site.

3.2 Sediment Forebay

Sediment forebays are to be installed immediately upstream of the stormwater infiltration basin(s). They are designed to allow initial pretreatment of stormwater discharge prior to discharging to the basins via a stone overflow weir.

4.0 Inspection, Maintenance Checklist and Schedule

Inspection and maintenance of stormwater BMPs identified in this plan shall be conducted at the frequencies outlined below for each item.

4.1 Stormwater Infiltration Basin

Stormwater basins are to be inspected every three months during the first year, and annually thereafter. Inspections are to include all items noted below.

All accumulated sediment and debris in the stormwater basins will be removed and disposed of according to local, state, and federal regulations. Any grassed areas in close proximity to any areas that use salt in deicing applications will be re-seeded in the spring. Vegetation in basin bottoms will

likewise be inspected for degradation and any accumulated sediment will be removed and bare spots will be re-seeded as needed.

Any vegetation, soil, or debris that forms a barrier to flow will be removed. If any soil erosion is noted, erosion will be repaired, and bare spots will be armored with stone riprap. Embankments, spillways, and swales will likewise be inspected for blockage or damage. Any accumulated debris that may impede stormwater flow will be removed, and any noted erosion will be repaired with stone riprap.

In the event of contamination by a spill or other means, all cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000 and handled as hazardous waste.

In the absence of evidence of contamination, cleanings may be taken to a landfill or other facility permitted by MassDEP to accept Solid Waste without any prior approval by MassDEP. Please note that current MassDEP regulations prevent landfills from accepting materials that contain free-draining liquids.

4.2 Sediment Forebays

Sediment forebays, at a minimum, are to be inspected monthly and are to be cleaned out at least four times per year. Stabilize the floor and sidewalls before making it operational, otherwise the forebay will discharge excess amounts of suspended sediments. Mow so that the grass height does not exceed six (6) inches and ensure mower blades are set no lower than three to four (3-4) inches. If vegetation is damaged during sediment removal reseed or resod damaged areas. When reseeding, incorporate practices such as hydroseeding with a tackifier, blanket, or similar practice to ensure no scour occurs in the forebay while the seeds germinate and develop roots.

Stormwater Operation and Maintenance Plan

INSPECTION CHECKLIST SHEETS

Stormwater Infiltration Basin

Frequency: Stormwater basins are to be inspected every three months during the first year, and annually thereafter. Inspect and/or clean outlet control structures at least four times per year and at the end of foliage and snow removal seasons.

Basin Location: _____

Inspected By: _____ Date: _____

Observations: _____

_____

_____

Actions Taken: _____

_____

_____

Instructions: All accumulated sediment and debris in the stormwater basins will be removed and disposed of according to local, state, and federal regulations. Any grassed areas in close proximity to any areas that use salt in deicing applications will be re-seeded in the spring. Vegetation in basin bottoms will likewise be inspected for degradation and any accumulated sediment will be removed and bare spots will be re-seeded as needed.

Any vegetation, soil, or debris that forms a barrier to flow will be removed. If any soil erosion is noted, erosion will be repaired, and bare spots will be armored with stone riprap. Embankments, spillways, and swales will likewise be inspected for blockage or damage. Any accumulated debris that may impede stormwater flow will be removed, and any noted erosion will be repaired with stone riprap.

INSPECTION CHECKLIST SHEETS

Sediment Forebays

Frequency: Sediment forebays, at a minimum, are to be inspected monthly and are to be cleaned out at least four times per year.

Basin Location: _____

Inspected By: _____ Date: _____

Observations: _____

_____

_____

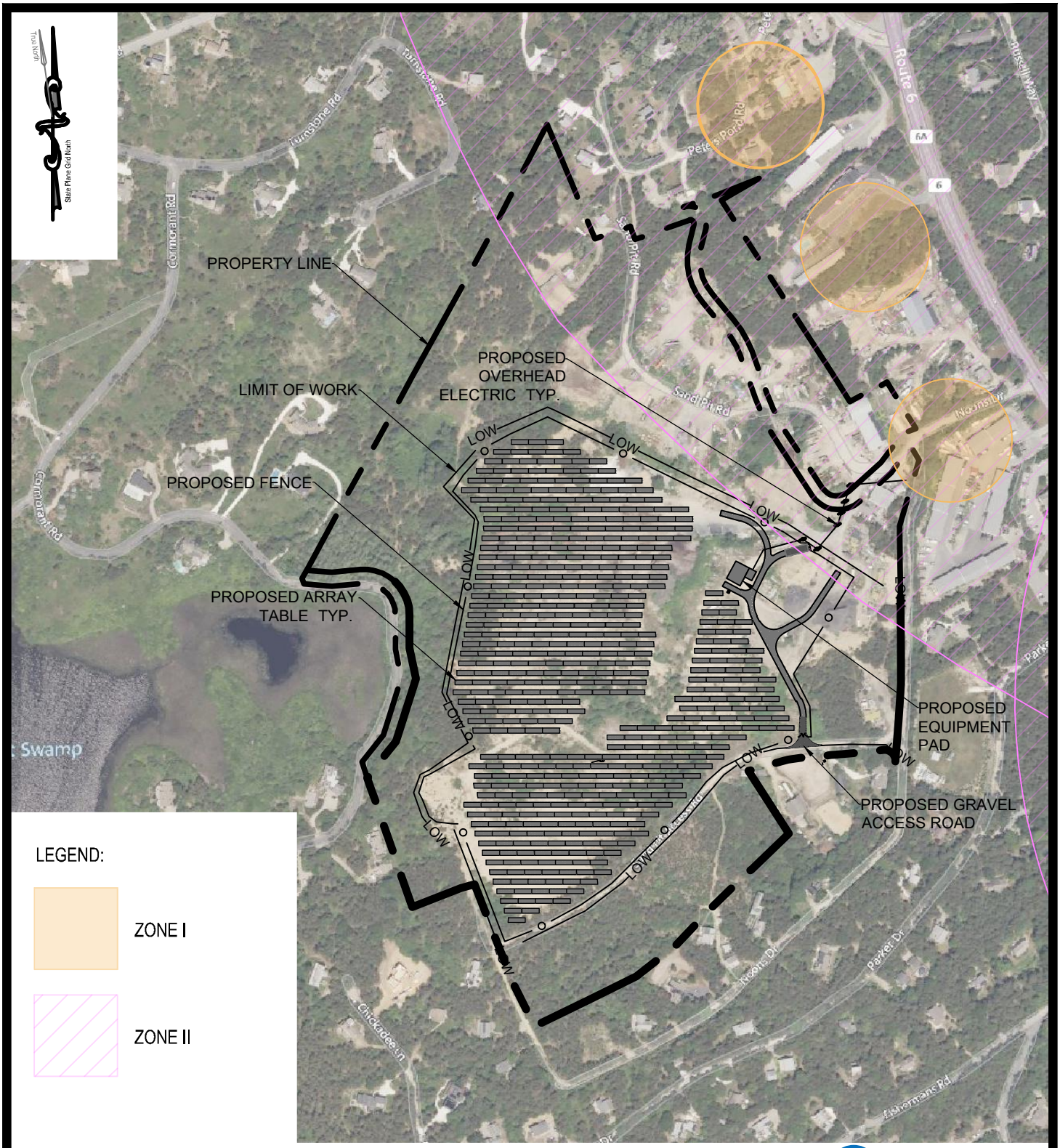
Actions Taken: _____

_____

_____

Instructions: Stabilize the floor and sidewalls before making it operational, otherwise the forebay will discharge excess amounts of suspended sediments. Mow so that the grass height does not exceed six (6) inches and ensure mower blades are set no lower than three to four (3-4) inches. If vegetation is damaged during sediment removal reseed or resod damaged areas. When reseeding, incorporate practices such as hydroseeding with a tackifier, blanket, or similar practice to ensure no scour occurs in the forebay while the seeds germinate and develop roots.

Attachment H - Critical Areas Map



Weston & Sampson

GENERAL NOTES:

1. ZONE I AND ZONE II LAYERS PROVIDED BY MASSGIS.

FIGURE 1
CRITICAL AREAS MAP
2 SAND PIT ROAD & 9 NOONS DRIVE
TRURO, MASSACHUSETTS
SCALE: 1" = 400'

0 200' 400' 800'
1" = 400' HORIZONTAL

Rev: 1 Date: 12/31/2025

P:\Private\NextGrid Inc\Truro, MA\2 Sand Pit - 9 Noons Drive\06-BIM-CAD\07-Civil-Survey\03 Sheets\Figure 1 - Critical Areas Map.dwg

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Attachment I - Construction Period Pollution and Erosion and Sedimentation Plan

SECTION 1: Introduction

The project applicant proposes construction of a ground mounted solar photovoltaic (PV) ground mounted array with associated gravel access driveways, battery energy storage (BESS), and electrical appurtenances.

SECTION 2: Construction Period Pollution Prevention Measures

Best Management Practices (BMPs) will be utilized as Construction Period Pollution Prevention Measures to reduce potential pollutants and prevent any off-site discharge. The objectives of the BMPs for construction activity are to minimize the disturbed areas, stabilize any disturbed areas, control the site perimeter, and retain sediment. Both erosion and sedimentation controls and non-stormwater best management measures will be used to minimize site disturbance and ensure compliance with the performance standards of the Wetlands Protection Act and any state and local stormwater standards. Measures will be taken to minimize the area disturbed by construction activities to reduce the potential for soil erosion and stormwater pollution problems. In addition, good housekeeping measures will be followed for the day-to-day operation of the construction site under the control of the contractor to minimize the impact of construction. This section describes the control practices that will be in place during construction activities. Recommended control practices will comply with the standards set in the MA DEP Stormwater Policy Handbook.

2.1 Minimize Disturbed Area and Protect Natural Features and Soil

To minimize disturbed areas, work will be completed within well-defined work limits. These work limits are shown on the construction plans. The Contractor will be responsible to make sure that their workers and any subcontractors know the proper work limits and do not extend their work into the undisturbed areas. The protective measures are described in more detail in the following sections.

2.2 Control Stormwater Flowing onto and through the Project

Perimeter erosion controls shall be installed on-site to control stormwater discharges as depicted on the site plans. The barriers will be inspected at least once every 7 calendar days, or every 14 calendar days and within 24 hours of a storm event of 0.25 inches or greater, and accumulated silt will be removed as needed.

2.3 Stabilize Soils

The Contractor should limit the area of land which is exposed and unvegetated during construction. In areas where the period of exposure will be greater than two months, mulching, the use of erosion control mats, or other protective measures will be provided as specified on the plans.

The Contractor should follow the seeding requirements outlined on the plans and will be responsible for maintaining the seeded areas until final acceptance is received. Final acceptance after 90 days following construction, or until the site reaches 70% stabilization, whichever is longer.

2.4 Proper Storage and Cover of Any Stockpiles

The location of the Contractor's storage areas for equipment and/or materials should be upon cleared portions of the job site or areas to be cleared as a part of this project.

Adequate measures for erosion and sediment control such as the placement of straw wattle sediment barriers around the downstream perimeter of stockpiles will be employed to protect any downstream areas from siltation.

There will be no storage of equipment or materials in wetlands.

2.5 Perimeter Controls and Sediment Barriers

Straw wattle (as detailed in the site plans) will be utilized to ensure that sedimentation does not occur outside the perimeter of the work area.

2.6 Storm Drain Inlet Protection

There are no storm drains in the work area.

2.7 Retain Sediment On-Site

The Contractor will be responsible for monitoring erosion control measures. Whenever necessary, the Contractor will clear sediment from the sediment barriers that have been silted up during construction. Inspections must be documented using the attached Monitoring Form.

2.8 Material Handling and Waste Management

Materials stored on-site will be stored in a neat, orderly manner in appropriate containers. Materials will be kept in their original containers with the original manufacturer's label. Substances will not be mixed with one another unless recommended by the manufacturer.

Waste materials will be collected and stored in a securely lidded metal container from a licensed management company. The waste and any construction debris from the site will be hauled off-site and disposed of properly. The contractor will be responsible for waste removal. Manufacturer's recommendations for proper use and disposal will be followed for materials. If portable sanitary waste facilities will be used on-site, sanitary waste will be collected from the units a minimum of once a week, by a licensed sanitary waste management contractor.

2.9 Designated Washout Areas

The Contractor should use washout facilities at their own facilities.

2.10 Proper Equipment/Vehicle Fueling and Maintenance Practices

On-site vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the risk of leakage. To ensure that leaks from stored equipment do not contaminate the site, oil-absorbing mats will be placed under oil-containing equipment during storage. Regular fueling and service of the equipment may be performed using approved methods and with care taken to minimize chance of spills. Repair of equipment or machinery within 100 feet of any water resources is not allowed. Any petroleum products will be stored in tightly sealed containers that are clearly labeled with spill control pads/socks placed under/around their perimeters.

2.11 Equipment/Vehicle Washing

The Contractor will be responsible to ensure that no equipment is washed on-site.

SECTION 3: Spill Prevention and Control Plan

The Contractor will be responsible for preventing spills in accordance with the project drawings and applicable federal, state, and local regulations. The Contractor will identify a properly trained site employee, involved with the day-to-day site operations to be the spill prevention and cleanup coordinator. The name(s) of the responsible spill personnel will be posted on-site. Each employee will be instructed that all spills are to be reported to the spill prevention and cleanup coordinator.

3.1 Spill Control Equipment

Spill control/containment equipment will be kept in the work area. Materials and equipment necessary for spill cleanup will be kept either in the work area or in an otherwise accessible on-site location. Equipment and materials will include, but not be limited to, absorbent booms/mats, brooms, dust pans, mops, rags, gloves, sand, plastic and metal containers specifically for this purpose. It is the responsibility of the Contractor to ensure the inventory will be readily accessible and maintained.

3.2 Notification

Workers will be directed to inform the on-site supervisor of a spill event. The supervisor will assess the incident and initiate proper containment and response procedures immediately upon notification. Workers should avoid direct contact with spilled materials during the containment procedures. Primary notification of a spill should be made to the local Fire Department and Police Departments. Secondary Notification will be to the certified cleanup contractor if deemed necessary by Fire and/or Police personnel. The third level of notification (within 1 hour), if required, is to the DEP or municipality's Licensed Site Professional (LSP) if the spill exceeds the reportable quantity for the material spilt. The specific cleanup contractor to be used will be identified by the Contractor prior to commencement of construction activities.

3.3 Spill Containment and Clean-Up Measures

Spills will be contained with granular sorbent material, sand, sorbent pads, booms or all of the above to prevent spreading. Certified cleanup contractors should complete spill cleanup. The material manufacturer's recommended methods for spill cleanup will be clearly posted and on-site personnel will be made aware of the procedures and the location of the information and cleanup supplies.

3.4 Hazardous Materials Spill Report

The Contractor will report and record any spill. The spill report will present a description of the release, including the quantity and type of material, date of the spill, circumstances leading to the release, location of spill, response actions and personnel, documentation of notifications and corrective measures implemented to prevent reoccurrence.

This document does not relieve the Contractor of the Federal reporting requirements of 40 CFR Part 110, 40 CFR Part 117, 40 CFR Part 302 and the State requirements specified under the Massachusetts Contingency Plan (M.C.P) relating to spills or other releases of oils or hazardous substances. Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117 or 40 CFR Part 302, occurs during a twenty-four (24) hour period, the Contractor is required to comply with the response requirements of the above mentioned regulations. Spills of oil or hazardous material in excess of the reportable quantity will be reported to the National Response Center (NRC).

SECTION 4: Contact Information/Responsible Parties

Owner/Operator:
NextGrid Pecan LLC
Daniel Serber, Senior Director of Land Development
68 Harrison Avenue, Suite 605, PMB 73069
Boston, MA 02111

Engineer:
Melinda Costello, PE
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978-532-1900

Site Inspector:
TBD

Contractor:
TBD

SECTION 5: Erosion and Sedimentation Control

Erosion and Sedimentation Control features can be found in the attached project plans which include specifications for installation and monitoring control devices.

SECTION 6: Site Development Plan

The proposed site development plan is included in the attached plans.

SECTION 7: Operation and Maintenance of Erosion Control

The erosion control measures will be installed as detailed in project plans. If there is a failure of the controls, the Contractor is required to stop work until the failure is repaired.

Periodically throughout the work, the sediment that has been deposited against the controls will be removed to ensure that the controls are working properly.

SECTION 8: Inspection Schedule

During construction, the erosion and sedimentation controls will be inspected at least once every 7 calendar days, or once every 14 calendar days and within 24 hours of the end of a storm event of 0.25 inches or greater. Once the Contractor is selected, an on-site inspector will be identified to ensure that erosion and sedimentation controls are in place and working properly. A Monitoring Form is included for use by the on-site inspector.

Monitoring Form

Inspected By:_____ Date: _____Time:_____

YES	NO	DOES NOT APPLY	ITEM
			Do any erosion/siltation control measures require repair or clean out to maintain adequate function?
			Is there any evidence that sediment is leaving the site?
			Are any temporary soil stockpiles or construction materials located in non-approved areas?
			Are on-site construction traffic routes, parking, and storage of equipment and supplies located in areas not specifically designed for them?
			Are storage of fuels located outside of resource areas and associated buffer zones? Are fuels stored in proper storage containers?

Specific location, current weather conditions, and action to be taken:

_____

_____

_____

_____

_____

Other Comments:

_____

_____

_____

Pending the actions noted above I certify that the erosion and sedimentation controls at the site are in compliance with the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan.

Signature:_____ Date: _____

Attachment J - Illicit Discharge Statement

ILLICIT DISCHARGE COMPLIANCE STATEMENT

Illicit Discharge Compliance Statement

Section I – Purpose/Intent

Standard 10 of the Massachusetts Stormwater Handbook prohibits illicit discharges to stormwater management systems. The stormwater management system is the system for conveying, treating, and infiltrating stormwater on-site, including stormwater best management practices (BMPs) and any pipes intended to transport stormwater to the groundwater, a surface water, or municipal separate storm sewer system. Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater.

This Illicit Discharge Statement is related to work performed by NextGrid Pecan LLC and their subcontractor(s). Site maintenance will be performed in accordance with the Site's Operation and Maintenance Plan and Long-Term Pollution Prevention Plan.

Section II - Prohibitions

Prohibition of Illicit Discharges
No person shall dump, discharge, cause or allow to be discharged any pollutant or non-stormwater discharge into the Stormwater BMPs, into a watercourse, or into waters of the United States and/or Commonwealth.

Exemptions
The following activities are considered exempt: firefighting, water line flushing, landscape irrigation, uncontaminated groundwater, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents.

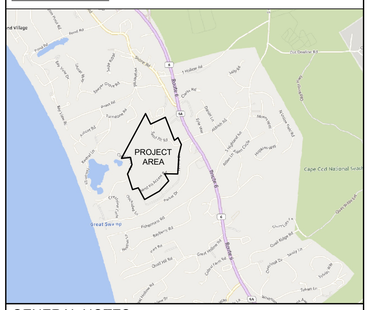
Section III - Notification of Spills

In the event of a spill or release which may result in a discharge of pollutants or non-stormwater discharge to the on-site Stormwater BMPs, waters of the United States, and/or waters of the Commonwealth, the responsible parties, potentially responsible parties, or any person or persons managing the Site shall take all necessary steps to ensure containment and provide the required notification under local, state and/or federal law.

Representative of NextGrid Pecan LLC _____ Date _____

Appendix E – Copy of Proposed ANR Plan

VICINITY MAP: NOT TO SCALE



GENERAL NOTES:

1. OWNER OF RECORD: ESTATE OF DONALD W. NOONS BY VIRTUE OF RECORDED DEEDS WITHIN THE BARNSTABLE REGISTRY OF DEEDS FILED AS BOOK 279 – PAGE 034 AND BOOK 1083 – PAGE 307.

   THE TOWN OF TRURO HAS LISTED THESE PROPERTIES AS TAX MAP 039 – LOT 107 AND LOT 108. SURVEY FIELD WORK ON THIS SITE DATED AUGUST 2025.

2. THE HORIZONTAL DATUM IS BASED ON MASSACHUSETTS STATE GRID COORDINATE SYSTEM NAD83 (2011 – MAINLAND). VERTICAL DATUM IS REFERENCED TO NAVD 88. TOPOGRAPHY SHOWN WAS DEVELOPED UTILIZING ON THE GROUND DATA COLLECTION WITH SURVEY GRADE GPS, UAS DRONE W/LIDAR, AND OR ROBOTIC TOTAL STATION. THE CONTOUR INTERVAL SHOWN ON PLAN IS 1 – FOOT CONTOUR INTERVAL.

3. PROPERTY IS NOT LOCATED WITHIN OR AFFECTED BY A DESIGNATED FLOOD ZONE PER MAPS FLOOD HAZARD F.I.R.M. – FLOOD INSURANCE RATE MAP – COMMUNITY PANEL NUMBER 255222 – PANEL 0139 / MAP NUMBER 25001C0139I FOR THE TOWN OF TRURO, BARNSTABLE COUNTY, MASSACHUSETTS (ALL JURISDICTIONS), WITH AN EFFECTIVE DATE OF JULY 16, 2014. ZONE 'X' IS DEFINED AS AREAS DETERMINED TO BE OUTSIDE THE 0.2% CHANCE FLOODPLAIN.

4. PROPERTY IS LOCATED WITHIN THE 'R' ZONING DISTRICT (RESIDENTIAL ZONE) UPDATED APRIL 03, 2025. SEE TOWN OF TRURO FOR SOLAR FARM OVERLAY DISTRICT / LARGE SCALE GROUND MOUNTED SOLAR PHOTOVOLTAIC INSTALLATIONS. SEE FOLLOWING TOWN'S DIMENSIONAL REQUIREMENTS PER ONLINE ZONING BYLAWS – 2024:

   a. MINIMUM LOT SIZE 2 – ACRES
   b. FRONT SETBACK 50 FT
   c. SIDE SETBACK 50 FT
   d. REAR SETBACK 50 FT

5. SGC ENGINEERING, LLC HAS NOT INDEPENDENTLY VERIFIED THE LOCATION, EXISTENCE, AND SERVICEABILITY OF ANY UTILITIES AND MAKES NO GUARANTEE TO THE COMPLETENESS OR THE ACCURACY OF ANY UTILITIES. UTILITIES SHOWN ON THIS PLAN WERE ABOVEGROUND AND VISUAL FOR FIELD LOCATES OR WERE SHOWN ON PLAN – MAP REFERENCES. ADDITIONAL UTILITIES MAY EXIST IN THE FIELD, WHICH ARE NOT SHOWN ON THIS PLAN. ACTUAL LOCATIONS MUST BE DETERMINED IN THE FIELD PRIOR TO EXCAVATION OR OTHER CONSTRUCTION ACTIVITIES. CALL "DIG SAFE" AT 1–888–344–7233 OR DIAL 811. SGC ENGINEERING, LLC ASSUMES NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN ON THIS PLAN.

6. THIS SURVEY WAS PREPARED FOR THE EXCLUSIVE USE OF THE PERSON, PERSONS, OR ENTITY NAMED IN THE CERTIFICATION AND TITLE BLOCK OF THIS PLAN. THIS SURVEY DOES NOT EXTEND TO ANY UNNAMED PERSON, PERSONS, OR ENTITY WITHOUT HAVING SGC ENGINEERING'S CONSENT IN WRITING.

7. NOONS DRIVE IS A 40 FOOT WIDE DEDICATED AND PRIVATE WAY AS SHOWN ON PLAN BOOK 241 PAGE 41 (SEE MAP REFERENCE 15 THIS PLAN). NOONS DRIVE HAS DEDICATED AND PUBLIC USE TO HIGHWAY ROUTE 6.

   SAND PIT ROAD AND PETERS POND ROAD ARE 40 FOOT WIDE DEDICATED AND UNIMPROVED PRIVATE WAYS – SEE PLAN BOOK 650 PAGE 60 AND OTHER MAP REFERENCES THIS PLAN.

LEGEND:

- LOCUS BOUNDARY LINE
- ADJACENT LOT LINE
- EDGE OF GRAVEL
- EDGE OF PAVEMENT
- ABANDONED VEHICLES
- DEBRIS
- STOCKPILE
- OVERHEAD WIRE — OHW
- GRANITE BOUND
- REBAR
- SOLID SMOOTH ROD
- UTILITY POLE

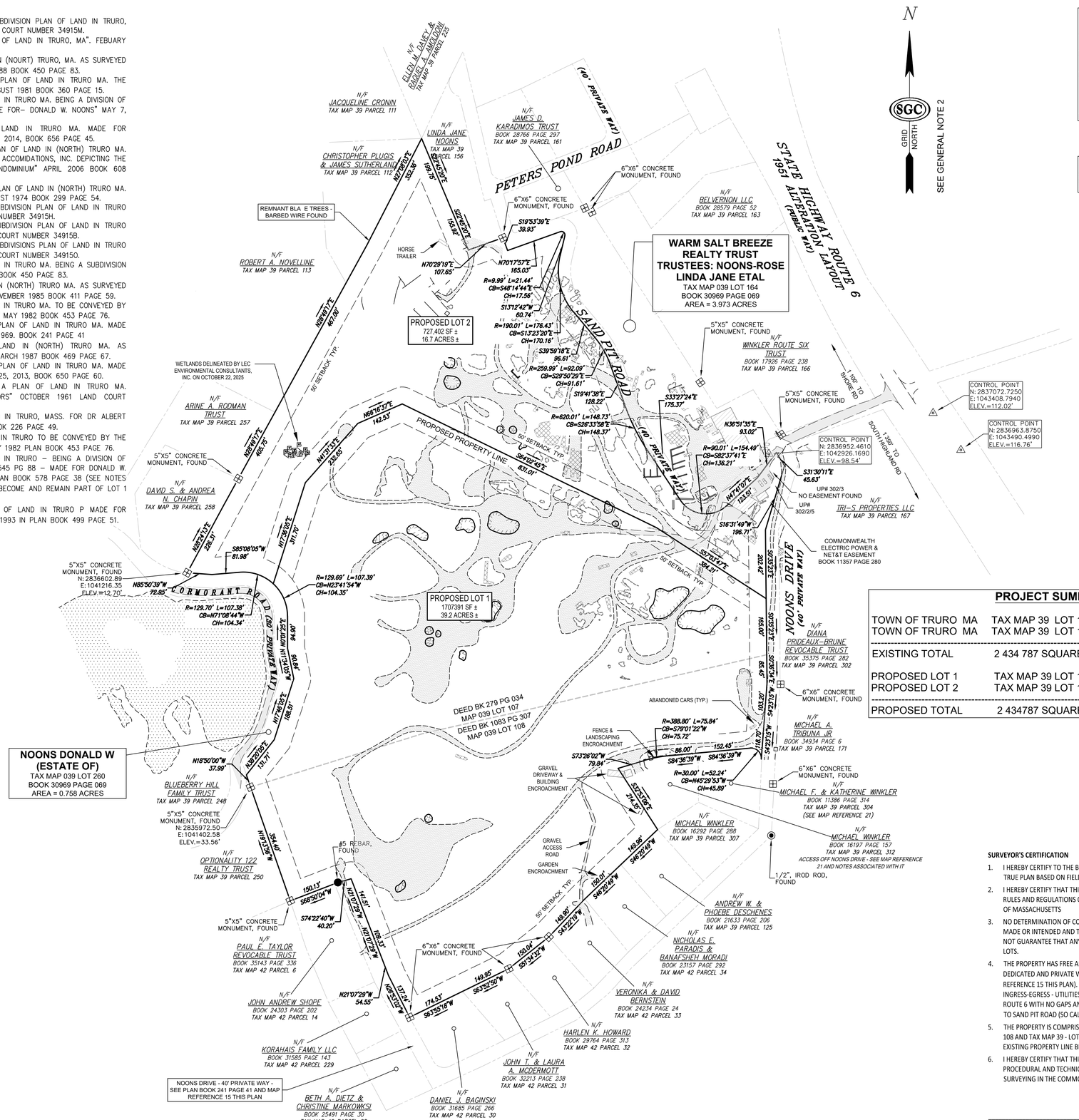
SCALE

0 75 150 300

1 INCH = 150 FEET

MAP REFERENCES:

1. PLAN ENTITLED "LAND COURT SUBDIVISION PLAN OF LAND IN TRURO, MA." DATED JANUARY 1994 LAND COURT NUMBER 34915M.
2. PLAN ENTITLED "REDIVISION PAN OF LAND IN TRURO, MA". FEBUARY 5,1993 BOOK 547 PAGE 82.
3. PLAN ENTITLED "PLAN OF LAND IN (NOURT) TRURO, MA. AS SURVEYED FOR JAMES F. SANTOS" JUNE 1988 BOOK 450 PAGE 83.
4. PLAN ENTITLED "CONSOLIDATION PLAN OF LAND IN TRURO MA. THE ESTATE OF JOHN F. NOONS" AUGUST 1981 BOOK 360 PAGE 15.
5. PLAN ENTITLED "A PLAN OF LAND IN TRURO MA. BEING A DIVISION OF LOT 3 AS SHOWN IN PLAN MADE FOR– DONALD W. NOONS" MAY 7, 2002, BOOK 545, PAGE 88.
6. PLAN ENTITLED "A PLAN OF LAND IN TRURO MA. MADE FOR BELVERNON", LLC. DECEMBER 29, 2014, BOOK 656 PAGE 45.
7. PLAN ENTITLED "PHASE 1 A PLAN OF LAND IN (NORTH) TRURO MA. AS SURVEYED FOR CAPE SHORE ACCOMIDATIONS, INC. DEPICTING THE STONE'S THROW AT TRURO CONDOMINIUM" APRIL 2006 BOOK 608 PAGE 86.
8. PLAN ENTITLED "A SUBDIVISION PLAN OF LAND IN (NORTH) TRURO MA. MADE FOR JOHN F. NOONS AUGUST 1974 BOOK 299 PAGE 54.
9. PLAN ENTITLED "LAND COURT SUBDIVISION PLAN OF LAND IN TRURO MA." AUGUST 1986 LAND COURT NUMBER 34915H.
10. PLAN ENTITLED "LAND COURT SUBDIVISION PLAN OF LAND IN TRURO MA". NOVEMBER 8, 1977, LAND COURT NUMBER 34915B.
11. PLAN ENTITLED "LAND COURT SUBDIVISIONS PLAN OF LAND IN TRURO MA." JANUARY 23, 2004, LAND COURT NUMBER 34915O.
12. PLAN ENTITLED "A PLAN OF LAND IN TRURO MA. BEING A SUBDIVISION OF LOT 5", AS SHOWN IN PLAN BOOK 450 PAGE 83.
13. PLAN ENTITLED "PLAN OF LAND IN (NORTH) TRURO MA. AS SURVEYED FOR CAPE VIEW MOTEL, INC." NOVEMBER 1985 BOOK 411 PAGE 59.
14. PLAN ENTITLED "A PLAN OF LAND IN TRURO MA. TO BE CONVEYED BY THE ESTATE OF JOHN F. NOONS" MAY 1982 BOOK 453 PAGE 76.
15. PLAN ENTITLED "A SUBDIVISION PLAN OF LAND IN TRURO MA. MADE FOR JOHN F. NOONS" OCTOBER 1969. BOOK 241 PAGE 41
16. PLAN ENTITLED "A PLAN OF LAND IN (NORTH) TRURO MA. AS SURVEYED FOR SEABANK, INC" MARCH 1987 BOOK 469 PAGE 67.
17. PLAN ENTITLED "CONSOLIDATION PLAN OF LAND IN TRURO MA. MADE FOR LINDA NOONS–ROSE" JUNE 25, 2013, BOOK 650 PAGE 60.
18. PLAN ENTITLED "LAND COURT A PLAN OF LAND IN TRURO MA. SCHOFIELD BROTHERS SURVEYORS" OCTOBER 1961 LAND COURT NUMBER 32446A.
19. PLAN ENTITLED "PLAN OF LAND IN TRURO, MASS. FOR DR ALBERT FREED" OCTOBER 1968 PLAN BOOK 226 PAGE 49.
20. PLAN ENTITLED "PLAN OF LAND IN TRURO TO BE CONVEYED BY THE ESTATE OF JOHN F. NOONS" MAY 1982 PLAN BOOK 453 PAGE 76.
21. PLAN ENTITLED "PLAN OF LAND IN TRURO – BEING A DIVISION OF LOT 3 AS SHOWN IN PLAN BK 545 PG 88 – MADE FOR DONALD W. NOONS" DATED MAY 2002 IN PLAN BOOK 578 PAGE 38 (SEE NOTES "NOT BUILDABLE LOT" AND "TO BECOME AND REMAIN PART OF LOT 1 OF PLAN BOOK 499 PAGE 51"
22. PLAN ENTITLED "DIVISION PLAN OF LAND IN TRURO P MADE FOR DONALD W. NOONS" DATED MAY 1993 IN PLAN BOOK 499 PAGE 51.



PROJECT SUMMARY

TOWN OF TRURO MA	TAX MAP 39 LOT 108 - 17.200 ACRES
TOWN OF TRURO MA	TAX MAP 39 LOT 107 - 38.695 ACRES
EXISTING TOTAL	2 434 787 SQUARE FEET / 55.895 ACRES
PROPOSED LOT 1	TAX MAP 39 LOT 108 - 39.195
PROPOSED LOT 2	TAX MAP 39 LOT 107 - 16.700
PROPOSED TOTAL	2 434787 SQUARE FEET / 55.895

APPROVAL UNDER THE SUBDIVISION CONTROL LAW NOT REQUIRED

APPLICATION SUBMITTAL DATE

DATE OF ENDORSEMENT

DOCKET NUMBER

BOARD MEMBERS

PLANNING BOARD ENDORSEMENT OF THIS PLAN INDICATES ONLY THAT THE PLAN IS NOT A SUBDIVISION UNDER MGL, CHAPTER 41, SECTION 81-L AND DOES NOT INDICATE THAT A LOT IS BUILDABLE OR THAT IT MEETS ZONING, HEALTH OR GENERAL BYLAW REQUIREMENTS

SURVEYOR'S CERTIFICATION

1. I HEREBY CERTIFY TO THE BEST OF MY PROFESSIONAL KNOWLEDGE THAT THIS IS A TRUE PLAN BASED ON FIELD SURVEYS AND THE LATEST DEEDS - PLANS OF RECORD.
2. I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS
3. NO DETERMINATION OF COMPLIANCE WITH ZONING REQUIREMENTS HAS BEEN MADE OR INTENDED AND THAT ENDORSEMENT BY THE PLANNING BOARD DOES NOT GUARANTEE THAT ANY OF THE LOTS SHOWN ON THIS PLAN ARE BUILDABLE LOTS.
4. THE PROPERTY HAS FREE AND CLEAR ACCESS IN AND TO NOONS DRIVE, BEING A DEDICATED AND PRIVATE WAY AS SHOWN ON PLAN BOOK 241 PAGE 41 (SEE MAP REFERENCE 15 THIS PLAN). ADDITIONALLY, NOONS DRIVE PROVIDES INGRESS-EGRESS - UTILITIES TO DEDICATED AND PUBLIC USE STATE HIGHWAY ROUTE 6 WITH NO GAPS AND GORES. LOCUST PARCEL ALSO HAS RIGHTS IN AND TO SAND PIT ROAD (SO CALLED) BEING A DEDICATED AND PRIVATE WAY.
5. THE PROPERTY IS COMPRISED AS TWO TAX LOTS - TRURO TOWN TAX MAP 39 - LOT 108 AND TAX MAP 39 - LOT 107. THE PURPOSE OF THIS PLAN IS TO MOVE THE EXISTING PROPERTY LINE BETWEEN LOTS 107 AND 108. SEE SUMMARY REPORT.
6. I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE PROCEDURAL AND TECHNICAL STANDARDS FOR THE PRACTICE OF LAND SURVEYING IN THE COMMONWEALTH OF MASSACHUSETTS.

JEROME B. WATTS / MASSACHUSETTS PLS 40409 / DATE: DECEMBER 10, 2025

REVISIONS:

NO.	DATE	
0	12-10-2025	SUBMITTED FOR COMMENT
1	12-19-2025	ADDRESSED COMMENTS

ONLY VALID WITH ORIGINAL STAMP

SGC ENGINEERING, LLC
SURVEY AND MAPPING
501 COUNTY ROAD
WESTBROOK, MAINE 04092
PHONE: 207-347-8100 / FAX: 207-347-8101
WWW.SGCENG.COM

DWG:1985104 - TRURO
FILE:1985104 - TRURO

SHEET 1 OF 1

CALC: JBW
DRAWN: EGL
DESIGN: JBW

DATE: 12-10-2025
SCALE: 1" = 150'

APPROVAL NOT REQUIRED PLAN

ON LAND OF THE ESTATE OF DONALD W. NOONS

NOONS DRIVE, TRURO, BARNSTABLE COUNTY, MASSACHUSETTS

PREPARED FOR:

WESTON AND SAMPSON ENGINEERS, INC.

55 WALKERS BROOK DRIVE SUITE 100 READING MA 01867

Appendix F – Criteria Review

ADDRESSING THE REVIEW CRITERIA

§ 70.1 PURPOSE

The purpose of Site Plan Review for Commercial Development and for Residential Development is to protect the health, safety, convenience and general welfare of the inhabitants of the Town. It provides for a review of plans for uses and structures which may have significant impacts, both within the site and in relation to adjacent properties and streets; including the potential impact on public services and infrastructure; pedestrian and vehicular traffic; significant environmental and historic resources; abutting properties; and community character and ambiance.

Instructions: Please provide the Planning Board with a short explanation of how your application meets each of the review criteria of §70.3F of the Truro Zoning Bylaw. If you require extra space for your answers, please attach the additional information to your application in no more than two pages. This is to provide the Planning Board with an overview of your rationale prior to the meeting.

§70.3F – REVIEW CRITERIA/DESIGN GUIDELINES

The Planning Board will review applications and their supporting information based on the following:

1. The proposal is in conformity with all applicable provisions of the Zoning Bylaw because:

   The project narrative in Appendix B includes an analysis of the project's compliance with Section 40.7 of the Zoning Bylaw for Large-Scale Ground-Mounted Solar Photovoltaic Installations and Section 30.8 of the Zoning Bylaw for Special Permits.

2. The proposal provides for the protection of abutting properties and the surrounding area from detrimental site characteristics and from adverse impact from excessive noise, dust, smoke, or vibration higher than levels previously experienced from permitted uses because:

   Excessive noise, dust, smoke, or vibration will not occur on the site once construction of the solar array is complete. During construction, excessive noise, dust, smoke, and vibration will be minimized as much as possible.

3. The proposal provides for the protection of adjacent properties and the night sky from intrusive lighting, including parking lot and building exterior lighting. Lighting must be consistent with Chapter IV, Section 6 of the General Bylaws of the Town of Truro because:

   There is no lighting proposed for this project.

4. The proposal provides for the protection of significant or important natural, historic, or scenic features because:

   Clearing of natural vegetation will be limited to what is necessary for the construction, operation, and maintenance of the solar installation in an attempt to maintain natural screening of the solar energy system and appurtenant structures. According to the Massachusetts Historical Commission and Massachusetts Cultural Resource Information System, there are no historic properties within the limit of work for the proposed project.

5. The building sites shall minimize obstruction of scenic views from publicly accessible locations; minimize tree, vegetation, and soil removal and grade changes; and maximize open space retention because:

   The proposed project consists of solar panels that are ground-mounted, and the site is located in an area that is not near publicly accessible locations with scenic views. Clearing of trees and vegetation will be limited to what is necessary for the construction, operation, and maintenance of the solar installation.

6. The proposal adequately provides for refuse disposal because:

   The proposed solar PV development will not produce regular refuse.

7. The proposed sewage disposal and water supply systems within and adjacent to the site shall be adequate to serve the proposed use because:

   The proposed solar PV development will not produce regular sewage or require a regular water supply.

8. The proposed drainage system within the site shall be adequate to handle the runoff resulting from the development. Drainage run-off from the project shall not: damage any existing wellfield(s) or public water supply; damage adjoining property; overload, silt up or contaminate any marsh, swamp, bog, pond, stream, or other body of water; or interfere with the functioning of any vernal pool because:

   A stormwater report, which shows how the proposed drainage within the site shall be adequate to handle the runoff resulting from the development, is included in Appendix D. An erosion and sediment control plan is included in the site plans in Appendix C. This drawing details all proposed methods of controlling runoff and preventing damage to adjacent properties, nearby bodies of water, the public water supply, and streets during and after construction.

9. A soil erosion plan shall adequately protect all steep slopes within the site and control runoff to adjacent properties and streets both during and after construction because:

An erosion and sediment control plan is included in the site plans in Appendix C. This drawing details all proposed methods of controlling runoff to adjacent properties and streets during and after construction.

10. The proposal shall provide for structural and/or landscaped screening or buffers for storage areas, loading docks, dumpsters, rooftop or other exposed equipment, parking areas, utility buildings and similar features viewed from street frontages and residentially used or zoned premises because:

There are no storage areas, loading docks, dumpsters, rooftop equipment, parking areas, or utility buildings proposed for this project.

11. Buildings and structures within the subject site shall relate harmoniously to each other in architectural style, site location, and building exits and entrances. Building scale, massing, materials, and detailing should be compatible with the surrounding area because:

No buildings and structures are proposed for the site. Details of the solar PV array, associated battery energy storage system and equipment pad areas, and gravel access road are included in the site plans in Appendix C.

12. Electric, telephone, cable, and other such utility lines and equipment shall be placed underground because:

The proposed solar energy system includes underground electrical lines from the panels to the equipment pads and electrical equipment housings. From the electrical equipment pad, an electrical line will run underground to the first new client-owned utility pole which will include a riser to bring electric utility above ground.

13. The project shall not place excessive demands on Town services because:

The operation and maintenance of the proposed solar PV array will not demand Town services, see the Solar Operation & Maintenance Plan in Appendix I.

14. The location and number of curb cuts shall be minimized to reduce turning movements and hazardous exits and entrances. Where appropriate and allowable, access to adjoining properties shall be provided. Joint access driveways between adjoining properties shall be encouraged because:

No curb cuts are proposed for this project. A gravel access road is proposed on the site as well as a construction entrance/exit, see the site plans in Appendix C.

15. Convenience and safety of vehicular and pedestrian movement within the site and in relation to adjacent and other ways serving the project shall be maximized. Traffic patterns for vehicles and pedestrians must show safe and adequate circulation within and access to and from the site because:

A gravel access road is proposed on the site, see the site plans in Appendix C. Large amounts of vehicular and pedestrian movement within the site are not anticipated.

16. A bicycle rack(s) shall be provided on the site and shall be located near the entrance to the building(s) because:

There is no bicycle rack proposed for this project as it is a large-scale solar array.

Appendix G – Certified Abutters List

TOWN OF TRURO

Assessors Office
Certified Abutters List
Request Form

Received by Assessors
12/15/2025

DATE: 12/12/2025

NAME OF APPLICANT: NextGrid Pecan, LLC

NAME OF AGENT (if any): Weston & Sampson Engineers, Inc.

MAILING ADDRESS: 55 Walkers Brook Drive, Suite 100, Reading, MA 01867

CONTACT: HOME/CELL (978) 532-1900 **EMAIL** garani.tara@wseinc.com

PROPERTY LOCATION: 2 Sand Pit Road & 9 Noons Drive
(street address)

PROPERTY IDENTIFICATION NUMBER: MAP 39 **PARCEL** 107 & 108 **EXT.** _____
(*if condominium*)

ABUTTERS LIST NEEDED FOR: **FEE: $15.00 per checked item**

(*please check **all** applicable*) (*Fee must accompany the application unless other arrangements are made*)

___ Board of Health[5]	Planning Board (PB)	Zoning Board of Appeals (ZBA)
___ Cape Cod Commission	X Special Permit[1]	___ Special Permit[1]
___ Conservation Commission[4]	X Site Plan[2]	___ Variance[1]
___ Licensing	___ Preliminary Subdivision[3]	
Type: _____	___ Definitive Subdivision[3]	

___ Other _____ ***(Fee: Inquire with Assessors)***
(*Please Specify*)

Note: Per M.G.L., processing may take up to 10 calendar days. Please plan accordingly.

THIS SECTION FOR ASSESSORS OFFICE USE ONLY

Date request received by Assessors: 12/15/2025 Date completed: 12/15/2025

List completed by: Jon Nahas Date paid: 12/13/2025 Cash/Check CC Online

---

[1]Abutters, owners of land directly opposite on any public or private street or way, and abutters to the abutters within 300 feet of the property line.

[2]Abutters to the subject property, abutters to the abutters, and owners of properties across the street from the subject property.

[3]Landowners immediately bordering the proposed subdivision, landowners immediately bordering the immediate abutters, and landowners located across the streets and ways bordering the proposed subdivision. Note: For Definitive Subdivision only, responsibility of applicant to notify abutters and produce evidence as required.

[4]All abutters within 300 feet of parcel, except Beach Point between Knowles Heights Road and Provincetown border, in which case it is all abutters within 100 feet. Note: Responsibility of applicant to notify abutters and produce evidence as required.

[5]Abutters sharing any boundary or corner in any direction – including land across a street, river or stream. Note: Responsibility of applicant to notify abutters and produce evidence as required.

TRURO ASSESSORS OFFICE
PO Box 2012 Truro, MA 02666
Telephone: (508) 214-0921
Fax: (508) 349-5506

Date: December 15, 2025

To: NextGrid Pecan, LLC
c/o Weston & Sampson Engineers, Inc
55 Walkers Brook Dr, Ste 100
Reading, MA 01867

From: Assessors Department

Property: 2 Sand Pit Rd & 9 Noons Dr

Certified abutters list application for: Site Plan

Attached is an abutters list for 2 Sand Pit Rd & 9 Noons Dr. Parcel ID 39-107 & 39-108. The owner of the Property is the Estate of Donald W Noons The names and addresses of the abutting parcels are as of December 5, 2025, according to the most recent documents received from the Barnstable County Registry of Deeds and the ownership records kept by the Town of Truro.

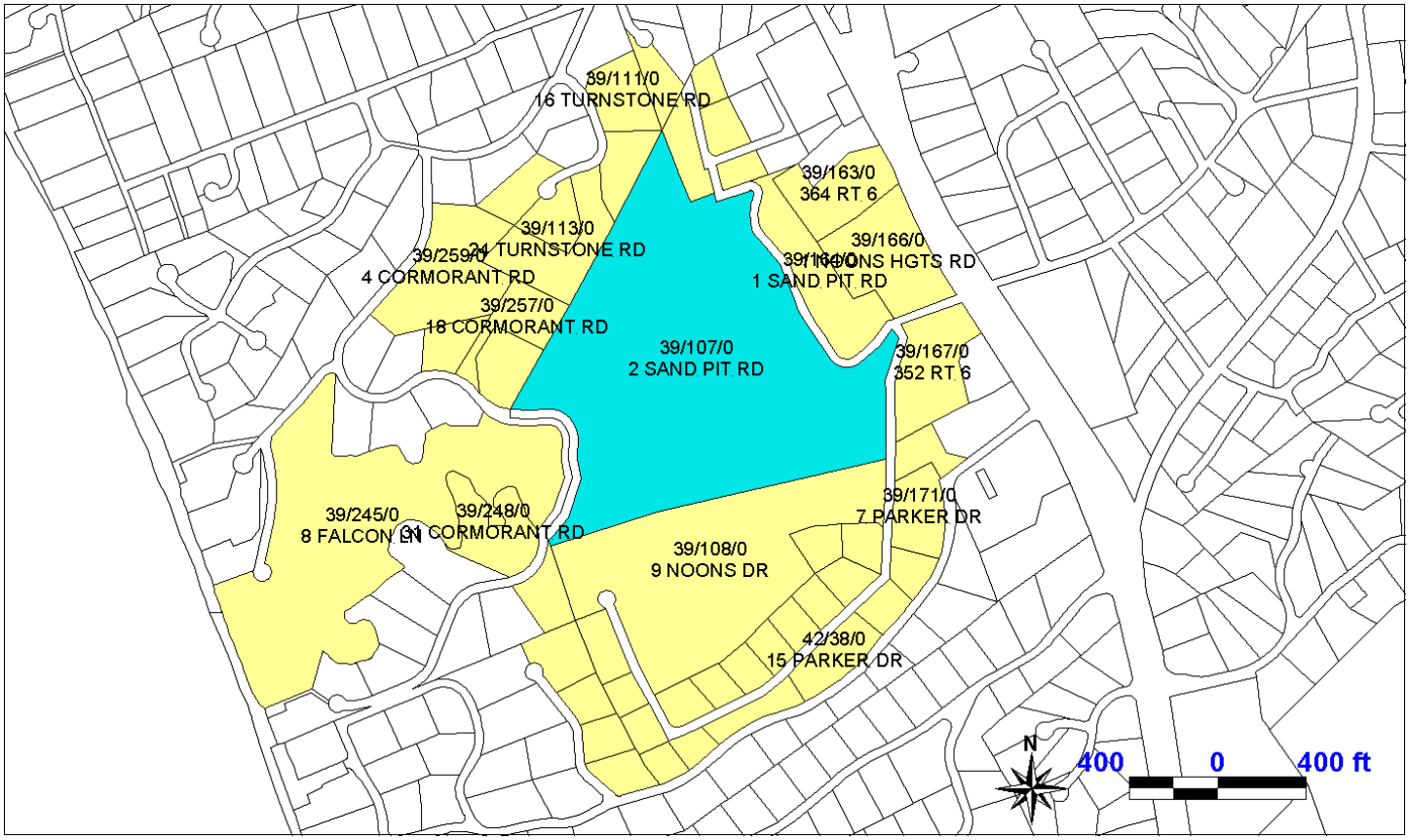
Certified by: _____Jon Nahas_____

Jon Nahas
Principal Assessor
Town of Truro
24 Town Hall Rd
PO Box 2012
Truro, MA 02666
508.214.0917
jnahas@truro-ma.gov

Parcel 39-107 & 39-108
2 Sand Pit Rd & 9 Noons Dr
Planning Board-Site Plan

TOWN OF TRURO, MA
BOARD OF ASSESSORS
P.O. BOX 2012, TRURO MA 02666

Custom Abutters List



Key	Parcel ID	Owner	Location	Mailing Street	Mailing City	ST	ZipCd/Country
1234	39-107-0-R	NOONS DONALD W ESTATE OF	2 SAND PIT RD	PO BOX 23	NO TRURO	MA	02652-0023
1235	39-108-0-R	NOONS DONALD W ESTATE OF	9 NOONS DR	PO BOX 23	NO TRURO	MA	02652-0023
1238	39-111-0-R	CRONIN JACQUELINE SUE, ET AL	16 TURNSTONE RD	13121 ESWORTHY RD	NORTH POTOMAC	MD	20878
1239	39-112-0-R	PLUGIS CHRISTOPHER & SUTHERLAND JAMES	18 TURNSTONE RD	67 SAWYER AVE, UNIT 1	BOSTON	MA	02125
1240	39-113-0-R	NOVELLINE ROBERT A	24 TURNSTONE RD	400 STUART ST UNIT 28C	BOSTON	MA	02116
1241	39-114-0-R	ROGER W CUMMINGS REV TRST & CANDACE S CUMMINGS REV TRST	22 TURNSTONE RD	5401 EASTERN SHORES DR	GREENSBORO	NC	27455
1242	39-115-0-R	PHILLIPS STEVEN E & PAULA MONR	21 TURNSTONE RD	PO BOX 782	NO TRURO	MA	02652-0782
1251	39-125-0-R	DESCHENES ANDREW W & PHOEBE	19 NOONS DR	PO BOX 870	TRURO	MA	02666-0870
1278	39-153-0-R	ROSE JEFFREY & NOONS LINDA	17 PETERS POND RD	PO BOX 2	TRURO	MA	02666
1281	39-156-0-R	NOONS LINDA JANE	16 PETERS POND RD	PO BOX 2	TRURO	MA	02666-0002
1282	39-157-0-R	ANNA E SWABY FAMILY REV TRST TRS: SWABY ANNA E	13 PETERS POND RD	PO BOX 451	NO TRURO	MA	02652
1286	39-161-0-R	JAMES D KARADIMOS TRUST TRS: KARADIMOS JAMES D ET AL	12 PETERS POND RD	14 BREWER STREET	NORTHBOROUGH	MA	01532
1288	39-163-0-R	BELVERNON LLC	364 RT 6	PO BOX 1768 95 COMMERCIAL STREET	WELLFLEET	MA	02667
1289	39-164-0-R	WARM SALT BREEZE REALTY TRUST TRS:NOONS-ROSE LINDA JANE ETAL	1 SAND PIT RD	PO BOX 2	TRURO	MA	02666
1290	39-166-0-R	WINKLER ROUTE SIX TRUST TRS: WINKLER MICHAEL F	1 NOONS HGTS RD	PO BOX 1110	TRURO	MA	02666-1110

Key	Parcel ID	Owner	Location	Mailing Street	Mailing City	ST	ZipCd/Country
1291	39-167-0-R	TRI-S PROPERTIES LLC	352 RT 6	PO BOX 1081	TRURO	MA	02666-1081
1294	39-171-0-R	TRIBUNA JR MICHAEL A	7 PARKER DR	192 MILTON ST	QUINCY	MA	02170
1297	39-173-0-R	CAROL ANN H D'AMICO REVOC TRST TRS: CAROL ANN H D'AMICO	11 PARKER DR	PO BOX 423	NO TRURO	MA	02652
1298	39-174-0-R	LUKACS THOMAS J & SHARON M	13 PARKER DR	8 ASPEN HEIGHTS	SLINGERLANDS	NY	12159
1346	39-225-0-R	DAVEY ELLEN M & AMOLDONI RAQUEL A	5 AMBER WAY	PO BOX 757	NO TRURO	MA	02652-0757
1364	39-245-0-R	WARD CHARLES G & DONNA R	8 FALCON LN	232 EMERALD LN	PALM BEACH	FL	33480
1367	39-248-0-R	BLUEBERRY HILL FAMILY TRUST TRS:MAZZELLA JOSEPH F&LAUREN W	31 CORMORANT RD	201 W BROOKLINE ST #401	BOSTON	MA	02118
1369	39-250-0-R	OPTIONALITY 122 REALTY TRUST TRS: JOS. & LAUREN MAZZELLA	32 CORMORANT RD	201 WEST BROOKLINE ST	BOSTON	MA	02118
1375	39-256-0-R	CAMPBELL MICHAEL E & VALERIE A	16 CORMORANT RD	370 CONIL WAY	PORTOLA VALLEY	CA	94028
1376	39-257-0-R	SARINE A RODMAN 2015 TRUST TRS: SARINE A RODMAN	18 CORMORANT RD	PO BOX 1038	TRURO	MA	02666
1377	39-258-0-R	CHAPIN DAVID S & ANDREA N	20 CORMORANT RD	PO BOX 592	NO TRURO	MA	02652
1378	39-259-0-E	TRURO CONSERVATION TRUST TRS: BROWN BETSEY ET AL	4 CORMORANT RD	PO BOX 327	NO TRURO	MA	02652-0327
1421	39-302-0-R	DIANA PRIDEAUX-BRUNE REV TRUST TRS: DIANA E PRIDEAUX-BRUNE	5 PARKER DR	1100 UNION ST, APT 600	SAN FRANCISCO	CA	94109
1423	39-304-0-R	WINKLER MICHAEL F & KATHERINE	13 NOONS DR	PO BOX 1110	TRURO	MA	02666-1110
1426	39-307-0-R	WINKLER MICHAEL	17 NOONS DR	PO BOX 1110	TRURO	MA	02666-1110
5745	39-312-0-R	WINKLER MICHAEL	13-A NOONS DR	PO BOX 1110	TRURO	MA	02666-1110
1583	42-6-0-R	PAUL E TAYLOR REVOC TRUST & KIMBERLY A TAYLOR REV TRUST	7 CHICKADEE LN	PO BOX 1080	NORTH TRURO	MA	02652
1588	42-13-0-R	DEVINE RICHARD	5 CHICKADEE LN	1005 CARROLL ST	BROOKLYN	NY	11225
1589	42-14-0-R	SHOPE JOHN ANDREW	32 NOONS DR	56 FAYETTE ST	BOSTON	MA	02116
1598	42-26-0-R	AMANDA REED TRST OF NOV 2023 & R SOKOLOWSKI TRST OF NOV 2023	3 CHICKADEE LN	PO BOX 968	TRURO	MA	02666
1599	42-27-0-R	CRONIN-GRAHAM TRUST TRS: GRAHAM PETER P ET AL	1 CHICKADEE LN	PO BOX 856	NO TRURO	MA	02652-0856
1600	42-28-0-R	DIETZ BETH A & MARKOWSKI CHRISTINE	28 NOONS DR	PO BOX 1193	TRURO	MA	02666-1193
1601	42-29-0-R	ANN L GROSSMAN REVOC TRUST TRS: ANN L GROSSMAN	25 PARKER DR	41 OAKMONT RD	NEWTON	MA	02459
1602	42-30-0-R	BAGINSKI DANIEL J	29 NOONS DR	85 HIGHLAND AVE	ROWAYTON	CT	06853-1314
1603	42-31-0-R	MCDERMOTT JOHN T & LAURA A	27 NOONS DR	10 FERN ST	AUBURNDALE	MA	02466
1604	42-32-0-R	HOWARD HARLEN K	25 NOONS DR	PO BOX 726	N TRURO	MA	02652
1605	42-33-0-R	BERNSTEIN VERONIKA & DAVID	23 NOONS DR	250 HAMMOND POND PKWY, #5135	NEWTON	MA	02467
1606	42-34-0-R	PARADIS NICHOLAS E & MORADI BANAFSHEH	21 NOONS DR	6817 NW 67TH AVE	GAINESVILLE	FL	32653
1607	42-35-0-R	GAIL L HINCHEN FAMILY TRUST TRS: DAVID S HINCHEN	23 PARKER DR	19 MANNING BLVD	ALBANY	NY	12203
1608	42-36-0-R	WEIHE KINGSLEY C	19 PARKER DR	79 SPRING PARK AVE	JAMAICA PLAIN	MA	02130
1609	42-38-0-R	MESSINA FRANK J & CHEPUS PETER	15 PARKER DR	PO BOX 51	NORTH TRURO	MA	02652
1811	42-229-0-R	KORAHAIS FAMILY LLC MGR: GWYNDOLYN KORAHAIS	30 NOONS DR	c/o FRANK KORAHAIS 10460 QUEENS BLVD	FOREST HILLS	NY	11375

39-107-0-R

NOONS DONALD W ESTATE OF
PO BOX 23
NO TRURO, MA 02652-0023

39-108-0-R

NOONS DONALD W ESTATE OF
PO BOX 23
NO TRURO, MA 02652-0023

39-111-0-R

CRONIN JACQUELINE SUE, ET AL
13121 ESWORTHY RD
NORTH POTOMAC, MD 20878

39-112-0-R

PLUGIS CHRISTOPHER &
SUTHERLAND JAMES
67 SAWYER AVE, UNIT 1
BOSTON, MA 02125

39-113-0-R

NOVELLINE ROBERT A
400 STUART ST UNIT 28C
BOSTON, MA 02116

39-114-0-R

ROGER W CUMMINGS REV TRST &
CANDACE S CUMMINGS REV TRST
5401 EASTERN SHORES DR
GREENSBORO, NC 27455

39-115-0-R

PHILLIPS STEVEN E & PAULA MONR
PO BOX 782
NO TRURO, MA 02652-0782

39-125-0-R

DESCHENES ANDREW W & PHOEBE
PO BOX 870
TRURO, MA 02666-0870

39-153-0-R

ROSE JEFFREY & NOONS LINDA
PO BOX 2
TRURO, MA 02666

39-156-0-R

NOONS LINDA JANE
PO BOX 2
TRURO, MA 02666-0002

39-157-0-R

ANNA E SWABY FAMILY REV TRST
TRS: SWABY ANNA E
PO BOX 451
NO TRURO, MA 02652

39-161-0-R

JAMES D KARADIMOS TRUST
TRS: KARADIMOS JAMES D ET AL
14 BREWER STREET
NORTHBOROUGH, MA 01532

39-163-0-R

BELVERNON LLC
PO BOX 1768
95 COMMERCIAL STREET
WELLFLEET, MA 02667

39-164-0-R

WARM SALT BREEZE REALTY TRUST
TRS:NOONS-ROSE LINDA JANE ETAL
PO BOX 2
TRURO, MA 02666

39-166-0-R

WINKLER ROUTE SIX TRUST
TRS: WINKLER MICHAEL F
PO BOX 1110
TRURO, MA 02666-1110

39-167-0-R

TRI-S PROPERTIES LLC
PO BOX 1081
TRURO, MA 02666-1081

39-171-0-R

TRIBUNA JR MICHAEL A
192 MILTON ST
QUINCY, MA 02170

39-173-0-R

CAROL ANN H D'AMICO REVOC TRST
TRS: CAROL ANN H D'AMICO
PO BOX 423
NO TRURO, MA 02652

39-174-0-R

LUKACS THOMAS J & SHARON M
8 ASPEN HEIGHTS
SLINGERLANDS, NY 12159

39-225-0-R

DAVEY ELLEN M &
AMOLDONI RAQUEL A
PO BOX 757
NO TRURO, MA 02652-0757

39-245-0-R

WARD CHARLES G & DONNA R
232 EMERALD LN
PALM BEACH, FL 33480

39-248-0-R

BLUEBERRY HILL FAMILY TRUST
TRS:MAZZELLA JOSEPH F&LAUREN W
201 W BROOKLINE ST #401
BOSTON, MA 02118

39-250-0-R

OPTIONALITY 122 REALTY TRUST
TRS: JOS. & LAUREN MAZZELLA
201 WEST BROOKLINE ST
BOSTON, MA 02118

39-256-0-R

CAMPBELL MICHAEL E & VALERIE A
370 CONIL WAY
PORTOLA VALLEY, CA 94028

39-257-0-R

SARINE A RODMAN 2015 TRUST
TRS: SARINE A RODMAN
PO BOX 1038
TRURO, MA 02666

39-258-0-R

CHAPIN DAVID S & ANDREA N
PO BOX 592
NO TRURO, MA 02652

39-259-0-E

TRURO CONSERVATION TRUST
TRS: BROWN BETSEY ET AL
PO BOX 327
NO TRURO, MA 02652-0327

39-302-0-R

DIANA PRIDEAUX-BRUNE REV TRUST
TRS: DIANA E PRIDEAUX-BRUNE
1100 UNION ST, APT 600
SAN FRANCISCO, CA 94109

39-304-0-R

WINKLER MICHAEL F & KATHERINE
PO BOX 1110
TRURO, MA 02666-1110

39-307-0-R

WINKLER MICHAEL
PO BOX 1110
TRURO, MA 02666-1110

39-312-0-R

WINKLER MICHAEL
PO BOX 1110
TRURO, MA 02666-1110

42-6-0-R

PAUL E TAYLOR REVOC TRUST &
KIMBERLY A TAYLOR REV TRUST
PO BOX 1080
NORTH TRURO, MA 02652

42-13-0-R

DEVINE RICHARD
1005 CARROLL ST
BROOKLYN, NY 11225

42-14-0-R

SHOPE JOHN ANDREW
56 FAYETTE ST
BOSTON, MA 02116

42-26-0-R

AMANDA REED TRST OF NOV 2023 &
R SOKOLOWSKI TRST OF NOV 2023
PO BOX 968
TRURO, MA 02666

42-27-0-R

CRONIN-GRAHAM TRUST
TRS: GRAHAM PETER P ET AL
PO BOX 856
NO TRURO, MA 02652-0856

42-28-0-R

DIETZ BETH A &
MARKOWSKI CHRISTINE
PO BOX 1193
TRURO, MA 02666-1193

42-29-0-R

ANN L GROSSMAN REVOC TRUST
TRS: ANN L GROSSMAN
41 OAKMONT RD
NEWTON, MA 02459

42-30-0-R

BAGINSKI DANIEL J
85 HIGHLAND AVE
ROWAYTON, CT 06853-1314

42-31-0-R

MCDERMOTT JOHN T & LAURA A
10 FERN ST
AUBURNDALE, MA 02466

42-32-0-R

HOWARD HARLEN K
PO BOX 726
N TRURO, MA 02652

42-33-0-R

BERNSTEIN VERONIKA & DAVID
250 HAMMOND POND PKWY, #5135
NEWTON, MA 02467

42-34-0-R

PARADIS NICHOLAS E &
MORADI BANAFSHEH
6817 NW 67TH AVE
GAINESVILLE, FL 32653

42-35-0-R

GAIL L HINCHEN FAMILY TRUST
TRS: DAVID S HINCHEN
19 MANNING BLVD
ALBANY, NY 12203

42-36-0-R

WEIHE KINGSLEY C
79 SPRING PARK AVE
JAMAICA PLAIN, MA 02130

42-38-0-R

MESSINA FRANK J & CHEPUS PETER
PO BOX 51
NORTH TRURO, MA 02652

42-229-0-R

KORAHAIS FAMILY LLC
MGR: GWYNDOLYN KORAHAIS
c/o FRANK KORAHAIS
10460 QUEENS BLVD
FOREST HILLS, NY 11375

TOWN OF TRURO

Assessors Office
Certified Abutters List
Request Form

Received by Assessors
12/15/2025-jn

DATE: 12/12/2025

NAME OF APPLICANT: NextGrid Pecan, LLC

NAME OF AGENT (if any): Weston & Sampson Engineers, Inc.

MAILING ADDRESS: 55 Walkers Brook Drive, Suite 100, Reading, MA 01867

CONTACT: HOME/CELL (978) 532-1900 **EMAIL** garani.tara@wseinc.com

PROPERTY LOCATION: 2 Sand Pit Road & 9 Noons Drive
(street address)

PROPERTY IDENTIFICATION NUMBER: MAP 39 **PARCEL** 107 & 108 **EXT.** _____
(*if condominium*)

ABUTTERS LIST NEEDED FOR: **FEE: $15.00 per checked item**
(*please check **all** applicable*) (*Fee must accompany the application unless other arrangements are made*)

___ Board of Health[5]	Planning Board (PB)	Zoning Board of Appeals (ZBA)
___ Cape Cod Commission	X Special Permit[1]	___ Special Permit[1]
___ Conservation Commission[4]	X Site Plan[2]	___ Variance[1]
___ Licensing	___ Preliminary Subdivision[3]	
Type: _____	___ Definitive Subdivision[3]	

___ Other _____ ***(Fee: Inquire with Assessors)***
(*Please Specify*)

Note: Per M.G.L., processing may take up to 10 calendar days. Please plan accordingly.

THIS SECTION FOR ASSESSORS OFFICE USE ONLY

Date request received by Assessors: 12/15/2025 Date completed: 12/15/2025

List completed by: Jon Nahas Date paid: 12/13/25 Cash/Check CC Online

[1]Abutters, owners of land directly opposite on any public or private street or way, and abutters to the abutters within 300 feet of the property line.

[2]Abutters to the subject property, abutters to the abutters, and owners of properties across the street from the subject property.

[3]Landowners immediately bordering the proposed subdivision, landowners immediately bordering the immediate abutters, and landowners located across the streets and ways bordering the proposed subdivision. Note: For Definitive Subdivision only, responsibility of applicant to notify abutters and produce evidence as required.

[4]All abutters within 300 feet of parcel, except Beach Point between Knowles Heights Road and Provincetown border, in which case it is all abutters within 100 feet. Note: Responsibility of applicant to notify abutters and produce evidence as required.

[5]Abutters sharing any boundary or corner in any direction – including land across a street, river or stream. Note: Responsibility of applicant to notify abutters and produce evidence as required.

TRURO ASSESSORS OFFICE
PO Box 2012 Truro, MA 02666
Telephone: (508) 214-0921
Fax: (508) 349-5506

Date: December 15, 2025

To: NextGrid Pecan, LLC
c/o Weston & Sampson Engineers, Inc
55 Walkers Brook Dr, Ste 100
Reading, MA 01867

From: Assessors Department

Property: 2 Sand Pit Rd & 9 Noons Dr

Certified abutters list application for: Special Permit

Attached is an abutters list for 2 Sand Pit Rd & 9 Noons Dr. Parcel ID 39-107 & 39-108. The owner of the Property is the Estate of Donald W Noons The names and addresses of the abutting parcels are as of December 5, 2025, according to the most recent documents received from the Barnstable County Registry of Deeds and the ownership records kept by the Town of Truro.

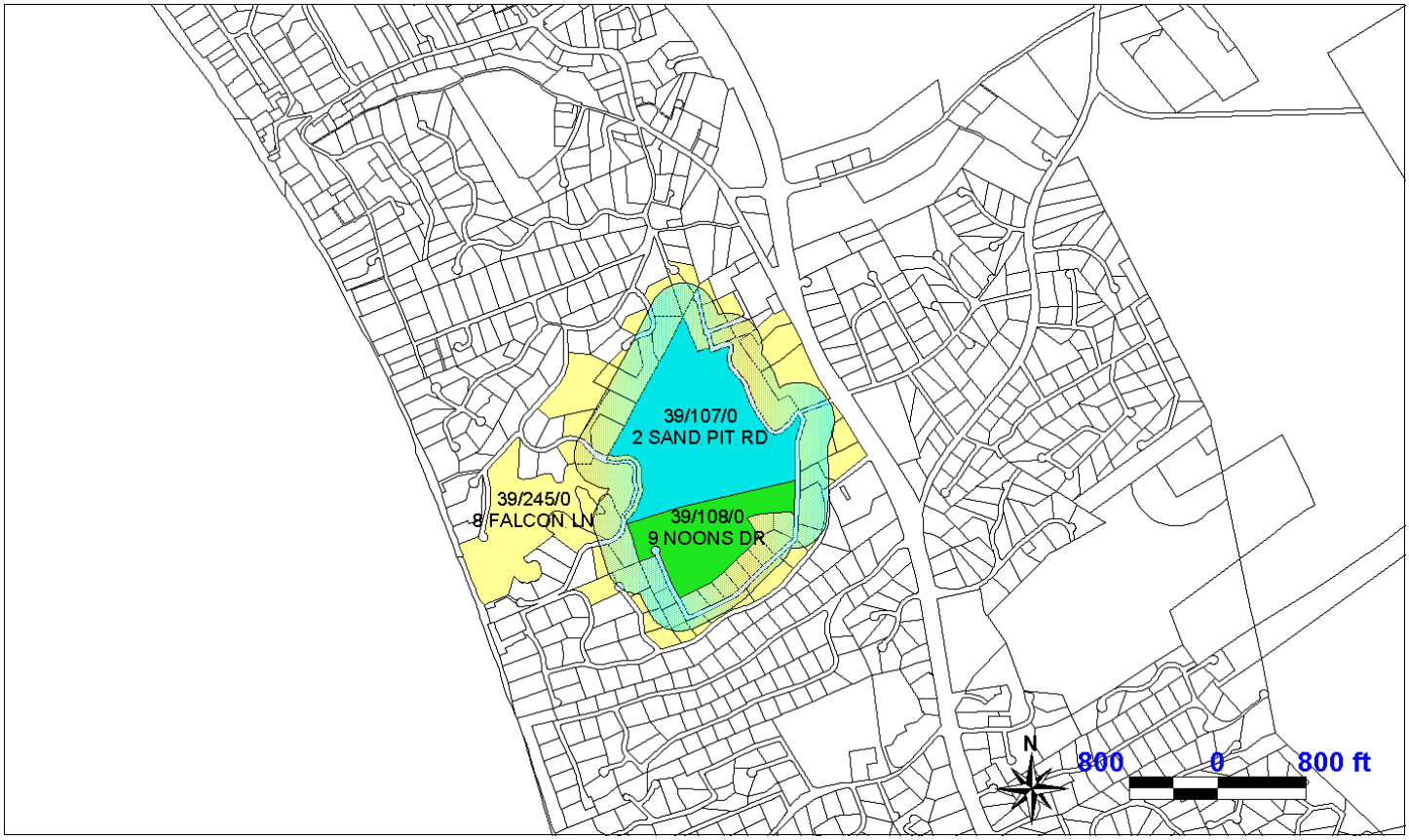
Certified by: _____Jon Nahas_____

Jon Nahas
Principal Assessor
Town of Truro
24 Town Hall Rd
PO Box 2012
Truro, MA 02666
508.214.0917
jnahas@truro-ma.gov

Parcels 39-107 & 39-108
2 Sand Pit Rd & 9 Noons Dr
Planning Board-Special Permit

TOWN OF TRURO, MA
BOARD OF ASSESSORS
P.O. BOX 2012, TRURO MA 02666

Abutters List Within 300 feet of Abutters to Parcel 39/108/0



Key	Parcel ID	Owner	Location	Mailing Street	Mailing City	ST	ZipCd/Country
1234	39-107-0-R	NOONS DONALD W ESTATE OF	2 SAND PIT RD	PO BOX 23	NO TRURO	MA	02652-0023
1235	39-108-0-R	NOONS DONALD W ESTATE OF	9 NOONS DR	PO BOX 23	NO TRURO	MA	02652-0023
1238	39-111-0-R	CRONIN JACQUELINE SUE, ET AL	16 TURNSTONE RD	13121 ESWORTHY RD	NORTH POTOMAC	MD	20878
1239	39-112-0-R	PLUGIS CHRISTOPHER & SUTHERLAND JAMES	18 TURNSTONE RD	67 SAWYER AVE, UNIT 1	BOSTON	MA	02125
1240	39-113-0-R	NOVELLINE ROBERT A	24 TURNSTONE RD	400 STUART ST UNIT 28C	BOSTON	MA	02116
1241	39-114-0-R	ROGER W CUMMINGS REV TRST & CANDACE S CUMMINGS REV TRST	22 TURNSTONE RD	5401 EASTERN SHORES DR	GREENSBORO	NC	27455
1243	39-116-0-R	SKLOFF ROBERT LOUIS & RHONDA	19 TURNSTONE RD	88 WAREHAM ST #402	BOSTON	MA	02118
1251	39-125-0-R	DESCHENES ANDREW W & PHOEBE	19 NOONS DR	PO BOX 870	TRURO	MA	02666-0870
1278	39-153-0-R	ROSE JEFFREY & NOONS LINDA	17 PETERS POND RD	PO BOX 2	TRURO	MA	02666
1281	39-156-0-R	NOONS LINDA JANE	16 PETERS POND RD	PO BOX 2	TRURO	MA	02666-0002
1282	39-157-0-R	ANNA E SWABY FAMILY REV TRST TRS: SWABY ANNA E	13 PETERS POND RD	PO BOX 451	NO TRURO	MA	02652
1283	39-158-0-R	BAKER JEFFREY R	9 PETERS POND RD	408 BAILEY RD	MONTGOMERY	NY	12549
1286	39-161-0-R	JAMES D KARADIMOS TRUST TRS: KARADIMOS JAMES D ET AL	12 PETERS POND RD	14 BREWER STREET	NORTHBOROUGH	MA	01532
1287	39-162-0-R	WILLIAMS JOHN N FAMILY TR TRS: WILLIAMS RONALD	10 PETERS POND RD	PO BOX 48	NO TRURO	MA	02652-0048
1288	39-163-0-R	BELVERNON LLC	364 RT 6	PO BOX 1768 95 COMMERCIAL STREET	WELLFLEET	MA	02667

Key	Parcel ID	Owner	Location	Mailing Street	Mailing City	ST	ZipCd/Country
1289	39-164-0-R	WARM SALT BREEZE REALTY TRUST TRS:NOONS-ROSE LINDA JANE ETAL	1 SAND PIT RD	PO BOX 2	TRURO	MA	02666
1290	39-166-0-R	WINKLER ROUTE SIX TRUST TRS: WINKLER MICHAEL F	1 NOONS HGTS RD	PO BOX 1110	TRURO	MA	02666-1110
1291	39-167-0-R	TRI-S PROPERTIES LLC	352 RT 6	PO BOX 1081	TRURO	MA	02666-1081
1292	39-168-0-R	SEAMENS BANK	350 RT 6	PO BOX 74	NO TRURO	MA	02652
1293	39-169-0-R	SEAMENS BANK	346 RT 6	PO BOX 74	NO TRURO	MA	02652
1294	39-171-0-R	TRIBUNA JR MICHAEL A	7 PARKER DR	192 MILTON ST	QUINCY	MA	02170
1297	39-173-0-R	CAROL ANN H D'AMICO REVOC TRST TRS: CAROL ANN H D'AMICO	11 PARKER DR	PO BOX 423	NO TRURO	MA	02652
1298	39-174-0-R	LUKACS THOMAS J & SHARON M	13 PARKER DR	8 ASPEN HEIGHTS	SLINGERLANDS	NY	12159
1345	39-224-0-R	PHAM CHINH & MCVAY LAUREEN	6 AMBER WAY	1371 WALNUT ST	NEWTON	MA	02461-1851
1346	39-225-0-R	DAVEY ELLEN M & AMOLDONI RAQUEL A	5 AMBER WAY	PO BOX 757	NO TRURO	MA	02652-0757
1354	39-234-0-R	HANSCOMB NEIL P & IRVING MARK	2 SHORE RD	C/O IRVING PO BOX 1111	PROVINCETOWN	MA	02657-1111
1364	39-245-0-R	WARD CHARLES G & DONNA R	8 FALCON LN	232 EMERALD LN	PALM BEACH	FL	33480
1366	39-247-0-R	SILACCI GARY E JR & SARA	35 CORMORANT RD	8 FRANCIS DR	MIDDLETON	MA	01949
1367	39-248-0-R	BLUEBERRY HILL FAMILY TRUST TRS:MAZZELLA JOSEPH F&LAUREN W	31 CORMORANT RD	201 W BROOKLINE ST #401	BOSTON	MA	02118
1368	39-249-0-R	COLLIER REVOCABLE TRUST TRS: RICHARD & JOYCE COLLIER	34 CORMORANT RD	13597 TRENTINO ST	VENICE	FL	34293
1369	39-250-0-R	OPTIONALITY 122 REALTY TRUST TRS: JOS. & LAUREN MAZZELLA	32 CORMORANT RD	201 WEST BROOKLINE ST	BOSTON	MA	02118
1370	39-251-0-R	DALI REALTY TRUST TRS: ARONSON RICHARD B	15 CORMORANT RD	C/O BOURSO TAMARA PO BOX 702	NORTH TRURO	MA	02652
1375	39-256-0-R	CAMPBELL MICHAEL E & VALERIE A	16 CORMORANT RD	370 CONIL WAY	PORTOLA VALLEY	CA	94028
1376	39-257-0-R	SARINE A RODMAN 2015 TRUST TRS: SARINE A RODMAN	18 CORMORANT RD	PO BOX 1038	TRURO	MA	02666
1377	39-258-0-R	CHAPIN DAVID S & ANDREA N	20 CORMORANT RD	PO BOX 592	NO TRURO	MA	02652
1378	39-259-0-E	TRURO CONSERVATION TRUST TRS: BROWN BETSEY ET AL	4 CORMORANT RD	PO BOX 327	NO TRURO	MA	02652-0327
1379	39-260-0-R	NOONS DONALD W ESTATE OF	22 CORMORANT RD	PO BOX 23	NO TRURO	MA	02652-0023
1421	39-302-0-R	DIANA PRIDEAUX-BRUNE REV TRUST TRS: DIANA E PRIDEAUX-BRUNE	5 PARKER DR	1100 UNION ST, APT 600	SAN FRANCISCO	CA	94109
1423	39-304-0-R	WINKLER MICHAEL F & KATHERINE	13 NOONS DR	PO BOX 1110	TRURO	MA	02666-1110
1426	39-307-0-R	WINKLER MICHAEL	17 NOONS DR	PO BOX 1110	TRURO	MA	02666-1110
5745	39-312-0-R	WINKLER MICHAEL	13-A NOONS DR	PO BOX 1110	TRURO	MA	02666-1110
1582	42-5-0-R	PETERSON RONALIE C QTIP TRUST TRS: PETERSON RONALIE C	8 CHICKADEE LN	5312 WANETA RD	BETHESDA	MD	20816
1583	42-6-0-R	PAUL E TAYLOR REVOC TRUST & KIMBERLY A TAYLOR REV TRUST	7 CHICKADEE LN	PO BOX 1080	NORTH TRURO	MA	02652
1588	42-13-0-R	DEVINE RICHARD	5 CHICKADEE LN	1005 CARROLL ST	BROOKLYN	NY	11225
1589	42-14-0-R	SHOPE JOHN ANDREW	32 NOONS DR	56 FAYETTE ST	BOSTON	MA	02116
1598	42-26-0-R	AMANDA REED TRST OF NOV 2023 & R SOKOLOWSKI TRST OF NOV 2023	3 CHICKADEE LN	PO BOX 968	TRURO	MA	02666
1599	42-27-0-R	CRONIN-GRAHAM TRUST TRS: GRAHAM PETER P ET AL	1 CHICKADEE LN	PO BOX 856	NO TRURO	MA	02652-0856
1600	42-28-0-R	DIETZ BETH A & MARKOWSKI CHRISTINE	28 NOONS DR	PO BOX 1193	TRURO	MA	02666-1193
1601	42-29-0-R	ANN L GROSSMAN REVOC TRUST TRS: ANN L GROSSMAN	25 PARKER DR	41 OAKMONT RD	NEWTON	MA	02459
1602	42-30-0-R	BAGINSKI DANIEL J	29 NOONS DR	85 HIGHLAND AVE	ROWAYTON	CT	06853-1314
1603	42-31-0-R	MCDERMOTT JOHN T & LAURA A	27 NOONS DR	10 FERN ST	AUBURNDALE	MA	02466
1604	42-32-0-R	HOWARD HARLEN K	25 NOONS DR	PO BOX 726	N TRURO	MA	02652
1605	42-33-0-R	BERNSTEIN VERONIKA & DAVID	23 NOONS DR	250 HAMMOND POND PKWY, #5135	NEWTON	MA	02467
1606	42-34-0-R	PARADIS NICHOLAS E & MORADI BANAFSHEH	21 NOONS DR	6817 NW 67TH AVE	GAINESVILLE	FL	32653
1607	42-35-0-R	GAIL L HINCHEN FAMILY TRUST TRS: DAVID S HINCHEN	23 PARKER DR	19 MANNING BLVD	ALBANY	NY	12203
1608	42-36-0-R	WEIHE KINGSLEY C	19 PARKER DR	79 SPRING PARK AVE	JAMAICA PLAIN	MA	02130

Key	Parcel ID	Owner	Location	Mailing Street	Mailing City	ST	ZipCd/Country
1609	42-38-0-R	MESSINA FRANK J & CHEPUS PETER	15 PARKER DR	PO BOX 51	NORTH TRURO	MA	02652
1811	42-229-0-R	KORAHAIS FAMILY LLC MGR: GWYNDOLYN KORAHAIS	30 NOONS DR	c/o FRANK KORAHAIS 10460 QUEENS BLVD	FOREST HILLS	NY	11375

39-107-0-R

NOONS DONALD W ESTATE OF
PO BOX 23
NO TRURO, MA 02652-0023

39-108-0-R

NOONS DONALD W ESTATE OF
PO BOX 23
NO TRURO, MA 02652-0023

39-111-0-R

CRONIN JACQUELINE SUE, ET AL
13121 ESWORTHY RD
NORTH POTOMAC, MD 20878

39-112-0-R

PLUGIS CHRISTOPHER &
SUTHERLAND JAMES
67 SAWYER AVE, UNIT 1
BOSTON, MA 02125

39-113-0-R

NOVELLINE ROBERT A
400 STUART ST UNIT 28C
BOSTON, MA 02116

39-114-0-R

ROGER W CUMMINGS REV TRST &
CANDACE S CUMMINGS REV TRST
5401 EASTERN SHORES DR
GREENSBORO, NC 27455

39-116-0-R

SKLOFF ROBERT LOUIS & RHONDA
88 WAREHAM ST #402
BOSTON, MA 02118

39-125-0-R

DESCHENES ANDREW W & PHOEBE
PO BOX 870
TRURO, MA 02666-0870

39-153-0-R

ROSE JEFFREY & NOONS LINDA
PO BOX 2
TRURO, MA 02666

39-156-0-R

NOONS LINDA JANE
PO BOX 2
TRURO, MA 02666-0002

39-157-0-R

ANNA E SWABY FAMILY REV TRST
TRS: SWABY ANNA E
PO BOX 451
NO TRURO, MA 02652

39-158-0-R

BAKER JEFFREY R
408 BAILEY RD
MONTGOMERY, NY 12549

39-161-0-R

JAMES D KARADIMOS TRUST
TRS: KARADIMOS JAMES D ET AL
14 BREWER STREET
NORTHBOROUGH, MA 01532

39-162-0-R

WILLIAMS JOHN N FAMILY TR
TRS: WILLIAMS RONALD
PO BOX 48
NO TRURO, MA 02652-0048

39-163-0-R

BELVERNON LLC
PO BOX 1768
95 COMMERCIAL STREET
WELLFLEET, MA 02667

39-164-0-R

WARM SALT BREEZE REALTY TRUST
TRS:NOONS-ROSE LINDA JANE ETAL
PO BOX 2
TRURO, MA 02666

39-166-0-R

WINKLER ROUTE SIX TRUST
TRS: WINKLER MICHAEL F
PO BOX 1110
TRURO, MA 02666-1110

39-167-0-R

TRI-S PROPERTIES LLC
PO BOX 1081
TRURO, MA 02666-1081

39-168-0-R

SEAMENS BANK
PO BOX 74
NO TRURO, MA 02652

39-169-0-R

SEAMENS BANK
PO BOX 74
NO TRURO, MA 02652

39-171-0-R

TRIBUNA JR MICHAEL A
192 MILTON ST
QUINCY, MA 02170

39-173-0-R

CAROL ANN H D'AMICO REVOC TRST
TRS: CAROL ANN H D'AMICO
PO BOX 423
NO TRURO, MA 02652

39-174-0-R

LUKACS THOMAS J & SHARON M
8 ASPEN HEIGHTS
SLINGERLANDS, NY 12159

39-224-0-R

PHAM CHINH &
MCVAY LAUREEN
1371 WALNUT ST
NEWTON, MA 02461-1851

39-225-0-R

DAVEY ELLEN M &
AMOLDONI RAQUEL A
PO BOX 757
NO TRURO, MA 02652-0757

39-234-0-R

HANSCOMB NEIL P & IRVING MARK
C/O IRVING
PO BOX 1111
PROVINCETOWN, MA 02657-1111

39-245-0-R

WARD CHARLES G & DONNA R
232 EMERALD LN
PALM BEACH, FL 33480

39-247-0-R

SILACCI GARY E JR & SARA
8 FRANCIS DR
MIDDLETON, MA 01949

39-248-0-R

BLUEBERRY HILL FAMILY TRUST
TRS:MAZZELLA JOSEPH F&LAUREN W
201 W BROOKLINE ST #401
BOSTON, MA 02118

39-249-0-R

COLLIER REVOCABLE TRUST
TRS: RICHARD & JOYCE COLLIER
13597 TRENTINO ST
VENICE, FL 34293

39-250-0-R

OPTIONALITY 122 REALTY TRUST
TRS: JOS. & LAUREN MAZZELLA
201 WEST BROOKLINE ST
BOSTON, MA 02118

39-251-0-R

DALI REALTY TRUST
TRS: ARONSON RICHARD B
C/O BOURSO TAMARA
PO BOX 702
NORTH TRURO, MA 02652

39-256-0-R

CAMPBELL MICHAEL E & VALERIE A
370 CONIL WAY
PORTOLA VALLEY, CA 94028

39-257-0-R

SARINE A RODMAN 2015 TRUST
TRS: SARINE A RODMAN
PO BOX 1038
TRURO, MA 02666

39-258-0-R

CHAPIN DAVID S & ANDREA N
PO BOX 592
NO TRURO, MA 02652

39-259-0-E

TRURO CONSERVATION TRUST
TRS: BROWN BETSEY ET AL
PO BOX 327
NO TRURO, MA 02652-0327

39-260-0-R

NOONS DONALD W ESTATE OF
PO BOX 23
NO TRURO, MA 02652-0023

39-302-0-R

DIANA PRIDEAUX-BRUNE REV TRUST
TRS: DIANA E PRIDEAUX-BRUNE
1100 UNION ST, APT 600
SAN FRANCISCO, CA 94109

39-304-0-R

WINKLER MICHAEL F & KATHERINE
PO BOX 1110
TRURO, MA 02666-1110

39-307-0-R

WINKLER MICHAEL
PO BOX 1110
TRURO, MA 02666-1110

39-312-0-R

WINKLER MICHAEL
PO BOX 1110
TRURO, MA 02666-1110

42-5-0-R

PETERSON RONALIE C QTIP TRUST
TRS: PETERSON RONALIE C
5312 WANETA RD
BETHESDA, MD 20816

42-6-0-R

PAUL E TAYLOR REVOC TRUST &
KIMBERLY A TAYLOR REV TRUST
PO BOX 1080
NORTH TRURO, MA 02652

42-13-0-R

DEVINE RICHARD
1005 CARROLL ST
BROOKLYN, NY 11225

42-14-0-R

SHOPE JOHN ANDREW
56 FAYETTE ST
BOSTON, MA 02116

42-26-0-R

AMANDA REED TRST OF NOV 2023 &
R SOKOLOWSKI TRST OF NOV 2023
PO BOX 968
TRURO, MA 02666

42-27-0-R

CRONIN-GRAHAM TRUST
TRS: GRAHAM PETER P ET AL
PO BOX 856
NO TRURO, MA 02652-0856

42-28-0-R

DIETZ BETH A &
MARKOWSKI CHRISTINE
PO BOX 1193
TRURO, MA 02666-1193

42-29-0-R

ANN L GROSSMAN REVOC TRUST
TRS: ANN L GROSSMAN
41 OAKMONT RD
NEWTON, MA 02459

42-30-0-R

BAGINSKI DANIEL J
85 HIGHLAND AVE
ROWAYTON, CT 06853-1314

42-31-0-R

MCDERMOTT JOHN T & LAURA A
10 FERN ST
AUBURNDALE, MA 02466

42-32-0-R

HOWARD HARLEN K
PO BOX 726
N TRURO, MA 02652

42-33-0-R

BERNSTEIN VERONIKA & DAVID
250 HAMMOND POND PKWY, #5135
NEWTON, MA 02467

42-34-0-R

PARADIS NICHOLAS E &
MORADI BANAFSHEH
6817 NW 67TH AVE
GAINESVILLE, FL 32653

42-35-0-R

GAIL L HINCHEN FAMILY TRUST
TRS: DAVID S HINCHEN
19 MANNING BLVD
ALBANY, NY 12203

42-36-0-R

WEIHE KINGSLEY C
79 SPRING PARK AVE
JAMAICA PLAIN, MA 02130

42-38-0-R

MESSINA FRANK J & CHEPUS PETER
PO BOX 51
NORTH TRURO, MA 02652

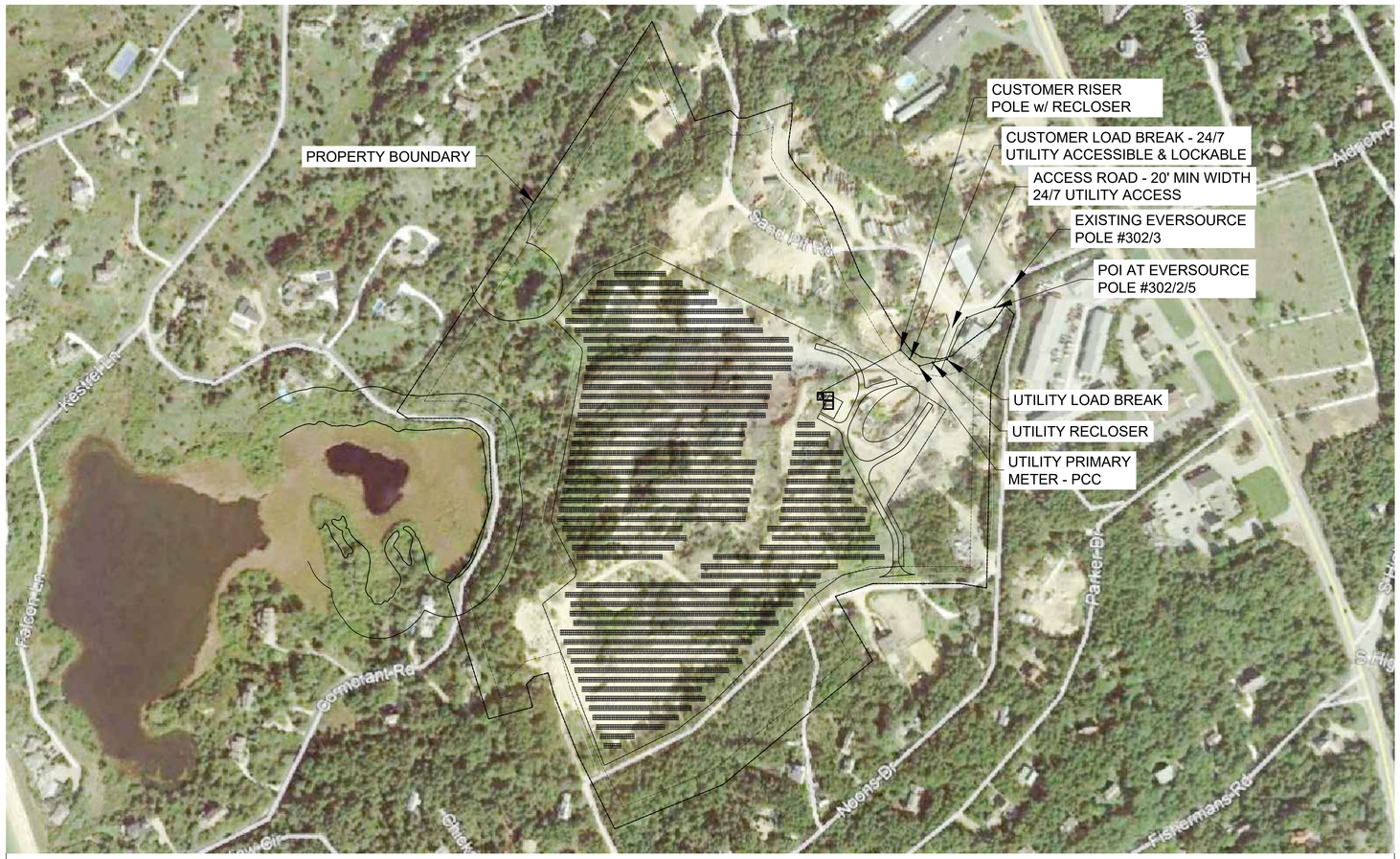
42-229-0-R

KORAHAIS FAMILY LLC
MGR: GWYNDOLYN KORAHAIS
c/o FRANK KORAHAIS
10460 QUEENS BLVD
FOREST HILLS, NY 11375

Appendix H – Electrical Documents



LOCATION MAP:



SITE PLAN:

N

180° MODULE ORIENTATION
25° TILT

2 SANDPIT ROAD SOLAR
7,679.1 - KW DC
PHOTOVOLTAIC POWER SYSTEM

0 100 200 400

GRAPHIC SCALE IN FEET
1" = 200'-0"

PROJECT DATA

INTEGRATOR: NEXTGRID
P.O. BOX 7775 #73069
SAN FRANCISCO, CA 94120

SITE: 2 SANDPIT ROAD
TRURO, MA 02652

CODES: NEC-2020
IBC-2015
9TH EDITION CMR 780

SOLAR ARRAY:

MODULE: ZNSHINE ZXM7-SHDB144 550W
13,962 MODULES

RACKING: GROUND MOUNTED @ 25° TILT

DC OUTPUT: 7,679,100 W DC - STC

ASHRAE TEMPERATURE:

PROVINCETOWN AWOS			
ELEV.	HIGH TEMPERATURE		LOW TEMPERATURE
	0.4%	2% AVG.	EXTREME MINIMUM
2m	32°C	28°C	-14°C

COVER SHEET

ARC DESIGN
409 NORTH MAIN STREET
ELMER, NJ 08318
(856) 712-2166 FAX: (856) 358-1511

PREPARED FOR:
NextGrid
PO BOX 7775 #73069
SAN FRANCISCO, CA 94120

PROPOSED PHOTOVOLTAIC ARRAY
2 SANDPIT ROAD SOLAR
2 SANDPIT ROAD
TRURO, MA 02652

REVISIONS	
DATE	COMMENT
03-03-22	INFO FOR DYNAMIC STUDY
03-10-22	ADD 79 ELEMENT NOTE
09-02-22	NEUTRAL GND REACTORS
02-23-24	ADD UTILITY RQD. RTAC
04-24-24	IMPORT/EXPORT LIMITS
06-11-24	UPDATE ISO-NE TABLES

JOB #	
DRWN	RCA
CHKD	JAC
SCALE	AS NOTED
DATE	06-15-2020

C-1

EVERSOURCE

Exhibit G - Interconnection Service Agreement

1. Parties. This Interconnection Service Agreement ("Agreement"), dated as of **07-02-2024** is entered into, by and between **NSTAR Electric d/b/a Eversource Energy**, a Massachusetts corporation with a principal place of business at **247 Station Drive, Westwood, MA 02090** (hereinafter referred to as the Company"), and **NextGrid Pecan, LLC** a corporation with a principal place of business at **PO Box 73069 #7775, San Francisco, CA, 94120** ("Interconnecting Customer"). (The Company and Interconnecting Customer are collectively referred to as the "Parties"). Terms used herein without definition shall have the meanings set forth in Section 1.2 of the Interconnection Tariff which is hereby incorporated by reference.

Project Number #	HISTEX-69847
Maximo WO #	2405858
Project Size	4107 kW AC
Has Storage	Yes
Storage Type	DC Coupled
Storage Size (AC)	N/A
Existing Facility Capacity	N/A
Total Facility Capacity	4,107 kW AC

2. **Basic Understandings.** This Agreement provides for parallel operation of an Interconnecting Customer's Facility with the Company EPS to be installed and operated by the Interconnecting Customer at **2 Sand Pit Rd, Truro, MA, 02652 Acct# TBD.** A description of the Facility is located in Attachment 1. If the Interconnecting Customer is not the Customer, an Agreement between the Company and the Company's Retail Customer, attached as Exhibit H to the Interconnection Tariff, must be signed and included as an Attachment to this Agreement. If neither the Interconnecting Customer nor the Customer is the Landowner of the property where the Facility is sited, a Landowner Consent Agreement, attached as Exhibit I to the Interconnection Tariff, must be signed and included as an Attachment to this Agreement, unless the Company, in its sole discretion, waives this requirement. The Interconnecting Customer has the right to operate its Facility in parallel with the Company EPS immediately upon successful completion of the protective relays testing as witnessed by the Company and receipt of written notice from the Company that interconnection with the Company EPS is authorized ("Authorization Date").

3. **Term.** This Agreement shall become effective as of the Effective Date. The Agreement shall continue in full force and effect until terminated pursuant to Section 4 of this Agreement.

4. **Termination.**

4.1. This Agreement may be terminated under the following conditions.

4.1 a)The Parties agree in writing to terminate the Agreement.

4.1 b) The Interconnecting Customer may terminate this agreement at any time by providing sixty (60) days written notice to Company.

4.1 c)The Company may terminate this Agreement upon the occurrence of an Event of Default by the Interconnecting Customer as provided in Section 18 of this Agreement.

4.1 d) The Company may terminate this Agreement if the Interconnecting Customer either:

(1) fails to energize the Facility within 12 months of the Authorization Date; or,

(2) permanently abandons the Facility. Failure to operate the Facility for any consecutive 12 month period after the Authorization Date shall constitute permanent abandonment unless otherwise agreed to in writing between the Parties.

4.1 e)The Company, upon 30 days notice, may terminate this Agreement if there are any changes in Department regulations or state law that have a material adverse effect on the Company's ability to perform its obligations under the terms of this Agreement.

4.2. **Survival of Obligations**. The termination of this Agreement shall not relieve either Party of its liabilities and obligations, owed or continuing at the time of termination. Sections 5, 10, 12, 13, and 25 as it relates to disputes pending or for wrongful termination of this Agreement shall survive the termination of this Agreement.

4.3. **Related Agreements**. Any agreement attached to and incorporated into this Agreement shall terminate concurrently with this Agreement unless the Parties have agreed otherwise in writing. If the Interconnection Service Agreement is signed prior to a Detailed Study (if applicable), the System Modifications construction schedule from the Detailed Study when finalized shall be deemed a part of the signed Interconnection Service Agreement.

5. **General Payment Terms.** The Interconnecting Customer shall be responsible for the System Modification costs and payment terms identified in Attachment 3 of this Agreement and any approved cost increases pursuant to the terms of the Interconnection Tariff. The Interconnecting Customer shall also be directly responsible to the Affected System Operator and/or Affected System Owner of any potentially Affected System for all costs of any additional studies required to evaluate the impact of the interconnection on the potentially Affected Systems and any resulting Affected System costs for its requirements, including, without limitation, modifications to the electric power system of the Affected System and operation and maintenance costs; provided, however, the Company may, in its sole discretion, elect to include the additional Affected System study and/or system modification costs known at the time of this Agreement in the Company's costs and payment terms identified in Attachment 3 of this Agreement, and the Interconnecting Customer will pay such costs to the Company (and will be responsible for any and all actual costs thereof). Where the Company includes the Affected System costs in this Agreement, the costs will be collected by the Company and passed-through to the Affected System Operator(s). Interconnecting Customer shall not be required to pay any costs related to Company infrastructure upgrades or System Modifications upon execution of the Interconnection Service Agreement (or once the Interconnecting Customer receives the construction schedule). Interconnecting Customers shall have 60 Business Days from the date of the Interconnecting Customer's execution of an Interconnection Service Agreement to pay 25 percent of those costs; if an Interconnecting Customer pays such cost within the 60 Business Day Time Frame, the Interconnecting Customer shall have an additional 120 Business Days from the earlier of the date of receipt of the first payment or 60 Business Days from the date of the Interconnecting Customer's execution of an Interconnection Service Agreement to pay the remainder of the costs. If the Company fails to sign this Interconnection Service Agreement within 15 Business Days after receipt of the first installment payment by the Interconnecting Customer, this Interconnection Service Agreement shall be deemed accepted by the Company on the 15th Business

Day after receipt of the first installment payment. If the system modifications exceed $25,000, the Interconnecting Customer is eligible for a payment plan, including a payment and construction schedule with milestones for both parties, within the Time Frames for payment of such costs under the Interconnection Service Agreement in Section 3.6.2. Any such payment plan shall be set forth in Attachment 3. The payment plan may include a payment schedule different than the 60 Business Day payment schedule requirements set forth in this paragraph above, but shall not exceed 180 Business Days.

Construction estimates are valid for 60 Business Days from when they are delivered to the Interconnecting Customer. If an Interconnecting Customer payment is not received within 60 Business Days of receiving the Interconnection Service Agreement in the Expedited Process, or the Impact Study in the Standard Process, the Company has the right to reassess construction costs and Time Frames. In the event that the Interconnecting Customer fails to pay the Company within the Time Frame required by this provision, the Interconnecting Customer's interconnection application and this Interconnection Service Agreement will be cancelled, and its interconnection queue position will be lost. Further, any fees paid will not be refunded. The construction schedule will commence once the Interconnecting Customer's financial payment has been made in full or as otherwise provided in Attachment 3. The Company's obligation to the construction schedule (as it appears in either the Interconnection Service Agreement or the Detailed Study, if the Interconnecting Customer has opted to sign the Interconnection Service Agreement without a Detailed Study) begins on the next Business Day after the Company receives full payment for such construction or as otherwise provided in Attachment 3.The Interconnecting Customer shall be responsible for the System Modification costs and payment terms identified in Attachment 3of this Agreement and any approved cost increases pursuant to the terms of the Interconnection Tariff. Interconnecting Customers shall not be required to pay any costs related to Company infrastructure upgrades or System Modifications upon execution of the Interconnection Service Agreement (or once the Interconnecting Customer receives the construction schedule). Interconnecting Customers shall have 60 Business Days from the date of execution of an Interconnection Service Agreement to pay 25 percent of those costs; if an Interconnecting Customer pays such cost within the 60 Business Day Time Frame, the Interconnecting Customer shall have an additional 120 Business Days from the date of first payment to pay the remainder of the costs. If the system modifications exceed $25,000, the Interconnecting Customer is eligible for a payment plan, including a payment and construction schedule with milestones for both parties, and any such payment plan shall be set forth in Attachment 3. The payment plan may include a payment schedule different than the 120 Business Day payment schedule requirements set forth in this paragraph above.

5.1. <u>Cost or Fee Adjustment Procedures</u>.

The Company will, in writing, advise the Interconnecting Customer in advance of any cost increase for work to be performed up to a total amount of increase of 10% only. Interconnecting Customers who elected to execute an Interconnection Services Agreement following the completion of the Impact Study but prior to the commencement of any required Detailed Study, pursuant to Section 3.4(g) of the Interconnection Tariff, shall be responsible for any System Modifications costs, ±25%, as identified by the Company in the Impact Study. All costs that exceed the above caps will be borne solely by the Company. Any such changes to the Company's costs for the work shall be subject to the Interconnecting Customer's consent. The Interconnecting Customer shall, within thirty (30) Business Days of the Company's notice of increase, authorize such increase and make payment in the amount up to the above caps, or the Company will suspend the work and the corresponding agreement will terminate.

5.2. Final Accounting.

An Interconnecting Customer may request a final accounting report of any difference between (a) Interconnecting Customer's cost responsibility under this Agreement for the actual cost of the System Modifications, and (b) Interconnecting Customer's previous aggregate payments to the Company under the Interconnection Service Agreement for such System Modifications within 120 Business days after completion of the construction and installation of the System Modifications described in an attached exhibit to the Interconnection Service Agreement. Upon receipt of such a request from an Interconnecting Customer, the Company shall have 120 Business days to provide the requested final accounting report to the Interconnecting Customer. To the extent that Interconnecting Customer's cost responsibility in the Interconnection Service Agreement exceeds Interconnecting Customer's previous aggregate payments, the Company shall invoice Interconnecting Customer and Interconnecting Customer shall make payment to the Company within 45 Business Days. To the extent that Interconnecting Customer's previous aggregate payments exceed Interconnecting Customer's cost responsibility under this agreement, the Company shall refund to Interconnecting Customer an amount equal to the difference within forty five (45) Business Days of the provision of such final accounting report.

6. Operating Requirements.

6.1. General Operating Requirements.

Interconnecting Customer shall operate and maintain the Facility in accordance with the applicable manufacturer's recommended maintenance schedule, in compliance with all aspects of the Company's Interconnection Tariff. The Interconnecting Customer will continue to comply with all applicable laws and requirements after interconnection has occurred. In the event the Company has reason to believe that the Interconnecting Customer's installation may be the source of problems on the Company EPS, the Company has the right to install monitoring equipment at a mutually agreed upon location to determine the source of the problems. If the Facility is determined to be the source of the problems, the Company may require disconnection as outlined in Section 7.0 of this Interconnection Tariff. The cost of this testing will be borne by the Company unless the Company demonstrates that the problem or problems are caused by the Facility or if the test was performed at the request of the Interconnecting Customer.

6.2. No Adverse Effects; Non-interference.

Company shall notify Interconnecting Customer if there is evidence that the operation of the Facility could cause disruption or deterioration of service to other Customers served from the same Company EPS or if operation of the Facility could cause damage to Company EPS or Affected Systems. The deterioration of service could be, but is not limited to, harmonic injection in excess of IEEE Standard 1547-2003, as well as voltage fluctuations caused by large step changes in loading at the Facility. Each Party will notify the other of any emergency or hazardous condition or occurrence with its equipment or facilities which could affect safe operation of the other Party's equipment or facilities. Each Party shall use reasonable efforts to provide the other Party with advance notice of such conditions.

The Company will operate the EPS in such a manner so as to not unreasonably interfere with the operation of the Facility. The Interconnecting Customer will protect itself from normal disturbances propagating through the Company EPS, and such normal disturbances shall not constitute unreasonable interference unless the Company has deviated from Good Utility

Practice. Examples of such disturbances could be, but are not limited to, single-phasing events, voltage sags from remote faults on the Company EPS, and outages on the Company EPS. If the Interconnecting Customer demonstrates that the Company EPS is adversely affecting the operation of the Facility and if the adverse effect is a result of a Company deviation from Good Utility Practice, the Company shall take appropriate action to eliminate the adverse effect.

6.3. Safe Operations and Maintenance.

Each Party shall operate, maintain, repair, and inspect, and shall be fully responsible for, the facility or facilities that it now or hereafter may own unless otherwise specified in this Agreement. Each Party shall be responsible for the maintenance, repair and condition of its respective lines and appurtenances on their respective side of the PCC. The Company and the Interconnecting Customer shall each provide equipment on its respective side of the PCC that adequately protects the Company's EPS, personnel, and other persons from damage and injury.

6.4. Access.

The Company shall have access to the disconnect switch of the Facility at all times.

6.4 a) Company and Interconnecting Customer Representatives.

Each Party shall provide and update as necessary the telephone number that can be used at all times to allow either Party to report an emergency.

6.4 b) Company Right to Access Company-Owned Facilities and Equipment.

If necessary for the purposes of the Interconnection Tariff and in the manner it describes, the Interconnecting Customer shall allow the Company access to the Company's equipment and the Company's facilities located on the Interconnecting Customer's or Customer's premises. To the extent that the Interconnecting Customer does not own all or any part of the property on which the Company is required to locate its equipment or facilities to serve the Interconnecting Customer under the Interconnection Tariff, the Interconnecting Customer shall secure and provide in favor of the Company the necessary rights to obtain access to such equipment or facilities, including easements if the circumstances so require. In addition to any rights and easements required by the Company in accordance with the above provision, the Interconnecting Customer shall obtain an executed Landowner Consent Agreement (Exhibit I) from the Landowner, unless the Company, in its sole discretion, waives this requirement.

6.4 c) Right to Review Information.

The Company shall have the right to review and obtain copies of Interconnecting Customer's operations and maintenance records, logs, or other information such as, unit availability, maintenance outages, circuit breaker operation requiring manual reset, relay targets and unusual events pertaining to Interconnecting Customer's Facility or its interconnection with the Company EPS. This information will be treated as customer-confidential and only used for the

purposes of meeting the requirements of Section 4.2.4 in the Interconnection Tariff.

7. Disconnection

7.1. Temporary Disconnection

7.1 a) Emergency Conditions. Company shall have the right to immediately and temporarily disconnect the Facility without prior notification in cases where, in the reasonable judgment of Company, continuance of such service to Interconnecting Customer is imminently likely to (i) endanger persons or damage property or (ii) cause a material adverse effect on the integrity or security of, or damage to, Company EPS or to the electric systems of others to which the Company EPS is directly connected. Company shall notify Interconnecting Customer promptly of the emergency condition. Interconnecting Customer shall notify Company promptly when it becomes aware of an emergency condition that affects the Facility that may reasonably be expected to affect the Company EPS. To the extent information is known, the notification shall describe the emergency condition, the extent of the damage or deficiency, or the expected effect on the operation of both Parties' facilities and operations, its anticipated duration and the necessary corrective action.

7.1 b) Routine Maintenance, Construction and Repair. Company shall have the right to disconnect the Facility from the Company EPS when necessary for routine maintenance, construction and repairs on the Company EPS. The Company shall provide the Interconnecting Customer with a minimum of seven calendar days planned outage notification consistent with the Company's planned outage notification protocols. If the Interconnecting Customer requests disconnection by the Company at the PCC, the Interconnecting Customer will provide a minimum of seven days notice to the Company. Any additional notification requirements will be specified by mutual agreement in the Interconnection Service Agreement. Company shall make an effort to schedule such curtailment or temporary disconnection with Interconnecting Customer.

7.1 c) Forced Outages. During any forced outage, Company shall have the right to suspend interconnection service to effect immediate repairs on the Company EPS; provided, however, Company shall use reasonable efforts to provide the Interconnecting Customer with prior notice. Where circumstances do not permit such prior notice to Interconnecting Customer, Company may interrupt Interconnection Service and disconnect the Facility from the Company EPS without such notice.

7.1 d) Non-Emergency Adverse Operating Effects. The Company may disconnect the Facility if the Facility is having an adverse operating effect on the Company EPS or other Customers that is not an emergency, and the Interconnecting Customer fails to correct such adverse operating effect after written notice has been provided and a maximum of 45 days to correct such adverse operating effect has elapsed.

7.1 e) Modification of the Facility. Company shall notify Interconnecting Customer if there is evidence of a material modification to the Facility and shall have the right to immediately suspend interconnection service in cases where such material modification has been implemented without prior written authorization from the Company.

7.1 f) Re-connection. Any curtailment, reduction or disconnection shall continue only for so long as reasonably necessary. The Interconnecting Customer and the Company shall cooperate with each other to restore the Facility and the Company EPS, respectively, to their normal operating state as soon as reasonably practicable following the cessation or remedy of the event that led to the temporary disconnection.

7.2. Permanent Disconnection.

The Interconnecting Customer has the right to permanently disconnect at any time with 30 days written notice to the Company.

7.2 a) The Company may permanently disconnect the Facility upon termination of the Interconnection Service Agreement in accordance with the terms thereof.

8. **Metering.** Metering of the output from the Facility shall be conducted pursuant to the terms of the Interconnection Tariff.

9. **Assignment.** Except as provided herein, Interconnecting Customer shall not voluntarily assign its rights or obligations, in whole or in part, under this Agreement without Company's written consent. Any assignment Interconnecting Customer purports to make without Company's written consent shall not be valid. Company shall not unreasonably withhold or delay its consent to Interconnecting Customer's assignment of this Agreement. Notwithstanding the above, Company's consent will not be required for any assignment made by Interconnecting Customer to an Affiliate or as collateral security in connection with a financing transaction. In all events, the Interconnecting Customer will not be relieved of its obligations under this Agreement unless, and until the assignee assumes in writing all obligations of this Agreement and notifies the Company of such assumption.

10. **Confidentiality.** Company shall maintain confidentiality of all Interconnecting Customer confidential and proprietary information except as otherwise required by applicable laws and regulations, the Interconnection Tariff, or as approved by the Interconnecting Customer in the Simplified or Expedited/Standard Application form or otherwise.

11. Insurance Requirements.

11.1. General Liability.

11.1 a) In connection with Interconnecting Customer's performance of its duties and obligations under the Interconnection Service Agreement, Interconnecting Customer shall maintain, during the term of the Agreement, general liability insurance with a combined single limit of not less than:

i) Five million dollars ($5,000,000) for each occurrence and in the aggregate if the Gross Nameplate Rating of Interconnecting Customer's Facility is greater than five (5) MW.

ii) Two million dollars ($2,000,000) for each occurrence and five million dollars ($5,000,000) in the aggregate if the Gross Nameplate Rating of Interconnecting Customer's Facility is greater than one (1) MW and less than or equal to five (5) MW;

iii) One million dollars ($1,000,000) for each occurrence and in the aggregate if the Gross Nameplate Rating of Interconnecting Customer's Facility is greater than one hundred (100) kW and less than or equal to one (1) MW;

iv) Five hundred thousand dollars ($500,000) for each occurrence and in the aggregate if the Gross Nameplate Rating of Interconnecting Customer's Facility is greater than ten (10) kW and less than or equal to one hundred (100) kW, except for as provide below in subsection 11.1(b).

11.1 b) Pursuant to 220 CMR §18.03(2), no insurance is required for Interconnecting Customers with facilities eligible for Class 1 Net Metering (facilities less than or equal to sixty (60) kW. However, the Company recommends that the Interconnecting Customer obtain adequate insurance to cover potential liabilities.

11.1 c) Any combination of General Liability and Umbrella/Excess Liability policy limits can be used to satisfy the limit requirements stated above.

11.1 d) The general liability insurance required to be purchased in this Section 11 may be purchased for the direct benefit of the Company and shall respond to third party claims asserted against the Company (hereinafter known as "Owners Protective Liability"). Should this option be chosen, the requirement of Section 11.2(a) will not apply but the Owners Protective Liability policy will be purchased for the direct benefit of the Company and the Company will be designated as the primary and "Named Insured" under the policy.

11.1 e) The insurance hereunder is intended to provide coverage for the Company solely with respect to claims made by third parties against the Company.

11.1 f) In the event the Commonwealth of Massachusetts, or any other governmental subdivision thereof subject to the claims limits of the Massachusetts Tort Claims Act, G.L. c. 258 (hereinafter referred to as the "Governmental Entity") is the Interconnecting Customer, any insurance maintained by the Governmental Entity shall contain an endorsement that strictly prohibits the applicable insurance company from interposing the claims limits of G.L. c. 258 as a defense in either the adjustment of any claim, or in the defense of any lawsuit directly asserted against the insurer by the Company. Nothing herein is intended to constitute a waiver or indication of an intent to waive the protections of G.L. c. 258 by the Governmental Entity.

11.1 g) Notwithstanding the requirements of section 11.1(a) through (f), insurance for certain Governmental Entity facilities may be provided as set forth in section 11.1(g)(i) and (ii) below. Nothing herein changes the provision in subsection 11.1(a)(iv) that exempts Class I Net Metering facilities (less than or equal to 60 kW) from the requirement to obtain insurance. In addition, nothing shall prevent the Governmental Entity from obtaining insurance consistent with the provisions of subsection 11.1(a) through (f), if it is able and chooses to do so.

i) For solar photovoltaic (PV) facilities with a Gross Nameplate Rating in excess of 60 kW up to 500 kW, the Governmental Entity is not required to obtain liability insurance. Any liability costs borne by the Company associated with a third-party claim for damages in excess of the claims limit of the Massachusetts Tort Claims Act, M.G.L. c. 258, and market-based premium-related costs, if any,

borne by the Company associated with insurance for such third-party claims shall be recovered annually on a reconciling basis in Company rates in a manner that shall be reviewed and approved by the Department.

ii) For (a) PV facilities with a Gross Nameplate Rating in excess of 500 kW up to 5 MW, (b) wind facilities with a Gross Nameplate Rating in excess of 60 kW up to 5 MW, and (c) highly efficient combined heat and power facilities with a Gross Nameplate Rating of in excess of 60 kW up to 5 MW, the Governmental Entity is not required to obtain liability insurance, subject to the requirements of the following paragraph.

The Company shall either self-insure for any risk associated with possible third-party claims for damages in excess of the Massachusetts Tort Claims Act limit, or obtain liability insurance for such third-party claims, and the Company is authorized to charge and collect from the Governmental Entity its pro-rata allocable share of the cost of so doing, plus all reasonable administrative costs. The coverage and cost may vary with the size and type of facility, and may change (increase or decrease) over time, based on insurance market conditions, and such cost shall be added to, and paid for as part of the Governmental Entity's electric bill.

11.2. Insurer Requirements and Endorsements.

All required insurance shall be carried by reputable insurers qualified to underwrite insurance in MA having a Best Rating of at least "A-". In addition, all insurance shall, (a) include Company as an additional insured; (b) contain a severability of interest clause or cross-liability clause; (c) provide that Company shall not incur liability to the insurance carrier for payment of premium for such insurance; and (d) provide for thirty (30) calendar days' written notice to Company prior to cancellation, termination, or material change of such –insurance; provided that to the extent the Interconnecting Customer is satisfying the requirements of subpart (d) of this paragraph by means of a presently existing insurance policy, the Interconnecting Customer shall only be required to make good faith efforts to satisfy that requirement and will assume the responsibility for notifying the Company as required above.

If the requirement of clause (a) in the paragraph above prevents Interconnecting Customer from obtaining the insurance required without added cost or due to written refusal by the insurance carrier, then upon Interconnecting Customer's written Notice to Company, the requirements of clause (a) shall be waived.

11.3. Evidence of Insurance.

Evidence of the insurance required shall state that coverage provided is primary and is not in excess to or contributing with any insurance or self-insurance maintained by Interconnecting Customer.

The Interconnecting Customer is responsible for providing the Company with evidence of insurance in compliance with the Interconnection Tariff on an annual basis.

Prior to the Company commencing work on System Modifications, and annually thereafter, the Interconnecting Customer shall have its insurer furnish to the Company

certificates of insurance evidencing the insurance coverage required above. The Interconnecting Customer shall notify and send to the Company a certificate of insurance for any policy written on a "claims-made" basis. The Interconnecting Customer will maintain extended reporting coverage for three years on all policies written on a "claims-made" basis.

In the event that an Owners Protective Liability policy is provided, the original policy shall be provided to the Company.

11.4. Self Insurance.

If Interconnecting Customer has a self-insurance program established in accordance with commercially acceptable risk management practices. Interconnecting Customer may comply with the following in lieu of the above requirements as reasonably approved by the Company:

- Interconnecting Customer shall provide to Company, at least thirty (30) calendar days prior to the Date of Initial Operation, evidence of such program to self-insure to a level of coverage equivalent to that required.

- If Interconnecting Customer ceases to self-insure to the standards required hereunder, or if Interconnecting Customer is unable to provide continuing evidence of Interconnecting Customer's financial ability to self-insure, Interconnecting Customer agrees to promptly obtain the coverage required under Section 11.1.

This section shall not allow any Governmental Entity to self-insure where the existence of a limitation on damages payable by a Government Entity imposed by the Massachusetts Tort Claims Act, G.L. c. 258, or similar law, could effectively limit recovery (by virtue of a cap on recovery) to an amount lower than that required in Section 11.1(a).

11.5. All insurance certificates, statements of self-insurance, endorsements, cancellations, terminations, alterations, and material changes of such insurance shall be issued and submitted to the following:

Eversource
Attention: DG Group, SW 340
247 Station Dr, Westwood MA 02090-9230

12. Indemnification. Except as the Commonwealth is precluded from pledging credit by Section 1 of Article 62 of the Amendments to the Constitution of the Commonwealth of Massachusetts, and except as the Commonwealth's cities and towns are precluded by Section 7 of Article 2 of the Amendments to the Massachusetts Constitution from pledging their credit without prior legislative authority, Interconnecting Customer and Company shall each indemnify, defend and hold the other, its directors, officers, employees and agents (including, but not limited to, Affiliates and contractors and their employees), harmless from and against all liabilities, damages, losses, penalties, claims, demands, suits and proceedings of any nature whatsoever for personal injury (including death) or property damages to unaffiliated third parties that arise out of or are in any manner connected with the performance of this Agreement by that Party except to the extent that such injury or damages to unaffiliated third parties may be attributable to the negligence or willful misconduct of the Party seeking indemnification.

13. Limitation of Liability. Each Party's liability to the other Party for any loss, cost, claim, injury, liability, or expense, including court costs and reasonable attorney's fees, relating to or arising from any act or omission in its performance of this Agreement, shall be limited to the amount of direct damage or liability actually incurred. In no event shall either Party be liable to the other Party for any indirect, incidental, special, consequential, or punitive damages of any kind whatsoever. The Interconnecting Customer further understands and acknowledges that, consistent with Section 3.4 of the Interconnection Tariff, the Company will coordinate with the Affected System Operator and/or Affected System Owner to facilitate the interconnection of the Facility to the Company's EPS; however the Company does not represent the Affected System Operator and/or Affected System Owner and is not responsible for any action or inaction on the part of the Affected System Operator and/or Affected System Owner. The Affected System Operator and/or Affected System Owner are not parties to this Agreement even though the Company may incorporate some Affected System Operator and/or Affected System Owner requirements herein. The Company disclaims any and all responsibility and liability in connection with any ASO Studies and Affected System modifications and the Interconnecting Customer hereby waives recourse against and releases the Company, its directors, officers, employees and agents from any and all losses, penalties, claims, demands, fees, damages or other liabilities arising from or attributable to, either directly or indirectly, such ASO Studies and/or Affected System modifications.

14. Amendments and Modifications. No amendment or modification of this Agreement shall be binding unless in writing and duly executed by both Parties.

15. Permits and Approvals. Interconnecting Customer shall obtain all environmental and other permits lawfully required by governmental authorities for the construction and operation of the Facility. Prior to the construction of System Modifications the Interconnecting Customer will notify the Company that it has initiated the permitting process. Prior to the commercial operation of the Facility the Interconnecting Customer will notify the Company that it has obtained all permits necessary. Upon request the Interconnecting Customer shall provide copies of one or more of the necessary permits to the Company.

16. Force Majeure. For purposes of this Agreement, "Force Majeure Event" means any event:

    a) that is beyond the reasonable control of the affected Party; and

    b) that the affected Party is unable to prevent or provide against by exercising commercially reasonable efforts, including the following events or circumstances, but only to the extent they satisfy the preceding requirements: acts of war or terrorism, public disorder, insurrection, or rebellion; floods, hurricanes, earthquakes, lightning, storms, and other natural calamities; explosions or fire; strikes, work stoppages, or labor disputes; embargoes; and sabotage. If a Force Majeure Event prevents a Party from fulfilling any obligations under this Agreement, such Party will promptly notify the other Party in writing, and will keep the other Party informed on a continuing basis of the scope and duration of the Force Majeure Event. The affected Party will specify in reasonable detail the circumstances of the Force Majeure Event, its expected duration, and the steps that the affected Party is taking to mitigate the effects of the event on its performance. The affected Party will be entitled to suspend or modify its performance of obligations under this Agreement, other than the obligation to make payments then due or becoming due under this Agreement, but only to the extent that the effect of the Force Majeure Event cannot be mitigated by the use of reasonable efforts. The affected Party will use reasonable efforts to resume its performance as soon as possible. In no event, will the unavailability or inability to obtain funds constitute a Force Majeure Event.

17. Notices.

17.1. Any written notice, demand, or request required or authorized in connection with this Agreement ("Notice") shall be deemed properly given on the date actually delivered in person or five (5) Business Days after being sent by certified mail, e-mail or fax with confirmation of receipt to the person specified below:

If to Company:	Name: **Eversource** Attention: **247 Station Dr, SW340** **Westwood MA 02090-9230** Email: melanie.khederian@eversource.com
If to Interconnecting Customer:	Name: NextGrid Pecan, LLC Attention: Eko McHugh Address: PO Box 73069 #7775 City: San Francisco, CA, 94120 Phone: (559) 731-4645 Email: eko@nextgrid.com

17.2. A Party may change its address for Notices at any time by providing the other Party Notice of the change in accordance with Section 17.1.

17.3. The Parties may also designate operating representatives to conduct the daily communications, which may be necessary or convenient for the administration of this Agreement. Such designations, including names, addresses, email addresses, and phone numbers may be communicated or revised by one Party's Notice to the other.

18 Default and Remedies.

18.1. Defaults. Any one of the following shall constitute "An Event of Default."

i. One of the Parties shall fail to pay any undisputed bill for charges incurred under this Agreement or other amounts which one Party owes the other Party as and when due, and such failure shall continue for a period of thirty (30) days after written notice of nonpayment from the affected Party to the defaulting Party, or

ii. One of the Parties fails to comply with any other provision of this Agreement or breaches any representation or warranty in any material respect and fails to cure or remedy that default or breach within sixty (60) days after notice and written demand by the affected Party to cure the same or such longer period reasonably required to cure (not to exceed an additional 90 days unless otherwise mutually agreed upon), provided that the defaulting Party diligently continues to cure until such failure is fully cured.Supercedence. In the event of a conflict between this Agreement, the Interconnection Tariff, or the terms of any other tariff, Exhibit or Attachment incorporated by reference, the terms of the Interconnection Tariff, as the same may be amended from time to time, shall control. In the event that the Company files a revised tariff related to interconnection for Department approval after the effective date of this Agreement, the Company shall, not later than the date of such filing, notify the signatories of this Agreement and provide them a copy of said filing.

18.2. Remedies. Upon the occurrence of an Event of Default, the affected Party may at its option, in addition to any remedies available under any other provision herein, do any, or any combination, as appropriate, of the following:

a) Continue to perform and enforce this Agreement;
b) Recover damages from the defaulting Party except as limited by this Agreement;
c) By written notice to the defaulting Party terminate this Agreement;
d) Pursue any other remedies it may have under this Agreement or under applicable law or in equity.

19. Entire Agreement. This Agreement, including any attachments or appendices, is entered into pursuant to the Interconnection Tariff. Together the Agreement and the Interconnection Tariff represent the entire understanding between the Parties, their agents, and employees as to the subject matter of this Agreement. Each Party also represents that in entering into this Agreement, it has not relied on any promise, inducement, representation, warranty, agreement or other statement not set forth in this Agreement or in the Company's Interconnection Tariff.

20. Supercedence. In the event of a conflict between this Agreement, the Interconnection Tariff, or the terms of any other tariff, Exhibit or Attachment incorporated by reference, the terms of the Interconnection Tariff, as the same may be amended from time to time, shall control. In the event that the Company files a revised tariff related to interconnection for Department approval after the effective date of this Agreement, the Company shall, not later than the date of such filing, notify the signatories of this Agreement and provide them a copy of said filing.

21. Governing Law. This Agreement shall be interpreted, governed, and construed under the laws of the Commonwealth of Massachusetts without giving effect to choice of law provisions that might apply to the law of a different jurisdiction.

22. Non-waiver. None of the provisions of this Agreement shall be considered waived by a Party unless such waiver is given in writing. The failure of a Party to insist in any one or more instances upon strict performance of any of the provisions of this Agreement or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provisions or the relinquishment of any such rights for the future, but the same shall continue and remain in full force and effect.

23 Counterparts. This Agreement may be signed in counterparts.

24 No Third Party Beneficiaries. This Agreement is made solely for the benefit of the Parties hereto. Nothing in the Agreement shall be construed to create any rights in or duty to, or standard of care with respect to, or any liability to, any person not a party to this Agreement.

25 Dispute Resolution. Unless otherwise agreed by the Parties, all disputes arising under this Agreement shall be resolved pursuant to the Dispute Resolution Process set forth in the Interconnection Tariff.

26 Severability. If any clause, provision, or section of this Agreement is ruled invalid by any court of competent jurisdiction, the invalidity of such clause, provision, or section, shall not affect any of the remaining provisions herein.

27 Signatures.

IN WITNESS WHEREOF, the Parties hereto have caused two (2) originals of this Agreement to be executed under seal by their duly authorized representatives.

Interconnecting Customer		Company	
By:	Eko McHugh	By:	Zach Tedford
Name:	Eko McHugh	Name:	Zach Tedford
Title:	IX Coordinator	Title:	Account Executive
Date:	7/30/24	Date:	07-02-2024

The following attachments will be included as appropriate for each specific Interconnection Service Agreement:

Attachment 1:

Description of Facilities, including demarcation of Point of Common Coupling

Refer the Design Document & One-Line Diagram on the Power Clerk Portal under the attachment

In the event that a one-line does not meet Eversource Standards for Distribution, Metering or Control and Protection the Eversource Standards will still be required in all cases.

Attachment 2:

Description of System Modifications

The interconnection of this distributed generation application is queued behind other applicants which may require system upgrades to the Eversource system, and the cost for those upgrades has been included as a requirement in their respective Interconnection Services Agreement(s). If a prior applicant should dequeue or withdraw for any reason, the system conditions permitting the interconnection of succeeding applicant(s) may change. Upon the withdrawal of previously queued applicants, succeeding applicant(s) may become responsible some or all of the system upgrades that were required for the prior applicants, and Eversource may have to reassess system conditions to determine if the applicant currently under study would trigger the same upgrades

If you are planning to participate in the Net Metering Program three configurations pursuant to which paired systems are eligible to participate in the net metering program:

(1) the ESS charges only from the net metering facility and cannot export
(2) the ESS charges only from the net metering facility and can export
(3) the ESS charges either from the grid or the net metering facility and cannot export

The Department also sets forth certain other requirements related to the eligibility of paired systems to net meter and a process through which the host customer of a paired system must self-certify compliance with all net metering rules and regulations. Including inadvertent export which is defined as "the unscheduled and uncompensated export of real power from a generating facility for a limited duration, not to exceed 30 seconds."

For SMART Metering Work Orders:

SMART Metering and Wiring Installation Guidelines to be Adhered to:

https://www.eversource.com/content/docs/default-source/builders-contractors/eversource-smart-metering-wiring-guidelines.pdf?sfvrsn=2043df62_4

All metering must comply with Eversource Bluebook Standards, specifically regarding hot sequence and cold sequence.

The following distribution upgrades are currently required for this DG Interconnection Application:

COST ESTIMATE				
	Material	Labor	Outside Services	Total
Off Site - Distribution System Upgrade	$202,200	$364,600	$285,300	$852,100
On Site Interconnection Work- Pole Top Regulator Three (3), Recloser Two (2), Three Phase Disconnects six (6), Tree Trimming Four (4) Sections	$105,286	$254,203	$0	$359,489
Tax Adder 15.4%	$46,123	$92,820	$42,795	$181,738
Total	$353,609	$711,623	$328,095	$1,393,327

Conditions to ISA:

- Can't charge from grid
- RTAC
- Not allowed to operate under microgrid conditions, DTT is required
- Enable SPOV set to 1.4 p.u to trip within 1 ms
- The DG facility is not allowed to operate under N-1 contingency (Loss of transmission line or transformer) and must be tripped offline via a DTT scheme.

The following transmission upgrades are currently required for this DG Interconnection Application:

The Level 3 Affected System Operator (ASO) Study of Southeast Massachusetts (SEMA) and Cape completed in August 2021 identified Affected System upgrades. Specifically, the 115 kV 191 line between the Auburn Street station and the Kingston station must be reconductored no later than 2025 to avoid thermal overloads. The Level 3 ASO Study of SEMA and Cape completed in September 2023 included the 191 line upgrade in service as a known upgrade necessary to effectuate the interconnection of the Facility. The interconnection and operation of the Facility beyond 2025 depends on the completion of the 191 line upgrade. In accordance with Section 7 of this Agreement, the Facility may be subject to temporary disconnection and/or curtailment prior to the completion of the 191 line reconductoring, as deemed necessary by Eversource and in Eversource's sole discretion.

Attachment 3

Cost of System Modifications and Payment Terms

The **Eversource** cost summary is shown below:

Distribution System Modifications

Project Cost / Fees: Project Work Order Number **HISTEX-69847**

The enclosed total cost of **$1,393,327.00 (+/- 25%)** regarding Project Work Order Number **HISTEX-69847**, must all be paid in full to move the project forward into construction. This total estimated cost (+/- 25%) may be adjusted if Interconnecting Customer or such Interconnecting Customer's successor(s) in interest requires a change to the Design Document and/or One-Line Diagram in the possession of Eversource as of the date of this Interconnection Service Agreement.

Eversource and the Applicant will mutually agree upon a construction schedule which will take be required to consider inclement weather and customer outages for completion. This will be established upon the **Eversource** construction final design. Note: For customers with multiple projects, **Eversource** will require a priority listing of those projects and timeframe for completion to sufficiently order materials and to determine the projected construction schedule.

The following check off items will be required, prior to commencement of final design for system modifications and construction:

- Payment in full prior to beginning of any construction work by Eversource
- Final site plan, alter survey and final ISD must be completed before final design
- Approved final electrical wiring inspection – 1-888-633-3797
- Approved final customer relay/protection settings for Recloser, if applicable
- Signed easement and/or rights documents, if applicable
- This cost is handled between customer/developer and Verizon. This is a separate cost from the estimate included in the Eversource ISA and will be paid to Verizon directly by the customer/developer during the post-ISA construction process.
- Signed agreements to operate within Eversource Right-of-Ways, if applicable
- All Required Closeout Documents per Checklist

Your Witness Test for Final Commissioning can then take place once you have completed the check-off steps as part of the Interconnection Agreement and that the facility is connected (energized) to Eversource's distribution system.

Please mail your payment, made payable to **Eversource** as shown below. Please reference the **Eversource** Electric Work Order **# HISTEX-69847** on the check. This cost is valid for Ninety (90) calendar days from the date of this letter. Note: the customer is responsible for all costs on private property.

Eversource
ATTN: DG Group, WO# HISTEX-69847
247 Station Dr, SW340
Westwood, MA 02090-9230

Affected System Operator (ASO) Transmission Upgrades

As detailed in Attachment 2 of this Agreement, interconnection of and continued safe operation of the Facility requires that the 115 kV 191 line between the Auburn Street station and the Kingston station must be reconductored no later than 2025 to avoid thermal overloads. As of the date of this Agreement, consistent with Eversource's position in D.P.U. 20-75, the Affected System Operator has indicated its intent to recover the costs of the 115 kV 191 line reconductoring project through the Local Network Service rate consistent with the broader benefits this project provides. In the event the Affected System Operator is unable to recover the costs of the 115 kV 191 line reconductoring through either Local Network Service or some other Massachusetts Department of Public Utilities-approved cost recovery means, the Interconnecting Customer will be responsible for the Facility's load ratio share of such costs. Affected System Operator costs are currently estimated under a non-binding good faith cost estimate of approximately $27,000,000, with a load ratio cost of approximately $114,762.00/MW. In accordance with Section 5.1 of this Agreement, the Interconnecting Customer shall be responsible for the actual Affected System Operator and/or Affected System Owner costs, including operation and maintenance costs, and any additional Company costs necessitated as a result of the Affected System Operator and/or Affected System Owner requirements not specified as of the date of this Agreement, none of which shall be subject to any cost caps or limitations. In the event Interconnecting Customer becomes responsible for any such Affected System Operator and/or Affected System Owner transmission upgrade costs, Eversource will provide Interconnecting Customer with full transmission costs when known and the Parties will incorporate such costs in an amended Agreement, consistent with the directives of the Department of Public Utilities in Distributed Generation Interconnection, D.P.U. 19-55-C (2020).

Attachment 4

Special Operating Requirements

General Clause:

The Customer acknowledges and agrees to certain operating constraints required by the Company so that its Facility does not adversely affect the Company's electric power system or the quality of power delivered by it.

General Off-unity power factor operation (for facilities of 500kW or greater):

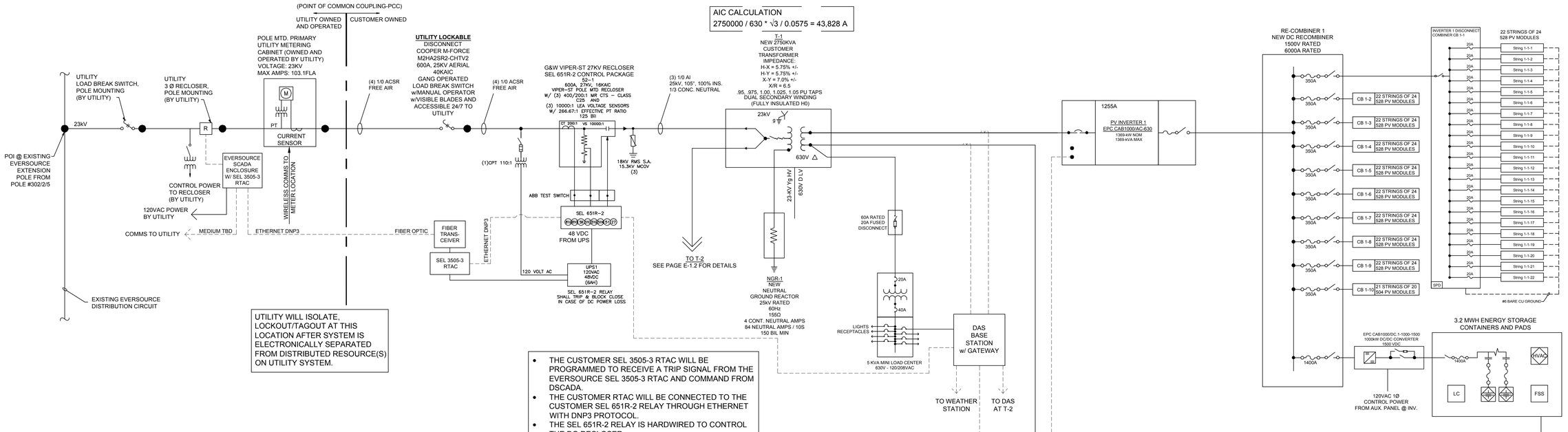
The Customer's Facility must be capable of operating at power factors within +/-0.95, and the Customer must adjust the Facility's control parameters to output at power factors within that range at the request of the Company in order to mitigate voltage deviations or other power quality phenomenon on the circuits that interconnect the Facility. Any such requests will be issued to the Customer in writing. The Company may consult with the Customer in order to determine a control methodology that will provide adequate mitigation that is consistent with the control capabilities of the Facility and are of least impact to the Customer; however, the requirements will ultimately be determined at the sole discretion of the Company. Should the Company determine that the Customer is operating its Facility contrary to this requirement; the Company will disconnect the Facility and will not allow re-connection until the Company is satisfied that the customer has implemented appropriate changes to its controls and/or settings to achieve the required performance.

Inverters must have adjustable power factor. The Company has the right to go back and request off unity output from the DG interconnection.

This facility will be tripped offline via an Eversource recloser when the normal electrical Feed is not in operation. This includes when the area is fed from another feeder which is not the normal electrical feed. The facility will not be allowed on-line until the normal electrical feed is restored to service.

SYSTEM SIZE = 6,366.6 kW DC
4,107.0 kW AC NOM.
4,107.0 kW AC MAX.
2,400 kW / 9,600 kWH DC-COUPLED BESS

(15,720) CANADIAN SOLAR CS1U-405MS 405W MODULES
(3) EPS CAB1000/AC-630
(3) EPC CAB1000/DC.1-1000-1500 DC-DC CONVERTERS



AIC CALCULATION
2750000 / 630 * √3 / 0.0575 = 43,828 A

UTILITY WILL ISOLATE, LOCKOUT/TAGOUT AT THIS LOCATION AFTER SYSTEM IS ELECTRONICALLY SEPARATED FROM DISTRIBUTED RESOURCE(S) ON UTILITY SYSTEM.

- THE CUSTOMER SEL 3505-3 RTAC WILL BE PROGRAMMED TO RECEIVE A TRIP SIGNAL FROM THE EVERSOURCE SEL 3505-3 RTAC AND COMMAND FROM DSCADA.
- THE CUSTOMER RTAC WILL BE CONNECTED TO THE CUSTOMER SEL 651R-2 RELAY THROUGH ETHERNET WITH DNP3 PROTOCOL.
- THE SEL 651R-2 RELAY IS HARDWIRED TO CONTROL THE DG RECLOSER.
- ENTIRE LOGIC MUST BE IMPLEMENTED IN CUSTOMER RTAC.
- ALL INTERCONNECTION REQUIREMENTS (SUCH AS MIN/MAX IMPORT/EXPORT LIMITS) TO BE PROGRAMMED WITH LOGIC INSIDE CUSTOMER RTAC.
- THE EVERSOURCE RTAC WILL HAVE PERMISSIONS TO TRIP RECLOSER THROUGH THE CUSTOMER RTAC AND RELAY. RECLOSER STATUS AND ALARMS WILL BE PROVIDED TO THE EVERSOURCE RTAC AND TRANSMITTED TO DSCADA.
- IN CASE OF COMMUNICATION OFFLINE, RECLOSER SHOULD BE TRIPPED OFF. CUSTOMER RTAC MUST ISSUE A DELAYED TRIP DUE TO THE FOLLOWING SITUATIONS:
  1. EVERSOURCE RTAC TO CUSTOMER RTAC COMMUNICATION HAS FAILED, OR EVERSOURCE RTAC IS OFFLINE (AFTER 5 MINUTES)
  2. EVERSOURCE RTAC TO DSCADA COMM HAS FAILED. (AFTER 10 MINUTES)
  3. THE SEL RELAY MUST TRIP THE RECLOSER IF IT LOSES COMMUNICATION WITH RTAC (AFTER 1 MINUTE)

EXPORT WILL BE LIMITED TO THE MAXIMUM INVERTER OUTPUT OF 4,107 KW/KVA. IMPORT WILL BE LIMITED TO 25 KW/KVA TO ALLOW FOR MISCELLANEOUS PARASITIC AUXILIARY LOADS. THESE LIMITS WILL BE PROGRAMMED INTO THE CUSTOMER RTAC.

79 ELEMENT IS A 5-MINUTE HEALTHY GRID RECONNECTION FEATURE WITH SYNCH

PROTECTIVE RELAY SETTINGS

SEL 651-2 Protective Relay Setting

CONTROLLER PROTECTIVE FUNCTIONS	TRIP OUTPUT	VOLTAGE SETTING PU	VOLTAGE SETTING (RELAY)	RELAY CLEARING TIME (sec)	RELAY CLEARING TIME (cycle)	TOTAL CLEARING TIME (sec)	TOTAL CLEARING TIME (cycle)		
27P1P - UNDERVOLTAGE	X	0.50	24.9 V (L-N)	1.05	63	1.1	66		
27P2P - UNDERVOLTAGE	X	0.88	43.82 V (L-N)	2.95	177	3	180		
59P1P - OVERVOLTAGE	X	1.10	54.78 V (L-N)	1.95	117	2	120		
59P2P - OVERVOLTAGE	X	1.20	59.76 V (L-N)	0.11	6.6	0.16	9.6		
59N1P - 3V0	X	0.87	43.32 V (L-N)	1.95	117	2	120		
79 - MIN RECLOSE VOLTAGE		0.95	47.4 V (L-N)	299.95	17997	300	18000		
79 - MAX RECLOSE VOLTAGE		1.05	52.2 V (L-N)	299.95	17997	300	18000		
CONTROLLER PROTECTIVE FUNCTIONS	TRIP OUTPUT		FREQUENCY SETTING	RELAY CLEARING TIME (sec)	RELAY CLEARING TIME (cycle)	TOTAL CLEARING TIME (sec)	TOTAL CLEARING TIME (cycle)		
81U-1 - UNDERFREQUENCY	X		56.5 Hz	0.11	6.6	0.16	9.6		
81U-2 - UNDERFREQUENCY	X		58.5 Hz	299.95	17997	300	18000		
81O-1 - OVERFREQUENCY	X		61.2 Hz	299.95	17997	300	18000		
81O-2 - OVERFREQUENCY	X		62 Hz	0.11	6.6	0.16	9.6		
79 - MIN RECLOSE FREQUENCY			59.5 Hz	299.95	17997	300	18000		
79 - MAX RECLOSE FREQUENCY			60.5 Hz	299.95	17997	300	18000		
CONTROLLER PROTECTIVE FUNCTIONS	TRIP OUTPUT					CLEARING TIME (sec)		CURRENT SETTING (RELAY)	CURRENT SETTING (PRIMARY)
51P - PHASE OVER CURRENT	X					U4 / T.D. 2.0		0.64 A	128.87 A
51G - GROUND OVER CURRENT	X					U4 / T.D. 1.5		0.26 A	51.55 A
ALARM	X								
PRIMARY BASE VOLTAGE	13279 V L-N	23000 V L-L	SECONDARY BASE VOLTAGE				49.8 V L-N	86.2 V L-L	266.67:1 PT RATIO
PRIMARY BASE FLA CURRENT	103.1 A		SECONDARY BASE FLA CURRENT				0.52 A		200:1 CT RATIO
RELAY/RECLOSER CLEARING TIME	CLEARING TIME IS .05 SECONDS, OR 3 CYCLES. TOTAL VALUES REFLECT SETTING + CLEARING TIME								
RTAC REMOTE COMMAND	RELAY SHALL BE PROGRAMMED TO ACCEPT TRIP AND CLOSE COMMANDS FROM CUSTOMER SEL 3505-3 RTAC. RELAY WILL TRIP BREAKER UPON RECEIVING TRIP COMMAND FROM RTAC AND BLOCK CLOSE. RTAC WILL NEVER ISSUE A CLOSE COMMAND.								
79 - RECLOSE/UTILITY RESTORATION DETECTION	RELAY SHALL BE SET TO 5 MIN OPEN INTERVAL TIMER. AT THE END OF TIMER RELAY WILL ATTEMPT TO CLOSE IF TRIP CONDITION IS CLEARED, LINE VOLTAGE FOR ALL PHASES IS BETWEEN .95 PU & 1.05 PU L-N, & FREQUENCY IS BETWEEN 59.5Hz & 60.5Hz FOR 5 MINUTES. INVERTERS HAVE ADDITIONAL 5 MINUTE TIMER, TOTAL RESTORATION TIME = 10 MINUTES WHEN ALL CONDITIONS ARE MET. FAILURE TO RECLOSE AFTER A 4 HOUR SENSING PERIOD WILL LOCKOUT RECLOSING.								
RELAY FAILURE PROTECTION	NORMALLY CLOSED ALARM OUTPUT CONTACT IS WIRED IN PARALLEL WITH TRIP OUTPUT CONTACT. IN THE EVENT OF HARDWARE FAILURE OR LOSS OF DC POWER, THE ALARM OUTPUT WILL DE-ENERGIZE AND RETURN CONTACT TO ITS NORMALLY CLOSED STATE. A DIODE AND CAPACITOR IN THE TRIPPING CIRCUIT STORE THE ENERGY REQUIRED TO TRIP THE FAULT INTERRUPTER.								

INVERTER 1
PV Modules = 405 Watts STC
5,256 Modules per Inverter = 2,128,680 watts DC STC
219 Strings of 24 PV Modules per Inverter
w/ 800 kW / 3,200 kWH DC-Coupled Storage

INVERTERS 2-3
PV Modules = 405 Watts STC
5,232 Modules per Inverter = 2,118,960 watts DC STC
218 Strings of 24 PV Modules per Inverter
w/ 800 kW / 3,200 kWH DC-Coupled Storage

Inverter Protective Settings ISO-NE SRD Table I

INTERNAL PROTECTIVE FUNCTIONS	TRIP OUTPUT	SETTING	CLEARING TIME (sec)
81U-1 - UNDERFREQUENCY	X	56.5 Hz	0.16
81U-2 - UNDERFREQUENCY	X	58.5 Hz	300
81O-1 - OVERFREQUENCY	X	61.2 Hz	300
81O-2 - OVERFREQUENCY	X	62 Hz	0.16

Inverter Protective Settings ISO-NE SRD Table IV

INTERNAL PROTECTIVE FUNCTIONS	TRIP OUTPUT	VOLTAGE SETTING PU	SETTING	CLEARING TIME (sec)
27-1 - UNDERVOLTAGE	X	0.50	315 V	1.1
27-2 - UNDERVOLTAGE	X	0.88	554.4 V	3
59-1 - OVERVOLTAGE	X	1.10	693 V	2
59-2 - OVERVOLTAGE	X	1.20	756 V	0.16
PRIMARY VOLTAGE (L-L)	0.63	kV	630	V

Inverter Frequency Ride-Through Settings ISO-NE SRD Table II

OPERATING MODE / RESPONSE	FREQUENCY RANGE (Hz)	MIN. RIDE-THROUGH TIME (sec)
N/A	f > 62.0	N/A
MANDATORY OPERATION	61.2 < f ≤ 61.8	299
CONTINUOUS OPERATION	58.8 ≤ f ≤ 61.2	Infinite
MANDATORY OPERATION	57.0 ≤ f < 58.8	299
N/A	f < 57.0	N/A

Inverter Voltage Ride-Through Settings ISO-NE SRD Table V

OPERATING MODE / RESPONSE	VOLTAGE SETTING PU RANGE	SETTING (MIN.)	SETTING (MAX.)	MIN. RIDE-THROUGH TIME (sec)	MAX. RESPONSE TIME (sec)
CEASE TO ENERGIZE	V > 1.2	N/A	756.1 V	N/A	0.16
MOMENTARY CESSATION	1.10 < V ≤ 1.2	693 V	756 V	2	0.083
CONTINUOUS OPERATION	0.88 ≤ V ≤ 1.10	554.4 V	693 V	INFINITE	N/A
MANDATORY OPERATION	0.5 ≤ V < 0.88	315 V	554.4 V	3	N/A
MOMENTARY CESSATION	V < 0.5	314.9 V	N/A	1.1	0.083

ELECTRICAL - LINE DIAGRAM

ARC DESIGN
409 NORTH MAIN STREET
ELMER, NJ 08318
(856) 712-2166 FAX: (856) 358-1511

PREPARED FOR:
NextGrid
PO BOX 7775 #73069
SAN FRANCISCO, CA 94120

PROPOSED PHOTOVOLTAIC ARRAY
2 SANDPIT ROAD SOLAR
2 SANDPIT ROAD
TRURO, MA 02652

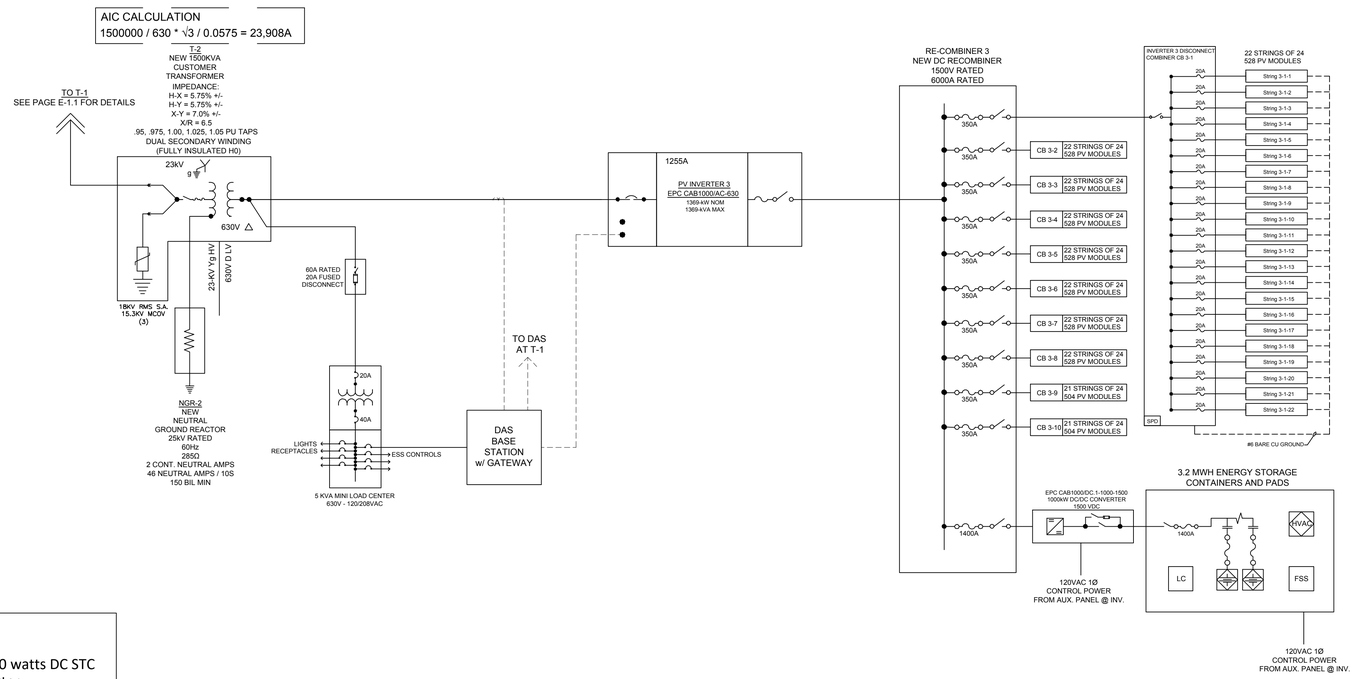
JAMES A. CLANCY
MA PE (PROFESSIONAL) #46775
COMMONWEALTH OF MASSACHUSETTS JAMES A. CLANCY No. 46775 REGISTERED PROFESSIONAL ENGINEER

REVISIONS

DATE	COMMENT
03-03-22	INFO FOR DYNAMIC STUDY
03-10-22	ADD 79 ELEMENT NOTE
09-02-22	NEUTRAL GND REACTORS
02-23-24	ADD UTILITY RQD. RTAC
04-24-24	IMPORT/EXPORT LIMITS
06-11-24	UPDATE ISO-NE TABLES

JOB #	
DRWN	RCA
CHKD	JAC
SCALE	AS NOTED
DATE	06-15-2020

E-1.1



INVERTER 1
PV Modules = 405 Watts STC 5,256 Modules per Inverter = 2,128,680 watts DC STC 219 Strings of 24 PV Modules per Inverter w/ 800 kW / 3,200 kWH DC-Coupled Storage
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2 SANDPIT ROAD SOLAR

2 SANDPIT ROAD
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JAMES A. CLANCY
MA PE REGISTRATION 46775

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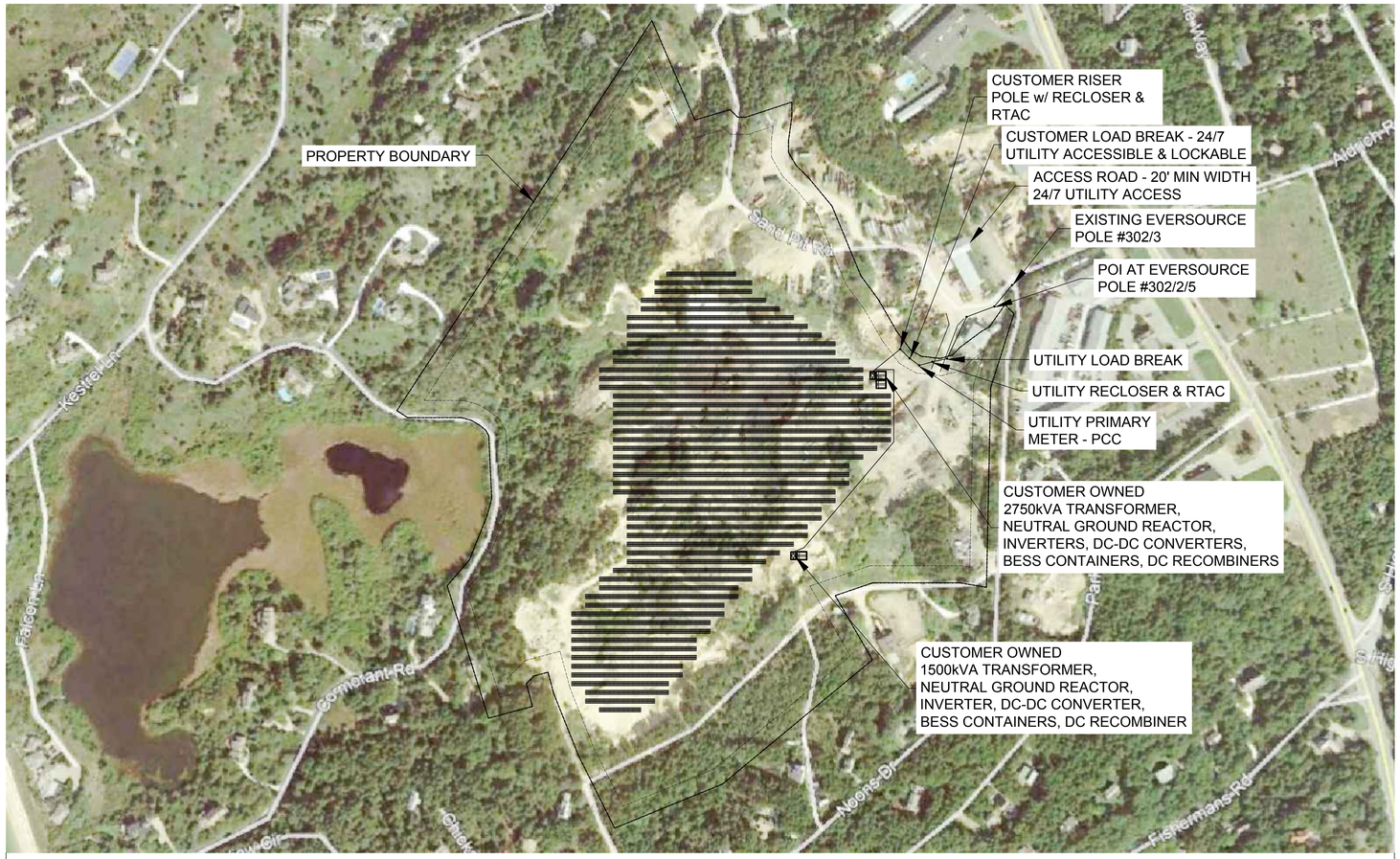
JOB #	
DRWN	RCA
CHKD	JAC
SCALE	AS NOTED
DATE	06-15-2020

ELECTRICAL - LINE DIAGRAM

E-1.2



LOCATION MAP:



SITE PLAN:

N

180° MODULE ORIENTATION
25° TILT

0 100 200 400

GRAPHIC SCALE IN FEET
1" = 200'-0"

2 SANDPIT ROAD SOLAR
6,575.4 - KW DC
4,107.0 - KW AC NOMINAL
4,107.0 - KW AC MAXIMUM
PHOTOVOLTAIC POWER SYSTEM
W/ 2,400kW / 9,600 kWH DC-COUPLED STORAGE

PROJECT DATA

INTEGRATOR:	NEXTGRID P.O. BOX 7775 #73069 SAN FRANCISCO, CA 94120
SITE:	2 SANDPIT ROAD TRURO, MA 02652
CODES:	NEC-2020 IBC-2015 9TH EDITION CMR 780
SOLAR ARRAY:	
MODULE:	ZNSHINE ZXM6-NHLDD144-450/M 14,612 MODULES
RACKING:	GROUND MOUNTED @ 25° TILT
INVERTER:	(3) EPC CAB1000/AC-630
DC STORAGE:	(3) EPC CAB1000/DC.1-1000-1500 DC-DC CONV. 9.6 MWH BATTERY STORAGE
DC OUTPUT:	6,575,400 W DC - STC
AC OUTPUT:	4,107,000 W AC

ASHRAE TEMPERATURE:

PROVINCETOWN AWOS			
ELEV.	HIGH TEMPERATURE		LOW TEMPERATURE
	0.4%	2% AVG.	EXTREME MINIMUM
2m	32°C	28°C	-14°C

ARRAY SIZE

GROUND ARRAY	6,575.4-kW DC	4,107-kW AC	14,612 MODULES	9,125,449 kWh/YR

PV WATTS CALCULATOR
LAT,LON 42.01, -70.06 WEATHER DATA
PREMIUM MODULE
9.68% SYSTEM LOSSES ASSUMED
FIXED TILT
98% INV EFFICIENCY

COVER SHEET

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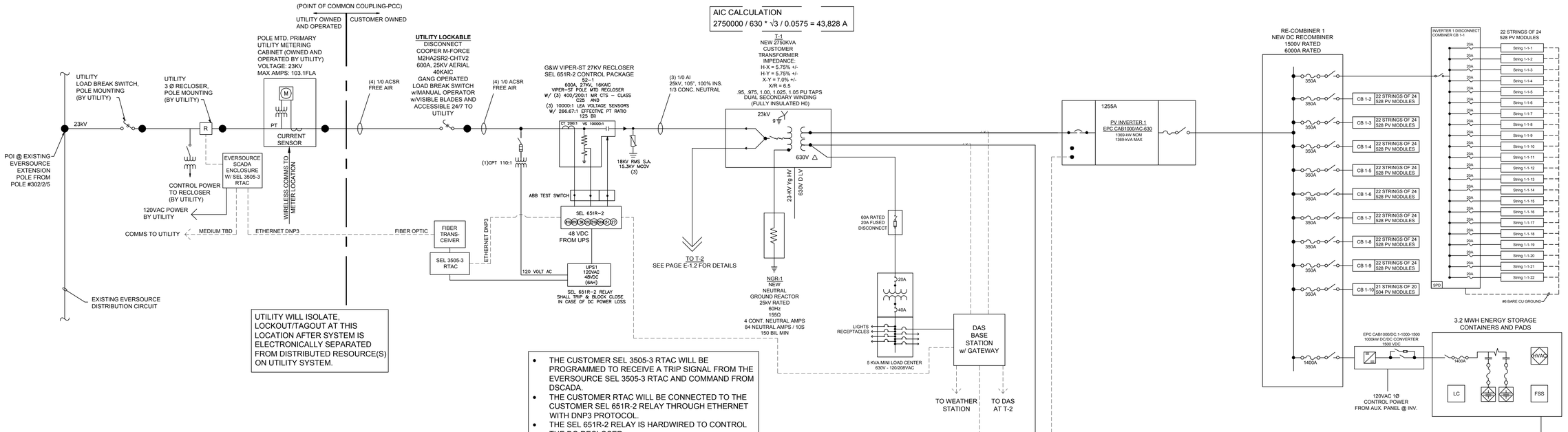
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JOB #	
DRWN	RCA
CHKD	JAC
SCALE	AS NOTED
DATE	06-15-2020

C-1

SYSTEM SIZE = 6,366.6 kW DC
4,107.0 kW AC NOM.
4,107.0 kW AC MAX.
2,400 kW / 9,600 kWH DC-COUPLED BESS

(15,720) CANADIAN SOLAR CS1U-405MS 405W MODULES
(3) EPS CAB1000/AC-630
(3) EPC CAB1000/DC.1-1000-1500 DC-DC CONVERTERS



AIC CALCULATION
2750000 / 630 * √3 / 0.0575 = 43,828 A

UTILITY WILL ISOLATE, LOCKOUT/TAGOUT AT THIS LOCATION AFTER SYSTEM IS ELECTRONICALLY SEPARATED FROM DISTRIBUTED RESOURCE(S) ON UTILITY SYSTEM.

- THE CUSTOMER SEL 3505-3 RTAC WILL BE PROGRAMMED TO RECEIVE A TRIP SIGNAL FROM THE EVERSOURCE SEL 3505-3 RTAC AND COMMAND FROM DSCADA.
- THE CUSTOMER RTAC WILL BE CONNECTED TO THE CUSTOMER SEL 651R-2 RELAY THROUGH ETHERNET WITH DNP3 PROTOCOL.
- THE SEL 651R-2 RELAY IS HARDWIRED TO CONTROL THE DG RECLOSER.
- ENTIRE LOGIC MUST BE IMPLEMENTED IN CUSTOMER RTAC.
- ALL INTERCONNECTION REQUIREMENTS (SUCH AS MIN/MAX IMPORT/EXPORT LIMITS) TO BE PROGRAMMED WITH LOGIC INSIDE CUSTOMER RTAC.
- THE EVERSOURCE RTAC WILL HAVE PERMISSIONS TO TRIP RECLOSER THROUGH THE CUSTOMER RTAC AND RELAY. RECLOSER STATUS AND ALARMS WILL BE PROVIDED TO THE EVERSOURCE RTAC AND TRANSMITTED TO DSCADA.
- IN CASE OF COMMUNICATION OFFLINE, RECLOSER SHOULD BE TRIPPED OFF. CUSTOMER RTAC MUST ISSUE A DELAYED TRIP DUE TO THE FOLLOWING SITUATIONS:
  1. EVERSOURCE RTAC TO CUSTOMER RTAC COMMUNICATION HAS FAILED, OR EVERSOURCE RTAC IS OFFLINE (AFTER 5 MINUTES)
  2. EVERSOURCE RTAC TO DSCADA COMM HAS FAILED. (AFTER 10 MINUTES)
  3. THE SEL RELAY MUST TRIP THE RECLOSER IF IT LOSES COMMUNICATION WITH RTAC (AFTER 1 MINUTE)

EXPORT WILL BE LIMITED TO THE MAXIMUM INVERTER OUTPUT OF 4,107 KW/KVA. IMPORT WILL BE LIMITED TO 25 KW/KVA TO ALLOW FOR MISCELLANEOUS PARASITIC AUXILIARY LOADS. THESE LIMITS WILL BE PROGRAMMED INTO THE CUSTOMER RTAC.

79 ELEMENT IS A 5-MINUTE HEALTHY GRID RECONNECTION FEATURE WITH SYNCH

PROTECTIVE RELAY SETTINGS

SEL 651-2 Protective Relay Setting

CONTROLLER PROTECTIVE FUNCTIONS	TRIP OUTPUT	VOLTAGE SETTING PU	VOLTAGE SETTING (RELAY)	RELAY CLEARING TIME (sec)	RELAY CLEARING TIME (cycle)	TOTAL CLEARING TIME (sec)	TOTAL CLEARING TIME (cycle)		
27P1P - UNDERVOLTAGE	X	0.50	24.9 V (L-N)	1.05	63	1.1	66		
27P2P - UNDERVOLTAGE	X	0.88	43.82 V (L-N)	2.95	177	3	180		
59P1P - OVERVOLTAGE	X	1.10	54.78 V (L-N)	1.95	117	2	120		
59P2P - OVERVOLTAGE	X	1.20	59.76 V (L-N)	0.11	6.6	0.16	9.6		
59N1P - 3V0	X	0.87	43.32 V (L-N)	1.95	117	2	120		
79 - MIN RECLOSE VOLTAGE		0.95	47.4 V (L-N)	299.95	17997	300	18000		
79 - MAX RECLOSE VOLTAGE		1.05	52.2 V (L-N)	299.95	17997	300	18000		
CONTROLLER PROTECTIVE FUNCTIONS	TRIP OUTPUT		FREQUENCY SETTING	RELAY CLEARING TIME (sec)	RELAY CLEARING TIME (cycle)	TOTAL CLEARING TIME (sec)	TOTAL CLEARING TIME (cycle)		
81U-1 - UNDERFREQUENCY	X		56.5 Hz	0.11	6.6	0.16	9.6		
81U-2 - UNDERFREQUENCY	X		58.5 Hz	299.95	17997	300	18000		
81O-1 - OVERFREQUENCY	X		61.2 Hz	299.95	17997	300	18000		
81O-2 - OVERFREQUENCY	X		62 Hz	0.11	6.6	0.16	9.6		
79 - MIN RECLOSE FREQUENCY			59.5 Hz	299.95	17997	300	18000		
79 - MAX RECLOSE FREQUENCY			60.5 Hz	299.95	17997	300	18000		
CONTROLLER PROTECTIVE FUNCTIONS	TRIP OUTPUT					CLEARING TIME (sec)		CURRENT SETTING (RELAY)	CURRENT SETTING (PRIMARY)
51P - PHASE OVER CURRENT	X					U4 / T.D. 2.0		0.64 A	128.87 A
51G - GROUND OVER CURRENT	X					U4 / T.D. 1.5		0.26 A	51.55 A
ALARM	X								
PRIMARY BASE VOLTAGE	13279 V L-N	23000 V L-L	SECONDARY BASE VOLTAGE				49.8 V L-N	86.2 V L-L	266.67:1 PT RATIO
PRIMARY BASE FLA CURRENT	103.1 A		SECONDARY BASE FLA CURRENT				0.52 A		200:1 CT RATIO
RELAY/RECLOSER CLEARING TIME	CLEARING TIME IS .05 SECONDS, OR 3 CYCLES. TOTAL VALUES REFLECT SETTING + CLEARING TIME								
RTAC REMOTE COMMAND	RELAY SHALL BE PROGRAMMED TO ACCEPT TRIP AND CLOSE COMMANDS FROM CUSTOMER SEL 3505-3 RTAC. RELAY WILL TRIP BREAKER UPON RECEIVING TRIP COMMAND FROM RTAC AND BLOCK CLOSE. RTAC WILL NEVER ISSUE A CLOSE COMMAND.								
79 - RECLOSE/UTILITY RESTORATION DETECTION	RELAY SHALL BE SET TO 5 MIN OPEN INTERVAL TIMER. AT THE END OF TIMER RELAY WILL ATTEMPT TO CLOSE IF TRIP CONDITION IS CLEARED, LINE VOLTAGE FOR ALL PHASES IS BETWEEN .95 PU & 1.05 PU L-N, & FREQUENCY IS BETWEEN 59.5Hz & 60.5Hz FOR 5 MINUTES. INVERTERS HAVE ADDITIONAL 5 MINUTE TIMER, TOTAL RESTORATION TIME = 10 MINUTES WHEN ALL CONDITIONS ARE MET. FAILURE TO RECLOSE AFTER A 4 HOUR SENSING PERIOD WILL LOCKOUT RECLOSING.								
RELAY FAILURE PROTECTION	NORMALLY CLOSED ALARM OUTPUT CONTACT IS WIRED IN PARALLEL WITH TRIP OUTPUT CONTACT. IN THE EVENT OF HARDWARE FAILURE OR LOSS OF DC POWER, THE ALARM OUTPUT WILL DE-ENERGIZE AND RETURN CONTACT TO ITS NORMALLY CLOSED STATE. A DIODE AND CAPACITOR IN THE TRIPPING CIRCUIT STORE THE ENERGY REQUIRED TO TRIP THE FAULT INTERRUPTER.								

INVERTER 1
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219 Strings of 24 PV Modules per Inverter
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INVERTERS 2-3
PV Modules = 405 Watts STC
5,232 Modules per Inverter = 2,118,960 watts DC STC
218 Strings of 24 PV Modules per Inverter
w/ 800 kW / 3,200 kWH DC-Coupled Storage

Inverter Protective Settings ISO-NE SRD Table I

INTERNAL PROTECTIVE FUNCTIONS	TRIP OUTPUT	SETTING	CLEARING TIME (sec)
81U-1 - UNDERFREQUENCY	X	56.5 Hz	0.16
81U-2 - UNDERFREQUENCY	X	58.5 Hz	300
81O-1 - OVERFREQUENCY	X	61.2 Hz	300
81O-2 - OVERFREQUENCY	X	62 Hz	0.16

Inverter Protective Settings ISO-NE SRD Table IV

INTERNAL PROTECTIVE FUNCTIONS	TRIP OUTPUT	VOLTAGE SETTING PU	SETTING	CLEARING TIME (sec)
27-1 - UNDERVOLTAGE	X	0.50	315 V	1.1
27-2 - UNDERVOLTAGE	X	0.88	554.4 V	3
59-1 - OVERVOLTAGE	X	1.10	693 V	2
59-2 - OVERVOLTAGE	X	1.20	756 V	0.16
PRIMARY VOLTAGE (L-L)	0.63	kV	630	V

Inverter Frequency Ride-Through Settings ISO-NE SRD Table II

OPERATING MODE / RESPONSE	FREQUENCY RANGE (Hz)	MIN. RIDE-THROUGH TIME (sec)
N/A	f > 62.0	N/A
MANDATORY OPERATION	61.2 < f ≤ 61.8	299
CONTINUOUS OPERATION	58.8 ≤ f ≤ 61.2	Infinite
MANDATORY OPERATION	57.0 ≤ f < 58.8	299
N/A	f < 57.0	N/A

Inverter Voltage Ride-Through Settings ISO-NE SRD Table V

OPERATING MODE / RESPONSE	VOLTAGE SETTING PU RANGE	SETTING (MIN.)	SETTING (MAX.)	MIN. RIDE-THROUGH TIME (sec)	MAX. RESPONSE TIME (sec)
CEASE TO ENERGIZE	V > 1.2	N/A	756.1 V	N/A	0.16
MOMENTARY CESSATION	1.10 < V ≤ 1.2	693 V	756 V	2	0.083
CONTINUOUS OPERATION	0.88 ≤ V ≤ 1.10	554.4 V	693 V	INFINITE	N/A
MANDATORY OPERATION	0.5 ≤ V < 0.88	315 V	554.4 V	3	N/A
MOMENTARY CESSATION	V < 0.5	314.9 V	N/A	1.1	0.083

ELECTRICAL - LINE DIAGRAM

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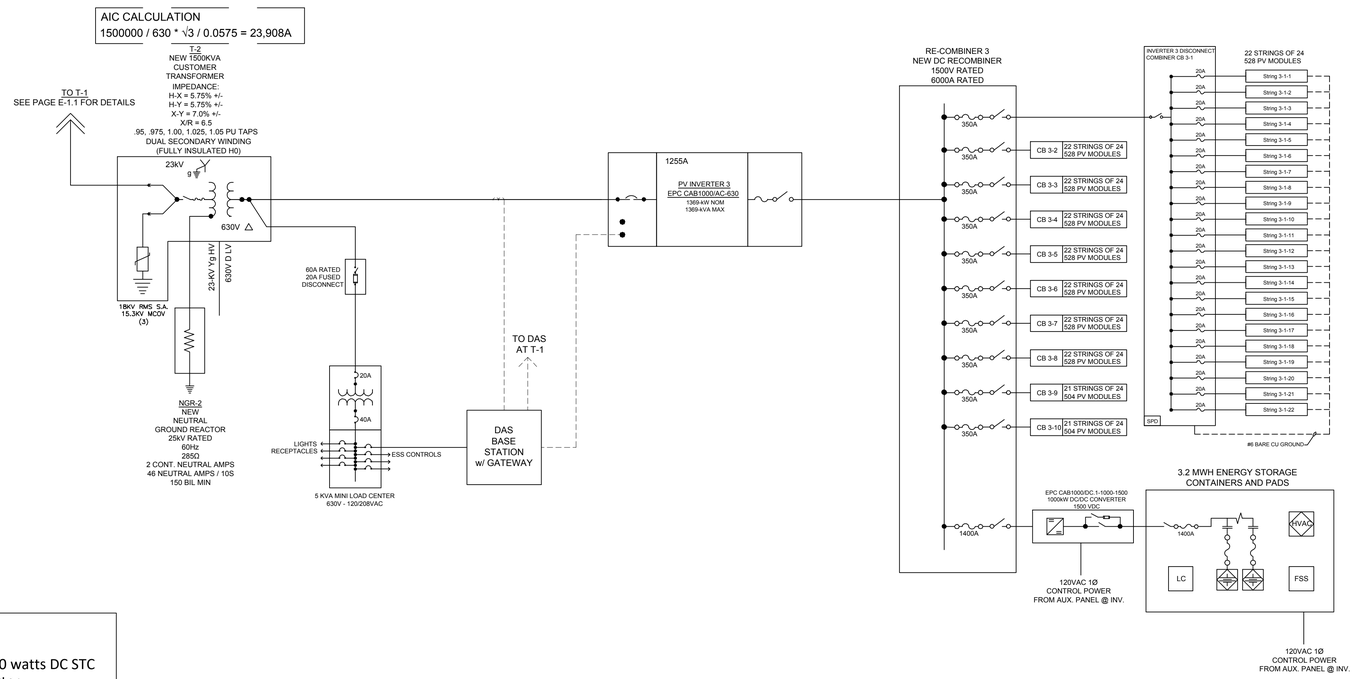
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E-1.1



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ELECTRICAL - LINE DIAGRAM

E-1.2

NEW

CanadianSolar

HiDM

HIGH DENSITY MONO PERC MODULE
400 W ~ 420 W
CS1U-400|405|410|415|420MS



MORE POWER

- UP TO 20.37% — Maximize the light absorption area, module efficiency up to 20.37 %
- 42°C — Low NMOT: 42 ± 3 °C; Low temperature coefficient (Pmax): -0.37 % / °C
- Better shading tolerance

MORE RELIABLE

- Lower internal current, lower hot spot temperature
- Cell crack risk limited in small region, enhance the module reliability
- Heavy snow load up to 5400 Pa, wind load up to 2400 Pa

25 years — **linear power output warranty**

10 years — **product warranty on materials and workmanship**

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001:2015 / Quality management system
ISO 14001:2015 / Standards for environmental management system
OHSAS 18001:2007 / International standards for occupational health & safety

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730: VDE / CE / CEC AU
UL 1703 / IEC 61215 performance: CEC listed (US) / FSEC (US Florida)
IEC61701 ED2: VDE / IEC62716: VDE
UL 1703: CSA / Take-e-way

* We can provide this product with special BOM specifically certified with salt mist, and ammonia tests. Please talk to our local technical sales representatives to get your customized solutions.

CANADIAN SOLAR INC. is committed to providing high quality solar products, solar system solutions and services to customers around the world. No. 1 module supplier for quality and performance/price ratio in IHS Module Customer Insight Survey. As a leading PV project developer and manufacturer of solar modules with over 30 GW deployed around the world since 2001.

CANADIAN SOLAR INC.
545 Speedvale Avenue West, Guelph, Ontario N1K 1E6, Canada, www.canadiansolar.com, support@canadiansolar.com

ENGINEERING DRAWING (mm)

Rear View



Frame Cross Section A-A



Mounting Hole



ELECTRICAL DATA | STC*

CS1U	400MS	405MS	410MS	415MS	420MS
Nominal Max. Power (Pmax)	400 W	405 W	410 W	415 W	420 W
Opt. Operating Voltage (Vmp)	44.1 V	44.3 V	44.5 V	44.7 V	44.9 V
Opt. Operating Current (Imp)	9.08 A	9.16 A	9.23 A	9.30 A	9.37 A
Open Circuit Voltage (Voc)	53.4 V	53.5 V	53.6 V	53.7 V	53.8 V
Short Circuit Current (Isc)	9.60 A	9.65 A	9.70 A	9.75 A	9.80 A
Module Efficiency	19.40%	19.65%	19.89%	20.13%	20.37%
Operating Temperature	-40°C ~ +85°C				
Max. System Voltage	1500V (IEC/UL) or 1000V (IEC/UL)				
Module Fire Performance	TYPE 1 (UL 1703) or CLASS C (IEC 61730)				
Max. Series Fuse Rating	20 A				
Application Classification	Class A				
Power Tolerance	0 ~ + 5 W				

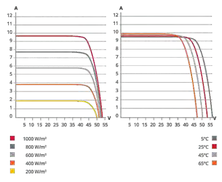
* Under Standard Test Conditions (STC) of irradiance of 1000 W/m2, spectrum AM 1.5 and cell temperature of 25°C.

ELECTRICAL DATA | NMOT*

CS1U	400MS	405MS	410MS	415MS	420MS
Nominal Max. Power (Pmax)	298 W	302 W	306 W	310 W	313 W
Opt. Operating Voltage (Vmp)	40.2 V	40.4 V	40.6 V	40.8 V	41.0 V
Opt. Operating Current (Imp)	7.42 A	7.47 A	7.53 A	7.59 A	7.65 A
Open Circuit Voltage (Voc)	50.2 V	50.3 V	50.4 V	50.5 V	50.6 V
Short Circuit Current (Isc)	7.74 A	7.78 A	7.82 A	7.86 A	7.90 A

* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m² spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

CS1U-405MS / I-V CURVES



MECHANICAL DATA

Specification	Data
Cell Type	Mono-crystalline
Dimensions	2078 × 992 × 35 mm (81.8 × 39.1 × 1.38 in)
Weight	23.4 kg (51.6 lbs)
Front Cover	3.2 mm tempered glass
Frame	Anodized aluminium alloy
J-Box	IP67, 4 bypass diodes
Cable	4.0 mm² (IEC), 12 AWG (UL)
Cable length (Including connector)	1000 mm (39.4 in) (+) and 640 mm (25.2 in) (-) *; leap-frog connection: 1780 mm (70.1 in)**
Connector	T4 series
Per Pallet	30 pieces
Per Container (40' HQ)	660 pieces

* Adjacent two modules (portrait: left and right modules, landscape: up and down modules) need to be rotated 180 degrees.
** Need to confirm with the tracker suppliers there are no mounting or operation risks when cables go across the tongue tube and bearing house.

TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.37 % / °C
Temperature Coefficient (Voc)	-0.29 % / °C
Temperature Coefficient (Isc)	0.05 % / °C
Nominal Module Operating Temperature	42±3 °C

PARTNER SECTION

The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. Canadian Solar Inc. reserves the right to make necessary adjustment to the information described herein at any time without further notice.
Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

CANADIAN SOLAR INC.
545 Speedvale Avenue West, Guelph, Ontario N1K 1E6, Canada, www.canadiansolar.com, support@canadiansolar.com

March 2019. All rights reserved, PV Module Product Datasheet V5.571_EN

CONNECTPV Simplifying Solar PV

1500V Disconnect Combiners

ConnectPV Disconnect Combiner products are based on a core product architecture optimized for commercial and utility scale solar projects, simplifying design and specification. Options and accessories allow the designer to optimize the products for each project – reducing installation labor costs.

ConnectPV products incorporate "best-in-class" components combined with rugged mechanical designs to maximize reliability over the projected life of the project.

Compatible with grounded systems - negatively or positively grounded with fuses on the ungrounded string input conductors, or ungrounded systems with fuses on both string input conductors.

Standard Product Features

- 250A, 320A, and 400A UL98B Certified Manual Disconnects
- Lock-Out/Tag-Out on Disconnect Handle
- 8-32 Fused Inputs, #14-#6 AWG Wire Range
- Touch Safe Fuse-holders
- 15A Fuse Typical, 30A Maximum – user specified
- M10 or M12 Studs provided for single or double hole lugs
- Accommodates 90C Cu/Al Mechanical or Compression Lugs
- Internal Safety Cover over all live components
- NEMA 3R, 4, and 4X Enclosures
- Padlock Latch for Door
- Unique Serial number per unit
- Labelling to meet NEC Requirements
- 5 Year Warranty



Product Options

- Class 2 40kA Surge Protective Device
- Mechanical Lugs Installed or Compression Lugs Included
- Breather Vents for High Humidity Locations
- H4 or MC4 Bulkhead or Whip Connectors Installed
- Upsized Enclosures for Larger Output Wires
- Mounting Brackets Installed
- Extended Warranty

ISO 9001:2008 COMPLIANT Certified Manufacturing

UL LISTED

MADE IN U.S.A.

Contact Toll Free: **(844)-246-6140**
Local: **(858) 246-6140**
www.connectpv.com
sales@connectpv.com
San Diego, CA
CBX15 Rev. 3.0

CONNECTPV Simplifying Solar PV

ConnectPV reduces electrical BOS project costs by simplifying:

Configuration
Design Engineers easily configure our products to meet the project's requirements - Simplifying design and specification

Installation
Field Installers quickly install our products because they provide ample wiring room *- Reducing installation time and labor cost*

Regulation
AHJ Inspectors quickly review and approve our products because we have designed for 100% compliance with the NEC and UL Standards *– Reducing project inspection and approval time*

Operation
O&M Personnel reduce field service time because our products use high quality componentsand are designed for a 20 year life expectancy *– Maximizing system revenue generation*

Typical Input Characteristics				Grounded Systems		Floating Systems	
Input Circuits	Standard Disconnect Ampacity	Input Wire Size	Output Type	NEMA 4 Steel (inches)	NEMA 4X Fiberglass (inches)	NEMA 4 Steel (inches)	NEMA 4X Fiberglass (inches)
16	250	#14-#4 AWG Copper	M10 Stud	24x24x8	24x24x8	24x30x8	24x30x8
20	250			24x24x8	24x24x8	24x30x8	24x30x8
24	320		M12 Stud	30x24x8	30x24x8	30x30x8	30x30x8*
28	400			30x30x8	36x30x8	36x36x8	36x36x8*
32	400			30x30x8	36x30x8	36x36x8	36x36x8*

** Painted Stainless Steel NEMA 4X*

High Ampacity Input Versions available: e.g., 12 input, 400A with 30A fuses

Standard Disconnects sized at 1.25x Sum(Isc) per UL1741.
Upsize Disconnect available at 1.56x Sum(Isc) for OCPD coordination.

Specifications Subject to Change

Model Numbers are derived from the following template: CBXVVT-####D(S)-FFAA-EE

VV Voltage	T Topology	### Disconnect Rating	FF String Count	AA Fuse Rating	EE Enclosure Type
15 = 1500V	G=Grounded F= Floating	250A, 320A,or 400A	08-32 2 string increments	02-30 15A Typical	N4 = Carbon Steel 4X = Fiberglass*

Additional Options and Accessories Available

Stainless Steel Available

ABOUT CONNECTPV INC.



Based in San Diego, CA, ConnectPV Inc. delivers expertise and experience. We bring over 10 years of Solar PV industry experience in electrical Balance of System products coupled with more than 25 years of high quality, ISO9001:2008 certified, manufacturing expertise. We actively work with our customers to deliver innovative, high quality, and cost effective solutions.

Contact Toll Free: **(844)-246-6140**
Local: **(858) 246-6140**
www.connectpv.com
sales@connectpv.com
San Diego, CA
CBX15 Rev. 3.0

CAB1000/AC

Up to 1500 VDC
Utility Grade Storage Inverter
Scalable from 1 to 6 MW



- **Return on Investment**
  - >98% max efficiency
  - Low shipping & installation cost
  - Modular 1-1.5 MW blocks
  - Monetizable dynamic performance
- **Modular / flexible configuration**
  - 1-1.5 MW blocks, up to 1500 VDC
  - Configurable up to 6 MW
  - Individual AC connections or combined throat
  - Able to mix storage, PV & DC-DC in a single lineup
- **Simple O&M**
  - Easily maintainable
  - Modular design with low component count
  - Extended warranty available
- **Easily Transportable**
  - Standard Freight = low transportation cost
  - Moveable with pallet jack or standard forklift
  - No crane required
  - Separable building blocks
- **Advanced Technology**
  - Parallel UPS functionality
  - Fully parameterizable grid support
  - Certified to standards: UL1741 / IEC
  - ZVRT / LVRT / 4-quadrant high bandwidth control

The CAB1000 scalable platform was specifically developed to offer a straightforward and simple solution to developers of Utility-grade energy storage systems. In ~1 MW blocks, the CAB1000 platform offers a single modular system which is tailored to Utility systems of all sizes. The scalable power conversion system also boasts high-performance controls and system redundancy.

With world-class power density and an easy to install design, your energy storage system will be commissioned quickly and easily. The energy storage PCS has never been more flexible or straightforward.

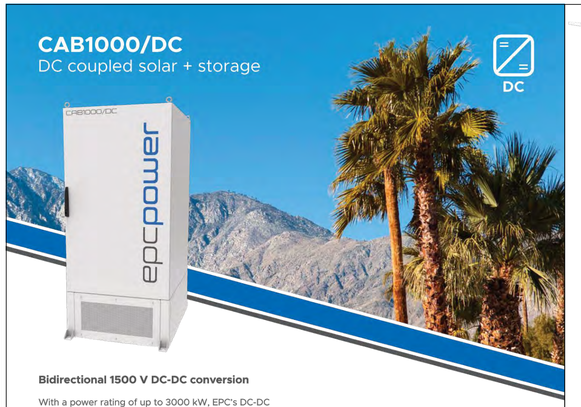
MODEL	50-100101	CAB1000/AC-3L.1 @ 630 VRMS		
Lineup Quantity		1	...	4
AC	AC configuration	3-wire (3P3W)	600 kcmil x 6	
	AC voltage range	630 VRMS +10% / -12%		
	AC export capacity (1) @ 40°C	1369 kVA | 1255 ARMS	...	5476 kVA | 5020 ARMS
	AC import capacity @ 40°C	913 kVA | 837 ARMS	...	3652 kVA | 3348 ARMS
	Export power overload capacity @ 40°C, starting from 66% full load.	1.6 MW for 3 sec, or 1.35 MW for 5 min.	...	6.4 MW for 3 sec, or 5.4 MW for 5 min.
	Minimum SC ratio (3)	2		
	Maximum fault current from sources AC | DC	100 kA (AC RMS) | 180 kA (DC, per input)		
	Nominal frequency range	50 - 60 Hz (configurable)		
	Harmonic distortion	UL1741 / IEEE 1547, <2% TDD at rated power per IEEE 519		
	Efficiency: Max | CEC | Euro	98.6% (est.) | >98% (est.) | >98% (est.)		
DC	DC voltage range (2)	891 - 1500 VDC		
	Typical battery voltage range	986 - 1350 VDC		
	Maximum DC current	1400 ADC	...	5600 ADC
	Number of DC inputs	1	...	4
Environmental	Ambient temperature (operation)	-20°C to 55°C (-40°C with Arctic option)		
	Ambient temperature (storage)	-40°C to 60°C		
	Protection degree	Outdoor: IP55 / NEMA 3R. Salt fog kit available for coastal sites.		
	Max elevation	2,000 m (6,500 ft.)		
	Airborne noise	<75 dBA @ 3m		
	Altitude derating	10% per 1,000m above 1000m elevation		
	Temperature de-rating	1.7% per degree °C from 40-55 °C		
Cabinet	Maximum dimensions (H x W x D)	mm: (2281 x 1000 x 1636) in.: (89.8 x 39.4 x 64.4)	...	mm: (2281 x 4915 x 1636) in.: (89.8 x 193.6 x 64.4)
	Weight (est.)	1043 kg (2300 lb.)	...	(4) x 1043 kg (4) x 2300 lb.)
	Mounting	Pad mount / skid mount		
	Cooling	Hybrid liquid / air		
Certifications (pending)	Safety	UL 1741 | C22.2 No. 107.1-16		
	Utility interconnect	UL 1741:2010 R2.18 (SA) | IEEE 1547.1-2005 | CA Rule 21 No. 16-06-052 | Hawaii Rule 14 No. 2014-0192		
Protections	AC disconnection	Motorized switch		
	DC disconnection	Motorized switch		
	AC fuses | DC fuses (optional)	2000 A, 200 kAIc (248A min) | 1890 A, 180 kAIc (208A min)		
	AC | DC surge protection (Type 2 optional)	Type 1 surge arrester | Class 1 surge arrester		
	Safety features	overvoltage, overcurrent, overtemperature (both instantaneous and time-overload), etc.		
	Ground fault detection (optional)	Bender / integrated		
Control	Control interface	CAN, Modbus TCP/IP		
	Command latency	1 ms (CAN), 3 ms (Modbus TCP)		
	Response time; (time to accomplish full power step)	2 ms; adjustable longer via parameters		
	On-off grid transitions (optional)	Yes | UPS mode available		
	Black-start capable (optional)	Yes; requires external control power		
	Grid-tied control modes	Voltage mode | PQ (power) | DQ (current) | cos phi (pf)		
	Grid-support functions	Active/Reactive control | Volt/VAR | Hz/Watt | Volt/Watt | LRVRT & LHFRT | ramp rate, etc.		
	Islanded control modes	V&f | droop control | Ok to parallel with other sources		
	Island overload avoidance	active inrush limiting for starting large loads		
	Control power voltage	208 - 240 VAC, 1 ph		
	Self-consumption; Max. | 66% load, 30C | 33% load, 30C [standby]	1500 W | 1100 W | 900 W (155 W)	...	6000 W | 4400 W | 3600 W (620 W)

(1) Power ratings at nominal line voltage; available power reduces in proportion to any AC voltage reduction from nominal.
(2) Minimum DC voltage is at nominal AC line voltage. Higher AC voltage raises min. DC voltage proportionally.
(3) Contact EPC for SC ratios below 2

EPC Power Corporation 70-100032 April 2020
epcpower excellence in power conversion

CAB1000/DC

DC coupled solar + storage



Bidirectional 1500 V DC-DC conversion

With a power rating of up to 3000 kW, EPC's DC-DC outdoor cabinet is designed to seamlessly integrate energy storage into 1000 V or 1500 V PV systems.

Our DC-DC converters are compatible with a wide range of DC sources. Whether you have 1000 V class lithium battery banks, DC generators, ultra-capacitors, other battery chemistries (lead-acid, flow, etc.), or even fuel cells, our DC-DC converters have your needs covered. By connecting a wide range of DC voltage levels, EPC's DC-DC solutions enable highly scalable power conversion in your application.

The CAB1000/DC is designed from the ground up with simplicity, reliability and scalability in mind.

Key benefits:

- 4-quadrant (bidirectional buck or boost)
- DC coupled solar
- Power flow in either direction regardless of voltages
- Wide DC range
- Optimized for energy storage

1500 V DC-DC
Any DC source
Wide DC voltage range

- NEMA 3R rated
- Peak efficiency >98%
- Connects directly between PV & storage
- Refit or new instalations
- MPPT capable
- Bidirectional buck/boost

epcpower excellence in power conversion

CAB1000/DC Bidirectional DC-DC

Use Case 1:



Use Case 2:



MODEL		CAB1000/DC.1-1000-1500	CAB1000/DC.2-2000-1500	CAB1000/DC.3-3000-1500
LINEUP		1	2	3
DC	DC import capacity @ 50°C	1000 kW | 1350 ADC	2000 kW | 2700 ADC	3000 kW | 4050 ADC
	Converter topology	3-Level		
	Maximum aux. power consumption	750 W	1500 W	2250 W
	Efficiency: Max | CEC | Euro	98.5% (est.) | 98.5% (est.) | 98.5% (est.)		
	PV DC voltage range	500 - 1500 VDC		
	Maximum PV input voltage	1500 VDC		
	Battery DC voltage range	500 - 1500 VDC		
	Suggested battery voltage range	720 - 1300 VDC		
	Maximum DC current	1350 ADC	2700 ADC	4050 ADC
	DC voltage ripple	<3%		
	Battery technology	all battery types; fuel cells; other DC sources, etc.		
	Number of DC connections	4 positive / 4 negative	8 positive / 8 negative	12 positive / 12 negative
Environmental	Ambient temperature (operation)	-20°C to 50°C		
	Ambient temperature (storage)	-20°C to 50°C		
	Protection degree	NEMA 3R / IP54		
	Relative humidity	5% - 100% condensing		
	Max elevation	2,000 m (6,500 ft.)		
	Airborne noise	<75 dBA @ 1m		
	Temperature de-rating	automatic; see charts		
Cabinet	Maximum dimensions (H x W x D)	mm: [2760 x 1000 x 1200] in.: [108.6" x 39.4" x 47.2"]	mm: [2760 x 2000 x 1200] in.: [108.6" x 78.8" x 47.2"]	mm: [2760 x 3000 x 1200] in.: [108.6" x 118.2" x 47.2"]
	Weight (est.)	907 kg [2000 lb.]	1814 kg [4000 lb.]	2721 kg [6000 lb.]
	Mounting	Pad mount		
	Cooling	Hybrid liquid / air		
	Cooling fluid	30% - 50% EWG or PWG		
Certifications	Safety	UL 1741 pending		
Protections	DC protection	DC disconnect (battery); DC disconnect (PV); DC fuses (optional)		
	Humidity	internal cabinet heating		
	Safety features	overvoltage, overcurrent, overtemperature		
	Ground fault detection	integrated		
Control	Control interface	CAN, Modbus RS485, or Modbus TCP		
	Command latency	1 ms		
	Response time; e.g. step from full charge to discharge	10 ms; adjustable longer via parameters		
	Black-start capable	Yes; requires external control power		
	Control power options	208 - 240 VAC | DC: 24 VDC		

Proven products. Limitless possibilities.

epcpower excellence in power conversion

13125 Danielson St., Suite 112 | Poway, CA 92064 | 1.858.748.5590 | epcpower.com

ARC DESIGN
409 NORTH MAIN STREET
ELMER, NJ 08318
(856) 712-2166 FAX: (856) 358-1511

PREPARED FOR:

NextGrid
PO BOX 7775 #73069
SAN FRANCISCO, CA 94120

PROPOSED PHOTOVOLTAIC ARRAY

2 SANDPIT ROAD SOLAR

2 SANDPIT ROAD
TRURO, MA 02652

JAMES A. CLANCY
MA PE #46775



REVISIONS

DATE	COMMENT
03-03-22	INFO FOR DYNAMIC STUDY
03-10-22	ADD 79 ELEMENT NOTE
09-02-22	NEUTRAL GND REACTORS
02-23-24	ADD UTILITY RQD. RTAC
04-24-24	IMPORT/EXPORT LIMITS
06-11-24	UPDATE ISO-NE TABLES

JOB #	
DRWN	RCA
CHKD	JAC
SCALE	AS NOTED
DATE	06-15-2020

E-2.1

EQUIPMENT SPECIFICATIONS

Switches and Disconnects
CA008004EN

Effective January 2016
Supersedes June 2015

COOPER POWER SERIES

M-Force™ three-phase switch



Description

Eaton's Cooper Power™ series M-Force™ switch is a distribution-class, gang-operated, factory unitized three-phase overhead loadbreak switch. The M-Force switch is offered in distribution voltage classifications of 15.5 kV, 27 kV, and 38 kV. The M-Force switch may be used for line sectionalizing, paralleling, by-passing, or isolating.

M-Force stands for "Magnetic Force." Eaton has the only reverse loop contacts found on distribution-class sidebreak switches; a contact usually reserved for higher priced transmission switches. The reverse loop contacts utilize high current magnetic forces for added reliability. The reverse loop design allows for high contact pressure to be maintained during fault conditions. This feature prevents pitting and distorting of the switch blade and contacts even under severe momentary overload.

EATON
Powering Business Worldwide

Basic concept

Current-carrying conductors that are parallel to each other and have current flowing in the same direction, attract each other due to the magnetic forces acting on them (See Figure 1A).

Current-carrying conductors that are parallel to each other and have current flowing in the opposite direction, repel due to the magnetic forces acting on them (See Figure 1B).

Current flows through the two parallel inner segments of the reverse loop contacts in the same direction, thus these two segments attract each other, initiating contact pressure. Current flow through the inner segment and the outer segment is in opposite directions, which causes a repelling force that amplifies the contact pressure.

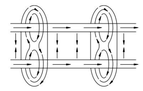


Figure 1A. Current flowing in same direction.

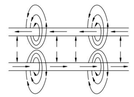


Figure 1B. Current flowing in opposite direction.

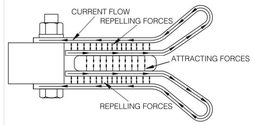


Figure 2. Magnetic forces acting on contacts.

Design features

Reverse loop contacts

The reverse loop contacts utilize high current magnetic forces for added reliability. The reverse loop contacts were adapted from Eaton's Cooper Power series KPF Line Tension Switch and have been field-proven for over 80 years. The reverse loop design allows for high contact pressure to be maintained during fault conditions. This feature prevents pitting and distorting of the switch blade and contacts even under severe momentary overload. These contacts originally designed for high voltage transmission switches also maintain extremely cool temperatures even under the rated full load. The max temperature rise allowed per IEEE Std 1247™-2005 standard for the blade and contact area is 65 °C. The max temperature rise observed on the reverse loop contact area was 38 °C, less than half of the allowed temperature. These types of test results, along with the proven field performance, undoubtedly make the Reverse Loop Contacts found in the M-Force switch the premiere choice in the industry.

Insulators

The M-Force switch comes standard with polymer (silicone rubber) insulators. These non-porcelain insulators offer exceptional dielectric and mechanical characteristics adding to the reliability of the M-Force switch, while lowering the weight. The M-Force switch can be provided in cycloaliphatic epoxy and porcelain housings. Insulators come standard with 2.25" bolt circles at 15 and 25 kV. Insulators require a 3.00" bolt circle at 35 kV.

Extended bearing assembly

The stainless steel shaft on the rotating insulator bearing assembly has been extended to four inches. This extra length will prevent horizontal movement of the rotating insulator during operation which ensures proper blade/contact alignment which is essential for smooth operation. Another feature of the bearing assembly is the oil-impregnated bushings that provide maintenance-free operation for the life of the switch.

Insulated Reliabreak™ arm

The Reliabreak™ Pick-up Arm on the M-Force switch is insulated on one side, which isolates the interrupter from the current path during a close operation. This feature allows for a wide range of adjustments between the Reliabreak arm and the blade catch finger. This increased tolerance removes the possibility of misalignment during operation which ensures proper load interruption.

Positive locking dead-end brackets

The dead-end brackets on the M-Force switch are of a positive locking design. This design allows for dead-ending at an angle without any distortion of the brackets. This allows for a more flexible switch that can be used in a wider variety of installation requirements.

New inter-phase clamps

The inter-phase control rod clamps on the M-Force switch are designed with a jam nut through the side of the casting which locks the clamps after factory alignment. This feature eliminates any possibility of accidental slippage of the control mechanism which ensures proper operation even under icy conditions.

Optional ice shields

The standard M-Force switch is capable of operating under a 3/8" ice build up. With the optional ice shields the M-Force switch is capable of opening and closing with a 3/4" ice build up.

The unique shields are designed to prevent ice from building up between the contact clips as well as removing the ice from the blade during the closing operation. Per IEEE Std C37.34™-1994, a chopping action is allowed during the close operation to break the ice. Due to the shearing action of the M-Force Ice Shields, the closing operation can be accomplished with one motion. No chopping is needed.

Table 7. M-Force Three-Phase Switch Catalog Number Configuration

M 1 H 11 T R 2

Voltage Class
1 - 15.5 kV/110 kV BIL
2 - 27 kV/150 kV BIL
3 - 38 kV/200 kV BIL

Mounting Configuration
H - Horizontal Upright (Standard Option)
A - Horizontal Pole Top
P - Phase over Phase
R - Vertical Riser
G - Horizontal Upright (G095 Spacing)
S - Vertical Riser (G095 Spacing)
T - Triangular
U - Underhung (GO95 Spacing)

Control Rod and Mechanism
Reciprocating Mechanism
11 - 28" Round Pipe 1.0" O.D. (Standard Option)
21 - 28" Round Fiberglass
41 - 28" 1" Pipe w/Fiberglass Top Section
51 - 28" Pipe w/Cycloaliphatic Insulator
Torsional Mechanism
A2 - 28" T5" Pipe (Steel Universal Section)
B2 - 28" T5" Pipe (Fiberglass Universal Section)
C2 - 28" 1.5" Pipe (Cycloaliphatic Insulator)
None
03- Hookstick operated (no control rod)

Crossarm Options
T - Steel with Single Point Lift (Standard Option)
S - Steel with Two Point Lift
G - Fiberglass with Single Point Lift
F - Fiberglass with Two Point Lift

Insulator Material
R - Polymer (Standard Option)
C - Cycloaliphatic Epoxy
P - Porcelain

Options (See Page 9 for details)
Note: More than one may be chosen. Append codes in alphanumeric order.
B - Provisions for Crossarm Support Bracket
C - Captive Hardware on Terminal Pads (Incompatible with Option U below)
E - Extension Links (1H-)
F - Bonded Reciprocating Control Handle (Standard on Torsional Controls)
G - Reciprocating Handle with Interlocks
H - Lightning Arrester Brackets
I - Steel Interphase Rod
J - Provisions for Neutral Wire
K - Provisions for Sensors
R - Additional Nameplate on Handle
S - Ice Shields (3/4" Ice Break on Open or Close Operation)
T - Grounding Connector on Crossarm Mounting Bracket
U - terminals, Copper, #2-500 MCM (Incompatible with Option C above)
V - Pole Mounting Bands
1 - Extra "J" of Control Rod
2 - Extra "T" of Control Rod

Insulator Bolt Pattern
2 - 2.25" Bolt circle for 15 and 27 kV switches
3 - 3.00" Bolt circle for 35 kV switches

Consult factory for other bolt circle options.



Viper®-ST

Solid-Dielectric, Independent Pole Option Recloser Providing electronic overcurrent protection for single or three phase operation on systems rated through 38kV, 800A continuous current, 12.5kA or 16kA interrupting current



- Interrupting rating up to 16kA through 27kV
- Overhead, substation and dead-front padmount designs
- Operator safety with mechanical block and triple redundancy on trip handle
- Smart Grid/Lazer® solutions
- Ease of installation with site-ready design
- Reliable performance
- Maintenance-free recloser
- High accuracy Accusense voltage sensors
- Up to six internal voltage sensors
- Works directly with SEL-651R, ABB RER620, Beckwith M-7679, and GE R650 controls
- RUS accepted

G&W Engineered to order. Built to last.

Catalog O-vst18

Typical Specifications

DESIGN RATINGS AND STANDARDS
Reclosers shall be designed, tested and built per IEEE C37.60 and IEC 62271-111 standards. Certified test reports shall be provided. The recloser shall be rated (select column):

Max System Voltage (kV)	15.5	27	38
Rated Voltage (kV)	15	25	35***
Interrupting Rating RMS (kA)	16*	16*	12.5
BIL (kV)	110	125	150
Continuous Current (A)	800/ 1000**	800/ 1000**	800
8 Hr. Overload, at 20° C	960	960	960
Making Current, RMS, asym, KA	25*	25*	20
Peak, asym (kA)	42*	42*	32
Short Circuit Current, kA sym, 3 seconds	16*	16*	12.5
60Hz Withstand, kV rms Dry, 1 minute	50	60	60
60Hz Withstand, kV rms Wet, 10 seconds	45	50	50
Operating Temperature	-60˚C to +65˚C		
Mechanical Operations	10K	10K	10K

* 29.3kV system voltages are available
** Consult factory for higher continuous current up to 1000A
† 12.5kA Interrupting Current rating available

Voltage Class	Catalog Number
15.5kV	VIP378ER-[12 or 16]*-1-ST
27kV	VIP388ER-[12 or 16]*-1-ST
38kV	VIP398ER-[12]*-1-ST

*12=12.5kA sym. fault interrupting or
16=16kA sym. fault interrupting

Approximate weight (for single-phase module less frame) is 100lbs. (45kg)



◀ NEMA 4-hole, 2-hole and clamp style aerial lugs.

Options*

The following options shall be supplied:
(Check as necessary)
___ NEMA 2-hole aerial lugs
___ NEMA 4-hole aerial lugs
___ Clamp style aerial lugs (#2 - 500 kcmil)
___ Clamp style aerial lugs (250 -750 kcmil)
___ 4/0 brass eyebolt ground lug
___ ___ Polemount site-ready assembly
___ Lightning arresters
___ Dead-front padmounted design with stainless steel enclosure
___ External Accusense Voltage Sensors (0.5 class accuracy)
___ External 1.0 KVA oil potential transformer (3% accuracy) for 120 VAC supply power with hardware to mount on standard aluminum frame
___ External 0.75 KVA solid-dielectric voltage transformer (0.3% accuracy) for 120 VAC supply power with hardware to mount on standard aluminum frame
___ High impact, UV stable wildlife protectors for source and load insulators
___ External CTs for current monitoring
___ Six internal voltage sensors
___ Junction box with all twist lock connections
___ 42 pin interface with additional 52b auxiliary contact (Form C type) and cable-disconnected alarm
___ 3-phase ganged manual trip handle

* Additional Cost
Contact factory for additional options or customization.

Visit gwelec.com/specs.html for electronic versions of typical specifications.

SEL-651R

Advanced Recloser Control

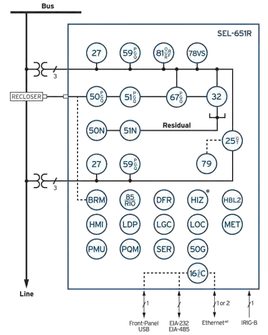


The industry's gold standard for recloser control

- Advanced recloser protection capabilities support coordinated high-speed fault isolation and restoration.
- Three- or single-phase tripping minimizes customer outages and improves reliability metrics.
- Arc Sense™ technology improves public safety and minimizes fire dangers caused by downed conductors.
- Fast islanding detection, precise synchronization, and IEEE 1547-2018 tripping let you safely interconnect distributed energy resources (DERs).
- Second-harmonic blocking secures overcurrent elements from transformer inrush.

SEL

Functional Overview



ANSI NUMBERS/ACRONYMS AND FUNCTIONS

16 SEC	Access Security (Serial, Ethernet)
25 (G,T)	Generator/Intertie Synchronism Check
27	Undervoltage
32	Directional Power
50G	Best Choice Ground
50N	Neutral Overcurrent
50 (P,G,Q)	Overcurrent (Phase, Ground, Negative Sequence)
51 (P,G,Q)	Time Overcurrent (Phase, Ground, Negative Sequence)
51N	Neutral Time Overcurrent
59 (P,G,Q)	Overvoltage (Phase, Ground, Negative Sequence)
67 (P,G,Q)	Directional Overcurrent (Phase, Ground, Negative Sequence)
78VS	Vector Shift
79	Autoreclosing
81 (O,U,R)	Frequency (Over, Under, Rate)
81RF	Fast Rate-of-Change of Frequency
85 RIO	SEL Mirrored Bits® Communications
DFR	Event Reports
HIZ	SEL Arc Sense® Technology (AST)*
HMI	Operator Interface
LGC	SELogic® Control Equations
MET	High-Accuracy Metering
PMU	Synchrophasors
PQM	Voltage Sag, Swell, and Interruption
SER	Sequential Events Recorder

ADDITIONAL FUNCTIONS

BRM	Breaker Wear Monitor
HBL2	Second-Harmonic Blocking
LDP	Load Data Profiling
LOC	Fault Locator

*Optional feature †Copper or fiber-optic

Compatible With Popular Reclosers

The SEL-651R Advanced Recloser Control works with a wide range of reclosers for complete plug-and-work capability. All interfaces are designed and tested to exceed the IEEE C37.60 standard. Certificates are available at selinc.com/SEL-651R.

G&W
Control Power Viper-S
Viper-LT
Viper-S
Viper-SP
Viper-ST
Viper-G

Other Reclosers
Elastimold Molded Vacuum Recloser (MVR)
Joslyn TriMod 300R
Joslyn TriMod 600R
OVR-3 (15 and 27 kV only)
Gridshield 32-Pin (15, 27, and 38 kV)
Gridshield 42-Pin (15, 27, and 38 kV)
VR-3S (15 and 27 kV only)
CXE
NOVA Auxiliary Powered
NOVA Control Powered
NOVA NX-T
NOVA Triple-Single

RE
RVE
RXE
VSA
VSO
VWE
VWVE 27
VWVE 38X
WE
WVE 27
WVE 38X
GVR*
SDR Triple-Single
SDR Three-Phase
OSM_150

*When equipped with interface module

ARC DESIGN
409 NORTH MAIN STREET
ELMER, NJ 08318
(856) 712-2166 FAX: (856) 358-1511

PREPARED FOR:
NextGrid
PO BOX 7775 #73069
SAN FRANCISCO, CA 94120

PROPOSED PHOTOVOLTAIC ARRAY
2 SANDPIT ROAD SOLAR
2 SANDPIT ROAD
TRURO, MA 02652

JAMES A. CLANCY
MA PE NO. 46775
JAMES A. CLANCY No. 46775 REGISTERED PROFESSIONAL ENGINEER COMMONWEALTH OF MASSACHUSETTS

REVISIONS	
DATE	COMMENT
03-03-22	INFO FOR DYNAMIC STUDY
03-10-22	ADD 79 ELEMENT NOTE
09-02-22	NEUTRAL GND REACTORS
02-23-24	ADD UTILITY RQD. RTAC
04-24-24	IMPORT/EXPORT LIMITS
06-11-24	UPDATE ISO-NE TABLES

JOB #	
DRWN	RCA
CHKD	JAC
SCALE	AS NOTED
DATE	06-15-2020

EQUIPMENT SPECIFICATIONS

E-2.2

Appendix I – Solar and BESS Operation & Maintenance Plan

NextGrid

OPERATION AND MAINTENANCE PLAN

Noons Drive Solar Array
Truro, Massachusetts

Project Owner/Responsible Party:

NextGrid Energy, LLC
68 Harrison Avenue, Suite 605 PMB 73069
Boston, MA 02115

Daniel Serber
(559) 731-4645
daniel@nextgrid.com

Signature: Daniel Serber **Date:** 01/03/2026

The above designated party is responsible (financially and otherwise) for the operation and maintenance, including emergency repairs of the Noons Drive Solar Project, including the arrays, the land occupied within the fenced area, the access roads leading into the fenced-in area, the utility lines serving the array, and the stormwater facilities associated with the project, as shown on the Site Plans. This area is herein referred to as the Solar O&M Area.

The project owner/responsible party agrees to the following:

A. At all times, the solar photovoltaic installation will be maintained in good working condition and regular maintenance will be performed in accordance with this approved operation and maintenance schedule. A record shall be kept of all maintenance performed and said maintenance record will be provided to Town officials whenever requested to verify maintenance or status.

B. A copy of the site plan and emergency shutdown procedures will be provided to the Police Chief and Fire Chief prior to the issuance of an occupancy permit. The project owner/responsible party will cooperate with local emergency services in developing an emergency response plan.

C. Contact information for the person responsible for responding to public inquiries and complaints throughout the life of the project will be provided to the Building Inspector and this information will be posted in a visible location at the installation. This contact information will be updated as necessary.

D. The Town will be notified of changes in project ownership or assignment of operation and maintenance financial responsibility.

E. The maintenance schedule in this operation and maintenance (O&M) Plan will only be amended by mutual agreement of the Town and the responsible party. Amendments will be made in writing and signed by the party responsible.

1.0 Service Visits

An O&M contractor that specializes in commercial scale solar farms will be contracted to provide service visit one time per calendar year, occurring approximately eleven (11) months apart. The service visits will incorporate the inspection and maintenance procedures outlined in Section 2.0 (Preventative Maintenance), Section 4.0 (Equipment Inspections), Section 5.0 (Vegetation Maintenance), Section 6.0 (Access Roadways, Perimeter Fences, and Access Gates), and Section 7.0 (Stormwater and Erosion Control Facilities). Note that Item 7.0 (Stormwater and Erosion Control Facilities) will require additional visits during certain rainfall events. After each service visit, the O&M contractor will issue a report to the project developer/owner. The report will summarize all maintenance and inspection activities conducted, identify any issues encountered, and provide recommendations to correct any of the issues. After review and any clarifications requested by the project developer/owner, the report will be forwarded to the Town, as required.

In addition to the Service Visits outlined above, the O&M contractor will be responsible for plowing the solar field access drive from Sand Pit Way and Noons Drive to the electrical cabinet turnaround area sufficiently to provide emergency vehicle access at all times.

2.0 Preventative Maintenance

The following Preventative Maintenance (PM) services will be performed during each service visit:

(a) Ensure the site is clean, secure and any site management such as cutting grass (see below) is performed as needed.

(b) Ensure the proper structure and operation of all racking, modules, wiring, electrical boxes, conduit, string, inverters, and sensors.

(c) Visual checks of each module for broken glass, debris, or other causes of low performance.

(d) Ensure that the racking system (posts, crossbeams, brackets, bolts, clips, etc.) that support the panels are free of major rust or corrosion.

(e) Ensure that all signs/labels for inverters, disconnects, and safety warnings are intact and legible.

(f) Ensure that all enclosures, fences, and facilities that are part of installation are maintained to retain original appearance, aside from reasonable wear and tear, including but not limited to paint, roadways, gates and access panels.

3.0 Continuous Monitoring

The following will be performed continuously for the duration of the project, by either the project developer/owner or a company that specializes in solar monitoring:

(a) Monitoring of system production.

(b) A monthly report will be produced comparing system output to expected production taking into account actual climatic conditions. The project developer/owner or the O&M contractor shall summarize this information.

(c) Responding to alerts from the array's automated alert system(s) regarding potential system malfunction(s), and if necessary, a service visit by an O&M contractor.

4.0 Equipment Maintenance

The project developer/owner and/or an O&M contractor will conduct regular, scheduled equipment maintenance annually, including but not limited to the following:

Panels

(a) Should panel washing be determined to be necessary, panels will be washed utilizing only water. Use of a squeegee is permitted for solar modules. Soap or any detergents are not required to clean the panels and are not allowed.

(b) Damaged or inoperative array panels observed during service visits will be investigated to determine the cause of the damage or inoperability with the plan to prevent, repair and/or replace as soon as possible.

(c) Array panels that have deteriorated in efficiency in excess of the manufacturer's warranty will be reported to the manufacturer for repair or replacement as soon as possible.

Central Inverters

Inverters will be checked for the following during inspections:

(a) Power capacitors for any sign of damage.

(b) Any visible discoloration.

(c) Voltage and current readings.

(d) Corrosion, dust and water ingress on terminals and cables.

(e) Condition of both the AC and DC surge suppressors.

(e) Operation of all safety devices.

(f) Cleaning and replacement of air filters.

Batteries

(a) Verify proper operation of circuit breakers and disconnect switches on all battery cabinets.

(b) Ensure all battery cabinets are free of physical damage, corrosion, or degradation.

(c) Inspect and clean all HVAC system cooling fans, filters, and pumps.

(d) Verify proper operation of ventilation system.

(e) Simulate faults to verify alarm systems function as designed.

(f) Perform capacity tests to measure battery capacity degradation.

Racking

(a) Racking shall be checked for rust, corrosion, warping, or damage and repaired or replaced as soon as possible.

(b) Racking system components that have major rust or corrosion will be repaired or replaced as soon as possible.

(c) Visual inspections will be completed of the equipment, including sub-assemblies, wiring harnesses, contacts and major components.

Other Components

The following will also be checked during annual inspections:

(a) Visual inspection of all feeder terminations for corrosion and proper attachment.

(b) Inspection and testing of surge arrestor and lightning protection operation.

(c) Ground continuity testing, lightning protection and overall system safety inspection, to include correction of any unsafe or abnormal issues.

(d) Inspection/survey of all combiner boxes, disconnects (AC&DC), switchgear, and inverters with an infrared camera, with the purpose of detecting hotspots, bad connections, and related issues.

(e) Mechanical and structural integrity of the system, and correction of issues.

(f) Modules for excessive dirt and debris.

(g) Replacement of unserviceable or degraded system labeling.

(h) Testing of voltage and amperage of all source conductors.

(i) Documentation and inspections reporting to include:

i. PV System Quality Assurance and Quality Control Plan;
ii. PV System Commissioning Form; and
iii. System Component Torque Specifications Form.

5.0 Vegetation Maintenance

(a) The Solar O&M area will be mowed to maintain a maximum grass height of approximately 1.5 feet. Use of a weed whacker is recommended underneath the panels and around the posts of the racking system. Woody seedlings may also be removed by hand. No pesticides, fertilizers, herbicides or chemicals will be used to manage vegetation.

(b) An O&M contractor shall monitor the ground cover growth rate and system performance to determine whether vegetation maintenance frequency requires modifications.

(c) An O&M contractor should be aware of the locations of any wiring associated with the system. The project developer/owner shall complete a site walk of the Solar O&M area with any new O&M contractor before scheduling the first vegetation maintenance event.

(d) The state of vegetation will be monitored during normal maintenance visits and, as appropriate, a landscape professional will be contracted to repair any areas of concern.

(e) A landscape professional will be contracted to perform the following adjustments if areas of topsoil are observed within the solar array limit:

i. Adjust the seed mix that is appropriate to the current vegetative cover and the season in which seed is spread.
ii. Manually rake topsoil to prepare for seeding.
iii. Spread seed atop raked area at an appropriate density.
iv. Implement temporary precautions within the seeded area to help the restoration process.

v. Monitor the vegetative cover to restoration completion.

(f) The state of vegetation outside of the fenced in solar development area will be monitored during normal maintenance visits to confirm that excessive growth which will result in shading of the solar panels has not occurred. If shading is visible, a landscape professional will be contacted to trim/cut the vegetation as necessary.

(g) The use of herbicides, pesticides, fertilizers or chemicals for maintenance of vegetation throughout the array and outside the fence is prohibited.

6.0 Equipment Refueling Restrictions

Due to the site's location, refueling of any type of equipment is strictly prohibited on-site. This policy is intended to safeguard the groundwater and surrounding natural resources from potential contamination by fuels or lubricants.

(a) No fueling of vehicles or equipment shall occur anywhere within the project boundary, including access roads and staging areas.
(b) Equipment requiring fuel must be transported off-site for refueling.
(c) In the event that emergency refueling is deemed unavoidable, such an activity must receive prior written approval from both the project owner and relevant Town authorities, and must follow all containment and spill mitigation procedures.
(d) Spill kits and containment measures must be readily available at all times as part of general site safety and environmental protection protocols.
(e) All personnel must be trained on proper spill prevention and response actions.

7.0 Access Roadways, Perimeter Fences, and Access Gates

(a) As part of the annual service visit, the gravel surface of the access road shall be inspected. This inspection will cover the following areas at a minimum: settlement, rutting, erosion/barren spots, vegetation/tree growth, wash boarding, and potholes. A roadway maintenance firm, to be hired by the developer, shall evaluate any deficiencies encountered during the inspection to the extent it cannot be handled by the O&M contractor and provide recommendations if repairs are required.

(b) During the annual service visit, the perimeter fencing and access gates shall be inspected for workable locks and knox boxes, settlement, erosion around post footings, significant corrosion, and signs of vandalism (i.e. holes cut in the wire, removed wooden panels, project ID signs damaged/stolen). A fence maintenance firm, to be hired by the developer, shall immediately repair any

deficiencies encountered during the inspection to the extent it cannot be handled by the O&M contractor.

(c) Plow the access drive from Sand Pit Way and Noons Drive to the electrical cabinet turnaround area sufficiently to provide emergency vehicle access at all times.

8.0 Stormwater and Erosion Control Facilities

(a) Erosion control barriers (straw wattles, silt sacks, etc.) should be inspected immediately after each run-off producing rainfall event and at least weekly during prolonged rainfall. Sediment deposits must be removed when the level of deposition reaches approximately one-half the height of the barrier. Sediment shall be disposed of in a suitable area and protected from erosion by either structural or vegetative means.

(b) Inspect subsurface infiltration system after every major storm event (4" or greater) for the first few months after construction to ensure proper stabilization and function, thereafter inspect annually to ensure the system is draining properly. Check for accumulation of sediment and ponding of water. If ponding water is visible inside the inspection port for several days after a storm event, notify the engineer for possible remedial measures, clogging and trash, and remove organic matter, trash and debris as necessary. Remove sediment as necessary during construction, while the system is dry, and at least every 5 years after construction.

(c) Inspect area drains after every major storm event (4” or greater) for the first few months after construction, and annually thereafter. Check for accumulation of sediment. Remove organic matter, trash and debris as necessary to ensure grates are not obscured or blocked.

(d) Inspect all slopes, panel drip edges, and graded areas throughout the project on a quarterly basis for the first two years after completion of construction. Thereafter, inspect once per year. Look for formation of eroded channels, particularly at panel drip edges and on newly constructed slopes. Repair and/or re-seed any areas that are eroded or not stabilized.

Appendix J – Certificate of Insurance

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 10/16/2025

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER CAC Specialty 2121 Sage Road, Suite 145 Houston, TX 77056	**CONTACT NAME:** Filmon Issak **PHONE (A/C, No, Ext):** 346-245-9528 **FAX (A/C, No):** **E-MAIL ADDRESS:** filmon.issak@cacgroup.com	
	INSURER(S) AFFORDING COVERAGE	**NAIC #**
	INSURER A : United Specialty Insurance Company	12537
INSURED NextGrid Holdings, LLC 56 Broad St STE 14037 Boston MA 02109	**INSURER B :**	
	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** 87668999 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	✓ **COMMERCIAL GENERAL LIABILITY** ☐ CLAIMS-MADE ✓ OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY ✓ PRO-JECT ☐ LOC ☐ OTHER:			GRU25GL00283	10/15/2025	10/15/2026	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 1,000,000 $ 10,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
A	**AUTOMOBILE LIABILITY** ☐ ANY AUTO ☐ OWNED AUTOS ONLY ☐ SCHEDULED AUTOS ✓ HIRED AUTOS ONLY ✓ NON-OWNED AUTOS ONLY			GRU25GL00283	10/15/2025	10/15/2026	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ 1,000,000 $ 1,000,000 $ 1,000,000
A	✓ **UMBRELLA LIAB** ✓ OCCUR ✓ **EXCESS LIAB** ☐ CLAIMS-MADE ☐ DED ☐ RETENTION $			GRU25GL00283	10/15/2025	10/15/2026	EACH OCCURRENCE AGGREGATE	$ 15,000,000 $ 15,000,000
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A					☐ PER STATUTE ☐ OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ $ $

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Evidence of Insurance

CERTIFICATE HOLDER

Evidence of Insurance

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Grantland Rice IV

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AGENCY CUSTOMER ID: NEXTENE-01

LOC #: _____

ADDITIONAL REMARKS SCHEDULE

AGENCY CAC Specialty	**NAMED INSURED** NextGrid Holdings, LLC 56 Broad St STE 14037 Boston MA 02109
POLICY NUMBER	
CARRIER / **NAIC CODE**	**EFFECTIVE DATE:**

ADDITIONAL REMARKS

THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,

FORM NUMBER: 25 **FORM TITLE:** Certificate of Liability Insurance (03/16)

HOLDER: Evidence of Insurance

ADDRESS:

Insureds Included:
NGP Nakina, LLC - 574 Ervin T. Richardson Rd, Nakina, NC 28455
Next Grid Holdings LLC - 989 Centerton Rd, Pittsgrove, NJ 08318

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ADDENDUM

Appendix K – Decommissioning Cost Estimate

DECOMMISSIONING PLAN

Ground-Mounted Solar & Battery Energy Storage System
9 Noons Drive
Truro, Massachusetts

Applicant & Responsible Party

NextGrid, Inc.
68 Harrison Ave Ste 605 PMB 73069
Boston, MA 02111
(559) 731-4645
daniel@nextgrid.com

I. FACILITY DESCRIPTION

This Decommissioning Plan has been prepared for the proposed solar and battery facility to be constructed at the property located at 9 Noons Drive in Truro, Massachusetts. This plan describes the process for decommissioning the facility in accordance with State requirements and the Town of Truro. The facility will consist of a ±7.68 MW (DC) solar array connected to a 2.4 MW / 9.6 MWH Battery System and accompanying equipment secured within a 7-foot high chain-link fence and accessed via a 15-foot wide locked swing gate on the existing paved access drive off of Noons Drive.

The Facility will include the following site features which will require decommissioning at the end of the life of the project:

- An approximate 20-acre array of photovoltaic (PV) modules and racking system;
- Battery Energy Storage System (BESS) Containers;
- Screw anchor or driven pile foundations supporting the PV modules and racking system;
- Transformers, electrical equipment/cabinets & concrete pads
- 7-foot chain-link security fence;
- Underground conduit and wires;
- Above ground wooden utility poles;
- Underground wires;
- A 15' wide locking chain link security gate at the entrance to the solar array.

II. DECOMMISSIONING PLAN

The decommissioning of the facility will be a two-stage process consisting of Dismantling, Demolition and Disposal/Recycling followed by Site Restoration. The following is a description of each process.

Dismantlement, Demolition, and Disposal or Recycling

A significant portion of the components that comprise the facility will include recyclable components made up of copper, aluminum, galvanized steel, lithium, and the modules. Due to their re-sale monetary value, these components will be dismantled, disassembled, and recycled rather than being demolished and disposed of.

All electrical connections to the system will be disconnected and all connections will be tested locally to confirm that no electric current is running through them before proceeding. The facility will be dismantled following coordination with the utility company regarding timing and required procedures for disconnecting the facility from the utility distribution network. All electrical connections to the PV modules will be severed at each module, and the modules will then be removed from their framework by cutting or dismantling the connections to the supports. Modules will be removed and sold to a purchaser or recycler. In the event of a total fracture of any modules, the interior materials are silicon-based and are not hazardous. Disposal of these materials at a landfill is permissible.

The battery energy storage system will be dismantled and recycled in accordance with the Energy Storage Association's "End of Life Management of Lithium-Ion Energy Storage Systems" dated April 22, 2020. A copy of this document can be found attached as **Exhibit A.**

The PV mounting system framework will be dismantled and recycled. The foundation system will be removed and recycled if feasible. All other associated structures will be demolished and removed from the site for recycling or disposal. This will include the site fence and gates, which will likely be reclaimed or recycled.

Concrete equipment slabs will be broken and removed to a depth of one foot below grade and clean concrete will be crushed and disposed of off-site or recycled (reused either on or off-site). The paved driveway will remain in place.

Aboveground utility poles owned by the project operator will be completely removed and disposed of off-site in accordance with utility best practices. Any overhead wires owned by the project operator will be removed from the facility and will terminate at the utility-owned connections. The utility company (currently Eversource) will be responsible for dismantling the overhead wires and poles under its ownership. The decommissioning contractor will coordinate with the utility company personnel to facilitate the utility company's removal of any poles and overhead wires located on the site.

Disposal of all solid and hazardous waste shall be in accordance with local, state, and federal waste disposal regulations.

Site Restoration

Immediately following the complete dismantlement, demolition & disposal or recycling of the PV and accessory equipment, as described above, a final walkthrough inspection will be conducted to ensure that all debris and/or trash generated during the decommissioning process has been removed. Any debris that may have been wind-blown to areas outside the immediate footprint of the facility. Sanitary facilities will be provided on site for the workers performing the decommissioning of the facility. Areas of the parcel that are disturbed during decommissioning will be re-seeded, as necessary, with 4" loam and seed or hydro-seed, using a fast-growing seed mix.

Permitting Requirements

Several approvals will be obtained prior to initiation of the decommissioning process. Permitting requirements will be determined at the time of decommissioning and updated based on then current local, state, and federal regulations. The decommissioning process is anticipated to take approximately six to eight weeks and is intended to occur outside of the winter season. The owner/operator of the facility shall notify the Planning Board by certified mail of the proposed date of discontinued operations and the decommissioning will be completed no more than 150-days after the date of discontinued operation. Absent notice of a proposed date of decommissioning or written notice of extenuating circumstances, the solar photovoltaic installation shall be considered abandoned when is fails to operate for more than one year without the written consent of the Planning Board. Based upon current regulations, a building/demolition permit will be required from the Town of Truro Building Department for the decommissioning of this site because a building/demolition permit must be obtained for any demolition or change to the use of a structure.

System Decommissioning Tasks:		
Decommissioning of the system will occur within 150 days following the end of the lease term or if found to have fallen into disuse.		
Task		Cost
1)	**Remove Panels**	$10,583.00
	The panels are bolted in. A laborer needs to unbolt the panel and remove the panel off the rack.	
2)	**Remove Rack Wiring**	$10,622.00
	The panels are plugged together in the same manner as an electrical cord, a laborer needs only to reach over and pull the plug.	
3)	**Dismantle Racks**	$53,346.00
	Racks will be dismantled and stockpiled for removal.	
4)	**Remove Electrical Equipment (Inverters, Transformers, Switchgear, Storage Containers)**	$7,991.00
	Equipment will be removed from the equipment pads.	
5)	**Break Up Concrete Pads**	$6,479.00
	Concrete will be broken up using an excavator and jackhammer.	
6)	**Remove Racks**	$33,692.00
	Racks will be removed and stockpiled.	
7)	**Remove Cable**	$28,077.00
	Cables will be removed and stockpiled.	
8)	**Remove Foundation Posts and Utility Poles**	$59,825.00
	Posts and poles will be removed from the ground using appropriate equipment.	
9)	**Remove Battery Energy Storage System (see breakdown next page)**	$35,623.00
	Battery Energy Storage System shall be removed and transported to an off site licensed facility.	
10)	**Remove Fence**	$21,381.00
	Fencing and posts will be removed.	
11)	**Grading**	$17,278.00
	Graded areas (e.g., stormwater basins) will be returned to pre-construction conditions.	
12)	**Seed Disturbed Areas**	$1,080.00
	Any graded areas will be seeded to promote revegetation.	
13)	**Trucking Costs**	$9,719.00
	All stockpiled equipment and materials will be removed from the site.	
Total Decommissioning Cost Estimate		**$295,694.00**

Annual Inflation Rate: 2.5%							
	Year 1	$ 295,694	**Year 8**	$ 351,487	**Year 15**	$ 417,808	
	Year 2	$ 303,086	**Year 9**	$ 360,274	**Year 16**	$ 428,253	
	Year 3	$ 310,664	**Year 10**	$ 369,281	**Year 17**	$ 438,959	
	Year 4	$ 318,430	**Year 11**	$ 378,513	**Year 18**	$ 449,933	
	Year 5	$ 326,391	**Year 12**	$ 387,976	**Year 19**	$ 461,182	
	Year 6	$ 334,551	**Year 13**	$ 397,676	**Year 20**	$ 472,711	
	Year 7	$ 342,914	**Year 14**	$ 407,617			

Battery Decommissioning Tasks:		
Decommissioning of the BESS portion system will occur within 365 days following the end of the lease term or if found to have fallen into disuse.		
1)	**Remove Battery Racks**	$11,520.00
	Batteries are inserted as racks into the storage container. Batteries will need to be removed & palletized for transportation & disposal.	
2)	**Remove and Dispose HVAC Equipment & Ancillary Wiring**	$11,802.00
	HVAC Fluids will be drained, and HVAC equipment and ancillary wiring will be removed and disposed.	
3)	**Load And Dispose Battery Racks At Licensed Facility**	$2,100.00
	Equipment will be removed from the equipment pads.	
4)	**Remove Containers**	$1,561.00
	Containers will be removed from pads & transported off site.	
5)	**Break Up & Dispose Concrete Pads / Footings**	$8,640.00
	Concrete will be broken up using an excavator and jackhammer. Conduits greater than 3' in depth will be buried in place.	
Total Battery Decommissioning Cost Estimate		**$35,623.00**

Exhibit A



End-of-Life Management of Lithium-ion Energy Storage Systems

April 22, 2020

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Disclaimer

The U.S. Energy Storage Association assumes no responsibility or liability for the use of this document. Descriptions of legal requirements and rules governing the disposition of Li-ion battery systems are for general awareness purposes only, and parties should consult with legal advisors concerning liability and other issues associated with the end-of-life management of energy storage systems.

Acknowledgements

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Acronyms

DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EPA	U.S. Environmental Protection Agency
EPC	Engineering, procurement, and construction
ESA	U.S. Energy Storage Association
ESS	Energy storage system
EV	Electric vehicle
GHG	Greenhouse gas
LFP	Lithium iron phosphate
Li-ion	Lithium-ion
LMO	Lithium manganese oxide
NCA	Nickel cobalt aluminum
NMC	Nickel manganese cobalt
NYSERDA	New York State Energy Research & Development Authority
OEM	Original equipment manufacturer
RBRC	Rechargeable Battery Recycling Corporation (now Call2Recycle)
RCRA	Resource Conservation and Recovery Act
SO_x	Sulphur oxides

Introduction

Energy storage is experiencing a period of rapid deployment growth, and even in the midst of an economic downturn, global analysts' projections indicate this trend is poised to continue due to increasingly attractive economics and the value storage provides from multiple grid services.[1] While many developers and owners are gaining experience deploying and operating grid-connected energy storage systems (ESS), few have yet to manage ESS facilities at the end of a system's life. But ESS owners, operators and developers may be able to apply some of the lessons learned from the auto industry's experience as it confronts the task of managing an increasing stock of used Lithium-ion (Li-ion) batteries from electric vehicles (EVs).

Both grid-connected ESS and EVs rely on Li-ion batteries, and the phenomenal growth in Li-ion applications creates stress along the entire value chain–from mining raw material inputs, such as lithium and rarer elements, to manufacturing and disposition of the batteries once they reach the end of their useful lives. This linear depiction of material and energy use in the economy – from extraction of natural resources to production, use, and disposal – may present significant environmental consequences as the volume of battery production increases. An alternative model has emerged that instead attempts to mimic nature in the way inputs are used in production of goods, which upon reaching the end of their useful lives are then reused and/or recycled as inputs again. Such "circular economy" concepts are prevalent in the debates surrounding how to best manage the Li-ion battery life cycle.

In April 2019, the U.S. Energy Storage Association (ESA) launched the Corporate Responsibility Initiative (CRI) with dozens of industry leaders to share advanced safety practices and develop educational materials and resources on safety, emergency preparedness, and lifecycle management. This paper focuses on the end-of-life management of Li-ion batteries, offering a review of options from the circular economy perspective. A related forthcoming CRI track will look at supply chain issues, which represents another arc along the circular economy, one which may increasingly rely on materials recovered after the end of (first or subsequent) life application.

[1] In this paper, ESS primarily refers to "Front-of-the-Meter" (FTM) battery storage systems connected to the grid at the transmission or distribution system level. However, the concepts and end-of-life pathways identified are also relevant for "Behind the Meter" (BTM) customer systems.

Why Focus on Li-ion?

While there are many other energy storage technologies and several battery chemistries, Li-ion currently commands the bulk of the market for electric vehicle and stationary grid-connected systems. Its use in both applications is expected to grow at a rapid pace. According to Wood Mackenzie Power & Renewables, 99% of stationary energy storage deployments in 2019 used Li-ion technologies.[2] Moreover, the vast majority of lead acid batteries (predominantly automotive batteries) are already recycled, and other battery chemistries are not expected to gain significant market shares in EV or ESS applications in the near term.

Circular Economy and Li-ion Batteries

The primary objective of the circular economy framework is to promote a sustainable economic system by minimizing material and energy used to provide economic goods and services. Some of these principles are expressed in shorthand slogans, such as "reduce, reuse, recycle," and frequently are congruent with greenhouse gas (GHG) reductions objectives. However, *given current technology and markets*, not all production and waste can be brought into a circular economy with beneficial results. For some goods, more energy would be used in collecting and recycling activities than is used to produce virgin materials, or the costs of reuse or recycling are prohibitive compared with relatively benign disposal options. Life-cycle analysis (LCA) can help identify these factors and may identify challenges and opportunities that can lead to improved technologies and more effective markets. Indeed, the current constraints and limitations to beneficial reuse or recycling within the Li-ion battery value chain have already prompted recent initiatives and new programs to address these barriers as discussed later in this document.

Circular economy reasoning generally superimposes a loose hierarchy on end-of-life options, with reuse (in the original application or some other less demanding application) taking precedence over recycling, and recycling all, or at least some, of the material inputs preferred over disposal. These paths are shown for EV batteries in Figure 1, with green and blue arcs representing environmentally-sustainable flows. This hierarchy is a reasonable way to frame end-of-life management options for Li-ion batteries —

[2] Wood Mackenzie Power & Renewables and Energy Storage Association, *U.S. Energy Storage Monitor 2019 Year in Review*, March 2020.

though, again, the desirability of any specific end-of-life management pathway on costs, emissions, or other measures depends on technologies, systems and markets. Circular economy principles even apply at the start, in designing products for more economic refurbishment or recycling, or for a longer service life that reduces the need for energy and material inputs for manufacture of new products.

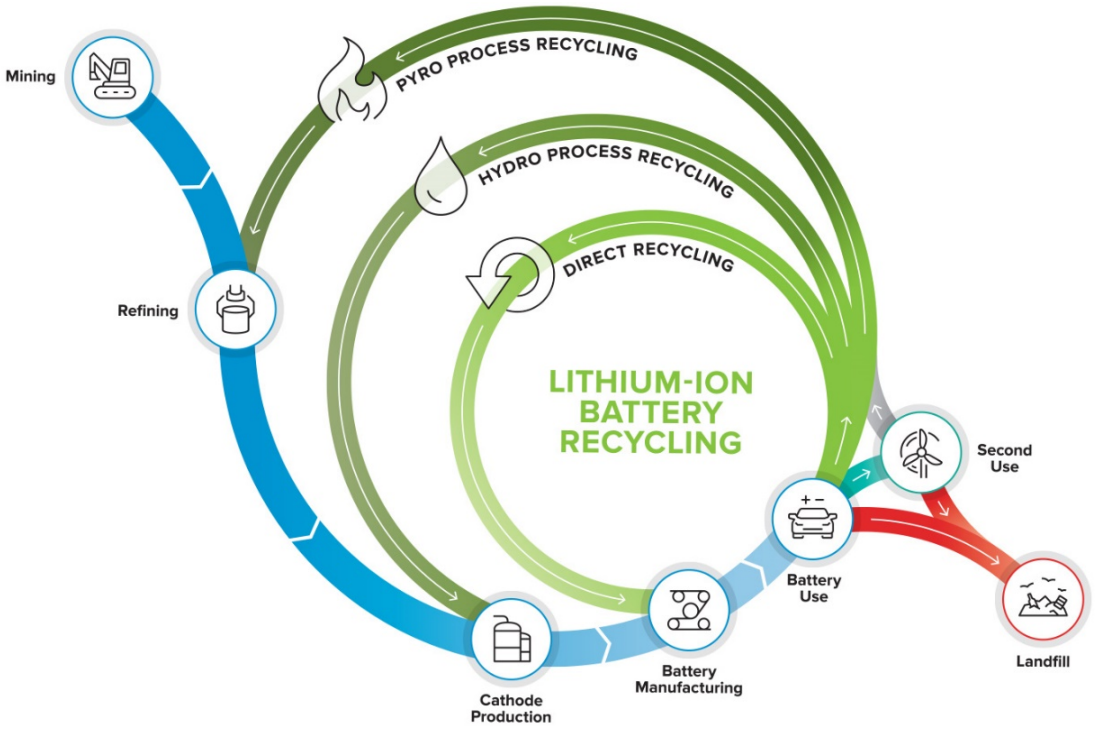


Figure 1:
Circular Economy Pathways for EV Batteries
Source: ReCell; Argonne National Laboratory

While this paper addresses stationary ESS, much of the information and experience with Li-ion end-of-life management is derived from the increasing management of spent EV batteries around the world. While ESS and EV Li-ion batteries have different applications, they share many material inputs and thus have similar reuse and recycle opportunities. Some of the practices that evolve to reuse and recycle EV batteries will influence, and sometimes determine, the end-of-life requirements and management practices applicable to stationary ESS batteries. Finally, the substantial number of EV batteries that will end service during this period as stationary ESS deployments rapidly increase has sparked research and commercial interest in the reuse and refurbishment of EV batteries for "second life" applications in stationary ESS, further linking the two applications.

Energy Storage System End of Life

For the vast majority of stationary ESS installations, the end of life represents a planning decision rather than an unexpected moment. Operating a Li-ion battery ESS under prudent safety guidelines and adhering to codes and standards helps prevent significant accidents or failures and thus extends its useful life. In the absence of catastrophic failure, owners generally have discretion on when to remove a Li-ion battery ESS from service.

The effective lifespan of the ESS can also sometimes be extended with enhanced maintenance and replacement activities. Li-ion battery-based ESS are inherently modular, being composed of individual battery cells assembled into modules (packs, trays or assemblies), arrayed in racks, connected into various control systems and enclosed in containers. Individual cells, modules and even entire racks can be replaced as needed (when, for example, one degrades unusually quickly compared to other components that maintain performance). Where economic, overall ESS performance can be maintained at acceptable levels by selectively refreshing individual components, thus extending the overall economic lifetime and deferring the retirement of the facility. Currently, the validation to ensure that a mixture of old and new battery cells or modules can work together effectively can be costly, although those costs will likely fall as operating experience accumulates. Extending the effective lifetime of a durable asset is consistent with circular economy benefits as it reduces both virgin material input requirements as well as potential waste, although at some point performance, safety and economic considerations will dictate decommissioning.

Decommissioning

As with any other asset within the power sector, the decommissioning process involves dismantling the ESS and removing it from the site in compliance with applicable federal and local rules that govern the safe transport and disposition of used equipment or waste. A primary issue in end-of-life planning is who bears the legal and financial liability for the equipment once a facility shuts down and components are moved offsite. Even if an engineering, procurement, and construction (EPC) or an operating contract assigns decommissioning cost responsibilities to another party,[3] the used Li-ion batteries will be

[3] Renewance estimated costs for dismantling, shipping, and recycling the batteries for a 10 MWh facility at over $474,000, or almost $50/kWh. See Renewance, Inc., “Commercial Liability Considerations for End-of-Life Industrial Batteries,” 5.

classified as hazardous waste and thus the owner will be considered a hazardous waste generator liable for proper disposal under the Environmental Protection Agency (EPA) rules under the Resource Conservation and Recovery Act (RCRA).[4]

Decommissioning obligations, processes, and costs for stationary storage were not always considered in earlier installations and remain to some extent discretionary, in part due to currently limited standards and ambiguous regulatory frameworks. Long before owners face actual decommissioning decisions, they should understand and evaluate the options and develop a decommissioning plan, considering current and future potential regulations. And because the options to consider in eventual decommissioning continue to evolve, the plan should be capable of adapting to new information to take advantages of emerging opportunities.

It is becoming more common for contract language to specify that system decommissioning responsibilities and their costs lie with the operations and maintenance provider or EPC contractor, even though the EPA deems the owner liable for proper treatment of removed equipment. Under such arrangements, the contractor identified as responsible typically provides all decommissioning services (including restoration of the site to original state if required, and removal of the equipment). However, the details of how decommissioning is to be done, or what happens to the decommissioned battery, have not commonly been specified in the contracts.

State agencies and utilities are also encouraging or requiring the development of energy storage decommissioning plans at project inception. For example, utilities such as Portland General Electric in Oregon are now making decommissioning responsibilities explicit in requests for proposals. The New York State Energy Research and Development Authority (NYSERDA) published *New York Battery Energy Storage System Guidebook for Local Governments,* which includes a model rule for localities that specifies that applicants for new energy storage projects must have a decommissioning plan and a decommissioning fund.[5] The NYSERDA model rule states that applicants must have a narrative description of the decommissioning process, the estimated life of the energy storage system, details

[4] The characteristics of Li-ion batteries determine their classification as hazardous waste, and a waste generator means "any person, by site, whose act or process produces hazardous waste…or whose act first causes a hazardous waste to become subject to regulation." (40 CFR § 260.10) and "a used battery becomes waste becomes a waste on the date it is discarded (e.g., when sent for reclamation)" (40 CFR § 273.2(c)(1)).

[5] See New York State Energy Research and Development Authority, *New York Battery Energy Storage System Guidebook for Local Governments,* 2019.

about the estimated cost of decommissioning and plans for ensuring its funding, and contingency plans for removal of damaged batteries.

The actual scope of decommissioning depends on project-specific conditions, the type of system, and the disposition pathway chosen, such as whether some or all of the ESS will be reused or recycled.[6] In some cases, the battery modules are removed, while the balance of the system (controls, enclosures, etc.) remain and are re-used with new battery modules. In other cases, the full systems are replaced as integrated packages. If the site itself is being entirely decommissioned (no future energy storage or similar infrastructure will occupy it), contractual agreements govern the final state of the site (e.g. resulting in remediated land, residual foundations, gravel, etc.).

Once a used battery is removed from service and diverted toward end-of-life management, it is designated as "Universal Waste," a special category of hazardous waste under EPA regulations.[7] These rules generally require recordkeeping, labeling, and storage methods that keep material out of the environment, and they outline approved recycling or disposal pathways. Damaged cells, e.g., where the cell casing has been breached, may face additional requirements than those imposed under Universal Waste rules.[8] A battery intended for refurbishment and reuse is not considered "waste" under RCRA, because it is not discarded.[9]

Although this paper addresses the end-of-life management of batteries, the balance of plant can represent a significant quantity of materials, including concrete pads, steel enclosures, cabling, and an array of electronics that are part of the entire energy storage system package. Concrete and steel are readily recyclable, and many enclosures can be reused, particularly if a site is being repowered with new batteries at the end of old equipment's lifespan. Inverters, control systems, and other electronic equipment share many of the challenges of e-waste more broadly, but useful materials can often be recovered. Some of the dismantled equipment from an ESS can be reused with minimal processing. For

[6] Strictly speaking, the ESS decommissioning applies to the battery-related elements of an ESS. The site itself, including interconnection facilities, could be reused with a new ESS, much like generating facilities can be "repowered" and thus re-commissioned with new generating equipment. However, the existing battery components would be dismantled and removed, thus becoming available for re-use, recycling or disposal.

[7] See 40 CFR § 273.

[8] See U.S. Environmental Protection Agency, "May a handler of universal waste manage broken or damaged batteries as universal wastes?" for a discussion of damaged battery classification.

[9] For material to be classified as hazardous waste, it first must be considered solid waste, and material "used or reused as effective substitutes for commercial products" is exempt from solid waste designation (40 CFR § 261.2(e)(1)(ii)).

example, rack systems can be reused in new or existing ESS facilities or returned to original equipment manufacturers (OEMs) for spare parts inventory.

Transport of Batteries

After dismantling and removal from the site, the old batteries are transported to facilities for refurbishment, recycling, or disposal. Moving Li-ion batteries can pose a fire risk if still-energized batteries short circuit or their containers are damaged. Transport of batteries, whether new or used, is governed by U.S. Department of Transportation (DOT) regulations that treat batteries as "Class 9" miscellaneous hazardous material and specify packaging and materials containment to mitigate the risk of accidental activation or reaction of the batteries during transport.[10] All batteries must be packed in a strong outer package which prevents short circuits or accidental activation, prevents the release of any hazardous materials, ensures no leakage, and inhibits any combustion, and damaged batteries are subject to additional packaging and labeling requirements.[11] However, Li-ion batteries shipped by motor vehicle to a permitted storage or disposal facility, or to a recycling facility, are exempted from certain labeling, marking, testing and record-keeping requirements.[12]

Both shippers who package battery waste and carriers (e.g., trucking firms and drivers) who haul the waste batteries must comply with training and certification requirements for hazardous materials transport. The packing, labeling, and training regulations are fairly detailed, and a lack of significant experience with the exact requirements that apply to transporting large-format Li-ion batteries may make carriers and/or individual drivers reluctant to accept loads where they lack regulatory experience.

Transport regulations generally apply to both individual Li-ion cells as well as battery modules; decommissioned ESS will generally yield battery modules for shipment. Batteries may be completely discharged prior to shipment to a recycling facility, while batteries destined for refurbishment and reuse will maintain some charge in transport (and while placed in temporary storage after transport). For reuse in particular, ensuring that the batteries are not damaged or further degraded is important (*e.g.,* leaving them exposed to weather or in a fully-discharged state can harm later reuse). The growing stockpiles of spent EV batteries may not become available for eventual refurbishing and reuse if not

[10] These rules are implemented and enforced by the Pipeline and Hazardous Materials Safety Administration and are found at 49 CFR § 173.185.
[11] See 49 CFR § 173.185(f).
[12] See 49 CFR §173.185(d). The exemptions relate to requirements found in UNECE, UN standard 38.3.

properly protected. The duration of time stored between transport and processing also raises liability issues for Universal Waste. Temporary storage must keep the decommissioned equipment in a safe state, shielded from fire risk, protected from risk of pollution and from safety hazards caused by trespassers.

Refurbishment and Reuse: "Second Life"

Where economically feasible, reusing battery systems and other components is more environmentally sound than recycling constituent materials. As batteries degrade over time, they may be less useful for their originally intended purpose, but still valuable for other applications. For example, backup power systems or batteries coupled with renewables to power remote irrigation systems may not need the same performance characteristics as commercial grid systems. These "second life" applications can substitute for newly-manufactured battery energy storage systems and in some cases expand the role of stationary energy storage, such as when new systems may be prohibitively expensive, but a lower cost refurbished system can meet the desired performance requirements.

There is increasing attention placed on reusing EV batteries for less exacting stationary service, and where energy density (Wh/kg) does not pose a significant design constraint. Projections of EV deployment indicate an immense and growing number of Li-ion battery systems will soon face end of life in their vehicle applications. Reconditioning EV batteries, either by original equipment manufacturers (OEMs) or third parties, is an active area of research and emerging commercial opportunity. Once EV batteries degrade to 70-80% of their original rated capacity they are typically retired, although future EV owners may retain their vehicle or original battery longer (even with degraded range) if it continues to serve their specific needs.[13] And while the current level of second-life battery deployment is very small in North America (10 MWh) and Europe (100 MWh), China had re-deployed almost 1 GW of used batteries by 2018, primarily as back-up power at telecommunication facilities.[14]

[13] EV range increases could also lower that retirement threshold somewhat, as batteries at roughly 60% of their capacity could meet most driving needs (with charging at work). Even at 30% of their capacity, LBNL anticipates most (55%) of US driving needs could be met. See Lawrence Berkeley National Laboratory, V2G-Sim.

[14] See Melin, Hans Eric, "The lithium-ion battery end-of-life market – a baseline study," Global Battery Alliance. The figures from China likely reflect the impact of government mandates to assess for second life opportunities and subsidies.

Refurbishing or reconditioning batteries for second use is a significant undertaking. First, a processor must conduct tests to determine the condition or "state of health" of used batteries. The batteries must then be assembled into modules suitable for stationary service. Coupling batteries of varying states of health can require more advanced control systems, as the control hardware and software that interacts with original batteries to ensure optimal – and safe –operation is usually proprietary and designed for the original battery application. Developing new controls and software to convert older batteries into use for new applications remains a significant challenge.

The cost savings must be significant enough, and the performance of second-life batteries high enough, to make refurbishing appealing compared to new batteries. The discounted cost of reconditioned batteries relative to new ones must offset increased integration costs and reduced performance relative to new ones for a robust market for second-use batteries to develop. Declining prices and improved performance of new batteries may limit the demand for use of reconditioned EV batteries in stationary energy storage projects. As costs for new batteries continue to fall, it may become harder to convince manufacturers and users to refurbish and use old ones. Designing for reuse at the outset could reduce refurbishment cost substantially and increase the commercial viability of this path.

Second-life battery system applications in the U.S. are currently limited to pilot demonstrations and small projects. Several companies and academic institutions are investigating the reuse of EV batteries for stationary applications, and this research likely will be useful and broadly applicable to second-life use for stationary batteries. The codes and standards that apply to refurbished batteries also continue to evolve. UL recently finalized its standard 1974 for Evaluation of Repurposing Batteries, which seeks to establish consistent processes and metrics for assessing batteries destined for second-life applications.[15]

The State of U.S. Recycling of Li-ion Batteries

The primary loop for spent Li-ion batteries to reenter the economy remains some form of recycling. Ultimately this becomes the only alternative to disposal for of all batteries: even if second life

[15] "This standard covers the sorting and grading process of battery packs, modules and cells and electrochemical capacitors that were originally configured and used for other purposes, such as electric vehicle propulsion, and that are intended for a repurposed use application, such as for use in energy storage systems and other applications for battery packs, modules, cells and electrochemical capacitors." UL, Standard 1974 for Evaluation of Repurposing Batteries, Edition 1 (2018).

applications become prevalent, at some point batteries can no longer perform useful service. Therefore, recycling is currently the only viable long-term path to manage spent Li-ion battery waste consistent with circular economy principles.

Beyond enhancing stationary energy storage market sustainability, increasing the volume of batteries that are recycled rather than disposed may also improve supply chain economics. Recycling reduces solid waste streams and allows for the recovery of valuable materials from batteries to reduce reliance on raw material mining that imposes inherent energy and environmental burdens. Many of the materials in lithium-ion batteries such as cobalt and nickel are valuable; reinjecting these domestic resources into the supply chain can reduce costs and reduce imports of raw materials.[16]

Recycling materials has been practiced for decades in consumer waste streams (such as paper, bottles and cans) and commercial recycling (such as scrap metal). However, recycling Li-ion batteries, particularly from large stationary applications, is a relatively new industry.[17] It lacks stable markets for the collection, transport, and recovered resource sales, and applicable federal and state regulations are not always consistent or clear to market participants. As economic, safety and environmental issues are intensifying interest in battery recycling options, related business practices in different stages of project development, operation and decommissioning are still evolving. Some battery recycling methods exist and are well understood. Yet significant research & development (R&D) efforts to improve recycling processes and make them applicable to Li-ion batteries are underway, which will drive new commercial opportunities, regulatory frameworks and best practices. In order to make Li-ion battery recycling commercially viable, innovations (particularly in automated processes) must reduce the cost of collecting, managing, and recycling batteries, and market demand for the recovered materials must support prices to maintain profitability.

At present, no facility in the U.S. fully recycles Li-ion batteries, *i.e.*, renders used batteries into constituent materials and sells or otherwise reintroduces all the resultant material back into commodity markets, although several U.S.-based companies will accept and treat batteries to some degree. However, market demand for recovered materials is likely to strengthen as domestic Li-ion battery

[16] Mayyas, Ahmad et. al. present a comprehensive overview of Li-ion battery recycling in "The case for recycling: Overview and challenges in the material supply chain for automotive li-ion batteries," *Sustainable Materials and Technologies*, Volume 19 (April 2019): e00087.
[17] Recycling li-ion EV batteries began approximately a decade ago in the U.S.; see Taylor, Phil, "When an Electric Car Dies, What Will Happen to the Battery? Can millions of lithium ion batteries be recycled?" *Scientific American*, (September 14, 2009).

production capacity is poised to grow substantially in the next few years.[18] Thus, the industry has a narrowing window of time to establish best practices at the outset, encourage the development of an effective recycling market, and implement efficient recycling processes at scale.

Recycling Processes

Sorting recovered batteries is a critical first step to ensure that same-chemistry batteries are being fed into the system. This is less of a concern for ESS and EVs than it is for collections of heterogenous consumer electronic batteries, given the relative large size and low volumes of the former currently sent to recycling facilities.[19] The recycling facilities ensure that the correct type of batteries flow into a given recycling process, including separating different types of lithium-based chemistries, such as lithium iron phosphate (LFP) versus lithium nickel manganese cobalt (NMC). For this reason, labeling cells and batteries with chemistry information is critical during manufacturing to ensure accuracy, using a consistent, standard labeling approach. Japan has developed labeling requirements that use color coding and material data labeling to aid recycling efforts, in addition to a pre-existing color coding of basic battery chemistries (Ni-Cd, Ni-MH, Li-ion, Pb) for quick visual identification.[20]

The recycling process begins with dismantling electrically discharged batteries. The current diversity of Li-ion battery types, sizes, and chemistries makes this process difficult to automate, so it must largely be done manually. The steps consist of removing the battery casings, separating the connectors, disassembling modules from packs, separating cells from modules, and removing the electrolyte. In addition to manual separation, some recyclers employ ultrasound and/or mechanical agitation to remove cathode material. After shredding, or milling and pre-treatment, the cells undergo the recycling process.

Today, there are two primary commercial pathways for recycling batteries: the most common being pyrometallurgical processes (*i.e.*, smelting), and emerging hydrometallurgical processes that include chemical methods such as precipitation, solvent extraction, ion exchange and electrowinning.

[18] U.S. Li-ion battery manufacturing capacity is projected to surge from 47 GWh currently to almost 160 GWh by the end of 2023. See Business Council for Sustainable Energy and Bloomberg New Energy Finance, *2020 Sustainable Energy in America Factbook* (February 2020): 104.
[19] Conventionally-recycled materials such as plastics, copper, and steel are readily separated without specialized sorting facilities or complex labeling.
[20] Battery Association of Japan, "Program to Make the Portable Secondary Battery Recycle Mark an International Standard." While the Japanese system does not yet indicate Li-ion sub-chemistries, BAI has proposed augmenting the current system with cathode material information. See Battery Association of Japan, "Revised Guideline for Recycle Marking on Li-ion Batteries for the Japanese Market."

Pyrometallurgy is based on 100-year old technology; the primary advantage of pyrometallurgy is that the smelters can easily handle battery cells of mixed chemistries.[21] Hydrometallurgical recycling processes reduce cells to elemental products using leaching techniques, which dissolve the metallic fraction and recycled metal solutions for separation and recovery. Leaching agents include organic and inorganic acids, and ammonia-ammonium salt systems. The main advantage for hydrometallurgy is the ability to recover transition metals and lithium from the cathode.

A major new research and development effort is focused on a third process called "direct cathode recycling." Direct cathode recycling aims to recover relatively intact cathode materials for easier reinsertion into the battery manufacturing process and may provide a method to recover significant value from lithium iron phosphate (LFP) and lithium manganese oxide (LMO) cathodes. This direct recycling is expected to have lower energy costs than other processes and produce more reclaimed and readily reusable material when scaled commercially.[22]

Lessons from Lead-Acid Battery End-of-Life Management

Unlike Li-ion, every stage in lead-acid recycling is profitable, owing to fundamental differences between lead-acid battery and Li-ion recycling. First, it is illegal to dispose of lead-acid batteries without recycling them, creating an enforced closed-loop market. Lead-acid battery recycling is also far simpler than Li-ion, having fewer materials, less material complexity, and less system design complexity. Manufacturers of car batteries all use the same materials: lead, lead oxide, and sulfuric acid in a standard sized polypropylene case. Moreover, the designs are nearly identical so dismantling can easily be automated.

The more complex the input material and design, the more complicated and costly the recycling. Other than some cylindrical Li-ion battery cells of common sizes, there are no prevailing standards for size and design, particularly for EV batteries that are customized for a specific model chassis. The lead in lead-acid batteries is used to manufacture new batteries, but the materials in a Li-ion battery do not always have a substantial market value and the dealer may be charged a fee to dispose of such materials. Lead-acid processors also enjoy an economy of scale, given their ubiquity in most cars and trucks, as well as in other consumer applications and some stationary storage systems.

[22] Pyrometallurgical, hydrometallurgical and direct cathode recycling processes are depicted on Figure 1.

Recycling methods that reintroduce raw materials into cell production can also reduce overall environmental impacts of battery production; life cycle analysis generally finds that upstream raw material extraction and processing creates more environment and energy burdens than cell production and pack assembly. [23] For example, since cobalt, nickel and copper are produced from sulfide ores, their virgin production is not just energy-intensive but also results in high sulfur oxide (SO_x) emissions, which are avoided by recycling.[24] Hence recycling or reclamation can be an efficient strategy to reduce overall environmental impacts from using Li-ion batteries.

However, overall environmental benefits depend on the recycling methods and particular battery chemistries. For example, both hydrometallurgy and direct cathode recycling would reduce greenhouse gas (GHG) emissions for NMC and nickel cobalt aluminum (NCA) batteries, whereas using pyrometallurgy to recycle NMC and NCA batteries may actually increase GHG emissions. Variation in the energy intensity of virgin metals production relative to the recycling process can produce counterintuitive results; *e.g.*, recycling LFP batteries may actually increase emissions relative to production from virgin materials, even using direct cathode recycling methods.[25] This underscores the importance of R&D into improving the processes used in battery recycling, both to improve environmental outcomes and economic viability.

Economics of Recycling

Currently, high processing costs and insufficient demand (and related low market prices for some of the constituent materials such as battery-grade lithium carbonate) impede full U.S. recycling.[26] For recycling to be economically viable for stand-alone commercial processors, the recovered materials must have more market value than the costs of the obtaining and recycling the batteries. Economies of scale in recycling processes and automation are key to reducing recycling costs, although very few ESS batteries are being decommissioned, while larger quantities of spent EV batteries increase slowly.

[23] Dai, Qiang et. al., "Life Cycle Analysis of Lithium-Ion Batteries for Automotive Applications," *Batteries*, 5 (2019): 48.
[24] Gaines, Linda et. al. "Key issues for Li-ion battery recycling" *MRS Energy & Sustainability: A Review Journal*, 5 (2018).
[25] Ciez, Rebecca, "Lithium-Ion Battery Recycling Processes: Environmental Impacts and Economics" ESA Webinar: *Decommissioning, End of Life and Recycling* (March 13, 2019).
[26] Standard battery-grade lithium carbonate (99.5% pure) represents one potential market, while applications requiring less refined grades of lithium compounds could also present sales opportunities.

The primary element working in favor of recycling economics is that the concentration of metals in scrap is much higher than in virgin ores. Under favorable commodities market conditions, and affordable costs for collection and recycling processes, using recycled materials can reduce the costs of production. The cost of materials comprises more than 50% of new cell cost, of which cathode materials comprise the most significant portion, so Li-ion recycling depends heavily on cost-effectively recovering cathode material. Pyrometallurgy yields cobalt and nickel metals which are valued at their commodity prices. In some instances, the value of cathode chemical material is actually greater than that of its constituent elements, so recovering a reusable cathode yields more revenue than recovery of individual elements. For example, one process cost analysis of direct cathode recycling estimates that if NMC cathode material can be recovered for $15/kg or less, then direct cathode recycling would be economically competitive with traditional NMC cathode manufacturing methods.[27] However, the promising economics of direct cathode recycling processes depend on a stable value of specific cathode formulations, which will decline as battery manufacturers move to newer chemistries and render old cathodes obsolete.

A significant barrier to investment in recycling processes is the evolution of Li-ion battery chemistry in response to market conditions. Li-ion batteries contain relatively low percentages of retrievable metals by weight, therefore recyclers get relatively low value from post-process commodities. Cobalt is one of the more valuable recoverable elements, but because of its high cost and supply chain challenges, battery manufacturers are already finding ways to use less cobalt, in turn reducing the demand for cobalt. Market volatility in cobalt and magnesium prices can significantly alter the economic viability of their recovery, and this uncertainty can impede long-term investment decisions in recycling facilities. Rapid technological advances also can challenge recyclers: a facility might invest in the equipment to recycle today's common battery chemistries and face stranded investments if chemistries change to reduce upstream input costs.

Many of the economic uncertainties surrounding investment in recycling R&D, technologies, and processes involve the time lag between initial deployment and end of life of Li-ion batteries in EV and ESS applications. For EVs, the lag between initial deployment and reclamation can be a decade or longer. ESS battery lifespans vary according to their use pattern and the number of discharge / recharge cycles, however 15 years of first use is not uncommon. As EV battery life improves and second life

[27] Ciez, ESA Webinar.

applications flourish, the quantity of EV batteries introduced into the recycling markets may decline somewhat from expected levels. Increasing the useful life of batteries can reduce environmental impacts from initial production, but conversely longer battery lives could also impede recyclers who might otherwise invest in Li-ion processing facilities, particularly in new technologies which need to scale in order to realize cost efficiencies. These impediments to expanding recycling could limit future opportunities for ESS Li-ion battery recycling.

Disposal

Where recycling facilities are unavailable or the recovered materials are uneconomic, batteries are disposed as waste. The management of disposed Li-ion batteries is governed by EPA Universal Waste rules that require waste handlers to separate hazardous materials for disposal under federal laws but allow the disposal of the remaining non-hazardous waste to comply with state and local requirements.

Proper collection, identifying battery chemistries, and fully de-energizing batteries are as important to a disposal site as to the recycling processes discussed above. Once rendered inert from fire risk (mechanically or chemically), non-hazardous materials not recovered for reuse or recycling can be disposed of through municipal waste streams. While some lithium chemistries are considered non-hazardous, many batteries have toxic constituents that require treatment as hazardous materials. The potential toxicity of Li-ion battery materials varies widely by chemistry; for example, where nickel, cobalt, or lead are present in battery chemistries in significant quantities, precautions must be taken at disposal or incineration sites in line with the hazards of those individual materials.

Small Li-ion batteries found in consumer electronics have proliferated in recent years, leading to state efforts to deter improper disposal and encourage recycling. However, even in states such as New York that have implemented rules against disposal, consumer batteries have improperly entered municipal waste streams. Although the experience of small consumer goods batteries is not a reliable predictor of the fate of large-scale Li-ion batteries, federal requirements promulgated decades ago did not contemplate the disposal of significant quantities of large Li-ion batteries, and no clear prospects for action at the federal level to strengthen the rules governing recycling or disposal have emerged. In response, some state and regional policies are emerging, such as California legislature creating an Advisory Group to consider approaches to effectively prohibit landfilling Li-ion EV batteries and

incentivize reuse and recycling.[28] The ESS industry will also need to work with regulators to ensure that waste managers utilize safe disposal practices for Li-ion batteries.

Promoting Sustainable End-of-Life Management

Numerous international and U.S. initiatives have recently launched to promote sustainable practices in managing the disposition of used Li-ion batteries. The European Union has established goals for recycling and directed its member states to establish collection programs; industry is working on strategies to meet them. The Global Battery Alliance, a public-private partnership initiated by the World Economic Forum in 2017, issued a report on sustainable battery production and use in September 2019, and announced in January 2020 that 42 organizations had agreed to abide by ten guiding principles to promote the realization of that objective.[29]

The U.S. manufacturing and consumer electronics industries have also been proactive in establishing standards and guidelines. The Rechargeable Battery Recycling Corporation (RBRC), now known as Call2Recycle, established a consumer 'seal' that is formally recognized by EPA; fees collected for licensing the seal help to fund consumer battery collection and recycling efforts. Other initiatives are led by associations of companies such as battery manufacturers, users and recyclers, including the National Alliance for Advanced Technology Batteries (NAATBatt) and the Responsible Battery Coalition.

The U.S. Department of Energy (DOE) has also recently initiated new projects to push forward recycling technology and develop a domestic recycling industry for Li-ion batteries recovered from consumer products, EVs, and stationary ESS facilities.

The ReCell Lithium Battery Recycling R&D Center,[30] led by Argonne National Laboratory along with other national labs and universities, is pursuing several areas of recycling innovation:

- **Designing for recycling** that would make recycling easier and cheaper by planning for disassembly and recycling in the physical layout or chemistry of batteries.

[28] See Lithium-ion Car Battery Recycling Advisory Group in Additional Resources for information and materials.
[29] See World Economic Forum, *A Vision for a Sustainable Battery Value Chain in 2030: Unlocking the Full Potential to Power Sustainable Development and Climate Change Mitigation* (September 2019), and Global Battery Alliance, "42 Global Organizations Agree on Guiding Principles for Batteries to Power Sustainable Energy Transition" (January 23, 2020).
[30] Argonne National Laboratory, "DOE launches its first lithium-ion battery recycling R&D center: ReCell" (February 15, 2019).

- **Direct cathode recycling** that would improve recovery of cathode material and enhance the value of lithium batteries in recycling.
- **Improving the recovery** of other materials to create more value from recycling.
- **Reintroduction** of recycled materials into new batteries.

In November 2019, ReCell and the Responsible Battery Coalition announced a partnership to jointly pursue advancements in Li-ion battery recycling. In addition, DOE's Li-ion Battery Recycling Prize, administered by the National Renewable Energy Laboratory, seeks to increase Li-ion recycling rates from consumer, EV, and stationary storage to 90% with $5.5 million in awards to improve collection, separating and sorting, safe storage and transportation, reverse logistics, and other areas.[31]

Other DOE-led efforts seek to reduce critical mineral dependence in Li-ion batteries, which will promote domestic recycling. Most recently, in January 2020, DOE announced the Energy Storage Grand Challenge, which includes a call to create "a secure domestic manufacturing supply chain that is independent of foreign sources of critical materials, by 2030." [32] Recent DOE workshop materials highlight the importance of materials recovered from domestic recycling efforts as critical to attaining that goal.[33]

Conclusion

Most U.S. grid-connected energy battery storage systems have only recently been installed and system lifetimes can span more than 15 years; therefore few storage systems in the U.S. have confronted end-of-life issues and undergone decommissioning.[34] Thus, end-of-life alternatives to disposal for ESS facilities have not yet developed into a consistently regulated and economically viable activity. However, the U.S. storage industry is preparing to develop responsible industry practices.

Used EV Li-ion batteries are increasingly being diverted from disposal pathways into a growing recycling industry and even reuse in stationary ESS applications. The lessons learned from used EV Li-ion batteries may help develop sustainable pathways for decommissioned ESS facilities. Not only can

[31] NREL, "Competition Spurs Transformative Lithium-Ion Battery Recycling Solutions" (February 28, 2019).
[32] U.S. Department of Energy, "U.S. Department of Energy Launches Energy Storage Grand Challenge" (January 8, 2020).
[33] Howell, David, "Lithium Battery Technology Discussion," Presentation at NREL (March 16, 2020).
[34] As of March 24, 2020, U.S. Energy Information Administration Form 860m data showed only 11 ESS systems (totaling 52.5 MW) retired to date.

recycling of Li-ion batteries be environmentally beneficial, it can be economically desirable given the right combination of materials, processes, and commodity market prices. Right now, commercial recycling does not yet exist at a scale sufficient to process today's used EV batteries or the forthcoming decommissioned ESS batteries. Significant R&D efforts and increasing investments in recycling capacity are needed to ensure that recycling at scale is economic and practicable. In the meantime, states and other jurisdictions are beginning to develop rules and processes regarding decommissioning, transportation, disposal, and reuse.

The U.S. Energy Storage Association continues to lead the U.S. storage industry and engage with key stakeholders to foster innovation and advanced practice guidelines in emergency preparedness, safety, supply chain, end-of-life and recycling issues. To learn more about how ESA is working proactively on these issues, visit the ESA's Corporate Responsibility Initiative webpage to obtain previously-published and forthcoming resources.

Additional Resources

1. Argonne Lab ReCell Center: https://recellcenter.org/
2. California Environmental Protection Agency Lithium-ion Car Battery Recycling Advisory Group homepage: https://calepa.ca.gov/climate/lithium-ion-car-battery-recycling-advisory-group/
3. Call2Recyle interactive map of recycling laws by state: https://www.call2recycle.org/recycling-laws-by-state/
4. NAATBatt "Laws, Regulations and Best Practices for Lithium Battery Packaging, Transport and Recycling in North America" https://naatbatt.org/lithium-recycling-laws/
5. NREL Lithium Ion Battery Recycling Prize: https://www.herox.com/BatteryRecyclingPrize
6. U.S. Department of Energy, Energy Storage Grand Challenge: https://www.energy.gov/energy-storage-grand-challenge/energy-storage-grand-challenge
7. U.S. Energy Information Administration Form 860m: https://www.eia.gov/electricity/data/eia860m/

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