Appendix K Electrical Equipment Specification Sheets

TRACKER S-SERIES

FLEXRACK by QCells

FLEXRACK SERIES

FlexTrack - S Series

Tough, Reliable Tracker & Team of Experts at Your Service

Single row, central slew drive balanced system

Engineered for long term durability and reliability

Low cost to maintain

Flexible to accommodate and optimize all your project design and generation needs

Superior land density with no gaps at the bearings

Available in Self-Powered and Grid-Powered options

Designed with intuitive constructability which translates to superior installation times and lower project costs

Over 500 projects successfully deployed throughout the USA and Canada

Bankable Product and Team. Successfully completed stringent third party bankability review for use on utility, C&I, and DG projects.



Professional engineering & superior quality products

Let us be your hands-on comprehensive partner. FLEXRACK by QCells has the most flexible product offering, customizable to your project needs.

Distributed Drive Reduces Operations And Maintenance Costs

FlexTrack Trackers have no mechanical components between rows, allowing easy access for mowers, cleaning services and other project maintenance.

Smart Backtracking Maximizes Energy Production

FlexTrack trackers can be programmed based on the terrain, to optimize MWh production. Trackers on east-facing slopes get more early-morning sun, and trackers on west-facing slopes get more in the late afternoon, increasing overall yield.

Complete Service Offering Reduces Project Costs And Risks

A tracker solution that comes with all the critical associated services – and an unmatched team of experts – will dramatically reduce your total cost. Project management is simplified, redundancies are eliminated, and we will assist you with optimizing your solar projects

216-998-5988 | INFO@FLEXRACK.COM | FLEXRACK.COM



CONTROL SYSTEM

Data Feed	Ethernet to Network Control Unit
Power Consumption	Grid-Powered: 31kWh per tracker per year
Tracker Controller	1 Controller to DC motor per tracker
Size	230 x 100 x 150 mm
Battery (self-powered)	Rechargeable LiFePO4 (Lithium Iron Phosphate 3Ah (standard operating temperatures), 6Ah for low temperature conditions
Battery Charging (self-powered)	Optimum charging through CC/CV algorithm for LiFePO4 Chemistries which contributes to extended battery life
SoC Monitoring (self-powered)	SoC achieved through OCV and Coulomb counting algorithms
Operating Temperatures	Grid Powered:-20C to 60C Self Powered (Standard): -10C to 50C Self Powered (Low Temp): -30C to 40C
Interface	HMI (includes enclosure mounted keypad LED visual interface)
Communication	Zigbee Wireless
PV Module (self-powered)	Standard: 38W Monocrystalline Low Temp: 76W Monocrystalline

SERVICES

Geotechnical Services	**Configuration of Tracker Controls**
Structural Analysis	**Project Management**
Layout and Design Services	**PE Stamp**
Foundation Design Services	**On-site Training**
Post Driving	**Commissioning of Tracker System**
Pull Testing	**Tracking System Installation**

UL COMPLIANCE

All FLEXRACK by Qcell systems have gone through UL testing. Each component-connection point within the system conforms to NEC codes for electrically bonded and conductive systems. Testing is performed by Solar PTL in accordance with UL 3703.

Certification covers both United States and Canada.

TRACKING

Tracking Method	Single-axis horizontal, distributed drive
Backtracking	Smart backtracking - 3D backtracking technology available to reduce row shading and optimize energy production on challenging terrain. Overcast feature intelligently positions trackers to optimize energy yields for diffused light conditions and bifacial modules
Tracking Range	Up to 110° (± 55°)
Ground Coverage Ratio (GCR)	No limitation. Configurable based on site conditions.
Tracking Accuracy	2°
Stow Features	Stow Strategy is customized to meet project specifications to protect system from extreme weather events including wind, snow, hail, and flooding

ARRAY CONFIGURATION

Panels per Tracker	Up to 90 (72 Cell Modules)
Trackers per Controller	1
String Voltage	Up to 1,500 volts
Posts per Tracker	Dependant on tracker size and site conditions, approximately 15 posts for 90 panels
Panel Configurations*	1 in portrait (crystalline) 2 in landscape (crystalline) 4 in landscape (thin film)
Drive Type	Slew 24 Volts DC

OPERATIONS AND MAINTENANCE

Scheduled Maintenance	None
Warranty	10 Years: Structural 5 Years: Drives and Electrical
Certifications	UL 3703
Dynamic Load Management	Integrated frictional dampening and limited progressive dampening technology

INSTALLATION TOLERANCES

North-south Slope Tolerance	Up to 7%
North-south Post Spacing	± 1.5 inches (.038 meter)
East-west Post Alignment	+/- 0.75 inches
Post Height	± 1 inch (0.025 meter)
Post Plumb	± 1°

CONSTRUCTION

Structural Materials	Galvanized Steel. Multiple coatings available.
Bearings	UV-rated engineering plastic, no lubrication needed
Mechanical Connections	Bolted - no welding, drilling or cutting required

ENVIRONMENTAL

Wind (IBC-2012/ASCE 7-10)	Up to 130 mph (Trackers can be customized to higher wind speeds upon request) 35 mph stow position
Snow Load	30 psf (Trackers can be customized to higher snow loads upon request)

TESTING

Rain, wind, sleet, snow, heat – every day and everywhere, our products are battling the elements. We perform ongoing extensive testing in these key areas: wind tunnel, structural load, electrical bonding, and life cycle. FLEXRACK by Qcell trackers also undergo wind tunnel testing performed by RWDI and CPP, per American Society of Civil Engineers Standard ASCE 7.

*Adaptable to all module sizes

50 YEARS & OVER 4 GIGAWATTS

FLEXRACK by Qcells is an integrated solar company that offers custom-designed, fixed tilt ground mount and single-axis solar tracking systems in the commercial and utility-scale solar mounting industries. FLEXRACK also offers full services, including engineering, geotechnical, pullout testing, field, and layout design services to address the actual site conditions of a project site. FLEXRACK has completed over 4 GW of solar racking installations in over 40 U.S. states and across the globe.

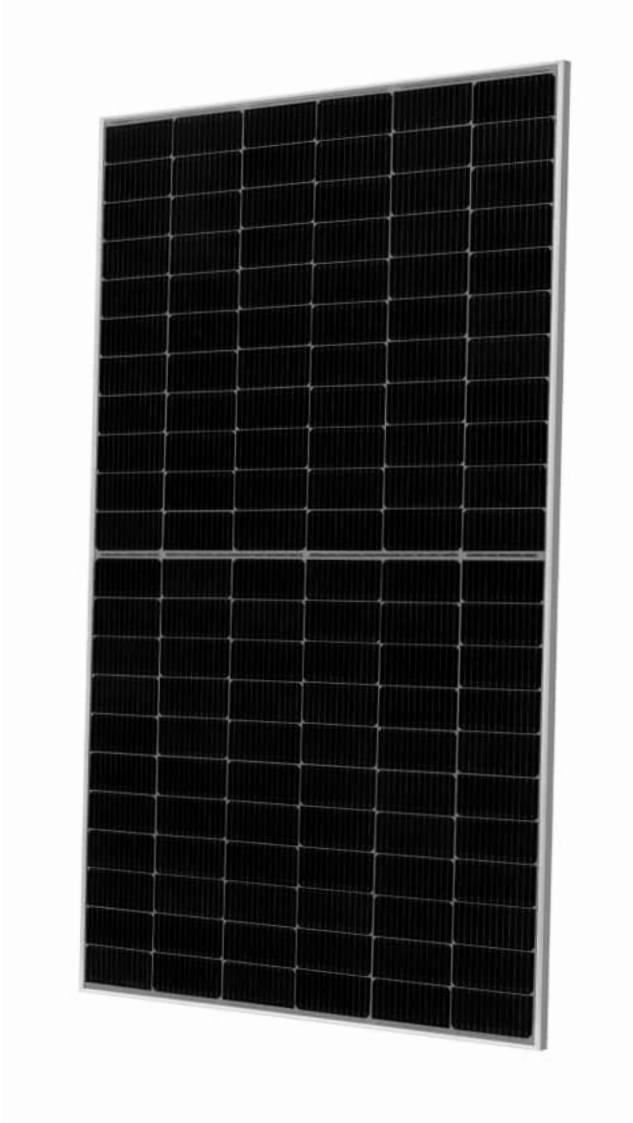
FLEXRACK by Qcells

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Q.PEAK DUO ML-G12S SERIES

660-675 Wp | 132 Cells
21.7 % Maximum Module Efficiency

MODEL Q.PEAK DUO ML-G12S.3 / BFG
Q.PEAK DUO ML-G12S.d / BFG



Bifacial energy yield gain of up to 21 %

Bifacial Q.ANTUM solar cells make efficient use of light shining on the module rear-side for radically improved LCOE.

Low electricity generation costs

Q.ANTUM DUO technology with optimized module layout to boost module power and improve LCOE.

A reliable investment

Double glass module design enables extended lifetime with 12-year product warranty and improved 30-year performance warranty[1].

Enduring high performance

Long-term yield security with Anti LID and Anti PID Technology[2], Hot-Spot Protect.

Frame for versatile mounting options

High-tech aluminum alloy frame protects from damage, enables use of a wide range of mounting structures and is certified regarding IEC for high snow (5400 Pa) and wind loads (2400 Pa).

Innovative all-weather technology

Optimal yields, whatever the weather with excellent low-light and temperature behavior.

[1] See data sheet on rear for further information.
[2] APT test conditions according to IEC / TS 62804-1:2015 method B (–1500 V, 168 h) including post treatment according to IEC 61215-1-1 Ed. 2.0 (CD)

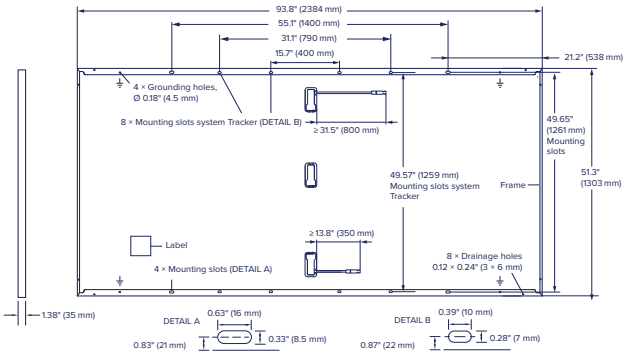
The ideal solution for:

Ground-mounted solar power plants

Q.PEAK DUO ML-G12S SERIES

Mechanical Specification

Format	93.8 in × 51.3 in × 1.38 in (including frame) (2384 mm × 1303 mm × 35 mm)
Weight	84.2 lbs (38.2kg)
Front Cover	0.08 in (2.0 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	0.08 in (2.0 mm) semi-tempered glass
Frame	Anodised aluminium
Cell	6 × 22 monocrystalline Q.ANTUM solar half cells
Junction box	2.09-3.98 × 1.26-2.36 × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), Protection class IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥31.5 in (800 mm), (−) ≥13.8 in (350 mm)
Connector	Stäubli MC4; Stäubli MC4-Evo2; - IP68



Electrical Characteristics

POWER CLASS			660		665		670		675	
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / −0 W)				BSTC*		BSTC*		BSTC*		BSTC*
Minimum — Power at MPP[1]	P_{MPP}	[W]	660	721.9	665	727.4	670	732.9	675	738.4
Minimum — Short Circuit Current[1]	I_{SC}	[A]	18.36	20.10	18.39	20.13	18.42	20.16	18.45	20.20
Minimum — Open Circuit Voltage[1]	V_{OC}	[V]	45.71	45.88	45.84	46.01	45.97	46.14	46.10	46.27
Minimum — Current at MPP	I_{MPP}	[A]	17.39	19.03	17.45	19.09	17.51	19.16	17.56	19.22
Minimum — Voltage at MPP	V_{MPP}	[V]	37.94	37.94	38.11	38.10	38.27	38.26	38.43	38.42
Minimum — Efficiency[1]	η	[%]	≥21.2		≥21.4		≥21.6		≥21.7	

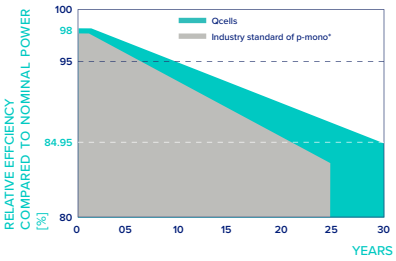
Bifaciality of P_{MPP} and I_{SC} 70 % ± 5 % • Bifaciality given for rear side irradiation on top of STC (front side) • According to IEC 60904-1-2

[1]Measurement tolerances P_{MPP} ±3 %; I_{SC}, V_{OC} ±5 % at STC: 1000 W/m²; *at BSTC: 1000 W/m² + φ × 135 W/m², φ = 70 %, 25 ± 2 °C, AM 1.5 according to IEC 60904-3

MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]						
Minimum — Power at MPP	P_{MPP}	[W]	496.9	500.7	504.4	508.2
Minimum — Short Circuit Current	I_{SC}	[A]	14.79	14.81	14.84	14.86
Minimum — Open Circuit Voltage	V_{OC}	[V]	43.24	43.36	43.49	43.61
Minimum — Current at MPP	I_{MPP}	[A]	13.67	13.73	13.78	13.83
Minimum — Voltage at MPP	V_{MPP}	[V]	36.34	36.48	36.62	36.75

[1]Measurement tolerances P_{MPP} ±3 %; I_{SC}; V_{OC} ±5 % at STC: 1000 W/m², 25 ± 2 °C, AM 1.5 according to IEC 60904-3 • [2]800 W/m², NMOT, spectrum AM 1.5

Qcells PERFORMANCE WARRANTY

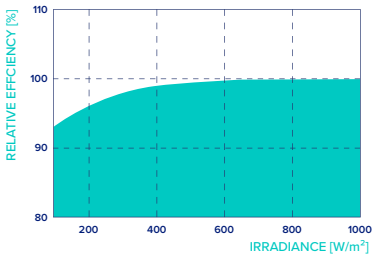


At least 98 % of nominal power during first year. Thereafter max. 0.45 % degradation per year. At least 93.95 % of nominal power up to 10 years. At least 84.95 % of nominal power up to 30 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Qcells sales organisation of your respective country.

*Standard terms of guarantee for the 5 PV companies with the highest production capacity in 2021 (February 2021)

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²).

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	Temperature Coefficient of V_{OC}	β	[%/K]	−0.27
Temperature Coefficient of P_{MPP}	γ	[%/K]	−0.34	Nominal Module Operating Temperature	NMOT	[°F]	108 ± 5.4 (42 ± 3 °C)

Properties for System Design

Maximum System Voltage	V_{SYS}	[V]	1500
Maximum Series Fuse Rating		[A DC]	30
Max. Design Load, Push / Pull[3]		[lbs / ft²]	75 (3600 Pa) / 33 (1600 Pa)
Max. Test Load, Push / Pull[3]		[lbs / ft²]	113 (5400 Pa) / 50 (2400 Pa)

[3] See Installation Manual

PV module classification	Class II
Fire Rating based on ANSI / UL 61730	TYPE 29[4]
Permitted Module Temperature on Continuous Duty	−40 °F up to +185 °F (−40 °C up to +85 °C)

[4] New Type is similar to Type 3 but with metallic frame

Qualifications and Certificates

UL 61730, CE-compliant,
IEC 61215:2016,
IEC 61730:2016,
U.S. Patent No. 9,893,215
(solar cells)

Specifications subject to technical changes © Qcells Q.PEAK_DUO_ML-G12S-BFG_series_660-675_2023-12_Rev04_NA

Qcells pursues minimizing paper output in consideration of the global environment.

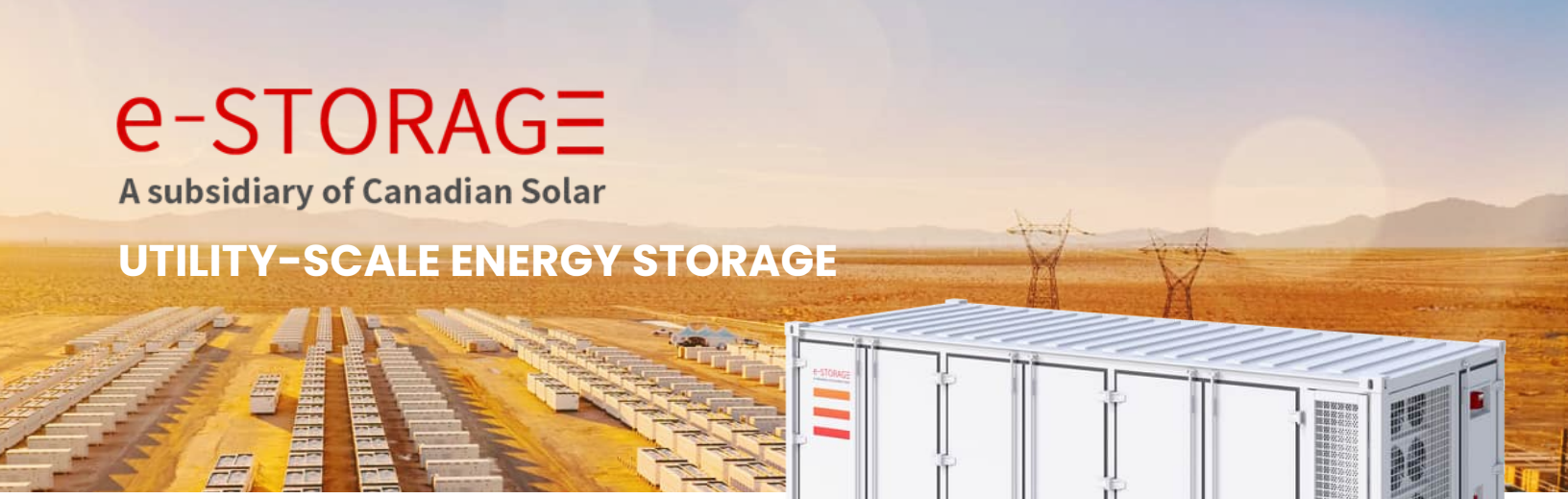
Note: Installation instructions must be followed. Contact our technical service for further information on approved installation of this product.

Hanwha Q CELLS America Inc. 400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL hqc-inquiry@qcells.com | WEB www.qcells.com

e-STORAGE

A subsidiary of Canadian Solar

UTILITY-SCALE ENERGY STORAGE





SolBank 3.0

ENERGY STORAGE SYSTEM

S-5016-2H-NA|S-5016-4H-NA

Capacity: 5.0 MWh

e-STORAGE, a subsidiary of **Canadian Solar**, is a world-class energy storage solution provider, specializing in storage system design, manufacturing, and integration of battery energy storage systems for utility-scale applications.

The company offers value-added system consulting and turnkey EPC services, in addition, we provide customers with our proprietary LFP battery solution SolBank.

Together, we are building a brighter, greener future for all.

SolBank 3.0 Highlights

- **Cutting-Edge Technology**: SolBank 3.0 features high-density LFP cells, an active balancing BMS, and an innovative liquid cooling TMS, ensuring optimal safety.

- **Compliance and Certifications**: SolBank 3.0 adheres to all industry standards: NFPA855, NFPA69, NFPA72, NFPA70E, and optional NFPA68. Certified under UL1973, UL9540, UL9540A, UN38.3/UN3536, ensuring rigorous safety and performance criteria.

Key Features

Enhanced Energy Density

- Utilizes 314 Ah battery cells and compact integration, increases single container energy density up to 45%
- Reduces land cost by up to 35% in a 100MWh project

Safety

- IP67-rated pack design
- Up to 20% faster detection of abnormal and automatic protection
- Advanced pack thermal isolation, electrical redundancy protection, and multi-level fire protection, effectively minimize potential issues

Intelligent Control

- Liquid cooling cuts auxiliary consumption up to 30%
- Active balance and string-level management, guarantee high efficiency and availability

Compatibility & Installation

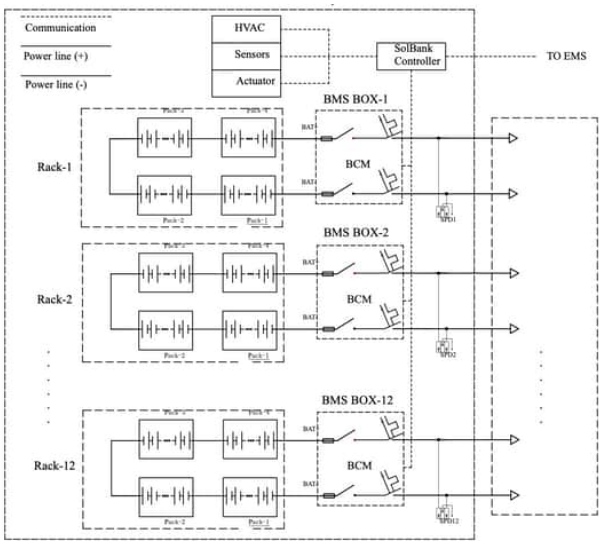
- Supports various PCS topologies
- Turn-key integration and stationery certification, reduce project schedule risks by up to 40%
- Plug-and-play setup for streamlined commissioning

SolBank 3.0
System Parameter

e-STORAGE
A subsidiary of Canadian Solar

General		
Product Model	CSI-SolBank-S-5016-2h-NA	
	CSI-SolBank-S-5016-4h-NA	
Battery Chemistry	Lithium Iron Phosphate (LFP)	
Pack Configuration	1P104S (104 Cells)	
Rack Configuration	1P416S (4 Packs)	
System Configuration	12P416S (12 Racks)	
Nominal DC Voltage	1331.2 V	
Operation DC Voltage Range	1164.8 V ~ 1497.6 V	
Performance		
Rated DC Power	2350 kW	1200 kW
Initial Storage Capacity	4700 kWh	4800 kWh
Charging/Discharging Mode	0.5 P / 0.5 P	0.25 P / 0.25 P
Duration @Rated Power	2hrs	4hrs
Round Trip Efficiency (RTE)	93%	94%
Max. Short Circuit Current	10 kA*12	10 kA*12

SolBank 3.0
Circuit Diagram



Aux Systems	
Auxiliary Power Interface	AC480 V / 60 Hz, 3P5W
Thermal Management System	Smart liquid cooling/heating for battery system
Aux Load (Standby/Peak)	1.5 kVA / 50 kVA
	1.5 kVA / 22 kVA
Operating Temperature (Ambient)	-30 °C to 55 °C (derating from 45°C to 55°C)
Relative Humidity	≤95% (non-condensing)
Altitude	< 2000 m (derating from 2000 m to 4000 m)
External Communication Interface	Ethernet connection, Modbus TCP/IP protocol
Safety	
Fire Detection and Alarm	Fire alarm panel, heat and smoke detection, alarm bell and strobe
Explosion Prevention	Combustible gas detector with active ventilation
Uninterrupted Power Reserve	Container level UPS for 2-hr control system backup; dedicated fire safety UPS for 24-hr fire alarm backup
Fire Suppression Options	Aerosol-based suppression system. Dry pipe sprinkler system.
Emergency Stop/Automatic Shut-off	Local and Remote
Mechanical	
Enclosure	20ft. high-cube container
Dimensions (L*W*H)	6058*2438*2896 mm (238.50*95.98*114.02 in)
Weight (Battery Included)	43,000 kg (94,800 lbs)
Enclosure Ingress Rating	IP55 / NEMA 3R
Painting/Coating	RAL9003 / C4 Coating
Seismic Parameter	Zone 4
Noise @1m distance	≤ 75 dB @1m distance

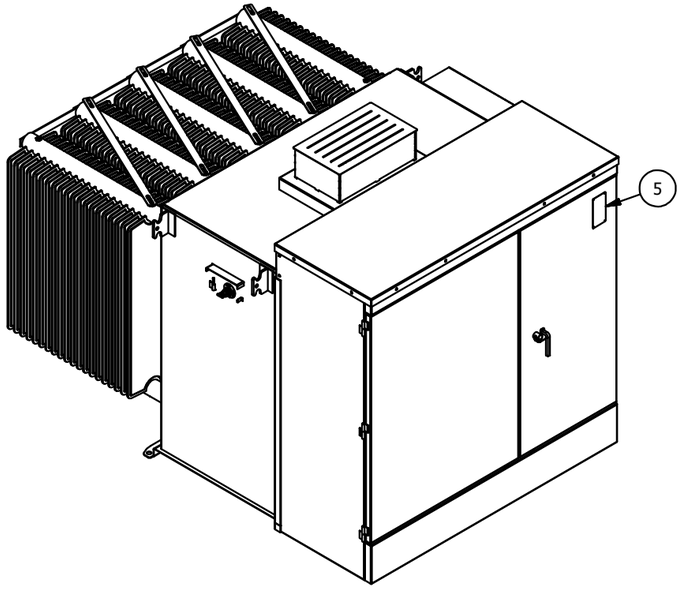
Notes

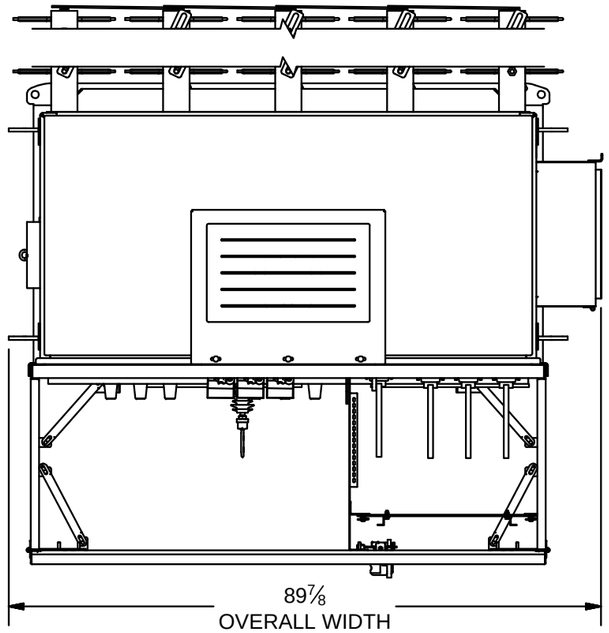
1. The unit is rated at 1164.8V~1497.6V for optimized product performance, the maximum voltage range for the battery system is 1060.8V~1497.6V
2. Rated DC Power is measured at the product DC terminal, the Rated DC Power and Initial Storage Capacity is limited to the use of two SolBank 3.0 units connected in parallel
3. Initial Storage Capacity is the usable product capacity at FAT, contact e-STORAGE for capacity at COD per project schedule
4. DC RTE is measured during capacity test at Rated DC Power, refer to the product warranty document for the complete procedure

Due to ongoing innovation, improvements, and product enhancements, the technical specifications in this document are subject to change and are not guaranteed.
Canadian Solar reserves the right to update or change its products or this technical data without prior notice and customers should not rely upon these or any technical specifications which are not made part of a definitive binding agreement.

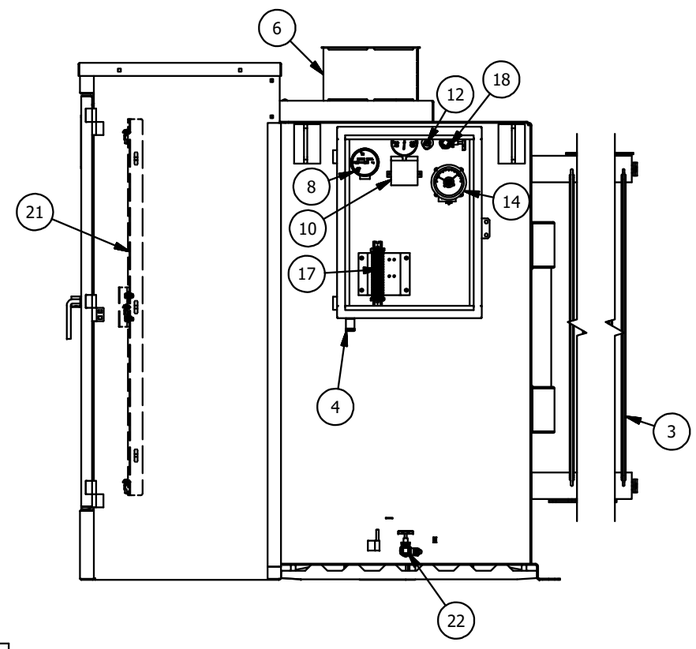
Canadian Solar SSES (US) Inc. 545 Speedvale Avenue West, Guelph Ontario | Canada N1K1E6, support@csestorage.com

REV	DATE	BY	APPROVED	DESCRIPTION
1	10/6/2025	AP	ZW	CHANGED LV BUSHINGS FROM 10 TO 12 HOLE SPADES





ITEM	QTY	DESCRIPTION
1	5	PARKING STANDS
2	3	2 HOLE GROUND PAD 3.5"W x 2"H x 5/8" THICK SS
3	5	RADIATORS
4	1	BREATHER VENT 1.25-.50 NPT hub
5	3	Name Plate 4"x8" SS - 2 STANDARD, 1 IN GAUGE BOX FOR CONTROLS
6	1	COVER-MOUNTED PRESSURE RELIEF DEVICE 10 PSI
7	6	HV BUSHING NON-LOADBREAK 200 BIL 600A
8	1	LIQUID LEVEL GAUGE WITH 1 CONTACT
9	1	H0 BUSHING 150 BIL 4 HOLE SPADE, GROUNDED
10	1	PRESSURE VACUUM GAUGE WITH 2 CONTACTS & SCHRADER VALVE
11	1	STATIC SHIELD BUSHING 30 BIL, GROUNDED
12	1	PRESSURE RELIEF VALVE WITH MANUAL PULL RING 10 PSI
13	1	SWITCH TAP CHANGER ASSY 63A 30KV 6T SILVER
14	1	LIQUID TEMPERATURE GAUGE WITH 2 CONTACTS
15	3	BAYONET FUSE - 65A
16	1	2 POS LB SWITCH 200BIL 300A - IN PADLOCKABLE BOX
17	1	TERMINAL BLOCK 18 POLE
18	1	FILL VALVE ASY GLOBE 1"NPT
19	2	COPPER GROUND BAR IN HV & LV COMPARTMENTS - 7 HOLES EACH
20	3	Plastic drip shield
21	1	LV LEXAN BARRIER ASSEMBLY
22	1	VALVE DRAIN GLOBE 1" w/ SIDE SAMPLER - IN PADLOCKABLE BOX
23	4	LV EPOXY BUSHINGS 30 BIL 12 HOLE SPADE, SUPPORTED, X0 GROUNDED



3 UNDER-OIL CURRENT LIMITING FUSES - 8.3KV 200A
- HITECH #HTSS372200

3 ELBOW ARRESTERS SHIPPED WITH TRANSFORMER - 27KV 22.0MCOV 35CL
- HUBBELL #235ELA27

DGA TEST TO BE PERFORMED

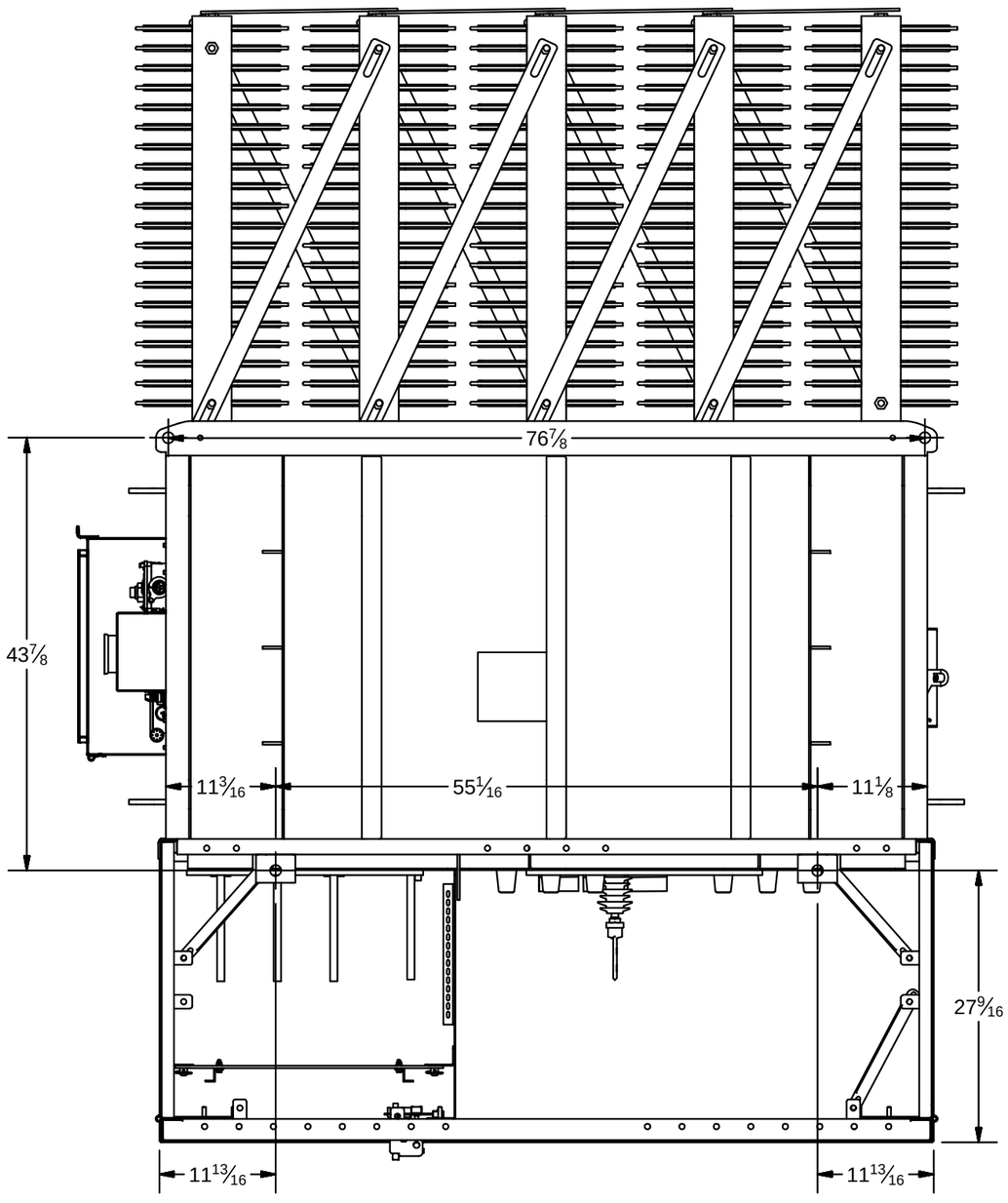
CUSTOMER: BLUEWAVE
S.O.# 496921501-010
KVA: 2500/2800
PRIMARY VOLTAGE: 34500Y/19920, 150 BIL WINDINGS, 200 BIL ACCESSORIES
SECONDARY VOLTAGE: 600Y/346, 45 BIL WINDINGS, 30 BIL ACCESSORIES
PAINT: GREEN (MUNSELL 7.0GY3.29/1.5)
FLUID: ENVIROTEMP FR3
OIL VOLUME: 762 GAL
TOTAL WEIGHT: 17267 LBS

DIVISION	TITLE				
DT	3ph Pad Transformer				
TOLERANCE	PART NUMBER		MATERIAL		
mm / in.	TopLevel				
STD ± 3 / ± 0.10	DRAWN BY	APPROVED	DATE	SCALE	UNITS
* ± 1 / ± 0.04	apanico		9/16/2025	NTS	IN
** ± 0.5 / ± 0.02					
ANGULAR ± 2°					

IDW - ANSI - A

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BOTTOM OF TRANSFORMER
SEISMIC ANCHORING HOLE LOCATIONS
Ø1.125" QTY. 4

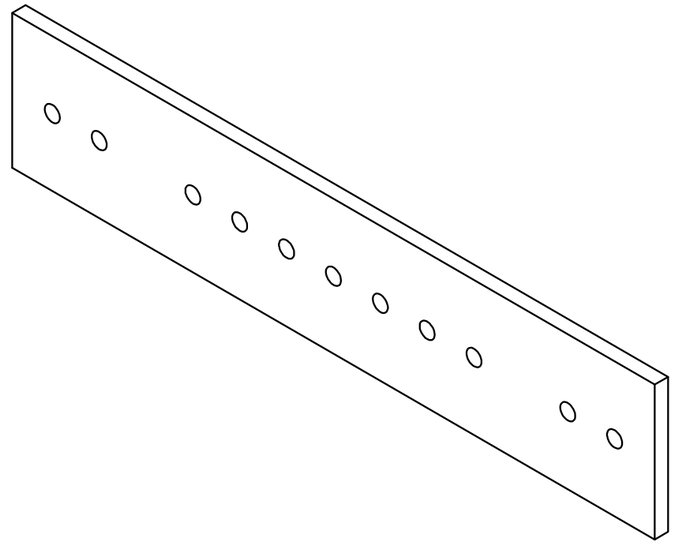


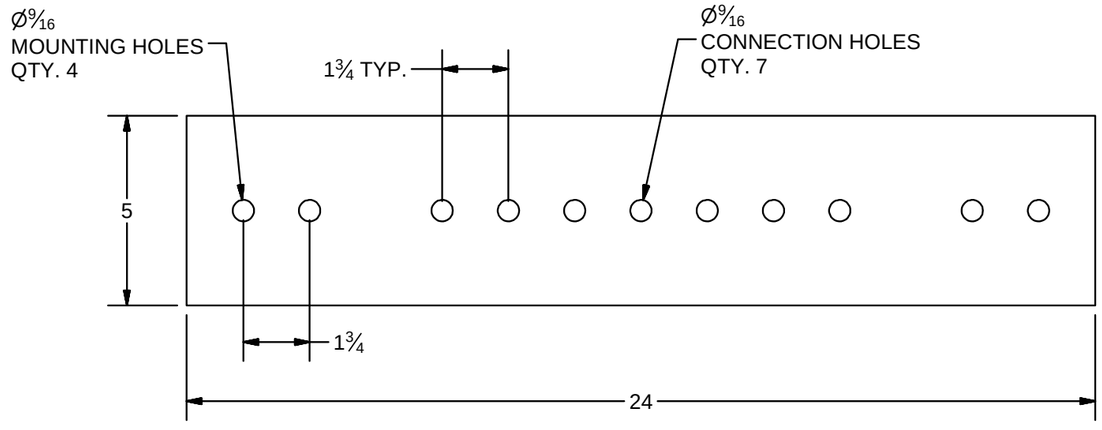
DIVISION			TITLE					
DT			3ph Pad Transformer					
TOLERANCE			PART NUMBER		MATERIAL			
	mm	in.	TopLevel					
STD	± 3	± 0.10	DRAWN BY	APPROVED	DATE	SCALE	UNITS	
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**	± 0.5	± 0.02						
ANGULAR		± 2°						

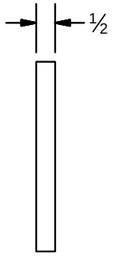
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COPPER GROUND BAR IN HV & LV COMPARTMENTS







DIVISION			TITLE				
DT			COPPER GROUND BAR M50 24L 5W				
TOLERANCE			PART NUMBER		MATERIAL		
	mm	in.	951		Copper		
STD	± 3	± 0.10	DRAWN BY	APPROVED	DATE	SCALE	UNITS
*	± 1	± 0.04					
**	± 0.5	± 0.02	apanico		9/16/2025	NTS	IN
ANGULAR		± 2°					

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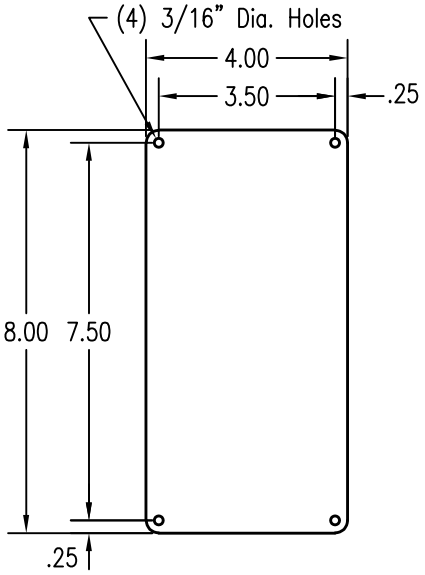
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Design X/R
7.45

Design Impedance
5.75 %

Approval Block

- ☐ Approved as Submitted
- ☐ Approved as Noted
- ☐ Resubmit Sign & Date



(4).1875" DIA. MTG. HOLES ON CENTERLINE 3.5" x 7.5" APART. SIZE OF PLATE 4.0" x 8.0" WITH .25" CORNER RADIUS.

55°/65°C
ENVIROTEMP FR3
NON-DOE 2016 COMPLIANT

MANUFACTURED IN WASHINGTON MO 63090 USA

THREE PHASE TRANSFORMER 55/65 °C RISE 60 HZ CLASS KNAN ENVIROTEMP FR3 FLUID

2500/2800 kVA HV (AL) 34500Y/19920
LV (AL) 600Y/346

S/N
MODEL M0215179-0100

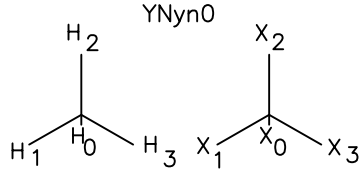
CORE & COIL (UNTANKING)	6892 LBS
TANK & FITTINGS	4521 LBS
LIQUID 762 GAL	5854 LBS
TOTAL	17267 LBS
DATE OF MFG. MM/YYYY	

%IMP

DETC SWITCH POSITION	LINE-LINE VOLTAGE (V)	LINE TOP CURRENT (A)
A OR 1	36225	44.6
B OR 2	35363	45.7
C OR 3	34500	47.0
D OR 4	33638	48.1
E OR 5	32775	49.3
	600	2694

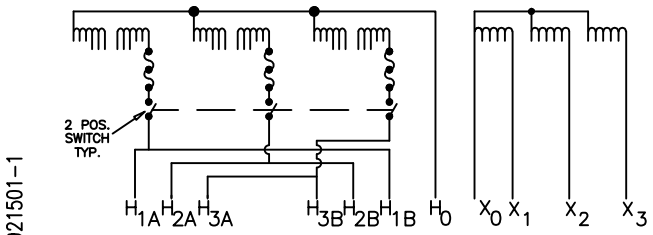
HV BIL WNDGS/ACCSS: 150/200 KV
LV BIL WNDGS/ACCSS: 45/30 KV

YNyn0



c UL US LISTED
Liquid Immersed
Distribution Transformer
16LR No.E495851

LIQUID CONTAINS LESS THAN 1 PPM PCB's AT TIME OF MANUFACTURE. LIQUID LEVEL AT 25°C IS 6" BELOW TOP OF HANDHOLE FLANGE. LIQUID LEVEL CHANGES 0.5" PER 10°C CHANGE IN LIQUID TEMPERATURE. OPERATING PRESSURES OF PRESERVATION SYSTEM ARE 7 PSIG MAX & -2 PSIG MIN. TANK IS DESIGNED FOR 3 PSIG VACUUM FILLING AND MUST BE SOLIDLY GROUNDED. BEFORE INSTALLATION AND OPERATION READ INSTRUCTION BOOK. +7-1801



496921501-1

NON-DOE 2016 COMPLIANT
DESIGN FOR STEP-UP OPERATION @ < 3300 FT ASL

R0	PR	ZW	----	9/12/2025	
FOR APPROVAL					

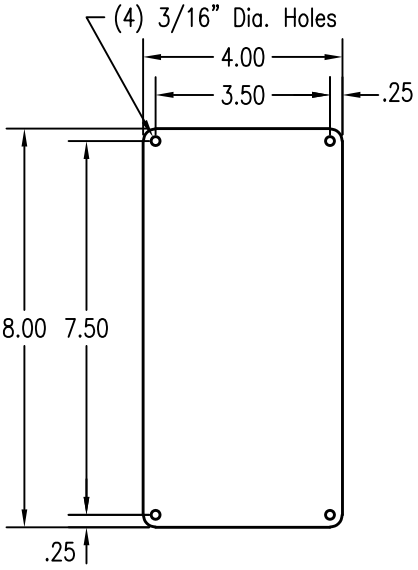
WEG
WASHINGTON, MO 63090, USA

NAME:					
WEG NAMEPLATE					
MAT'L:					
SST					
DATE:	PART NUMBER:				REV:
9/12/2025	496921501-1				0
DECIMAL	ANGULAR	FRACTIONAL	SCALE	TOLERANCES (except as noted)	DRAWN BY:	APPROVED
± .032	± 2°	± 1/32	NTS	± .032	PR	ZW

Approval Block

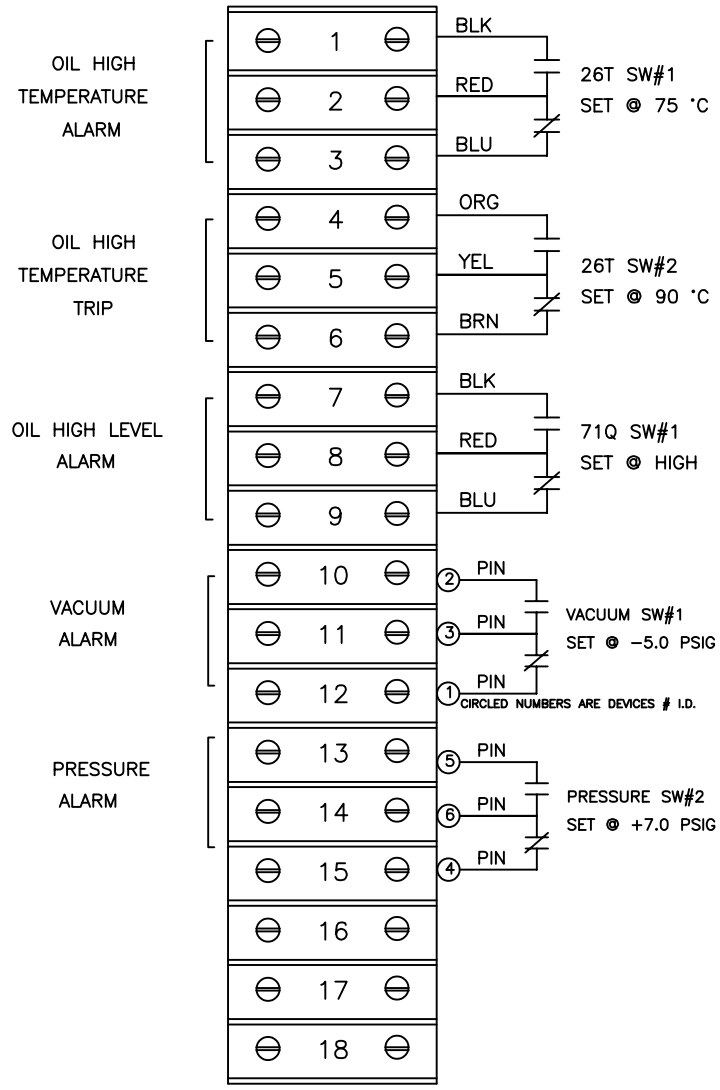
- ☐ Approved as Submitted
- ☐ Approved as Noted
- ☐ Resubmit

Sign & Date



MATERIAL: ALUMINUM (4).1875" DIA. MTG. HOLES ON CENTERLINE 3.5" x 7.5" APART. SIZE OF PLATE 4.0" x 8.0" WITH .25" CORNER RADIUS.

MANUFACTURED IN WASHINGTON MO 63090 USA



496921501-1A

R0	PR	ZW	----	9/12/2025
FOR APPROVAL				

WASHINGTON, MO 63090, USA

NAME: WEG CONTROL NAMEPLATE

MAT'L: SST

DATE:	PART NUMBER:	REV:
9/12/2025	496921501-1A	0

DECIMAL	ANGULAR	FRACTIONAL	SCALE	TOLERANCES (except as noted)	DRAWN BY:	APPROVED
± .032	± 2°	± 1/32	1:1	± .032	PR	ZW

SOLECTRIA® XGI 1500-166 SERIES

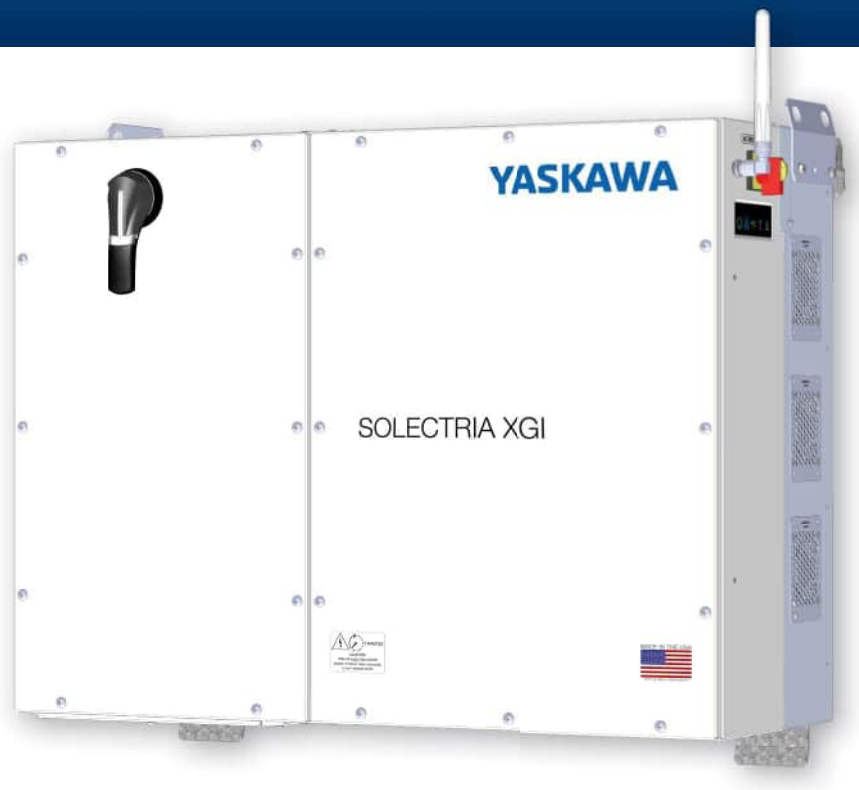
PREMIUM 3-PHASE TRANSFORMERLESS UTILITY-SCALE INVERTERS

FEATURES

- Made in the USA with global components
- Buy American Act (BAA) compliant
- Four models:
  - 125kW/125kVA,
  - 125kW/150kVA,
  - 150kW/166kVA,
  - 166kW/166kVA
- Additional models available certified to UL1699b, Photovoltaic DC Arc-Fault Circuit Protection
- 99.0% peak efficiency
- Flexible solution for distributed and centralized system architecture
- Advanced grid-support functionality Rule 21/UL1741SB
- Robust, dependable, & built to last
- Lowest O&M and installation costs
- Access all inverters on site via WiFi from one location
- Remote diagnostics and firmware upgrades
- SunSpec Modbus Certified
- Tested compatible with the TESLA PowerPack Microgrid System app for system visibility

OPTIONS

- String combiners for distributed and centralized systems
- Web-based monitoring
- Extended warranty



Yaskawa Solectria Solar's XGI 1500 utility-scale string inverters are designed for high reliability and built of the highest quality components that were selected, tested and proven to last beyond their warranty.

XGI 1500 inverters provide advanced grid-support functionality and meet the latest IEEE 1547 and UL1741SB standards for safety. They are the most powerful 1500 VDC string inverters in the PV market and have been engineered for both distributed and centralized system architecture.

Designed and engineered in Lawrence, MA, XGI inverters are assembled and tested at Yaskawa America's facilities in Buffalo Grove, IL. They are Made in the USA with global components and are compliant with the Buy American Act.

YASKAWA
SOLECTRIA SOLAR

Yaskawa Solectria Solar 1-978-683-9700 | Email: sales@solectria.com | solectria.com
Document No. FL.XGI1500.01 | 04/26/2023 | © 2021 Yaskawa America, Inc.

SOLECTRIA® XGI 1500-166 SERIES TECHNICAL DATA

SPECIFICATIONS

SOLECTRIA XGI 1500 Model		XGI 1500-125/125-UL XGI 1500-125/125-UL-A	XGI 1500-125/150-UL XGI 1500-125/150-UL-A	XGI 1500-150/166-UL XGI 1500-150/166-UL-A	XGI 1500-166/166-UL XGI 1500-166/166-UL-A
DC Input	Absolute Max Input Voltage	1500 VDC	1500 VDC	1500 VDC	1500 VDC
	Max Power Input Voltage Range (MPPT)	860-1250 VDC	860-1250 VDC	860-1250 VDC	860-1250 VDC
	Operating Voltage Range (MPPT)	860-1450 VDC	860-1450 VDC	860-1450 VDC	860-1450 VDC
	Number of MPP Trackers	1 MPPT	1 MPPT	1 MPPT	1 MPPT
	Max Operating Input Current	148.3 A	148.3 A	178.0 A	197.7 A
	Max Operating PV Power	128 kW	128 kW	153 kW	170 kW
	Max DC/AC Ratio | Max Rated PV Power	2.6 | 332 kW	2.6 | 332 kW	2.2 | 332 kW	2.0 | 332 kW
	Max Rated PV Short-Circuit Current (∑Isc x 1.25)	500 A	500 A	500 A	500 A
AC Output	Nominal Output Voltage	600 VAC, 3-Ph	600 VAC, 3-Ph	600 VAC, 3-Ph	600 VAC, 3-Ph
	AC Voltage Range	-12% to +10%	-12% to +10%	-12% to +10%	-12% to +10%
	Continuous Real Output Power	125 kW	125 kW	150 kW	166 kW
	Continuous Apparent Output Power	125 kVA	150 kVA	166 kVA	166 kVA
	Max Output Current	120 A	144 A	160 A	160 A
	Nominal Output Frequency	60 Hz	60 Hz	60 Hz	60 Hz
	Power Factor (Unity default)	+/- 0.80 Adjustable	+/- 0.80 Adjustable	+/- 0.80 Adjustable	+/- 0.80 Adjustable
	Total Harmonic Distortion (THD) @ Rated Load	<3%	<3%	<3%	<3%
	Grid Connection Type	3-Ph + N/GND	3-Ph + N/GND	3-Ph + N/GND	3-Ph + N/GND
	Fault Current Contribution (1 cycle RMS)	144 A	173 A	192 A	192 A
Efficiency	Peak Efficiency	98.9%	98.9%	99.0%	99.0%
	CEC Average Efficiency	98.5%	98.5%	98.5%	98.5%
	Tare Loss	2.75 W	2.75 W	2.75 W	2.75 W
Temperature	Ambient Temp Range	-40°F to 140°F (-40C to 60C)		-40°F to 140°F (-40C to 60C)	
	De-Rating Temperature	122°F (50C)		113°F (45C)	
	Storage Temperature Range	-40°F to 167°F (-40C to 75C)		-40°F to 167°F (-40C to 75C)	
	Relative Humidity (non-condensing)	0 - 95%		0 - 95%	
	Operating Altitude	Full Power up to 9,840 ft (3.0 km); De-Rate to 70% of Full Power at 13,123 ft (4.0 km)			
Communications	Advanced Graphical User Interface	WiFi			
	Communication Interface	Ethernet			
	Third-Party Monitoring Protocol	SunSpec Modbus TCP/IP			
	Web-Based Monitoring	Optional			
	Firmware Updates	Remote and Local			
Testing & Certifications	Safety Listings & Certifications	UL1741SB, IEEE 1547, UL 1998 (All models) UL 1699b Photovoltaic Arc-Fault Circuit Protection Certified (-A models)			
	Advanced Grid Support Functionality	Rule 21, UL 1741SB			
	Testing Agency	ETL			
	FCC Compliance	FCC Part 15 (Subpart B, Class A)			
Warranty	Standard and Options	5 Years Standard; Option for 10 Years			
Enclosure	Acoustic Noise Rating	73 dBA @ 1 m ; 67dBA @ 3 m			
	DC Disconnect	Integrated 2-Pole 250 A DC Disconnect			
	Mounting Angle	Vertical only			
	Dimensions	Height: 29.5 in. (750 mm) | Width: 39.4 in. (1000 mm) | Depth: 15.1 in. (380 mm)			
	Weight	270 lbs (122 kg)			
	Enclosure Rating and Finish	Type 4X, Polyester Powder-Coated Aluminum			

IT'S PERSONAL

YASKAWA
SOLECTRIA SOLAR

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Document No. FL.XGI1500.01 | 04/26/2023 | © 2021 Yaskawa America, Inc.

Appendix L Glare Analysis Memo

Memo

To: Ward Stream, LLC

From: WSP USA Inc.

Ref: US-EI-3652230437

Date: 2026-03-20

Subject: Glare Analysis for 3.00 MW AC Ground-Mount Solar PV Development
105 Old Post Road, Worthington, MA 01098

Introduction

On behalf of Ward Stream, LLC (the Applicant), WSP has completed a glare analysis for the proposed Large-Scale Ground Mounted Solar Photovoltaic Installation (LSGMSPI) (the Project) located at 105 Old Post Road, Massachusetts in Hampshire County.

The glare analysis assessed the potential glare and glint impact of the Project on the residences of abutting properties and the adjacent road. Table 1 summarizes the relevant project characteristics.[1]

Table 1 Project Characteristics

Parameter	Value
Project Capacity	3.00 MW AC
Module	Mono-crystalline with anti-reflective coating
Racking Configuration	Single-axis tracker, One-in-Portrait (1P)
Tilt Angle	±55°
Azimuth	180° (south)
Collector Width	8.08 ft
Nominal Module Ground Clearance (0° Tilt)	10.0 ft
Ground Coverage Ratio	31%

[1] BlueWave Old Post IFP Set 2026.02.09.pdf, C-102 Proposed Conditions.

Background

Photovoltaic (PV) solar panels generate electricity from sunlight; however, some of the light is reflected and can cause glint, a momentary flash of bright light and glare, or a continuous source of bright light. Glare is typically associated with stationary objects which reflect sunlight for a longer duration. Reflections from solar panels have the potential to impair observers which may cause risk to public safety if a driver is affected.

The ocular impact of glare is a function of the radiation that reaches the retina and the apparent size of the source point. It is typically assumed that 50% of incoming radiation is absorbed prior to reaching the retina. [2]

The ocular impact of glare is classified into three qualitative categories[3] based on the intensity and angle of incoming light:

- Green: Low potential for after-image;
- Yellow: Potential to cause a temporary after-image; and
- Red: Potential to cause permanent damage.

An after-image is an image that continues to appear in one's vision after the exposure to the original image has ceased. An example of this is the effect after viewing a camera flash in a dim room.[2] The sunlight reflected from a PV panel is not sufficient to cause permanent damage.

Analysis

The glare modelling was completed using the ForgeSolar GlareGauge tool[4]. The program considers the rotation angle of the PV panel as tracking and backtracking occurs, the path of the sun, the incoming radiation, the PV array shape, and panel reflectivity characteristics to calculate the amount of glare expected at each specified observation point and along each observation route. The output from the GlareGauge is the length of time that glare is possible and the time of day and month that it is most likely to be expected.

The program has the following limitations, which result in conservative estimates of glare duration:

- Gaps between panels and shading from panels are not considered;
- Reduction of panel reflectivity due to soiling is not considered;
- Observation points are modelled as greenhouses with windows on all sides. Building design may significantly change the number of hours and observation points that are affected by glare;

[2] Ho. Methodology to Assess Potential Glint and Glare Hazards from Concentrating Solar Power Plants: Analytical Models and Experimental Validation, 2011.
[3] Ho. Summary of Impact Analyses of Renewable Energy Technologies on Aviation and Airports, 2011.
[4] Sims Industries LLC d/b/a ForgeSolar, ForgeSolar GlareGauge, Release 2026B.1. https://www.forgesolar.com.

- The analysis model utilizes random number computations, thus predicted minutes can vary between analysis runs. Observation point results are more susceptible to variation.

The standard GlareGauge model assumptions were used for irradiance, ocular parameters and sun angles. The module surface was defined as smooth glass with anti-reflective coating.

The PV array footprint modelling areas exceed the planned PV table extents and therefore provide a conservative representation of the PV array footprint.

The height of the PV arrays was modelled at 10.0 ft, the tracker axis height. To account for the maximum and minimum array height at the extreme rotation angles, the analysis incorporated a conservative maximum height of 16.0 ft and a conservative minimum height of 4.0 ft.

Receptors considered were residences and roads. Receptor locations were determined using public satellite imagery.

The nearest residences on abutting properties were assessed in the glare model. The residences were evaluated using an observer height of 5.0 ft for a one-story house and 5.0 and 15.0 ft for a two-story house. The heights modelled for each residence are listed in the appended ForgeSolar report.

The road bordering the Project, Old Post Road, was assessed as a receptor. The road was evaluated at heights of 3.5 ft (passenger vehicles), 6.0 ft (single-unit trucks and buses), and 8.0 ft (large truck and trailer combinations). Routes were modelled using a field of view of ±50° (100° total).

The locations of the PV array areas and receptors are shown in Figure 1.

Figure 1 Glare Model PV Array Areas and Receptors



There are many vegetative obstructions, such as trees and bushes, that could act as barriers to any potential glare. No obstructions were modelled for this analysis, and thus any predicted glare represents a conservative estimation. Further modelling would be required to consider how the surrounding vegetation mitigates any predicted glare.

Results

No glare is predicted for the residences or the adjacent road. The ForgeSolar report appended is a representative configuration of the glare model analyses with the PV array modelled at the axis of height of 10 ft.

Appendix – ForgeSolar Report

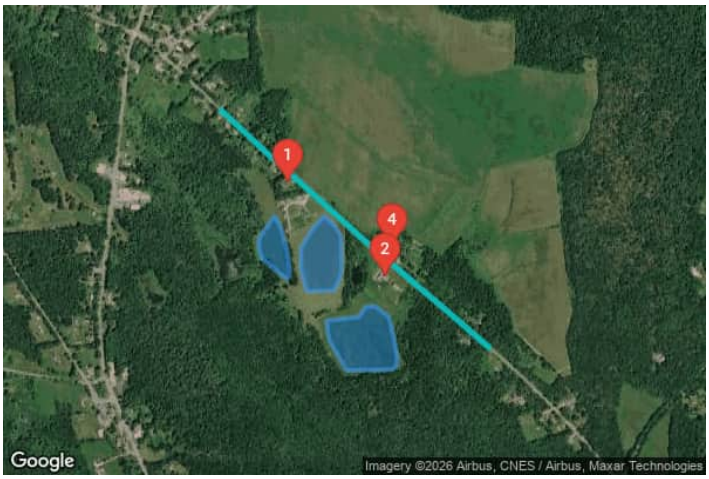
FORGESOLAR GLARE ANALYSIS

Project: **105 Old Post Road**
Site configuration: **B0-10-5-SS**
Calculated via ForgeSolar Radiometric Physics Engine v3.1.1

Client: Ward Stream, LLC

Created 18 Mar, 2026
Updated 18 Mar, 2026
Time-step 1 minute
Timezone offset UTC-8
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Category 1 MW to 5 MW
Site ID 173513.28745

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad



Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy	Peak Luminance
	°	°	min	hr	min	hr	kWh	cd/m^2
PV1	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV2	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV3	SA tracking	SA tracking	0	0.0	0	0.0	-	0

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OldPostRd1	0	0.0	0	0.0
OldPostRd2	0	0.0	0	0.0
OldPostRd3	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0

Component Data

PV Arrays

Name: PV1
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 55.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.31
Rated power: -
Panel material: Smooth glass with AR coating (revised)



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.404780	-72.932530	1414.20	10.00	1424.20
2	42.405379	-72.931966	1435.00	10.00	1445.00
3	42.405379	-72.931932	1436.10	10.00	1446.10
4	42.405099	-72.931733	1436.50	10.00	1446.50
5	42.404549	-72.931528	1432.20	10.00	1442.20
6	42.404049	-72.931421	1425.10	10.00	1435.10
7	42.403771	-72.931414	1412.70	10.00	1422.70
8	42.403709	-72.931511	1409.90	10.00	1419.90
9	42.403708	-72.931543	1409.70	10.00	1419.70
10	42.404253	-72.932421	1402.70	10.00	1412.70
11	42.404501	-72.932524	1406.60	10.00	1416.60

Name: PV2
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 55.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.31
Rated power: -
Panel material: Smooth glass with AR coating (revised)



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.404519	-72.930989	1441.00	10.00	1451.00
2	42.405088	-72.930521	1454.70	10.00	1464.70
3	42.405379	-72.930142	1461.10	10.00	1471.10
4	42.405379	-72.930109	1461.10	10.00	1471.10
5	42.405098	-72.929716	1456.60	10.00	1466.60
6	42.404819	-72.929517	1453.60	10.00	1463.60
7	42.403951	-72.929498	1448.40	10.00	1458.40
8	42.403668	-72.929587	1445.90	10.00	1455.90
9	42.403383	-72.929775	1437.50	10.00	1447.50
10	42.403372	-72.930770	1418.80	10.00	1428.80
11	42.403939	-72.930982	1429.40	10.00	1439.40

Name: PV3
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 55.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.31
Rated power: -
Panel material: Smooth glass with AR coating (revised)



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.402575	-72.930028	1415.60	10.00	1425.60
2	42.402671	-72.928875	1424.00	10.00	1434.00
3	42.402956	-72.928593	1429.80	10.00	1439.80
4	42.402961	-72.928269	1426.40	10.00	1436.40
5	42.402683	-72.927779	1419.40	10.00	1429.40
6	42.402402	-72.927676	1415.60	10.00	1425.60
7	42.401662	-72.927467	1402.30	10.00	1412.30
8	42.401381	-72.927460	1397.70	10.00	1407.70
9	42.401248	-72.927654	1396.90	10.00	1406.90
10	42.401229	-72.929322	1384.80	10.00	1394.80
11	42.401994	-72.929919	1403.00	10.00	1413.00
12	42.402292	-72.930022	1410.10	10.00	1420.10

Route Receptors

Name: OldPostRd1
Path type: Two-way
Azimuthal view angle: 50.0°
Downward view angle: 10.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.408241	-72.933909	1461.60	3.50	1465.10
2	42.407119	-72.932278	1468.20	3.50	1471.70
3	42.406023	-72.930602	1468.50	3.50	1472.00
4	42.404749	-72.928690	1449.90	3.50	1453.40
5	42.404502	-72.928304	1445.50	3.50	1449.00
6	42.404062	-72.927601	1436.80	3.50	1440.30
7	42.403597	-72.926861	1430.90	3.50	1434.40
8	42.402926	-72.925788	1427.00	3.50	1430.50
9	42.401853	-72.924104	1442.10	3.50	1445.60

Name: OldPostRd2
Path type: Two-way
Azimuthal view angle: 50.0°
Downward view angle: 10.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.408241	-72.933909	1461.60	6.00	1467.60
2	42.407119	-72.932278	1468.20	6.00	1474.20
3	42.406023	-72.930602	1468.50	6.00	1474.50
4	42.404749	-72.928690	1449.90	6.00	1455.90
5	42.404502	-72.928304	1445.50	6.00	1451.50
6	42.404062	-72.927601	1436.80	6.00	1442.80
7	42.403597	-72.926861	1430.90	6.00	1436.90
8	42.402926	-72.925788	1427.00	6.00	1433.00
9	42.401853	-72.924104	1442.10	6.00	1448.10

Name: OldPostRd3
Path type: Two-way
Azimuthal view angle: 50.0°
Downward view angle: 10.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.408241	-72.933909	1461.60	8.00	1469.60
2	42.407119	-72.932278	1468.20	8.00	1476.20
3	42.406023	-72.930602	1468.50	8.00	1476.50
4	42.404749	-72.928690	1449.90	8.00	1457.90
5	42.404502	-72.928304	1445.50	8.00	1453.50
6	42.404062	-72.927601	1436.80	8.00	1444.80
7	42.403597	-72.926861	1430.90	8.00	1438.90
8	42.402926	-72.925788	1427.00	8.00	1435.00
9	42.401853	-72.924104	1442.10	8.00	1450.10

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	42.406287	-72.931433	1464.40	5.00
OP 2	2	42.403737	-72.927910	1434.10	5.00
OP 3	3	42.403737	-72.927910	1434.10	15.00
OP 4	4	42.404539	-72.927636	1443.00	5.00
OP 5	5	42.404539	-72.927636	1443.00	15.00

Glare Analysis Results

Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy	Peak Luminance
	°	°	min	hr	min	hr	kWh	cd/m^2
PV1	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV2	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV3	SA tracking	SA tracking	0	0.0	0	0.0	-	0

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OldPostRd1	0	0.0	0	0.0
OldPostRd2	0	0.0	0	0.0
OldPostRd3	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0

PV: PV1 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m^2
OldPostRd1	0	0.0	0	0.0	0
OldPostRd2	0	0.0	0	0.0	0
OldPostRd3	0	0.0	0	0.0	0
OP 1	0	0.0	0	0.0	0
OP 2	0	0.0	0	0.0	0
OP 3	0	0.0	0	0.0	0
OP 4	0	0.0	0	0.0	0
OP 5	0	0.0	0	0.0	0

PV1 and Route: OldPostRd1

No glare found

PV1 and Route: OldPostRd2

No glare found

PV1 and Route: OldPostRd3

No glare found

PV1 and OP 1

No glare found

PV1 and OP 2

No glare found

PV1 and OP 3

No glare found

PV1 and OP 4

No glare found

PV1 and OP 5

No glare found

PV: PV2 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m^2
OldPostRd1	0	0.0	0	0.0	0
OldPostRd2	0	0.0	0	0.0	0
OldPostRd3	0	0.0	0	0.0	0
OP 1	0	0.0	0	0.0	0
OP 2	0	0.0	0	0.0	0
OP 3	0	0.0	0	0.0	0
OP 4	0	0.0	0	0.0	0
OP 5	0	0.0	0	0.0	0

PV2 and Route: OldPostRd1

No glare found

PV2 and Route: OldPostRd2

No glare found

PV2 and Route: OldPostRd3

No glare found

PV2 and OP 1

No glare found

PV2 and OP 2

No glare found

PV2 and OP 3

No glare found

PV2 and OP 4

No glare found

PV2 and OP 5

No glare found

PV: PV3 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m^2
OldPostRd1	0	0.0	0	0.0	0
OldPostRd2	0	0.0	0	0.0	0
OldPostRd3	0	0.0	0	0.0	0
OP 1	0	0.0	0	0.0	0
OP 2	0	0.0	0	0.0	0
OP 3	0	0.0	0	0.0	0
OP 4	0	0.0	0	0.0	0
OP 5	0	0.0	0	0.0	0

PV3 and Route: OldPostRd1

No glare found

PV3 and Route: OldPostRd2

No glare found

PV3 and Route: OldPostRd3

No glare found

PV3 and OP 1

No glare found

PV3 and OP 2

No glare found

PV3 and OP 3

No glare found

PV3 and OP 4

No glare found

PV3 and OP 5

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.
Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.
The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.
The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.
The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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This analysis was conducted using the best available radiometric modeling at the time of generation. Future updates to the modeling methodology may yield different results.

Appendix M Operation and Maintenance Plan

BLUEWAVE

PRELIMINARY BATTERY ENERGY STORAGE SYSTEM OPERATIONS AND MAINTENANCE PLAN

1 GENERAL PROTOCOL

1.1 Contact Information

The primary points of contact for operations & maintenance related issues are as follows:

Owner

Ward Stream, LLC with a facility address of 105 Old Post Road Worthington, MA
BlueWave
Phone: 617-209-3122 (General phone number listed here to be updated with project specific number between Mechanical Completion and Substantial Completion)
Email: assetmgmt@bluewave.energy

[Manufacturer]

XXXXXX (To be finalized prior to construction)
(XXX) XXX-XXXX (To be finalized prior to construction)
XXXX@XXXX.com (To be finalized prior to construction)

1.2 Safety Guidelines & Equipment

In the event of an emergency, immediately call 911 to alert local first responders. Emergency signage will be posted on-site for both the Local Fire Department and the contact of the Owner/Operator.

Owner/Operator will dispatch designated operational staff within 2 hours in the event of an emergency, and approximately 12 hours in the event of a non-emergency. In the event of an emergency, the Emergency Response Plan (ERP) on file with the Municipality and Local Fire Department should be referenced and appropriate procedures followed.

The Battery Energy Storage System (BESS) contains a number of high voltage AC and DC components and equipment. Only certified and [Manufacturer] approved technicians are authorized to conduct maintenance work on the system. Before performing work on the system, necessary Lockout-Tagout (LOTO) procedures should be followed to de-energize the system and fully disconnect the system from AC power. Proper procedures for de-energization should be referenced in the comprehensive Maintenance Manual provided by the system manufacturer prior to performing any maintenance tasks.

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Equipment

All technicians and personnel performing work on the system are required to wear personal protective equipment (PPE) including but not limited to:

- Long pants and shirt (FR rated)
- Insulated gloves (See Arc Flash Study for required Protective Category)
- High visibility safety vest (FR Rate)
- Hardhat
- Eye protection
- Safety toe boots
- Arc Flash Personal Protective Equipment as needed or required by manufacturer

The following equipment and hand tools are required when performing work on the system, including but not limited to:

- 1,000V Multimeter
- 1,5000 Vdc Multimeter
- Proving Unit
- Test Leads
- Data Cable Test Unit
- Infrared Camera
- Electrostatic Discharge (ESD) Ground Wristband
- Insulated wrenches, ratches, and screwdrivers and other tools meeting IEC 60900

Additional equipment and safety procedures may be required and implemented during the operation of the system. All equipment must have valid calibration certifications if applicable.

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2 OPERATION & MAINTENANCE ANNUAL SCHEDULE

O&M ANNUAL SCHEDULE		
Component Category	Service Descriptions	Frequency
Thermal Management System	Thermal management system inspection	Semi-Annual
	Thermal management system maintenance	Semi-Annual
	Motor Lubrication	Semi-Annual
	Clean Filters by rinsing with Water	Semi-Annual
	Electric Heater - Dust accumulation on the coil, signs of overheating on the heater frame, traces of water or rust on the electric heater control box.	Semi-Annual
	Coolant tester Visual inspection	Annual
Fire Safety System	Fire alarm and detection system inspection	Annual
	Fire alarm and detection system maintenance	Annual
	Fire suppression System Inspection	Annual
Battery	Set battery maintenance (system check, cell balancing)	Annual

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	Battery cable, appearance, grounding, dust removal	Annual
	Inspect battery management system alarms	Annual
	Visual inspection of all electrical terminations using thermal imager	Semi-Annual
Enclosure	Dust removal	Annual
	Inspect cable entry, grounding, sealing, dust removal	Annual
Reporting and Diagnostics	Inspection, maintenance reports and recommendations	Monthly
	Technical support and fault diagnosis	As required
	Data server connectivity check	Monthly
	Inspect battery running status, provide operating recommendations and maintain battery	Monthly
	System configuration check	Annual
General/ Miscellaneous	Auxiliary equipment maintenance and inspection	Annual
	Critical sensor calibration check	Annual
	Maintenance report	Annual
24/7 Monitoring	System is remote monitored 24/7 at the cell and enclosure level for voltage, temperature, and atmospheric conditions.	N/A

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Dispatch Commitment	24 hrs. In emergency, first responders will dispatch to site once fire alarm signal received, owner dispatch to follow as soon as possible.	
Three (3) Corrective Maintenance Troubleshooting Dispatches (total of 24 hrs.)	Baseline assumptions of 3 corrective maintenance visits per year	Annually

3 PREVENTATIVE MAINTENANCE AND SYSTEM SERVICES

3.1 Lifetime System Services

PREVENTIVE MAINTENANCE SITE VISITS

One time, annually, additional at request and expense of Project Owner for:

- System testing (voltage/amperage)
- System visual inspection and necessary corrections, excluding cost of replacement components:
- Inspect for stolen, broken or damaged equipment, record damage and location. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal, and wait for authorization on a course of action from the Project Owner.
- Inspect wiring for loose connections and wire condition. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal, and wait for authorization on a course of action from the Project Owner.
- Inspect string controllers for damage and general condition. Inspect AC and DC fuses for replacement if needed. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal, and wait for authorization on a course of action from the Project Owner.
- Inspect HVAC unit components for rust, damage, and general condition. Check condensate drain lines and refrigerant levels as required. Inspect exhaust outlets and bottom of unit for pooling, inspect and replace all filters as needed. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner,

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present proposal and wait for authorization on a course of action from the Project Owner.

- Verify proper system grounding is in place from enclosures to the inverter. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Check conduits and raceways for proper anchorage to structures. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect all enclosure metallic parts for corrosion. Inspect ESS labels and insure they match subpanel interior break. Verify that all enclosure doors, hinges and seals are in proper working order. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect all wiring connection for signs of poor contact at terminals (burning, discoloration, etc.). Verify all conductor connections and network cables are tight and solidly connected. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Visually inspect all interior components of the ESS enclosures for signs of damage, discoloration, water ingress, or deterioration. Inspect all batteries and battery management systems for signs of damage, discoloration, water ingress, or deterioration. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect disconnection for proper operation. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal, and wait for authorization on a course of action from the Project Owner.
- Survey entire jobsite for debris or obstructions. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal, and wait for authorization on a course of action from the Project Owner.
- Inspect fasteners for proper torque and corrosion. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner,

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present proposal and wait for authorization on a course of action from the Project Owner.

- Inspect inverter pad for cracking or settling. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect electrical hardware for proper warning and rating labeling. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Review as built documentation as needed and update as built documentation as changes are required.
- Inspect enclosure footings, anchor bolts, and alignment to identify settling foundation or loose attachments. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Check proper operation and reporting of monitoring hardware. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect sealed electrical components for condensation buildup. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect wiring and hardware for signs of damage from vandalism or animal damage. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Routine system maintenance to include correction of loose electrical connections, ground connections, replacement of defective fuses, other minor maintenance repair work. Tree trimming, and plant trimming work not included.
- Routine DAS maintenance to include sensor calibration and data integrity check.

TROUBLESHOOTING, INSPECTION AND ADDITIONAL REPAIRS

- Dispatch of field services resources within 12 hours for repairs up to three times per year or as deemed necessary by Operator.
- Major system repairs, not to include mid-voltage switchgear or transformers.
- The Project Owner agrees to permit Town staff to enter the property at reasonable times

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and in a reasonable manner for the purpose of inspection.

REPORTING

- Monthly Production report will be available online to the Project Owner personnel.
- Annual Performance report will be sent electronically to the Project Owner personnel.
- O&M Manual updates. Complete versions of new editions to be delivered electronically to the Project Owner staff as they become available.
- As Built drawing updates, as necessary.

OTHER SYSTEM SERVICES

Facility staff training, one time per site which will include the follow basic training items:

- General Inspection: A full visual and physical inspection of all systems components and their immediate surroundings carried out in accordance with inspection checklists.
- Safety: Operator will train Project Owner staff on how to safely shut down the system.
- Tree Trimming/Plant Trimming: Operator will train Project Owner staff on what vegetation near structures that need to be trimmed as required by local site conditions.
- Structure Maintenance: Necessary preventive maintenance may be performed on system structural components to ensure continued safe and effective operation.
- The basics of performing a visual inspection: Checklist review with Operator.
- Performance characterization, as determined by Operator.
- O&M Manuals – additional copies, as needed. Updated editions of O&M manuals will be sent electronically to the Project Owner as they become available.
- Management of long-term service and warranty agreements, ongoing. Operator shall provide Project Owner local DFD/AFSD with updates as required.
- Stormwater and Drainage Structure Maintenance: See Stormwater Report and associated BMP O&M and Long-Term Maintenance Plan on file with the Municipality for proper stormwater BMP maintenance schedule and procedures.

NVERTER REPAIR

Component replacement and refurbishment as required, in the event of a failure.

NVERTER INSPECTION AND REGULAR SERVICING

As required under inverter manufacturer's warranty specifications. Include but are not limited to the following, one time annually:

- Check appearance/cleanliness of the cabinet, ventilation system and all exposed surfaces.
- Inspect, clean/replace air filter elements.
- Check for corrosion on all terminals, cables and enclosure.
- Check all fuses.
- Perform a complete visual inspection of all internally mounted equipment including subassemblies, wiring harness, contractors, power supplies and all major components.

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- Check condition of all the AC and DC surge suppressors.
- Torque terminals and all fasteners in electrical power connections.
- Check the operation of all safety devices (E-stop, door switches)
- Record all operating voltages and current readings via the front display panel.
- Record all inspections completed.
- Inform Manufacturer of all deficiencies identified.
- Manufacture will be responsible for the In-Warranty replacement of failed inverter components, parts and labor.

SERVICES UNDER THE FOLLOWING WARRANTIES

- 20-year warranty for inverters & batteries.

3.2 Notice of Transfer

Should the property or any portion of the property be transferred to another owner, the relevant Authorized Administrative Agency will be notified. The new owner will be notified of the presence of this Operation and Maintenance Plan and be held responsible for the implementation of this plan and financing as it pertains to their property.

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Final O&M plans are subject to revision based on O&M provider or Original Equipment Manufacturer recommendations without notice

BLUEWAVE

PRELIMINARY GROUND MOUNTED SOLAR SYSTEM OPERATIONS & MAINTENANCE PLAN

1. GENERAL PROTOCOL

1.1 Contact Information

Owner

Ward Stream, LLC with a facility address of 105 Old Post Road Worthington, MA
BlueWave
Phone: 617-209-3122 (General phone number listed here to be updated with project specific number between Mechanical Completion and Substantial Completion)
Email: assetmgmt@bluewave.energy

1.2 OPERATION & MAINTENANCE ANNUAL SCHEDULE

Task	Schedule
Full Site Visual Inspection & Report	Annually
Production Performance Report	Annually
Inverter Preventative Maintenance	Annually
Medium Voltage Gear Maintenance	Annually
String Voc/Imp	As needed
IV Curve Tracing	As needed
Thermal Imaging Combiners, Inverters, Disconnects	100%, Annually
Warranty Enforcement	As needed
Issue Tracking of Unscheduled Service Dispatches	As needed
24/7 Monitoring	24/7
Dispatch Commitment	48 hrs.
Vegetation Management	As needed

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1.3 EXHIBIT A – SYSTEM SERVICES

1.3.1 PREVENTIVE MAINTENANCE SITE VISITS

One time, annually, additional at request and expense of Project Owner for:

- System testing (voltage/amperage)
- System visual inspection and necessary corrections, excluding cost of replacement components:
- Inspect for stolen, broken or damaged PV modules, record damage and location. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect PV wiring for loose connections and wire condition. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect for wires in contact with the structure or hanging loose from racking. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Check mechanical attachment of the PV modules to the racking. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Check attachment of racking components to each other and the structure. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Verify proper system grounding is in place from panels to the inverter. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Check conduits and raceways for proper anchorage to structures. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.

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- Inspect all metallic parts for corrosion. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Check combiner boxes for proper fuse size and continuity. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect all wiring connection for signs of poor contact at terminals (burning, discoloration, etc.). Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect disconnection for proper operation. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Survey entire jobsite for debris or obstructions. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project.
- Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect fasteners for proper torque and corrosion. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect inverter pad for cracking or settling. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect electrical hardware for proper warning and rating labeling. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Review as built documentation as needed and update as built documentation as changes are required.
- Inspect alignment of arrays and racking to identify settling foundation or loose attachments. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.

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- Inspect operation of tracking hinges, pivots, motors and actuators if present. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Check proper operation and reporting of monitoring hardware. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect sealed electrical components for condensation buildup. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect wiring and hardware for signs of damage from vandalism or animal damage. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Routine system maintenance to include correction of loose electrical connections, ground connections, replacement of defective modules found during testing, other minor maintenance repair work. Tree trimming, and plant trimming work not included.
- Routine DAS maintenance to include sensor calibration and data integrity check.

1.3.2 TROUBLESHOOTING, INSPECTION AND ADDITIONAL REPAIRS

- Dispatch of field services resources within two business days for repairs up to three times per year or as deemed necessary by Operator.
- Major system repairs, not to include mid-voltage switchgear or transformers.
- The Project Owner agrees to permit Town staff to enter the property at reasonable times and in a reasonable manner for the purpose of inspection.

1.3.3 REPORTING

- Monthly Production report will be available online to the Project Owner personnel.
- Annual Performance report will be sent electronically to the Project Owner personnel.
- O&M Manual updates. Complete versions of new editions to be delivered electronically to the Project Owner staff as they become available.
- As Built drawing updates, as necessary.

1.3.4 OTHER SYSTEM SERVICES

Facility staff training, one time per site which will include the follow basic training items:

- General Inspection: A full visual and physical inspection of all systems components and their immediate surroundings carried out in accordance with inspection checklists.

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- Safety: Operator will train Project Owner staff on how to safely shut down the system.
- Tree Trimming/Plant Trimming: Operator will train Project Owner staff on what vegetation near structures that need to be trimmed as required by local site conditions.
- Structure Maintenance: Necessary preventive maintenance may be performed on system structural components to ensure continued safe and effective operation.
- The basics of performing a visual inspection: Checklist review with Operator.
- Performance characterization, as determined by Operator.
- O&M Manuals – additional copies, as needed. Updated editions of O&M manuals will be sent electronically to the Project Owner as they become available.
- Management of long-term service and warranty agreements, ongoing. Operator shall provide Project Owner local DFD/AFSD with updates as required.

1.3.5 INVERTER REPAIR

Component replacement and refurbishment as required, in the event of a failure.

INVERTER INSPECTION AND REGULAR SERVICING

As required under inverter manufacturer's warranty specifications. Include but are not limited to the following, one time annually:

- Check appearance/cleanliness of the cabinet, ventilation system and all exposed surfaces.
- Inspect, clean/replace air filter elements.
- Check for corrosion on all terminals, cables and enclosure.
- Check all fuses.
- Perform a complete visual inspection of all internally mounted equipment including subassemblies, wiring harness, contractors, power supplies and all major components.
- Check condition of all the AC and DC surge suppressors.
- Torque terminals and all fasteners in electrical power connections.
- Check the operation of all safety devices (E-stop, door switches)
- Record all operating voltages and current readings via the front display panel.
- Record all inspections completed.
- Inform Manufacturer of all deficiencies identified.
- Manufacture will be responsible for the In-Warranty replacement of failed inverter components, parts and labor.

1.3.6 SERVICES UNDER THE FOLLOWING WARRANTIES

- 20-year warranty for inverters.
- 25-year warranty for PV Modules.

Final O&M plans are subject to revision based on O&M provider or Original Equipment Manufacturer recommendations without notice

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Appendix N Proof of Liability Insurance

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 12/14/2026 | 4/9/2026

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 Lockton Companies, LLC DBA Lockton Insurance Brokers, LLC in CA CA license #0F15767 8110 E Union Ave., Ste. 100 Denver CO 80237 denver-certs@lockton.com	CONTACT NAME: PHONE (A/C, No, Ext): FAX (A/C, No): E-MAIL ADDRESS:
INSURED 1518913 Ward Stream, LLC 116 Huntington Avenue, Ste. 601 Boston MA 02116	INSURER(S) AFFORDING COVERAGE — NAIC # INSURER A : The Travelers Indemnity Company — 25658 INSURER B : The Travelers Indemnity Company of Connecticut — 25682 INSURER C : Travelers Property Casualty Company of America — 25674 INSURER D : Twin City Fire Insurance Company — 29459 INSURER E : INSURER F :

COVERAGES **CERTIFICATE NUMBER:** 22362007 **REVISION NUMBER:** XXXXXXX

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	X COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR X Ded. $5,000 GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [ ] LOC [ ] OTHER:	N	N	DT-CO-B0001860-IND-26	4/12/2026	4/12/2027	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 $
B	AUTOMOBILE LIABILITY [ ] ANY AUTO [ ] OWNED AUTOS ONLY [ ] SCHEDULED AUTOS [X] HIRED AUTOS ONLY [X] NON-OWNED AUTOS ONLY	N	N	BA-B0006702-26-26-G	4/12/2026	4/12/2027	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) $	$ 1,000,000 $ XXXXXXX $ XXXXXXX $ XXXXXXX $ XXXXXXX
C	X UMBRELLA LIAB [X] OCCUR EXCESS LIAB [ ] CLAIMS-MADE DED [X] RETENTION $ 10,000	N	N	CUP-B0008013-26-26	4/12/2026	4/12/2027	EACH OCCURRENCE AGGREGATE $	$ 10,000,000 $ 10,000,000 $ XXXXXXX
D	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N [Y] If yes, describe under DESCRIPTION OF OPERATIONS below	N/A	N	72 WE AU7ZHS	12/14/2025	12/14/2026	X PER STATUTE [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
Re: MA Worthington 105 Old Post Rd; 105 Old Post Rd, Worthington MA.

CERTIFICATE HOLDER

22362007
Town of Worthington
160 Huntington Rd
Worthington MA 01098

CANCELLATION See Attachment

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

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Town of Worthington
160 Huntington Rd
Worthington MA 01098

To whom it may concern:

In our continuing effort to provide timely certificate delivery, Lockton Companies is transitioning to paperless delivery of Certificates of Insurance, thus this is your final hard-copy delivery.

To ensure electronic delivery for future renewals of this certificate, we need your email address. Please contact us via one of the methods below, referencing Certificate ID 22362007.

- Email: mountainwestedelivery@lockton.com
- Phone: 303-728-8060

If you received this certificate through an internet link where the current certificate is viewable, we have your email and no further action is needed.

In the event your mailing address has changed, will change in the future, or you no longer require this certificate, please let us know using one of the methods above.

The above inbox and phone number is for automating electronic delivery of certificates only. Please do NOT send future certificate requests to this inbox or contact the phone number below with email updates.

Thank you for your cooperation and willingness in reducing our environmental footprint.

Lockton Companies

Appendix O Decommissioning Cost Estimate and Financial Security Documentation

DECOMMISSIONING PLAN AND COST ESTIMATE
WARD STREAM, LLC
3.00 MW AC GROUND-MOUNT SOLAR AND BATTERY ENERGY STORAGE SYSTEM (BESS)
105 OLD POST ROAD, WORTHINGTON, MA



Timeline:

Decommissioning of the system will occur within 150 days following the end of the lease term.

Assumptions:

Key assumptions include the following:
1) Fencing, electrical cabinetry, solar racks, solar panels, wiring and all other equipment are 100% recyclable.
2) The primary cost of decommissioning is the labor to dismantle and load the equipment plus trucking.
3) Concrete pads will be demolished on-site and transported to an ABC recycling facility where it will be accepted at no charge.
4) All other recyclables will be transported to the nearest Transfer Station that accepts the material.
5) Costs are based on an Example Prevailing Wage Schedule for the Town of Worthington obtained from the Mass.gov Department of Labor Standards (DLS) Prevailing Wage Program and utilizing Effective Date of 6/1/2026. Task-level labor hours have been estimated to be consistent with the conceptual decommissioning scope. The total price is adjusted to estimate 2045 costs based on the current average inflation rate of July 2026 (3.4%).

Decommissioning Tasks:

Task		Cost	Assumption
1)	**Remove Panels** The panels are bolted in. A laborer needs to unbolt the panel and remove the panel off the rack.	**$5,078**	Assumes 80 labor hours at $63.47.
2)	**Remove Rack Wiring** The panels are plugged together in the same manner as an electrical cord from a light is plugged into a wall socket. A laborer needs only to reach over and pull the plug. The string wires lie in a tray. A laborer needs only to reach into the tray and remove the strands of wire.	**$5,078**	Assumes 80 labor hours at $63.47.
3)	**Dismantle Racks** Racks will be dismantled.	**$24,083**	Assumes 288 labor hours at $63.47 and 72 operator hours at $80.60.
4)	**Remove Electrical Equipment (Inverters, Transformers, Switchgear)** Equipment will be removed from the equipment pads.	**$4,503**	Assumes 24 labor hours at $63.47, 12 operator hours at $80.60, and 24 electrician hours at $83.87.
5)	**Dismantle and Remove BESS (Battery Racks, Storage Containers, Electrical Assembly, Etc.)** BESS cabinet will be removed from the equipment pad.	**$6,004**	Assumes 32 labor hours at $63.47, 16 operator hours at $80.60, and 32 electrician hours at $83.87.
6)	**Break Up Concrete Pads** Concrete will be broken up using an excavator and jackhammer.	**$3,863**	Assumes 24 labor hours at $63.47 and 24 jackhammer hours at $80.35.
7)	**Remove Racks** Racks will be removed and stockpiled.	**$15,314**	Assumes 160 labor hours at $63.47 and 64 operator hours at $80.60.
8)	**Remove Cable** Cables will be removed and stockpiled.	**$11,485**	Assumes 120 labor hours at $63.47 and 48 operator hours at $80.60.
9)	**Remove Foundation Posts and Utility Poles** Posts and poles will be removed from the ground using appropriate equipment.	**$26,799**	Assumes 280 labor hours at $63.47 and 112 operator hours at $80.60.
10)	**Remove Fence** Perimeter fixed knot game fence to remain. Fence fabric and posts will be removed around equipment pads.	**$1,153**	Assumes 8 labor hours at $63.47 and 8 operator hours at $80.60.
11)	**Grading** Graded areas (e.g., stormwater basins) will be returned to pre-construction conditions.	**$11,526**	Assumes 80 labor hours at $63.47 and 80 operator hours at $80.60.
12)	**Seed Disturbed Areas** Any graded areas will be seeded to promote revegetation.	**$762**	Assumes 12 labor hours at $63.47.
13)	**Trucking Costs** All stockpiled equipment and materials will be removed from the site and be recycled or disposed of.	**$3,835**	Assumes 48 teamster hours at $79.90.
Total Decommissioning Cost Estimate (2026)		**$119,481**	
Current average inflation rate from July 2026 (3.4%)		$106,041	
Total Decommissioning Cost Estimate (2045)		**$225,522**	1,728 Total Hours

DECOMMISSIONING BOND

Bond #

KNOW ALL BY THESE PRESENTS, that we**, Ward Stream, LLC** as principal, and _____, a _____ corporation, authorized to do business in the State of **Massachusetts**, as Surety, are held and firmly bound unto **The Town of Worthington**, as Obligee, in the penal sum of _____ **($_____)**, lawful money of the United States of America, for the payment of which well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal is responsible for decommissioning the solar electric generating facility located at **105 Old Post Rd, Worthington, MA 01098**

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall decommission the solar electric generating facility as required, and shall save the Obligee harmless from any loss, cost or damage by reason of its failure to complete said decommissioning, then this obligation shall be null and void; otherwise to remain in full force and effect.

The bond is subject, however, to the following express conditions:

FIRST: That in the event of a default on the part of the Principal, its successors or assigns, to decommission the solar electric generating facility in accordance with its written legal obligations a written statement of such default with full details thereof shall be given to Surety promptly, and in any event, within thirty (30) days after the Obligee shall learn of such default, such notice to be delivered to Surety at its Home Office in _____ by registered or certified mail, with a copy to **Ward Stream, LLC, 116 Huntington Ave Suite 601, Boston, MA 02116.**

SECOND: That no claim, suit or action under this bond by reason of any such default shall be brought against Surety unless asserted or commenced within twelve (12) months after the effective date of any termination or cancellation of this bond.

THIRD: This bond shall automatically renew for successive one-year terms unless, at least forty-five (45) days prior to the next annual renewal date, the Surety delivers written notice to Principal and to Obligee, or Principal delivers written notice to Surety and Obligee, that the notice-sender seeks to modify the terms of, or cancel, this bond. Written notice is effective if delivered to, or sent by certified mail, postage prepaid, and deposited in the U.S. Mail, at least forty-five (45) days prior to the next annual renewal date addressed to the Principal or Surety, as the case may be, and to the Obligee requiring bond, as outlined in the notice section of this Bond, and is actually received by the Principal or Surety, as the case may be, and the Obligee at least thirty (30) days prior to the renewal date. However, neither: (a) the Surety's decision to cancel, nor (b) the failure or inability of the Principal to file a replacement bond or other security in the event the Surety exercises its right to cancel this Bond, shall itself constitute a loss to the Obligee recoverable under this Bond or any extension thereof.

FOURTH: That no right of action shall accrue under this bond to or for the use of any person other than the Obligee, and its successors and assigns.

Signed, sealed and dated this day of .

_____
Principal

By: _____
Authorized Signatory

_____

By: _____
, Attorney-In-Fact

Appendix P Interconnection Service Agreement

EVERSOURCE

Exhibit C - Expedited/Standard Process Interconnection Application

Legal Name and address of Interconnecting Customer

Interconnecting Customer	BlueWave Origination, LLC
Contact Person	Mark Sylvia
Address	116 Huntington Ave Boston, MA 02116
Email	interconnection@bluewavesolar.com

Host Customer Details

Customer Name	Mark Sylvia
Customer Entity	BlueWave Origination, LLC
Mailing Address	116 Huntington Ave Boston, MA 02116
Email	interconnection@bluewavesolar.com

Landowner Details

Is Landowner Different than Customer?	Yes
Landowner Company	N/A
Landowner Name	Thomas Brisson
Address	105 Old Post Rd Worthington, MA 01098
Email	interconnection@bluewavesolar.com

Generating Facility Information

Address	105 Old Post Rd Worthington, MA 01098

Alternative Contact Information

Alternative Company Name	BlueWave Origination, LLC
Alternative Contact Name	Trevor Hardy
Address	116 Huntington Ave Suite 602 Boston, MA 02116

Ownership Information (include % ownership by any electric utility): Interconnecting Customer

Site Control? Yes

Will Facility be constructed on a single parcel of land? Yes

Confidentiality Statement: "I agree to allow information regarding the processing of my application

(without my name and address) to be reviewed by the Massachusetts DG Working Group that is exploring ways to further expedite future interconnections.": **Yes**

Group Study Agreement: "I understand and agree if my project becomes part of a Group Study, the Company is authorized to share my contact information and project details with other parties that are also involved in the Group Study": **True**

Need an air quality permit from DEP? - No

Planning to Export Power? - Yes

A Cogeneration Facility? - No

Anticipated Export Power Purchaser: - Eversource

Export Form? - SMART Program

Utility Details

Electric Distribution Company:	WMA
Account Number:	New Service
Meter Number:	New Service

System Details

Type of Generating Unit	Inverter
Phase	Three Phase
AMPS	800
Voltage	Primary Feeder Voltage

Option 1	Yes		
System Design Capacity: (Nominal)	3000 (kW)	3000 (kVA)	
System Design Capacity: (Maximum)	3000 (kW)	3000 (kVA)	
Prime Mover	PhotoVoltaic		
Energy Source	Solar + Battery		
DC STC Rating	3780 (kW DC)		
Generating Unit 1			
Inverter Manufacturer & Model	Inverter: 20 x SMA America 150.0 kW (Model SHP 150-US-20 (600V))		
AC Rating: (Nominal)	3000(KW)	3000(KVA)	600(AC Volts)
AC Rating: (Maximum)	3000(KW)	3000(KVA)	600(AC Volts)
Non-PV Manufacturer			
Non-PV Model			
Non-PV Quantity			

EVERSOURCE

Generating Unit 2			
Inverter Manufacturer & Model			
AC Rating: (Nominal)	(KW)	(KVA)	(AC Volts)
AC Rating: (Maximum)	(KW)	(KVA)	(AC Volts)
Non-PV Manufacturer			
Non-PV Model			
Non-PV Quantity			
Generating Unit 3			
Inverter Manufacturer & Model			
AC Rating: (Nominal)	(KW)	(KVA)	(AC Volts)
AC Rating: (Maximum)	(KW)	(KVA)	(AC Volts)
Non-PV Manufacturer			
Non-PV Model			
Non-PV Quantity			
Storage Information			
Is the proposed system has Battery Storage?	Yes		
Type of Storage Coupled	DC-Coupled		
Storage Technology Type	Lithium Ion		
Energy Storage Manufacture	Other		
Capacity DC (kW)	1000		
Capacity AC (kW)	0		
Storage Inverter	1 Manufacturer: Solectria Model Number: XGI-1500-150/166 Nameplate Power AC (kVA): 143 Nameplate Power AC (kW): 143 Qty: 20		

Option 2	No	
System Design Capacity: (Nominal)	(kW)	(kVA)
System Design Capacity: (Maximum)	(kW)	(kVA)
Prime Mover		
Energy Source		
DC STC Rating	(kW DC)	
Generating Unit 1		
Inverter Manufacturer & Model		
AC Rating: (Nominal)	(KW)	(KVA)	(AC Volts)
AC Rating: (Maximum)	(KW)	(KVA)	(AC Volts)
Non-PV Manufacturer		
Non-PV Model		
Non-PV Quantity		
Generating Unit 2		

EVERSOURCE

Inverter Manufacturer & Model			
AC Rating: (Nominal)	(KW)	(KVA)	(AC Volts)
AC Rating: (Maximum)	(KW)	(KVA)	(AC Volts)
Non-PV Manufacturer			
Non-PV Model			
Non-PV Quantity			
Generating Unit 3			
Inverter Manufacturer & Model			
AC Rating: (Nominal)	(KW)	(KVA)	(AC Volts)
AC Rating: (Maximum)	(KW)	(KVA)	(AC Volts)
Non-PV Manufacturer			
Non-PV Model			
Non-PV Quantity			
Storage Information			
Is the proposed system has Battery Storage?			
Type of Storage Coupled			
Storage Technology Type			
Energy Storage Manufacture			
Capacity DC (kW)			
Capacity AC (kW)			
Storage Inverter			

Option 3	No		
System Design Capacity: (Nominal)	(kW)	(kVA)	
System Design Capacity: (Maximum)	(kW)	(kVA)	
Prime Mover			
Energy Source			
DC STC Rating	(kW DC)		
Generating Unit 1			
Inverter Manufacturer & Model			
Non-PV Manufacturer			
Non-PV Model			
Non-PV Quantity			
AC Rating: (Nominal)	(KW)	(KVA)	(AC Volts)
AC Rating: (Maximum)	(KW)	(KVA)	(AC Volts)
Generating Unit 2			
Inverter Manufacturer & Model			
AC Rating: (Nominal)	(KW)	(KVA)	(AC Volts)
AC Rating: (Maximum)	(KW)	(KVA)	(AC Volts)
Non-PV Manufacturer			
Non-PV Model			

EVERSOURCE

Non-PV Quantity			
Generating Unit 3			
Inverter Manufacturer & Model			
AC Rating: (Nominal)	(KW)	(KVA)	(AC Volts)
AC Rating: (Maximum)	(KW)	(KVA)	(AC Volts)
Non-PV Manufacturer			
Non-PV Model			
Non-PV Quantity			
Storage Information			
Is the proposed system has Battery Storage?			
Type of Storage Coupled			
Storage Technology Type			
Energy Storage Manufacture			
Capacity DC (kW)			
Capacity AC (kW)			
Storage Inverter			

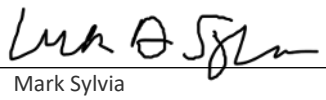
Application Process: I am opting to forego the Expedited Process. Please review this application under the Standard Process – **Yes**

Est. Install Date: 5/15/2024

Est. In-Service Date: 6/30/2024

Agreement Needed By: 6/30/2023

I hereby certify that, to the best of my knowledge, all of the information provided in this application is true:

Interconnecting Customer Signature:	
Interconnecting Customer Name (Printed):	Mark Sylvia
Title:	Authorized Signatory
Date:	May 10, 2023

EVERSOURCE

Exhibit G - Interconnection Service Agreement

1. Parties. This Interconnection Service Agreement ("Agreement"), dated as of 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 **Ward Stream, LLC** a corporation with a principal place of business at **116 Huntington Ave, Boston MA 02116** ("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 #	ESMAEX-01622
Maximo WO #	13027100
Project Size	2988 **kW AC**
Has Storage	Yes
Storage Type	DC-Coupled
Storage Size (AC)	0 **kW**
Storage Size (DC)	1000 **kW**
Existing Facility Capacity	
Limited Export Max Size	3,000
Total Facility Capacity	3000 **kW**

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 **105 Old Post Rd, WORTHINGTON MA 01098 Acct# .** 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 day's 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. Cost or Fee Adjustment Procedures.

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 day's 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:

- 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.
- 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;
- 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;
- 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,
247 Station Dr, SW340
Westwood, MA 02090

12. Indemnification. Except as the Commonwealth is precluded from pledging credit by Section 1of 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.

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	Brandon.Natale@eversource.com

If to Interconnecting Customer	
Name	Ward Stream, LLC
Attention	Kojo Asenso
Address	116 Huntington Ave, Boston MA 02116
Phone	6172093122
Email	ixteam@bluewavesolar.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.

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.

Eversource Company	
Name	Natale, Brandon
Title:	Account Executive
Signature:	Brandon Natale
Date:	7/30/2025

Interconnecting Customer	
Customer Name	Kojo Asenso
Title	Authorized Signatory
Signature	Kojo Asenso Kojo Asenso (Aug 26, 2025 15:58:44 EDT)
Date	Aug 26, 2025

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 section.

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."

All metering must comply with Eversource Bluebook Standards, specifically regarding hot sequence and cold sequence.

For SMART Metering Work Orders:

SMART Metering and Wiring Installation Guidelines to be Adhered to: Click here

The following distribution upgrades are currently required for this DG Interconnection Application:

Cost Estimate				
[redacted]				

- 0.5 miles of overhead three-phase extension to POI.
- Installation of Single Phase Voltage Regulator on 18K5.
- 1.5 miles of reconductoring on 18C3 (cost split with ESMAEX-02438).
- Installation of voltage regulator on 18C3 (cost split with ESMAEX-02438).
- Local POI upgrades which include but are not limited to lateral tap, recloser, primary metering package, primary disconnect and RTAC/DER gateway to allow interconnection.

: SPECIAL NOTE

- Substation & distribution level capital work is required to be completed prior to the interconnection of this project.
- Substation Capital Work: Upgrading the existing 25 MVA transformer to 62.5 MVA at Plainfield. Estimated for Q4 of 2025
- Distribution Capital Work: Reconfiguring the existing feeders from 18K2/18K3 to 18K4/18K5.
- The interconnection of ESMAEX-01622 is contingent on the Dalton-Hinsdale group and cannot proceed until after the Dalton-Hinsdale group's PTO date. In the event that the Dalton-Hinsdale group is dissolved, the Plainfield-Worthington participants interconnecting to The Berkshire 18C substation during an N-1 contingency will be responsible for all required upgrades.
- The project inverters are required to operate under volt-var mode with the default settings specified in Appendix A.1 of impact study report.
- It is required that the inverters must have the SPOV function enabled and set to trip at 1.3 p.u within 1 ms as listed in the manufacturer provided letter.

Attachment 3: Costs of System Modifications and Payment Terms.

The **Eversource** cost summary is shown below:

Project Cost / Fees: Project Work Order Number **13027100**



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 .
- 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 solar array 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 **# 13027100** 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.

Once final customer design, permits are secured and upon the 1st payment, Eversource will then schedule the final engineering and design to be completed.

This may take up to 2 – 3 months for review and approval based on the complexity of the Work Order. If a single customer has multiple projects Eversource may ask them to provide a priority.

Eversource
ATTN: DG Group, WO# 13027100
247 Station Dr, SW340
Westwood, MA 02090-9230

Attachment 4: Special Operating Requirements (Optional)

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.

As indicated in the SIS report under Appendix A, all applicable system modifications and/or Capital upgrades must be completed before the Permission to Operate (PTO) letter is issued ensuring the safe and reliable operation of the System. Furthermore, please refer to this Section in understanding any field limitations related to the operation of Battery Energy Storage Systems (BESS) if applicable along with any other restrictive operation to the operating parameters and the activation of any Protective elements as identified throughout the review of the Oneline and the SIS report analysis must be programmed and witness tested before the official PTO is awarded. Any subsequent design changes upon the issuance of ISA that may require modification to any of the above mentioned clause would require an amended ISA reflecting those impactful changes in ensuring that we deliver the safe and reliable service to our Customers.

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.

By signing this certification, Interconnecting Customer certifies that they will set and operate the Facility in accordance with the aggregate export/import limit on this Facility as stated herein. The installed Facility will have the limit install per the Interconnecting Customer's Installer Application or WEB Portal. Any future modifications to the aggregate power export/import limit stated herein must be reported to the Company prior to making any modifications to the Facility settings as stated herein. Future modifications cannot be implemented to the Facility until an updated permission to operate is issued by the Company. Notwithstanding the foregoing, the Company maintains the right to further curtail or disconnect the Facility consistent with Section 7 of the Interconnection Tariff, M.D.P.U. No. 55A, as amended from time to time. Any and all costs associated with the damage to the Company's EPS resulting from the failure of or unauthorized modification to the Facility's curtailment limit as stated herein will be the Interconnecting Customer's sole responsibility.

Attachment 5: Agreement between the Company and the Company's retail Customer (Exhibit H)

Agreement between the Company and the Company's retail Customer (to be signed by the Company's retail Customer where DG installation and interconnection will be placed, when retail Customer is not the owner and/or operator of the distributed generation facility.

3rd Party Agreement Required - No
Document References – Refer the **3rd Party Agreement (Unsigned)** on the Power Clerk Portal under the attachment section.

Attachment 6: Landowner Consent Agreement (Exhibit I)

Landowner Consent Agreement (to be signed by the Landowner where the Facility will be located when the Landowner is neither the Customer nor Interconnecting Customer --Exhibit I)

Landowner Agreement Required - Yes
Document References – Refer the **Landowner Agreement (Unsigned)** on the Power Clerk Portal under the attachment section.

Attachment 7: System Modifications construction schedule. 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.

25-0826 MA Worthington 105 Old Post Rd ISA Agreement ESMAEX-01622

Final Audit Report 2025-08-26

Created:	2025-08-26
By:	Eric Ibarra (eibarra@bluewavesolar.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAATrhEnvbl7snFxlgBTC-MwhLbioWBB3ZB

"25-0826 MA Worthington 105 Old Post Rd ISA Agreement ESM AEX-01622" History

Document created by Eric Ibarra (eibarra@bluewavesolar.com)
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Email viewed by Kojo Asenso (kojo.asenso@bluewavesolar.com)
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Document e-signed by Kojo Asenso (kojo.asenso@bluewavesolar.com)
Signature Date: 2025-08-26 - 7:58:44 PM GMT - Time Source: server

Agreement completed.
2025-08-26 - 7:58:44 PM GMT

Appendix Q Phase I Geotechnical Report

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wsp.com

August 21, 2026

Ms. Brie Fortmuller

Project Development

Ward Stream, LLC
116 Huntington Avenue, Suite 601

Boston, MA 02116

Subject: Phase I Geotechnical Report, Revised
Ground Mount Solar PV Development
105 Old Post Road, Worthington, Massachusetts

Dear Ms. Fortmuller:

WSP USA, Inc. (WSP) is pleased to provide this Phase I Geotechnical Report (Report) in support of Ward Stream, LLC proposed solar development (the Project) located at 105 Old Post Road in Worthington, Massachusetts (Site). WSP performed a geotechnical investigation and prepared this Report in accordance with WSP's Revised Proposal for Geotechnical Engineering Services dated December 12, 2025.

1.0 OVERVIEW

The following sections provide general descriptions of the Project, regional geologic setting, subsurface exploration and laboratory testing programs, and the subsurface conditions encountered as well as design and construction recommendations for the proposed solar arrays, equipment pads, and access roads.

Elevations reported herein are reported in units of feet (ft) and based on the North American Vertical Datum of 1988 (NAVD88), unless otherwise noted. The horizontal datum is the North American Datum of 1983 (NAD83), Massachusetts State Grid Coordinate System (2011), Mainland Zone.

Important information prepared by the Geoprofessional Business Association (GBA), regarding studies of the type performed, is included in Attachment A for reference.

1.1 PROJECT SUMMARY

The Site is located at 105 Old Post Road in Worthington, Massachusetts (Figure 1). The limit of work area is approximately 32 acres and generally consists of grassy farm fields. Existing site grades range from approximately 1390 to 1460 feet (ft) within the proposed solar footprint and generally slope downward from north/northeast to south/southwest at approximately 5 to 10%.

It is our understanding that Ward Stream, LLC intends to construct approximately 5,064 ground-mounted solar photovoltaic (PV) panels, two equipment pads, and an access road (Figure 2).

Ward Stream, LLC has not yet provided proposed foundation support information or loading conditions for the planned ground mount, but it is assumed that foundations typically consist of either "C", "HP", "W", or pipe-shaped, relatively small, galvanized steel, driven piles with approximately 6 to 10-ft embedment.

1.2 GEOLOGIC SETTING

Available surficial geologic mapping (DiGiacomo-Cohen, 2018) indicates the Site is underlain by a matrix of sand, silt, and clay (glacial till) and relatively shallow bedrock.

1.3 SUBSURFACE EXPLORATIONS

WSP completed 14 test pit excavations at the Site, designated TP-1 through TP-14 on March 26, 2026.

Test pit locations were selected in relation to existing and proposed Site features and under the constraints of excavator access and utility conflicts. WSP subcontracted GPRS LLC to clear each test pit location of possible subsurface utilities and/or obstructions. The test pit locations were GPS surveyed by WSP and are depicted in Figure 2, overlaid on the proposed development.

- TP-1 through TP-11 were performed in proposed solar array areas;
- TP-12 and TP-14 were performed in proposed equipment pad areas; and
- TP-13 was performed adjacent to the proposed access road.

A WSP representative directed the test pit operations, collected soil samples, and logged subsurface conditions encountered. Seaboard Drilling LLC of Chicopee, Massachusetts provided excavation services using a Komatsu PC40 mini excavator, under contract with WSP. Each test pit was advanced to refusal or 10 ft below ground surface (bgs), whichever was encountered first.

Soil samples were collected in approximately one-foot depth intervals from each test pit, and soil samples were described in the field by the WSP representative. Soil samples were sealed in moisture-tight containers (i.e., one-gallon Ziplock bags) and delivered to the geotechnical laboratory for testing.

Upon completion, each test pit was backfilled with soil cuttings and compacted to the extent practicable by tamping each lift with the excavator bucket. Ground surface was restored to pre-excavation conditions to the extent possible.

Test pit logs are provided in Attachment B.

1.4 LABORATORY TESTING

WSP subcontracted GeoTesting Express (GeoTesting) to conduct geotechnical laboratory testing of selected soil samples. Testing was performed in general accordance with the referenced procedures.

- Moisture Content (ASTM D2216) – 4 tests;
- Atterberg Limit (fine grained soil) (ASTM D4318) - 2 tests;
- Grain Size Analysis (ASTM D6913) – 4 tests;
- Soil Electrical Resistivity (G57) - 3 tests;
- Thermal Resistivity, with dry-out curve (3 points) (ASTM D5334) - 2 tests; and
- Corrosion Suite – 2 tests each:
  - Soil pH (ASTM D4972);
  - Soluble Sulfates (ASTM D516);
  - Soluble Chlorides (ASTM D512); and
  - Oxidation-Reduction (Redox) Potential (ASTM G200).

Laboratory test reports and a summary table of results are provided in Attachment C.

1.5 SUBSURFACE CONDITIONS

The overburden soils encountered at the exploration locations are interpreted to be surficial topsoil approximately 1 ft thick overlying native glacial deposits. Native glacial deposits encountered were generally brown (olive, yellowish, or grayish) and consisted of the following:

- silty sand;
- silty sand with gravel;
- sandy silt;
- sandy silt with gravel;
- sandy silty clay; or
- sandy clay.

The glacial soil is visually classified as SM, CL-ML, ML, or CL in accordance with the Unified Soil Classification System (USCS). The soil was generally described as moist.

The results of laboratory testing on the glacial soils are summarized below. Laboratory test reports are provided in Attachment C.

- Moisture content of the soil ranged from 14.5% to 28.0%;
- Gravel content ranged from 1.3% to 4.4%;
- Sand content ranged from 39.3% to 47.8%;
- Fines (silt and clay sized particles) content ranged from 50.6% to 59.4%;
- Atterberg limits, as follows:
    - Liquid limit (LL) of 23 and 26;
    - Plastic limit (PL) of 15 and 18;
    - Plasticity index (PI) of 5 and 11; and
    - Liquidity index (LI) of -0.6 and 0.
- pH of 3.8 and 4.3 (in distilled water);
- Thermal conductivity from 0.42 to 1.77 watts per meter-degree Kelvin (W/m°K) for moisture content between approximately 0% to 30%;
- Electrical resistivity from 38,862 to 55,868 ohm-centimeter (ohm-cm);
- Sulfate content less than 10 parts per million (ppm);
- Chloride content of 12 and 72 ppm; and
- Redox potential of 279.9 and 301.9 millivolts (mV).

Refusal to further penetration of the excavator bucket was encountered at each test pit, ranging from 1 to 9 ft bgs (average approximately 4.5 ft bgs). Refusal was interpreted as bedrock. Bedrock was not confirmed via coring at any of the test pit locations.

Groundwater weeping was not observed in any of the test pits. WSP anticipates that groundwater elevation generally mirrors Site topography and is likely within the underlying bedrock. Groundwater levels are subject to fluctuation due to seasonal precipitation, temperature, snow melt, and/or construction conditions, and therefore may vary from those observed at the time of this investigation.

2.0 DESIGN RECOMMENDATIONS

The following subsections provide WSP's preliminary foundation design recommendations, based on the results of the Phase I investigation.

2.1 MAT FOUNDATIONS

Based on the subsurface conditions encountered at the exploration locations and our current understanding of the proposed development, the following recommendations are provided for mat foundations:

- Equipment can be supported on reinforced concrete mat foundations (approximately 50 ft by 65 ft, based on current plans) bearing directly on Crushed Stone built up from properly prepared subgrade.
- The 50-ft wide mat foundation may be designed using a maximum net allowable bearing pressure of 1,200 pounds per square foot (psf). WSP must review the bearing capacity of the soil beneath the mat if designers change the size of the mat significantly.
- The mat foundation should be underlain by a minimum of 6 inches of Crushed Stone to provide a capillary break and a stable working surface.
- Resistance to net uplift loads can be provided by the mass of the foundation. The design engineer should evaluate the design uplift load and uplift resistance based upon the foundation configuration as the design progresses. It is recommended that the foundation be designed such that the foundation will always provide compressive forces on the subgrade (i.e., uplift forces do not cause a net unloading on one side of the foundation resulting in tensile forces between the foundation and subgrade).
- Resistance to lateral loads can be provided by frictional resistance along the base of the mat foundation. For a mat bearing on Crushed Stone built up from subgrade soils, an interface friction angle, δ, of 28 degrees is recommended, resulting in a coefficient of friction of 0.53.

- A modulus of vertical subgrade reaction, kvi, of 100 pounds per cubic inch (pci) should be available for structural design of the mat foundation, provided that the subgrade and Crushed Stone are prepared as recommended.
- Total post-construction settlement due to maximum net allowable bearing pressure (1,200 psf) is estimated to be on the order of approximately 1/2-inch considering elastic soil conditions. Consolidation settlement estimates for the fine-grained soil should be evaluated as the design progresses.
- Flexible piping/conduit connections (flexible boot, expansion foam, etc.) are recommended for the equipment that would allow for post-construction deflection/movement while maintaining serviceability of the system.

2.2 DRIVEN PILES

It is our understanding that piles for solar arrays are generally lightweight "C", "HP", "W", or pipe shaped sections driven about 6 to 10 ft beneath finished grade. Based on the soil conditions encountered during Phase I, driven steel piles may not be feasible for this project due to the shallow bedrock conditions. Where required skin friction and/or embedment depth cannot be achieved for driven piles due to shallow refusal/bedrock, piles should be socketed into underlying bedrock or alternative foundation support should be considered (i.e., ground/bedrock screws, concrete ballasts, etc.). Recommendations for these alternative foundation options are not included herein.

Recommendations for bedrock-socketed foundation design parameters can be provided following completion of a Phase II geotechnical investigation, which should include bedrock coring.

2.3 FROST PROTECTION

Based on the laboratory testing results, the existing site soils are considered frost susceptible.

According to National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center Air Freezing Index Tables, the Air Freezing Index for the Worthington, MA area is approximately 1,220-degree days for a 35-year return period, which could result in a depth of frost penetration of about 5 ft in snow–free areas. The Northeast Regional Climate Center (DeGaetano et al., 1996) indicates maximum depth of freezing under snow-free bare soil of approximately 150 centimeters (5 ft) for a 35-year return period in the Worthington, MA area. The Massachusetts Building Code (10th Edition) indicates the minimum frost depth for footings is 48 inches (4 ft).

The following recommendations are provided for protection against frost and to reduce the potential for heaving of mat foundations:

- The mat foundations should be underlain by a minimum of 6 inches of Crushed Stone and 1-1/2 inches of rigid insulation buried a minimum of 10-inches below final grade. The rigid insulation should extend a minimum of 3.5 feet laterally beyond the edge of the mat foundations in all directions and slope downward to drain water away from the foundation. It is recommended that the structural engineer check that the contact pressure of the foundation does not exceed the compressive resistance of the insulation; or
- Alternatively, the mat foundations should be underlain by Crushed Stone (6-inch minimum) and non-frost susceptible backfill (Gravel Borrow). The Gravel Borrow should extend to a depth of at least 5 ft below final adjacent grade. Permanent perimeter drains should be installed at the base/bottom of the Gravel Borrow layer underlying the mat foundation. The drains should consist of 6-inch diameter perforated (slotted, 0.12-inch slot widths) drainpipe manufactured by Advanced Drainage System (ADS), or approved equal, surrounded by a minimum of 6-inches (all sides) of Crushed Stone. To mitigate the potential of fines clogging the drain, a non-woven geotextile fabric (Mirafi 140-N or approved equal) should be wrapped around the Crushed Stone. The underdrains should be installed such that positive drainage is maintained (1 percent slope minimum) from the foundation to the point where the drain daylights/outlets.

Soil in contact with foundations can freeze to the foundation, developing a substantial adfreeze bond and uplift forces to the foundation. Average adfreeze bond stresses, determined from field

experiments, typically range from 1.36 ksf for soil frozen to concrete to 2.1 ksf for soil frozen to steel (Kibriya and Tahir, 2015). These recommended bond stresses do not include a factor of safety.

Adfreeze can be estimated based upon CGS (2006) for the general soil type found in the explorations. Frost load, F in kips, from adfreezing is given by $F = \pi * d * l * \alpha * 4.448$, where d is outside pile diameter (ft), l is frost depth (ft), α is adfreeze stress (ksf), and 4.448 metric correction factor. Safe pile resistance, R, may be estimated from $R = \pi\ d\ L\ \beta\ GF$, where d is outside pile diameter (ft), L is pile length below frost depth (ft), β is soil side resistance uplift stress (ksf), and GF is the appropriate geotechnical resistance factor taken from CGS (2006). From semi-empirical analysis, use GF of 0.3.

Finished site grades should be sloped away from the proposed development to promote positive drainage.

2.4 CORROSION

A summary table of the corrosion and resistivity test results is provided in Attachment C. Laboratory test reports are also provided in Attachment C. In general, the soil is considered non-corrosive to steel but potentially corrosive to concrete based on measured pH.

2.4.1 CHLORIDE IONS

Chloride ions concentration affects corrosion rate of embedded steel. According to Decker et al. (2008), the relationship between corrosion rate and chloride concentration may be expressed as:

CR=16.28*Ln(CL)-83.8
where CL is the chloride concentration in ppm and CR is the corrosion rate of steel in µm/year.

For chloride concentrations less than 172 ppm, the CR is considered zero (non-corrosive).

2.4.2 ELECTRICAL RESISTIVITY

A general guide as to the degree of corrosiveness of soil based on soil resistivity, presented by EPRI (1997), is as follows in Table 1.

Table 1 - Corrosion Classification of Soil and Water (EPRI, 1997)

RESISTIVITY (OHM-CM)	CORROSION CLASSIFICATION
0-1,000	Extremely Corrosive
1,000 – 2,000	Very Corrosive
2,000 – 10,000	Corrosive
Greater than 10,000	Progressively Less Corrosive

The soil resistivity laboratory test results indicate that the environment is not corrosive.

2.4.3 ACIDITY (PH)

Acidity affects the corrosion of steel and concrete. In general, pH levels of 5 or below can lead to extreme corrosion rates and premature pitting of metallic objects. Based on NRCS (2017), Table 2 shows concrete corrosion potential for various pH values. The pH results indicate the soil is acidic and has high corrosion potential for steel and concrete.

Table 2 - Corrosion Potential for Concrete, Per NRCS Table 618.81 (2017)

SOIL TYPE	LOW POTENTIAL	MODERATE POTENTIAL	HIGH POTENTIAL
Sandy/organic soil	pH > 6.5	5.5 < pH > 6.5	pH < 5.5
Loamy/clayey soil	pH > 6.0	5.0 < pH > 6.0	pH < 5.0

2.4.4 SULFATE IONS

Sulfate ion concentration affects the corrosion of concrete. Sulfate Exposure Class is based upon ACI (2014) and summarized in Table 3. Based on limited analytical laboratory testing, it is concluded that sulfate concentrations do not pose a corrosion risk to concrete.

Table 3 - Sulfate Corrosion Scale, per ACI 318 Table 19.3.1.1 (2014)

CLASS	SULFATE (PPM)	CORROSION POTENTIAL	
S0	< 150	Not Applicable	Injurious sulfate attack is not a concern
S1	150 - 1,500	Moderate	Equal to seawater exposure, Type II cement
S2	1,500 – 10,000	Severe	Type V cement
S3	> 10,000	Very Severe	Type V cement + pozzolan or slag

2.5 THERMAL RESISTIVITY

The thermal resistivity (ρ) of a material tested per ASTM D5334 is a measure of its ability to resist conduction of heat and has units of ^{o}K-cm/ W (degrees Kelvin-centimeter per watt). When electricity is transferred through a cable, heat is produced; in the case of underground cables, soil thermal resistivity influences heat transference that may affect cable life or continuity. Soil thermal resistivity testing should be used by designers to determine the appropriate cable design and cable bedding properties to assure long-term cable life and efficient operation. The thermal resistance dry-out test reports are provided in Attachment C.

2.6 ACCESS ROAD

Permanent unpaved road should consist of 4 inches of Surfacing Material, a well-graded blend of gravel, sand, and fines (clay and silt). Surfacing Material should be selected to allow for sufficient compaction resulting in a firm, low permeable surface promoting surface drainage off the roadway surface.

Surfacing material should be underlain by 8 inches of Crushed Stone and 16-ounce nonwoven geotextile fabric placed between the Crush Stone and underlying subgrade.

Access road surfaces and subgrades should be sloped to promote proper surface drainage.

3.0 CONSTRUCTION RECOMMENDATIONS

Geotechnical engineering recommendations pertaining to the construction of the proposed development are provided in the following subsections.

3.1 SITE PREPARATION

- Stripping: The mat footprints should be cleared and stripped of all existing pavement, topsoil, root mat, and/or otherwise unsuitable materials.

- Excavation: Excavation of the encountered overburden soils should not prove difficult for heavy equipment. Raveling of excavations in response to moisture fluctuations and precipitation should be anticipated. Disturbed soil conditions are likely to develop in areas of excessive soil moisture. To aid in maintaining stable cut conditions, surface runoff should be diverted away from the top of excavation slopes.
- Protection of Structures: The Contractor shall be responsible for protecting all adjacent existing structures from deflection, vibration, and damage during all earthwork activities. ASCE (2017) indicates that residential structures should be greater than 52.5 ft from the pile driving site to be safe from damage due to vibration. Considering that several factors contribute to vibration attenuation, including pile driving hammer type/energy, soil type/density, etc., WSP recommends that the Contractor perform pre- and post-construction surveys by a third-party structural engineer on adjacent structures within 100 ft of the work and shall be responsible for any damage that has been incurred as a result of array construction.

3.2 SUBGRADE PREPARATION

Subgrade preparation should be performed in accordance with the following procedures:

- Existing soils contain substantial proportions of fine sand, silt, and/or clay-sized particles and may degrade and/or become unworkable when subjected to construction traffic or other disturbance during wet conditions. As such, site grading should be performed during a dry season, if possible.
- The final 1-foot, at a minimum, of excavation should be performed with a smooth-edged cutting bucket to minimize subgrade disturbance.
- The exposed subgrade soils should be proof rolled using a large smooth-drum static roller, with successive passes aligned perpendicularly. The proof rolling efforts, including the number of passes, should be directed by the on-site geotechnical engineer.
- Any loose, soft, wet, and/or otherwise unsuitable soils (typically evidenced by rutting, pumping, and/or deflection of the subgrade) should be further over-excavated to expose suitable soils, or other remedial measures should be taken, as approved by the on-site geotechnical engineer.
- Over-excavated areas should be backfilled with properly placed and compacted Gravel Borrow.
- Existing subsurface utilities, remnant foundations, and/or underground structures and obstructions should be removed from the proposed footprint and backfilled with properly placed and compacted Gravel Borrow.
- The Contractor should coordinate with the utility owner prior to relocating any utilities.
- The placement of fill materials to achieve design grades should not begin until the exposed subgrade soils have been directly observed and approved by the on-site geotechnical engineer.
- Prior to setting forms and placing reinforcing steel, a geotechnical engineer should directly observe foundation subgrades.
- Foundation subgrades should be level and free of standing water and/or debris.
- Loose, soft, wet, frozen, or otherwise unsuitable soils should either be re-compacted or over-excavated to a suitable subgrade and replaced with compacted Gravel Borrow, as approved by the on-site geotechnical engineer.
- Subgrade soils should be protected against physical disturbance, precipitation, and/or frost. Surface water run-on/run-off should be diverted away from open excavations.

3.3 FILL

The following are recommendations for Crushed Stone:

- Crushed Stone should be placed as fill or backfill below and adjacent to mat foundations, beneath Surfacing Material on access roads. and immediately surrounding permanent drains (if applicable).
- Crushed Stone should be free of construction and demolition debris, frozen soil, organic soil, peat, stumps, brush, trash, and refuse.

- Crushed Stone should not be placed on soft, saturated, or frozen subgrade soils.
- Crushed Stone should conform to Massachusetts Department of Transportation (MassDOT) Standard Specifications (MassDOT, 2026) Section M2.01.0 (Crushed Stone) and gradation M2.01.4 (Table M2.01.0-1):

Table 4 – Recommended Crushed Stone Gradation (M2.01.4)

SIEVE SIZE	PERCENT PASSING BY WEIGHT
1-inch	100
3/4-inch	90 - 100
1/2-inch	10 - 50
3/8-inch	0 - 20
No. 4	0 - 5

- Crushed Stone beneath mat foundations and access roads should be compacted with 2 to 3 passes of a large smooth-drum vibratory roller in perpendicular directions to a firm and unyielding condition.

The following are recommendations for Gravel Borrow:

- Gravel Borrow should be placed as backfill in over-excavations for debris removal and/or where unsuitable subgrade soils are encountered.
- Gravel Borrow should be free of construction and demolition debris, frozen soil, organic soil, peat, stumps, brush, trash, and refuse.
- Gravel Borrow should contain no frozen material or be placed in freezing weather.
- Gravel Borrow should have a maximum particle size of 3 inches; particles larger than 3 inches should be removed prior to placement.
- Gravel Borrow should conform to MassDOT Standard Specifications (MassDOT, 2026) Section M1.03.0 (Gravel Borrow) and gradation Type b (Table M1.03.0-1).

Table 5 – Recommended Gravel Borrow Gradation (M1.03.0 Type b)

SIEVE SIZE	PERCENT PASSING BY WEIGHT
3-inch	100
1/2-inch	50 - 85
No. 4	40 - 75
No. 50	8 - 28
No. 200	0 - 10

Gravel Borrow should be conditioned to within 3 percent of its optimum moisture content and placed in maximum 12-inch-thick loose lifts (prior to compaction) if a heavy single- or double-drum vibratory roller is used. Loose lift thickness should be limited to 6 inches (prior to compaction) if hand-operated compaction equipment is used. Gravel Borrow should be compacted to at least 95 percent of maximum dry density, as determined by the Modified Proctor Test (ASTM D1557) or to at least 98 percent of maximum dry density, as determined by the Standard Proctor Test (ASTM D698).

Surfacing Material should consist of a well-graded blend of gravel, sand, and fines (clay and silt). The maximum size particle should not exceed 1 inch in diameter, and the gravel should be crushed with angular edges (not rounded). The Surfacing Material should also contain approximately 10 to 25 percent fines (silt and clay-sized particles passing the No. 200 sieve). The fines should exhibit low to moderate plasticity (plastic index less than 15) and will act as a binder to help reduce risk for wash boarding. If the fines content of a roadway Surfacing Material is comprised mostly of silt, the fines will be non-plastic and will not have the benefit of the binder or cohesive aspects. Aggregate surfacing material should be placed in a single 4-inch lift, conditioned to within 3 percent of its optimum moisture content, and compacted to a minimum of 95 percent of the maximum dry unit weight as

determined by ASTM D1557.

Based on the laboratory test results for particle size analysis, existing Site soils are not expected to be suitable for reuse as Crushed Stone, Gravel Borrow, or Surfacing Material. Existing Site soils may be reused as general fill in landscaped and/or non-structural areas of the proposed development. Fill placed in landscaped and/or non-structural areas of the Site should be conditioned within 3 percent of its optimum moisture content and placed in maximum 12-inch-thick loose lifts (prior to compaction) if a heavy single- or double-drum vibratory roller is used. Loose lift thickness should be limited to 6 inches (prior to compaction) if hand-operated compaction equipment is used. General fill in landscaped and/or non-structural areas should be compacted to at least 90 percent of maximum dry density, as determined by the Modified Proctor Test (ASTM D1557) or to at least 92 percent of maximum dry density, as determined by the Standard Proctor Test (ASTM D698).

Quality control testing, including in-place field density and moisture tests, should be performed to confirm that the specified compaction is achieved.

3.4 EXCAVATION SLOPES

Safe excavation slopes are the responsibility of the Contractor and should be based on actual conditions during construction. It has been our experience that temporary unsupported cuts in similar soil types have been observed to be stable at 1.5H:1V (horizontal to vertical), if free from surface runoff and seepage. All excavation slopes should comply with current OSHA and other local applicable safety standards. If an excavation cannot be properly sloped or benched due to space limitations, adjacent structures, and/or seepage, the Contractor should install an engineered shoring system to support the temporary excavation.

4.0 REFERENCES

ACI, 2014. “ACI-318 Building Code Requirements for Structural Concrete and Commentary”. Washington, D.C.: American Concrete Institute.

ASCE, 2017. “Allowable Distance from Impact Pile Driving to Prevent Structural Damage Considering Limits in Different Standards”. Volume 23, Issue 1.

Canadian Geotechnical Society (CGS), 2006. “Canadian Foundation Engineering Manual”. 4th Edition, Richmond, BC, Canada.

Decker, J.B., Rollins, K.M., and Ellsworth, J.C., 2008. “Corrosion rate evaluation and prediction for piles based on long- term field performance". Journal of Geotechnical and Geoenvironmental Engineering, 134(3), pp. 341-351.

DeGaetano, A.T., Wilks, D.S., and McKay, M., 1996. Northeast Regional Climate Center Atlas of Soil Freezing Depth Extremes for the Northeastern United States. Cornell University, Ithaca, New York. Publication No. RR 96-1. March 1996.

DiGiacomo-Cohen, M.L., 2018. Surficial Materials Map of the Worthington Quadrangle, Massachusetts.

Electric Power Research Institute (EPRI), 1997. “Cathodic Protection”, Vol. 11.

Kibriya, T. and Tahir, L., 2015. Adfreeze Forces on Lightly Loaded Pile Foundations of Solar PV Farms in Cold Regions. American Journal of Civil Engineering and Architecture, Vol. 3, No. 4, pp. 109-117.

Massachusetts Building Code (Draft), 10th Edition. Published August 2021. Updated December 2022.

Massachusetts Department of Transportation (MassDOT) Highway Division, 2026. Standard Specifications for Highways and Bridges. Division III.

Natural Resources Conservation Service (NRCS), 2017. "618.81 Guide for Estimating Risk of Corrosion Potential for Concrete".

5.0 CLOSING

The findings and recommendations presented herein were prepared in accordance with generally accepted geotechnical engineering principles and professional engineering practice, consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. We make no other warranty, either expressed or implied. The findings and recommendations presented herein are based on the results of the geotechnical explorations and laboratory testing, and assumed grading, preliminary loadings, and foundation types, combined with an interpolation of soil and groundwater conditions between and beyond the widely spaced explorations. The recommendations provided herein pertain only to the project described herein. If conditions are observed or encountered subsequent to this report that appear to be different from those presented herein, or if grades or loads assumed as part of this geotechnical assessment are different from final design conditions, we request that we be notified so that we may review and modify, if necessary, our recommendations.

Thank you for the continued opportunity to support Ward Stream, LLC's Project at 105 Old Post Road in Worthington, Massachusetts. Should you have any questions, please contact Olivia Crosby at (978) 761-7934 or at olivia.crosby@wsp.com.

Sincerely,
WSP USA Inc.

Nicholas D. Langlais, PE (ME)
Senior Geotechnical Engineer

Olivia A. Crosby, PE
Project Manager

COMMONWEALTH OF MASSACHUSETTS
DOUGLAS E. TATE
CIVIL
No. 40908
REGISTERED PROFESSIONAL ENGINEER

Douglas E. Tate, PE
Lead Consultant, Geotechnical Engineer
MA PE No. 40908, expires 6/30/2022

Attachments:

Figure 1 – Location Map

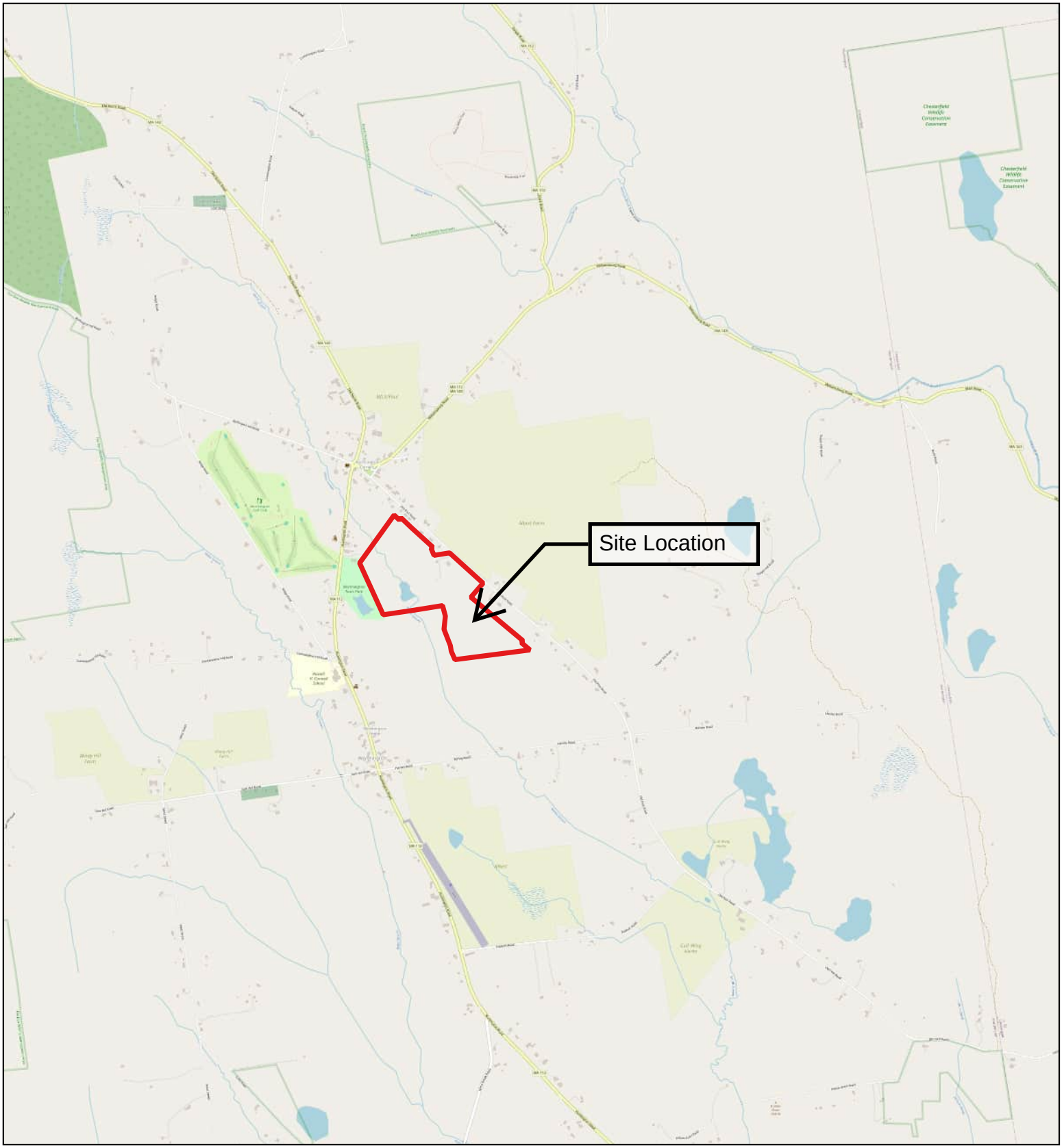
Figure 2 – Site Plan

Attachment A – Geoprofessional Business Association

Attachment B - Test Pit Logs

Attachment C – Laboratory Test Reports

FIGURES



WSP USA, Inc
100 Apollo Drive, Suite 302
Chelmsford, MA 01824
(978) 692-9090

0 2,500 5,000 ft N

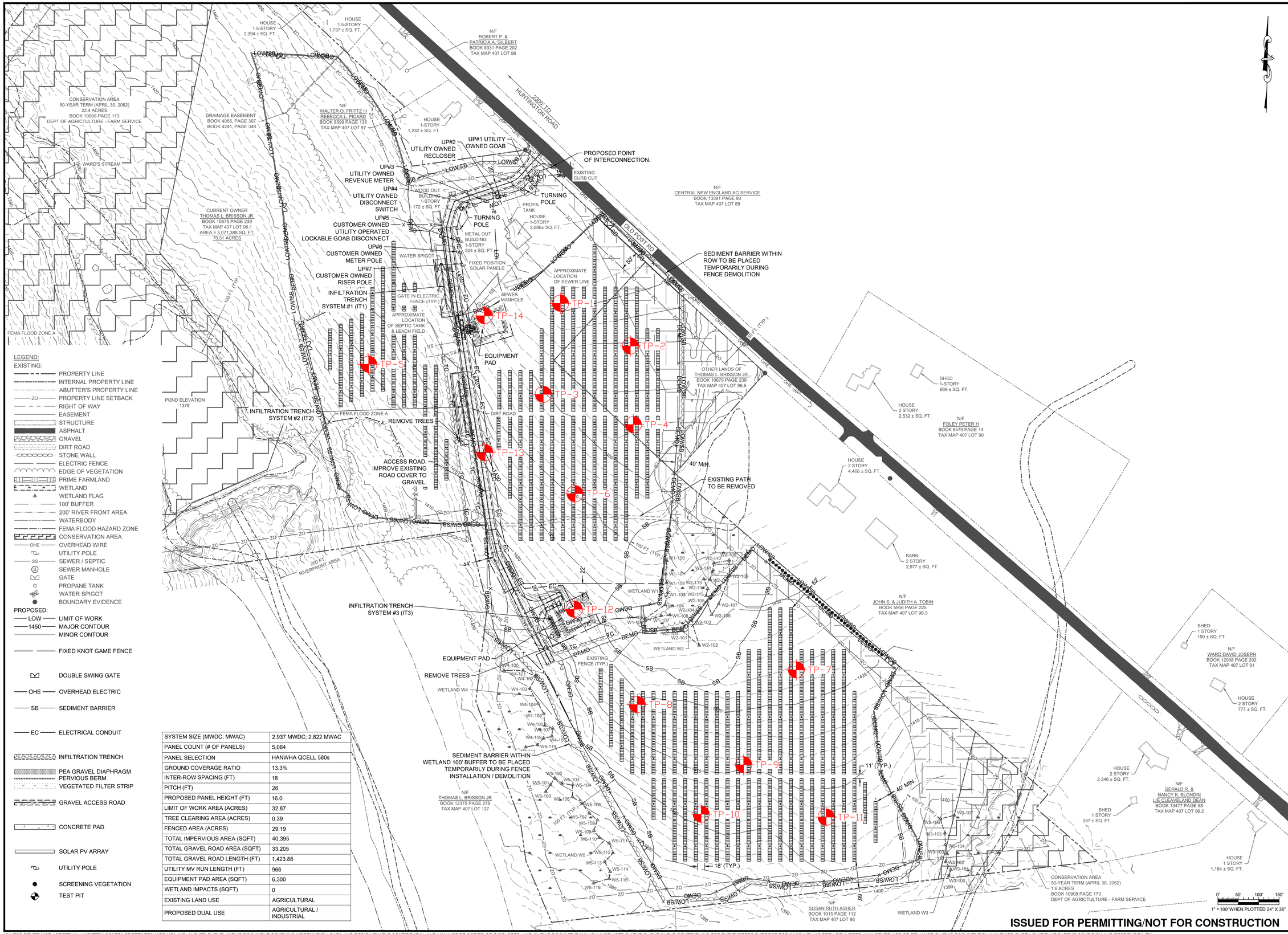
FIGURE 1
Location Map

Ward Stream, LLC
105 Old Post Rd,
Worthington, Massachusetts 01098

Prepared/Date: NN 04-28-2026

Data Layer Sources: Base layer aerial imagery is from QGIS Web OSM Standard.

C:\Users\USNN133798\WSP O365\BlueWave - Documents\US-EI-3652230437 - BlueWave - Old Post Rd Worthington\Figures\Old Post.qgz



LEGEND:

EXISTING:
- PROPERTY LINE
- INTERNAL PROPERTY LINE
- ABUTTER'S PROPERTY LINE
- ZO — PROPERTY LINE SETBACK
- RIGHT OF WAY
- EASEMENT
- STRUCTURE
- ASPHALT
- GRAVEL
- DIRT ROAD
- STONE WALL
- ELECTRIC FENCE
- EDGE OF VEGETATION
- PRIME FARMLAND
- WETLAND
- WETLAND FLAG
- 100' BUFFER
- 200' RIVER FRONT AREA
- WATERBODY
- FEMA FLOOD HAZARD ZONE
- CONSERVATION AREA
- OHE — OVERHEAD WIRE
- UTILITY POLE
- SS — SEWER / SEPTIC
- SEWER MANHOLE
- GATE
- PROPANE TANK
- WATER SPIGOT
- BOUNDARY EVIDENCE

PROPOSED:
- LOW — LIMIT OF WORK
- 1450 — MAJOR CONTOUR
- MINOR CONTOUR
- FIXED KNOT GAME FENCE
- DOUBLE SWING GATE
- OHE — OVERHEAD ELECTRIC
- SB — SEDIMENT BARRIER
- EC — ELECTRICAL CONDUIT
- INFILTRATION TRENCH
- PEA GRAVEL DIAPHRAGM
- PERVIOUS BERM
- VEGETATED FILTER STRIP
- GRAVEL ACCESS ROAD
- CONCRETE PAD
- SOLAR PV ARRAY
- UTILITY POLE
- SCREENING VEGETATION
- TEST PIT

SYSTEM SIZE (MWDC; MWAC)	2.937 MWDC; 2.822 MWAC
PANEL COUNT (# OF PANELS)	5,064
PANEL SELECTION	HANWHA QCELL 580s
GROUND COVERAGE RATIO	13.3%
INTER-ROW SPACING (FT)	18
PITCH (FT)	26
PROPOSED PANEL HEIGHT (FT)	16.0
LIMIT OF WORK AREA (ACRES)	32.87
TREE CLEARING AREA (ACRES)	0.39
FENCED AREA (ACRES)	29.19
TOTAL IMPERVIOUS AREA (SQFT)	40,395
TOTAL GRAVEL ROAD AREA (SQFT)	33,205
TOTAL GRAVEL ROAD LENGTH (FT)	1,423.88
UTILITY MV RUN LENGTH (FT)	966
EQUIPMENT PAD AREA (SQFT)	6,300
WETLAND IMPACTS (SQFT)	0
EXISTING LAND USE	AGRICULTURAL
PROPOSED DUAL USE	AGRICULTURAL / INDUSTRIAL

ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION

WSP USA INC.
100 APOLLO DRIVE, SUITE 302
CHELMSFORD MASSACHUSETTS 01824
TELEPHONE: (978) 692-9090
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WEB: WWW.WSP.COM

REVISION	DATE	ISSUE / REVISION DESCRIPTION	ISSUED	APPROVED
2	05/05/2026	GEOTECHNICAL INVESTIGATION TEST PIT LOCATIONS	NN	OAC
1	04/17/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC
0	01/14/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC

PROJECT: 3.00 MW AC GROUND-MOUNT SOLAR PV DEVELOPMENT 105 OLD POST RD WORTHINGTON, MA 01098

TITLE: GEOTECHNICAL INVESTIGATION TEST PITS LOCATIONS

CLIENT: WARD STREAM, LLC

SEAL: DRAFT

DESIGNED BY: OAC	DRAWN BY: MRB
CHECKED BY: APV	SCALE: AS SHOWN
PROJECT NUMBER:	US-EI-3652230437
DRAWING NUMBER:	FIGURE 2
SHEET NUMBER:	SITE PLAN

D:\- CAD Projects\BrickWorx\US-EI-3652230437 - Old Post Rd Worthington\7.1 Permitting\Sheets\Test Pits Location Site Plan.dwg - C-102 - May. 11, 2026 11:22am - USNH133765

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ATTACHMENT A

Geoprofessional Business Association

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

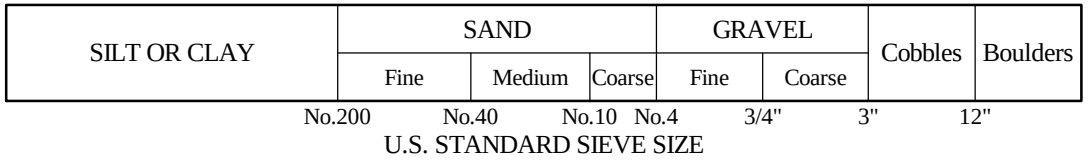
Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

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ATTACHMENT B
Test Pit Logs

MAJOR DIVISIONS			GROUP SYMBOLS		GENERAL DESCRIPTIONS
COARSE GRAINED SOILS (More than 50% RETAINED on No. 200 sieve)	GRAVELS (More than 50% of coarse fraction RETAINED on No. 4 sieve)	CLEAN GRAVELS (Less than 5% fines)		GW	Well graded gravels or gravel-sand mixtures; trace or no fines.
				GP	Poorly graded gravels or gravel-sand mixtures; trace or no fines.
		GRAVELS WITH FINES (More than 12% fines)		GM	Silty gravels or gravel-sand-silt mixtures.
				GC	Clayey gravels or gravel-sand-clay mixtures.
	SANDS (50% or more of coarse fraction PASSES the No. 4 sieve)	CLEAN SANDS (Less than 5% fines)		SW	Well graded sands or sand-gravel mixtures; trace or no fines.
				SP	Poorly graded sands or sand-gravel mixtures, trace or no fines.
		SANDS WITH FINES (More than 12% fines)		SM	Silty sands or sand-gravel-silt mixtures.
				SC	Clayey sands or sand-gravel-clay mixtures.
FINE GRAINED SOILS (50% or more PASSES the No. 200 sieve)	SILTS AND CLAYS (Liquid Limit LESS than 50)			ML	Inorganic silts or rock flour. Non-plastic or very slightly plastic. PI < 4 or plots below "A" line.
				CL	Inorganic lean clay. Low to medium plasticity. PI > 7 and plots on or above "A" line.
				OL	Organic silts, clays, and silty clays. Low to medium plasticity.
	SILTS AND CLAYS (Liquid Limit of 50 or GREATER)			MH	Inorganic elastic silt. PI plots below "A" line.
				CH	Inorganic fat clay. High plasticity. PI plots on or above "A" line.
				OH	Organic silts and clays. High plasticity.
HIGHLY ORGANIC SOILS				PT	Peat and other highly organic soils. Decomposed vegetable tissue. Fibrous to amorphous texture.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.



References: ASTM D 2487 (Unified Soil Classification System) and ASTM D 2488 (Visual-Manual Procedure).

TYPICAL SYMBOLS

	Shelby Tube		Auger Cuttings
	Standard Split Spoon Sample		3" Split Spoon Sample
	Rock Core		Dynamic Cone Penetrometer
	Vane Shear		Bulk/Grab Sample
	Geoprobe Sample		Sonic or Vibro-Core Sample
	Water Table at time of drilling		Water Table after 24 hours

CORRELATION OF STANDARD PENETRATION TEST (SPT) WITH RELATIVE DENSITY AND CONSISTENCY

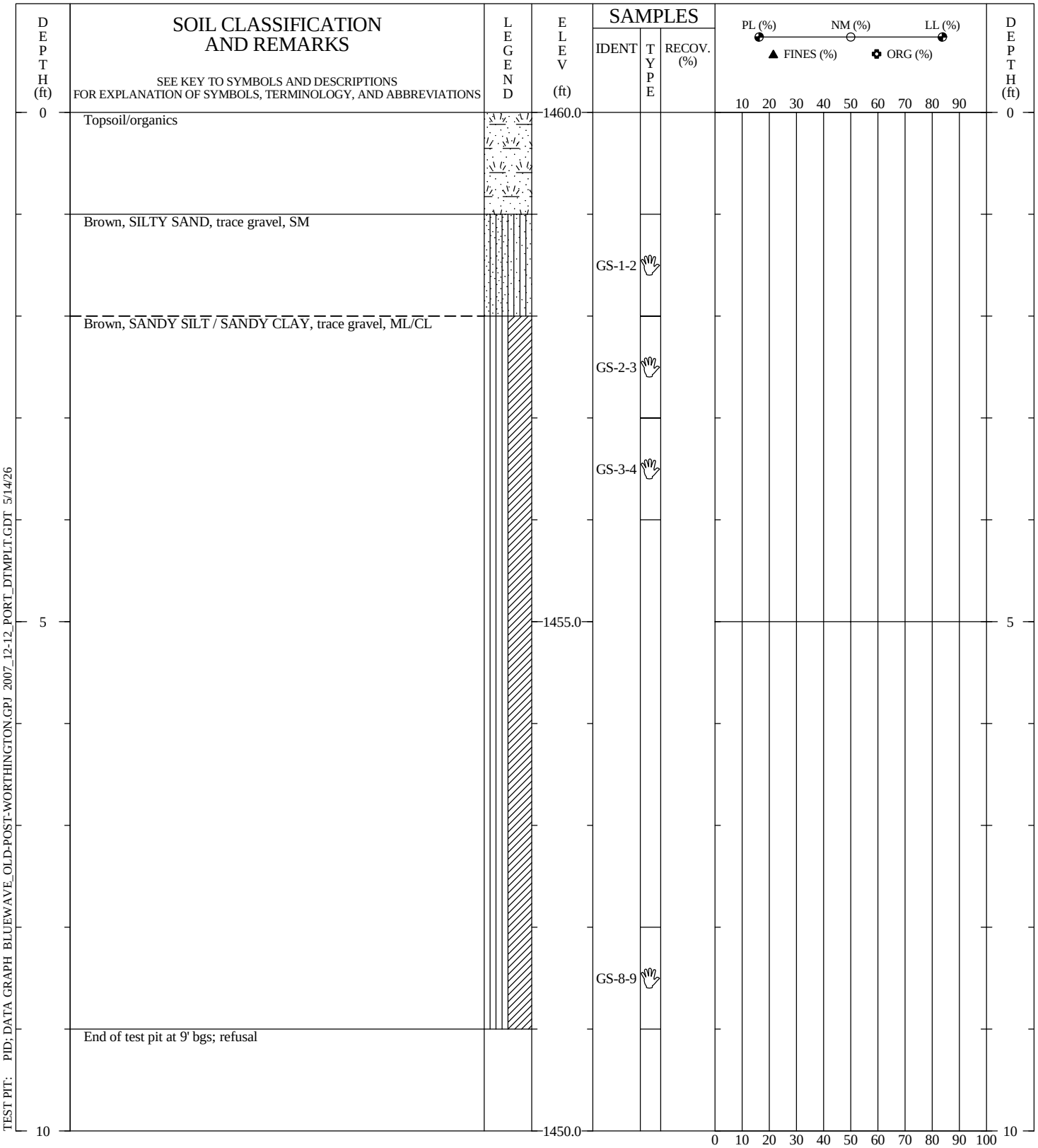
GRAVEL, SAND, & SILT (NON-PLASTIC)		SILT (PLASTIC) & CLAY		
N or N_{60}	Relative Density	N or N^{60}	Su (psf)	Consistency
0 - 4	Very Loose	0 - 2	0 - 250	Very Soft
5 - 10	Loose	3 - 4	250 - 500	Soft
11 - 30	Medium Dense	5 - 8	500 - 1000	Medium Stiff
31 - 50	Dense	9 - 15	1000 - 2000	Stiff
Over 50	Very Dense	16 - 30	2000 - 4000	Very Stiff
		Over 30	Over 4000	Hard

SPT Notes: WR = Weight of Rods; WH = Weight of Hammer

TERMS DESCRIBING SOILS (excludes particles > 3", organics, debris, etc.)	TERMS DESCRIBING MATERIALS (i.e. particles > 3", organics, debris, etc.)
Trace: Particles present, but < 5%	Occasional: Particles present, but < 10%
Few: 5% to 15%	Some: 10% to 25%
Little: 15% to 25%	Frequent: > 25%
Some: 25% to 50%	

TERMS DESCRIBING MOISTURE	TERMS DESCRIBING STRUCTURE
Dry: Absence of moisture; dusty	Layer: > 3" thick
Moist: Damp, but no visible water	Seam: 1/16" to 3" thick
Wet: Visible/free water	Parting: < 1/16" thick

KEY TO SYMBOLS AND DESCRIPTIONS



TEST PIT: PID; DATA GRAPH BLUEWAVE_OLD-POST-WORTHINGTON.GPJ 2007_12-12_PORT_DTMPLT.GDT 5/14/26

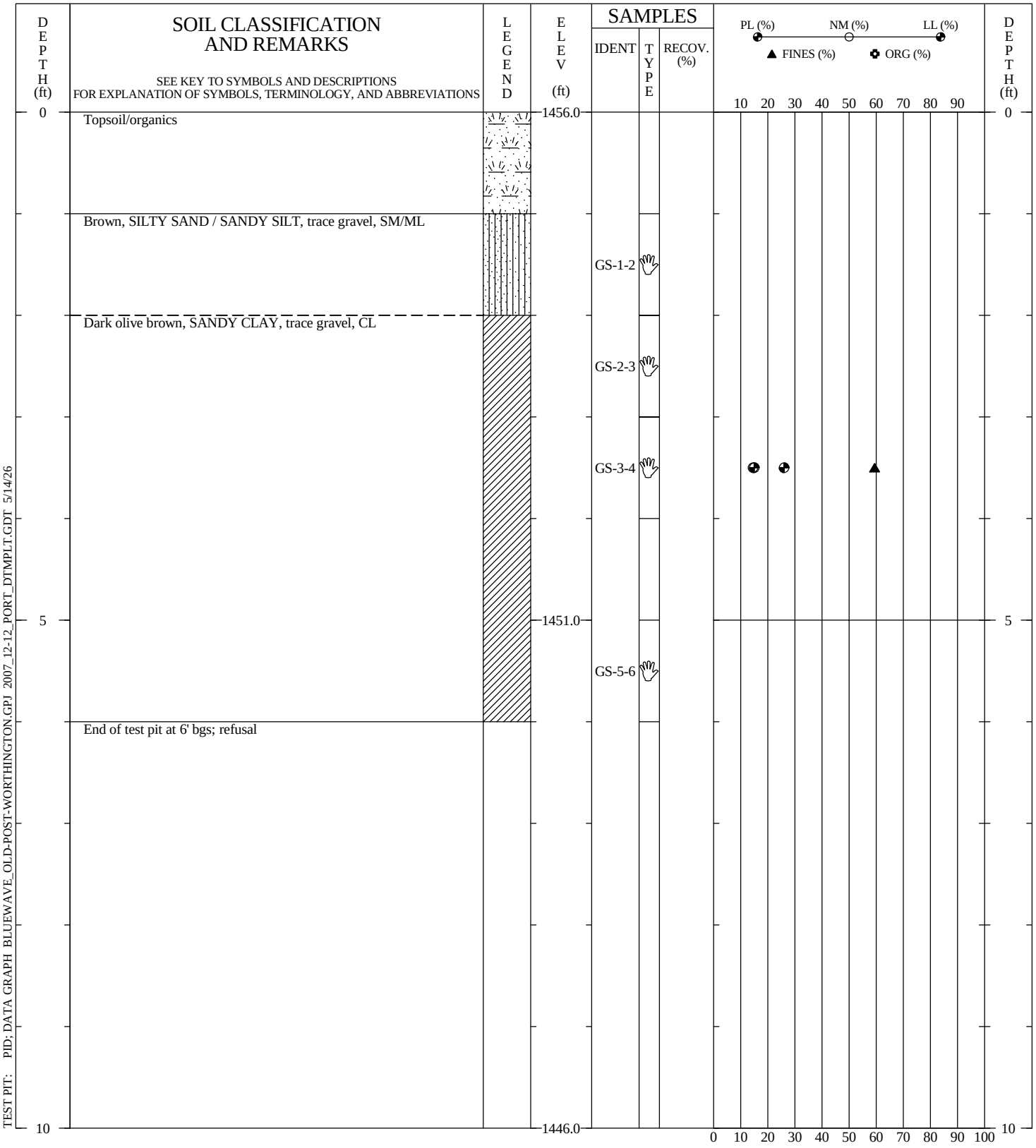
CONTRACTOR: Seaboard Drilling
EQUIPMENT: PC40 Mini
METHOD:
REMARKS: Test pit backfilled with excavated materials and compacted with excavator bucket. Surface conditions restored to the extent practicable.

LOGGED BY: M. Turner CHECKED BY/DATE: NDL/5-14-26

THIS TEST PIT RECORD PRESENTS A REASONABLE INTERPRETATION OF THE SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS MAY DIFFER. STRATA INTERFACES (AS SHOWN) ARE APPROXIMATE. ACTUAL TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

TEST PIT RECORD

TEST PIT NO.: TP-1
EXCAVATED: 3/26/26
PROJECT: BlueWave
LOCATION: 105 Old Post Rd, Worthington, MA
PROJECT NO.: 3652230437-800.01 **PAGE** 1 **OF** 1



TEST PIT: PID; DATA GRAPH BLUEWAVE_OLD-POST-WORTHINGTON.GPJ 2007_12-12_PORT_DTMPLT.GDT 5/14/26

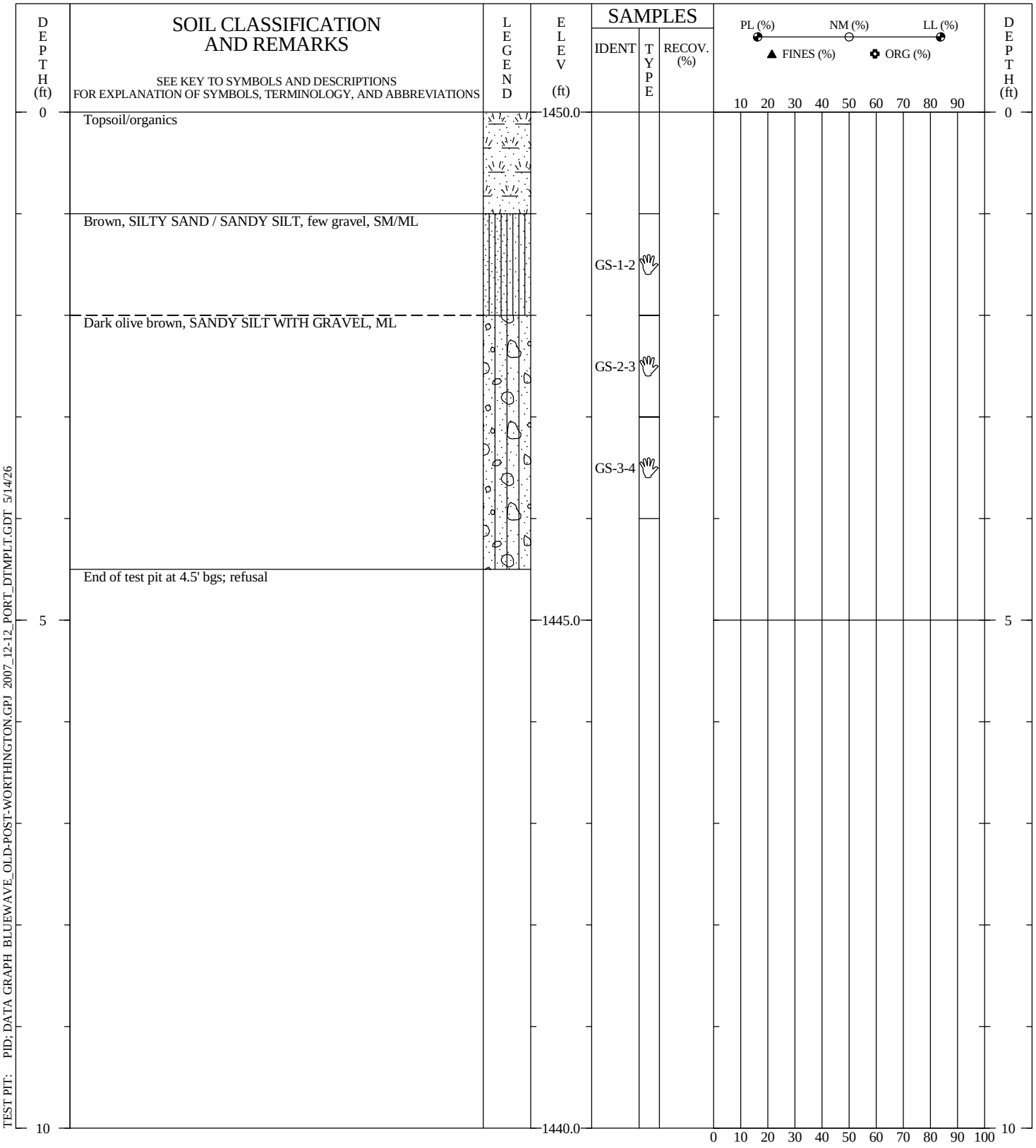
CONTRACTOR: Seaboard Drilling
EQUIPMENT: PC40 Mini
METHOD:
REMARKS: Test pit backfilled with excavated materials and compacted with excavator bucket. Surface conditions restored to the extent practicable.

LOGGED BY: M. Turner CHECKED BY/DATE: NDL/5-14-26

THIS TEST PIT RECORD PRESENTS A REASONABLE INTERPRETATION OF THE SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS MAY DIFFER. STRATA INTERFACES (AS SHOWN) ARE APPROXIMATE. ACTUAL TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

TEST PIT RECORD

TEST PIT NO.: TP-2
EXCAVATED: 3/26/26
PROJECT: BlueWave
LOCATION: 105 Old Post Rd, Worthington, MA
PROJECT NO.: 3652230437-800.01 **PAGE** 1 **OF** 1



TEST PIT: PID; DATA GRAPH BLUEWAVE_OLD-POST-WORTHINGTON.GPJ 2007_12-12_PORT_DTMPLT.GDT 5/14/26

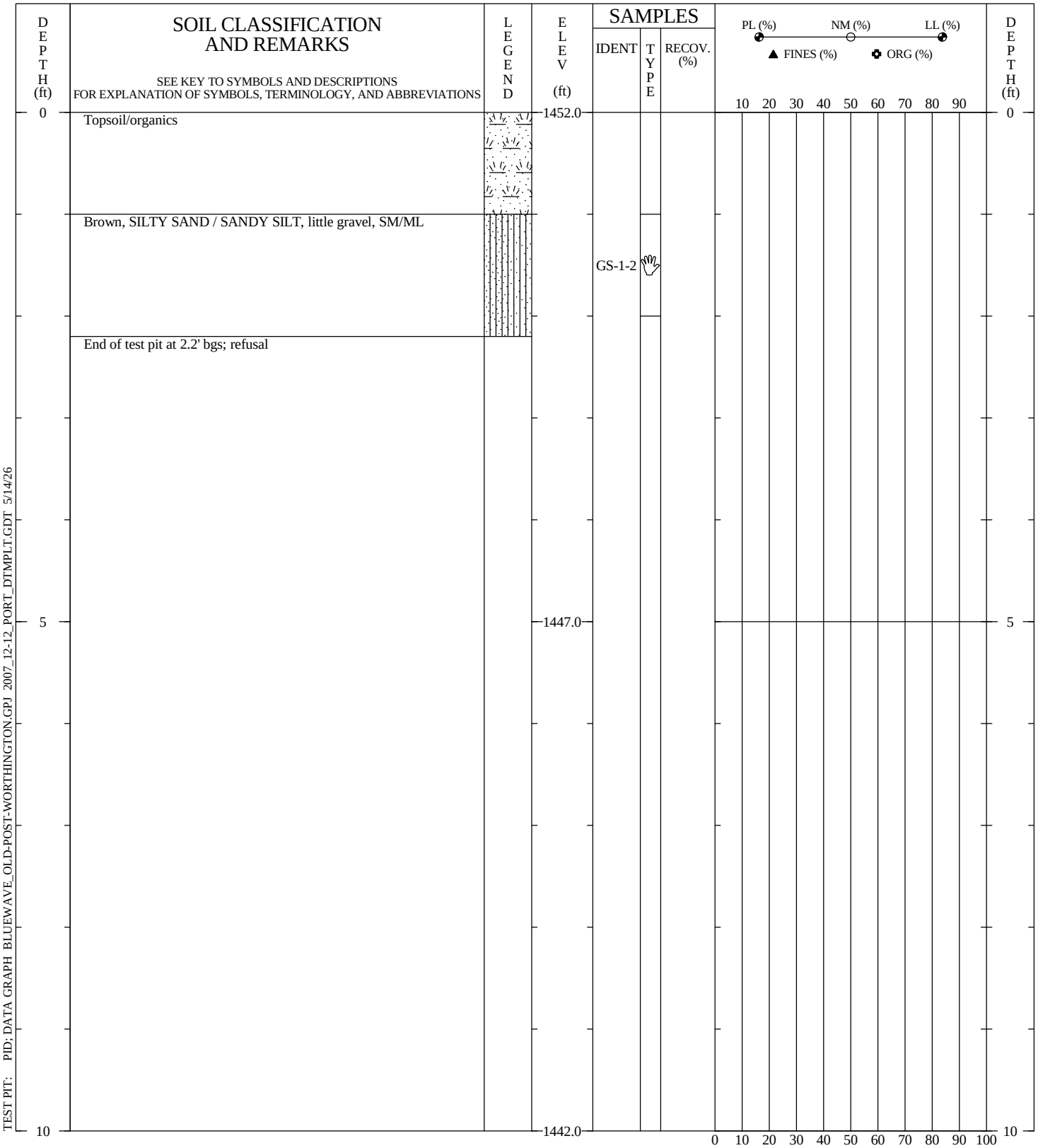
CONTRACTOR: Seaboard Drilling
EQUIPMENT: PC40 Mini
METHOD:
REMARKS: Test pit backfilled with excavated materials and compacted with excavator bucket. Surface conditions restored to the extent practicable.

LOGGED BY: M. Turner CHECKED BY/DATE: NDL/5-14-26

THIS TEST PIT RECORD PRESENTS A REASONABLE INTERPRETATION OF THE SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS MAY DIFFER. STRATA INTERFACES (AS SHOWN) ARE APPROXIMATE. ACTUAL TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

TEST PIT RECORD

TEST PIT NO.: TP-3
EXCAVATED: 3/26/26
PROJECT: BlueWave
LOCATION: 105 Old Post Rd, Worthington, MA
PROJECT NO.: 3652230437-800.01 **PAGE** 1 **OF** 1



TEST PIT: PID; DATA GRAPH BLUEWAVE_OLD-POST-WORTHINGTON.GPJ 2007_12-12_PORT_DTMPLT.GDT 5/14/26

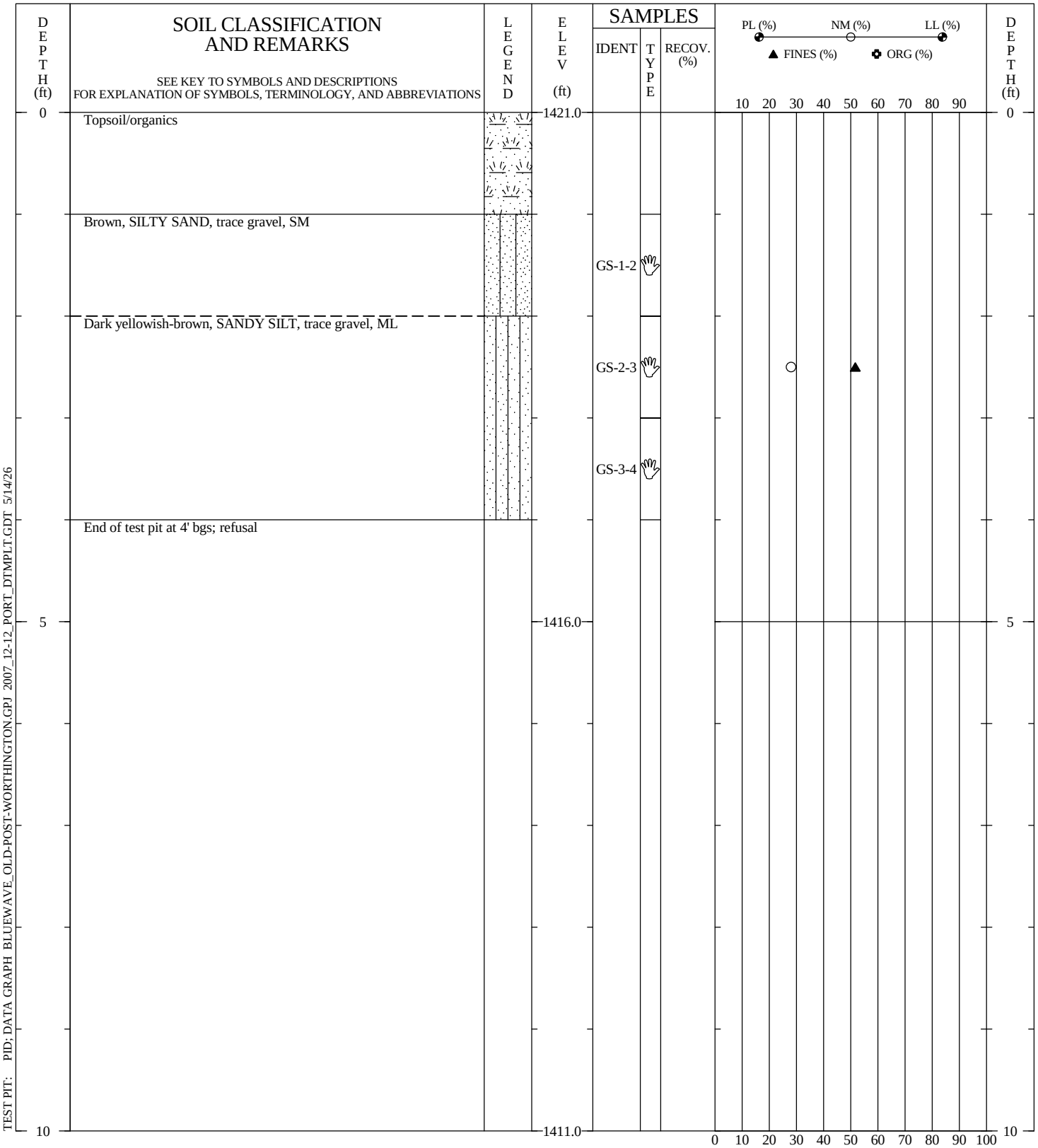
CONTRACTOR: Seaboard Drilling
EQUIPMENT: PC40 Mini
METHOD:
REMARKS: Test pit backfilled with excavated materials and compacted with excavator bucket. Surface conditions restored to the extent practicable.

LOGGED BY: M. Turner CHECKED BY/DATE: NDL/5-14-26

THIS TEST PIT RECORD PRESENTS A REASONABLE INTERPRETATION OF THE SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS MAY DIFFER. STRATA INTERFACES (AS SHOWN) ARE APPROXIMATE. ACTUAL TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

TEST PIT RECORD

TEST PIT NO.: TP-4
EXCAVATED: 3/26/26
PROJECT: BlueWave
LOCATION: 105 Old Post Rd, Worthington, MA
PROJECT NO.: 3652230437-800.01 **PAGE** 1 **OF** 1



TEST PIT: PID; DATA GRAPH BLUEWAVE_OLD-POST-WORTHINGTON.GPJ 2007_12-12_PORT_DTMPLT.GDT 5/14/26

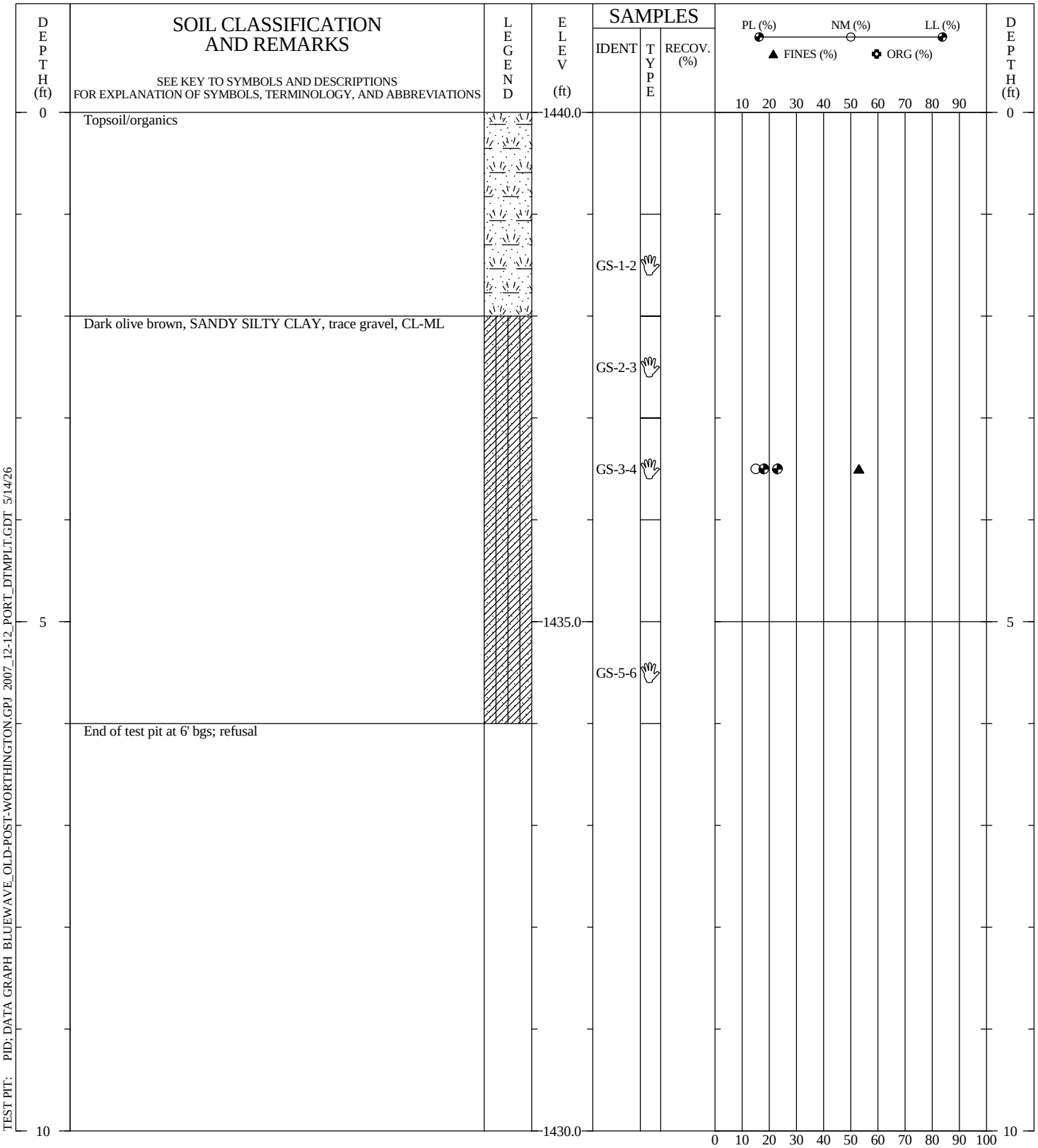
CONTRACTOR: Seaboard Drilling
EQUIPMENT: PC40 Mini
METHOD:
REMARKS: Test pit backfilled with excavated materials and compacted with excavator bucket. Surface conditions restored to the extent practicable.

LOGGED BY: M. Turner CHECKED BY/DATE: NDL/5-14-26

THIS TEST PIT RECORD PRESENTS A REASONABLE INTERPRETATION OF THE SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS MAY DIFFER. STRATA INTERFACES (AS SHOWN) ARE APPROXIMATE. ACTUAL TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

TEST PIT RECORD

TEST PIT NO.: TP-5
EXCAVATED: 3/26/26
PROJECT: BlueWave
LOCATION: 105 Old Post Rd, Worthington, MA
PROJECT NO.: 3652230437-800.01 **PAGE** 1 **OF** 1



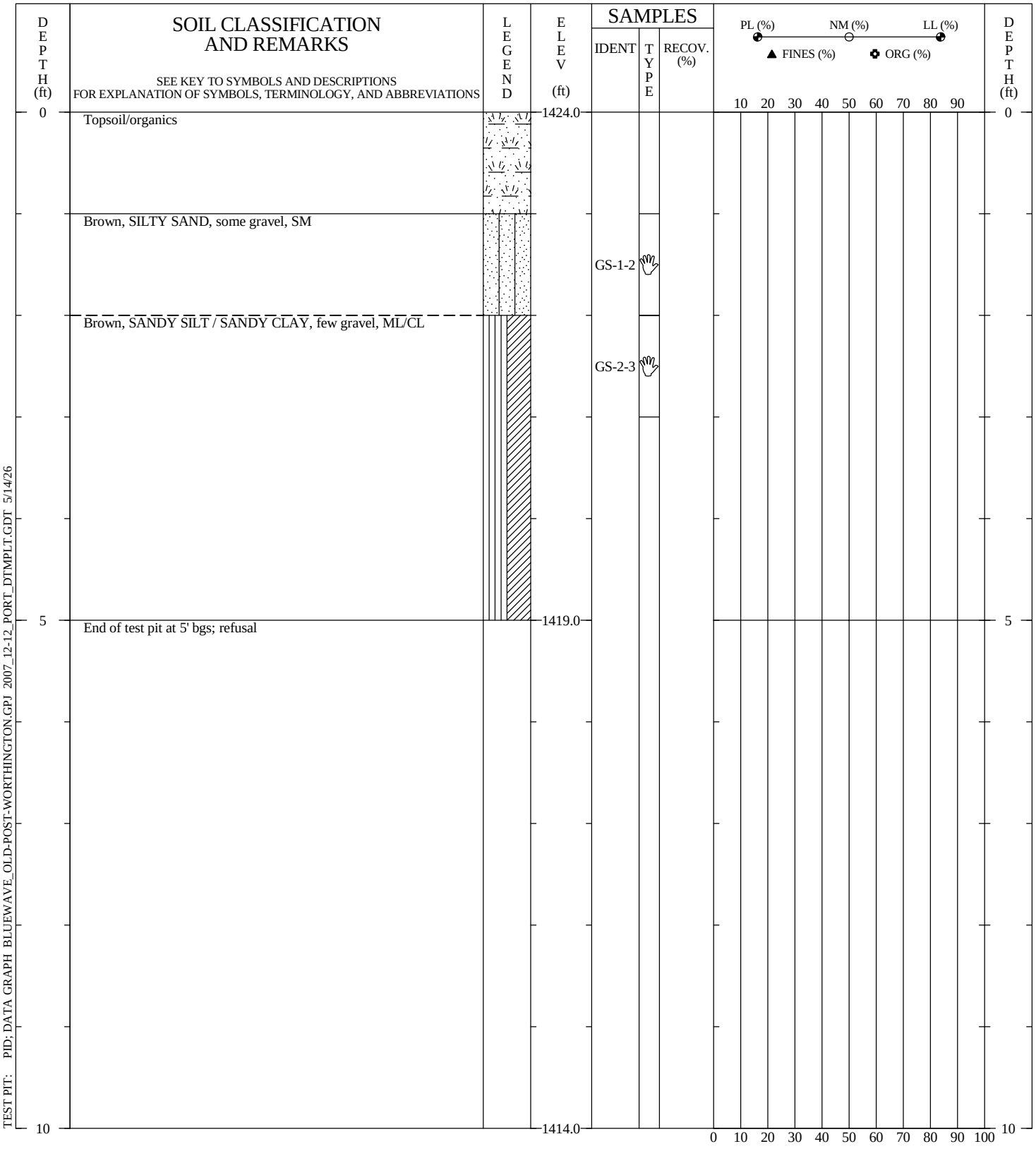
CONTRACTOR: Seaboard Drilling
EQUIPMENT: PC40 Mini
METHOD:
REMARKS: Test pit backfilled with excavated materials and compacted with excavator bucket. Surface conditions restored to the extent practicable.

LOGGED BY: M. Turner CHECKED BY/DATE: NDL/5-14-26

THIS TEST PIT RECORD PRESENTS A REASONABLE INTERPRETATION OF THE SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS MAY DIFFER. STRATA INTERFACES (AS SHOWN) ARE APPROXIMATE. ACTUAL TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

TEST PIT RECORD

TEST PIT NO.: TP-6
EXCAVATED: 3/26/26
PROJECT: BlueWave
LOCATION: 105 Old Post Rd, Worthington, MA
PROJECT NO.: 3652230437-800.01 **PAGE** 1 **OF** 1



TEST PIT: PID; DATA GRAPH BLUEWAVE_OLD-POST-WORTHINGTON.GPJ 2007_12-12_PORT_DTMPLT.GDT 5/14/26

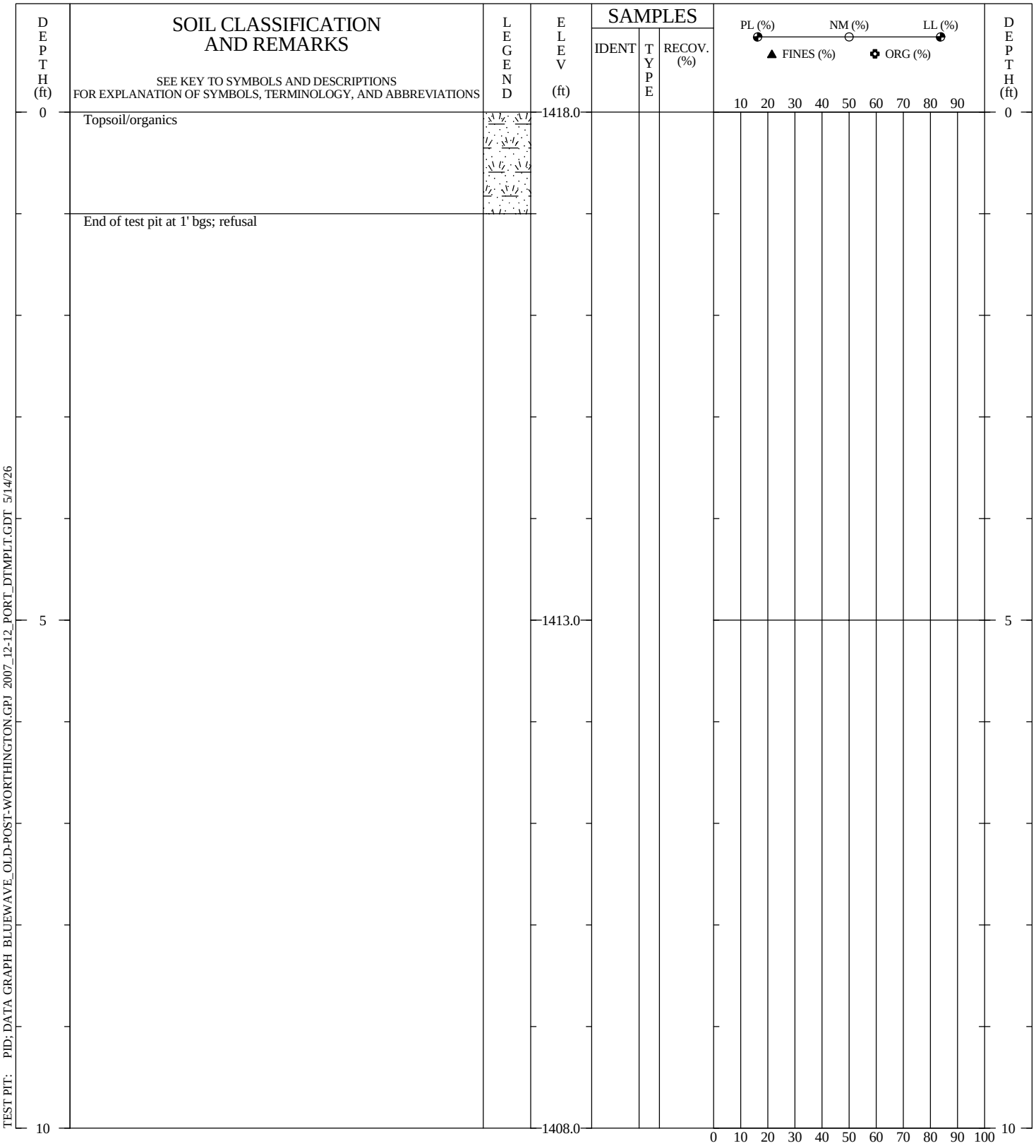
CONTRACTOR: Seaboard Drilling
EQUIPMENT: PC40 Mini
METHOD:
REMARKS: Test pit backfilled with excavated materials and compacted with excavator bucket. Surface conditions restored to the extent practicable.

LOGGED BY: M. Turner CHECKED BY/DATE: NDL/5-14-26

THIS TEST PIT RECORD PRESENTS A REASONABLE INTERPRETATION OF THE SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS MAY DIFFER. STRATA INTERFACES (AS SHOWN) ARE APPROXIMATE. ACTUAL TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

TEST PIT RECORD

TEST PIT NO.: TP-7
EXCAVATED: 3/26/26
PROJECT: BlueWave
LOCATION: 105 Old Post Rd, Worthington, MA
PROJECT NO.: 3652230437-800.01 **PAGE** 1 **OF** 1



TEST PIT: PID; DATA GRAPH BLUEWAVE_OLD-POST-WORTHINGTON.GPJ 2007_12-12_PORT_DTMPLT.GDT 5/14/26

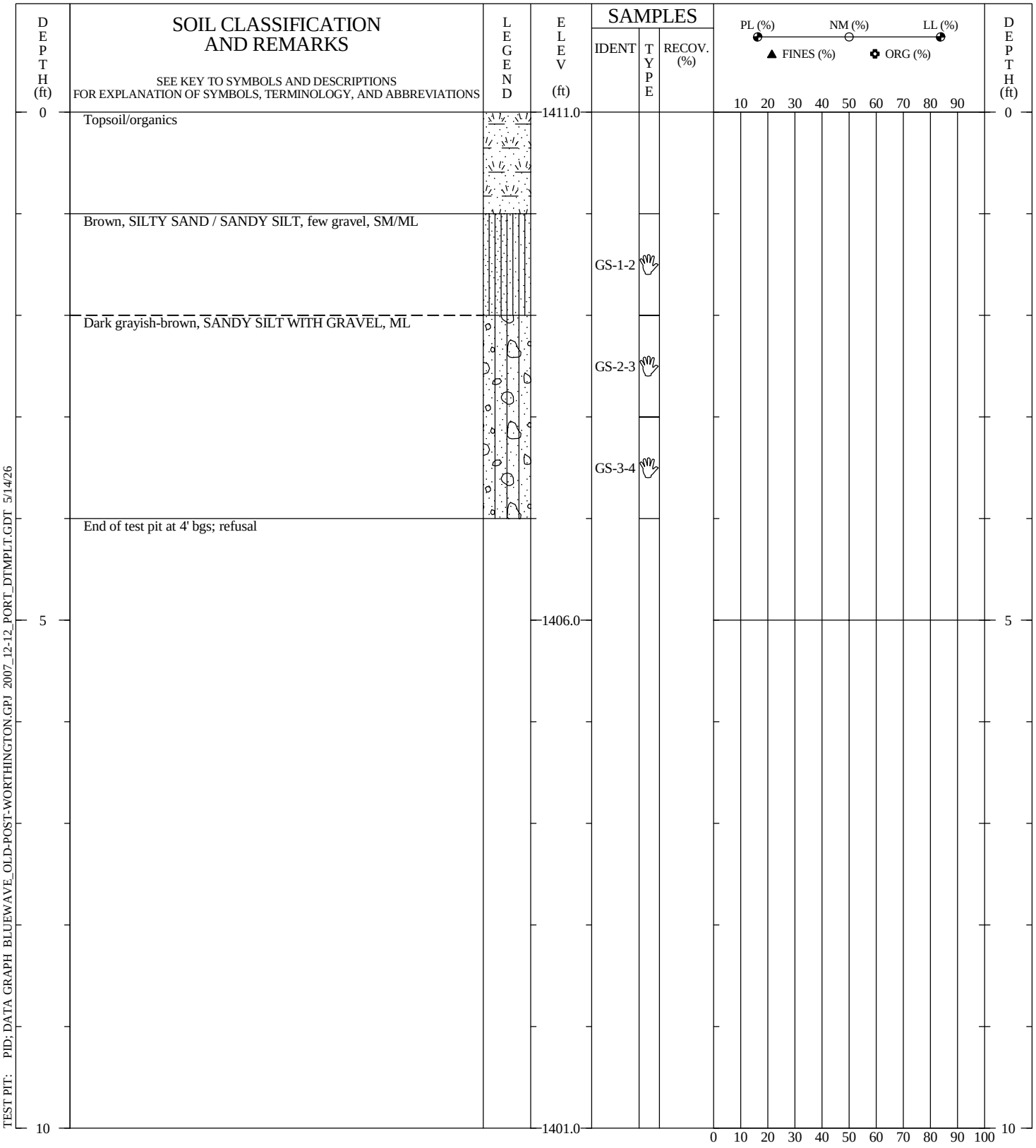
CONTRACTOR: Seaboard Drilling
EQUIPMENT: PC40 Mini
METHOD:
REMARKS: Test pit backfilled with excavated materials and compacted with excavator bucket. Surface conditions restored to the extent practicable.

LOGGED BY: M. Turner CHECKED BY/DATE: NDL/5-14-26

THIS TEST PIT RECORD PRESENTS A REASONABLE INTERPRETATION OF THE SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS MAY DIFFER. STRATA INTERFACES (AS SHOWN) ARE APPROXIMATE. ACTUAL TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

TEST PIT RECORD

TEST PIT NO.: TP-8
EXCAVATED: 3/26/26
PROJECT: BlueWave
LOCATION: 105 Old Post Rd, Worthington, MA
PROJECT NO.: 3652230437-800.01 **PAGE** 1 **OF** 1



TEST PIT: PID; DATA GRAPH BLUEWAVE_OLD-POST-WORTHINGTON.GPJ 2007_12-12_PORT_DTMPLT.GDT 5/14/26

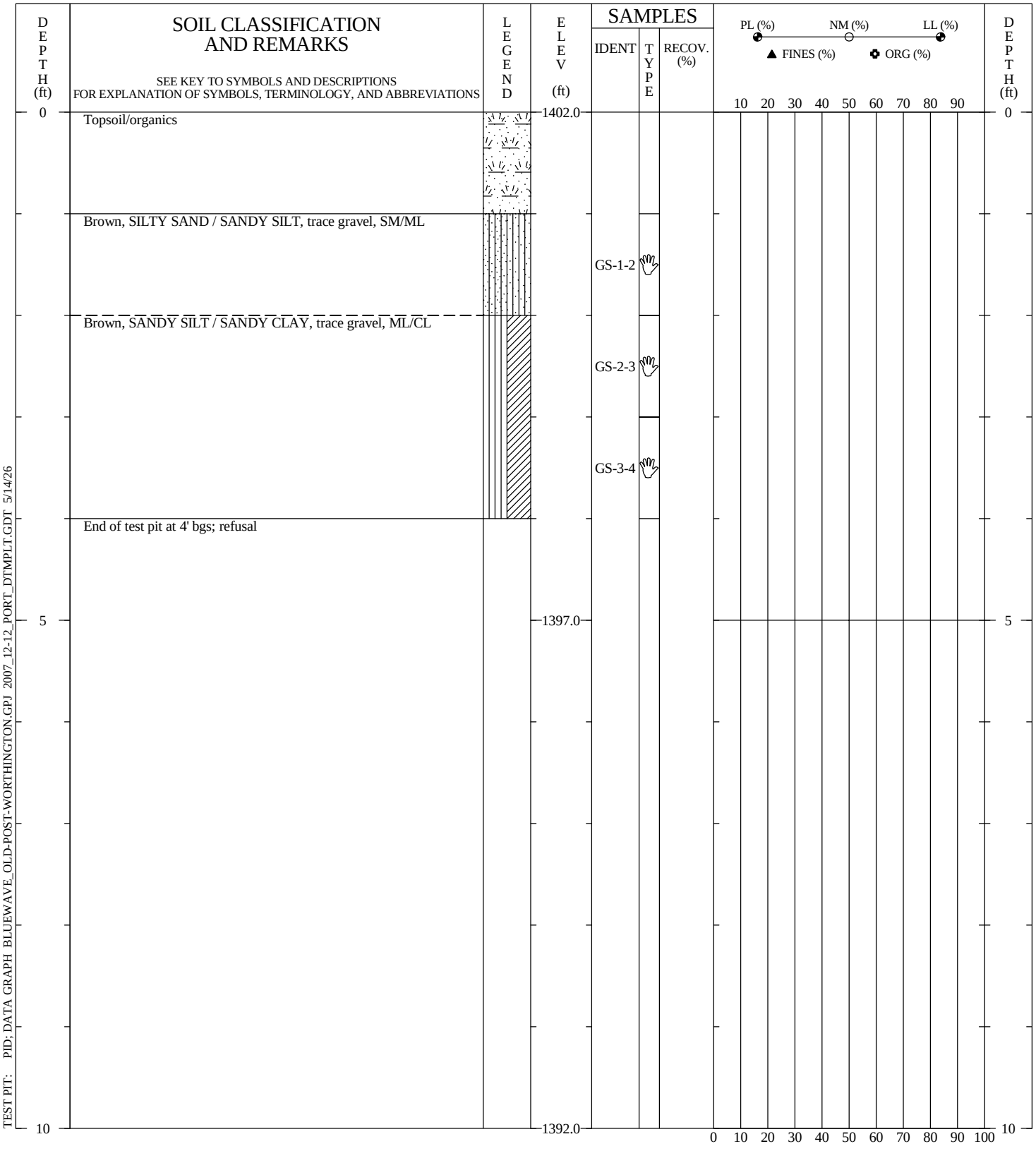
CONTRACTOR: Seaboard Drilling
EQUIPMENT: PC40 Mini
METHOD:
REMARKS: Test pit backfilled with excavated materials and compacted with excavator bucket. Surface conditions restored to the extent practicable.

LOGGED BY: M. Turner CHECKED BY/DATE: NDL/5-14-26

THIS TEST PIT RECORD PRESENTS A REASONABLE INTERPRETATION OF THE SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS MAY DIFFER. STRATA INTERFACES (AS SHOWN) ARE APPROXIMATE. ACTUAL TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

TEST PIT RECORD

TEST PIT NO.: TP-9
EXCAVATED: 3/26/26
PROJECT: BlueWave
LOCATION: 105 Old Post Rd, Worthington, MA
PROJECT NO.: 3652230437-800.01 **PAGE** 1 **OF** 1



TEST PIT: PID; DATA GRAPH BLUEWAVE_OLD-POST-WORTHINGTON.GPJ 2007_12-12_PORT_DTMPLT.GDT 5/14/26

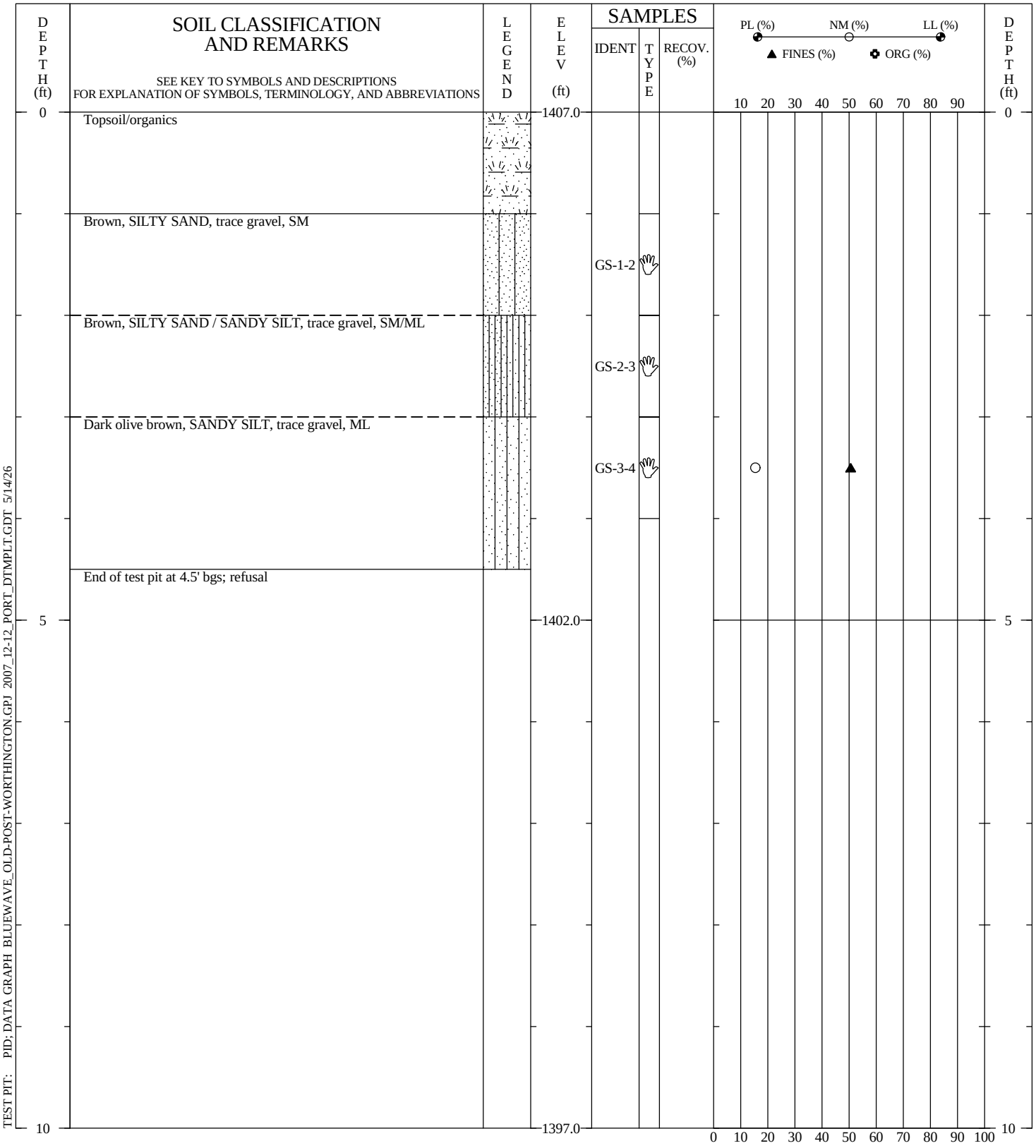
CONTRACTOR: Seaboard Drilling
EQUIPMENT: PC40 Mini
METHOD:
REMARKS: Test pit backfilled with excavated materials and compacted with excavator bucket. Surface conditions restored to the extent practicable.

LOGGED BY: M. Turner CHECKED BY/DATE: NDL/5-14-26

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TEST PIT RECORD

TEST PIT NO.: TP-10
EXCAVATED: 3/26/26
PROJECT: BlueWave
LOCATION: 105 Old Post Rd, Worthington, MA
PROJECT NO.: 3652230437-800.01 **PAGE** 1 **OF** 1



TEST PIT: PID; DATA GRAPH BLUEWAVE_OLD-POST-WORTHINGTON.GPJ 2007_12-12_PORT_DTMPLT.GDT 5/14/26

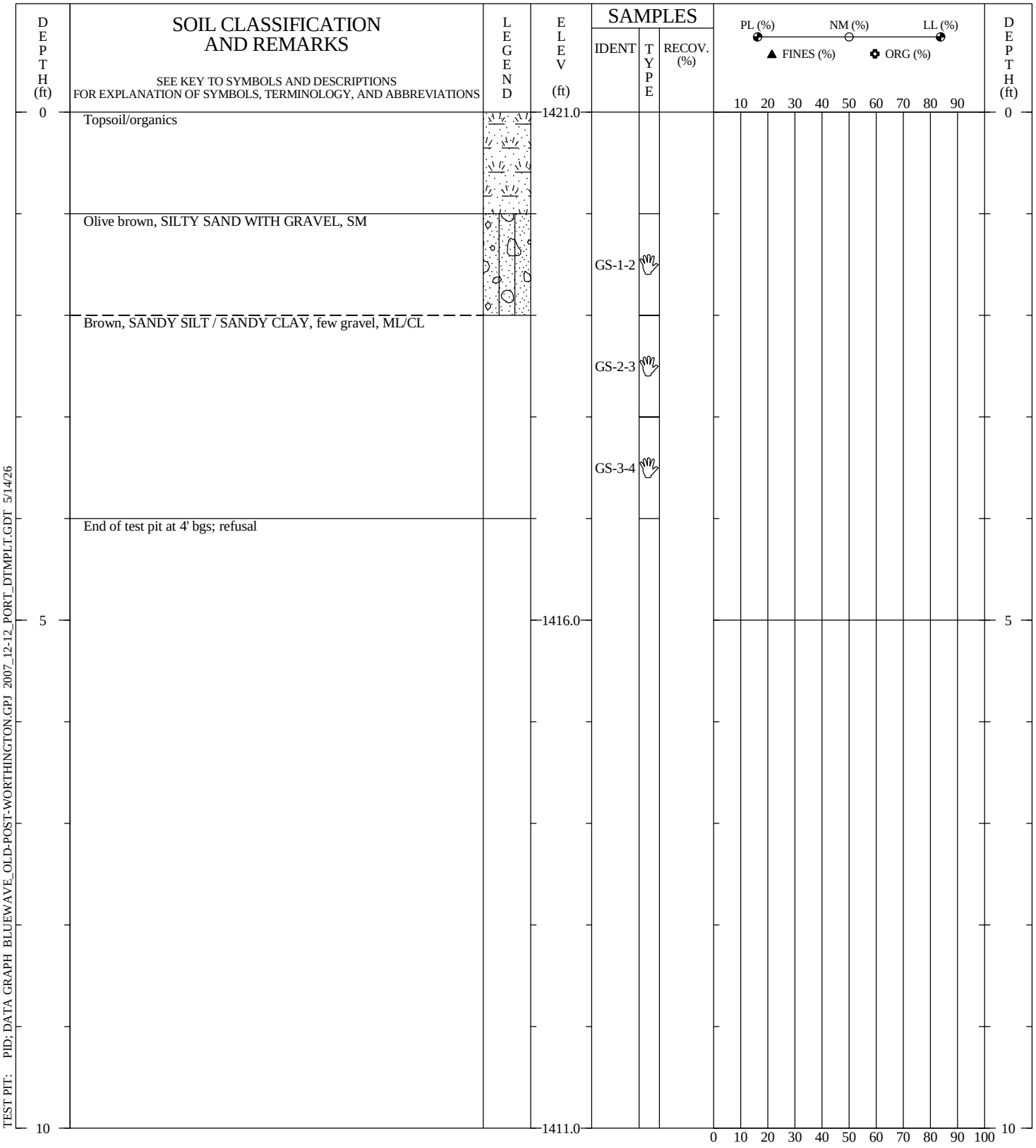
CONTRACTOR: Seaboard Drilling
EQUIPMENT: PC40 Mini
METHOD:
REMARKS: Test pit backfilled with excavated materials and compacted with excavator bucket. Surface conditions restored to the extent practicable.

LOGGED BY: M. Turner CHECKED BY/DATE: NDL/5-14-26

THIS TEST PIT RECORD PRESENTS A REASONABLE INTERPRETATION OF THE SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS MAY DIFFER. STRATA INTERFACES (AS SHOWN) ARE APPROXIMATE. ACTUAL TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

TEST PIT RECORD

TEST PIT NO.: TP-11
EXCAVATED: 3/26/26
PROJECT: BlueWave
LOCATION: 105 Old Post Rd, Worthington, MA
PROJECT NO.: 3652230437-800.01 **PAGE** 1 **OF** 1



TEST PIT: PID; DATA GRAPH BLUEWAVE_OLD-POST-WORTHINGTON.GPJ 2007_12-12_PORT_DTMPLT.GDT 5/14/26

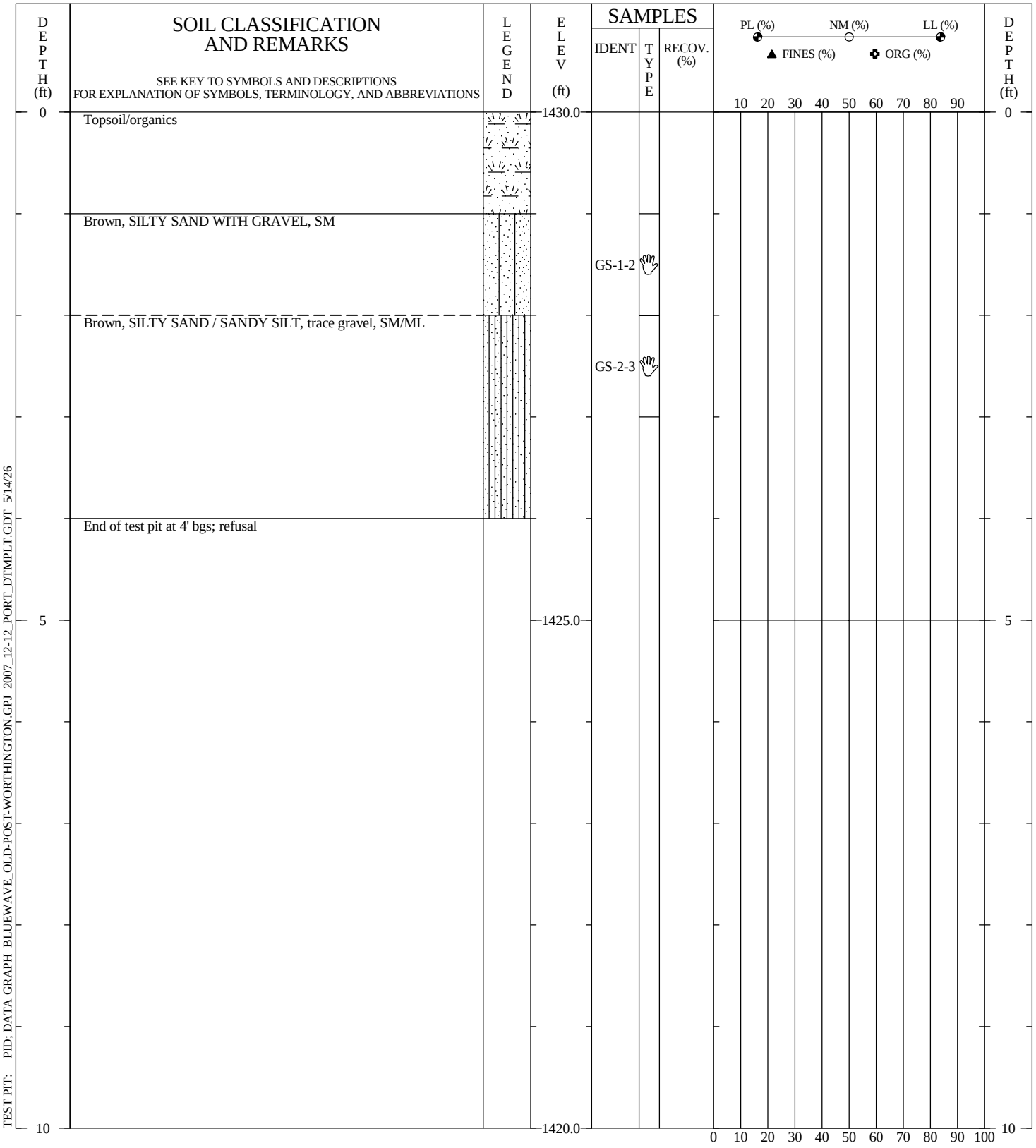
CONTRACTOR: Seaboard Drilling
EQUIPMENT: PC40 Mini
METHOD:
REMARKS: Test pit backfilled with excavated materials and compacted with excavator bucket. Surface conditions restored to the extent practicable.

LOGGED BY: M. Turner CHECKED BY/DATE: NDL/5-14-26

THIS TEST PIT RECORD PRESENTS A REASONABLE INTERPRETATION OF THE SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS MAY DIFFER. STRATA INTERFACES (AS SHOWN) ARE APPROXIMATE. ACTUAL TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

TEST PIT RECORD

TEST PIT NO.: TP-12
EXCAVATED: 3/26/26
PROJECT: BlueWave
LOCATION: 105 Old Post Rd, Worthington, MA
PROJECT NO.: 3652230437-800.01 **PAGE** 1 **OF** 1



TEST PIT: PID; DATA GRAPH BLUEWAVE_OLD-POST-WORTHINGTON.GPJ 2007_12-12_PORT_DTMPLT.GDT 5/14/26

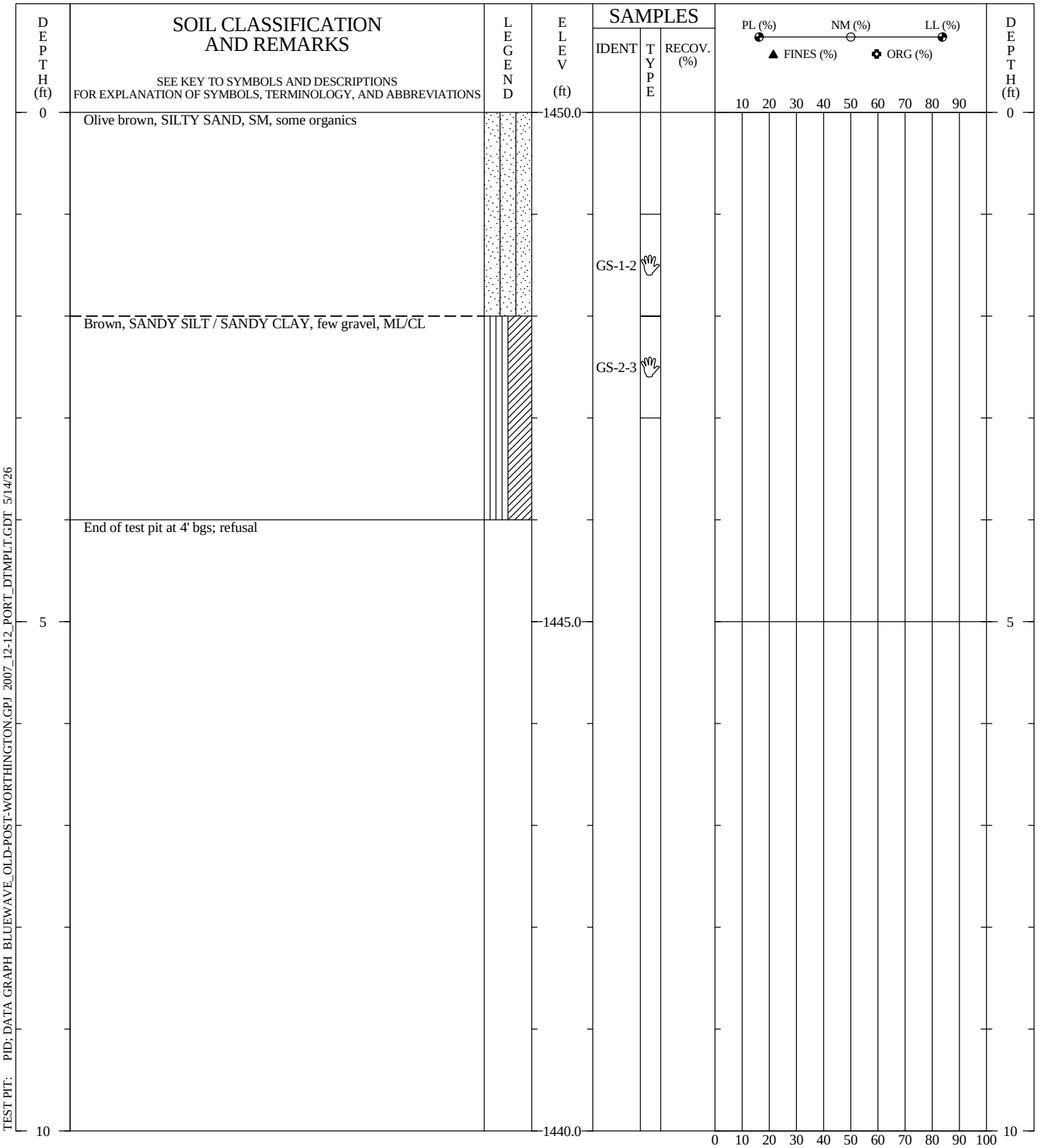
CONTRACTOR: Seaboard Drilling
EQUIPMENT: PC40 Mini
METHOD:
REMARKS: Test pit backfilled with excavated materials and compacted with excavator bucket. Surface conditions restored to the extent practicable.

LOGGED BY: M. Turner CHECKED BY/DATE: NDL/5-14-26

THIS TEST PIT RECORD PRESENTS A REASONABLE INTERPRETATION OF THE SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS MAY DIFFER. STRATA INTERFACES (AS SHOWN) ARE APPROXIMATE. ACTUAL TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

TEST PIT RECORD

TEST PIT NO.: TP-13
EXCAVATED: 3/26/26
PROJECT: BlueWave
LOCATION: 105 Old Post Rd, Worthington, MA
PROJECT NO.: 3652230437-800.01 **PAGE** 1 **OF** 1



TEST PIT: PID; DATA GRAPH BLUEWAVE_OLD-POST-WORTHINGTON.GPJ 2007_12-12_PORT_DTMPLT.GDT 5/14/26

CONTRACTOR: Seaboard Drilling
EQUIPMENT: PC40 Mini
METHOD:
REMARKS: Test pit backfilled with excavated materials and compacted with excavator bucket. Surface conditions restored to the extent practicable.

LOGGED BY: M. Turner CHECKED BY/DATE: NDL/5-14-26

THIS TEST PIT RECORD PRESENTS A REASONABLE INTERPRETATION OF THE SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS MAY DIFFER. STRATA INTERFACES (AS SHOWN) ARE APPROXIMATE. ACTUAL TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

TEST PIT RECORD

TEST PIT NO.: TP-14
EXCAVATED: 3/26/26
PROJECT: BlueWave
LOCATION: 105 Old Post Rd, Worthington, MA
PROJECT NO.: 3652230437-800.01 **PAGE** 1 **OF** 1

ATTACHMENT C
Laboratory Test Reports

Summary of Geotechnical Laboratory Testing Data
Phase 1 Geotechnical Investigation
105 Old Post Rd, Worthington, Massachusetts

Test Pit No.	Sample Information					Laboratory Testing Results																	
	Sample ID	Sample Type	Sample Interval	USCS D 2487 / D 2488		Moisture Content D 2216	Particle-Size Analysis & Hydrometer D 6913 / 7928				Atterberg Limits D 4318						Soil Resistivity G 57	Thermal Conductivity D 5334			pH D 4972	Sulfate D 516	Chloride D 512	Oxidation-Reduction Potential G 200
				Description	Symbol		Gravel	Sand	Silt	Clay	LL			PL	PI	LI		Moisture Content	Bulk Density	Thermal Conductivity				
											Wet Prep.	Oven Dried	ODLL WPLL Ratio											
			(ft bgs)			(%)	(%)	(%)	(%)	(%)							(ohm-cm)	(%)	(pcf)	(W/m°K)	(-)	(ppm)	(ppm)	(mV)
TP-2	OPR-TP-2	Bulk	3 - 4	sandy clay	CL	14.5	1.3	39.3	59.4		26	-	-	15	11	0.0	-	-	-	-	-	-	-	-
TP-3	OPR-TP-3	Bulk	2 - 3	sandy silt with gravel	ML	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.3	<10	72	279.9
TP-5	OPR-TP-5	Bulk	2 - 3	sandy silt	ML	28.0	1.5	46.8	51.7		-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-6	OPR-TP-6	Bulk	3 - 4	sandy silty clay	CL-ML	15.0	4.4	42.6	53.0		23	-	-	18	5	-0.6	-	-	-	-	-	-	-	-
TP-9	OPR-TP-9	Bulk	2 - 3	sandy silt with gravel	ML	-	-	-	-	-	-	-	-	-	-	-	55,868	-	-	-	3.8	<10	12	301.9
TP-11	OPR-TP-11	Bulk	3 - 4	sandy silt	ML	15.4	1.6	47.8	50.6		-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-12	OPR-TP-12	Bulk	1 - 2	silty sand with gravel	SM	-	-	-	-	-	-	-	-	-	-	-	38,826	0.4	115.0	0.42	-	-	-	-
																		15.4	115.0	1.27				
																		25.8	127.8	1.77				
TP-14	OPR-TP-14	Bulk	1 - 2	silty sand	SM	-	-	-	-	-	-	-	-	-	-	-	47,221	0.3	115.1	0.50	-	-	-	-
																		13.8	115.0	1.43				
																		28.7	124.7	1.70				

Prepared/Date: NDL/4-21-26
Checked/Date: RSE/5-15-26

Client:	WSP USA, Inc.				
Project:	Old Post Road				
Location:	Worthington, MA			Project No:	GTX-323019
Boring ID:	---	Sample Type:	---	Tested By:	ajl
Sample ID:	---	Test Date:	04/17/26	Checked By:	ank
Depth :	---	Test Id:	862833		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
TP-2	OPR- TP-2	3-4	Moist, dark olive brown sandy clay	14.5
TP-5	OPR- TP-5	2-3	Moist, dark yellowish brown sandy silt	28.0
TP-6	OPR- TP-6	3-4	Moist, dark olive brown sandy silty clay	15.0
TP-11	OPR- TP-11	3-4	Moist, dark olive brown sandy silt	15.4

Notes: Temperature of Drying : 110º Celsius

Client:	WSP USA, Inc.				
Project:	Old Post Road				
Location:	Worthington, MA			Project No:	GTX-323019
Boring ID:	---	Sample Type:	---	Tested By:	ajl
Sample ID:	---	Test Date:	04/14/26	Checked By:	ank
Depth :	---	Test Id:	862844		

pH of Soil by ASTM D4972

Boring ID	Sample ID	Depth	Visual Description	pH of Soil in Distilled Water	pH of Soil in Calcium Chloride
TP-3	OPR-TP-3	2-3	Moist, dark olive brown sandy silt with gravel	4.3	4.1
TP-9	OPR-TP-9	2-3	Moist, very dark grayish brown sandy silt with gravel	3.8	4.0

Notes: Sample Preparation: screened through #10 sieve

Method A, pH meter used

Client:	WSP USA, Inc.
Project:	Old Post Road
Location:	Worthington, MA
GTX#:	323019
Test Date:	04/15/26
Tested By:	NMK
Checked By:	ank

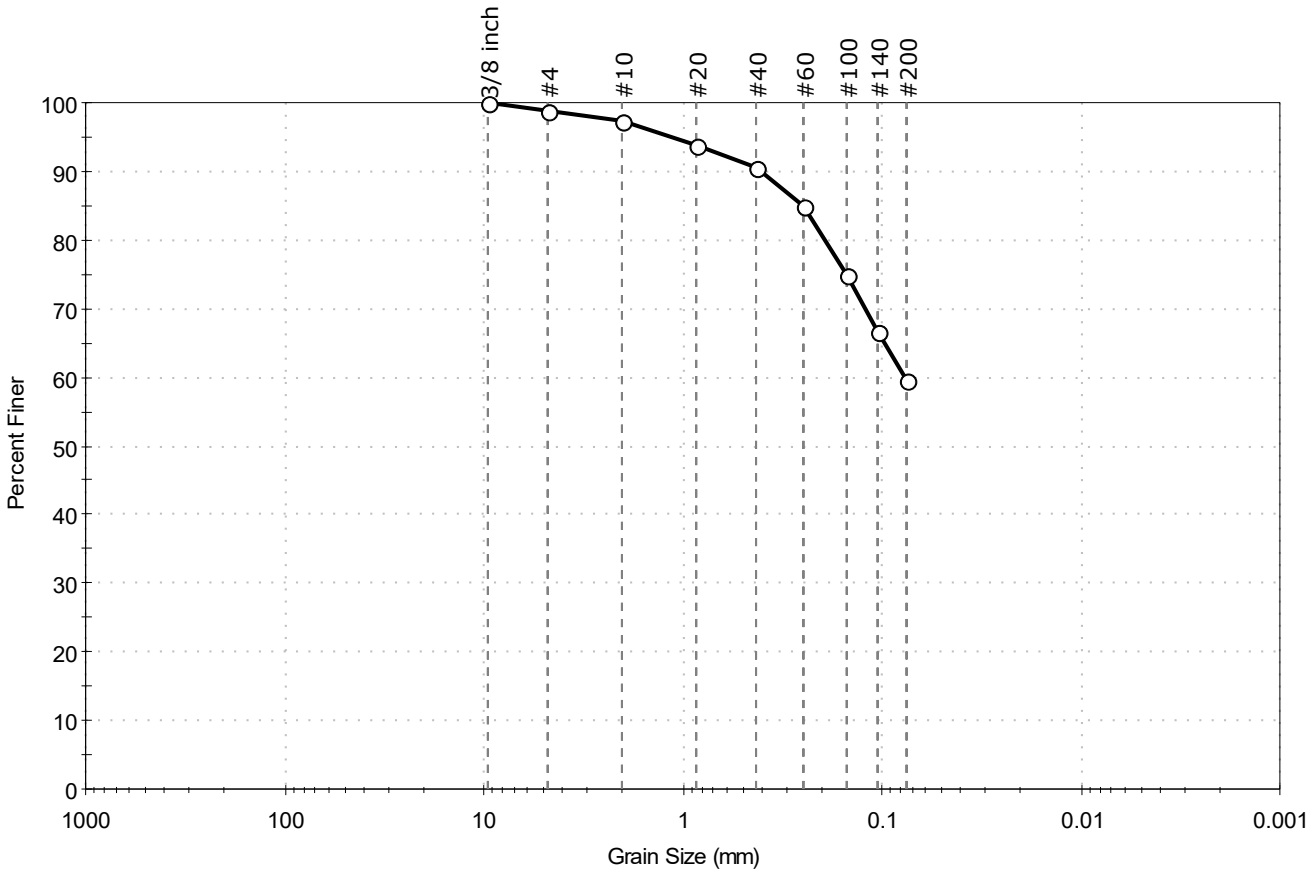
Laboratory Measurement of Soil Resistivity Using the Wenner Four-Electrode Method by ASTM G57 (Laboratory Measurement)

Boring ID	Sample ID	Depth, ft.	Sample Description	Electrical Resistivity, ohm-cm	Electrical Conductivity, $(ohm\text{-}cm)^{-1}$
TP-9	OPR-TP-9	2-3'	Moist, very dark grayish brown sandy silt with gravel	55,868	1.79E-05
TP-12	OPR-TP-12	1-2'	Moist, olive brown silty sand with gravel	38,826	2.58E-05
TP-14	OPR-TP-14	1-2'	Moist, olive brown silty sand	47,221	2.12E-05

Notes: Test Equipment: Nilsson Model 400 Soil Resistance Meter, MC Miller Soil Box
Water added to sample to create a thick slurry prior to testing (saturated condition).
Electrical Conductivity is calculated as inverse of Electrical Resistivity (per ASTM G57)
Test conducted in standard laboratory atmosphere: 68-73 F

Client:	WSP USA, Inc.				
Project:	Old Post Road				
Location:	Worthington, MA			Project No:	GTX-323019
Boring ID:	TP-2	Sample Type:	Bag	Tested By:	ajl
Sample ID:	OPR-TP-2	Test Date:	04/10/26	Checked By:	ank
Depth :	3-4	Test Id:	862826		
Test Comment:	---				
Visual Description:	Moist, dark olive brown sandy clay				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.3	39.3	59.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3/8 inch	9.50	100		
#4	4.75	99		
#10	2.00	97		
#20	0.85	94		
#40	0.42	90		
#60	0.25	85		
#100	0.15	75		
#140	0.11	67		
#200	0.075	59		

Coefficients

D_{85} = 0.2530 mm	D_{30} = N/A
D_{60} = 0.0770 mm	D_{15} = N/A
D_{50} = N/A	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM Sandy Lean CLAY (CL)

AASHTO Clayey Soils (A-6 (4))

Sample/Test Description

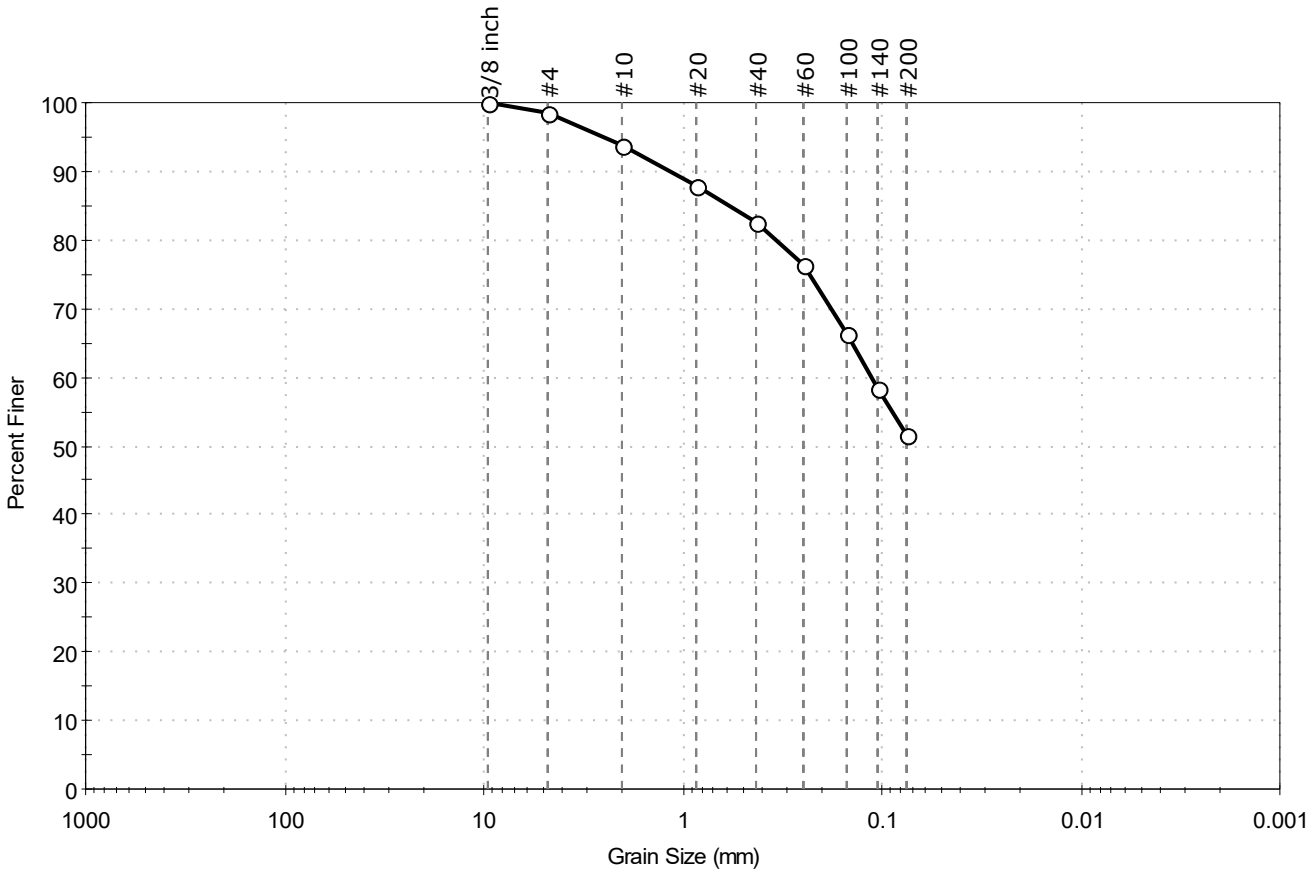
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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Client:	WSP USA, Inc.				
Project:	Old Post Road				
Location:	Worthington, MA			Project No:	GTX-323019
Boring ID:	TP-5	Sample Type:	Bag	Tested By:	ajl
Sample ID:	OPR-TP-5	Test Date:	04/09/26	Checked By:	ank
Depth :	2-3	Test Id:	862827		
Test Comment:	---				
Visual Description:	Moist, dark yellowish brown sandy silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.5	46.8	51.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3/8 inch	9.50	100		
#4	4.75	99		
#10	2.00	94		
#20	0.85	88		
#40	0.42	83		
#60	0.25	76		
#100	0.15	66		
#140	0.11	58		
#200	0.075	52		

Coefficients

D_{85} = 0.5744 mm	D_{30} = N/A
D_{60} = 0.1135 mm	D_{15} = N/A
D_{50} = N/A	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

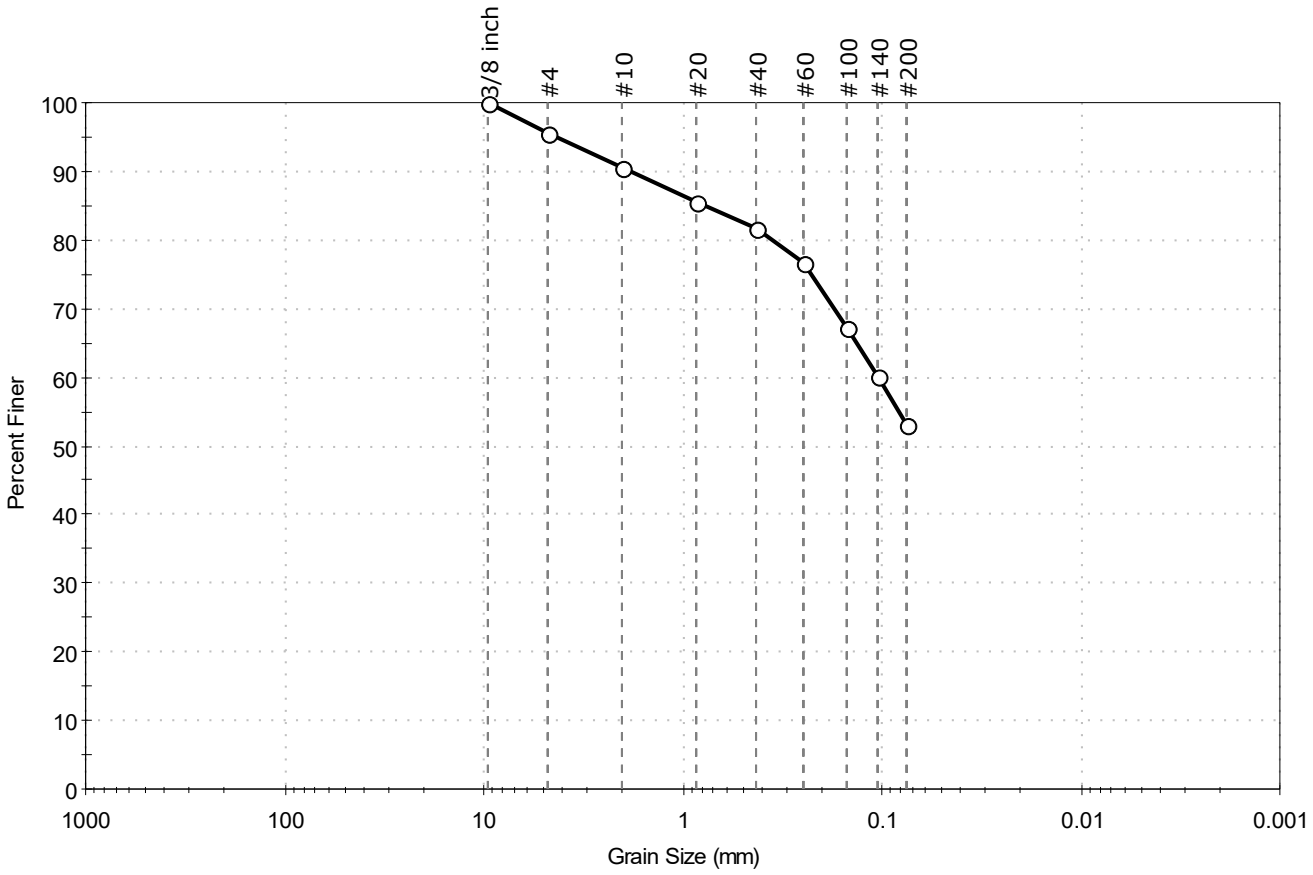
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	WSP USA, Inc.				
Project:	Old Post Road				
Location:	Worthington, MA			Project No:	GTX-323019
Boring ID:	TP-6	Sample Type:	Bag	Tested By:	ajl
Sample ID:	OPR-TP-6	Test Date:	04/09/26	Checked By:	ank
Depth :	3-4	Test Id:	862828		
Test Comment:	---				
Visual Description:	Moist, dark olive brown sandy silty clay				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	4.4	42.6	53.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3/8 inch	9.50	100		
#4	4.75	96		
#10	2.00	90		
#20	0.85	85		
#40	0.42	82		
#60	0.25	77		
#100	0.15	67		
#140	0.11	60		
#200	0.075	53		

Coefficients

D_{85} = 0.7868 mm D_{30} = N/A

D_{60} = 0.1052 mm D_{15} = N/A

D_{50} = N/A D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM Sandy Silty CLAY (CL-ML)

AASHTO Silty Soils (A-4 (0))

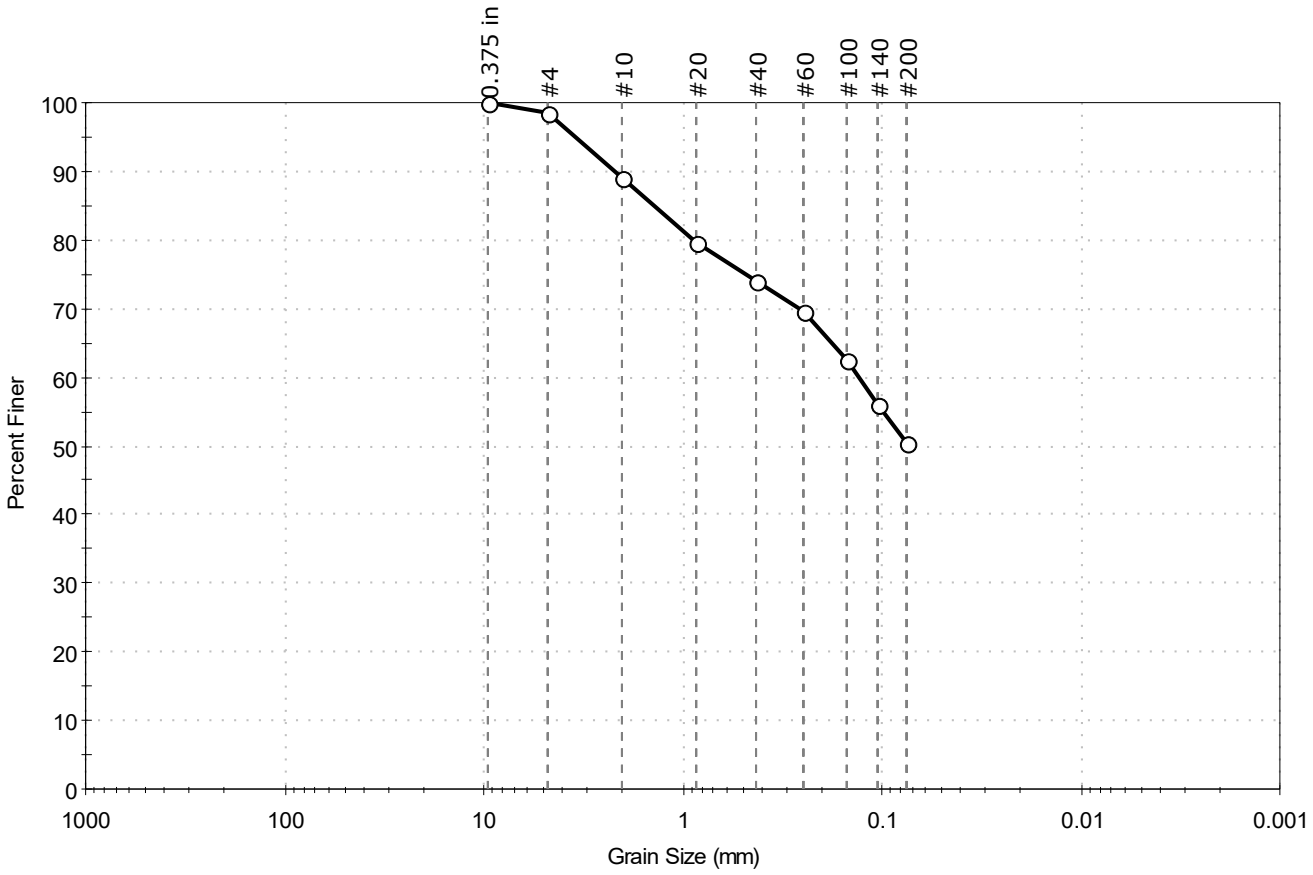
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	WSP USA, Inc.				
Project:	Old Post Road				
Location:	Worthington, MA			Project No:	GTX-323019
Boring ID:	TP-11	Sample Type:	Bag	Tested By:	ajl
Sample ID:	OPR-TP-11	Test Date:	04/10/26	Checked By:	ank
Depth :	3-4	Test Id:	862829		
Test Comment:	---				
Visual Description:	Moist, dark olive brown sandy silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.6	47.8	50.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	98		
#10	2.00	89		
#20	0.85	80		
#40	0.42	74		
#60	0.25	70		
#100	0.15	63		
#140	0.11	56		
#200	0.075	51		

Coefficients

D_{85} = 1.3774 mm D_{30} = N/A

D_{60} = 0.1304 mm D_{15} = N/A

D_{50} = N/A D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

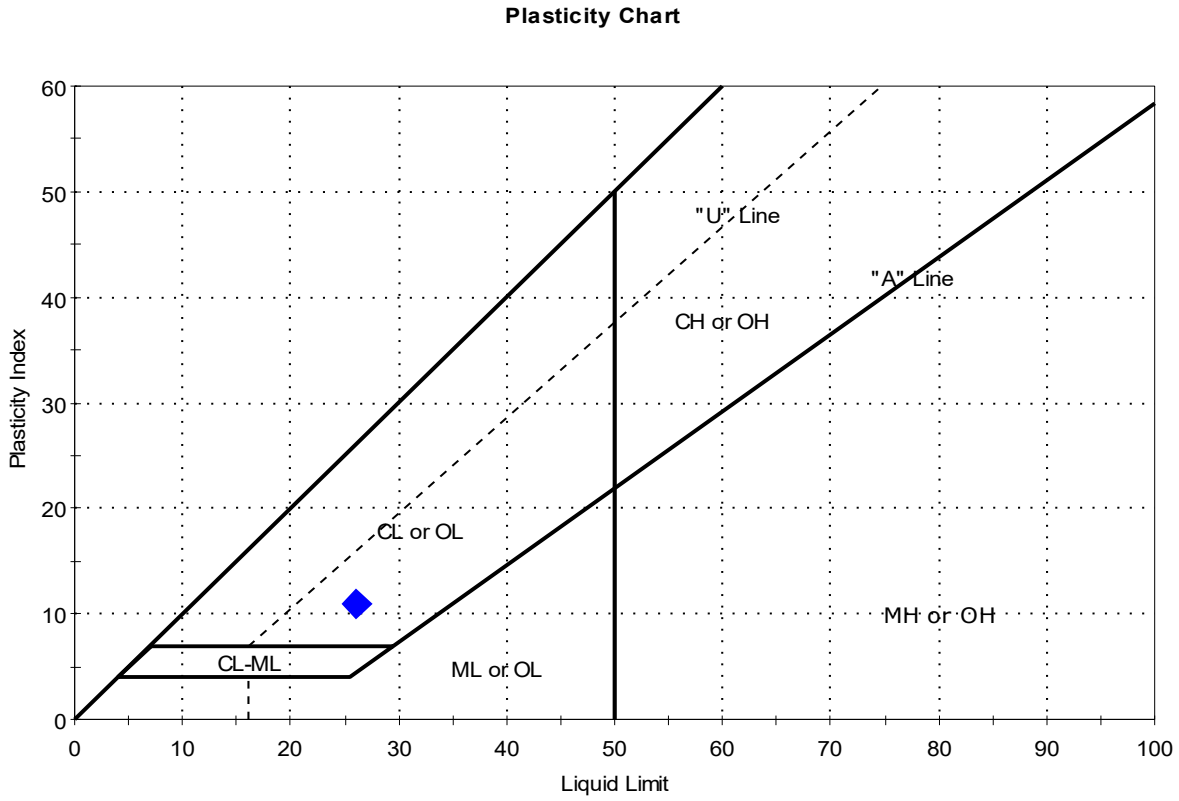
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	WSP USA, Inc.				
Project:	Old Post Road				
Location:	Worthington, MA			Project No:	GTX-323019
Boring ID:	TP-2	Sample Type:	Bag	Tested By:	ajl
Sample ID:	OPR-TP-2	Test Date:	04/17/26	Checked By:	ank
Depth :	3-4	Test Id:	862824		
Test Comment:	---				
Visual Description:	Moist, dark olive brown sandy clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318

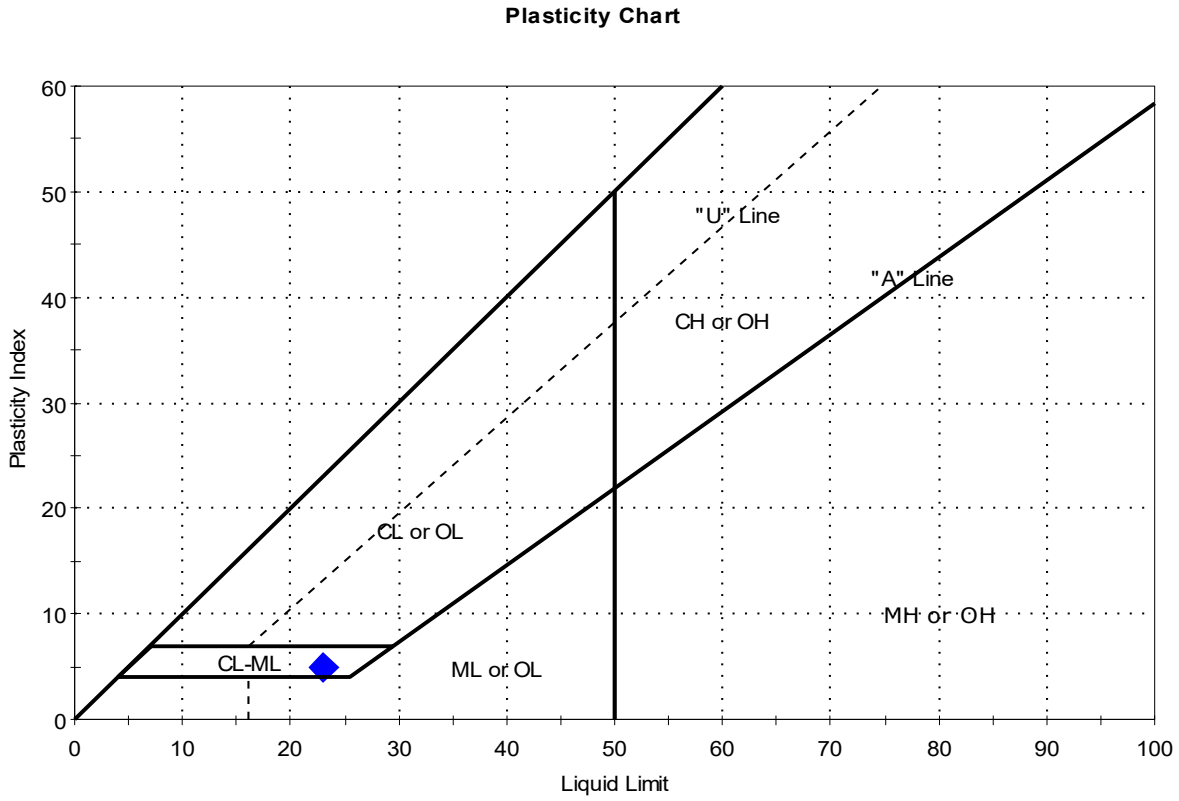


Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	OPR-TP-2	TP-2	3-4	14	26	15	11	0	Sandy Lean CLAY (CL)

Sample Prepared using the WET method
10% Retained on #40 Sieve
Dry Strength: VERY HIGH
Dilatancy: SLOW
Toughness: LOW

Client:	WSP USA, Inc.				
Project:	Old Post Road				
Location:	Worthington, MA			Project No:	GTX-323019
Boring ID:	TP-6	Sample Type:	Bag	Tested By:	ajl
Sample ID:	OPR-TP-6	Test Date:	04/14/26	Checked By:	ank
Depth :	3-4	Test Id:	862825		
Test Comment:	---				
Visual Description:	Moist, dark olive brown sandy silty clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	OPR-TP-6	TP-6	3-4	15	23	18	5	-0.6	Sandy Silty CLAY (CL-ML)

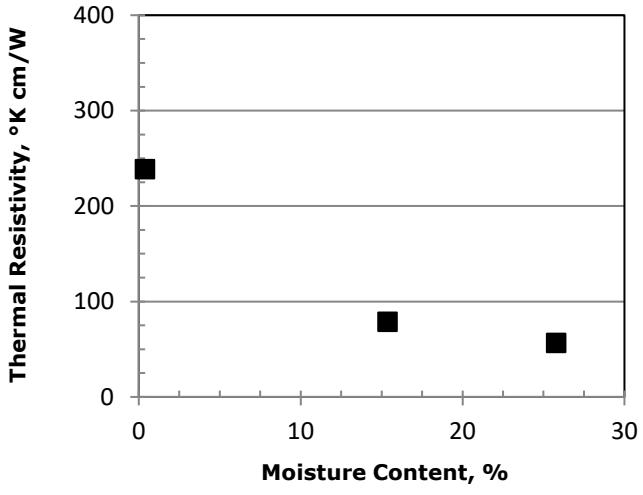
Sample Prepared using the WET method
18% Retained on #40 Sieve
Dry Strength: VERY HIGH
Dilatancy: SLOW
Toughness: LOW

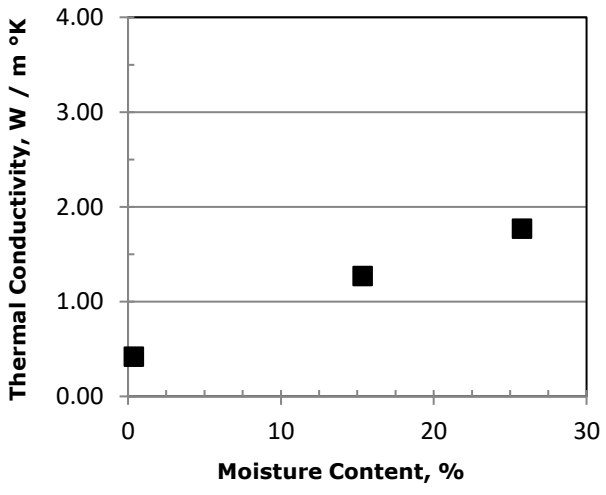
Client:	WSP USA, Inc.
Project Name:	Old Post Road
Project Location:	Worthington, MA
GTX #:	323019
Start Date:	04/14/26
End Date:	04/17/26
Tested By:	ges
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 115 pcf bulk density, at dry, as-received, and saturated moisture contents. Unable to meet the requested compaction at the saturated moisture content. Needle was pushed into specimen.

Thermal Conductivity of Soil by ASTM D5334

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-12	OPR-TP-12	1-2	Moist, olive brown silty sand with gravel	0.39	115.0	114.5	0.42	239
TP-12	OPR-TP-12	1-2	Moist, olive brown silty sand with gravel	15.36	115.0	99.7	1.27	79
TP-12	OPR-TP-12	1-2	Moist, olive brown silty sand with gravel	25.78	127.8	101.6	1.77	56

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



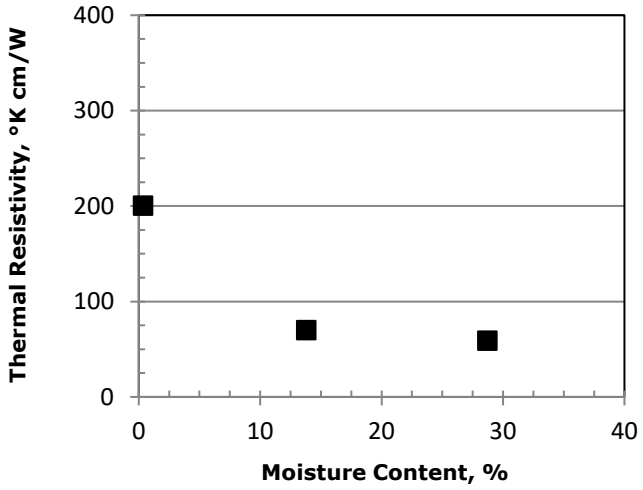


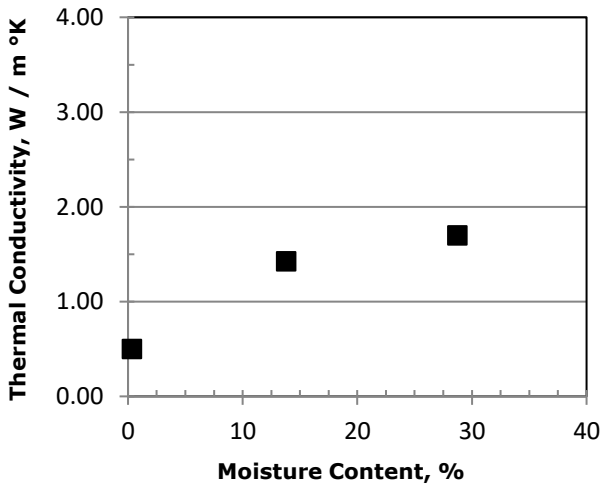
Client:	WSP USA, Inc.
Project Name:	Old Post Road
Project Location:	Worthington, MA
GTX #:	323019
Start Date:	04/14/26
End Date:	04/17/26
Tested By:	ges
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 115 pcf bulk density, at dry, as-received, and saturated moisture contents. Unable to meet the requested compaction at the saturated moisture content. Needle was pushed into specimen.

Thermal Conductivity of Soil by ASTM D5334

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-14	OPR-TP-14	1-2	Moist, olive brown silt sand	0.34	115.1	114.7	0.50	200
TP-14	OPR-TP-14	1-2	Moist, olive brown silt sand	13.80	115.0	101.1	1.43	70
TP-14	OPR-TP-14	1-2	Moist, olive brown silt sand	28.72	124.7	96.9	1.70	59

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt







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www.TEi-TS.com

GEOTESTING EXPRESS INCORPORATED
125 NAGOG PARK
ACTON MA 01720-3451
USA

Analysis No.	TS-A2613826
Report Date	16 April 2026
Date Sampled	13 April 2026
Date Received	14 April 2026
Where Sampled	Acton, MA USA
Sampled By	Client

This is to attest that we have examined: Soil: Project: Old Post Road; Site Location: – — –; Job Number: GTX-323019

When examined to the applicable requirements of:

ASTM D 512-23	“Standard Test Methods for Chloride Ion in Water” Method B
ASTM D 516-22	“Standard Test Method for Sulfate Ion in Water”
ASTM G 200-20	“Standard Test Method for Measurement of Oxidation-Reduction Potential (ORP) of Soil”

Results:

ASTM D 512 - Chloride Method B

Sample		Results		Minimum Detection Limit
		ppm (mg/kg)	%[1]	
OPR-TP-3		72.	0.0072	10.
TP-3	2 – 3’			
OPR-TP-9		12.	0.0012	
TP-9	2 – 3’			

NOTE: [1]Percent by weight after drying and prepared as per the Standard.

ASTM D 516 - Sulfates (Soluble)

Sample		Results		Minimum Detection Limit
		ppm (mg/kg)	%[1]	
OPR-TP-3		< 10.	< 0.0010	10.
TP-3	2 – 3’			
OPR-TP-9		< 10.	< 0.0010	
TP-9	2 – 3’			

NOTE: [1]Percent by weight after drying and prepared as per the Standard.

3455 South 500 West
Salt Lake City, UT 84115-4234 USA
TEL: +1 801 262 2448
EMAIL: Director-TS-A@TEi-Test.com

ASTM G 200 - REDOX

Sample		Results	Minimum Detection Limit
OPR-TP-3		279.9 @ 20.5 ºC	0.1 mV
TP-3	2 – 3’		
OPR-TP-9		301.9 @ 20.4 ºC	
TP-9	2 – 3’		

NOTE: [1]Percent by weight after drying and prepared as per the Standard.

END OF ANALYSIS

USEPA Laboratory ID UT00930

Merrill Gee P.E. – Engineer in Charge

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Appendix R Stormwater Management Report Dated September 25, 2026

Business Confidential

BWC Ward Stream, LLC
c/o BlueWave Solar
3.00 MW AC Ground-Mount Solar PV Development

Stormwater Management Report

2026-09-25

US-EI-3652230437

Document distribution

BWC Ward Stream, LLC

c/o BlueWave Solar

3.00 MW AC Ground-Mount Solar PV Development

Stormwater Management Report

2026-09-25

US-EI-3652230437

Prepared for

BWC Ward Stream, LLC

c/o BlueWave Solar

116 Huntington Avenue, Suite 601

Boston, MA 02116

Submitted to

Town of Worthington Planning Board
P.O. Box 247
160 Huntington Rd.
Worthington, MA

Prepared by

WSP USA Inc.
100 Apollo Drive, Suite 302
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Proposed Conditions HydroCAD
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Abbreviations and glossary

Abbreviations

Abbreviation	Description
AC	Alternating Current
BESS	Battery Energy Storage System
DC	Direct Current
DP	Design Point
HSG	Hydrologic Soil Group
IWPA	Interim Wellhead Protection Area
LFP	Lithium Iron Phosphate
LOW	Limit of Work
LTPPP	Long-term Pollution Prevention Plan
LUHPPL	Land use with higher potential pollutant loads
MS4	Municipal Separate Storm Sewer System
MV	Medium Voltage
MW	Megawatt
O&M	Operation and maintenance
PV	Photovoltaic
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
UP	Utility pole

Glossary of terms

Term	Explanation
Bordering vegetated wetland	Areas where soils are saturated and/or inundated with freshwater such that they contain a predominance of hydrophilic plants, and which border a surface body of water such as a stream or pond
Project area	The all-encompassing area within the limit of work and disturbance
Site	Parcel of land which the Project is located on (Property ID 407 0 96.1)

Executive summary

WSP USA Inc. (WSP) performed a stormwater evaluation to assess the impacts of the proposed 3.00-megawatt (MW) alternating current (AC) solar photovoltaic (PV) development (the Project) being installed at 105 Old Post Road, Worthington, MA (the Site). Stormwater drainage plans are attached to this report for reference (Appendix G – Drainage Figures). The 33-acre project area includes proposed ground-mounted PV modules on a tracker system. The array will be surrounded by a fixed knot game fence primarily following the existing fence line. Existing vegetative borders shall be maintained as screening, and an additional section of vegetative screening is proposed along the eastern border of the southern portion of the array. An existing dirt driveway connects the Site to Old Post Road and will be resurfaced with gravel and will have a 'T' turnaround installed at the far end. The driveway's footprint will be altered as necessary to accommodate emergency vehicles. The array will be connected through a series of inverters, switchboards, and transformers mounted on concrete pads in a consolidated area adjacent to the access drive. Each concrete pad foundation for the equipment will have a stabilized gravel base surrounding the pads and the area between shall be permeable pavement. The permeable pavement will treat and recharge groundwater. Power from the transformer will run in underground Medium Voltage (MV) lines to a series of proposed utility poles along the driveway, with overhead MV lines connecting the utility poles to an existing utility pole located near the intersection of the existing driveway and Old Post Road, which will serve as the interconnection point. The array will also be accompanied by Battery Energy Storage System (BESS) equipment located in the consolidated equipment area. The BESS will consist of the cabinet body, Lithium Iron Phosphate (LFP) battery system, temperature control system, and fire suppression system. A dry detention basin will attenuate the peak runoff rate from the Project. A detailed description of the Stormwater Best Management Practices (BMPs) and their location is contained in this report. WSP has performed the analysis described in detail below to compare the existing (pre-construction) stormwater runoff volumes and rates to the proposed (post-construction) stormwater runoff volumes and rates.

1. Stormwater Modelling

1.1 Existing Conditions

The 73.56-acre Site's primary use is agricultural hay production. A dirt driveway provides access to several structures on Site. There are four structures present on-site: a house, one metal out building, a fixed tilt solar panel, and a woodshed building. An electric fence surrounds a majority of the non-forested portions of the Site, with a small gap separating the northern and southern agricultural fields. A sewer manhole and water spigot were identified in the northern portion of the site during a field survey by SGC Engineering, LLC (SGC) in December 2023, and a leach field is believed to be located near the gate west of the dirt driveway. Ward's Stream and an associated pond are located on the western portion of the Site. In the northwestern portion of the property, outside the limit of work for the Project, exists 22.4 acres of conservation land and in the southeast corner is another 1.6 acres. This conservation land is protected by the Department of Agriculture – Farm Service.

1.1.1 Soils

The Site is made up of soils rated as Hydrologic Soil Group (HSG) C and D with a slow to very slow infiltration rate. Majority of the agricultural fields are HSG C and classified as not prime farmland. Farmland classification and HSG was obtained from publicly available USDA soil surveys at the Site (Appendix B – Soils Information). Soils within the Project area are primarily classified as fine sandy loam with an assumed conductivity of 0.17 inches per hour according to the 1982 Rawl's Rates referenced in the Massachusetts Stormwater Handbook (the Handbook).

1.1.2 Waters

1.1.2.1 Wetlands

Fleetwood Environmental Solutions, LLC (Fleetwood) performed a wetland and waterbody delineation field survey of the Site in Q2 of 2023 and delineated five wetlands near the Project area. These wetland systems will be referred to according to their IDs as shown in the Issued for Permitting Plan Set in Appendix F. All wetlands are classified as bordering vegetated wetlands. Wetlands W1 and W2 are located in the eastern portion of the Site, Wetland W3 is located at the southeastern corner of the Site, Wetland W4 is located at the northwest corner of the southern field, and Wetland W5 is located along the western edge of the southern field. An additional Site visit was performed by Fleetwood Environmental Solutions in November 2025 to analyze the pasture west of the existing dirt road. Wetlands were not delineated, but a mean-annual high-water line of Ward's Stream was provided as the starting point of a 200-foot River Front Area buffer. There are also several off-site wetlands identified by the National Wetlands Inventory and additional watercourses on-site. Ward's Stream flows from north to south through the western portion of the Site, an

unnamed stream flows through the southeast corner of the Site and is approximately 150 feet from the limit of work for the Project, and a pond is located along Ward's Stream in the northwest of the Site.

1.1.2.2 Groundwater

The water table across the Project area is estimated 1.5 feet or more below the ground surface based on the USDA NRCS Web Soil Survey publicly available data (Appendix C – USGS NRCS Depth to Water Table Map). The water table is where the soil is considered saturated. Soils with higher water tables will infiltrate less water and therefore generate more runoff because they have less capacity for water storage. Well Driller Reports filed with the MA Executive Office of Energy & Environmental Affairs for Worthington provide a variance of depth to static water level around the Site. On March 26, 2026, a geotechnical survey of the Site was performed. Fourteen (14) test pits across the Site were dug to identify the depth to ground water and bed rock refusal. Bedrock refusal was hit at shallow depths ranging from one to nine feet below ground surface. Most test pits encountered refusal around four feet below ground surface. No groundwater was observed in the test pits.

There are no Wellhead Protection Areas within the Site. The nearest Wellhead Protection Areas is an IWPA located over one-half mile northwest of the Site.

1.1.2.3 Floodplain

Overlapping with Ward's Stream is FEMA Flood Zone A, meaning it has a 1% annual chance of flooding (once every 100 years), and a base flood elevation has not been determined (Appendix D – FEMA Map). No work associated with the Project shall be performed within the floodplain.

1.1.3 Drainage Patterns

An on-the-ground existing conditions topographic survey was completed by SGC in December 2023. The areas where trackers and modules will be installed have slopes primarily between 0% and 15%. Runoff from the northern and northwestern agricultural fields run to the west and south and runoff from the southern agricultural field runs primarily south. Runoff from the northern and northwestern portion of the Site flows west toward an unnamed pond (reference herein as Ward's Pond), while the remainder of the runoff from the Site flows toward the section of Ward's Stream downstream of Ward's Pond. This pond is impacted by a large upstream subcatchment outside of the Site extending along Ward's Stream northwest to Cold Street.

Ward's Stream (sub-basin 4072) combines with Watts Stream south of Witt Hill Road and becomes Little River. Little River drains into Westfield River which is controlled by Knightville Reservoir before continuing its flow southeast to the Connecticut River. Knightville Reservoir is a U.S. Army Corps of Engineers flood control facility consisting of a dam and large reservoir. It has a drainage area of approximately 162 square miles and a flood storage capacity of 49,000 acre-feet. Its primary function is to regulate the flows in the Westfield River to reduce flooding by gradually releasing stored water.

The Site is within the major watershed known as Westfield which is a sub-watershed of the Connecticut River Watershed. Both the Westfield (MA32-04) and Connecticut (MA34-05) basins have Massachusetts Statewide Total Maximum Daily Load (TMDL) for Pathogen-impaired Waterbodies (CN 515.1). Both are in

reference to the pollutant E. Coli under pollutant group Pathogens. The Westfield River Basin TMDL is preventative while the Connecticut River Basin TMDL is restorative.

1.2 Proposed Conditions

The Project includes the installation of ground-mounted PV modules on tracker systems. The array will be surrounded by a proposed fixed knot game fence primarily following the location of the existing fence line. Additional vegetative screening is proposed along the northeastern boundary of the southern field, which, in combination with existing vegetative screening, will provide sufficient screening for neighboring properties. An existing dirt driveway connects the Site to Old Post Road. This driveway material shall be improved to a gravel surface and shall be widened as necessary to provide a road width of 20 feet. A 'T' turnaround shall be added to the existing driveway to provide direct access to battery storage equipment and temporary parking areas for maintenance vehicles. The array will be connected through a series of inverters, switchboards, and transformers mounted on concrete pads in a consolidated area adjacent to the access drive. Each concrete pad foundation for the equipment will have a stabilized gravel base surrounding the pads and the area between each pad shall be permeable pavement. Also housed in the equipment pad area will be the Battery Energy Storage System (BESS) equipment consisting of the cabinet body, a Lithium Iron Phosphate (LFP) battery system, a temperature control system, and a fire suppression system. Power from the transformers will run in underground Medium Voltage (MV) lines to proposed utility poles along the driveway. A total of eleven utility poles will be installed along the northern portion of the driveway, with an existing pole serving as the interconnection point along Old Post Road.

The Project is an agrivoltaics system which allows dual use of the farmland for solar energy and hay production. Throughout the design process, the owner and farmer of the land has been consulted to confirm the solar PV development will have minimal impact on hay production and will not impede the use of the property.

The Project has been designed to minimize the total increase in impervious area and disturbance to surrounding natural resources to the maximum extent practicable while accomplishing the Project design goals (Table 1.1). In totality, the Project limit of work encompasses approximately 33 acres and introduces approximately 6,536 square feet of impervious area. A majority of the increase in impervious area is comprised of the concrete equipment pads, driveway resurfacing, and driveway turnaround. The fence posts, array racking posts, and utility poles introduce a negligible amount of impervious area comparatively.

Table 1.1 Land Disturbance Summary

Area Description	Area (square feet)
Limit of Work (LOW)	1,436,254
Existing Impervious Area	64,588
Proposed Impervious Area	71,124
Net Change in Impervious Area	6,536

1.2.1 Soils

Being an agrivoltaics system, nearly all the farmland will continue producing hay post-construction. Permanent impacts to the prime farmland have been minimized to the maximum extent practicable while achieving the Project design goals.

Earthwork has been minimized to extent practicable, however it is required for construction of BMPs, grading the access drive, and grading areas for the equipment pads. The design aims to balance the volume of cut and fill such that the transport of soil to and from the Site is minimized. The construction of the BMPs and driveway will require aggregate deliveries to the Site. A designated laydown area shall be used to store the stockpiles. Fertile soils/loam may be brought to the Site to promote vegetative growth.

1.2.2 Waters

1.2.2.1 Wetlands

The Project has been designed with significant buffers from Ward's Pond and Ward's Stream (> 100 feet), and a 100-foot wetland buffer. Proposed work within the buffer zone consists exclusively of normal maintenance or improvement of land in agricultural use as defined by 310 CMR 10.04 (Agriculture), are directly related to production of hay and raising on livestock, and which shall be undertaken in such a manner as to prevent erosion and siltation of adjacent water bodies and wetlands and conducted in accordance with federal and state laws. Specific work proposed within the buffer zone is limited to the repair and improvement of an existing fence, which includes the removal of approximately 1,477 feet of existing electrical fence and the installation of approximately 1,563 feet of fixed knot game fence, approximately 850 square feet of vegetative clearing, and the improvement of an existing access road by resurfacing with crushed stone. Within the wetland, a small portion of existing fence shall be removed and approximately 118 feet of proposed fence will replace it. This results in an alteration of less than one square foot of the wetland. The areas where existing fence posts were located shall be returned to wetland as replacement, and an additional area will be restored as necessary to make up any difference between the original and proposed fence post areas. The Applicant has submitted a Notice of Intent (NOI) for the work to be performed within the wetland and buffer to confirm there shall be no long-term impacts to the wetlands on Site.

1.2.2.2 Groundwater

The impervious areas proposed for the Project provide a less pervious surface condition than the existing conditions, so a greater volume of runoff will be generated during storms, and less rainfall will be infiltrated. Through installation of the proposed BMPs, the required recharge volume will be treated and infiltrated. No wastewater nor hazardous materials will be discharged on Site. All proposed measures ensure that groundwater will not be contaminated, under-recharged, or otherwise adversely impacted.

1.2.2.3 Floodplain

The Project does not involve work within the floodplain and will not adversely impact the floodplain.

1.2.3 Drainage Patterns

Flow paths are primarily maintained, with the main areas of alteration corresponding with the concrete equipment pads and driveway. The driveway shall be gently sloped to the southwest to promote runoff flow directly across the semi-pervious gravel. To treat and infiltrate new runoff from the increase in impervious area, the gravel area within the consolidated equipment pad area shall be installed as permeable pavement. Consequentially, the equipment pad area shall be graded to provide a more level surface for layering of the proposed permeable pavement materials. To achieve a post development peak runoff rate equal to or below the pre-development conditions, a dry detention basin has been designed along the southwestern side of the access road to capture and slow down runoff from the array areas.

1.3 Hydrologic Analysis

A hydrologic analysis was performed using HydroCAD (Version 10.20-6a) for 24-hour, Type III, 2-, 10- and 100-year return frequency rainfall events for Worthington, MA. According to NOAA Atlas 14, Volume 10, Version 3, the storm events generate 3.28, 5.12, and 8.05 inches of precipitation respectively (Appendix E – Rainfall Data). HydroCAD is an industry accepted modelling software that combines the capabilities of the TR-20 and TR-55 methodology. The calculations confirm the Project meets the Massachusetts Stormwater Standards, as described in further detail in Section 4. Each rainfall event was analyzed under two scenarios: the Existing Condition (pre-construction) and the Proposed Condition (post-construction). The detailed stormwater models are included in Appendix I – HydroCAD Reports.

The Site was analyzed with three design points (DPs), Ward's Pond, Ward's Stream and the unnamed stream in the southeast corner of the Site. Hydrologic analysis results show proposed conditions demonstrate a lower or functionally equivalent peak rate of runoff and a negligible increase to the total volume of runoff leaving the Site when compared to existing conditions (Table 1.2).

Table 1.2 Hydrologic Analysis Results

Design point	Rainfall event	Peak flow (cfs)		Runoff volume (cf)	
		Existing	Proposed	Existing	Proposed
DP-P (Pond)	2-year	23.28	22.47	98,186	94,778
	10-year	49.43	47.71	204,891	197,780
	100-year	93.67	90.42	392,166	378,556
DP-U (Unnamed Stream)	2-year	13.83	13.83	66,891	66,887
	10-year	30.64	30.64	144,050	144,042
	100-year	59.62	59.62	281,677	281,661
DP-W (Wards Stream)	2-year	53.82	50.64	266,551	266,575
	10-year	121.97	114.43	583,448	585,470
	100-year	240.83	238.67	1,153,480	1,161,568

2. Erosion and Sedimentation Control

2.1 During Construction

The Contractor shall be responsible for implementing and maintaining appropriate erosion and sedimentation controls to prevent sediment laden runoff from entering the existing stormwater management system. All controls shall be installed prior to beginning land disturbance and shall be maintained until the Site is fully stabilized.

Sediment barriers (straw wattles, compost socks, or other appropriate best management practices (BMPs)) shall be placed around the perimeter of the proposed development area. Any disturbed areas that are proposed to have vegetated ground cover will be restored to pre-construction conditions or seeded with similar vegetation to the maximum extent practicable. The area of disturbed soil exposed at any one time shall be minimized to the extent practicable.

Temporary erosion control measures shall be implemented within 14 days of soil exposure or disturbance. Fast and effective measures include mulching and sprinkling for dust control. Reference manufacturer recommendations for mulching as well as the Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, 2003. The implementation of a stabilized construction entrance/exit will prevent tracking of mud and sediment onto public roadways. Any material stockpiles shall be maintained in one or more designated, centralized locations away from drainage features. Perimeter erosion control shall surround all stockpiles and will consist of sediment barriers sized and maintained to effectively contain sediment. On any disturbed areas with steep slopes (slopes exceeding 20%), erosion control blankets shall be installed to provide immediate soil stabilization.

The contractor shall inspect all erosion control devices a minimum of once weekly during construction and additionally following a major storm event. The contractor shall perform an inspection and any necessary repairs to achieve working order according to the original design. All temporary controls shall be maintained in working order until permanent stabilization is achieved.

The erosion prevention activities typically occur in the following sequence:

- Establish the Limits of Work (Surveying and staking the LOW boundary)
- Install Erosion and Sediment Controls
- Perform Clearing and Grubbing
- Conduct Necessary Site Grading
- Seed Disturbed Areas with Temporary Vegetation Mix
- Install Crushed Stone Access Road and BMPs
- Install Concrete Equipment Pads

- Install Perimeter Fence
- Perform Final Seeding and Landscaping (permanent stabilization of the site)
- Remove Temporary Erosion Controls Upon Close of Construction

2.2 Long-Term Pollution Prevention Plan

In accordance with EPA Standards, the development and implementation of suitable practices for source control and pollution prevention shall be incorporated in a Long-Term Pollution Prevention Plan (LTPPP). The primary focus of the LTPPP is to establish procedures and controls for limiting the potential sources of pollutants, including nutrients that may contribute to excessive contaminant levels in the site's stormwater runoff. To this end the following source controls and procedures will be in place at the Site:

- Good housekeeping – The Site shall be kept clean at all times. Refuse collection and disposal shall occur on a regular basis. All materials shall be disposed of in approved, designated locations in accordance with the relevant regulations.
- Storing material and waste products inside or under cover – No material storage shall take place outside at the Site on paved or lawn surfaces. All materials and waste products stored on-site shall be stored in compliance with all local, state, and federal requirements for spill prevention and containment.
- Vehicle washing controls – Vehicle washing shall not occur at the Site during construction. Any vehicle cleaning will be performed at an off-site facility with proper wastewater treatment. This prevents potentially harmful detergents, wash water or other associated pollutants from entering the stormwater BMPs. Standard farming equipment maintenance may require washing post-construction as may be typical pre-construction. The landowner/farmer shall be provided a copy of this report with the following recommendations for vehicle washing:
  - Use biodegradable, phosphate-free, water-based detergents.
  - Limit the amount of detergent used to only what is necessary.
  - Wash vehicles away from stormwater BMPs and wetlands.
  - Direct the wash water to pervious ground covers such as grassed areas.
- Requirement for routine inspections and maintenance of stormwater BMPs – All stormwater BMPs shall be inspected and maintained according to the Long-Term Operations and Maintenance (O&M) Plan (see Section 3).
- Spill prevention and response plans – A spill recovery kit shall always be readily accessible at the Site. Emergency contact information for a certified cleanup vendor shall be visible and apparent at the Site. All employees shall be briefed on clean-up response and procedures. All spills shall be documented and reported as required by law.

- Maintenance of lawns, gardens, and other landscaped areas – Landscaping activities shall be performed to avoid disturbing stabilized surfaces. Mowing shall be conducted in coordination with the farmer's hay production schedule and limited to only what is necessary to promote plant health.
- Requirements for storage and use of fertilizers, herbicides, and pesticides – Herbicide and pesticide use shall not take place during construction. If used post-construction, application shall be performed in accordance with product labels and applicable guidelines. Any fertilizer, herbicide, or pesticide application shall be coordinated with the farmer's hay production practices to avoid impacts on crop quality and yield.
- Pet waste management provisions – Pets shall not be present on-site during construction or operation. Waste from livestock present shall be managed through manual removal and specific grazing schedules to avoid accumulation of waste.
- Provisions for operation and management of septic systems – No septic systems are proposed for the Site. Temporary facilities present during construction shall be maintained according to the relevant regulations. It is the owner's responsibility to properly manage and maintain the existing septic system.
- Provisions for solid waste management – Solid waste generated during construction shall be stored in designated locations in covered containers. Containers will be removed by a licensed vendor, in compliance with the applicable regulations. Minimal waste generation is expected post-construction, and any found shall be removed promptly during routine maintenance visits.
- Snow disposal and plowing plans relative to Wetland Resources Act – Where snow plowing is appropriate, snow shall be compiled in upland areas, away from wetland resources and structural BMPs, to prevent direct discharge of meltwater. Snow shall not be piled within 100 feet of wetland resources and structural BMPs.
- Winter Road Salt and/or Sand Use and Storage restrictions – De-icing chemicals will be used strategically to minimize environmental impacts. Mechanical snow removal shall be prioritized over chemical treatment when possible. Snow piles shall be located away from storm drains and BMPs.
- Street sweeping schedules – During construction, street sweeping shall occur after all significant sediment disturbances. Driveways and adjacent roads shall be inspected for sediment tracking at the end of each workday and swept if deemed necessary. Post-construction, street sweeping shall occur twice annually during routine maintenance inspections.
- Provisions for prevention of illicit discharges to the stormwater management system – There are no illicit discharges (i.e., wastewater, discharges of substance, oil, or grease) associated with the Project. Illicit discharge detection and elimination measures shall be implemented including signage and regular inspections. Any evidence of illicit discharge shall be addressed immediately.

No new discharges shall occur near critical areas nor from any LUHPPLs. All personnel responsible for maintenance, repair of stormwater controls, and/or implementation of the LTPPP must receive adequate training related to the scope of their job duties. This includes training on the proper procedures to follow with respect to the LTPPP requirements and understand the principles and practices of erosion and sediment

control. The following contact(s) can be reached in case of any questions or emergencies surrounding implementation of the LTPPP:

BlueWave Asset Management
T +1 617-209-3122
assetmgmt@bluewave.energy

2.2.1 Total Maximum Daily Loads

As described in Section 1.1.3, the Site is within two major watersheds which both have Massachusetts Statewide Total Maximum Daily Load (TMDL) for Pathogen-impaired Waterbodies (CN 515.1) in reference to the pollutant E. Coli. In accordance with these TMDLs, the development and implementation of suitable practices for source control and pollution prevention of pathogens shall be incorporated in this LTPPP. The Town of Worthington has no specific ordinances or bylaws pertaining to the TMDLs and is not within the regulated MS4 area.

For both the Westfield and Connecticut TMDLs, agricultural activities and wildlife waste have been identified as potential sources of pollution. These sources are applicable to the Site and its current and proposed use. Manure storage and spreading, if not well managed, can introduce pathogens to nearby waterbodies. It is recommended that any and all manure and fertilizer application is performed in accordance with applicable guidelines and in a conservative manner. Due to the large areas within the major watersheds dedicated to conservation and the wetlands throughout the watershed, wildlife waste can introduce pathogens pollution. Waterfowl are attracted to large open mowed areas near waterbodies, bringing with them a potential increase in bacteria levels. It is probable the solar PV development shall deter excessive waterfowl from the wetlands on Site. By practicing the measures outlined in this LTPPP, pathogen pollution will be mitigated throughout construction and the life of the Project.

3. Operation and Maintenance

3.1 Responsible Party & Notification of Future Owners

Property Owner: Thomas L. Brisson Jr.

Site Adress: 105 Old Post Road, Worthington, MA 01098

Mailing Address: 105 Old Post Road, Worthington, MA 01098

The property owner noted above is the stormwater management system owner. Upon transfer of property, and therefore stormwater system ownership, the seller shall notify the buyer of the presence and location of all stormwater BMPs and the ongoing responsibility to maintain them in accordance with this plan. O&M requirements and contract details shall be included in property transaction documents when possible.

It is the responsibility of the operator of the solar PV development to implement this O&M plan as outlined in their agreement with the owner.

Energy Storage Facility Operator: BlueWave Asset Manager
Mailing Address: 116 Huntington Avenue, Suite 601, Boston, MA 02116
Phone: +1 617-209-3122
Email: assetmgmt@bluewave.energy

3.2 General Site Maintenance

General site-wide conditions may be inspected simultaneously with stormwater inspections. The Site shall be checked for any eroded drainage paths and repaired, as necessary. Any loose debris on-site shall be removed and disposed of appropriately. If any significant sediment build-up occurs on the roadways or drives, it shall be removed by sweeping or other methods.

The array areas shall continue to be farmed post-construction as hay pastures by the landowner/farmer. Pesticides, fungicides and herbicides shall only be applied by the landowner/farmer in accordance with product labels and applicable guidelines. All landscaping and landscaping maintenance shall be performed by the landowner/farmer or a licensed subcontractor.

In general, maintenance of BMPs requiring earth disturbance should occur in late spring or summer, after spring rains have diminished, drier weather has set in, and when vegetation can re-establish itself through the growing season. Other times may be suitable if weather permits or if the potential for sediment transport is low. Any maintenance should occur with the intent to limit earth disturbance during times of high erosion potential. If earth disturbance occurs as part of maintenance activities, appropriate erosion and sediment controls shall be implemented.

The following maintenance procedures are necessary to ensure proper function of the stormwater management system and compliance with regulatory standards. The maintenance tasks are grouped by

system component and summarized in the tables below. These actions, routine and corrective, shall be performed in a timely manner by the responsible party throughout the life of the system. At all times, across all activity relating to system O&M trash, sediment, and other debris that is removed from the system shall be disposed of in accordance with applicable local, state and federal guidelines and regulations.

Based on the following O&M activities, the anticipated annual cost for full site-wide maintenance of the stormwater control system is estimated at $5,000.

3.2.1 Crushed Stone Access Road

The access road is a semi-permeable surface that can become unsafe if infiltration is not acceptable. Inspecting and repairing the access road in a timely manner is essential for overall system success. The surface of the crushed stone access road shall not be used to store soil or other materials that could clog the permeable stone surface.

Table 3.1 Routine O&M Activities – Crushed Stone Access Road

Activity	Details	Frequency
Inspect	Check for standing water, uneven surface, snowplow damage, and vegetation.	Twice a year or more often if needed, especially during winter.
Re-grade the stone	Redistribute and compact washed crushed stone to restore grades in original design.	As necessary
Remove vegetation	Manually remove vegetation that is growing within the road surface area.	Immediately when observed
Repair potholes and snowplow damage	Fill and compact potholes and other road damage with design specific material.	As necessary
Restore infiltration	If water remains on road surface >48 hours after storm, excavate, scarify the underlying topsoil, and replace the stone.	As necessary
Clean	Remove trash and debris from the road surface.	Immediately when observed

3.2.2 Dry Detention Basin

The dry detention basin should be inspected at least once per year to ensure they are operating as intended. The basin should drain within 24 hours and to ensure the basin is functioning as designed, sediment, trash and debris should be removed to prevent clogging.

Table 3.2 Routine O&M Activities – Dry Detention Basin

Activity	Details	Frequency
Inspect	Inspect dry basins to ensure they are operating as designed. Inspect for adequate vegetation, signs of erosion, rilling and gullying. Check for slope integrity, soil moisture, vegetative health, soil stability, soil compaction, soil erosion, ponding and sedimentation.	At least once a year
Mow	Mow the upper-stage, side slopes, embankment, and emergency spillway.	At least twice a year.
Remove sediment	Remove sediment and other debris manually.	At least twice a year
Reseed	Reseed as necessary to ensure that vegetative cover is never below 80%.	As necessary

3.2.3 Permeable Pavement

The permeable pavement has several layers which must all be operational to provide proper water quality treatment. The top layer acts as pretreatment itself, so frequent cleaning and maintenance of the surface is critical to prevent clogging.

Table 3.3 Routine O&M Activities – Permeable Pavement

Activity	Details	Frequency
Monitor	Ensure that the paving surface drains properly after storms.	As necessary
Clean	Remove sediment and other debris manually.	As necessary
Inspect	Check for deterioration or clogging of the surface layer.	Annually
Assess Performance	Measure the exfiltration capacity. When exfiltration capacity is found to decline, implement measures to restore original exfiltration capacity. This may require removing the permeable materials, stripping accumulating sediment from the bottom, scarifying and tilling to	Annually

Activity	Details	Frequency
	induce infiltration and replacing the permeable materials.	

3.3 Public Safety Features

The stormwater management system and energy storage facility shall have several features to ensure public safety, prevent unauthorized access to the Site, and ensure effective emergency response. The Project will be surrounded by a perimeter fence and will have a lockable gate at all entrances. The gate at the main entrance will include signage with operator identification and emergency contact information. A secure lockbox containing access key(s) shall be installed in case of emergency to provide full access to the Site for the local fire department. In accordance with the Worthington Protective Zoning Bylaws (the Bylaws) Section 8.5.6(A), “All means of shutting down the solar photovoltaic installation shall be clearly marked and approved by the Town fire chief.” In addition to gate and emergency shutoff signage, temporary and permanent signs may be installed near BMPs as is appropriate.

Aside from secondary protective measures to be implemented, the proposed BESS has several incorporated safety features to prevent emergency situations. The BESS is sealed and fabricated in a container before delivery. Any materials considered hazardous are enclosed in a secure storage container of an impervious material. The container is installed on an impervious concrete pad which is surrounded by gravel. A spill event is highly unlikely. O&M procedures are in place to maintain proper working order, 24/7 monitoring, and suppression systems. In the unlikely event of a spill from the storage container and concrete pad, downstream of each pad has been designed to be diverted towards areas of vegetative cover and much of the runoff from the impervious pads will be captured and treated by the designed BMPs. Furthermore, in the unlikely scenario of a spill, temporary flow barriers can be quickly and reliably implemented to block flow downstream and isolate the affected area. Such flow barriers can be kept on Site as part of the spill response kit and could include items such as hazardous material absorbent booms and socks or rapid-deployment dams.

4. Massachusetts Stormwater Management Standards

The Project has been designed in accordance with the Massachusetts Stormwater Management Standards.

4.1 Standard 1: No New Untreated Discharges

No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Impervious areas as a result of the development include the concrete equipment pads, resurfacing of the existing driveway and the addition of the 'T' turnaround to the driveway. Runoff rates and volumes would increase without mitigation due to the ground cover change from hay pasture and grass to concrete and gravel. Further, some vegetation clearing will occur on-site, contributing to a minor increase in the Site's total runoff volume. With the BMPs implemented on the Site, the peak rate has been attenuated and the volume discharging to the wetlands and streams has minimally increased. New stormwater conveyances capturing much of the runoff generated from impervious areas are treated by pretreatment and treatment BMPs which in total provide a minimum 80% removal of Total Suspended Solids (TSS) as described in Volume 2 of the Handbook. New impervious areas which are not captured are treated through vegetative filtration through existing and natural stormwater conveyances which provide up to 45% TSS removal.

4.2 Standard 2: Peak Rate Attenuation

Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

The post-development peak discharge rates have been attenuated to be less than or equal to the pre-development rates through design of the BMPs (see Table 1.2). A dry detention basin helps to control runoff release from much of the introduced impervious area by collecting and controlling the release rates through low flow orifices and an overflow berm. Runoff volumes under proposed conditions are comparable to existing conditions. The calculated increase in runoff volume during the 100-year storm shown in Table 1.2 is not likely to increase risk of off-site downstream flooding due to the decrease in peak runoff rates under proposed conditions during the 100-year storm event.

4.3 Standard 3: Recharge

Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

The required recharge volume for the Site was calculated as follows:

$$\begin{aligned} &Recharge\ Volume \\ &\quad = 0.25\ in.runoff\ \times total\ impervious\ area\ within\ HSG\ C \\ &\quad + 0.10\ in.runoff\ \times total\ impervious\ area\ within\ HSG\ D \\ &= 0.25\ in.runoff \left({}^{1\ ft}/_{12\ in.}\right) \times 5{,}172 sf\ +\ 0.10\ in.runoff \left({}^{1\ ft}/_{12\ in.}\right) \times 66{,}042\ sf \\ &= 108\ cf\ runoff + 550\ cf\ runoff \\ &= 658\ cf\ runoff \end{aligned}$$

The permeable pavement provides a combined recharge capacity of 3,336 cubic feet, meeting the standard.

The permeable pavement is built over soil classified as HSG C and D which has poor drainage and an assumed conductivity of 0.17 inches per hour according to the 1982 Rawl's Rates referenced in the Handbook.

The Site is comprised solely of HSG soil types C and D, which have limited infiltration capacity. The proposed BMPs have been designed to meet the required recharge and water quality volumes to the maximum extent practicable. The required recharge volume will be infiltrated within 72 hours. However, due to the HSG soil types and conservative infiltration rate assumptions, the permeable pavement void spaces fully drain within 88 hours.

4.4 Standard 4: Water Quality

Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:

a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;

b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and

c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook

The Site does not meet any of the criteria requiring 1.0 inch of runoff; therefore, 0.5 inches of runoff may be used instead.

The required water quality volume for the Site was calculated as follows:

$$Water\ Quality\ Volume = 0.5\ in. runoff\ \times total\ impervious\ area\ of\ the\ post-development\ site$$
$$= 0.5\ in. runoff \left({}^{1\ ft}/_{12\ in.}\right) \times 71{,}214\ sf$$
$$= 2{,}967\ cf\ runoff$$

The permeable pavement has been sized to capture and treat 3,336 cubic feet. The permeable pavement provides 80% removal of TSS of stormwater which fully drains within 88 hours as described in Volume 2 of the Handbook, see Appendix J for TSS removal calculations.

A TMDL does exist for two major watersheds the Site is within as discussed in Section 2.2.1. These TMDLs have been appropriately taken into account when designing the BMPs and the LTPPP provided in Section 2.2. The TMDLs do not have explicit guidance on BMP selection for efficient removal of E. Coli. *Volume 2 Chapter 2: Structural BMP Specifications for the Massachusetts Stormwater Handbook* indicates permeable pavement currently has insufficient data for conclusive results for pathogens.

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

For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

The solar PV development is not considered a land use with higher potential pollutant loads (LUHPPL).

4.6 Standard 6: Critical Areas

Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a

significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

Critical areas protected under the Massachusetts stormwater handbook include the following areas:

- Outstanding Resource Waters (ORWs) as designated in 314 CMR 4.00
- Special Resource Waters (SRWs) as designated in 314 CMR 4.00
- Recharge areas for public water supplies as defined in 310 CMR 22.02 (Zone Is, Zone IIs and Interim Wellhead Protection Areas for groundwater sources and Zone As for surface water sources)
- Bathing beaches as defined in 105 CMR 445.000
- Cold-water fisheries as defined in 310 CMR 10.04 and 314 CMR 9.02
- Shellfish growing areas as defined in 310 CMR 10.04 and 314 CMR 9.02.

Based on a review of MassGIS and Massachusetts Department of Environmental Protection (MassDEP) data and mapping resources:

- There are no ORWs mapped within or near the Site.
- The Site is in the Connecticut River Basin, an area that currently does not have any SRWs.
- The Project will not have any discharges within Zone I, Zone II, IWPA, or Zone A areas.
- There are no bathing beaches within or near the Site
- Ward's Stream (3211175) is a Coldwater Fish Resource. The Project does not include any changes which are likely to reduce the ability of these waters to support cold-water fish reproduction. The Project has been specifically designed to not significantly impact these streams.
- There are no shellfish growing areas within or near the Site.

4.7 Standard 7: Redevelopments

A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

The Project is new development; therefore, this standard does not apply.

4.8 Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

The erosion and sediment control plan narrative is provided in Section 2 and is included in the Issued for Permitting (IFP) plan set which shows the locations of measures to be implemented and visualizations of prevention measures (Appendix F – Issued for Permitting Plan Set).

4.9 Standard 9: Operation and Maintenance Plan

A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

The Operation and Maintenance (O&M) Plan is provided in Section 3.

4.10 Standard 10: Prohibition of Illicit Discharges

All illicit discharges to the stormwater management system are prohibited.

There are no illicit discharges (i.e., wastewater, discharges of substance, oil, or grease) associated with the Project. See Section 2.2 for the long-term pollution prevention plan detailing measures to prevent illicit discharges. An Illicit Discharge Compliance Statement shall be submitted prior to the discharge of any stormwater to post-construction BMPs.



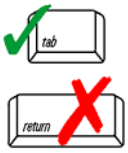
Appendix A – MA DEP Checklist for Stormwater Report

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

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[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



09/25/2026

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☐ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☒ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☒ Other (describe): Crushed stone access drive, permeable pavement, dry detention basin

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☒ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☐ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

☒ Site is comprised solely of C and D soils and/or bedrock at the land surface

☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000

☐ Solid Waste Landfill pursuant to 310 CMR 19.000

☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☐ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☒ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs) Not Applicable

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☒ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable Not Applicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

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

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☒ Description and delineation of public safety features;
- ☒ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

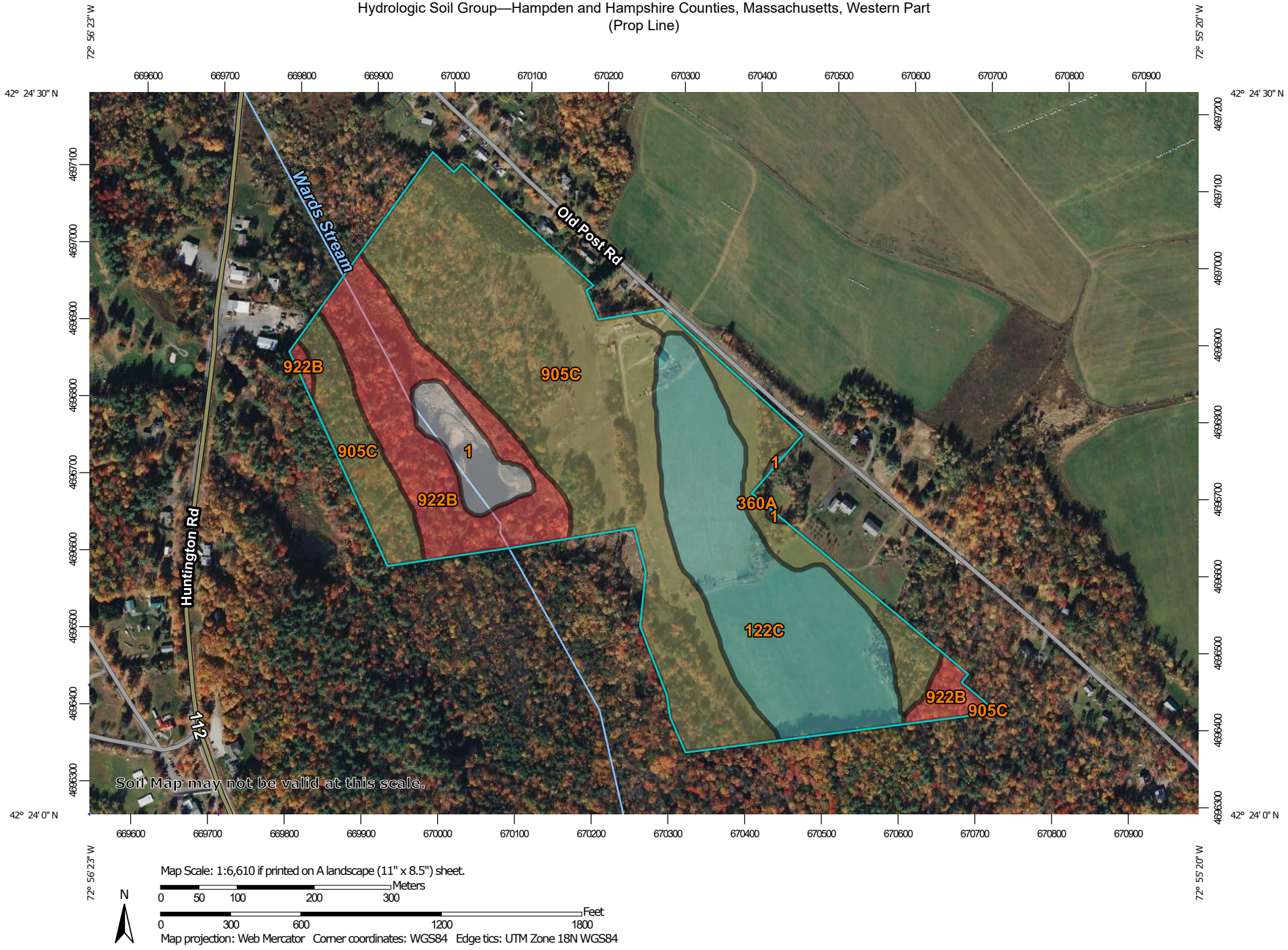
☐ An Illicit Discharge Compliance Statement is attached;

☒ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

Appendix B – Soils Information

USDA NRCS HSG Soil Map

Hydrologic Soil Group—Hampden and Hampshire Counties, Massachusetts, Western Part
(Prop Line)



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: Hampden and Hampshire Counties, Massachusetts, Western Part
Survey Area Data: Version 21, 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: Oct 15, 2020—Oct 31, 2020

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
1	Water		3.0	4.1%
122C	Tunbridge-Lyman complex, 8 to 15 percent slopes, rocky	C	18.0	24.5%
360A	Peru fine sandy loam, 0 to 3 percent slopes	C/D	5.3	7.2%
905C	Peru-Marlow association, 3 to 15 percent slopes, extremely stony	C/D	34.8	47.3%
922B	Pillsbury-Peacham-Wonsqueak association, 0 to 8 percent slopes, extremely stony	D	12.4	16.9%
Totals for Area of Interest			**73.6**	**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

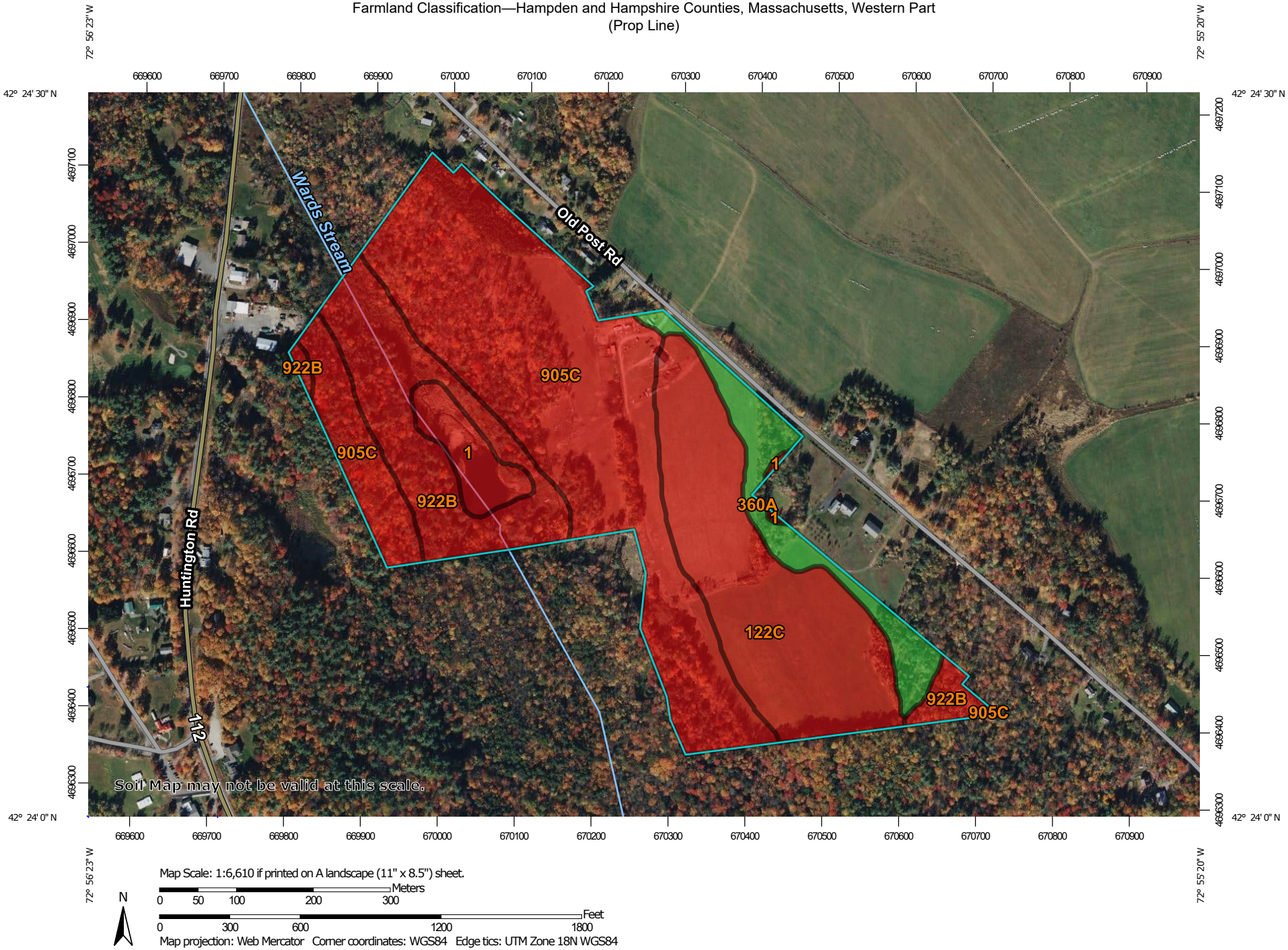
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

USDA NRCS Farmland Classification Map

Farmland Classification—Hampden and Hampshire Counties, Massachusetts, Western Part
(Prop Line)



Map Scale: 1:6,610 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

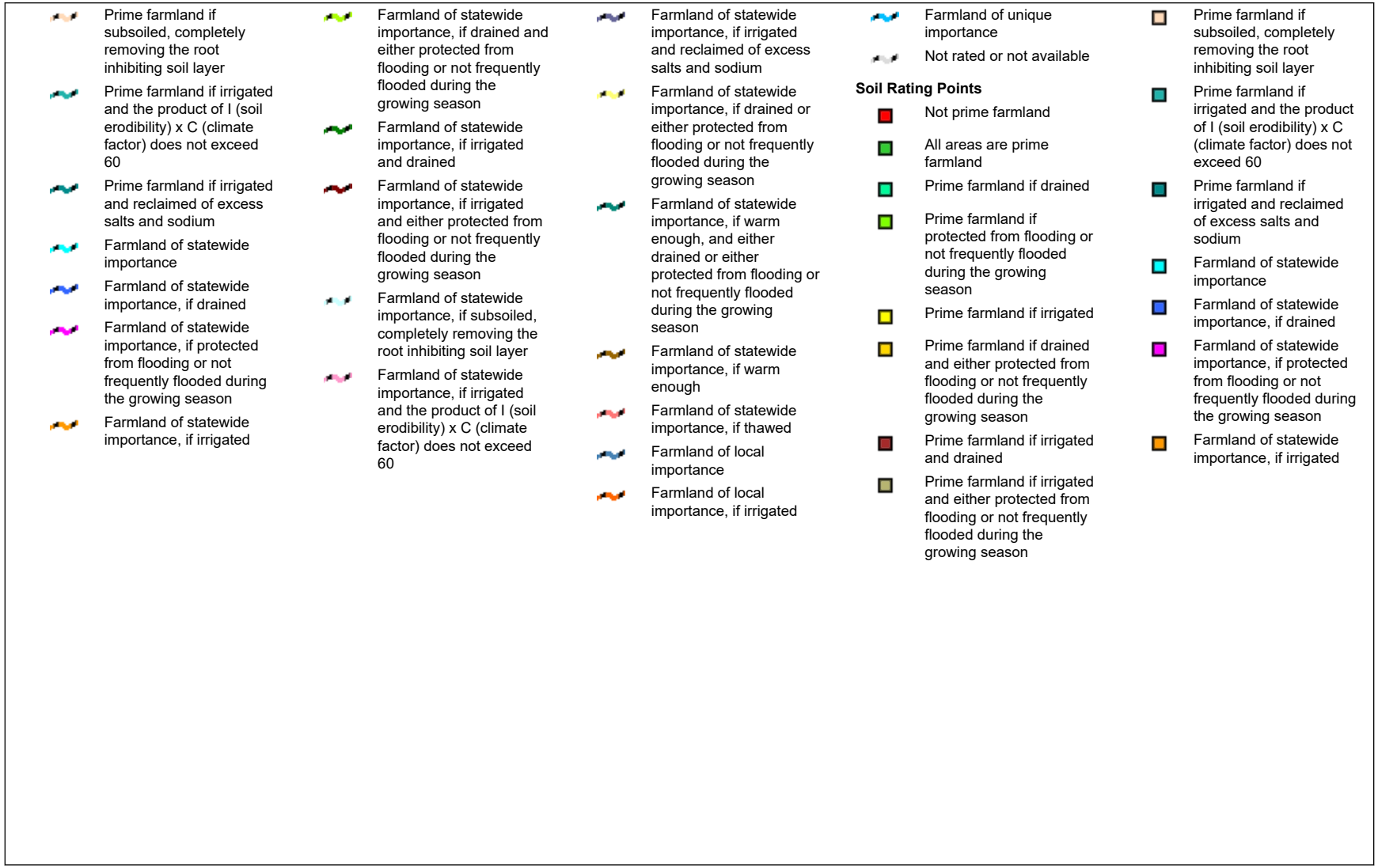
Soils

Soil Rating Polygons

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of statewide importance, if drained
- Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated
- Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated and drained
- Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
- Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough
- Farmland of statewide importance, if thawed
- Farmland of local importance
- Farmland of local importance, if irrigated
- Farmland of unique importance
- Not rated or not available

Soil Rating Lines

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season


Prime farmland if subsoiled, completely removing the root inhibiting soil layer
Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
Prime farmland if irrigated and reclaimed of excess salts and sodium
Farmland of statewide importance
Farmland of statewide importance, if drained
Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if irrigated
Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if irrigated and drained
Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if warm enough
Farmland of statewide importance, if thawed
Farmland of local importance
Farmland of local importance, if irrigated
Farmland of unique importance
Not rated or not available
Soil Rating Points
Not prime farmland
All areas are prime farmland
Prime farmland if drained
Prime farmland if protected from flooding or not frequently flooded during the growing season
Prime farmland if irrigated
Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
Prime farmland if irrigated and drained
Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
Prime farmland if subsoiled, completely removing the root inhibiting soil layer
Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
Prime farmland if irrigated and reclaimed of excess salts and sodium
Farmland of statewide importance
Farmland of statewide importance, if drained
Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if irrigated

- Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated and drained
- Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
- Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough
- Farmland of statewide importance, if thawed
- Farmland of local importance
- Farmland of local importance, if irrigated
- Farmland of unique importance
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

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)

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Soil Survey Area: Hampden and Hampshire Counties, Massachusetts, Western Part
Survey Area Data: Version 21, 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: Oct 15, 2020—Oct 31, 2020

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.

Farmland Classification

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Water	Not prime farmland	3.0	4.1%
122C	Tunbridge-Lyman complex, 8 to 15 percent slopes, rocky	Not prime farmland	18.0	24.5%
360A	Peru fine sandy loam, 0 to 3 percent slopes	All areas are prime farmland	5.3	7.2%
905C	Peru-Marlow association, 3 to 15 percent slopes, extremely stony	Not prime farmland	34.8	47.3%
922B	Pillsbury-Peacham-Wonsqueak association, 0 to 8 percent slopes, extremely stony	Not prime farmland	12.4	16.9%
Totals for Area of Interest			**73.6**	**100.0%**

Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

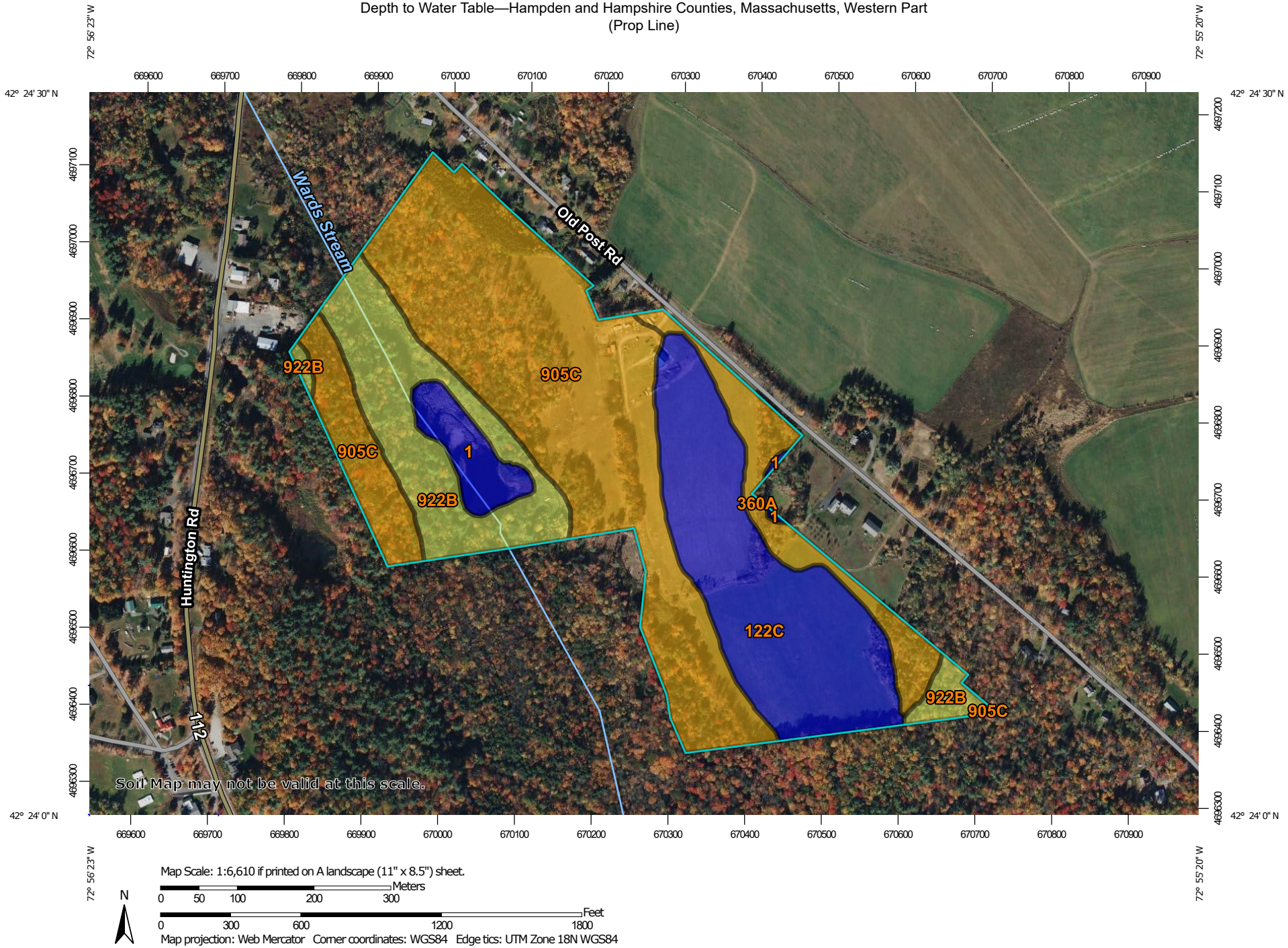
Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

Appendix C – USGS NRCS Depth to Water Table Map

Depth to Water Table—Hampden and Hampshire Counties, Massachusetts, Western Part
(Prop Line)



Map Scale: 1:6,610 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N 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: Hampden and Hampshire Counties, Massachusetts, Western Part
Survey Area Data: Version 21, 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: Oct 15, 2020—Oct 31, 2020

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
1	Water	>200	3.0	4.1%
122C	Tunbridge-Lyman complex, 8 to 15 percent slopes, rocky	>200	18.0	24.5%
360A	Peru fine sandy loam, 0 to 3 percent slopes	46	5.3	7.2%
905C	Peru-Marlow association, 3 to 15 percent slopes, extremely stony	46	34.8	47.3%
922B	Pillsbury-Peacham-Wonsqueak association, 0 to 8 percent slopes, extremely stony	65	12.4	16.9%
Totals for Area of Interest			**73.6**	**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

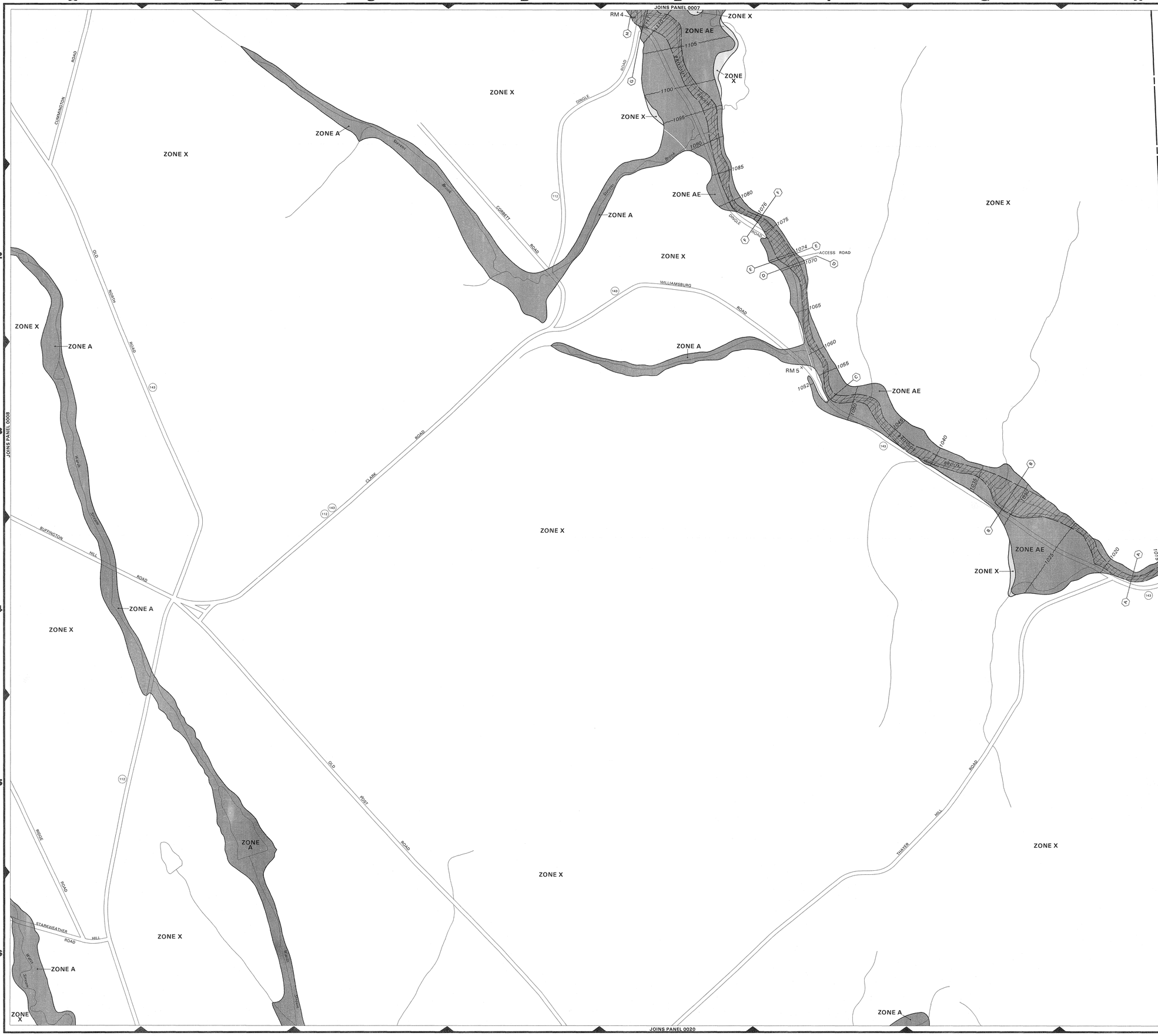
Tie-break Rule: Higher

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

Appendix D – FEMA Map



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

- **ZONE A** No base flood elevations determined.
- **ZONE AE** Base flood elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding; velocities also determined.
- **ZONE A99** To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined.
- **ZONE V** Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- **ZONE VE** Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- **ZONE X** Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside 500-year floodplain.
- **ZONE D** Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Floodplain Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

513 — Base Flood Elevation Line; Elevation in Feet*

D — D — Cross Section Line

(EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone*

RM 7X — Elevation Reference Mark

•M1.5 — River Mile

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for possible updated flood hazard information prior to use of this map for property purchase or construction purposes.

Coastal base flood elevations apply only landward of 0.0 NGVD, and include the effects of wave action; these elevations may also differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

Areas of special flood hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

Elevation reference marks are described in the Flood Insurance Study Report.

For adjoining map panels see separately printed Map Index.

MAP REPOSITORY

Town Clerk's Vault, Town Hall, Huntington Road, Worthington, Massachusetts 01098 (Maps available for reference only, not for distribution).

INITIAL IDENTIFICATION:
JUNE 28, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:
APRIL 9, 1976

FLOOD INSURANCE RATE MAP EFFECTIVE:
JUNE 19, 1989

FLOOD INSURANCE RATE MAP REVISIONS:

Refer to the Flood Insurance Rate Map Effective date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

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

APPROXIMATE SCALE
400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
WORTHINGTON, MASSACHUSETTS
HAMPSHIRE COUNTY

PANEL 9 OF 25
(SEE MAP INDEX FOR PANELS NOT PRINTED)

PANEL LOCATION

COMMUNITY-PANEL NUMBER
250175 0009 B

EFFECTIVE DATE:
JUNE 19, 1989

Federal Emergency Management Agency

Appendix E – Rainfall Data

NOAA Atlas 14, Volume 10, Version 3
Location name: Worthington, Massachusetts, USA*
Latitude: 42.4054°, Longitude: -72.9308°
Elevation: 1463 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	**0.322** (0.249-0.410)	**0.376** (0.290-0.479)	**0.463** (0.356-0.593)	**0.536** (0.410-0.689)	**0.635** (0.471-0.850)	**0.711** (0.517-0.971)	**0.789** (0.556-1.12)	**0.874** (0.588-1.27)	**0.992** (0.643-1.49)	**1.09** (0.688-1.67)
10-min	**0.457** (0.353-0.581)	**0.532** (0.411-0.678)	**0.656** (0.505-0.838)	**0.758** (0.581-0.974)	**0.900** (0.668-1.20)	**1.01** (0.732-1.38)	**1.12** (0.788-1.58)	**1.24** (0.832-1.80)	**1.41** (0.910-2.12)	**1.54** (0.974-2.37)
15-min	**0.537** (0.415-0.684)	**0.626** (0.484-0.798)	**0.772** (0.594-0.987)	**0.893** (0.683-1.15)	**1.06** (0.785-1.42)	**1.18** (0.861-1.62)	**1.32** (0.927-1.86)	**1.46** (0.980-2.12)	**1.65** (1.07-2.49)	**1.81** (1.15-2.78)
30-min	**0.767** (0.593-0.976)	**0.890** (0.687-1.13)	**1.09** (0.840-1.39)	**1.26** (0.964-1.62)	**1.49** (1.10-1.99)	**1.66** (1.21-2.26)	**1.84** (1.29-2.59)	**2.03** (1.36-2.95)	**2.28** (1.48-3.44)	**2.48** (1.57-3.82)
60-min	**0.996** (0.770-1.27)	**1.15** (0.891-1.47)	**1.41** (1.08-1.80)	**1.62** (1.24-2.08)	**1.92** (1.42-2.56)	**2.14** (1.55-2.91)	**2.37** (1.66-3.33)	**2.60** (1.75-3.78)	**2.91** (1.89-4.38)	**3.15** (2.00-4.85)
2-hr	**1.28** (0.999-1.62)	**1.49** (1.16-1.88)	**1.82** (1.41-2.31)	**2.09** (1.61-2.67)	**2.47** (1.84-3.28)	**2.75** (2.01-3.74)	**3.05** (2.16-4.28)	**3.37** (2.27-4.86)	**3.81** (2.48-5.70)	**4.17** (2.65-6.37)
3-hr	**1.47** (1.15-1.86)	**1.71** (1.34-2.16)	**2.10** (1.64-2.66)	**2.43** (1.88-3.09)	**2.88** (2.15-3.82)	**3.21** (2.36-4.36)	**3.56** (2.54-5.01)	**3.96** (2.68-5.70)	**4.52** (2.95-6.74)	**4.99** (3.17-7.59)
6-hr	**1.84** (1.44-2.30)	**2.17** (1.70-2.72)	**2.71** (2.12-3.41)	**3.16** (2.46-4.00)	**3.79** (2.86-5.01)	**4.25** (3.14-5.75)	**4.74** (3.42-6.67)	**5.32** (3.61-7.62)	**6.18** (4.04-9.17)	**6.91** (4.41-10.4)
12-hr	**2.24** (1.77-2.79)	**2.71** (2.14-3.37)	**3.48** (2.73-4.34)	**4.11** (3.21-5.16)	**4.98** (3.78-6.57)	**5.63** (4.19-7.59)	**6.33** (4.60-8.90)	**7.17** (4.88-10.2)	**8.45** (5.54-12.5)	**9.55** (6.11-14.4)
24-hr	**2.66** (2.12-3.28)	**3.28** (2.60-4.05)	**4.29** (3.39-5.32)	**5.12** (4.03-6.39)	**6.28** (4.80-8.24)	**7.12** (5.34-9.58)	**8.05** (5.90-11.3)	**9.20** (6.28-13.0)	**11.0** (7.21-16.1)	**12.5** (8.04-18.7)
2-day	**3.07** (2.46-3.77)	**3.83** (3.06-4.70)	**5.07** (4.03-6.24)	**6.09** (4.82-7.55)	**7.51** (5.78-9.81)	**8.54** (6.46-11.5)	**9.68** (7.16-13.6)	**11.1** (7.63-15.7)	**13.4** (8.86-19.6)	**15.5** (9.96-22.9)
3-day	**3.37** (2.70-4.12)	**4.20** (3.37-5.14)	**5.57** (4.45-6.84)	**6.71** (5.33-8.28)	**8.27** (6.39-10.8)	**9.41** (7.14-12.6)	**10.7** (7.93-15.0)	**12.3** (8.45-17.3)	**14.9** (9.85-21.6)	**17.2** (11.1-25.5)
4-day	**3.63** (2.92-4.42)	**4.52** (3.64-5.52)	**5.98** (4.79-7.32)	**7.19** (5.73-8.85)	**8.86** (6.86-11.5)	**10.1** (7.67-13.4)	**11.4** (8.51-16.0)	**13.2** (9.06-18.4)	**16.0** (10.6-23.1)	**18.5** (11.9-27.2)
7-day	**4.37** (3.54-5.30)	**5.37** (4.34-6.51)	**7.00** (5.64-8.52)	**8.35** (6.68-10.2)	**10.2** (7.94-13.2)	**11.6** (8.83-15.3)	**13.1** (9.75-18.1)	**15.0** (10.4-20.9)	**18.0** (12.0-26.0)	**20.7** (13.4-30.3)
10-day	**5.12** (4.15-6.18)	**6.16** (5.00-7.45)	**7.87** (6.36-9.55)	**9.29** (7.46-11.3)	**11.2** (8.75-14.4)	**12.7** (9.68-16.7)	**14.3** (10.6-19.6)	**16.2** (11.2-22.4)	**19.3** (12.8-27.6)	**21.9** (14.2-32.0)
20-day	**7.42** (6.06-8.89)	**8.50** (6.94-10.2)	**10.3** (8.36-12.4)	**11.8** (9.50-14.3)	**13.8** (10.8-17.5)	**15.3** (11.7-19.8)	**16.9** (12.5-22.8)	**18.8** (13.1-25.8)	**21.6** (14.4-30.7)	**23.9** (15.5-34.7)
30-day	**9.32** (7.64-11.1)	**10.4** (8.55-12.5)	**12.3** (10.0-14.7)	**13.8** (11.2-16.6)	**15.9** (12.4-19.9)	**17.5** (13.3-22.4)	**19.1** (14.1-25.4)	**20.9** (14.6-28.5)	**23.4** (15.7-33.1)	**25.4** (16.6-36.7)
45-day	**11.6** (9.58-13.8)	**12.8** (10.5-15.3)	**14.8** (12.1-17.7)	**16.4** (13.3-19.7)	**18.6** (14.6-23.2)	**20.3** (15.5-25.8)	**22.1** (16.2-28.9)	**23.8** (16.7-32.3)	**26.0** (17.5-36.6)	**27.7** (18.1-39.9)
60-day	**13.5** (11.2-16.1)	**14.8** (12.2-17.6)	**16.9** (13.9-20.2)	**18.7** (15.2-22.4)	**21.0** (16.5-26.1)	**22.9** (17.5-28.9)	**24.7** (18.1-32.1)	**26.4** (18.6-35.8)	**28.5** (19.2-40.0)	**30.0** (19.6-43.0)

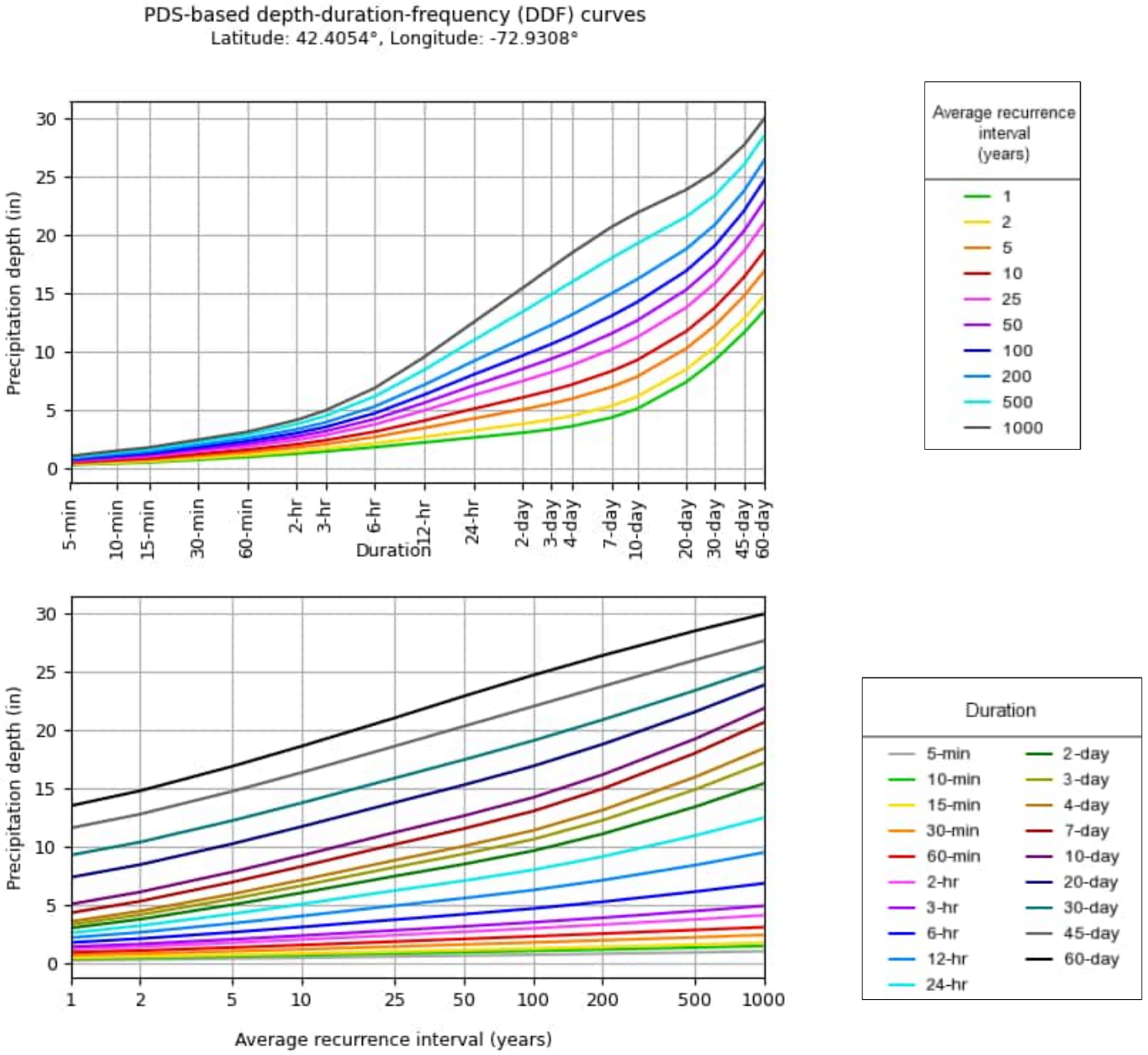
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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



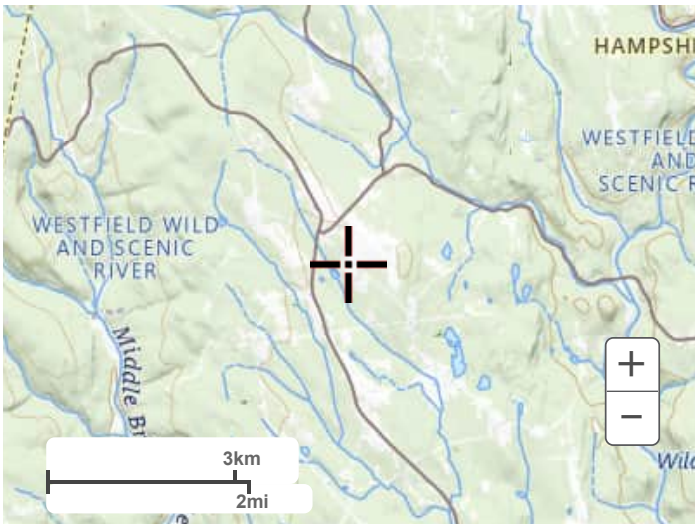
NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Mon Oct 13 17:14:33 2025

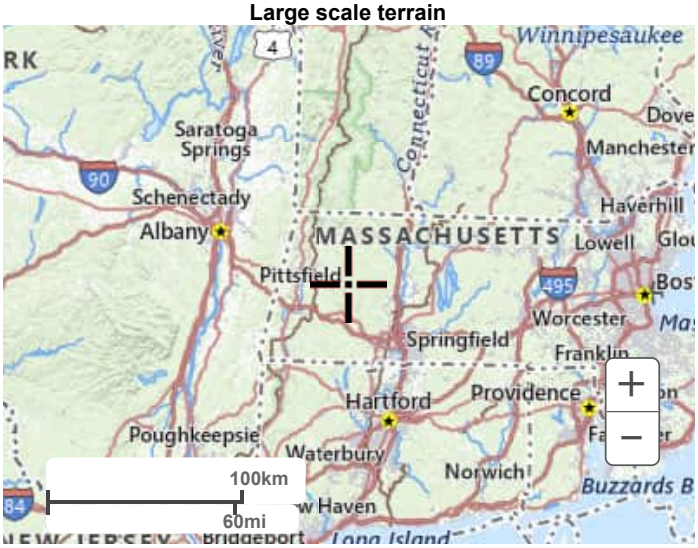
Back to Top

Maps & aerials

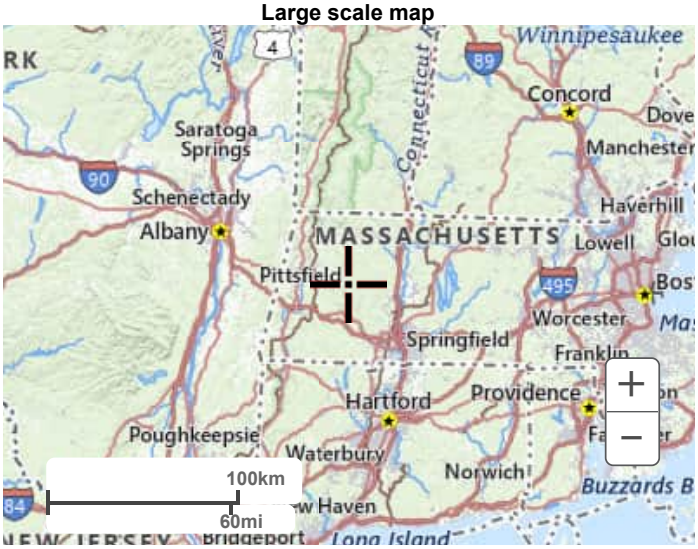
Small scale terrain



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

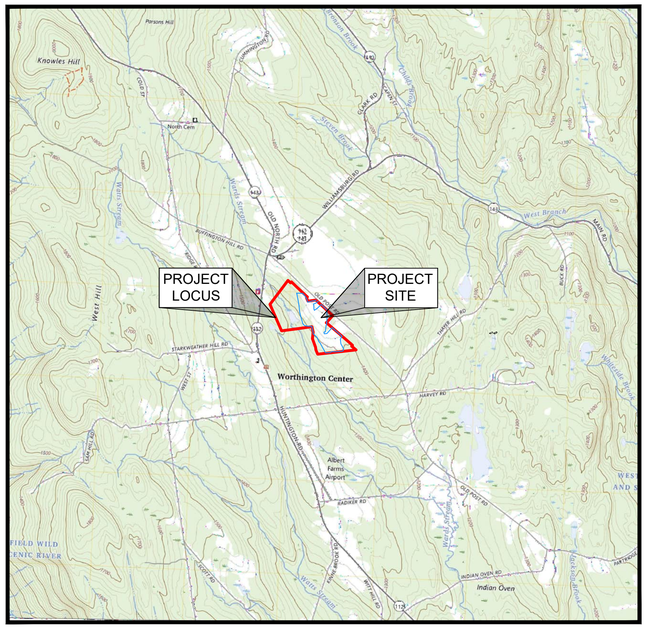
Disclaimer

Appendix F – Issued for Permitting Plan Set

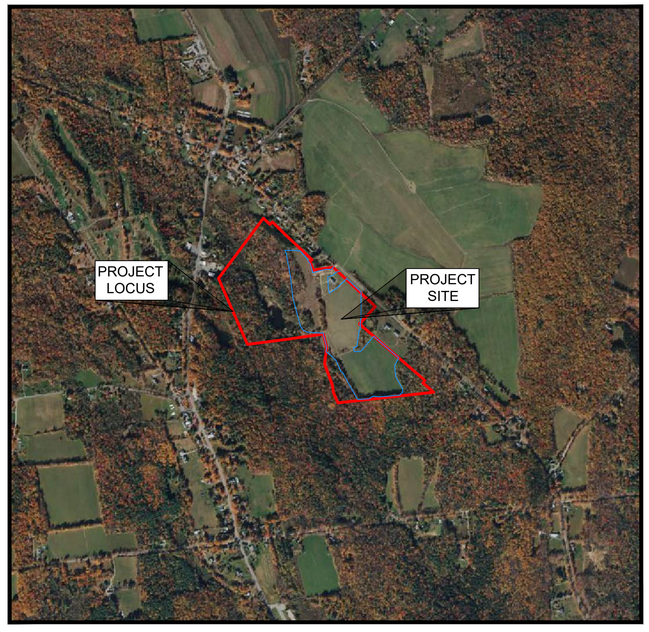
PROPRIETARY INFORMATION: THIS DRAWING IS THE PROPERTY OF WSP USA INC. AND IS NOT TO BE LOANED OR REPRODUCED IN ANY WAY WITHOUT THE PERMISSION OF WSP USA INC.

WARD STREAM, LLC

3 MW AC GROUND-MOUNT SOLAR PV DEVELOPMENT
105 OLD POST ROAD
WORTHINGTON, MA 01098
JANUARY 14, 2026
LAST REVISED SEPTEMBER 25, 2026
ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION



LOCUS MAP
1"=2500'



AERIAL IMAGE
1"=1000'

DRAWING INDEX

SHEET NUMBER	DRAWING TITLE	DRAWING NUMBER
	COVER SHEET	
1	CONSTRUCTION, EROSION AND SEDIMENTATION CONTROL NOTES	G-001
2	EXISTING CONDITIONS	V-101
3	DEMOLITION, GRADING, AND TREE CLEARING PLAN	C-101
4	PROPOSED CONDITIONS (OVERALL LAYOUT)	C-102
5	PROPOSED CONDITIONS (ENLARGED LAYOUT SHEET 1 OF 2)	C-103
6	PROPOSED CONDITIONS (ENLARGED LAYOUT SHEET 2 OF 2)	C-104
7	ACCESS ROAD TOPOGRAPHIC PROFILE ANALYSIS	C-105
8	SHADOW ANALYSIS OF PROPOSED CONDITIONS	C-106
9	DETAILS (SHEET 1 OF 2)	C-501
10	DETAILS (SHEET 2 OF 2)	C-502

DEVELOPED BY

WARD STREAM, LLC

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ASSETMGMT@BLUEWAVE.ENERGY

SITE PLAN REVIEW BY

TOWN OF WORTHINGTON
PLANNING BOARD
PO BOX 247; 160 HUNTINGTON ROAD
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T +1 413-238-5577
PLANNING@WORTHINGTONMA.US

PREPARED BY

COMMONWEALTH OF MASSACHUSETTS
OLIVIA CROSBY
CIVIL
No. 54915
PROFESSIONAL ENGINEER

09/25/2026

WSP USA INC.
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T +1 978-692-9090
OLIVIA.CROSBY@WSP.COM

PROPERTY OWNER

THOMAS L. BRISSON JR.
105 OLD POST ROAD
WORTHINGTON, MA 01098

D:\BlueWave\US-EI-3562230437 - Old Post Rd Worthington\7.1 Permitting\Sheets\0 - Old Post Rd - G-000.dwg - G-000 - Sep. 24, 2026 3:23pm - USKS140856

MATERIAL SPECIFICATIONS AND PLACEMENT REQUIREMENTS:

1.1 ANGULAR ROCK FILL

ANGULAR ROCK FILL SHALL BE USED FOR THE CONSTRUCTION ENTRANCE AS SHOWN ON THE DRAWINGS, AND SHALL MEET THE GRADATION REQUIREMENTS LISTED BELOW.

U.S. STANDARD SIEVE	PERCENT PASSING
3 INCH	100
2 INCH	80 - 100
1 INCH	50 - 80
NO. 200	0 - 10

PRIOR TO USE, THE ANGULAR ROCK FILL SHALL BE TESTED FOR APPROVAL AS DESCRIBED IN SECTION 2.0 AND SHALL BE PLACED AS DESCRIBED IN SECTION 3.0.

1.2 DENSE GRADED CRUSHED STONE

DENSE GRADED CRUSHED STONE SHALL BE USED TO CONSTRUCT THE CRUSHED STONE ACCESS ROAD, AND SHALL MEET THE REQUIREMENTS OF A MATERIAL SUCH AS MASSDOT SPECIFICATION M2.01.7 CRUSHED STONE, OR APPROVED EQUAL. THIS MATERIAL SHALL BE PLACED AT A MINIMUM THICKNESS OF 6-INCHES AND SHALL BE IN DIRECT CONTACT WITH THE BALLAST BLOCKS. THIS MATERIAL SHALL CONSIST OF CLEAN, HARD, DURABLE CRUSHED ROCK OR CRUSHED GRAVEL STONE, FREE FROM LOAM AND CLAY AND DELETERIOUS MATERIAL AND NO MORE THAN 10 PERCENT PASSING THE U.S. NO. 200 SIEVE. THIS MATERIAL SHALL MEET THE FOLLOWING GRADATION:

SIEVE DESIGNATION	PERCENT PASSING
2-INCH	100
1.5-INCH	70-100
¾-INCH	50-85
NO. 4	30-55
NO. 50	8-24
NO. 200	3-10

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

1.3 GRANULAR FILL MATERIAL

CLEAN GRANULAR FILL MAY BE USED FOR FILL OR GRADING MATERIAL. GRANULAR FILL SHALL CONSIST OF MASSDOT MATERIAL M1.03.0, GRAVEL BORROW, TYPE C, OR APPROVED EQUAL, AND MEET THE FOLLOWING GRADATION:

SIEVE DESIGNATION	PERCENT PASSING
2-INCH	100
½-INCH	50-85
NO. 4	40-75
NO. 50	8-28
NO. 200	0-10

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

1.4 LOAM BORROW MATERIAL

THE LOAM BORROW SHALL CONFORM TO MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, DIVISION III - MATERIALS SPECIFICATIONS, SECTION M1.05.0 "LOAM BORROW". THE LOAM SHALL CONTAIN NOT LESS THAN 4% NOR MORE THAN 20% ORGANIC MATTER.

1.5 GEOTEXTILE FABRIC

FIBERS USED IN MANUFACTURING OF THE GEOTEXTILES SHALL CONSIST OF POLYPROPYLENE, POLYVINYL CHLORIDE, NYLON, POLYOLEFINS, POLYAMIDES, OR POLYESTER. THE FIBERS SHALL BE FORMED INTO A NETWORK SUCH THAT THE FILAMENTS OR YARNS RETAIN DIMENSIONAL STABILITY RELATIVE TO EACH OTHER, INCLUDING SELVAGES. THE GEOTEXTILE SHALL CONTAIN STABILIZERS AND/OR INHIBITORS TO MAKE THE FIBERS RESISTANT TO DETERIORATION RESULTING FROM EXPOSURE TO SUNLIGHT, WATER, OR HEAT. THE GEOTEXTILE SHALL BE FREE OF DEFECTS OR FLAWS WHICH WILL AFFECT ITS PHYSICAL PROPERTIES. PROVIDE A GEOTEXTILE MEETING THE PROPERTIES LISTED IN TABLE 1:

TABLE 1

REQUIRED PHYSICAL PROPERTIES OF GEOTEXTILE FABRIC

PROPERTY	TEST METHOD	NON-WOVEN	WOVEN
MASS PER UNIT AREA	D 5261	6	N/A
GRAB TENSILE STRENGTH (LBS)	D 4632	170	N/A
TENSILE STRENGTH (LBS/FT)	D 4595	N/A	7200
ELONGATION (%)	D 4632	50	N/A
PUNCTURE STRENGTH (LBS)	D 6241	435	N/A
TRAPEZOID TEAR (LBS)	D 4533	70	N/A
PERMITTIVITY (SEC^{-1})	D 4491	1.50	0.90
WATER FLOW RATE (GPM/FT^2)	D 4491	110	65
ULTRAVIOLET STABILITY (% FOR MIN 500 HRS)	D 4355	70	80
APPARENT OPENING SIZE (AOS) (STANDARD SIEVE)	D 4751	70	20

TABLE NOTES:

1. ALL NUMERICAL VALUES EXCEPT AOS AND ULTRAVIOLET STABILITY REPRESENT MINIMUM AVERAGE ROLL VALUES (MARV), IN THE WEAKER PRINCIPAL DIRECTION.
2. AOS VALUE IS A MAXIMUM AVERAGE ROLL VALUE OR MAXARV.
3. ULTRAVIOLET STABILITY IS MEASURED AS A MINIMUM AVERAGE PERCENTAGE.
4. SEE DETAILS ON DRAWING C-501 FOR LOCATIONS OF WOVEN AND NON-WOVEN GEOTEXTILES.

2.0 BORROW SOURCE TESTING REQUIREMENTS

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

3.0 MATERIAL PLACEMENT AND FIELD QUALITY CONTROL REQUIREMENTS

1. FILL MATERIAL SHALL NOT BE PLACED ON SURFACES THAT ARE MUDDY, FROZEN, OR CONTAIN FROST OR ICE.
2. SURFACES ON WHICH THE GEOTEXTILE WILL BE PLACED SHALL BE PREPARED TO A RELATIVELY SMOOTH SURFACE CONDITION. SURFACES SHALL BE FREE FROM OBSTRUCTION, DEBRIS, DEPRESSIONS, EROSION FEATURE, OR VEGETATION. ANY IRREGULARITIES SHALL BE REMOVED SO AS TO ENSURE CONTINUOUS, INTIMATE CONTACT OF THE GEOTEXTILE WITH THE SURFACE. ANY LOOSE MATERIAL, OR SOFT OR LOW DENSITY POCKETS OF MATERIAL, SHALL BE REMOVED, FILLED WITH SUITABLE SUBGRADE FILL, AND COMPACTED. EROSION FEATURES SUCH AS RILLS AND GULLIES MUST BE GRADED OUT OF THE SURFACE BEFORE GEOTEXTILE PLACEMENT.
3. AT THE TIME OF INSTALLATION, FABRIC SHALL BE REJECTED IF IT HAS DEFECTS, RIPS, HOLES, FLAWS, DETERIORATION OR DAMAGE INCURRED DURING MANUFACTURE, TRANSPORT OR STORAGE.
4. FABRIC SHALL LAY SMOOTH AND BE FREE OF TENSION, STRESS, FOLDS, WRINKLES, OR CREASES.
5. CRUSHED STONE FOR ACCESS ROADS SHALL BE PLACED IN MAXIMUM 6-INCH LOOSE LIFTS AND COMPACTED TO A MINIMUM OF 95% OF MAXIMUM DRY DENSITY (MODIFIED PROCTOR (ASTM D 1557)).
6. LOAM BORROW FOR STORMWATER INFILTRATION BEST MANAGEMENT PRACTICES (BMPS) SHALL BE PLACED IN MAXIMUM 6-INCH LOOSE LIFTS AND COMPACTED TO A MINIMUM OF 92% OF MAXIMUM DRY DENSITY (MODIFIED PROCTOR (ASTM D 1557)).

CONCEPTUAL CONSTRUCTION SEQUENCE:

1. ESTABLISHMENT OF LIMITS OF WORK;
2. PLACEMENT OF EROSION CONTROLS;
3. MINOR CLEARING AND GRUBBING AND SITE GRADING;
4. CONSTRUCTION OF ACCESS ROAD;
5. CONSTRUCTION OF THE SOLAR ARRAY AND APPURTENANT EQUIPMENT;
4. RESTORATION OF DISTURBED AREAS;
5. CONSTRUCTION OF STORMWATER INFILTRATION BMPS;
6. ERECTION OF THE PERIMETER FENCE; AND
7. FINAL STABILIZATION OF DISTURBED AREAS.

EROSION AND SEDIMENTATION CONTROL PLAN:

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

THIS PLAN IS BASED ON STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION IN DEVELOPING AREAS AS CONTAINED IN MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS, 2003.

GENERAL EROSION AND SEDIMENTATION CONSTRUCTION DETAIL NOTES:

DURING CONSTRUCTION, THE CONTRACTOR SHALL TAKE ALL REASONABLE MEASURES TO SCHEDULE EARTHWORK OPERATIONS SUCH THAT THE AREA OF EXPOSED AND DISTURBED SOIL IS MINIMIZED. CONSTRUCTION SHALL BE PHASED TO MINIMIZE THE AREA OF DISTURBED SOIL THAT IS EXPOSED AT ANY ONE TIME. UPGRADIENT STORM WATER DIVERSION AND DISPERSION MEASURES SHALL BE INSTALLED WHERE APPROPRIATE. ALL CUT AND FILL SLOPES SHALL BE STABILIZED UPON COMPLETION. THE FOLLOWING MEASURES WILL BE UNDERTAKEN TO PROVIDE MAXIMUM PROTECTION TO THE SOIL, WATER, AND ABUTTING LANDS:

PRIOR TO GRUBBING OR ANY EARTH MOVING OPERATION, SEDIMENT BARRIERS, OR OTHER APPROPRIATE PERIMETER CONTROL BMPS SHALL BE INSTALLED ACROSS THE SLOPE ON THE CONTOUR AT THE DOWNHILL LIMIT OF THE WORK AS PROTECTION AGAINST CONSTRUCTION RELATED EROSION. INSTALL ALL NECESSARY STORMWATER DIVERSIONS AND DISPERSION MEASURES.

1. PERMANENT SOIL STABILIZATION MEASURES FOR ALL SLOPES, OR ANY DISTURBED LAND AREA SHALL BE COMPLETED WITHIN FOURTEEN CALENDAR DAYS AFTER FINAL GRADING HAS BEEN COMPLETED. WHEN IT IS NOT POSSIBLE OR PRACTICAL TO PERMANENTLY STABILIZE DISTURBED LAND, TEMPORARY EROSION CONTROL MEASURES SHALL BE IMPLEMENTED ON DISTURBED AREAS (INCLUDING STOCKPILES) WITHIN FOURTEEN CALENDAR DAYS OF EXPOSURE OF SOIL OR FORMATION OF PILES, UNLESS THESE AREAS ARE TO BE SUBSEQUENTLY SURFACED WITH PERMANENT STRUCTURES. ALL DISTURBED AREAS SHALL BE MULCHED FOR EROSION CONTROL UPON COMPLETION OF ROUGH GRADING.
2. ANY EXPOSED SLOPES 3:1 OR GREATER SHALL BE STABILIZED WITH EROSION CONTROL BLANKETS (NORTH AMERICAN GREEN C125BN OR APPROVED EQUAL) TO PREVENT EROSION DURING CONSTRUCTION AND TO FACILITATE REVEGETATION AFTER TOPSOILING AND SEEDING.
3. EXISTING TOPSOIL SHALL BE SAVED, STOCKPILED, AND REUSED AS MUCH AS POSSIBLE ON SITE. SEDIMENT BARRIER SHALL BE INSTALLED AT THE BASE OF STOCKPILES AT THE DOWNHILL LIMIT TO PROTECT AGAINST EROSION. STOCKPILES ANTICIPATED TO REMAIN FOR MORE THAN 14 CALENDAR DAYS SHALL BE STABILIZED BY SEEDING AND MULCHING UPON FORMATION OF THE PILES. UPGRADIENT OF THE STOCKPILES, STABILIZED DITCHES AND/OR BERMS SHALL BE CONSTRUCTED TO DIVERT STORMWATER RUNOFF AWAY FROM THE PILES.
4. INTERCEPTED SEDIMENT SHALL BE REMOVED WHEN IT REACHES ONE-HALF THE HEIGHT OF THE SEDIMENT BARRIER, OR AS DIRECTED IN THE DRAWING DETAILS FOR OTHER BMPS, AND SHALL BE DEPOSITED IN AN AREA THAT SHALL NOT CONTRIBUTE TO SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED. ALL DAMAGED EROSION CONTROL DEVICES SHALL BE REPAIRED AND/OR REPLACED IMMEDIATELY. DEVICES NO LONGER SERVICEABLE DUE TO SEDIMENT ACCUMULATION SHALL ALSO BE REPAIRED AND/OR REPLACED AS REQUIRED.
5. ADDITIONAL EROSION CONTROL METHODS SHALL BE IMPLEMENTED IF CONSTRUCTION OCCURS BETWEEN NOVEMBER 1ST AND APRIL 15TH. ALL DISTURBED AREAS SHALL BE MINIMIZED TO THE EXTENT POSSIBLE. PRIOR TO FREEZING, ADDITIONAL EROSION CONTROL DEVICES SHALL BE INSTALLED AS APPROPRIATE. INSPECTION OF THESE EROSION CONTROL ITEMS SHALL BE FREQUENT, WITH PARTICULAR ATTENTION PAID TO WEATHER PREDICTIONS TO ENSURE THAT THESE MEASURES ARE PROPERLY IN PLACE TO HANDLE LARGE QUANTITIES OF RUNOFF RESULTING FROM HEAVY RAINS OR EXCESSIVE THAWS.
6. GENERAL EROSION AND SEDIMENTATION CONTROL ACTIONS SHALL BE EMPLOYED, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   - MARK SOIL DISTURBANCE LIMITS
   - INSTALL SEDIMENT BARRIERS BEFORE DISTURBING ANY SOILS
   - DIVERT AND DISPERSE STORM WATER RUNOFF TO UNDISTURBED AREAS WHEREVER POSSIBLE
   - MULCH DISTURBED AREAS
   - PROTECT STEEP SLOPES
   - INSPECT AND REPAIR EROSION CONTROLS AND SEDIMENT BARRIERS

DUST CONTROL:

1. CONSTRUCTION ACTIVITIES SHALL BE SCHEDULED TO MINIMIZE THE AREA OF DISTURBED SOIL THAT IS EXPOSED AT ONE TIME.
2. DUST CONTROL SHALL BE USED 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 BE APPROVED BY THE ENGINEER AND MAY INCLUDE VEGETATIVE COVER, MULCH, SPRINKLING, AND BARRIERS.
5. VEGETATIVE COVER - FOR DISTURBED AREAS NOT SUBJECT TO TRAFFIC, VEGETATION PROVIDES THE MOST PRACTICAL METHOD OF DUST CONTROL.
6. MULCH - WHEN PROPERLY APPLIED, MULCH OFFERS A FAST, EFFECTIVE MEANS OF CONTROLLING DUST. SEE MANUFACTURER'S RECOMMENDATIONS OR THE MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS, 2003 FOR APPLICATION RATES.
7. SPRINKLING - EXPOSED SOILS MAY BE SPRINKLED UNTIL THE SURFACE IS WET. SPRINKLING IS ESPECIALLY EFFECTIVE FOR DUST CONTROL ON HAUL ROADS AND OTHER TRAFFIC ROUTES.
8. STONE - USED TO STABILIZE CONSTRUCTION ROADS.
9. BARRIERS - A BOARD FENCE, WIND FENCE, SEDIMENT FENCE, OR SIMILAR BARRIER CAN CONTROL AIR CURRENTS AND BLOWING SOIL. ALL OF THESE FENCES ARE NORMALLY CONSTRUCTED OF WOOD AND THEY PREVENT EROSION BY OBSTRUCTING THE WIND NEAR THE GROUND AND PREVENTING THE SOIL FROM BLOWING OFFSITE.

MONITORING PROGRAM:

1. EROSION AND SEDIMENTATION CONTROLS SHALL BE INSPECTED AT LEAST ONCE EVERY 7 CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT OF 0.25 INCHES OR GREATER. DAILY RAINFALL SHALL BE MONITORED AND RECORDED BY THE CONTRACTOR. ALL STRUCTURES DAMAGED BY CONSTRUCTION EQUIPMENT, VANDALS, OR THE ELEMENTS SHALL BE REPAIRED OR REPLACED IMMEDIATELY, PRIOR TO CONTINUING THE CONSTRUCTION.
2. FOLLOWING THE FINAL SEEDING, THE SITE SHALL BE INSPECTED IN ACCORDANCE WITH THE SCHEDULE OUTLINED IN #1 ABOVE, TO ENSURE THAT THE VEGETATION HAS BEEN ESTABLISHED (90% COVER ACHIEVED). IN THE EVENT OF ANY UNSATISFACTORY GROWTH, RESEEDING WILL BE CARRIED OUT, WITH FOLLOW-UP INSPECTION.
3. AFTER THE CONSTRUCTION INSPECTOR HAS DETERMINED THAT THE PROJECT AREA HAS BEEN PERMANENTLY STABILIZED (90% COVER HAS BEEN ACHIVED OR NON-VEGETATED MEASURES HAVE BEEN IMPLEMENTED), THE CONTRACTOR SHALL REMOVE ALL SEDIMENT BARRIERS, TEMPORARY SEDIMENTATION CONTROL RISERS AND ANY OTHER TEMPORARY EROSION CONTROL MEASURES.

SEEDING AND REVEGETATION PLAN:

IMMEDIATELY FOLLOWING THE COMPLETION OF TREE CLEARING, ALL DISTURBED AREAS SHALL BE TREATED AS STATED BELOW IN ORDER TO MINIMIZE CONSTRUCTION-PERIOD EROSION.

APPLY SEED/TACKIFIER MIX ACCORDING TO THE FOLLOWING SPECIFICATIONS:

1. SEED: ERNST SEEDS QUICK EROSION CONTROL COVER MIX CONSISTING OF (% BY WEIGHT):
   - 50% LOLIUM MULTIFLORUM (ANNUAL RYEGRASS)
   - 50% LOLIUM PERENNE, 'BIGLEAGUE' (PERENNIAL RYEGRASS, 'BIGLEAGUE')

   1.1. SEEDING RATE: 50 LBS PER ACRE
2. TACKIFIER: GEOPERM BONDED FIBER MATRIX (OR APPROVED EQUAL) APPLIED PER MANUFACTURER SPECIFICATIONS.

UPON COMPLETION OF SITE CONSTRUCTION, ALL AREAS PREVIOUSLY DISTURBED WITHIN THE FENCED AREA SHALL BE TREATED AS STATED BELOW. THESE AREAS WILL BE CLOSELY MONITORED BY THE CONTRACTOR UNTIL SUCH TIME AS A SATISFACTORY GROWTH OF VEGETATION IS ESTABLISHED. SATISFACTORY GROWTH SHALL MEAN A MINIMUM OF 90% OF THE AREA IS VEGETATED WITH VIGOROUS GROWTH.

1. TOPSOIL WILL BE SPREAD OVER ALL DISTURBED AREAS TO BE REVEGETATED AND SHALL BE GRADED TO A UNIFORM DEPTH OF FOUR (4) TO SIX (6) INCHES.
2. APPLY SEED AS DIRECTED BY THE OWNER AND FARMER OF THE LAND TO MAINTAIN HAY PRODUCTION AND RESTORE SITE TO PRE-EXISTING CONDITIONS TO THE MAXIMUM EXTENT PRACTICABLE.
3. SEEDING METHODS MAY BE DRILL SEEDINGS, BROADCASTS AND ROLLED, CULTIPACKED, OR TRACKED WITH A SMALL TRACK PIECE OF CONSTRUCTION EQUIPMENT, OR HYDRO-SEEDING, WITH SUBSEQUENT TRACKING.
4. WATERING MAY BE REQUIRED DURING DRY PERIODS, THE CONTRACTOR MUST CONSULT SEED MANUFACTURER'S INSTRUCTIONS.
5. INSPECT SEEDED AREAS FOR FAILURE AND MAKE NECESSARY REPAIRS AND RESEED IMMEDIATELY.
6. ALL SEDIMENT CONTROL STRUCTURES LOCATED DOWN GRADIENT OF SOILS STABILIZED BY VEGETATIVE MEASURES SHALL REMAIN IN PLACE UNTIL VEGETATION IS ESTABLISHED. ESTABLISHED MEANS A MINIMUM OF 90% OF THE AREA IS VEGETATED WITH VIGOROUS GROWTH.

UPON COMPLETION OF SITE CONSTRUCTION, ALL AREAS PREVIOUSLY DISTURBED OUTSIDE THE FENCED AREA SHALL BE TREATED AS STATED BELOW. THESE AREAS WILL BE CLOSELY MONITORED BY THE CONTRACTOR UNTIL SUCH TIME AS A SATISFACTORY GROWTH OF VEGETATION IS ESTABLISHED. SATISFACTORY GROWTH SHALL MEAN A MINIMUM OF 90% OF THE AREA IS VEGETATED WITH VIGOROUS GROWTH.

1. APPLY SEED AS DIRECTED BELOW:

   (APRIL 1ST THROUGH OCTOBER 1ST)
   - SEED DISTURBED AREAS TO MATCH EXISTING PASTURE MIX OF TIMOTHY HAY, ORCHARDGRASS, AND CLOVERS. CONTRACTOR MUST SUBMIT SEED MIX FOR APPROVAL.
   - APPLY WOOD FIBER MULCH AT A RATE OF 2,000 LBS PER ACRE FOR MAXIMUM MOISTURE RETENTION.
   - SEEDING SHALL HAVE A MINIMUM GERMINATION PERCENTAGE OF 85%.

   (NOVEMBER 1ST THROUGH DECEMBER 15TH)
   - SEED DISTURBED AREAS AT THE RATE OF 3 LBS PER 1,000 SQ. FT. OF WINTER RYE
   - APPLY HAY MULCH AT THE RATE OF 100 LBS PER 1,000 SQ. FT.

   (AFTER DECEMBER 15TH)
   - DO NOT SEED.
   - APPLY HAY MULCH AT THE RATE OF 100 LBS PER 1,000 SQ. FT.
2. SEEDING METHODS MAY BE DRILL SEEDINGS, BROADCASTS AND ROLLED, CULTIPACKED, OR TRACKED WITH A SMALL TRACK PIECE OF CONSTRUCTION EQUIPMENT, OR HYDRO-SEEDING, WITH SUBSEQUENT TRACKING.
3. WATERING MAY BE REQUIRED DURING DRY PERIODS CONSULT SEED MANUFACTURER'S INSTRUCTIONS.
4. INSPECT SEEDED AREAS FOR FAILURE AND MAKE NECESSARY REPAIRS AND RESEED IMMEDIATELY. CONDUCT A FOLLOW-UP SURVEY AFTER ONE YEAR AND RESEED WHERE NECESSARY.
5. ALL SEDIMENT CONTROL STRUCTURES LOCATED DOWN GRADIENT OF SOILS STABILIZED BY VEGETATIVE MEASURES SHALL REMAIN IN PLACE UNTIL VEGETATION IS ESTABLISHED. ESTABLISHED MEANS A MINIMUM OF 70% OF THE AREA IS VEGETATED WITH VIGOROUS GROWTH.

AGRIVOLTAICS SPECIFICS:

1. CONTRACTORS SHALL BE TRAINED IN APPROPRIATE SAFETY MEASURES TO BE FOLLOWED ON SITE WHEN LIVESTOCK ARE PRESENT.
2. REMOVE TOPSOIL IN AREAS OF PROPOSED GRADING TO ACHIEVE REQUIRED RACKING SYSTEM SLOPES. STOCKPILE TOPSOIL SEPERATELY TO AVOID MIXING WITH OTHER SOILS AND INVERTING SOIL LAYERS. LOAM AND SEED DISTURBED AREAS WITH TEMPORARY SEEDING AND INSTALL INTERMEDIATE EROSION CONTROL MEASURES PARALLEL TO THE SLOPES IMMEDIATELY FOLLOWING COMPLETION OF GRADING.
3. TOPSOIL SHALL NOT BE MIXED WITH SUBGRADE MATERIALS. TOPSOIL SHALL NOT BE BURIED. NO TOPSOIL SHALL LEAVE THE SITE. CONTRACTOR SHALL EMPLOY BEST MANAGEMENT PRACTICES TO ENSURE NO INVERSION OF TOPSOIL AND PROVIDE DECOMPACTION FOR FUTURE SOIL PRESERVATION. APPLY NPK FERTILIZER AND LIMESTONE (EQUIVALENT TO 50% CALCIUM PLUS MAGNESIUM OXIDE) AT MANUFACTURER'S RECOMMENDED RATES. CALCITIC LIMESTONE IS ACCEPTABLE AS SOIL MAGNESIUM LEVELS ARE SUFFICIENT. FINE GRADE, LOAM DISTURBED AREAS AS NECESSARY AND SEED SITE FOLLOWING INSTALLATION OF PANELS. DISTURBED AREAS SHALL BE TREATED WITH SUFFICIENT TOPSOIL/LOAM TO PROMOTE VEGETATION GROWTH FOR STABILIZATION IN ACCORDANCE WITH THE NOTES IN THIS PLAN. DISTURBED AREAS SHALL BE RAKED AND SURFACE STONES LARGER THAN 6" SHALL BE REMOVED PRIOR TO PLACEMENT OF SEED.
4. REVEGETATION MEASURES WILL COMMENCE UPON COMPLETION OF CONSTRUCTION EXCEPT AS NOTED. ALL DISTURBED AREAS NOT OTHERWISE STABILIZED SHALL BE GRADED, SMOOTHED, AND PREPARED FOR FINAL SEEDING AS FOLLOWS. COMPACTION SHALL BE TESTED IN SEVERAL PORTIONS OF THE ARRAY AREA. ANY AREAS WHERE COMPACTION EXCEEDS 200 PSI SHALL RECEIVE THE BELOW TREATMENT:

   4.1. INTER-ROW AREAS SHALL BE DECOMPACTED TO A DEPTH OF 12", REMOVING STONES GREATER THAN 3" AND WOOD DEBRIS. ENSURE PROTECTIONS OF BURIED CONDUIT DURING DECOMPACTION.

   4.2. ANY TOPSOIL TO BE PLACED FOR REVEGETATION MEASURES (WHETHER SCREENED ON-SITE OR IMPORTED) SHALL HAVE A SANDY LOAM TEXTURE RELATIVELY FREE OF SUBSOIL MATERIAL, STONES, ROOTS, LUMPS OF SOIL, TREE LIMBS, TRASH OR CONSTRUCTION DEBRIS, AND SHALL BE PLACED TO A DEPTH OF FOUR (4) INCHES ON ALL LOAM AND SEED AREAS OR AS SPECIFIED ON THE DRAWINGS.

   4.3. APPLY FERTILIZER AND/OR LIMESTONE (EQUIVALENT TO 50% CALCIUM PLUS MAGNESIUM OXIDE) AT MANUFACTURER'S RECOMMENDED RATES.

   4.4. THE DESIGN MIXES FOR SEEDING SHALL BE IN ACCORDANCE WITH THE SEED MIX TABLES AS SHOWN IN THIS PLAN. THE SEED MIX SHALL BE INOCULATED WITHIN TWENTY-FOUR (24) HOURS, BEFORE MIXING AND PLANTING, WITH APPROPRIATE INOCULUM FOR EACH VARIETY. (ALTERNATIVE SEED MIXES SHALL BE APPROVED BY THE OWNER AND ENGINEER PRIOR TO CONSTRUCTION).

ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION

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REVISION	DATE	ISSUE / REVISION DESCRIPTION	ISSUED	APPROVED
3	09/25/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	KRS	OAC
2	06/10/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC
1	04/17/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC
0	01/14/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC

PROJECT: 3 MW AC GROUND-MOUNT SOLAR PV DEVELOPMENT
105 OLD POST RD
WORTHINGTON, MA 01098

TITLE: CONSTRUCTION, EROSION, AND SEDIMENTATION CONTROL NOTES

CLIENT: WARD STREAM, LLC

SEAL:

COMMONWEALTH OF MASSACHUSETTS
OLIVIA CROSBY CIVIL No. 54915
PROFESSIONAL ENGINEER
09/25/2026

DESIGNED BY:	DRAWN BY:
OAC	MRB
CHECKED BY:	SCALE:
APV	AS SHOWN

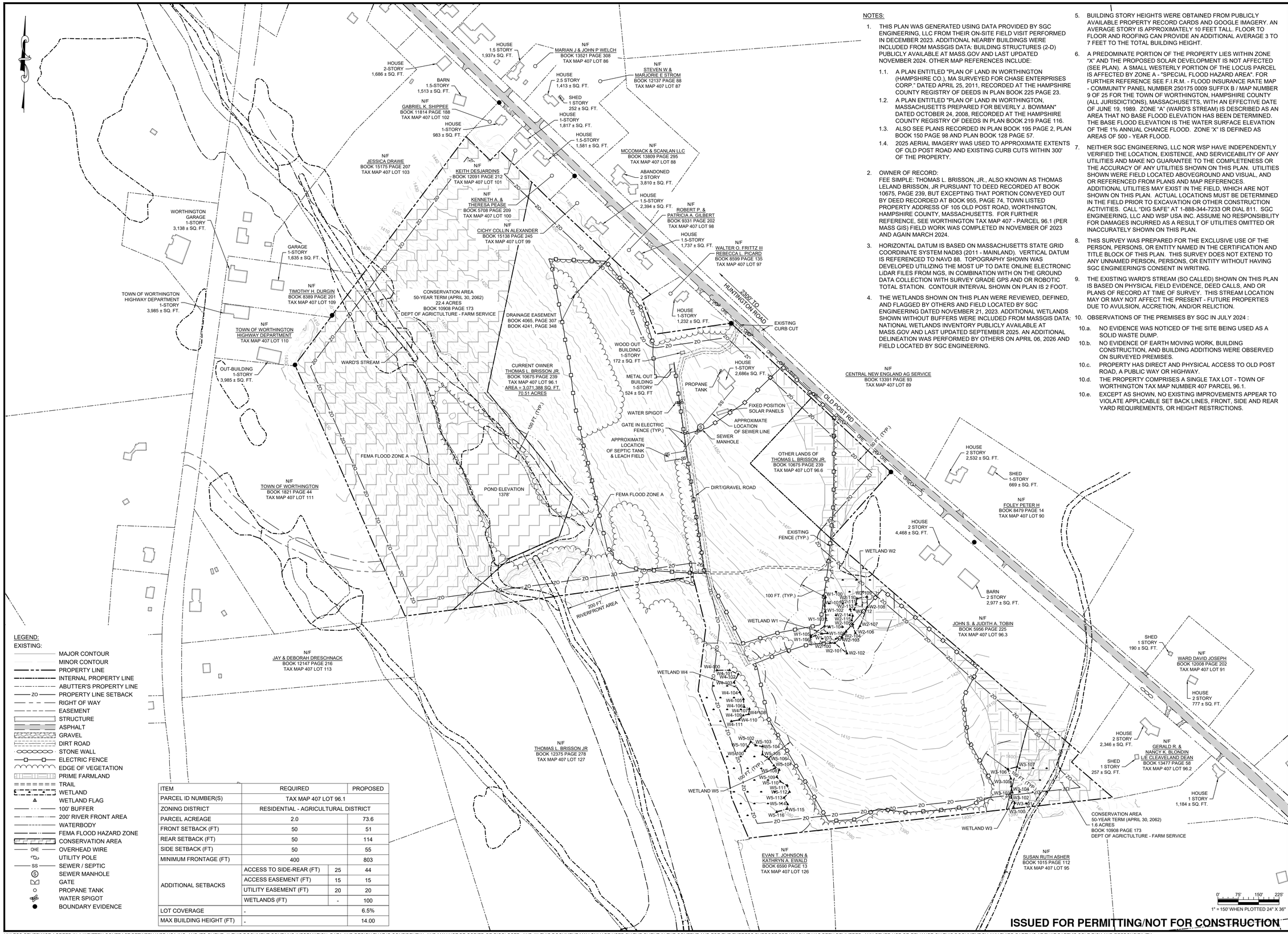
PROJECT NUMBER: US-EI-3652230437

DRAWING NUMBER: G-001

SHEET NUMBER: 1 OF 10

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NOTES:

1. THIS PLAN WAS GENERATED USING DATA PROVIDED BY SGC ENGINEERING, LLC FROM THEIR ON-SITE FIELD VISIT PERFORMED IN DECEMBER 2023. ADDITIONAL NEARBY BUILDINGS WERE INCLUDED FROM MASSGIS DATA: BUILDING STRUCTURES (2-D) PUBLICLY AVAILABLE AT MASS.GOV AND LAST UPDATED NOVEMBER 2024. OTHER MAP REFERENCES INCLUDE:
   - 1.1. A PLAN ENTITLED "PLAN OF LAND IN WORTHINGTON (HAMPSHIRE CO.), MA SURVEYED FOR CHASE ENTERPRISES CORP." DATED APRIL 25, 2011, RECORDED AT THE HAMPSHIRE COUNTY REGISTRY OF DEEDS IN PLAN BOOK 225 PAGE 23.
   - 1.2. A PLAN ENTITLED "PLAN OF LAND IN WORTHINGTON, MASSACHUSETTS PREPARED FOR BEVERLY J. BOWMAN" DATED OCTOBER 24, 2008, RECORDED AT THE HAMPSHIRE COUNTY REGISTRY OF DEEDS IN PLAN BOOK 219 PAGE 116.
   - 1.3. ALSO SEE PLANS RECORDED IN PLAN BOOK 195 PAGE 2, PLAN BOOK 150 PAGE 98 AND PLAN BOOK 128 PAGE 57.
   - 1.4. 2025 AERIAL IMAGERY WAS USED TO APPROXIMATE EXTENTS OF OLD POST ROAD AND EXISTING CURB CUTS WITHIN 300' OF THE PROPERTY.
2. OWNER OF RECORD:
   FEE SIMPLE: THOMAS L. BRISSON, JR., ALSO KNOWN AS THOMAS LELAND BRISSON, JR PURSUANT TO DEED RECORDED AT BOOK 10675, PAGE 239, BUT EXCEPTING THAT PORTION CONVEYED OUT BY DEED RECORDED AT BOOK 955, PAGE 74, TOWN LISTED PROPERTY ADDRESS OF 105 OLD POST ROAD, WORTHINGTON, HAMPSHIRE COUNTY, MASSACHUSETTS. FOR FURTHER REFERENCE, SEE WORTHINGTON TAX MAP 407 - PARCEL 96.1 (PER MASS GIS) FIELD WORK WAS COMPLETED IN NOVEMBER OF 2023 AND AGAIN MARCH 2024.
3. 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 THE MOST UP TO DATE ONLINE ELECTRONIC LiDAR FILES FROM NGS, IN COMBINATION WITH ON THE GROUND DATA COLLECTION WITH SURVEY GRADE GPS AND OR ROBOTIC TOTAL STATION. CONTOUR INTERVAL SHOWN ON PLAN IS 2 FOOT.
4. THE WETLANDS SHOWN ON THIS PLAN WERE REVIEWED, DEFINED, AND FLAGGED BY OTHERS AND FIELD LOCATED BY SGC ENGINEERING DATED NOVEMBER 21, 2023. ADDITIONAL WETLANDS SHOWN WITHOUT BUFFERS WERE INCLUDED FROM MASSGIS DATA: NATIONAL WETLANDS INVENTORY PUBLICLY AVAILABLE AT MASS.GOV AND LAST UPDATED SEPTEMBER 2025. AN ADDITIONAL DELINEATION WAS PERFORMED BY OTHERS ON APRIL 06, 2026 AND FIELD LOCATED BY SGC ENGINEERING.
5. BUILDING STORY HEIGHTS WERE OBTAINED FROM PUBLICLY AVAILABLE PROPERTY RECORD CARDS AND GOOGLE IMAGERY. AN AVERAGE STORY IS APPROXIMATELY 10 FEET TALL. FLOOR TO FLOOR AND ROOFING CAN PROVIDE AN ADDITIONAL AVERAGE 3 TO 7 FEET TO THE TOTAL BUILDING HEIGHT.
6. A PREDOMINATE PORTION OF THE PROPERTY LIES WITHIN ZONE "X" AND THE PROPOSED SOLAR DEVELOPMENT IS NOT AFFECTED (SEE PLAN). A SMALL WESTERLY PORTION OF THE LOCUS PARCEL IS AFFECTED BY ZONE A - "SPECIAL FLOOD HAZARD AREA". FOR FURTHER REFERENCE SEE F.I.R.M. - FLOOD INSURANCE RATE MAP - COMMUNITY PANEL NUMBER 250175 0009 SUFFIX B / MAP NUMBER 9 OF 25 FOR THE TOWN OF WORTHINGTON, HAMPSHIRE COUNTY (ALL JURISDICTIONS), MASSACHUSETTS, WITH AN EFFECTIVE DATE OF JUNE 19, 1989. ZONE "A" (WARD'S STREAM) IS DESCRIBED AS AN AREA THAT NO BASE FLOOD ELEVATION HAS BEEN DETERMINED. THE BASE FLOOD ELEVATION IS THE WATER SURFACE ELEVATION OF THE 1% ANNUAL CHANCE FLOOD. ZONE "X" IS DEFINED AS AREAS OF 500 - YEAR FLOOD.
7. NEITHER SGC ENGINEERING, LLC NOR WSP HAVE INDEPENDENTLY VERIFIED THE LOCATION, EXISTENCE, AND SERVICEABILITY OF ANY UTILITIES AND MAKE NO GUARANTEE TO THE COMPLETENESS OR THE ACCURACY OF ANY UTILITIES SHOWN ON THIS PLAN. UTILITIES SHOWN WERE FIELD LOCATED ABOVEGROUND AND VISUAL, AND OR REFERENCED FROM PLANS AND 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 AND WSP USA INC. ASSUME NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN ON THIS PLAN.
8. 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.
9. THE EXISTING WARD'S STREAM (SO CALLED) SHOWN ON THIS PLAN IS BASED ON PHYSICAL FIELD EVIDENCE, DEED CALLS, AND OR PLANS OF RECORD AT TIME OF SURVEY. THIS STREAM LOCATION MAY OR MAY NOT AFFECT THE PRESENT - FUTURE PROPERTIES DUE TO AVULSION, ACCRETION, AND/OR RELICTION.
10. OBSERVATIONS OF THE PREMISES BY SGC IN JULY 2024 :
    - 10.a. NO EVIDENCE WAS NOTICED OF THE SITE BEING USED AS A SOLID WASTE DUMP.
    - 10.b. NO EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION, AND BUILDING ADDITIONS WERE OBSERVED ON SURVEYED PREMISES.
    - 10.c. PROPERTY HAS DIRECT AND PHYSICAL ACCESS TO OLD POST ROAD, A PUBLIC WAY OR HIGHWAY.
    - 10.d. THE PROPERTY COMPRISES A SINGLE TAX LOT - TOWN OF WORTHINGTON TAX MAP NUMBER 407 PARCEL 96.1.
    - 10.e. EXCEPT AS SHOWN, NO EXISTING IMPROVEMENTS APPEAR TO VIOLATE APPLICABLE SET BACK LINES, FRONT, SIDE AND REAR YARD REQUIREMENTS, OR HEIGHT RESTRICTIONS.

LEGEND:

EXISTING:
- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- INTERNAL PROPERTY LINE
- ABUTTER'S PROPERTY LINE
- ZO — PROPERTY LINE SETBACK
- RIGHT OF WAY
- EASEMENT
- STRUCTURE
- ASPHALT
- GRAVEL
- DIRT ROAD
- STONE WALL
- ELECTRIC FENCE
- EDGE OF VEGETATION
- PRIME FARMLAND
- TRAIL
- WETLAND
- WETLAND FLAG
- 100' BUFFER
- 200' RIVER FRONT AREA
- WATERBODY
- FEMA FLOOD HAZARD ZONE
- CONSERVATION AREA
- OHE — OVERHEAD WIRE
- UTILITY POLE
- SS — SEWER / SEPTIC
- SEWER MANHOLE
- GATE
- PROPANE TANK
- WATER SPIGOT
- BOUNDARY EVIDENCE

ITEM	REQUIRED		PROPOSED
PARCEL ID NUMBER(S)	TAX MAP 407 LOT 96.1		
ZONING DISTRICT	RESIDENTIAL - AGRICULTURAL DISTRICT		
PARCEL ACREAGE	2.0		73.6
FRONT SETBACK (FT)	50		51
REAR SETBACK (FT)	50		114
SIDE SETBACK (FT)	50		55
MINIMUM FRONTAGE (FT)	400		803
ADDITIONAL SETBACKS	ACCESS TO SIDE-REAR (FT)	25	44
	ACCESS EASEMENT (FT)	15	15
	UTILITY EASEMENT (FT)	20	20
	WETLANDS (FT)	-	100
LOT COVERAGE	-		6.5%
MAX BUILDING HEIGHT (FT)	-		14.00

ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION

WSP USA INC.
100 APOLLO DRIVE, SUITE 302
CHELMSFORD MASSACHUSETTS 01824
TELEPHONE: (978) 692-9090
FAX: (978) 692-6633
WEB: WWW.WSP.COM

REVISION	DATE	ISSUE / REVISION DESCRIPTION	ISSUED	APPROVED
3	09/25/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	KRS	OAC
2	06/10/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC
1	04/17/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC
0	01/14/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC

PROJECT:
3 MW AC GROUND-MOUNT SOLAR PV DEVELOPMENT
105 OLD POST RD
WORTHINGTON, MA 01098

TITLE:
EXISTING CONDITIONS

CLIENT:
WARD STREAM, LLC

SEAL:
COMMONWEALTH OF MASSACHUSETTS
OLIVIA CROSBY CIVIL No. 54915
PROFESSIONAL ENGINEER
09/25/2026

DESIGNED BY:	DRAWN BY:
OAC	MRB
CHECKED BY:	SCALE:
APV	AS SHOWN

PROJECT NUMBER: US-EI-3652230437

DRAWING NUMBER: **V-101**

SHEET NUMBER: **2 OF 10**

D:\Blue\Vault\US-EI-3652230437 - Old Post Rd Worthington\7.1 Permitting\Sheets\2 - Old Post Rd - V-101.dwg - V-101 - Sep 24, 2025 3:37pm - USKS140856

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NOTES:

1. EXISTING FENCE TO BE REMOVED WHERE SHOWN.
2. PORTIONS OF FENCE REMOVAL AND TREE CLEARING WITHIN THE WETLAND BUFFER SUBJECT TO CHANGE.
3. CONTOUR INTERVAL SHOWN ON THIS SHEET IS ONE FOOT.

LEGEND:

EXISTING:
- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- INTERNAL PROPERTY LINE
- ABUTTER'S PROPERTY LINE
- ZO — PROPERTY LINE SETBACK
- RIGHT OF WAY
- EASEMENT
- STRUCTURE
- ASPHALT
- GRAVEL
- DIRT ROAD
- STONE WALL
- ELECTRIC FENCE
- EDGE OF VEGETATION
- PRIME FARMLAND
- TRAIL
- WETLAND
- WETLAND FLAG
- 100' BUFFER
- 200' RIVER FRONT AREA
- WATERBODY
- FEMA FLOOD HAZARD ZONE
- CONSERVATION AREA
- OHE — OVERHEAD WIRE
- UTILITY POLE
- SS — SEWER / SEPTIC
- SEWER MANHOLE
- GATE
- PROPANE TANK
- WATER SPIGOT
- BOUNDARY EVIDENCE

PROPOSED:
- LOW — LIMIT OF WORK
- 1450 — MAJOR CONTOUR
- MINOR CONTOUR
- TC — TREE CLEARING
- DEMO — REMOVED EXISTING FENCE
- FIXED KNOT GAME FENCE (11, C-501)
- DOUBLE SWING GATE (10, C-501)
- OHE — OVERHEAD ELECTRIC
- SB — SEDIMENT BARRIER (5,6, C-501)
- EC — ELECTRICAL CONDUIT (1, C-501)
- PERMEABLE PAVEMENT (14, C-502)
- GRAVEL ACCESS ROAD (4, C-501)
- CONCRETE PAD (8, C-501)
- SOLAR PV ARRAY (9, C-501)
- UTILITY POLE
- SCREENING VEGETATION (12,13, C-501)

WSP USA INC.
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1	04/17/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC
0	01/14/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC

PROJECT:
3 MW AC GROUND-MOUNT SOLAR PV DEVELOPMENT
105 OLD POST RD
WORTHINGTON, MA 01098

TITLE:
DEMOLITION, GRADING, AND TREE CLEARING PLAN

CLIENT:
WARD STREAM, LLC

SEAL:
COMMONWEALTH OF MASSACHUSETTS
OLIVIA CROSBY CIVIL No. 54915 PROFESSIONAL ENGINEER
09/25/2026

DESIGNED BY: OAC	DRAWN BY: MRB
CHECKED BY: APV	SCALE: AS SHOWN
PROJECT NUMBER:	US-EI-3652230437
DRAWING NUMBER:	C-101
SHEET NUMBER:	3 OF 10

1" = 100' WHEN PLOTTED 24" X 36"

ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION

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D:\BlueWave\US-EI-3652230437 - Old Post Rd Worthington\7.1 Permitting\Sheets\3-5 - Old Post Rd - C-101-4.dwg - C-101 - Sep. 25, 2026 11:53am - USKS140856

NOTES:

1. ELECTRICAL DESIGN, INCLUDING UTILITY POLES, PERFORMED BY OTHERS. ELECTRICAL EQUIPMENT AND COMPONENTS SHOWN TO ILLUSTRATE LOCATIONS ONLY. REFER TO ELECTRICAL DRAWINGS FOR DETAILED ELECTRICAL SYSTEM.
2. ALL AREAS WITHIN LIMIT OF DISTURBANCE TO BE SEEDED AS SPECIFIED IN THE SEEDING & REVEGETATION PLAN ON SHEET G-001.

C-103 EXTENTS

C-104 EXTENTS

LEGEND:

EXISTING:
- PROPERTY LINE
- INTERNAL PROPERTY LINE
- ABUTTER'S PROPERTY LINE
- ZO — PROPERTY LINE SETBACK
- RIGHT OF WAY
- EASEMENT
- STRUCTURE
- ASPHALT
- GRAVEL
- DIRT ROAD
- STONE WALL
- ELECTRIC FENCE
- EDGE OF VEGETATION
- PRIME FARMLAND
- WETLAND
- WETLAND FLAG
- 100' BUFFER
- 200' RIVER FRONT AREA
- WATERBODY
- FEMA FLOOD HAZARD ZONE
- CONSERVATION AREA
- OHE — OVERHEAD WIRE
- UTILITY POLE
- SS — SEWER / SEPTIC
- SEWER MANHOLE
- GATE
- PROPANE TANK
- WATER SPIGOT
- BOUNDARY EVIDENCE

PROPOSED:
- LOW — LIMIT OF WORK
- 1450 — MAJOR CONTOUR
- MINOR CONTOUR
- FIXED KNOT GAME FENCE (11, C-501)
- DOUBLE SWING GATE (10, C-501)
- OHE — OVERHEAD ELECTRIC
- SB — SEDIMENT BARRIER (5,6, C-501)
- EC — ELECTRICAL CONDUIT (1, C-501)
- PERMEABLE PAVEMENT (14, C-502)
- GRAVEL ACCESS ROAD (4, C-501)
- CONCRETE PAD (8, C-501)
- SOLAR PV ARRAY (9, C-501)
- UTILITY POLE
- SCREENING VEGETATION (12,13, C-501)

SYSTEM SIZE	3 MWAC
LIMIT OF WORK AREA (ACRES)	32.97
VEGETATION CLEARING AREA (ACRES)	0.39
FENCED AREA (ACRES)	28.94
TOTAL EXISTING IMPERVIOUS AREA (SQFT)	64,588
TOTAL PROPOSED IMPERVIOUS AREA (SQFT)	71,124
GRAVEL EQUIPMENT PAD AREA (SQFT)	4,790
WETLAND IMPACTS (SQFT)	1
EXISTING LAND USE	AGRICULTURAL
PROPOSED DUAL USE	AGRICULTURAL / INDUSTRIAL

WSP USA INC.
100 APOLLO DRIVE, SUITE 302
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WEB: WWW.WSP.COM

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1	04/17/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC
0	01/14/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC

PROJECT: 3 MW AC GROUND-MOUNT SOLAR PV DEVELOPMENT
105 OLD POST RD
WORTHINGTON, MA 01098

TITLE: PROPOSED CONDITIONS (OVERALL LAYOUT)

CLIENT: WARD STREAM, LLC

SEAL: COMMONWEALTH OF MASSACHUSETTS — OLIVIA CROSBY CIVIL No. 54915 — PROFESSIONAL ENGINEER
09/25/2026

DESIGNED BY: OAC	DRAWN BY: MRB
CHECKED BY: APV	SCALE: AS SHOWN
PROJECT NUMBER:	US-EI-3652230437
DRAWING NUMBER:	C-102
SHEET NUMBER:	4 OF 10

1" = 100' WHEN PLOTTED 24" X 36"

ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION

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NOTES:

1. ELECTRICAL DESIGN, INCLUDING UTILITY POLES, PERFORMED BY OTHERS. ELECTRICAL EQUIPMENT AND COMPONENTS SHOWN TO ILLUSTRATE LOCATIONS ONLY. REFER TO ELECTRICAL DRAWINGS FOR DETAILED ELECTRICAL SYSTEM.
2. ALL AREAS WITHIN LIMIT OF DISTURBANCE TO BE SEEDED AS SPECIFIED IN THE SEEDING & REVEGETATION PLAN ON SHEET G-001.

LEGEND:

EXISTING:
- PROPERTY LINE
- INTERNAL PROPERTY LINE
- ABUTTER'S PROPERTY LINE
- PROPERTY LINE SETBACK
- RIGHT OF WAY
- EASEMENT
- STRUCTURE
- ASPHALT
- GRAVEL
- DIRT ROAD
- STONE WALL
- ELECTRIC FENCE
- EDGE OF VEGETATION
- PRIME FARMLAND
- WETLAND
- WETLAND FLAG
- 100' BUFFER
- 200' RIVER FRONT AREA
- WATERBODY
- FEMA FLOOD HAZARD ZONE
- CONSERVATION AREA
- OHE — OVERHEAD WIRE
- UTILITY POLE
- SS — SEWER / SEPTIC
- SEWER MANHOLE
- GATE
- PROPANE TANK
- WATER SPIGOT
- BOUNDARY EVIDENCE

PROPOSED:
- LOW — LIMIT OF WORK
- 1450 — MAJOR CONTOUR
- MINOR CONTOUR
- FIXED KNOT GAME FENCE (11, C-501)
- DOUBLE SWING GATE (10, C-501)
- OHE — OVERHEAD ELECTRIC
- SB — SEDIMENT BARRIER (5,6, C-501)
- EC — ELECTRICAL CONDUIT (1, C-501)
- PERMEABLE PAVEMENT (14, C-502)
- GRAVEL ACCESS ROAD (4, C-501)
- CONCRETE PAD (8, C-501)
- SOLAR PV ARRAY (9, C-501)
- UTILITY POLE
- SCREENING VEGETATION (12,13, C-501)

WSP USA INC.
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1	04/17/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC
0	01/14/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC

PROJECT:
3 MW AC GROUND-MOUNT SOLAR PV DEVELOPMENT
105 OLD POST RD
WORTHINGTON, MA 01098

TITLE:
PROPOSED CONDITIONS (ENLARGED LAYOUT SHEET 1 OF 2)

CLIENT:
WARD STREAM, LLC

SEAL:
COMMONWEALTH OF MASSACHUSETTS
OLIVIA CROSBY CIVIL No. 54915 PROFESSIONAL ENGINEER
09/25/2026

DESIGNED BY: OAC	DRAWN BY: MRB
CHECKED BY: APV	SCALE: AS SHOWN
PROJECT NUMBER:	US-EI-3652230437
DRAWING NUMBER:	C-103
SHEET NUMBER:	5 OF 10

1" = 50' WHEN PLOTTED 24" X 36"

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NOTES:

1. ELECTRICAL DESIGN, INCLUDING UTILITY POLES, PERFORMED BY OTHERS. ELECTRICAL EQUIPMENT AND COMPONENTS SHOWN TO ILLUSTRATE LOCATIONS ONLY. REFER TO ELECTRICAL DRAWINGS FOR DETAILED ELECTRICAL SYSTEM.
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LEGEND:

EXISTING:
- PROPERTY LINE
- INTERNAL PROPERTY LINE
- ABUTTER'S PROPERTY LINE
- ZO — PROPERTY LINE SETBACK
- RIGHT OF WAY
- EASEMENT
- STRUCTURE
- ASPHALT
- GRAVEL
- DIRT ROAD
- STONE WALL
- ELECTRIC FENCE
- EDGE OF VEGETATION
- PRIME FARMLAND
- WETLAND
- WETLAND FLAG
- 100' BUFFER
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- CONSERVATION AREA
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- SS — SEWER / SEPTIC
- SEWER MANHOLE
- GATE
- PROPANE TANK
- WATER SPIGOT
- BOUNDARY EVIDENCE

PROPOSED:
- LOW — LIMIT OF WORK
- 1450 — MAJOR CONTOUR
- MINOR CONTOUR
- FIXED KNOT GAME FENCE (11, C-501)
- DOUBLE SWING GATE (10, C-501)
- OHE — OVERHEAD ELECTRIC
- SB — SEDIMENT BARRIER (5,6 C-501)
- EC — ELECTRICAL CONDUIT (1, C-501)
- PERMEABLE PAVEMENT (14, C-502)
- GRAVEL ACCESS ROAD (4, C-501)
- CONCRETE PAD (8, C-501)
- SOLAR PV ARRAY (9, C-501)
- UTILITY POLE
- SCREENING VEGETATION (12,13 C-501)

11 C-501 FIXED KNOT GAME FENCE
16,17 C-502 DRY DETENTION BASIN
VEHICLE TURNAROUND & MAINTENANCE PARKING AREA
18 C-502 RIP-RAP APRON
8 C-501 BESS PAD
14 C-502 PERMEABLE PAVEMENT
BESS 100' OFFSET
SEDIMENT BARRIER WITH SILT FENCE WITHIN 100' WETLAND BUFFER TO BE PLACED TEMPORARILY DURING FENCE INSTALLATION / DEMOLITION
5,6 C-501 SEDIMENT BARRIER
SOLAR EQUIPMENT PADS (TRANSFORMER, SWITCHBOARD INVERTER) 8 C-501
1 SF WETLAND REPLICATION
VEGETATIVE SCREENING 12,13 C-501
11' (TYP.)
40' MIN.
18' (TYP.)
62'
66'
100 FT. (TYP.)
20'
44'

N/F
JOHN S. & JUDITH A. TOBIN
BOOK 5956 PAGE 225
TAX MAP 407 LOT 96.3

HOUSE
2 STORY
4,468 ± SQ. FT.

BARN
2 STORY
2,977 ± SQ. FT.

N/F
THOMAS L. BRISSON JR
BOOK 12375 PAGE 278
TAX MAP 407 LOT 127

N/F
EVAN T. JOHNSON & KATHRYN A. EWALD
BOOK 6590 PAGE 13
TAX MAP 407 LOT 126

N/F
SUSAN RUTH ASHER
BOOK 1015 PAGE 112
TAX MAP 407 LOT 95

CONSERVATION AREA
50-YEAR TERM (APRIL 30, 2062)
1.6 ACRES
BOOK 10908 PAGE 173
DEPT OF AGRICTULTURE - FARM SERVICE

WETLAND W1
WETLAND W2
WETLAND W3
WETLAND W4
WETLAND W5

0' 25' 50' 75'
1" = 50' WHEN PLOTTED 24" X 36"

ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION

WSP USA INC.
100 APOLLO DRIVE, SUITE 302
CHELMSFORD MASSACHUSETTS 01824
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PROJECT:
3 MW AC GROUND-MOUNT SOLAR PV DEVELOPMENT
105 OLD POST RD
WORTHINGTON, MA 01098

TITLE:
PROPOSED CONDITIONS (ENLARGED LAYOUT SHEET 2 OF 2)

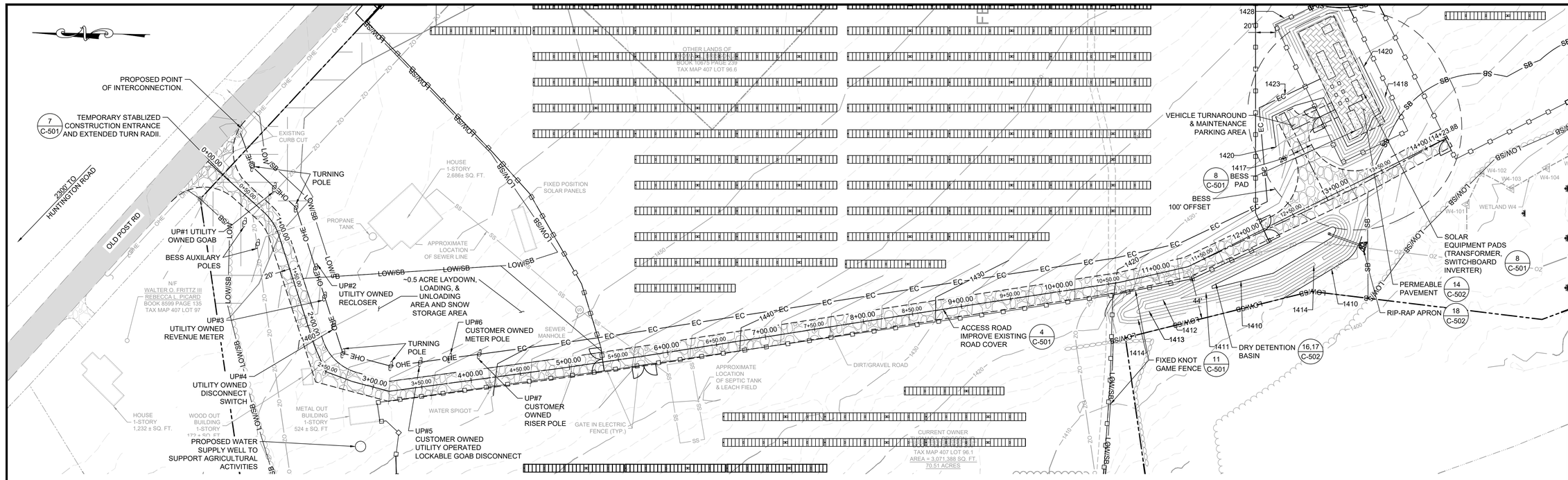
CLIENT:
WARD STREAM, LLC

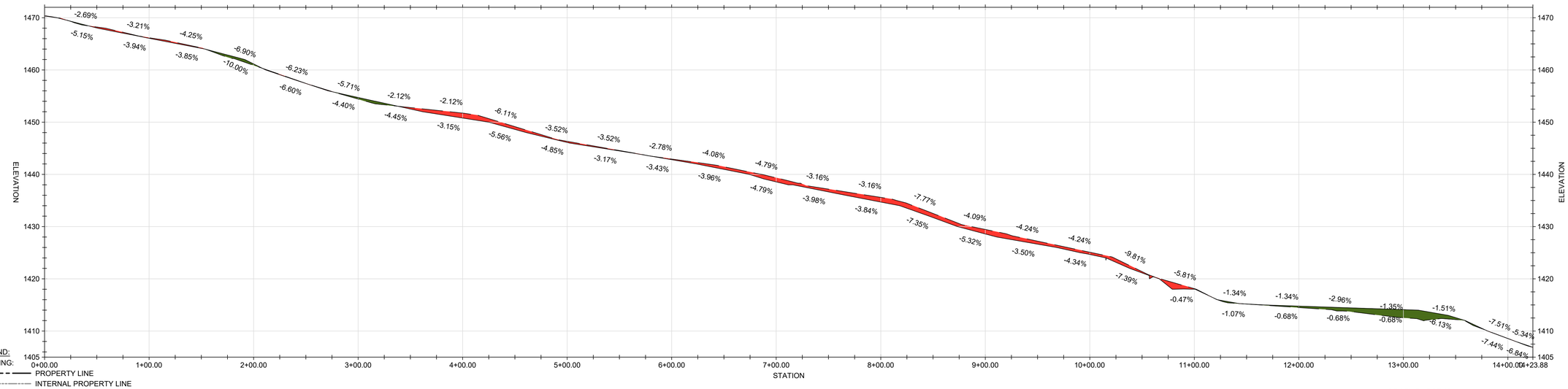
SEAL:
COMMONWEALTH OF MASSACHUSETTS
OLIVIA CROSBY
CIVIL
No. 54915
PROFESSIONAL ENGINEER
09/25/2026

DESIGNED BY: OAC	DRAWN BY: MRB
CHECKED BY: APV	SCALE: AS SHOWN
PROJECT NUMBER: US-EI-3652230437	
DRAWING NUMBER: **C-104**	
SHEET NUMBER: **6 OF 10**	

D:\Bluv\Vaveli\US-EI-3652230437 - Old Post Rd Worthington\7.1 Permitting\Sheets\3-6 - Old Post Rd - C-101-4.dwg - C-104 - Sep 25, 2026 12:25pm - USKG14N856

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LEGEND:

EXISTING:
- PROPERTY LINE
- INTERNAL PROPERTY LINE
- ABUTTER'S PROPERTY LINE
- ZO — PROPERTY LINE SETBACK
- RIGHT OF WAY
- EASEMENT
- STRUCTURE
- ASPHALT
- GRAVEL
- DIRT ROAD
- STONE WALL
- ELECTRIC FENCE
- EDGE OF VEGETATION
- PRIME FARMLAND
- TRAIL
- WETLAND
- WETLAND FLAG
- 100' BUFFER
- 200' RIVER FRONT AREA
- WATERBODY
- FEMA FLOOD HAZARD ZONE
- CONSERVATION AREA
- OHE — OVERHEAD WIRE
- UTILITY POLE
- SS — SEWER / SEPTIC
- SEWER MANHOLE
- GATE
- PROPANE TANK
- WATER SPIGOT
- BOUNDARY EVIDENCE

PROPOSED:
- LOW — LIMIT OF WORK
- 1450 — MAJOR CONTOUR
- MINOR CONTOUR
- FIXED KNOT GAME FENCE 11 C-501
- DOUBLE SWING GATE 10 C-501
- OHE — OVERHEAD ELECTRIC
- SB — SEDIMENT BARRIER 5,6 C-501
- EC — ELECTRICAL CONDUIT 1 C-501
- PERMEABLE PAVEMENT 14 C-502
- GRAVEL ACCESS ROAD 4 C-501
- CONCRETE PAD 8 C-501
- SOLAR PV ARRAY 9 C-501
- UTILITY POLE
- SCREENING VEGETATION 12,13 C-501

PROFILE LEGEND:
- 5.00% — EXISTING ELEVATION & SLOPE
- 5.00% — PROPOSED ELEVATION & SLOPE
- CUT AREA
- FILL AREA

NOTES:
1. ELECTRICAL DESIGN, INCLUDING UTILITY POLES, PERFORMED BY OTHERS. ELECTRICAL EQUIPMENT AND COMPONENTS SHOWN TO ILLUSTRATE LOCATIONS ONLY. REFER TO ELECTRICAL DRAWINGS FOR DETAILED ELECTRICAL SYSTEM.
2. ALL AREAS WITHIN LIMIT OF DISTURBANCE TO BE SEEDED AS SPECIFIED IN THE SEEDING & REVEGETATION PLAN ON SHEET G-001.
3. THE TOTAL GRADING CUT VOLUME IS 1,968.1 CUBIC YARDS. THE TOTAL GRADING FILL VOLUME IS 1,124.1 CUBIC YARDS. THE GRADING OF THE ACCESS ROAD, EQUIPMENT PAD AREAS, AND STORMWATER BMPS WILL RESULT IN A NET CUT VOLUME OF 844.6 CUBIC YARDS WHICH CAN BE DISPERSED ACROSS THE SITE AT OWNER'S DIRECTION.

0' 25' 50' 75'
1" = 50' WHEN PLOTTED 24" X 36"

ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION

WSP USA INC.
100 APOLLO DRIVE, SUITE 302
CHELMSFORD MASSACHUSETTS 01824
TELEPHONE: (978) 692-9090
FAX: (978) 692-6633
WEB: WWW.WSP.COM

REVISION	DATE	ISSUE / REVISION DESCRIPTION	ISSUED	APPROVED
3	09/25/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	KRS	OAC
2	06/10/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC
1	04/17/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC
0	01/14/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC

PROJECT:
3 MW AC GROUND-MOUNT SOLAR PV DEVELOPMENT
105 OLD POST RD
WORTHINGTON, MA 01098

TITLE:
ACCESS ROAD TOPOGRAPHIC PROFILE ANALYSIS

CLIENT:
WARD STREAM, LLC

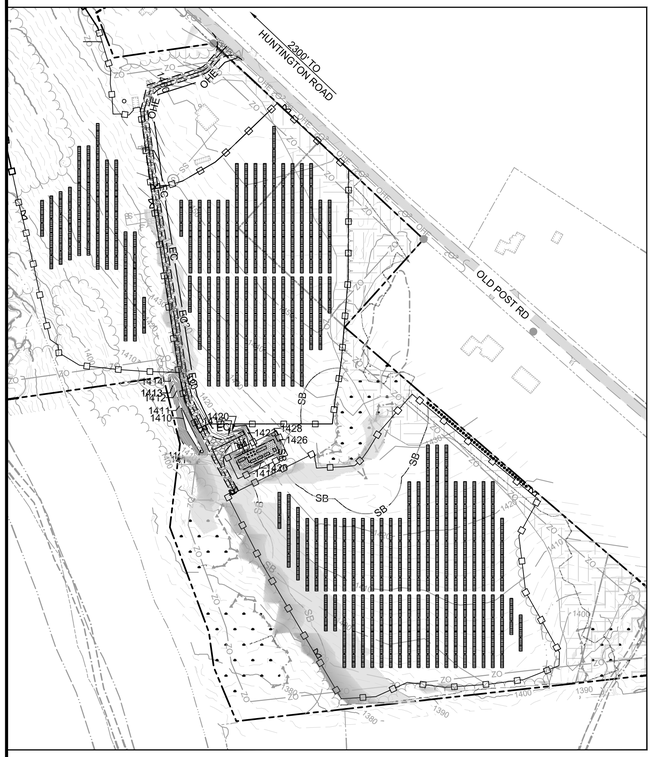
SEAL:
COMMONWEALTH OF MASSACHUSETTS
OLIVIA CROSBY
CIVIL
No. 54915
PROFESSIONAL ENGINEER
09/25/2026

DESIGNED BY: OAC	DRAWN BY: MRB
CHECKED BY: APV	SCALE: AS SHOWN
PROJECT NUMBER: US-EI-3652230437	
DRAWING NUMBER: **C-105**	
SHEET NUMBER: **7 OF 10**	

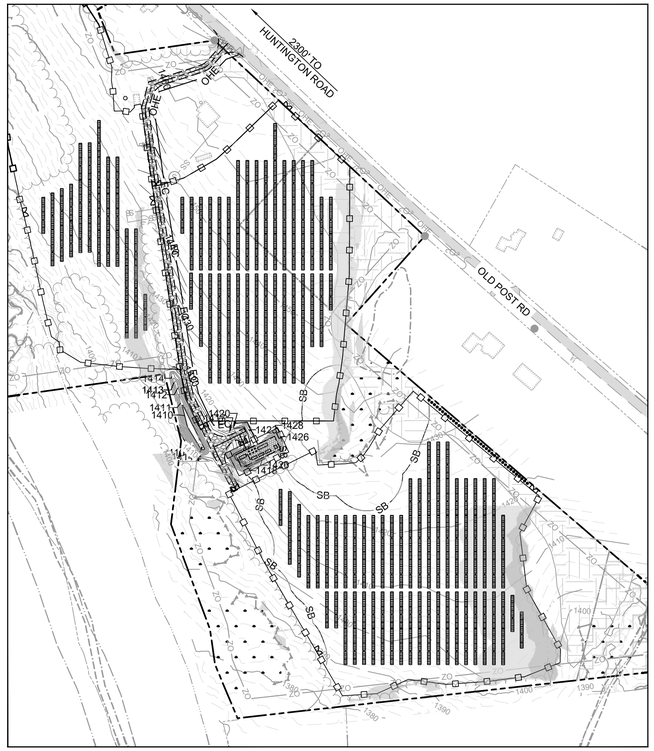
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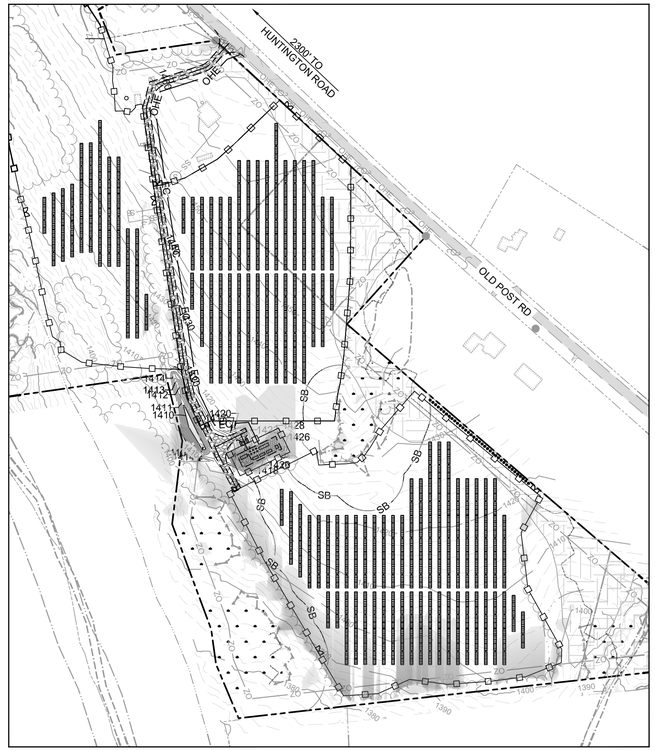
WEST



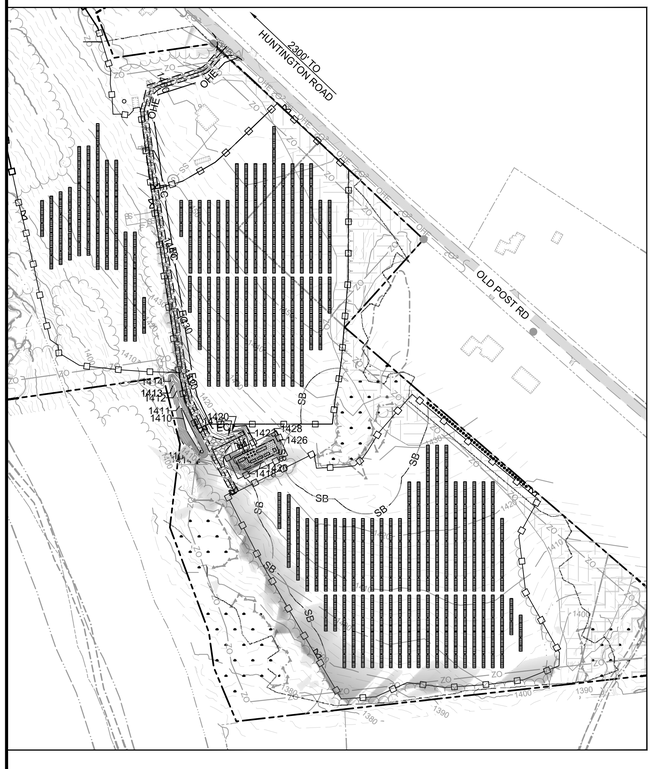
EAST



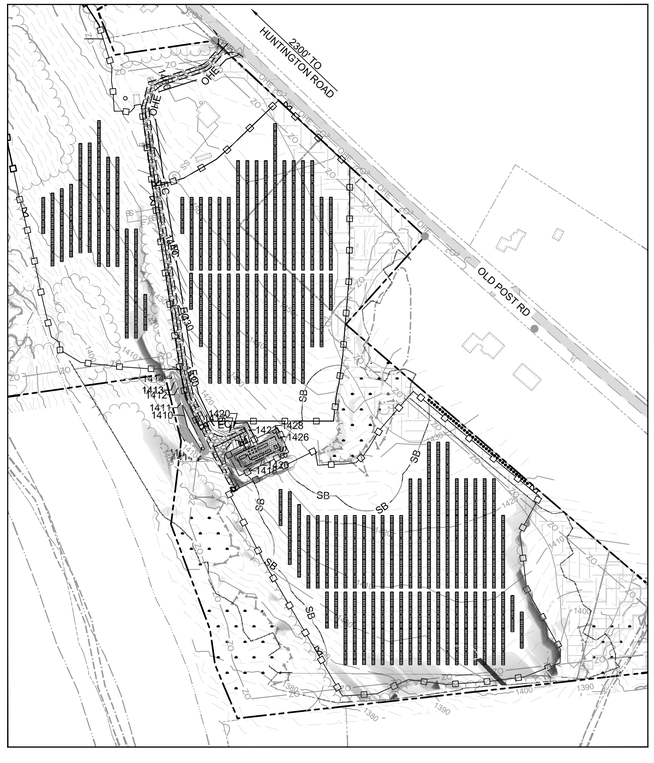
SOUTH



NORTHWEST & SOUTHWEST



NORTHEAST & SOUTHEAST



TREE HEIGHTS



LEGEND:

EXISTING:
- PROPERTY LINE
- INTERNAL PROPERTY LINE
- ABUTTER'S PROPERTY LINE
- PROPERTY LINE SETBACK
- RIGHT OF WAY
- EASEMENT
- STRUCTURE
- ASPHALT
- GRAVEL
- DIRT ROAD
- STONE WALL
- ELECTRIC FENCE
- EDGE OF VEGETATION
- PRIME FARMLAND
- TRAIL
- WETLAND
- WETLAND FLAG
- 100' BUFFER
- 200' RIVER FRONT AREA
- WATERBODY
- FEMA FLOOD HAZARD ZONE
- CONSERVATION AREA
- OVERHEAD WIRE
- UTILITY POLE
- SEWER / SEPTIC
- SEWER MANHOLE
- GATE
- PROPANE TANK
- WATER SPIGOT
- BOUNDARY EVIDENCE

PROPOSED:
- LIMIT OF WORK
- MAJOR CONTOUR
- MINOR CONTOUR
- FIXED KNOT GAME FENCE
- DOUBLE SWING GATE
- OVERHEAD ELECTRIC
- SEDIMENT BARRIER
- ELECTRICAL CONDUIT
- PERMEABLE PAVEMENT
- GRAVEL ACCESS ROAD
- CONCRETE PAD
- SOLAR PV ARRAY
- UTILITY POLE
- SCREENING VEGETATION

SWATCH	TREE HEIGHT (FT)
	55 - 60
	60 - 65
	65 - 70
	70 - 75
	75 - 80
	80 - 85
	85 - 90
	90 - 95
	95-100

0' 100' 200' 300'
1" = 200' WHEN PLOTTED 24" X 36"

ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION

WSP USA INC.
100 APOLLO DRIVE, SUITE 302
CHELMSFORD MASSACHUSETTS 01824
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PROJECT:
3 MW AC GROUND-MOUNT SOLAR PV DEVELOPMENT
105 OLD POST RD
WORTHINGTON, MA 01098

TITLE:
SHADOW ANALYSIS OVER PROPOSED CONDITIONS

CLIENT:
WARD STREAM, LLC

SEAL:
COMMONWEALTH OF MASSACHUSETTS
OLIVIA CROSBY
CIVIL
No. 54915
PROFESSIONAL ENGINEER
09/25/2026

DESIGNED BY:	DRAWN BY:
OAC	MRB
CHECKED BY:	SCALE:
APV	AS SHOWN

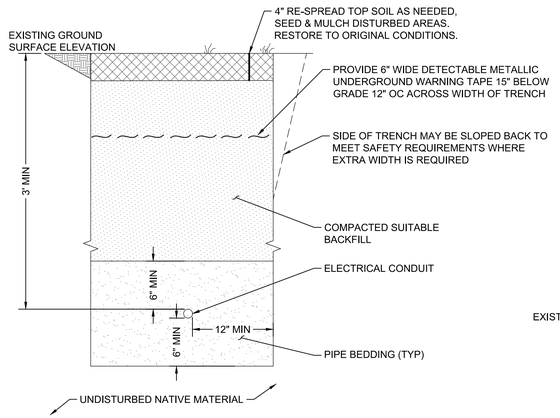
PROJECT NUMBER: US-EI-3652230437

DRAWING NUMBER: **C-106**

SHEET NUMBER: **8 OF 10**

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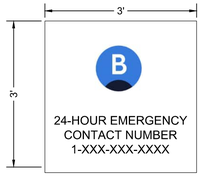
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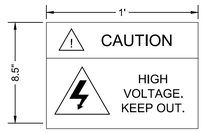
NOTE(S):

1. DETAIL SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. ELECTRICAL ENGINEER TO CONFIRM REGULATORY AND CODE COMPLIANCE.

TYPICAL ELECTRICAL CONDUIT UTILITY TRENCH 1
NOT TO SCALE



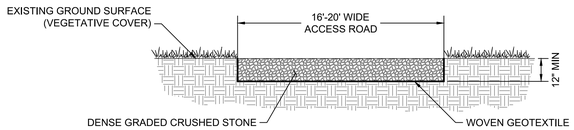
TYPICAL ENTRANCE SIGN 2
NOT TO SCALE



NOTES:

1. PLACE ALONG PERIMETER FENCING AT AN INTERVAL NO LESS THAN 100 FEET.
2. DETAIL SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. DESIGN TO BE FINALIZED AT LATER DATE.

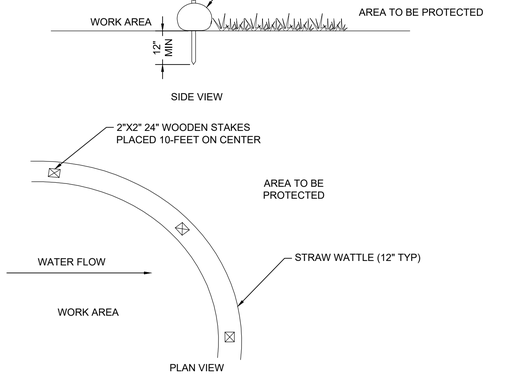
HIGH VOLTAGE SIGN 3
NOT TO SCALE



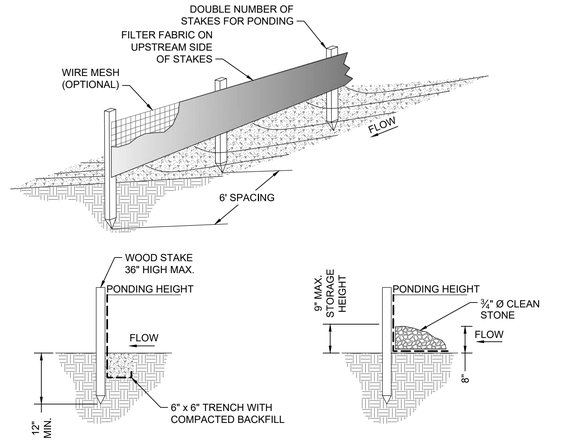
NOTE(S):

1. ACCESS ROAD TO BE CONSTRUCTED OF A MINIMUM 12" OF DENSE GRADED CRUSHED STONE.
2. WOVEN GEOTEXTILE TO BE PLACED BETWEEN THE GROUND SURFACE AND THE CRUSHED STONE.
3. CRUSHED STONE SHALL BE COMPACTED TO A FIRM AND NON-YIELDING CONDITION.

FLUSH CRUSHED STONE ACCESS ROAD 4
NOT TO SCALE



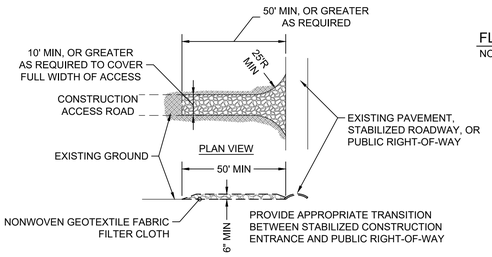
SEDIMENT BARRIER - STRAW WATTLE 5
NOT TO SCALE



NOTE(S):

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.

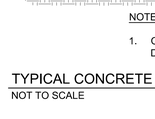
SEDIMENT BARRIER - SILT FENCE 6
NOT TO SCALE



NOTE(S):

1. STONE TO BE 1"-3" STONE, RECLAIMED STONE, OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - AS REQUIRED, BUT NOT LESS THAN 50 FT.
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TEN (10) FT. MIN, BUT NOT LESS THAN THE FULL TRAVELED WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
5. FILTER CLOTH - SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCE SHALL BE PIPED ACROSS OR BENEATH THE ENTRANCE.
7. 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.
8. WASHING - WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. IF WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

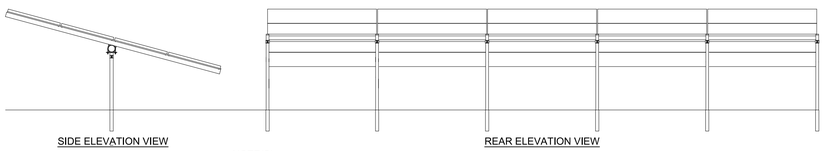
STABILIZED CONSTRUCTION ENTRANCE 7
NOT TO SCALE



NOTE(S):

1. CONCRETE PAD SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. DESIGN TO BE FINALIZED AT LATER DATE.

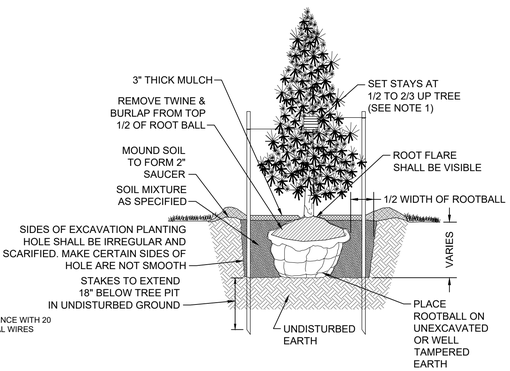
TYPICAL CONCRETE EQUIPMENT PAD SECTION 8
NOT TO SCALE



NOTE(S):

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

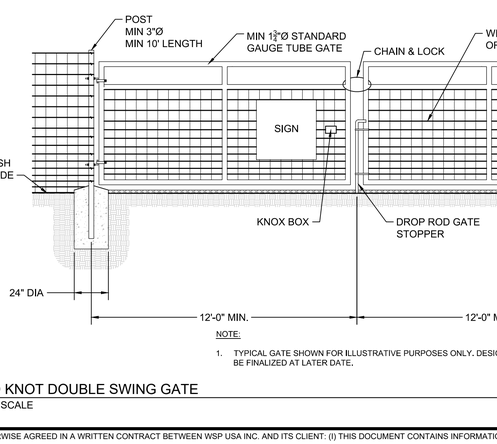
TYPICAL TRACKER SOLAR PV ARRAY 9
NOT TO SCALE



NOTE(S):

1. STAKE ALL TREES OVER 6 FEET TALL.
2. TREE SHALL BEAR SAME RELATION TO FINISHED GRADE AS IT BORE TO PREVIOUS GRADE (OR SLIGHTLY ABOVE).
3. NEVER CUT LEADERS.
4. PRUNE ONLY TO REMOVE DAMAGED OR BROKEN BRANCHES.
5. REMOVE ALL WIRE BRACKETS FROM ROOTBALL.
6. REMOVE ALL STAKES 1 YEAR AFTER PLANTING.

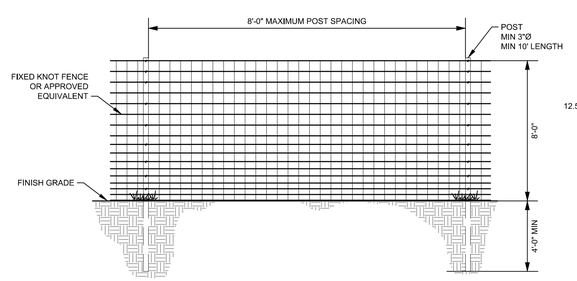
VEGETATIVE SCREENING PLANTING 12
NOT TO SCALE



NOTE:

1. TYPICAL GATE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. DESIGN TO BE FINALIZED AT LATER DATE.

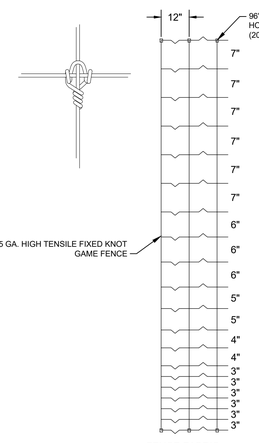
FIXED KNOT DOUBLE SWING GATE 10
NOT TO SCALE



NOTE:

1. TYPICAL FENCE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. DESIGN TO BE FINALIZED AT LATER DATE.

FIXED KNOT GAME FENCE 11
NOT TO SCALE



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0	01/14/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC

PROJECT:
3 MW AC GROUND-MOUNT SOLAR PV DEVELOPMENT
105 OLD POST RD
WORTHINGTON, MA 01098

TITLE:
DETAILS (SHEET 1 OF 2)

CLIENT:
WARD STREAM, LLC

SEAL:
COMMONWEALTH OF MASSACHUSETTS
OLIVIA CROSBY CIVIL No. 54915 PROFESSIONAL ENGINEER
09/25/2026

DESIGNED BY:	DRAWN BY:
OAC	MRB
CHECKED BY:	SCALE:
APV	AS SHOWN

PROJECT NUMBER: US-EI-3652230437
DRAWING NUMBER: **C-501**
SHEET NUMBER: **9 OF 10**

D:\BlueWave\US-EI-3652230437 - Old Post Rd Worthington\7.1 Permitting\Sheets\9-10 - Old Post Rd - C-501-2.dwg - C-501 - Sep. 24, 2026 4:26pm - USKS140956

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PLAN VIEW

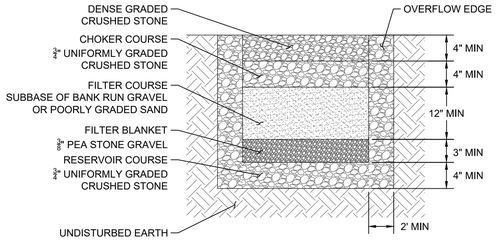


PROFILE VIEW

SPECIES	COMMON NAME	HEIGHT WHEN PLANTED	MATURE HEIGHT	MATURE WIDTH	ROOT
THUJA X PLICATA 'JUNIOR GIANT'	JUNIOR GIANT ARBORVITAE	6'-7'	15'-20'	3'-5'	BALLED & BURLAPED (B&B)

VEGETATIVE SCREENING PLANTING PLAN - SOUTHERN PLANTING 13

NOT TO SCALE

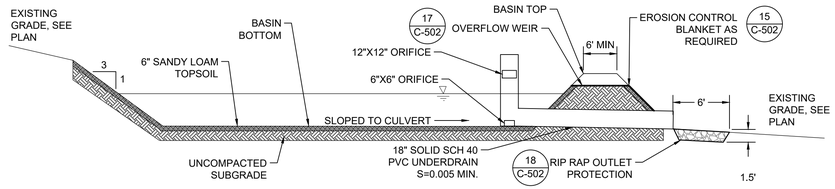


NOTE(S):

1. THE BOTTOM OF THE STONE RESERVOIR MUST BE COMPLETELY FLAT SO THAT RUNOFF CAN INFILTRATE THROUGH THE ENTIRE SURFACE.
2. THE OVERFLOW EDGE IS A TRENCH SURROUNDING THE EDGE OF THE PAVEMENT. THE TRENCH CONNECTS TO THE STONE RESERVOIR.

PERMEABLE PAVEMENT 14

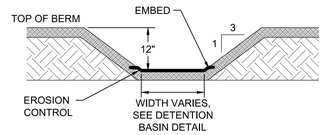
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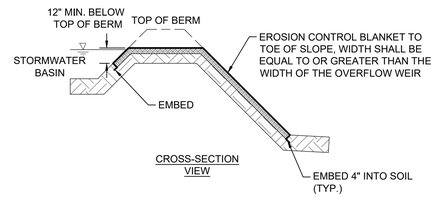
BASIN ID	BASIN TOP	BASIN BOTTOM	OVERFLOW WEIR	WEIR WIDTH
DETENTION BASIN 1	1414'	1410'	1413'	3'

DRY DETENTION BASIN 16

NOT TO SCALE



SECTION VIEW

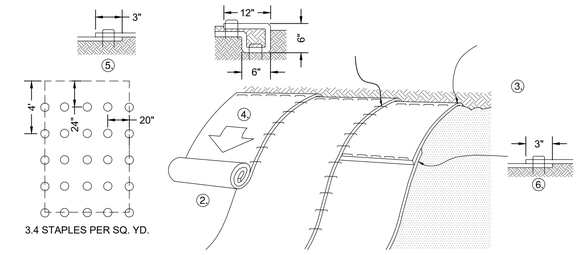


NOTE(S):

1. EROSION CONTROL BLANKET SHALL BE NORTH AMERICAN GREEN BIONET SC150 BN OR APPROVED EQUIVALENT.
2. EROSION CONTROL BLANKET SHALL BE INSTALLED PER MANUFACTURER'S REQUIREMENTS.

OVERFLOW WEIR 17

NOT TO SCALE



STAPLE PATTERN GUIDE
6.67' WIDE ROLLS

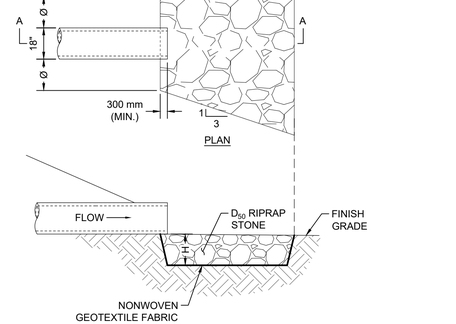
SLOPE INSTALLATION
(SEE STEPS BELOW)

NOTE(S):

1. THIS DETAIL REFERENCES PRODUCTS BY NORTH AMERICAN GREEN. EQUIVALENT PRODUCTS MAY BE USED AS APPROVED BY THE ENGINEER. EROSION CONTROL BLANKETS TO BE INSTALLATED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND INSTRUCTIONS.
2. EROSION CONTROL MATTING TO BE NORTH AMERICAN GREEN BIONET SC150 BN OR APPROVED EQUAL. INSTALL USING STAPLE PATTERN D.
3. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECPs), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED (SEE DRAWING G-001).
4. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECPs IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF RECPs EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECPs WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF RECPs BACK OVER SEED AND COMPACTED SOIL. SECURE RECPs OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE RECPs.
5. ROLL THE RECPs DOWN THE SLOPE. RECPs WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECPs MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
6. THE EDGES OF PARALLEL RECPs MUST BE STAPLED WITH AN APPROXIMATE 3" OVERLAP.
7. CONSECUTIVE RECPs SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE RECPs WIDTH.
8. STAPLES LONGER THAN 6 INCHES SHALL NOT BE USED WITHIN THE LIMIT OF WASTE TO AVOID PENETRATION INTO THE LANDFILL CAP.

EROSION CONTROL BLANKET INSTALLATION 15

NOT TO SCALE



SECTION A-A

RIPRAP APRON DIMENSIONS				
PIPE Ø	CLASS	D_{50} (IN)	LENGTH L (FT)	HEIGHT H (IN)
18"	1	6	6	18

RIPRAP APRON (CHANNEL) 18

NOT TO SCALE

ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION

WSP USA INC.
100 APOLLO DRIVE, SUITE 302
CHELMSFORD MASSACHUSETTS 01824
TELEPHONE: (978) 692-9090
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WEB: WWW.WSP.COM

REVISION	DATE	ISSUE / REVISION DESCRIPTION	ISSUED	APPROVED
3	09/25/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	KRS	OAC
2	06/10/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC
1	04/17/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC
0	01/14/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC

PROJECT:
3 MW AC GROUND-MOUNT SOLAR PV DEVELOPMENT
105 OLD POST RD
WORTHINGTON, MA 01098

TITLE:
DETAILS (SHEET 2 OF 2)

CLIENT:
WARD STREAM, LLC

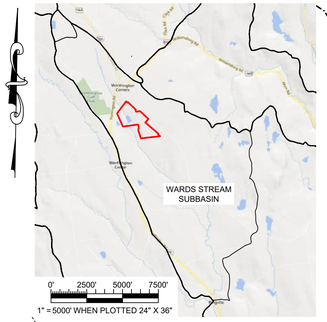
SEAL:
COMMONWEALTH OF MASSACHUSETTS
OLIVIA CROSBY
CIVIL
No. 54915
PROFESSIONAL ENGINEER
09/25/2026

DESIGNED BY: OAC	DRAWN BY: MRB
CHECKED BY: APV	SCALE: AS SHOWN
PROJECT NUMBER:	US-EI-3652230437
DRAWING NUMBER:	**C-502**
SHEET NUMBER:	**10 OF 10**

D:\BlueWave\US-EI-3652230437 - Old Post Rd Worthington\7.1 Permitting\Sheets\9-10 - Old Post Rd - C-501-2.dwg - C-502 - Sep. 24, 2026 4:21pm - USKS140856

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Appendix G – Drainage Figures



NOTES:

1. THIS PLAN WAS GENERATED USING DATA PROVIDED BY SGC ENGINEERING, LLC FROM THEIR ON-SITE FIELD VISIT PERFORMED IN DECEMBER 2023. ADDITIONAL NEARBY BUILDINGS WERE INCLUDED FROM MASSGIS DATA: BUILDING STRUCTURES (2-D) PUBLICLY AVAILABLE AT MASS.GOV AND LAST UPDATED NOVEMBER 2024. OTHER MAP REFERENCES INCLUDE:
   - 1.1. A PLAN ENTITLED "PLAN OF LAND IN WORTHINGTON (HAMPSHIRE CO.), MA SURVEYED FOR CHASE ENTERPRISES CORP." DATED APRIL 25, 2011, RECORDED AT THE HAMPSHIRE COUNTY REGISTRY OF DEEDS IN PLAN BOOK 225 PAGE 23.
   - 1.2. A PLAN ENTITLED "PLAN OF LAND IN WORTHINGTON, MASSACHUSETTS PREPARED FOR BEVERLY J. BOWMAN" DATED OCTOBER 24, 2008, RECORDED AT THE HAMPSHIRE COUNTY REGISTRY OF DEEDS IN PLAN BOOK 219 PAGE 116.
   - 1.3. ALSO SEE PLANS RECORDED IN PLAN BOOK 195 PAGE 2, PLAN BOOK 150 PAGE 98 AND PLAN BOOK 128 PAGE 57.
   - 1.4. 2025 AERIAL IMAGERY WAS USED TO APPROXIMATE EXTENTS OF OLD POST ROAD AND EXISTING CURB CUTS WITHIN 300' OF THE PROPERTY.
2. OWNER OF RECORD:
   FEE SIMPLE: THOMAS L. BRISSON, JR., ALSO KNOWN AS THOMAS LELAND BRISSON, JR PURSUANT TO DEED RECORDED AT BOOK 10675, PAGE 239, BUT EXCEPTING THAT PORTION CONVEYED OUT BY DEED RECORDED AT BOOK 955, PAGE 74, TOWN LISTED PROPERTY ADDRESS OF 105 OLD POST ROAD, WORTHINGTON, HAMPSHIRE COUNTY, MASSACHUSETTS. FOR FURTHER REFERENCE, SEE WORTHINGTON TAX MAP 407 - PARCEL 96.1 (PER MASS GIS) FIELD WORK WAS COMPLETED IN NOVEMBER OF 2023 AND AGAIN MARCH 2024.
3. 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 THE MOST UP TO DATE ONLINE ELECTRONIC LiDAR FILES FROM NGS, IN COMBINATION WITH ON THE GROUND DATA COLLECTION WITH SURVEY GRADE GPS AND OR ROBOTIC TOTAL STATION. CONTOUR INTERVAL SHOWN ON PLAN IS 2 FOOT.
4. THE WETLANDS SHOWN ON THIS PLAN WERE DEFINED AND LOCATED BY WSP USA INC. AND FIELD LOCATED BY SGC ENGINEERING DATED NOVEMBER 21, 2023. ADDITIONAL WETLANDS SHOWN WITHOUT BUFFERS WERE INCLUDED FROM MASSGIS DATA: NATIONAL WETLANDS INVENTORY PUBLICLY AVAILABLE AT MASS.GOV AND LAST UPDATED SEPTEMBER 2025.
5. BUILDING STORY HEIGHTS WERE OBTAINED FROM PUBLICLY AVAILABLE PROPERTY RECORD CARDS AND GOOGLE IMAGERY. AN AVERAGE STORY IS APPROXIMATELY 10 FEET TALL. FLOOR TO FLOOR AND ROOFING CAN PROVIDE AN ADDITIONAL AVERAGE 3 TO 7 FEET TO THE TOTAL BUILDING HEIGHT.
6. A PREDOMINATE PORTION OF THE PROPERTY LIES WITHIN ZONE "X" AND THE PROPOSED SOLAR DEVELOPMENT IS NOT AFFECTED (SEE PLAN). A SMALL WESTERLY PORTION OF THE LOCUS PARCEL IS AFFECTED BY ZONE A - "SPECIAL FLOOD HAZARD AREA". FOR FURTHER REFERENCE SEE F.I.R.M. - FLOOD INSURANCE RATE MAP - COMMUNITY PANEL NUMBER 250175 0009 SUFFIX B / MAP NUMBER 9 OF 25 FOR THE TOWN OF WORTHINGTON, HAMPSHIRE COUNTY (ALL JURISDICTIONS), MASSACHUSETTS, WITH AN EFFECTIVE DATE OF JUNE 19, 1989. ZONE "A" (WARD'S STREAM) IS DESCRIBED AS AN AREA THAT NO BASE FLOOD ELEVATION HAS BEEN DETERMINED. THE BASE FLOOD ELEVATION IS THE WATER SURFACE ELEVATION OF THE 1% ANNUAL CHANCE FLOOD. ZONE "X" IS DEFINED AS AREAS OF 500 - YEAR FLOOD.
7. NEITHER SGC ENGINEERING, LLC NOR WSP HAVE INDEPENDENTLY VERIFIED THE LOCATION, EXISTENCE, AND SERVICEABILITY OF ANY UTILITIES AND MAKE NO GUARANTEE TO THE COMPLETENESS OR THE ACCURACY OF ANY UTILITIES SHOWN ON THIS PLAN. UTILITIES SHOWN WERE FIELD LOCATED ABOVEGROUND AND VISUAL, AND OR REFERENCED FROM PLANS AND 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 AND WSP USA INC. ASSUME NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN ON THIS PLAN.
8. 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.
9. THE EXISTING WARD'S STREAM (SO CALLED) SHOWN ON THIS PLAN IS BASED ON PHYSICAL FIELD EVIDENCE, DEED CALLS, AND OR PLANS OF RECORD AT TIME OF SURVEY. THIS STREAM LOCATION MAY OR MAY NOT AFFECT THE PRESENT - FUTURE PROPERTIES DUE TO AVULSION, ACCRETION, AND/OR RELICTION.
10. OBSERVATIONS OF THE PREMISES BY SGC IN JULY 2024 :
    - 10.a. NO EVIDENCE WAS NOTICED OF THE SITE BEING USED AS A SOLID WASTE DUMP.
    - 10.b. NO EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION, AND BUILDING ADDITIONS WERE OBSERVED ON SURVEYED PREMISES.
    - 10.c. PROPERTY HAS DIRECT AND PHYSICAL ACCESS TO OLD POST ROAD, A PUBLIC WAY OR HIGHWAY.
    - 10.d. THE PROPERTY COMPRISES A SINGLE TAX LOT - TOWN OF WORTHINGTON TAX MAP NUMBER 407 PARCEL 96.1.
    - 10.e. EXCEPT AS SHOWN, NO EXISTING IMPROVEMENTS APPEAR TO VIOLATE APPLICABLE SET BACK LINES, FRONT, SIDE AND REAR YARD REQUIREMENTS, OR HEIGHT RESTRICTIONS.

LEGEND:

EXISTING:
- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- INTERNAL PROPERTY LINE
- ABUTTER'S PROPERTY LINE
- ZO — PROPERTY LINE SETBACK
- RIGHT OF WAY
- EASEMENT
- STRUCTURE
- ASPHALT
- GRAVEL
- DIRT ROAD
- STONE WALL
- ELECTRIC FENCE
- EDGE OF VEGETATION
- PRIME FARMLAND
- TRAIL
- WETLAND
- WETLAND FLAG
- 100' BUFFER
- 200' RIVER FRONT AREA
- WATERBODY
- FEMA FLOOD HAZARD ZONE
- CONSERVATION AREA
- OHE — OVERHEAD WIRE
- UTILITY POLE
- SS — SEWER / SEPTIC
- SEWER MANHOLE
- GATE
- PROPANE TANK
- WATER SPIGOT
- BOUNDARY EVIDENCE

HYDROLOGY:
- SUBCATCHMENT BOUNDARY
- TIME OF CONCENTRATION
- LAG PATH
- HSG C SOIL
- LBL — POND
- LBL — SUBCATCHMENT
- LBL — REACH
- LBL — LINK

0' 100' 200' 300'
1" = 200' WHEN PLOTTED 24" X 36"

ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION

WSP USA INC.
100 APOLLO DRIVE, SUITE 302
CHELMSFORD MASSACHUSETTS 01824
TELEPHONE: (978) 692-9090
FAX: (978) 692-6633
WEB: WWW.WSP.COM

REVISION	DATE	ISSUE / REVISION DESCRIPTION	ISSUED	APPROVED
1	09/25/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	KRS	OAC
0	02/09/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC

PROJECT:
3 MW AC GROUND-MOUNT SOLAR PV DEVELOPMENT
105 OLD POST RD
WORTHINGTON, MA 01098

TITLE:
EXISTING CONDITIONS DRAINAGE ANALYSIS

CLIENT:
WARD STREAM, LLC

SEAL:
COMMONWEALTH OF MASSACHUSETTS
OLIVIA CROSBY
CIVIL
No. 54915
PROFESSIONAL ENGINEER
09/25/2026

DESIGNED BY: OAC	DRAWN BY: MRB
CHECKED BY: APV	SCALE: AS SHOWN
PROJECT NUMBER: US-EI-3652230437	
DRAWING NUMBER: **D-101**	
SHEET NUMBER: **1 OF 3**	

D:\Blue Wave\US-EI-3652230437 - Old Post Rd Worthington\7.4 Stormwater\Sheets\D1 - Old Post Rd.dwg - D-101 - Sep. 25, 2026 1:13pm - USKS140856

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NOTES:

1. ELECTRICAL DESIGN, INCLUDING UTILITY POLES, PERFORMED BY OTHERS. ELECTRICAL EQUIPMENT AND COMPONENTS SHOWN TO ILLUSTRATE LOCATIONS ONLY. REFER TO ELECTRICAL DRAWINGS FOR DETAILED ELECTRICAL SYSTEM.
2. ALL AREAS WITHIN LIMIT OF DISTURBANCE TO BE SEEDED AS SPECIFIED IN THE SEEDING & REVEGETATION PLAN ON SHEET G-001.

D-103 EXTENTS

2000' TO HUNTINGTON ROAD

EXISTING:
- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- INTERNAL PROPERTY LINE
- ABUTTER'S PROPERTY LINE
- ZO — PROPERTY LINE SETBACK
- RIGHT OF WAY
- EASEMENT
- STRUCTURE
- ASPHALT
- GRAVEL
- DIRT ROAD
- STONE WALL
- ELECTRIC FENCE
- EDGE OF VEGETATION
- PRIME FARMLAND
- TRAIL
- WETLAND
- WETLAND FLAG
- 100' BUFFER
- 200' RIVER FRONT AREA
- WATERBODY
- FEMA FLOOD HAZARD ZONE
- CONSERVATION AREA
- OHE — OVERHEAD WIRE
- UTILITY POLE
- SS — SEWER / SEPTIC
- SEWER MANHOLE
- GATE
- PROPANE TANK
- WATER SPIGOT
- BOUNDARY EVIDENCE

PROPOSED:
- LOW — LIMIT OF WORK
- 1450 — MAJOR CONTOUR
- MINOR CONTOUR
- TC — TREE CLEARING
- REMOVED EXISTING FENCE
- FIXED KNOT GAME FENCE
- DOUBLE SWING GATE
- OHE — OVERHEAD ELECTRIC
- SB — SEDIMENT BARRIER
- EC — ELECTRICAL CONDUIT
- PERMEABLE PAVEMENT
- GRAVEL ACCESS ROAD
- CONCRETE PAD
- SOLAR PV ARRAY
- UTILITY POLE
- SCREENING VEGETATION

HYDROLOGY:
- SUBCATCHMENT BOUNDARY
- TIME OF CONCENTRATION
- LAG PATH
- HSG C SOIL
- LBL — POND
- LBL — SUBCATCHMENT
- LBL — REACH
- LBL — LINK

P-S-N, P-S-E, P-S-SE, P-S-SW, P-S-B, P-S-PAD, P-PAD, P-B, P-L3, P-L4, P-DP-P, P-DP-U, P-DP-W

0' 100' 200' 300'
1" = 200' WHEN PLOTTED 24" X 36"

ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION

WSP USA INC.
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FAX: (978) 692-6633
WEB: WWW.WSP.COM

REVISION	DATE	ISSUE / REVISION DESCRIPTION	ISSUED	APPROVED
1	09/25/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	KRS	OAC
0	02/09/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC

PROJECT:
3 MW AC GROUND-MOUNT SOLAR PV DEVELOPMENT
105 OLD POST RD
WORTHINGTON, MA 01098

TITLE:
PROPOSED CONDITIONS DRAINAGE ANALYSIS (OVERALL LAYOUT)

CLIENT:
WARD STREAM, LLC

SEAL:
COMMONWEALTH OF MASSACHUSETTS
OLIVIA CROSBY
CIVIL
No. 54915
PROFESSIONAL ENGINEER
09/25/2026

DESIGNED BY: OAC	DRAWN BY: MRB
CHECKED BY: APV	SCALE: AS SHOWN
PROJECT NUMBER: US-EI-3652230437	
DRAWING NUMBER: D-102	
SHEET NUMBER: 2 OF 3	

D:\BlueWave\US-EI-3652230437 - Old Post Rd Worthington\7.4 Stormwater\Sheets\D1 - Old Post Rd.dwg D-102 Sep 25, 2026 1:14pm USKS140656

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NOTES:

1. ELECTRICAL DESIGN, INCLUDING UTILITY POLES, PERFORMED BY OTHERS. ELECTRICAL EQUIPMENT AND COMPONENTS SHOWN TO ILLUSTRATE LOCATIONS ONLY. REFER TO ELECTRICAL DRAWINGS FOR DETAILED ELECTRICAL SYSTEM.
2. ALL AREAS WITHIN LIMIT OF DISTURBANCE TO BE SEEDED AS SPECIFIED IN THE SEEDING & REVEGETATION PLAN ON SHEET G-001.

EXISTING:
- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- INTERNAL PROPERTY LINE
- ABUTTER'S PROPERTY LINE
- ZO — PROPERTY LINE SETBACK
- RIGHT OF WAY
- EASEMENT
- STRUCTURE
- ASPHALT
- GRAVEL
- DIRT ROAD
- STONE WALL
- ELECTRIC FENCE
- EDGE OF VEGETATION
- PRIME FARMLAND
- TRAIL
- WETLAND
- WETLAND FLAG
- 100' BUFFER
- 200' RIVER FRONT AREA
- WATERBODY
- FEMA FLOOD HAZARD ZONE
- CONSERVATION AREA
- OHE — OVERHEAD WIRE
- UTILITY POLE
- SS — SEWER / SEPTIC
- SEWER MANHOLE
- GATE
- PROPANE TANK
- WATER SPIGOT
- BOUNDARY EVIDENCE

PROPOSED:
- LOW — LIMIT OF WORK
- 1450 — MAJOR CONTOUR
- MINOR CONTOUR
- TC — TREE CLEARING
- REMOVED EXISTING FENCE
- FIXED KNOT GAME FENCE
- DOUBLE SWING GATE
- OHE — OVERHEAD ELECTRIC
- SB — SEDIMENT BARRIER
- EC — ELECTRICAL CONDUIT
- PERMEABLE PAVEMENT
- GRAVEL ACCESS ROAD
- CONCRETE PAD
- SOLAR PV ARRAY
- UTILITY POLE
- SCREENING VEGETATION

HYDROLOGY:
- SUBCATCHMENT BOUNDARY
- TIME OF CONCENTRATION
- LAG PATH
- HSG C SOIL
- LBL — POND
- LBL — SUBCATCHMENT
- LBL — REACH
- LBL — LINK

P-S-N, P-S-SW, P-S-B, P-S-PAD, P-B, P-PAD

0' 30' 60' 90'
1" = 60' WHEN PLOTTED 24" X 36"

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REVISION	DATE	ISSUE / REVISION DESCRIPTION	ISSUED	APPROVED
1	09/25/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	KRS	OAC
0	02/09/2026	ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION	MRB	OAC

PROJECT:
3 MW AC GROUND-MOUNT SOLAR PV DEVELOPMENT
105 OLD POST RD
WORTHINGTON, MA 01098

TITLE:
PROPOSED CONDITIONS DRAINAGE ANALYSIS (ENLARGED LAYOUT)

CLIENT:
WARD STREAM, LLC

SEAL:
COMMONWEALTH OF MASSACHUSETTS
OLIVIA CROSBY
CIVIL
No. 54915
PROFESSIONAL ENGINEER
09/25/2026

DESIGNED BY: OAC	DRAWN BY: MRB
CHECKED BY: APV	SCALE: AS SHOWN
PROJECT NUMBER:	US-EI-3652230437
DRAWING NUMBER:	D-103
SHEET NUMBER:	3 OF 3

D:\BlueWave\US-EI-3652230437 - Old Post Rd Worthington\7.4 Stormwater\Sheets\D1 - Old Post Rd.dwg - D-103 - Sep 25, 2026, 1:16pm - USKS140865

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Appendix H – Operation & Maintenance Log Forms

Operation & Maintenance Log Form

Site: Bluewave Old Post Road

Address: 105 Old Post Road, Worthington, MA

Inspector:

Company:

Date:

Date of last inspection:

General Site Maintenance

Activity	Details	Performed?	Notes
Inspect	Inspect for any eroded drainage paths and repair as necessary.	☐ Y ☐ N	
Clean	Remove trash, leaves, and other debris.	☐ Y ☐ N	
Mow	Grass height shall not exceed 18 inches.	☐ Y ☐ N	
Sweep	Remove sediment build-up on roadways and drives.	☐ Y ☐ N	

Crushed Stone Access Road

Activity	Details	Performed?	Notes
Inspect	Check for standing water, uneven surface, snowplow damage, and vegetation.	☐ Y ☐ N	
Re-grade the stone	Redistribute and compact washed crushed stone to restore grades in original design.	☐ Y ☐ N	

Activity	Details	Performed?	Notes
Remove vegetation	Manually remove vegetation that is growing within the road surface area.	☐ Y ☐ N	
Repair potholes and snowplow damage	Fill and compact potholes and other road damage with design specific material.	☐ Y ☐ N	
Restore infiltration	If water remains on road surface >48 hours after storm, excavate, scarify the underlying topsoil, and replace the stone.	☐ Y ☐ N	
Clean	Remove trash and debris from the road surface.	☐ Y ☐ N	

Dry Detention Basin

Activity	Details	Performed?	Notes
Inspect	Inspect for adequate vegetation, signs of erosion, rilling and gullying. Check for slope integrity, soil moisture, vegetative health, soil stability, soil compaction, soil erosion, ponding and sedimentation.	☐ Y ☐ N	
Mow	Mow the upper-stage, side slopes, embankment, and emergency spillway twice a year.	☐ Y ☐ N	
Remove sediment	Remove sediment and other debris manually.	☐ Y ☐ N	
Reseed	Reseed as necessary to ensure that vegetative cover is never below 80%.	☐ Y ☐ N	

Permeable Pavement

Activity	Details	Performed?	Notes
Monitor	Ensure that the paving surface drains properly after storms.	☐ Y ☐ N	
Clean	Remove sediment and other debris manually.	☐ Y ☐ N	
Inspect	Check for deterioration or clogging of the surface layer.	☐ Y ☐ N	
Assess Performance	Measure the exfiltration capacity. When exfiltration capacity is found to decline, implement measures to restore original exfiltration capacity. This may require removing the permeable materials, stripping accumulating sediment from the bottom, scarifying and tilling to induce infiltration and replacing the permeable materials.	☐ Y ☐ N	

Non-compliance/Corrective actions

Describe any incidents of non-compliance and corrective actions taken to address those not described above:

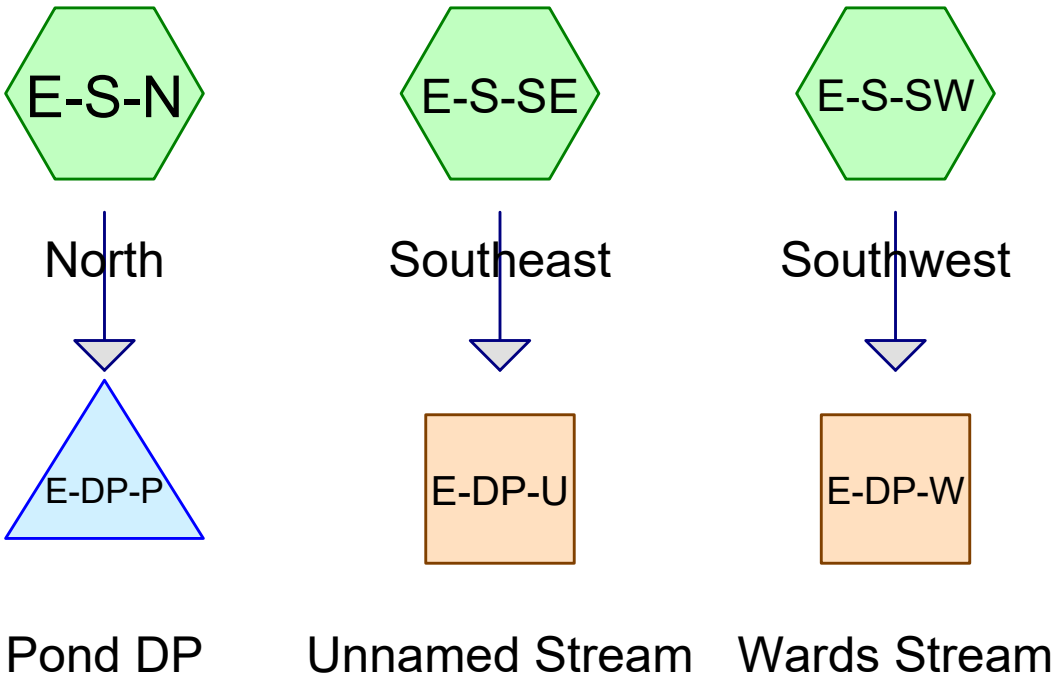
Print Name:

Signature:

Date:

Appendix I – HydroCAD Reports

Existing Conditions HydroCAD



Subcat Reach Pond Link

Routing Diagram for Old Post Road 9-11-26
Prepared by WSP USA, Printed 9/11/2026
HydroCAD® 10.20-6a s/n 00854 © 2024 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
28,883	96	Gravel surface, HSG C (E-S-N, E-S-SW)
727,619	74	Pasture/grassland/range, Good, HSG C (E-S-N, E-S-SE, E-S-SW)
861,777	80	Pasture/grassland/range, Good, HSG D (E-S-N, E-S-SE, E-S-SW)
2,244	98	Unconnected pavement, HSG C (E-S-N)
33,461	98	Unconnected pavement, HSG D (E-S-N, E-S-SE, E-S-SW)
27,183	98	Water Surface, 0% imp, HSG D (E-S-N, E-S-SW)
214,196	70	Woods, Good, HSG C (E-S-SE, E-S-SW)
2,204,718	77	Woods, Good, HSG D (E-S-N, E-S-SE, E-S-SW)
4,100,081	**77**	**TOTAL AREA**

Time span=0.00-100.00 hrs, dt=0.02 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-S-N: North Runoff Area=838,796 sf 2.07% Impervious Runoff Depth=1.40"
Flow Length=997' Tc=15.5 min CN=79 Runoff=23.28 cfs 98,186 cf

Subcatchment E-S-SE: Southeast Runoff Area=628,820 sf 2.46% Impervious Runoff Depth=1.28"
Flow Length=1,424' Tc=21.1 min CN=77 Runoff=13.83 cfs 66,891 cf

Subcatchment E-S-SW: Southwest Runoff Area=2,632,465 sf 0.11% Impervious Runoff Depth=1.22"
Flow Length=2,768' Tc=21.9 min CN=76 Runoff=53.82 cfs 266,551 cf

Reach E-DP-U: Unnamed Stream Inflow=13.83 cfs 66,891 cf
Outflow=13.83 cfs 66,891 cf

Reach E-DP-W: Wards Stream Inflow=53.82 cfs 266,551 cf
Outflow=53.82 cfs 266,551 cf

Pond E-DP-P: Pond DP Inflow=23.28 cfs 98,186 cf
Primary=23.28 cfs 98,186 cf

Total Runoff Area = 4,100,081 sf Runoff Volume = 431,629 cf Average Runoff Depth = 1.26"
99.13% Pervious = 4,064,376 sf 0.87% Impervious = 35,705 sf

Summary for Subcatchment E-S-N: North

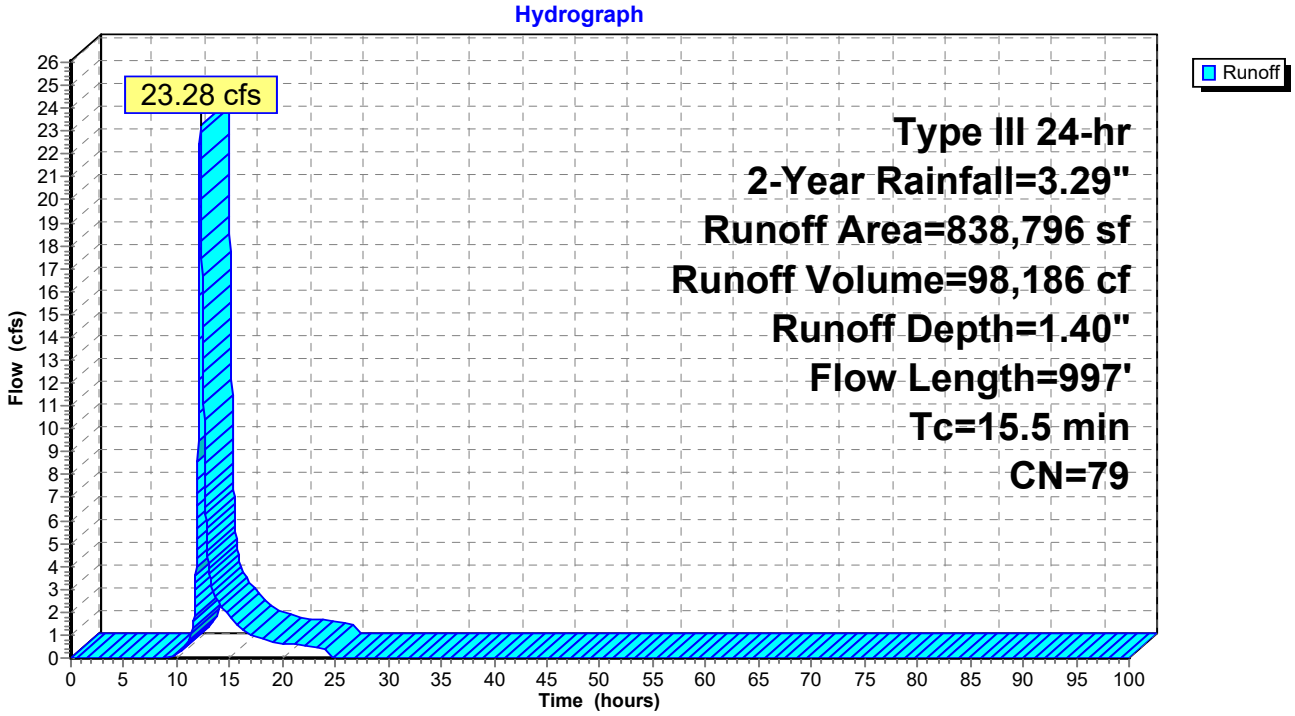
Runoff = 23.28 cfs @ 12.22 hrs, Volume= 98,186 cf, Depth= 1.40"
Routed to Pond E-DP-P : Pond DP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
24,996	74	Pasture/grassland/range, Good, HSG C
12,419	96	Gravel surface, HSG C
14	80	Pasture/grassland/range, Good, HSG D
300,464	80	Pasture/grassland/range, Good, HSG D
15,084	98	Unconnected pavement, HSG D
24,961	98	Water Surface, 0% imp, HSG D
458,614	77	Woods, Good, HSG D
2,244	98	Unconnected pavement, HSG C
838,796	79	Weighted Average
821,468		97.93% Pervious Area
17,328		2.07% Impervious Area
17,328		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0568	0.26		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.29"
1.4	113	0.0709	1.33		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
1.5	192	0.0975	2.19		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
6.2	592	0.1004	1.58		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
15.5	997	Total			

Subcatchment E-S-N: North



Summary for Subcatchment E-S-SE: Southeast

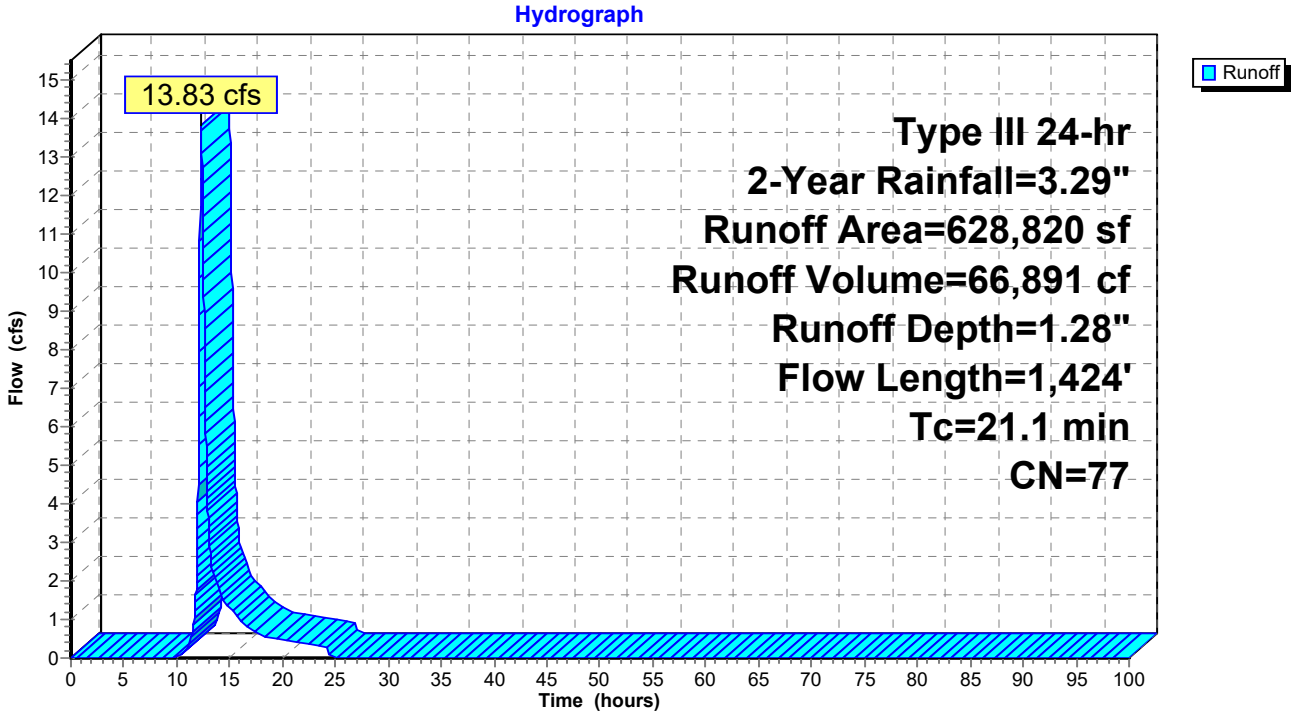
Runoff = 13.83 cfs @ 12.31 hrs, Volume= 66,891 cf, Depth= 1.28"
Routed to Reach E-DP-U : Unnamed Stream

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
15,467	98	Unconnected pavement, HSG D
2,356	80	Pasture/grassland/range, Good, HSG D
59,298	70	Woods, Good, HSG C
239,199	77	Woods, Good, HSG D
98,738	74	Pasture/grassland/range, Good, HSG C
213,762	80	Pasture/grassland/range, Good, HSG D
628,820	77	Weighted Average
613,353		97.54% Pervious Area
15,467		2.46% Impervious Area
15,467		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0696	0.28		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.29"
8.7	708	0.0378	1.36		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
6.5	616	0.0502	1.57		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
21.1	1,424	Total			

Subcatchment E-S-SE: Southeast



Summary for Subcatchment E-S-SW: Southwest

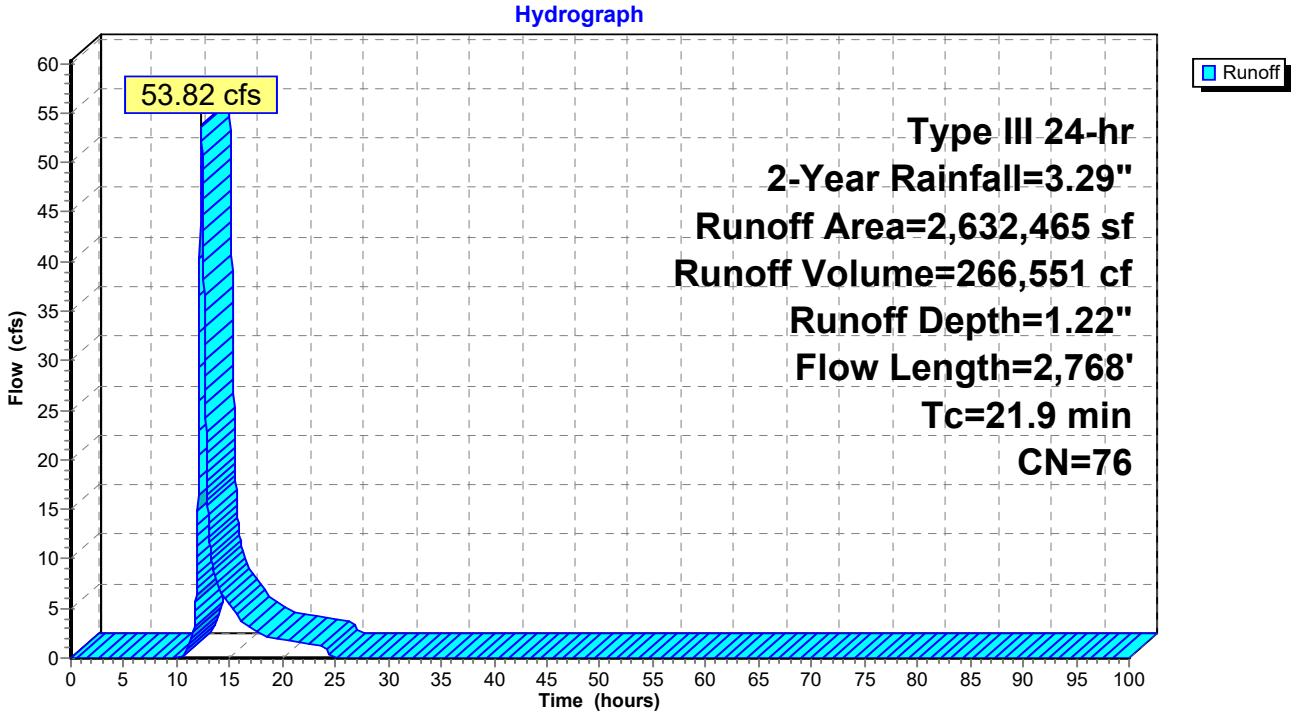
Runoff = 53.82 cfs @ 12.32 hrs, Volume= 266,551 cf, Depth= 1.22"
Routed to Reach E-DP-W : Wards Stream

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
2,222	98	Water Surface, 0% imp, HSG D
154,898	70	Woods, Good, HSG C
16,464	96	Gravel surface, HSG C
345,181	80	Pasture/grassland/range, Good, HSG D
603,885	74	Pasture/grassland/range, Good, HSG C
1,506,905	77	Woods, Good, HSG D
2,910	98	Unconnected pavement, HSG D
2,632,465	76	Weighted Average
2,629,555		99.89% Pervious Area
2,910		0.11% Impervious Area
2,910		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	29	0.1254	0.13		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.29"
4.8	71	0.0431	0.25		**Sheet Flow, BC** Range n= 0.130 P2= 3.29"
1.7	114	0.0258	1.12		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
3.7	336	0.0476	1.53		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
2.8	298	0.0654	1.79		**Shallow Concentrated Flow, EF** Short Grass Pasture Kv= 7.0 fps
1.8	170	0.1027	1.60		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
1.1	1,008	0.0634	14.98	599.10	**Trap/Vee/Rect Channel Flow, GH** Bot.W=10.00' D=2.00' Z= 5.0 '/' Top.W=30.00' n= 0.030 Earth, grassed & winding
2.2	742		5.67		**Lake or Reservoir, HI** Mean Depth= 1.00'
21.9	2,768	Total			

Subcatchment E-S-SW: Southwest



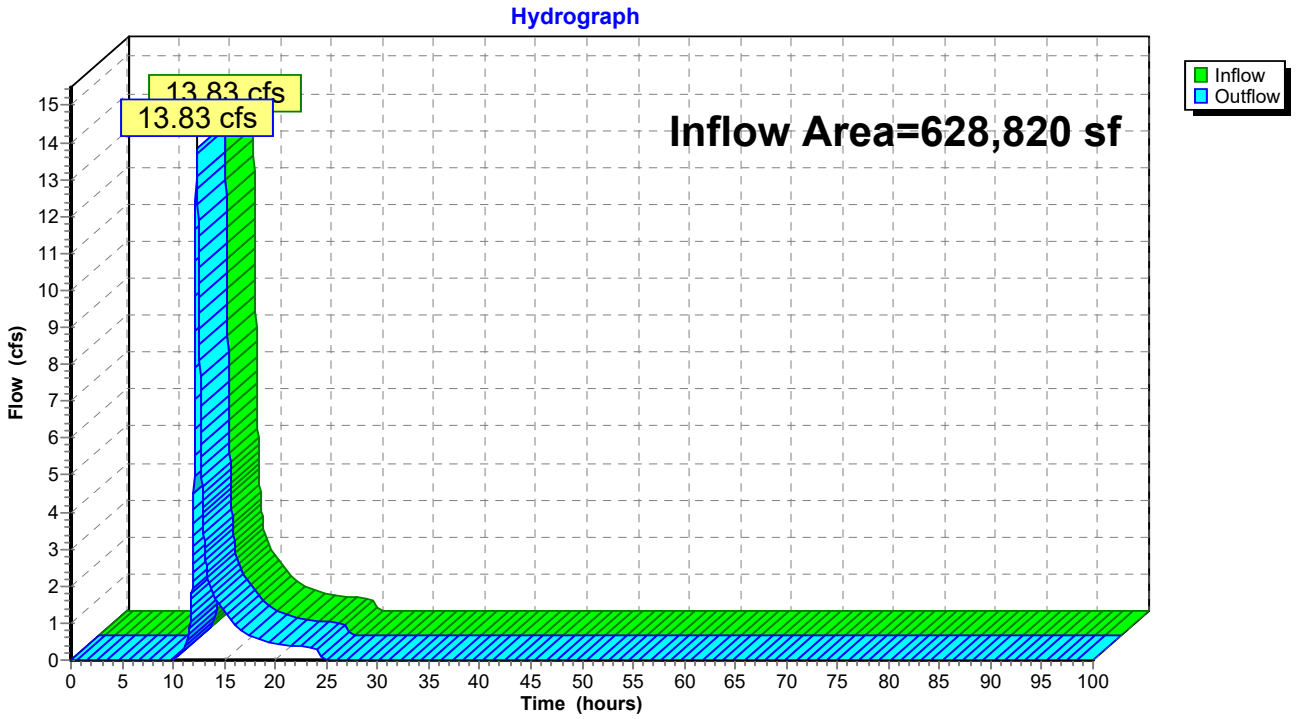
Summary for Reach E-DP-U: Unnamed Stream

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

Inflow Area = 628,820 sf, 2.46% Impervious, Inflow Depth = 1.28" for 2-Year event
Inflow = 13.83 cfs @ 12.31 hrs, Volume= 66,891 cf
Outflow = 13.83 cfs @ 12.31 hrs, Volume= 66,891 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Reach E-DP-U: Unnamed Stream



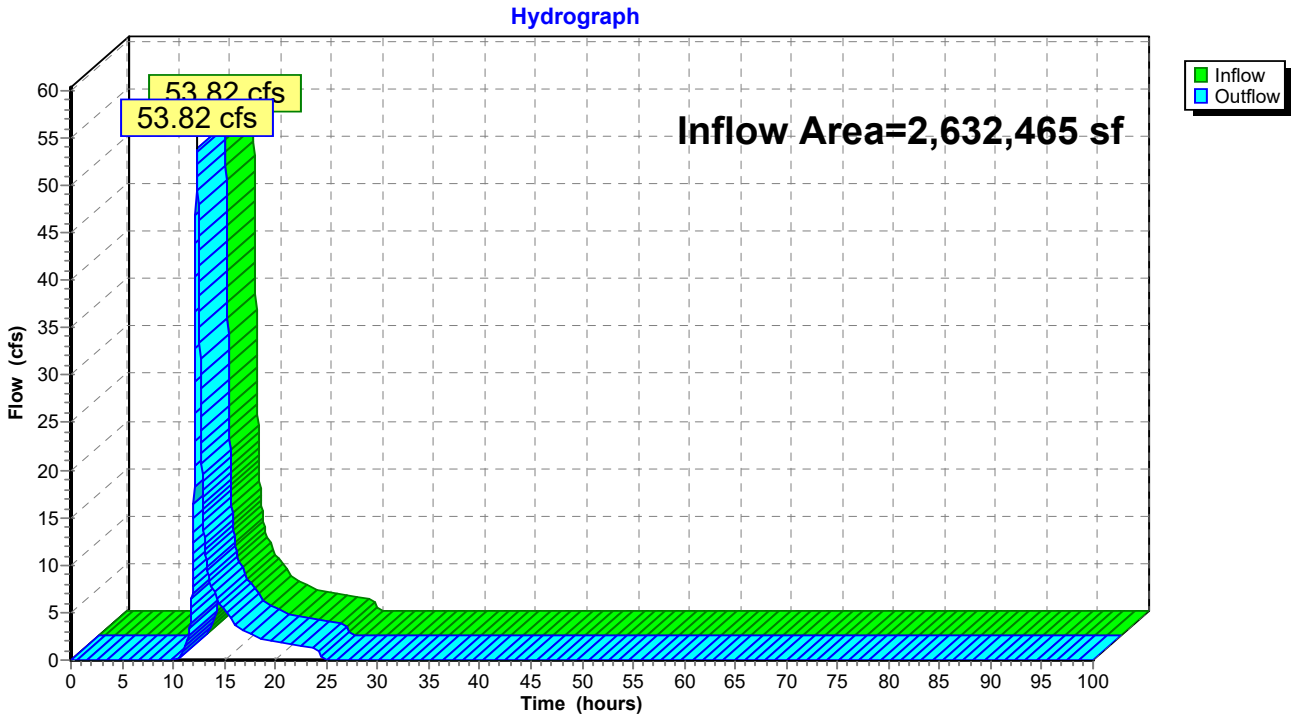
Summary for Reach E-DP-W: Wards Stream

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

Inflow Area = 2,632,465 sf, 0.11% Impervious, Inflow Depth = 1.22" for 2-Year event
Inflow = 53.82 cfs @ 12.32 hrs, Volume= 266,551 cf
Outflow = 53.82 cfs @ 12.32 hrs, Volume= 266,551 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Reach E-DP-W: Wards Stream



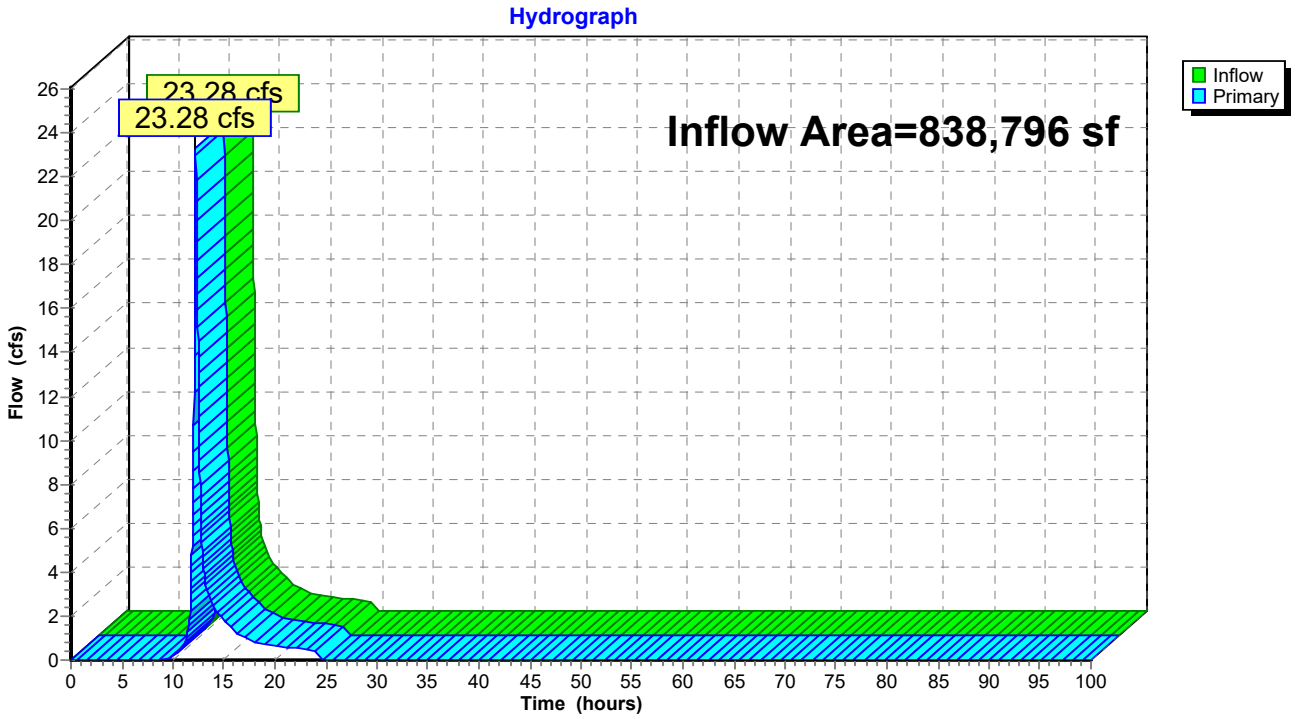
Summary for Pond E-DP-P: Pond DP

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

Inflow Area = 838,796 sf, 2.07% Impervious, Inflow Depth = 1.40" for 2-Year event
Inflow = 23.28 cfs @ 12.22 hrs, Volume= 98,186 cf
Primary = 23.28 cfs @ 12.22 hrs, Volume= 98,186 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Pond E-DP-P: Pond DP



Time span=0.00-100.00 hrs, dt=0.02 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-S-N: North Runoff Area=838,796 sf 2.07% Impervious Runoff Depth=2.93"
Flow Length=997' Tc=15.5 min CN=79 Runoff=49.43 cfs 204,891 cf

Subcatchment E-S-SE: Southeast Runoff Area=628,820 sf 2.46% Impervious Runoff Depth=2.75"
Flow Length=1,424' Tc=21.1 min CN=77 Runoff=30.64 cfs 144,050 cf

Subcatchment E-S-SW: Southwest Runoff Area=2,632,465 sf 0.11% Impervious Runoff Depth=2.66"
Flow Length=2,768' Tc=21.9 min CN=76 Runoff=121.97 cfs 583,448 cf

Reach E-DP-U: Unnamed Stream Inflow=30.64 cfs 144,050 cf
Outflow=30.64 cfs 144,050 cf

Reach E-DP-W: Wards Stream Inflow=121.97 cfs 583,448 cf
Outflow=121.97 cfs 583,448 cf

Pond E-DP-P: Pond DP Inflow=49.43 cfs 204,891 cf
Primary=49.43 cfs 204,891 cf

Total Runoff Area = 4,100,081 sf Runoff Volume = 932,389 cf Average Runoff Depth = 2.73"
99.13% Pervious = 4,064,376 sf 0.87% Impervious = 35,705 sf

Summary for Subcatchment E-S-N: North

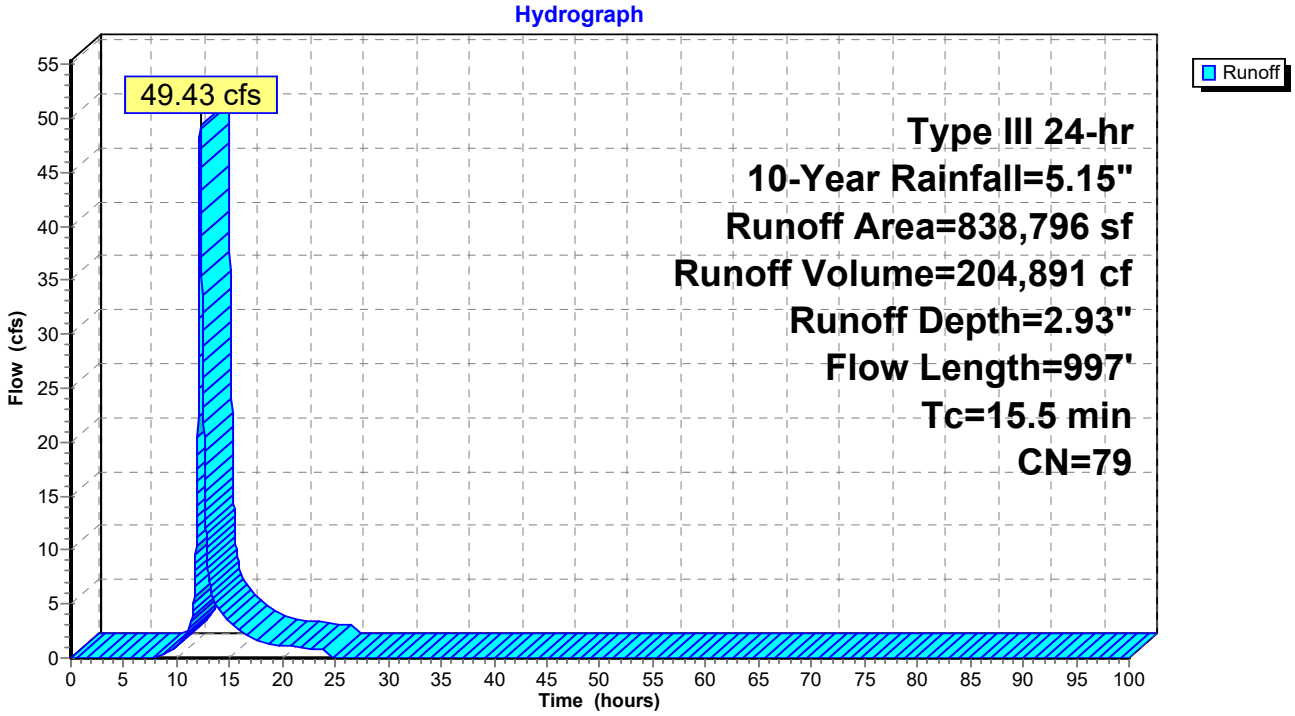
Runoff = 49.43 cfs @ 12.21 hrs, Volume= 204,891 cf, Depth= 2.93"
Routed to Pond E-DP-P : Pond DP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=5.15"

Area (sf)	CN	Description
24,996	74	Pasture/grassland/range, Good, HSG C
12,419	96	Gravel surface, HSG C
14	80	Pasture/grassland/range, Good, HSG D
300,464	80	Pasture/grassland/range, Good, HSG D
15,084	98	Unconnected pavement, HSG D
24,961	98	Water Surface, 0% imp, HSG D
458,614	77	Woods, Good, HSG D
2,244	98	Unconnected pavement, HSG C
838,796	79	Weighted Average
821,468		97.93% Pervious Area
17,328		2.07% Impervious Area
17,328		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0568	0.26		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.29"
1.4	113	0.0709	1.33		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
1.5	192	0.0975	2.19		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
6.2	592	0.1004	1.58		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
15.5	997	Total			

Subcatchment E-S-N: North



Summary for Subcatchment E-S-SE: Southeast

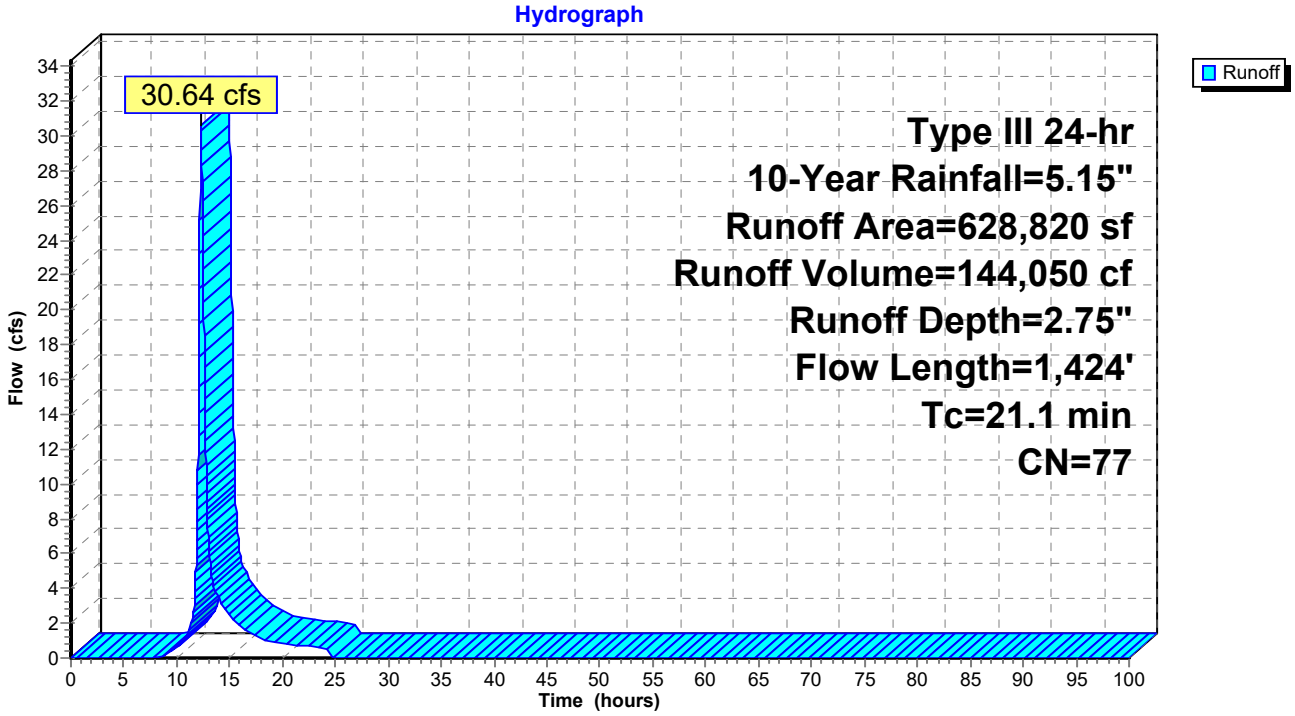
Runoff = 30.64 cfs @ 12.29 hrs, Volume= 144,050 cf, Depth= 2.75"
Routed to Reach E-DP-U : Unnamed Stream

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=5.15"

Area (sf)	CN	Description
15,467	98	Unconnected pavement, HSG D
2,356	80	Pasture/grassland/range, Good, HSG D
59,298	70	Woods, Good, HSG C
239,199	77	Woods, Good, HSG D
98,738	74	Pasture/grassland/range, Good, HSG C
213,762	80	Pasture/grassland/range, Good, HSG D
628,820	77	Weighted Average
613,353		97.54% Pervious Area
15,467		2.46% Impervious Area
15,467		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0696	0.28		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.29"
8.7	708	0.0378	1.36		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
6.5	616	0.0502	1.57		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
21.1	1,424	Total			

Subcatchment E-S-SE: Southeast



Summary for Subcatchment E-S-SW: Southwest

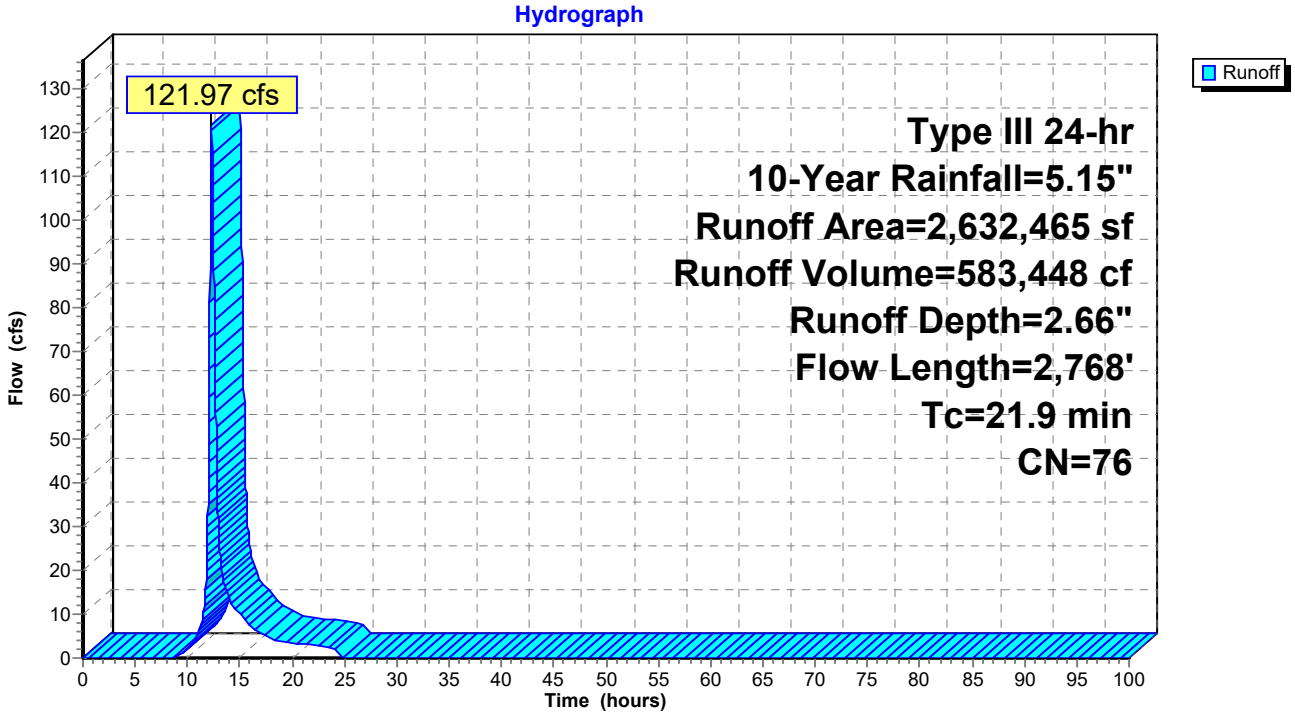
Runoff = 121.97 cfs @ 12.31 hrs, Volume= 583,448 cf, Depth= 2.66"
Routed to Reach E-DP-W : Wards Stream

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=5.15"

Area (sf)	CN	Description
2,222	98	Water Surface, 0% imp, HSG D
154,898	70	Woods, Good, HSG C
16,464	96	Gravel surface, HSG C
345,181	80	Pasture/grassland/range, Good, HSG D
603,885	74	Pasture/grassland/range, Good, HSG C
1,506,905	77	Woods, Good, HSG D
2,910	98	Unconnected pavement, HSG D
2,632,465	76	Weighted Average
2,629,555		99.89% Pervious Area
2,910		0.11% Impervious Area
2,910		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	29	0.1254	0.13		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.29"
4.8	71	0.0431	0.25		**Sheet Flow, BC** Range n= 0.130 P2= 3.29"
1.7	114	0.0258	1.12		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
3.7	336	0.0476	1.53		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
2.8	298	0.0654	1.79		**Shallow Concentrated Flow, EF** Short Grass Pasture Kv= 7.0 fps
1.8	170	0.1027	1.60		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
1.1	1,008	0.0634	14.98	599.10	**Trap/Vee/Rect Channel Flow, GH** Bot.W=10.00' D=2.00' Z= 5.0 '/' Top.W=30.00' n= 0.030 Earth, grassed & winding
2.2	742		5.67		**Lake or Reservoir, HI** Mean Depth= 1.00'
21.9	2,768	Total			

Subcatchment E-S-SW: Southwest



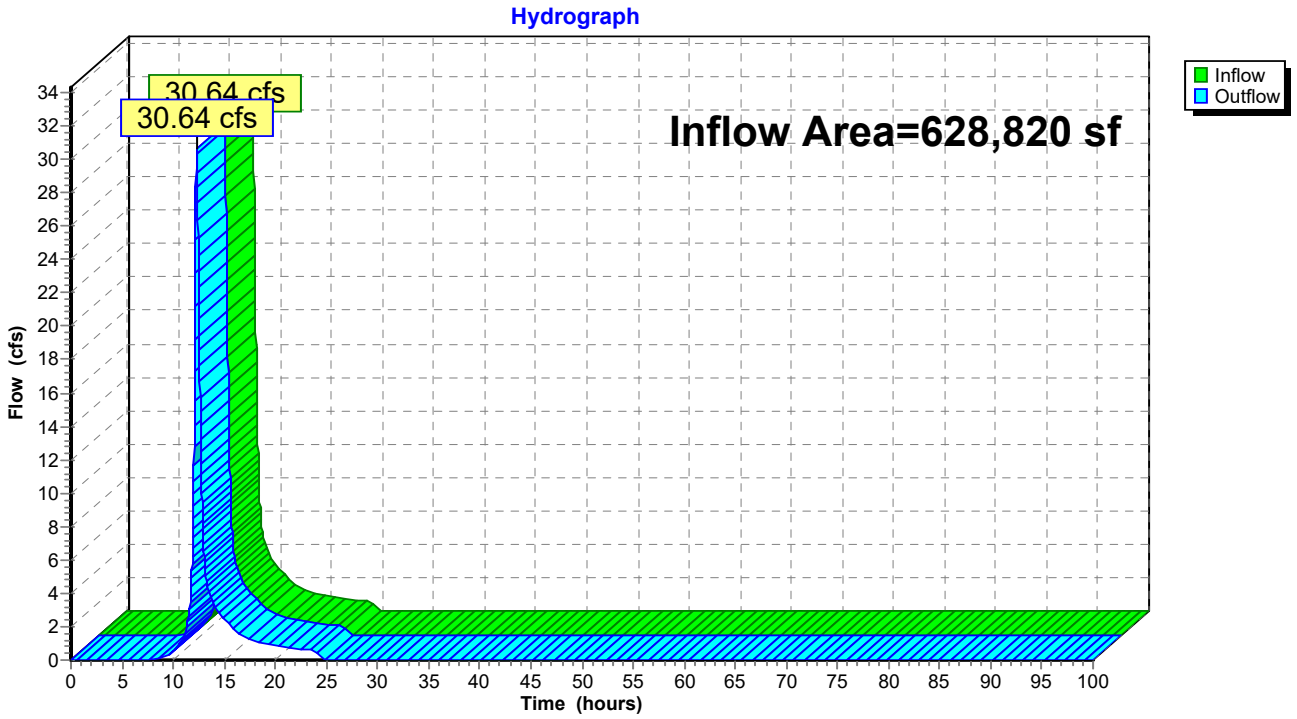
Summary for Reach E-DP-U: Unnamed Stream

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

Inflow Area = 628,820 sf, 2.46% Impervious, Inflow Depth = 2.75" for 10-Year event
Inflow = 30.64 cfs @ 12.29 hrs, Volume= 144,050 cf
Outflow = 30.64 cfs @ 12.29 hrs, Volume= 144,050 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Reach E-DP-U: Unnamed Stream



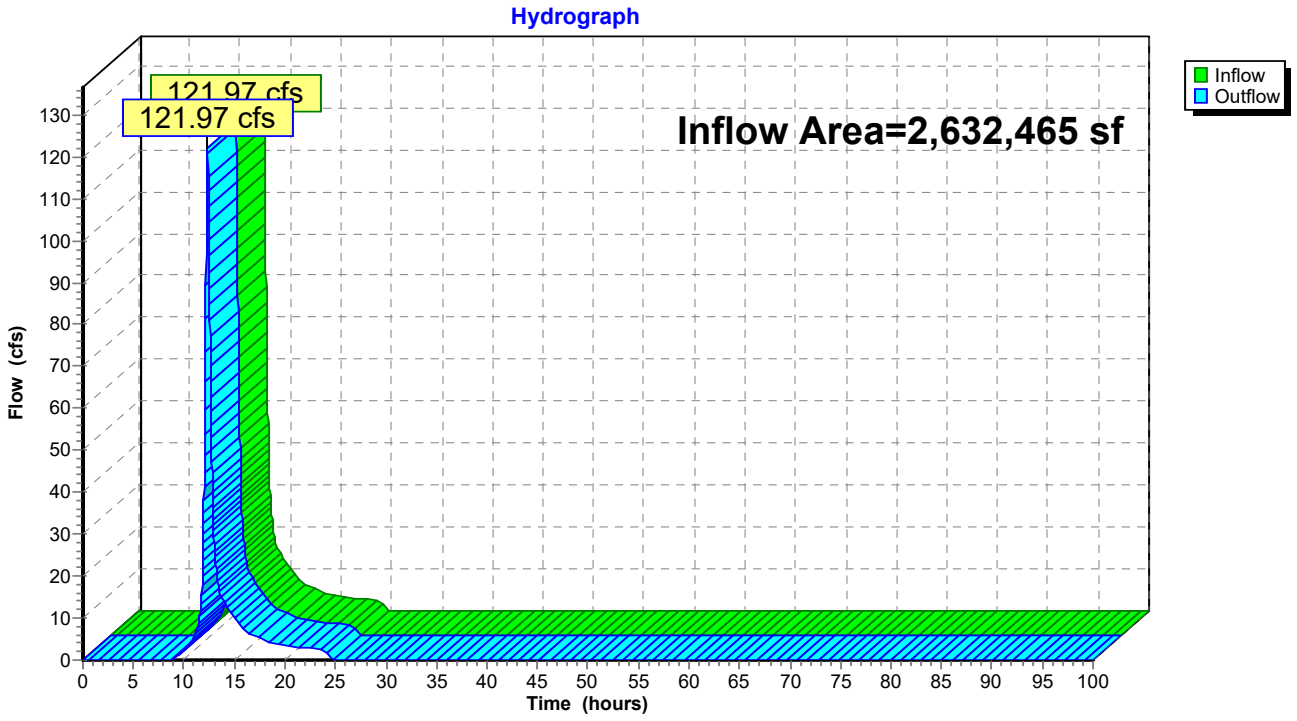
Summary for Reach E-DP-W: Wards Stream

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

Inflow Area = 2,632,465 sf, 0.11% Impervious, Inflow Depth = 2.66" for 10-Year event
Inflow = 121.97 cfs @ 12.31 hrs, Volume= 583,448 cf
Outflow = 121.97 cfs @ 12.31 hrs, Volume= 583,448 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Reach E-DP-W: Wards Stream



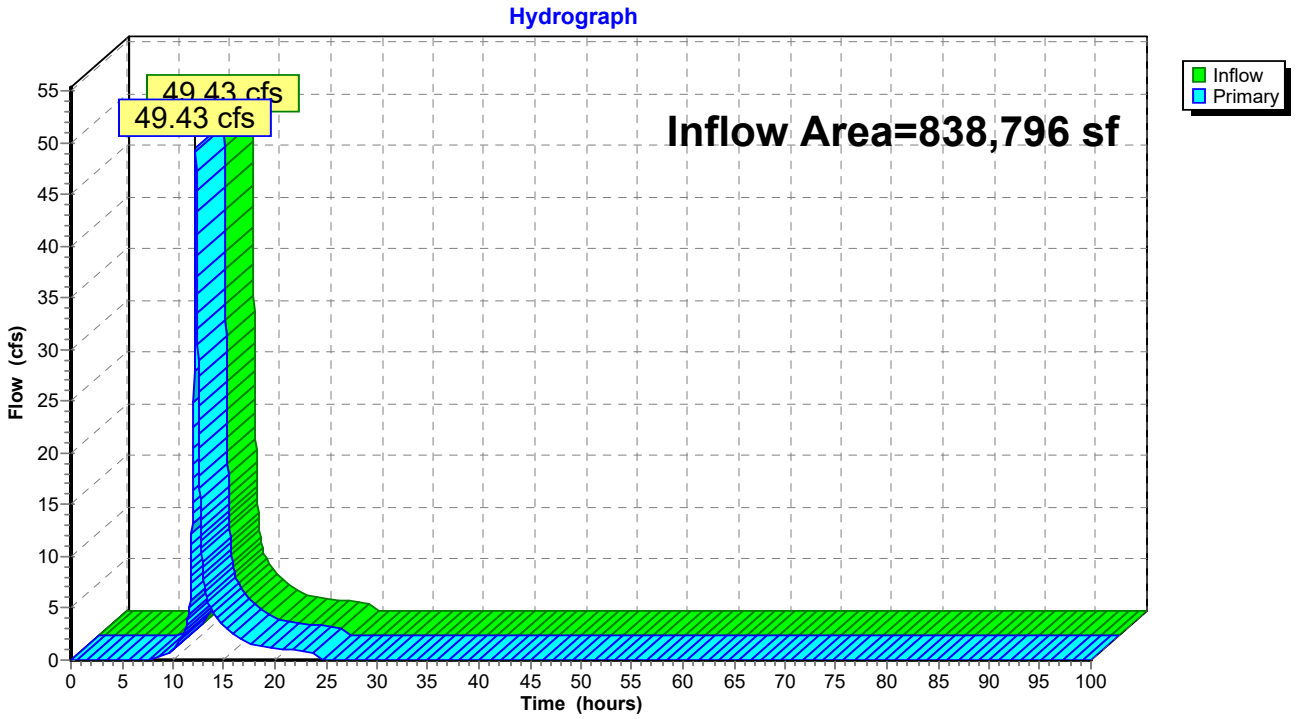
Summary for Pond E-DP-P: Pond DP

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

Inflow Area = 838,796 sf, 2.07% Impervious, Inflow Depth = 2.93" for 10-Year event
Inflow = 49.43 cfs @ 12.21 hrs, Volume= 204,891 cf
Primary = 49.43 cfs @ 12.21 hrs, Volume= 204,891 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Pond E-DP-P: Pond DP



Time span=0.00-100.00 hrs, dt=0.02 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-S-N: North Runoff Area=838,796 sf 2.07% Impervious Runoff Depth=5.61"
Flow Length=997' Tc=15.5 min CN=79 Runoff=93.67 cfs 392,166 cf

Subcatchment E-S-SE: Southeast Runoff Area=628,820 sf 2.46% Impervious Runoff Depth=5.38"
Flow Length=1,424' Tc=21.1 min CN=77 Runoff=59.62 cfs 281,677 cf

Subcatchment E-S-SW: Southwest Runoff Area=2,632,465 sf 0.11% Impervious Runoff Depth=5.26"
Flow Length=2,768' Tc=21.9 min CN=76 Runoff=240.83 cfs 1,153,480 cf

Reach E-DP-U: Unnamed Stream Inflow=59.62 cfs 281,677 cf
Outflow=59.62 cfs 281,677 cf

Reach E-DP-W: Wards Stream Inflow=240.83 cfs 1,153,480 cf
Outflow=240.83 cfs 1,153,480 cf

Pond E-DP-P: Pond DP Inflow=93.67 cfs 392,166 cf
Primary=93.67 cfs 392,166 cf

Total Runoff Area = 4,100,081 sf Runoff Volume = 1,827,323 cf Average Runoff Depth = 5.35"
99.13% Pervious = 4,064,376 sf 0.87% Impervious = 35,705 sf

Summary for Subcatchment E-S-N: North

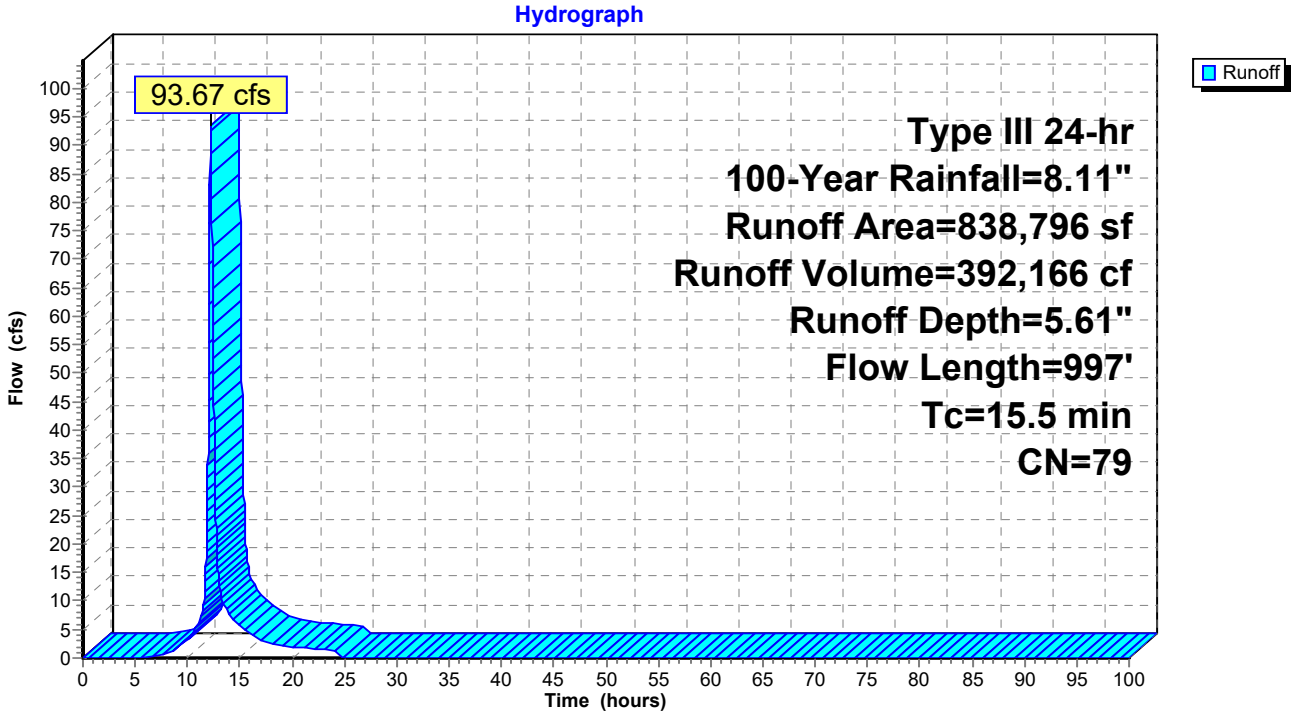
Runoff = 93.67 cfs @ 12.21 hrs, Volume= 392,166 cf, Depth= 5.61"
Routed to Pond E-DP-P : Pond DP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.11"

Area (sf)	CN	Description
24,996	74	Pasture/grassland/range, Good, HSG C
12,419	96	Gravel surface, HSG C
14	80	Pasture/grassland/range, Good, HSG D
300,464	80	Pasture/grassland/range, Good, HSG D
15,084	98	Unconnected pavement, HSG D
24,961	98	Water Surface, 0% imp, HSG D
458,614	77	Woods, Good, HSG D
2,244	98	Unconnected pavement, HSG C
838,796	79	Weighted Average
821,468		97.93% Pervious Area
17,328		2.07% Impervious Area
17,328		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0568	0.26		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.29"
1.4	113	0.0709	1.33		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
1.5	192	0.0975	2.19		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
6.2	592	0.1004	1.58		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
15.5	997	Total			

Subcatchment E-S-N: North



Summary for Subcatchment E-S-SE: Southeast

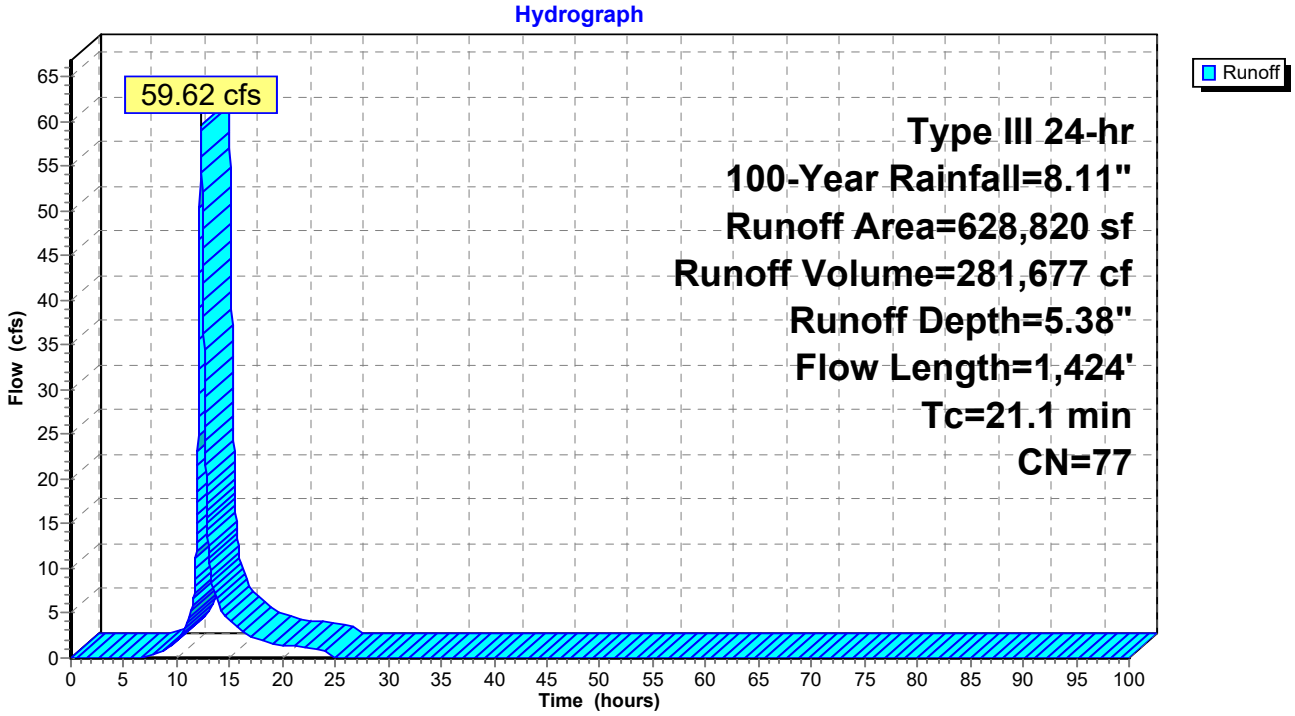
Runoff = 59.62 cfs @ 12.29 hrs, Volume= 281,677 cf, Depth= 5.38"
Routed to Reach E-DP-U : Unnamed Stream

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.11"

Area (sf)	CN	Description
15,467	98	Unconnected pavement, HSG D
2,356	80	Pasture/grassland/range, Good, HSG D
59,298	70	Woods, Good, HSG C
239,199	77	Woods, Good, HSG D
98,738	74	Pasture/grassland/range, Good, HSG C
213,762	80	Pasture/grassland/range, Good, HSG D
628,820	77	Weighted Average
613,353		97.54% Pervious Area
15,467		2.46% Impervious Area
15,467		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0696	0.28		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.29"
8.7	708	0.0378	1.36		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
6.5	616	0.0502	1.57		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
21.1	1,424	Total			

Subcatchment E-S-SE: Southeast



Summary for Subcatchment E-S-SW: Southwest

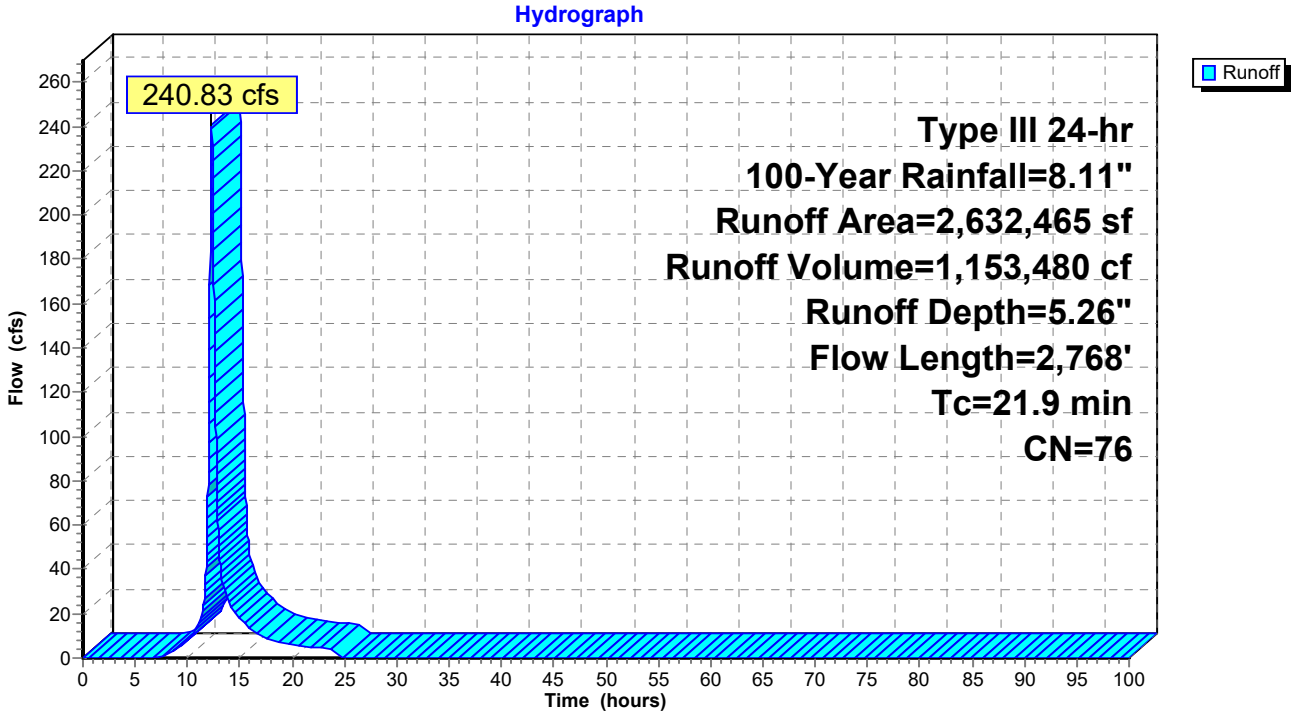
Runoff = 240.83 cfs @ 12.30 hrs, Volume= 1,153,480 cf, Depth= 5.26"
Routed to Reach E-DP-W : Wards Stream

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.11"

Area (sf)	CN	Description
2,222	98	Water Surface, 0% imp, HSG D
154,898	70	Woods, Good, HSG C
16,464	96	Gravel surface, HSG C
345,181	80	Pasture/grassland/range, Good, HSG D
603,885	74	Pasture/grassland/range, Good, HSG C
1,506,905	77	Woods, Good, HSG D
2,910	98	Unconnected pavement, HSG D
2,632,465	76	Weighted Average
2,629,555		99.89% Pervious Area
2,910		0.11% Impervious Area
2,910		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	29	0.1254	0.13		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.29"
4.8	71	0.0431	0.25		**Sheet Flow, BC** Range n= 0.130 P2= 3.29"
1.7	114	0.0258	1.12		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
3.7	336	0.0476	1.53		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
2.8	298	0.0654	1.79		**Shallow Concentrated Flow, EF** Short Grass Pasture Kv= 7.0 fps
1.8	170	0.1027	1.60		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
1.1	1,008	0.0634	14.98	599.10	**Trap/Vee/Rect Channel Flow, GH** Bot.W=10.00' D=2.00' Z= 5.0 '/' Top.W=30.00' n= 0.030 Earth, grassed & winding
2.2	742		5.67		**Lake or Reservoir, HI** Mean Depth= 1.00'
21.9	2,768	Total			

Subcatchment E-S-SW: Southwest



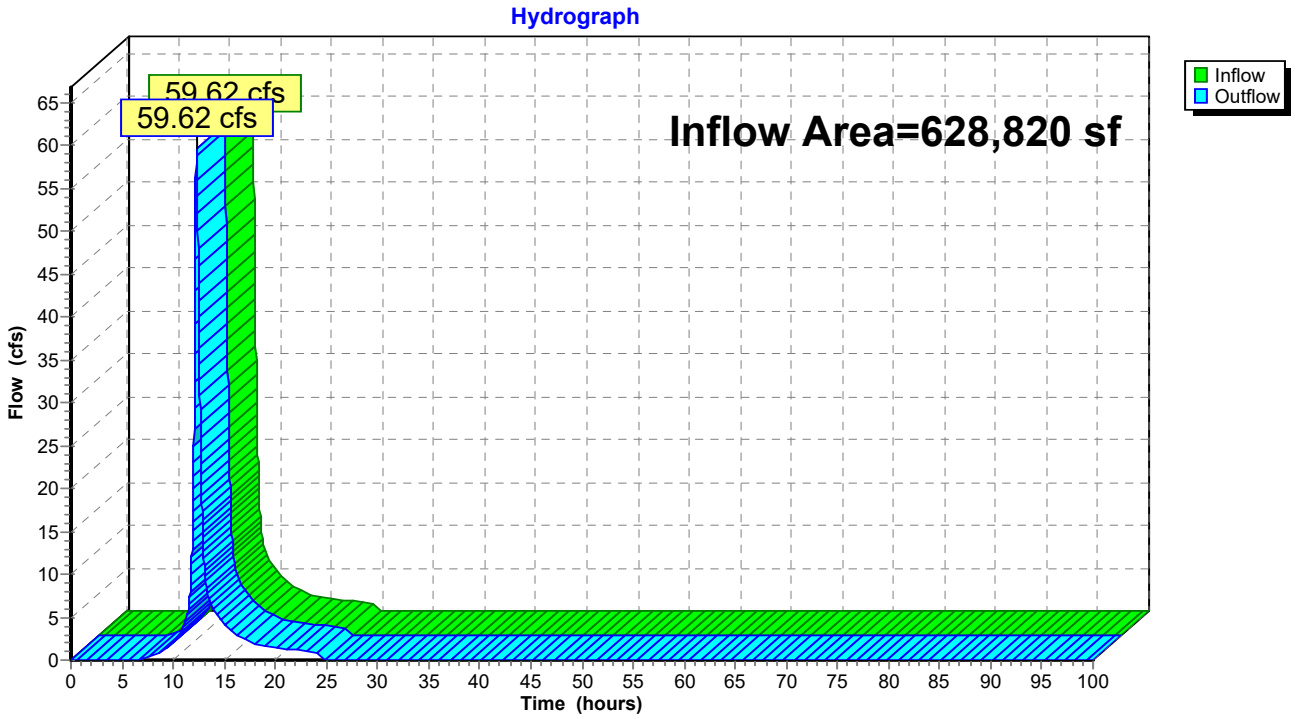
Summary for Reach E-DP-U: Unnamed Stream

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

Inflow Area = 628,820 sf, 2.46% Impervious, Inflow Depth = 5.38" for 100-Year event
Inflow = 59.62 cfs @ 12.29 hrs, Volume= 281,677 cf
Outflow = 59.62 cfs @ 12.29 hrs, Volume= 281,677 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Reach E-DP-U: Unnamed Stream



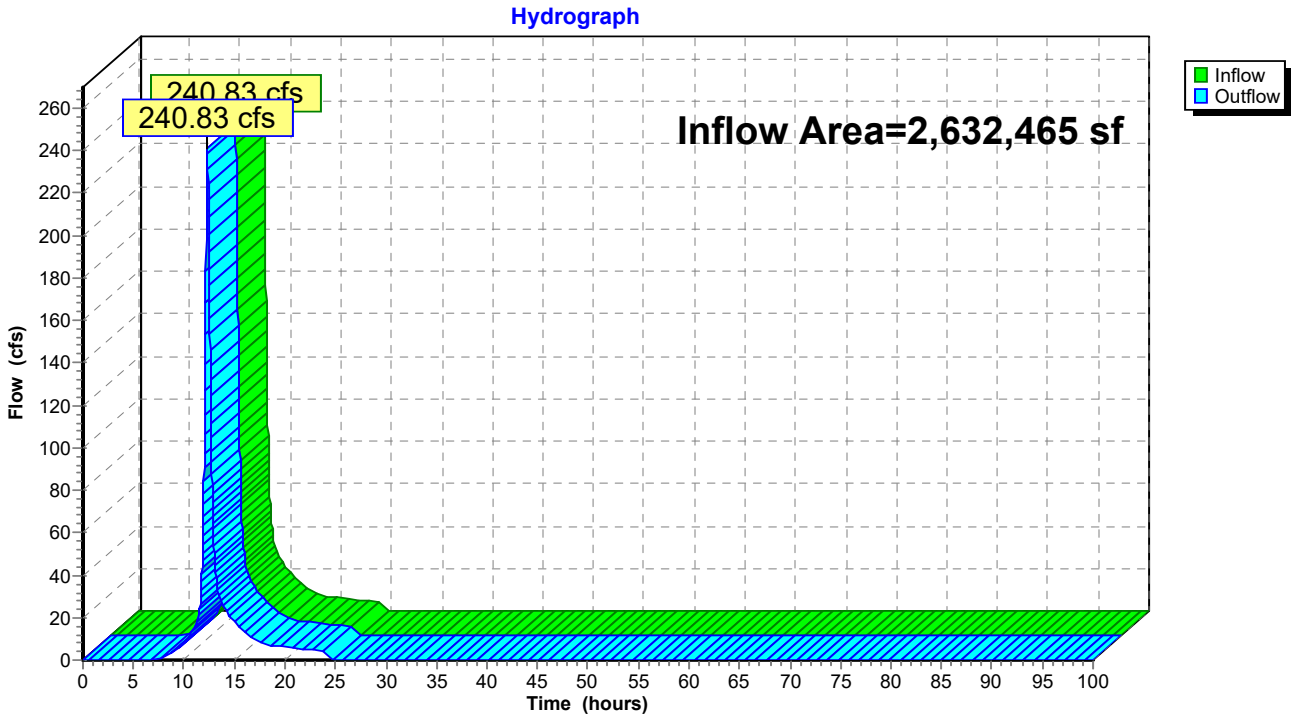
Summary for Reach E-DP-W: Wards Stream

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

Inflow Area = 2,632,465 sf, 0.11% Impervious, Inflow Depth = 5.26" for 100-Year event
Inflow = 240.83 cfs @ 12.30 hrs, Volume= 1,153,480 cf
Outflow = 240.83 cfs @ 12.30 hrs, Volume= 1,153,480 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Reach E-DP-W: Wards Stream



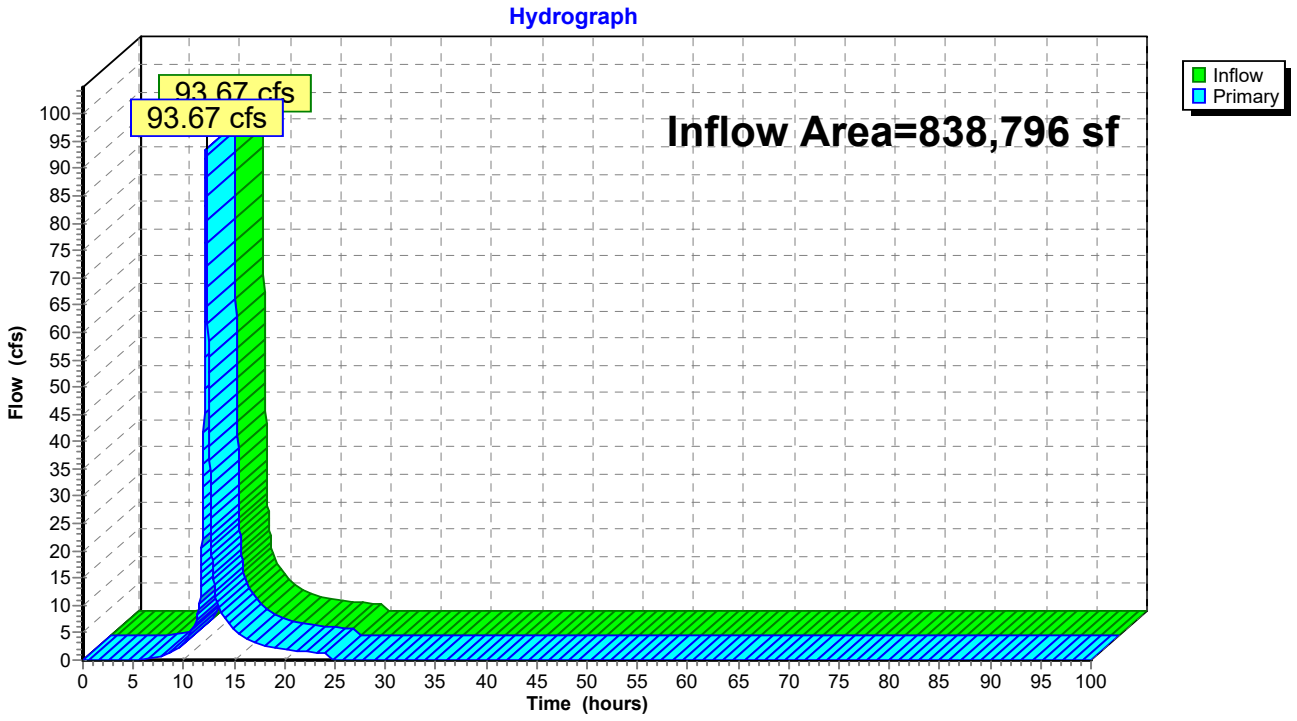
Summary for Pond E-DP-P: Pond DP

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

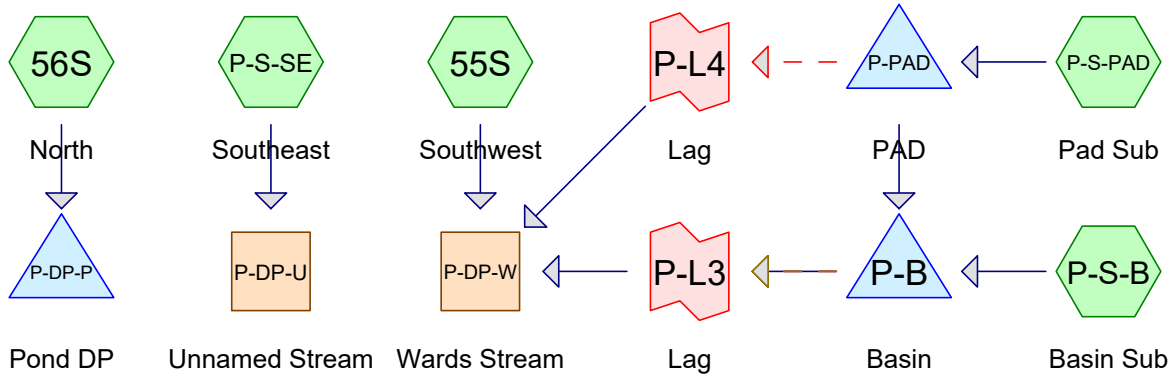
Inflow Area = 838,796 sf, 2.07% Impervious, Inflow Depth = 5.61" for 100-Year event
Inflow = 93.67 cfs @ 12.21 hrs, Volume= 392,166 cf
Primary = 93.67 cfs @ 12.21 hrs, Volume= 392,166 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Pond E-DP-P: Pond DP



Proposed Conditions HydroCAD



Subcat Reach Pond Link

Routing Diagram for Old Post Road 9-11-26
Prepared by WSP USA, Printed 9/13/2026
HydroCAD® 10.20-6a s/n 00854 © 2024 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
1,015	96	Gravel surface, HSG C (P-S-B)
31,815	96	Gravel surface, HSG D (55S, 56S, P-S-B)
721,481	74	Pasture/grassland/range, Good, HSG C (55S, 56S, P-S-B, P-S-PAD, P-S-SE)
856,956	80	Pasture/grassland/range, Good, HSG D (55S, 56S, P-S-B, P-S-SE)
4,157	98	Unconnected pavement, HSG C (55S, 56S, P-S-B, P-S-SE)
34,227	98	Unconnected pavement, HSG D (55S, 56S, P-S-B, P-S-SE)
3,170	98	Water Surface, 0% imp, HSG C (P-S-PAD)
28,237	98	Water Surface, 0% imp, HSG D (55S, 56S, P-S-PAD)
214,178	70	Woods, Good, HSG C (55S, P-S-SE)
2,204,330	77	Woods, Good, HSG D (55S, 56S, P-S-B, P-S-SE)
4,099,566	**77**	**TOTAL AREA**

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	P-B	1,410.00	1,409.50	30.0	0.0167	0.013	0.0	18.0	0.0	

Time span=0.00-100.00 hrs, dt=0.02 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 55S: Southwest Runoff Area=2,420,951 sf 0.21% Impervious Runoff Depth=1.22"
Flow Length=2,768' Tc=21.9 min UI Adjusted CN=76 Runoff=49.50 cfs 245,134 cf

Subcatchment 56S: North Runoff Area=809,685 sf 2.09% Impervious Runoff Depth=1.40"
Flow Length=997' Tc=15.5 min CN=79 Runoff=22.47 cfs 94,778 cf

Subcatchment P-S-B: Basin Sub Runoff Area=215,955 sf 0.33% Impervious Runoff Depth=1.22"
Flow Length=995' Tc=18.3 min CN=76 Runoff=4.76 cfs 21,867 cf

Subcatchment P-S-PAD: Pad Sub Runoff Area=24,192 sf 0.00% Impervious Runoff Depth=1.34"
Flow Length=242' Tc=6.0 min CN=78 Runoff=0.85 cfs 2,701 cf

Subcatchment P-S-SE: Southeast Runoff Area=628,783 sf 2.50% Impervious Runoff Depth=1.28"
Flow Length=1,424' Tc=21.1 min CN=77 Runoff=13.83 cfs 66,887 cf

Reach P-DP-U: Unnamed Stream Inflow=13.83 cfs 66,887 cf
Outflow=13.83 cfs 66,887 cf

Reach P-DP-W: Wards Stream Inflow=50.64 cfs 266,575 cf
Outflow=50.64 cfs 266,575 cf

Pond P-B: Basin Peak Elev=1,412.19' Storage=5,735 cf Inflow=4.76 cfs 21,867 cf
ed=0.02 cfs 426 cf Primary=1.93 cfs 21,441 cf Secondary=0.00 cfs 0 cf Tertiary=0.00 cfs 0 cf Outflow=1.95 cfs 21,866 cf

Pond P-DP-P: Pond DP Inflow=22.47 cfs 94,778 cf
Primary=22.47 cfs 94,778 cf

Pond P-PAD: PAD Peak Elev=1,420.80' Storage=2,002 cf Inflow=0.85 cfs 2,701 cf
Discarded=0.02 cfs 2,701 cf Primary=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.02 cfs 2,701 cf

Link P-L3: Lag delayed by 7.0 min Inflow=1.93 cfs 21,441 cf
Primary=1.93 cfs 21,441 cf

Link P-L4: Lag delayed by 11.6 min Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 4,099,566 sf Runoff Volume = 431,368 cf Average Runoff Depth = 1.26"
99.06% Pervious = 4,061,182 sf 0.94% Impervious = 38,384 sf

Summary for Subcatchment 55S: Southwest

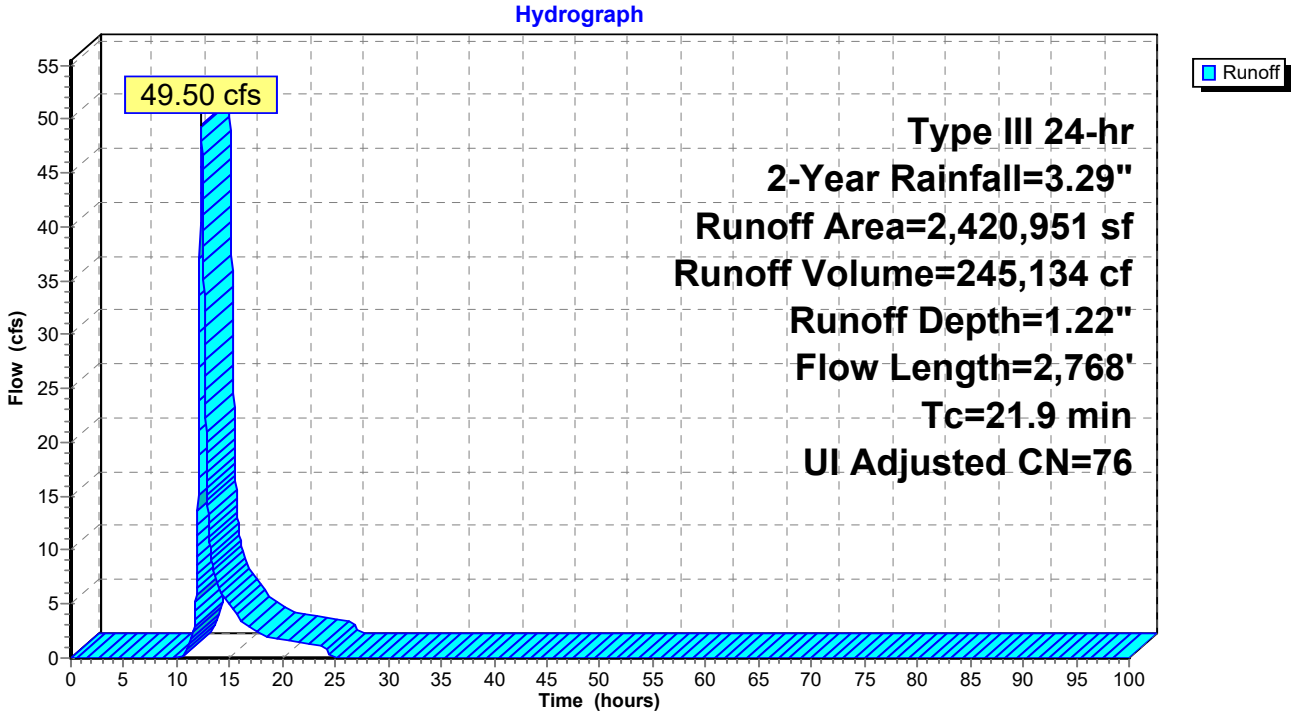
Runoff = 49.50 cfs @ 12.32 hrs, Volume= 245,134 cf, Depth= 1.22"
Routed to Reach P-DP-W : Wards Stream

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Adj	Description
444,479	74		Pasture/grassland/range, Good, HSG C
154,883	70		Woods, Good, HSG C
1,455	98		Unconnected pavement, HSG C
296,475	80		Pasture/grassland/range, Good, HSG D
1,506,583	77		Woods, Good, HSG D
11,313	96		Gravel surface, HSG D
3,541	98		Unconnected pavement, HSG D
2,222	98		Water Surface, 0% imp, HSG D
2,420,951	77	76	Weighted Average, UI Adjusted
2,415,955			99.79% Pervious Area
4,996			0.21% Impervious Area
4,996			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	29	0.1254	0.13		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.29"
4.8	71	0.0431	0.25		**Sheet Flow, BC** Range n= 0.130 P2= 3.29"
1.7	114	0.0258	1.12		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
3.7	336	0.0476	1.53		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
2.8	298	0.0654	1.79		**Shallow Concentrated Flow, EF** Short Grass Pasture Kv= 7.0 fps
1.8	170	0.1027	1.60		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
1.1	1,008	0.0634	14.98	599.10	**Trap/Vee/Rect Channel Flow, GH** Bot.W=10.00' D=2.00' Z= 5.0 '/' Top.W=30.00' n= 0.030 Earth, grassed & winding
2.2	742		5.67		**Lake or Reservoir, HI** Mean Depth= 1.00'
21.9	2,768	Total			

Subcatchment 55S: Southwest



Summary for Subcatchment 56S: North

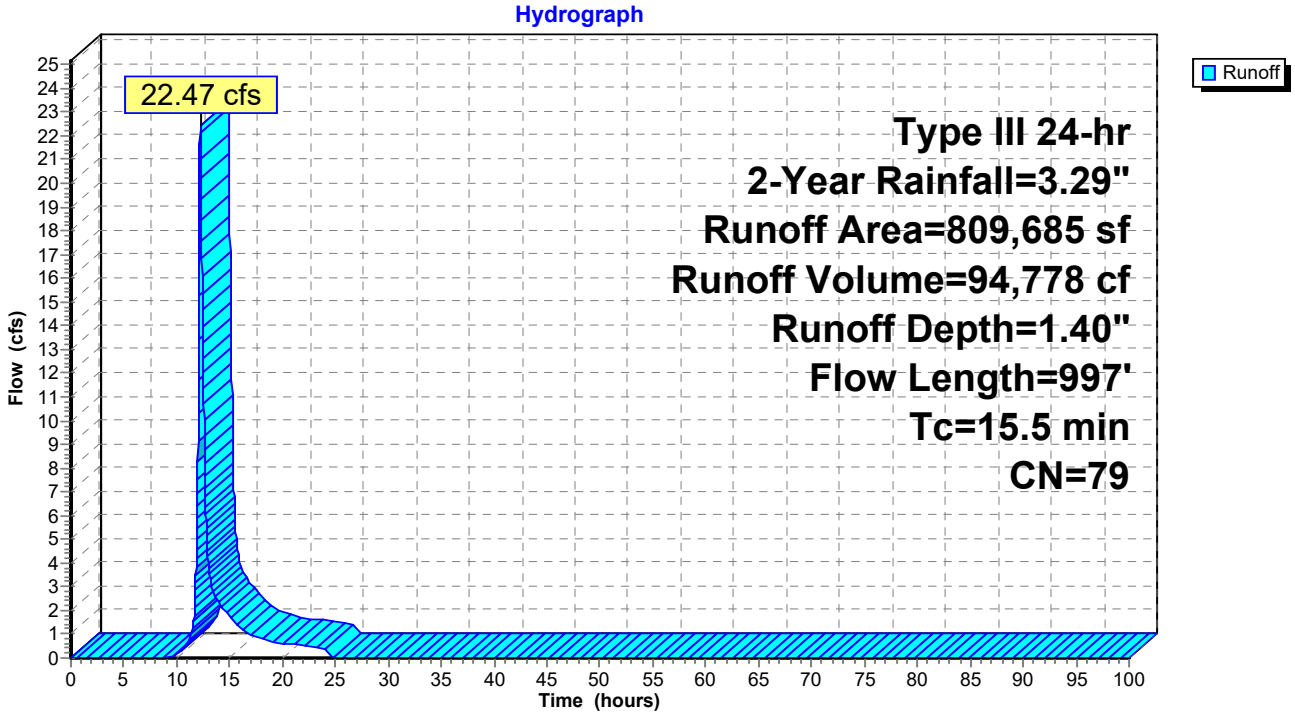
Runoff = 22.47 cfs @ 12.22 hrs, Volume= 94,778 cf, Depth= 1.40"
Routed to Pond P-DP-P : Pond DP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
101	74	Pasture/grassland/range, Good, HSG C
298,075	80	Pasture/grassland/range, Good, HSG D
15,150	98	Unconnected pavement, HSG D
24,690	98	Water Surface, 0% imp, HSG D
458,558	77	Woods, Good, HSG D
1,794	98	Unconnected pavement, HSG C
11,317	96	Gravel surface, HSG D
809,685	79	Weighted Average
792,741		97.91% Pervious Area
16,944		2.09% Impervious Area
16,944		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0568	0.26		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.29"
1.4	113	0.0709	1.33		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
1.5	192	0.0975	2.19		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
6.2	592	0.1004	1.58		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
15.5	997	Total			

Subcatchment 56S: North



Summary for Subcatchment P-S-B: Basin Sub

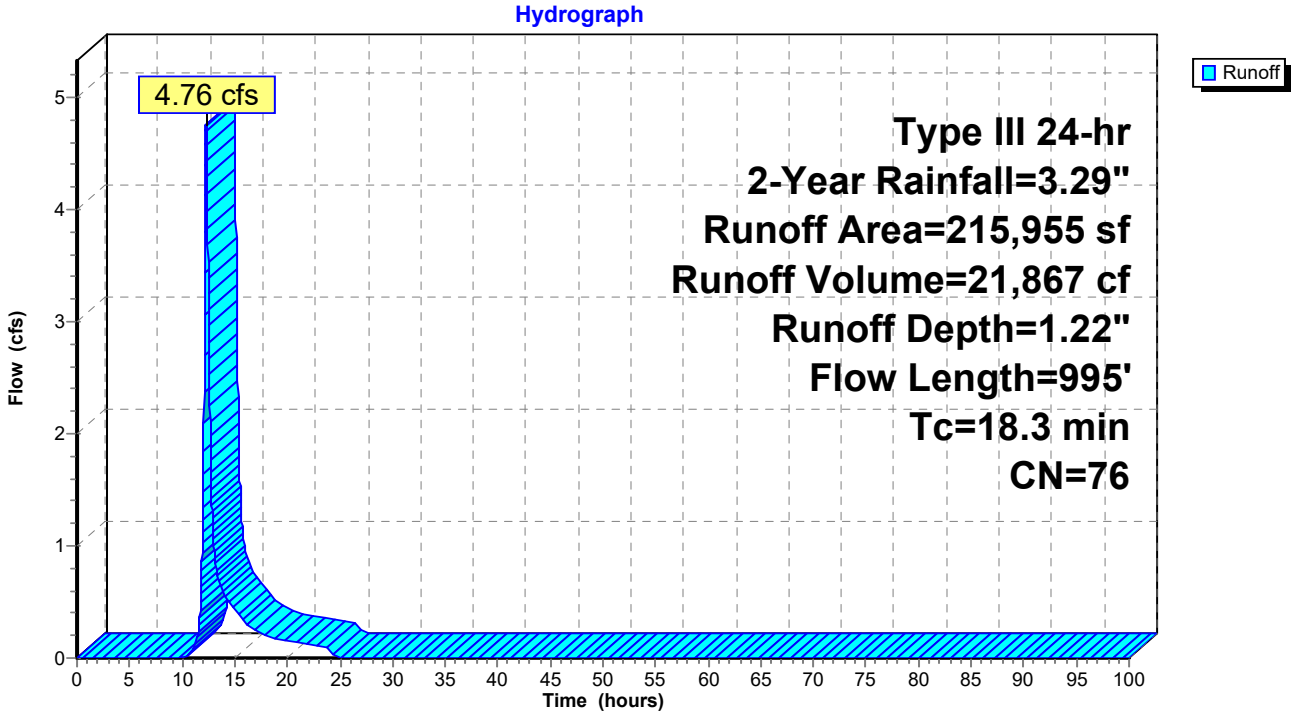
Runoff = 4.76 cfs @ 12.27 hrs, Volume= 21,867 cf, Depth= 1.22"
Routed to Pond P-B : Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
158,743	74	Pasture/grassland/range, Good, HSG C
46,301	80	Pasture/grassland/range, Good, HSG D
637	98	Unconnected pavement, HSG C
70	98	Unconnected pavement, HSG D
1,015	96	Gravel surface, HSG C
9,185	96	Gravel surface, HSG D
4	77	Woods, Good, HSG D
215,955	76	Weighted Average
215,248		99.67% Pervious Area
707		0.33% Impervious Area
707		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0253	0.19		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.29"
1.4	95	0.0264	1.14		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
5.8	456	0.0350	1.31		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
1.9	248	0.0922	2.13		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
0.4	96	0.0621	4.01		**Shallow Concentrated Flow, EF** Unpaved Kv= 16.1 fps
18.3	995	Total			

Subcatchment P-S-B: Basin Sub



Summary for Subcatchment P-S-PAD: Pad Sub

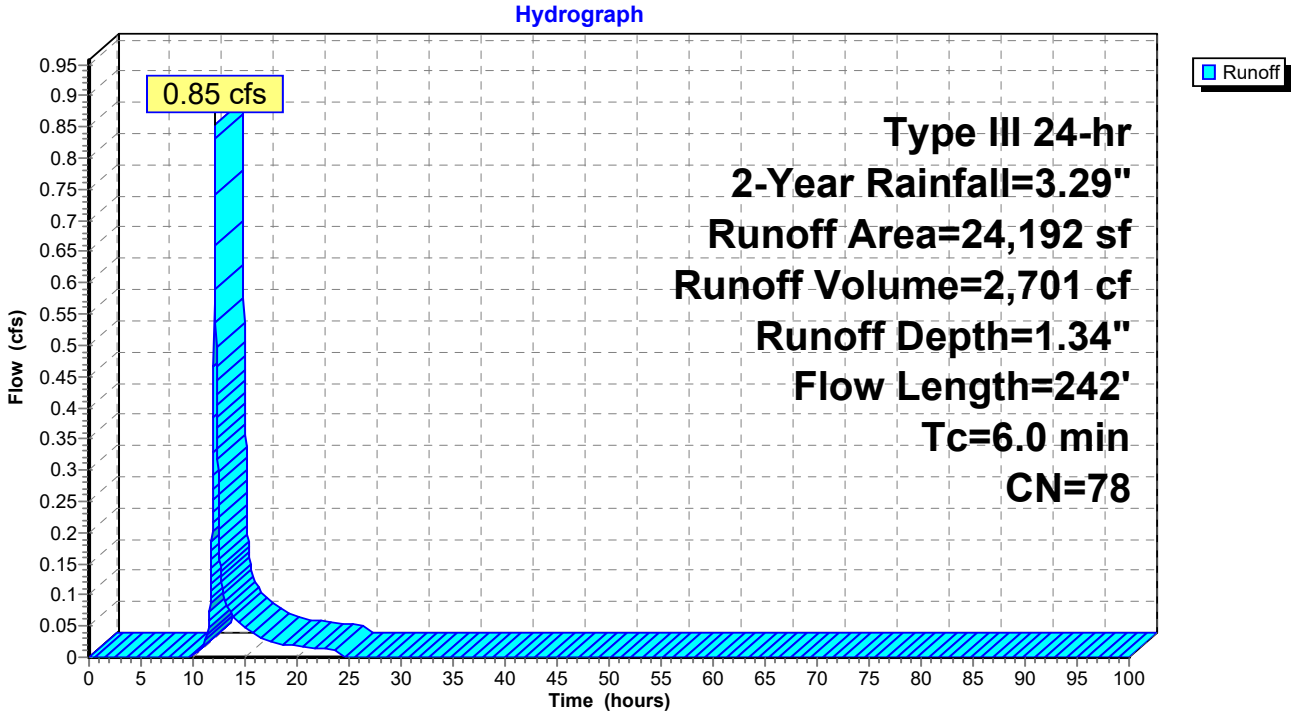
Runoff = 0.85 cfs @ 12.09 hrs, Volume= 2,701 cf, Depth= 1.34"
Routed to Pond P-PAD : PAD

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
19,697	74	Pasture/grassland/range, Good, HSG C
3,170	98	Water Surface, 0% imp, HSG C
1,325	98	Water Surface, 0% imp, HSG D
24,192	78	Weighted Average
24,192		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.0740	0.33		**Sheet Flow, AB** Range n= 0.130 P2= 3.29"
0.9	115	0.0876	2.07		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.0	27	0.2358	41.50	1,120.40	**Trap/Vee/Rect Channel Flow, CD** Bot.W=0.00' D=3.00' Z= 3.0 '/' Top.W=18.00' n= 0.022 Earth, clean & straight
6.0	242	Total			

Subcatchment P-S-PAD: Pad Sub



Summary for Subcatchment P-S-SE: Southeast

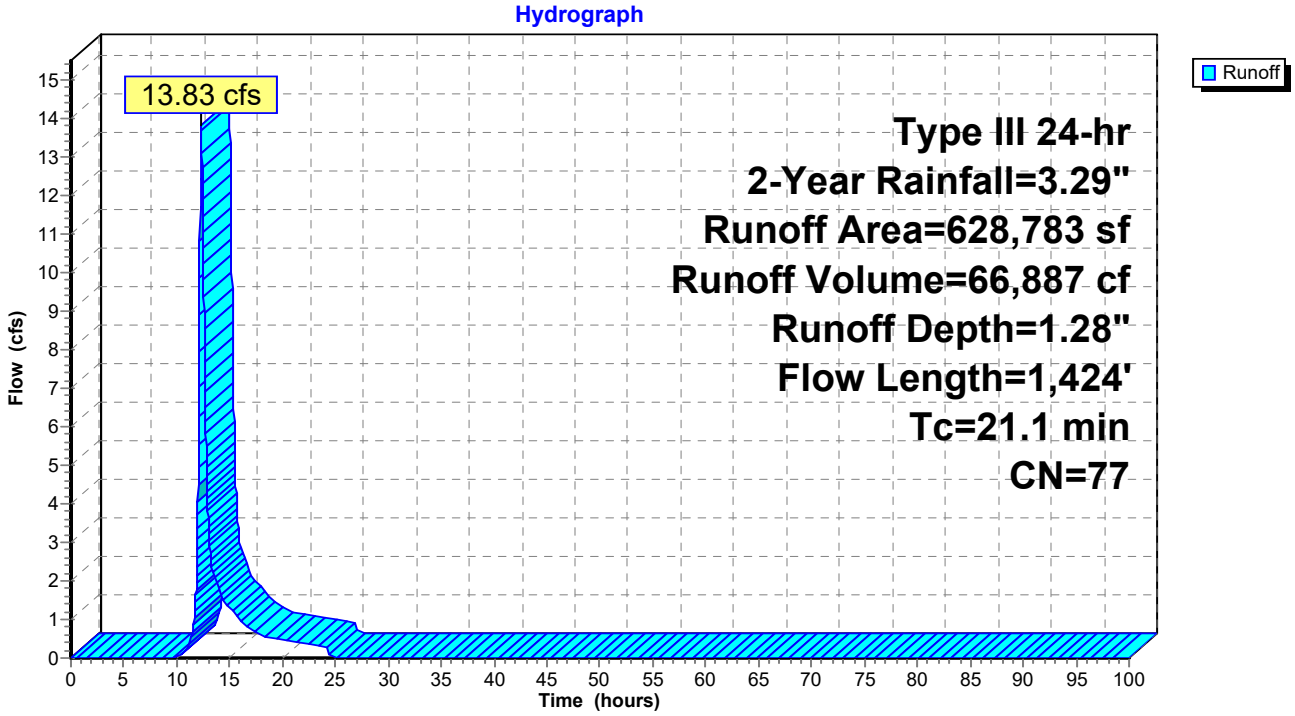
Runoff = 13.83 cfs @ 12.31 hrs, Volume= 66,887 cf, Depth= 1.28"
Routed to Reach P-DP-U : Unnamed Stream

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
98,461	74	Pasture/grassland/range, Good, HSG C
59,295	70	Woods, Good, HSG C
271	98	Unconnected pavement, HSG C
216,105	80	Pasture/grassland/range, Good, HSG D
239,185	77	Woods, Good, HSG D
15,466	98	Unconnected pavement, HSG D
628,783	77	Weighted Average
613,046		97.50% Pervious Area
15,737		2.50% Impervious Area
15,737		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0696	0.28		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.29"
8.7	708	0.0378	1.36		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
6.5	616	0.0502	1.57		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
21.1	1,424	Total			

Subcatchment P-S-SE: Southeast



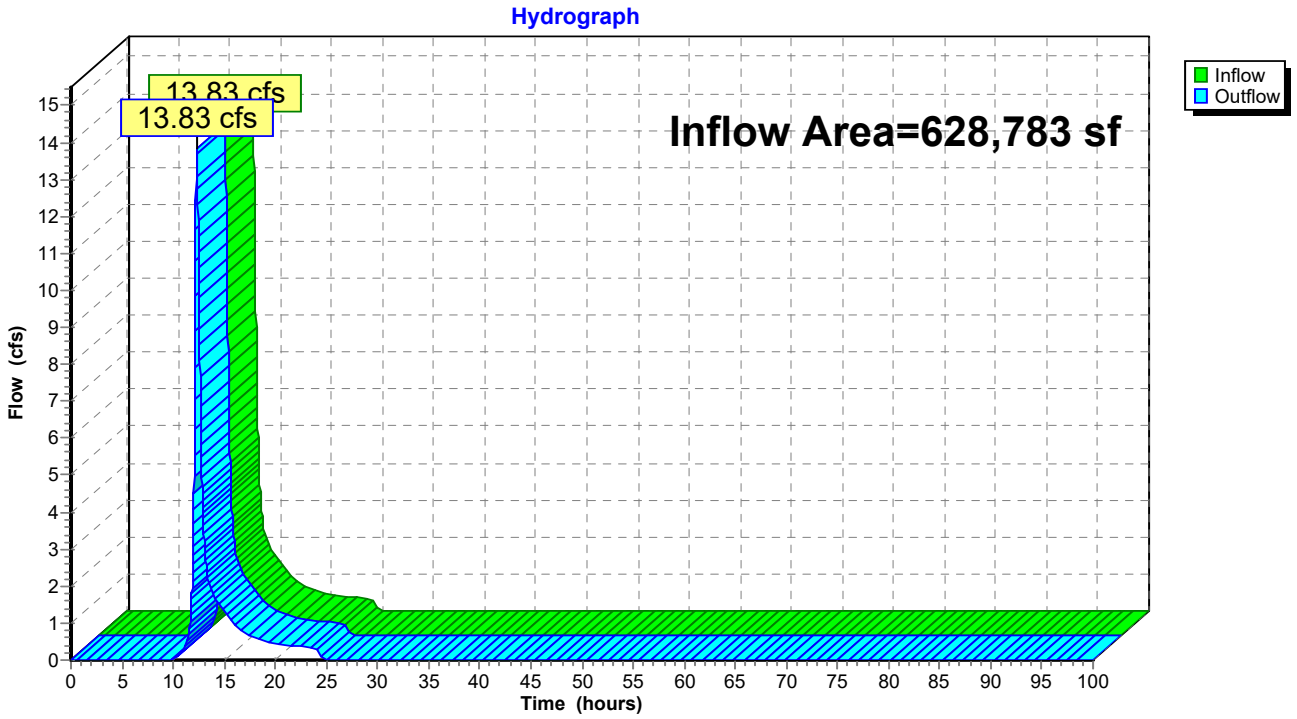
Summary for Reach P-DP-U: Unnamed Stream

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

Inflow Area = 628,783 sf, 2.50% Impervious, Inflow Depth = 1.28" for 2-Year event
Inflow = 13.83 cfs @ 12.31 hrs, Volume= 66,887 cf
Outflow = 13.83 cfs @ 12.31 hrs, Volume= 66,887 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Reach P-DP-U: Unnamed Stream



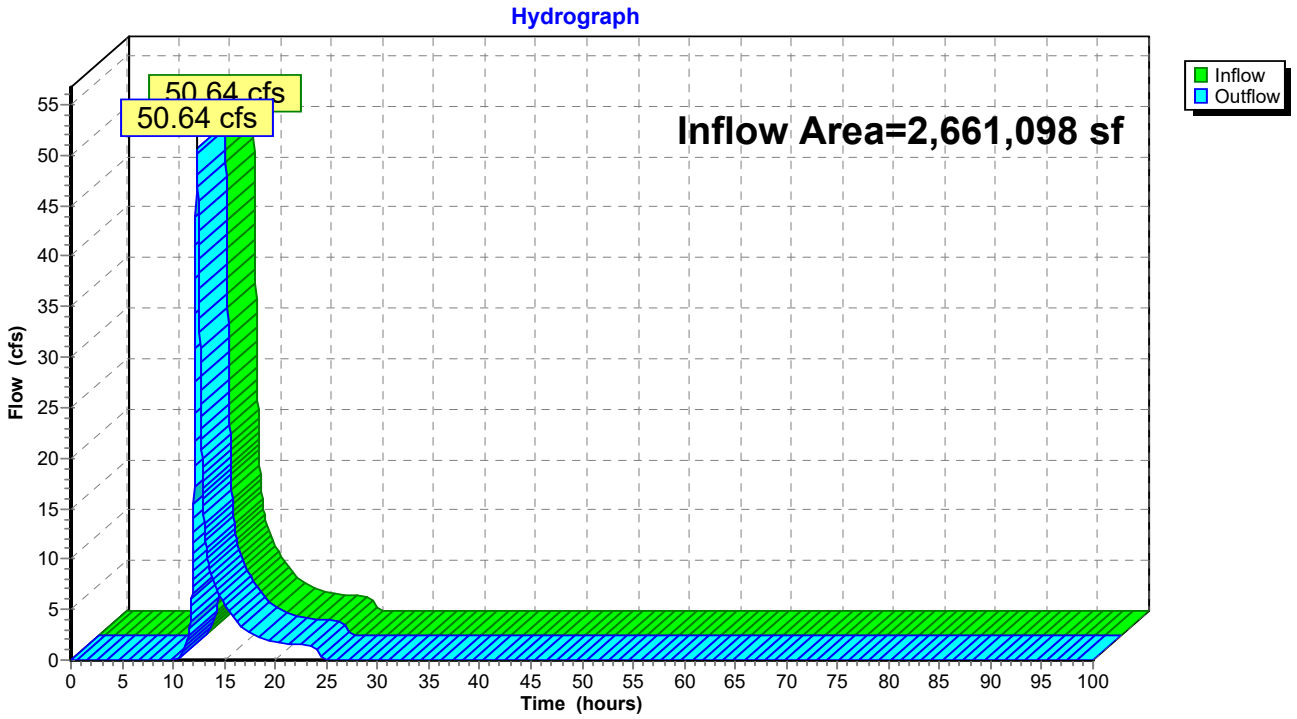
Summary for Reach P-DP-W: Wards Stream

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

Inflow Area = 2,661,098 sf, 0.21% Impervious, Inflow Depth = 1.20" for 2-Year event
Inflow = 50.64 cfs @ 12.33 hrs, Volume= 266,575 cf
Outflow = 50.64 cfs @ 12.33 hrs, Volume= 266,575 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Reach P-DP-W: Wards Stream



Summary for Pond P-B: Basin

Inflow Area = 240,147 sf, 0.29% Impervious, Inflow Depth = 1.09" for 2-Year event
Inflow = 4.76 cfs @ 12.27 hrs, Volume= 21,867 cf
Outflow = 1.95 cfs @ 12.69 hrs, Volume= 21,866 cf, Atten= 59%, Lag= 25.3 min
Discarded = 0.02 cfs @ 12.69 hrs, Volume= 426 cf
Primary = 1.93 cfs @ 12.69 hrs, Volume= 21,441 cf
Routed to Link P-L3 : Lag
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link P-L3 : Lag
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link P-L3 : Lag

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 1,412.19' @ 12.69 hrs Surf.Area= 3,988 sf Storage= 5,735 cf
Flood Elev= 1,414.00' Surf.Area= 6,667 sf Storage= 15,326 cf

Plug-Flow detention time= 38.2 min calculated for 21,866 cf (100% of inflow)
Center-of-Mass det. time= 38.1 min (903.5 - 865.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,410.00'	15,326 cf	**Basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,410.00	1,454	211.2	0	0	1,454
1,411.00	2,461	301.4	1,936	1,936	5,142
1,412.00	3,745	351.2	3,081	5,016	7,749
1,413.00	5,139	389.2	4,424	9,440	10,018
1,414.00	6,667	445.8	5,886	15,326	13,802

Device	Routing	Invert	Outlet Devices
#0	Tertiary	1,414.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	1,410.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Secondary	1,413.00'	**3.0' long + 3.0 '/' SideZ x 8.0' breadth Overflow Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#3	Primary	1,410.00'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,410.00' / 1,409.50' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#4	Device 3	1,410.00'	**6.0" W x 6.0" H Vert. Low Flow Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 3	1,412.00'	**12.0" W x 12.0" H Vert. High Flow Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 3	1,412.70'	**3.5" x 2.5" Horiz. Top of Riser X 5.00 columns** X 6 rows C= 0.600 in 24.0" x 24.0" Grate (46% open area) Limited to weir flow at low heads

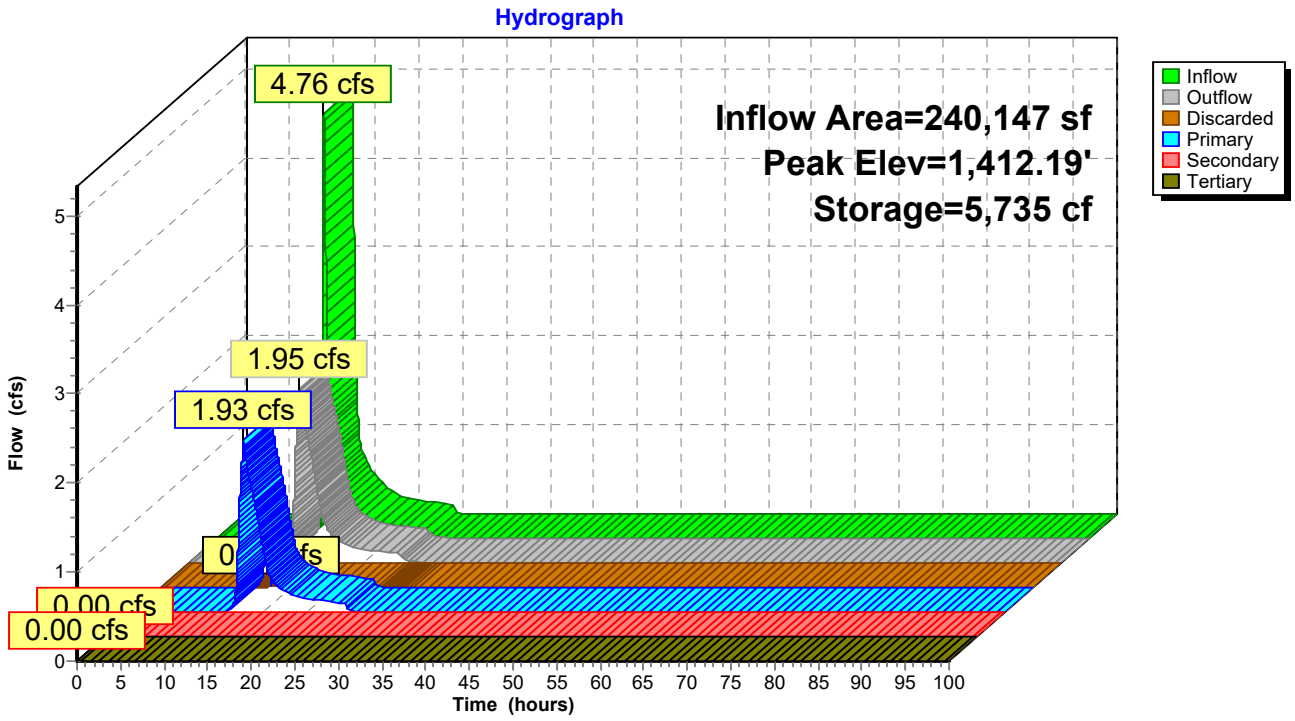
Discarded OutFlow Max=0.02 cfs @ 12.69 hrs HW=1,412.19' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.93 cfs @ 12.69 hrs HW=1,412.19' (Free Discharge)
└**3=Culvert** (Passes 1.93 cfs of 10.20 cfs potential flow)
  └**4=Low Flow Orifice** (Orifice Controls 1.67 cfs @ 6.69 fps)
  └**5=High Flow Orifice** (Orifice Controls 0.26 cfs @ 1.38 fps)
  └**6=Top of Riser** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,410.00' (Free Discharge)
└**2=Overflow Weir** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,410.00' (Free Discharge)

Pond P-B: Basin



Stage-Area-Storage for Pond P-B: Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
1,410.00	1,454	0
1,410.05	1,498	74
1,410.10	1,543	150
1,410.15	1,588	228
1,410.20	1,634	309
1,410.25	1,681	392
1,410.30	1,728	477
1,410.35	1,776	564
1,410.40	1,825	654
1,410.45	1,875	747
1,410.50	1,925	842
1,410.55	1,975	939
1,410.60	2,027	1,039
1,410.65	2,079	1,142
1,410.70	2,131	1,247
1,410.75	2,185	1,355
1,410.80	2,239	1,466
1,410.85	2,293	1,579
1,410.90	2,348	1,695
1,410.95	2,404	1,814
1,411.00	2,461	1,936
1,411.05	2,519	2,060
1,411.10	2,577	2,187
1,411.15	2,636	2,318
1,411.20	2,696	2,451
1,411.25	2,757	2,587
1,411.30	2,818	2,727
1,411.35	2,880	2,869
1,411.40	2,942	3,015
1,411.45	3,006	3,163
1,411.50	3,069	3,315
1,411.55	3,134	3,470
1,411.60	3,199	3,629
1,411.65	3,265	3,790
1,411.70	3,332	3,955
1,411.75	3,399	4,124
1,411.80	3,467	4,295
1,411.85	3,535	4,470
1,411.90	3,605	4,649
1,411.95	3,674	4,831
1,412.00	3,745	5,016
1,412.05	3,809	5,205
1,412.10	3,874	5,397
1,412.15	3,940	5,592
1,412.20	4,006	5,791
1,412.25	4,073	5,993
1,412.30	4,140	6,198
1,412.35	4,208	6,407
1,412.40	4,276	6,619
1,412.45	4,345	6,835
1,412.50	4,414	7,054
1,412.55	4,484	7,276
1,412.60	4,555	7,502
1,412.65	4,626	7,732
1,412.70	4,698	7,965
1,412.75	4,770	8,202
1,412.80	4,843	8,442
1,412.85	4,916	8,686
1,412.90	4,990	8,933
1,412.95	5,064	9,185
1,413.00	5,139	9,440
1,413.05	5,211	9,699
1,413.10	5,283	9,961
1,413.15	5,356	10,227
1,413.20	5,429	10,496
1,413.25	5,502	10,770
1,413.30	5,577	11,047
1,413.35	5,651	11,327
1,413.40	5,726	11,612
1,413.45	5,802	11,900
1,413.50	5,878	12,192
1,413.55	5,955	12,488
1,413.60	6,032	12,788
1,413.65	6,110	13,091
1,413.70	6,188	13,399
1,413.75	6,266	13,710
1,413.80	6,346	14,025
1,413.85	6,425	14,344
1,413.90	6,505	14,668
1,413.95	6,586	14,995
1,414.00	**6,667**	**15,326**

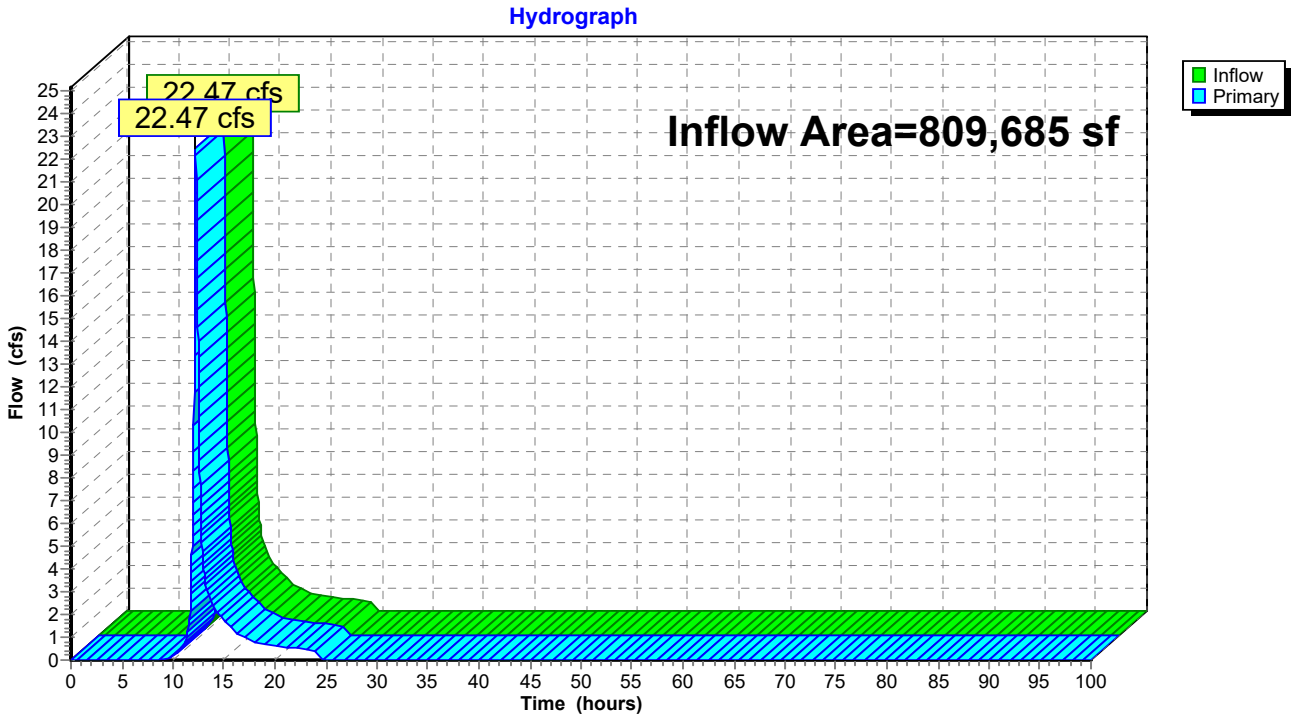
Summary for Pond P-DP-P: Pond DP

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

Inflow Area = 809,685 sf, 2.09% Impervious, Inflow Depth = 1.40" for 2-Year event
Inflow = 22.47 cfs @ 12.22 hrs, Volume= 94,778 cf
Primary = 22.47 cfs @ 12.22 hrs, Volume= 94,778 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Pond P-DP-P: Pond DP



Summary for Pond P-PAD: PAD

Inflow Area = 24,192 sf, 0.00% Impervious, Inflow Depth = 1.34" for 2-Year event
Inflow = 0.85 cfs @ 12.09 hrs, Volume= 2,701 cf
Outflow = 0.02 cfs @ 11.42 hrs, Volume= 2,701 cf, Atten= 98%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.42 hrs, Volume= 2,701 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond P-B : Basin
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link P-L4 : Lag

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 1,420.80' @ 21.79 hrs Surf.Area= 3,813 sf Storage= 2,002 cf

Plug-Flow detention time= 1,306.3 min calculated for 2,700 cf (100% of inflow)
Center-of-Mass det. time= 1,306.5 min (2,154.2 - 847.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,421.67'	3,813 cf	**Overflow (Prismatic)**Listed below (Recalc) -Impervious
#2	1,421.00'	1,022 cf	**Choker Course (Prismatic)**Listed below (Recalc) -Impervious 2,555 cf Overall x 40.0% Voids
#3	1,420.00'	1,525 cf	**Filter Course (Prismatic)**Listed below (Recalc) -Impervious 3,813 cf Overall x 40.0% Voids
#4	1,419.75'	286 cf	**Filter Blanket (Prismatic)**Listed below (Recalc) -Impervious 953 cf Overall x 30.0% Voids
#5	1,419.42'	503 cf	**Reservoir Course (Prismatic)**Listed below (Recalc) 1,258 cf Overall x 40.0% Voids
		7,149 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,421.67	3,813	0	0
1,422.67	3,813	3,813	3,813

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,421.00	3,813	0	0
1,421.67	3,813	2,555	2,555

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,420.00	3,813	0	0
1,421.00	3,813	3,813	3,813

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,419.75	3,813	0	0
1,420.00	3,813	953	953

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,419.42	3,813	0	0
1,419.75	3,813	1,258	1,258

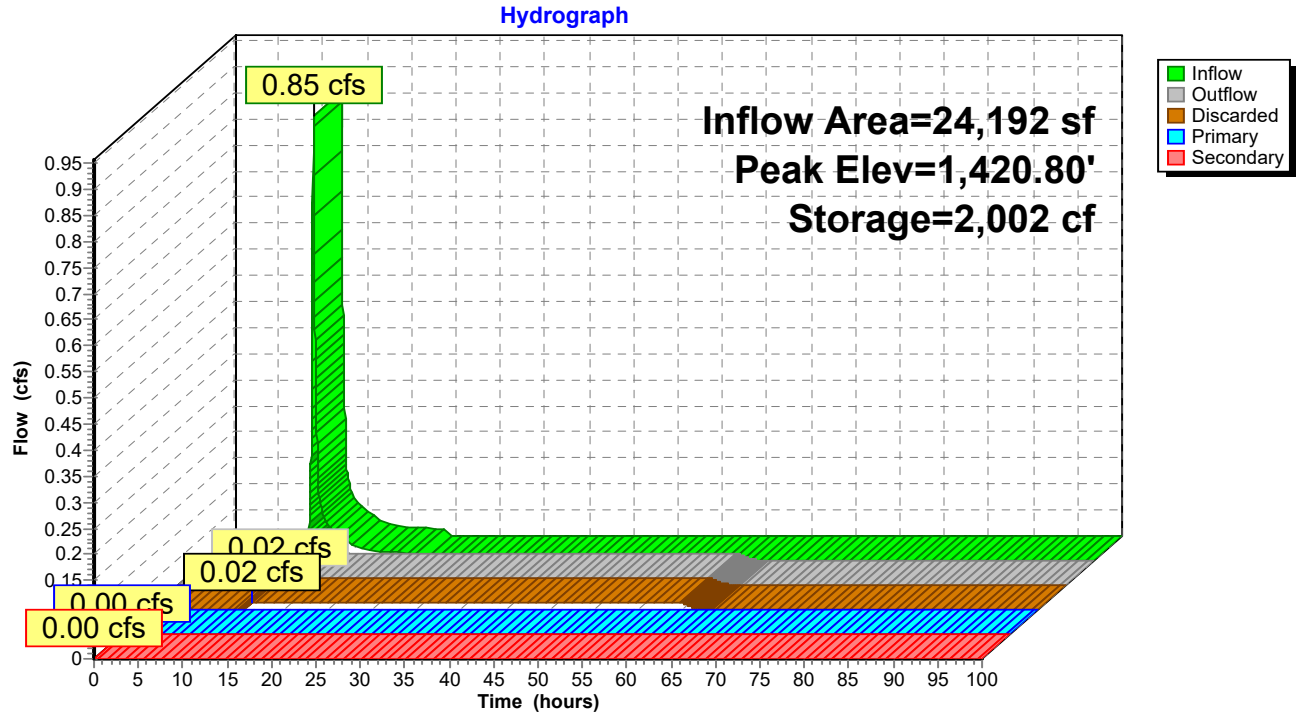
Device	Routing	Invert	Outlet Devices
#1	Discarded	1,419.42'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	1,421.67'	**60.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Secondary	1,421.67'	**108.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.02 cfs @ 11.42 hrs HW=1,419.45' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,419.42' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,419.42' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P-PAD: PAD



Stage-Area-Storage for Pond P-PAD: PAD

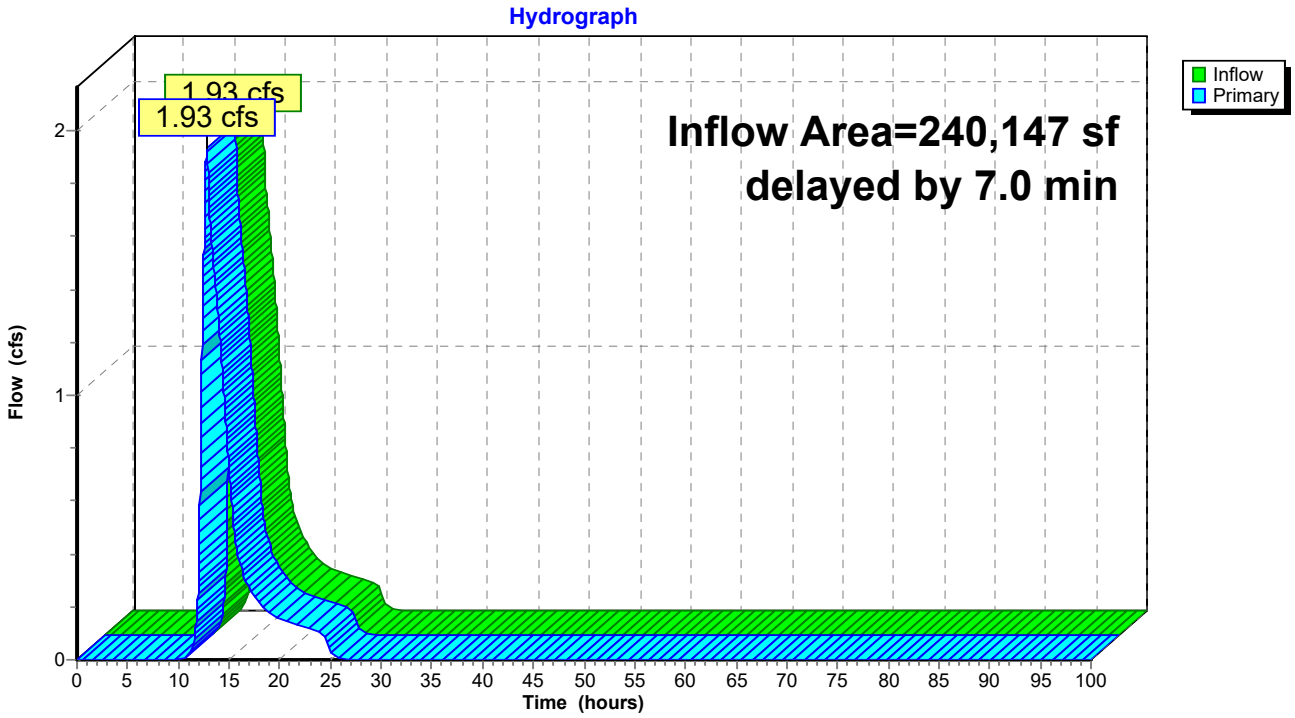
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
1,419.42	**3,813**	0
1,419.47	3,813	76
1,419.52	3,813	153
1,419.57	3,813	229
1,419.62	3,813	305
1,419.67	3,813	381
1,419.72	3,813	458
1,419.77	3,813	526
1,419.82	3,813	583
1,419.87	3,813	641
1,419.92	3,813	698
1,419.97	3,813	755
1,420.02	3,813	820
1,420.07	3,813	896
1,420.12	3,813	972
1,420.17	3,813	1,049
1,420.22	3,813	1,125
1,420.27	3,813	1,201
1,420.32	3,813	1,277
1,420.37	3,813	1,354
1,420.42	3,813	1,430
1,420.47	3,813	1,506
1,420.52	3,813	1,582
1,420.57	3,813	1,659
1,420.62	3,813	1,735
1,420.67	3,813	1,811
1,420.72	3,813	1,887
1,420.77	3,813	1,964
1,420.82	3,813	2,040
1,420.87	3,813	2,116
1,420.92	3,813	2,192
1,420.97	3,813	2,269
1,421.02	3,813	2,345
1,421.07	3,813	2,421
1,421.12	3,813	2,498
1,421.17	3,813	2,574
1,421.22	3,813	2,650
1,421.27	3,813	2,726
1,421.32	3,813	2,803
1,421.37	3,813	2,879
1,421.42	3,813	2,955
1,421.47	3,813	3,031
1,421.52	3,813	3,108
1,421.57	3,813	3,184
1,421.62	3,813	3,260
1,421.67	3,813	3,336
1,421.72	3,813	3,527
1,421.77	3,813	3,718
1,421.82	3,813	3,908
1,421.87	3,813	4,099
1,421.92	3,813	4,290
1,421.97	3,813	4,480
1,422.02	3,813	4,671
1,422.07	3,813	4,862
1,422.12	3,813	5,052
1,422.17	3,813	5,243
1,422.22	3,813	5,434
1,422.27	3,813	5,624
1,422.32	3,813	5,815
1,422.37	3,813	6,005
1,422.42	3,813	6,196
1,422.47	3,813	6,387
1,422.52	3,813	6,577
1,422.57	3,813	6,768
1,422.62	3,813	6,959
1,422.67	3,813	**7,149**

Summary for Link P-L3: Lag

Inflow Area = 240,147 sf, 0.29% Impervious, Inflow Depth = 1.07" for 2-Year event
Inflow = 1.93 cfs @ 12.69 hrs, Volume= 21,441 cf
Primary = 1.93 cfs @ 12.80 hrs, Volume= 21,441 cf, Atten= 0%, Lag= 7.0 min
Routed to Reach P-DP-W : Wards Stream

Primary outflow = Inflow delayed by 7.0 min, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Link P-L3: Lag

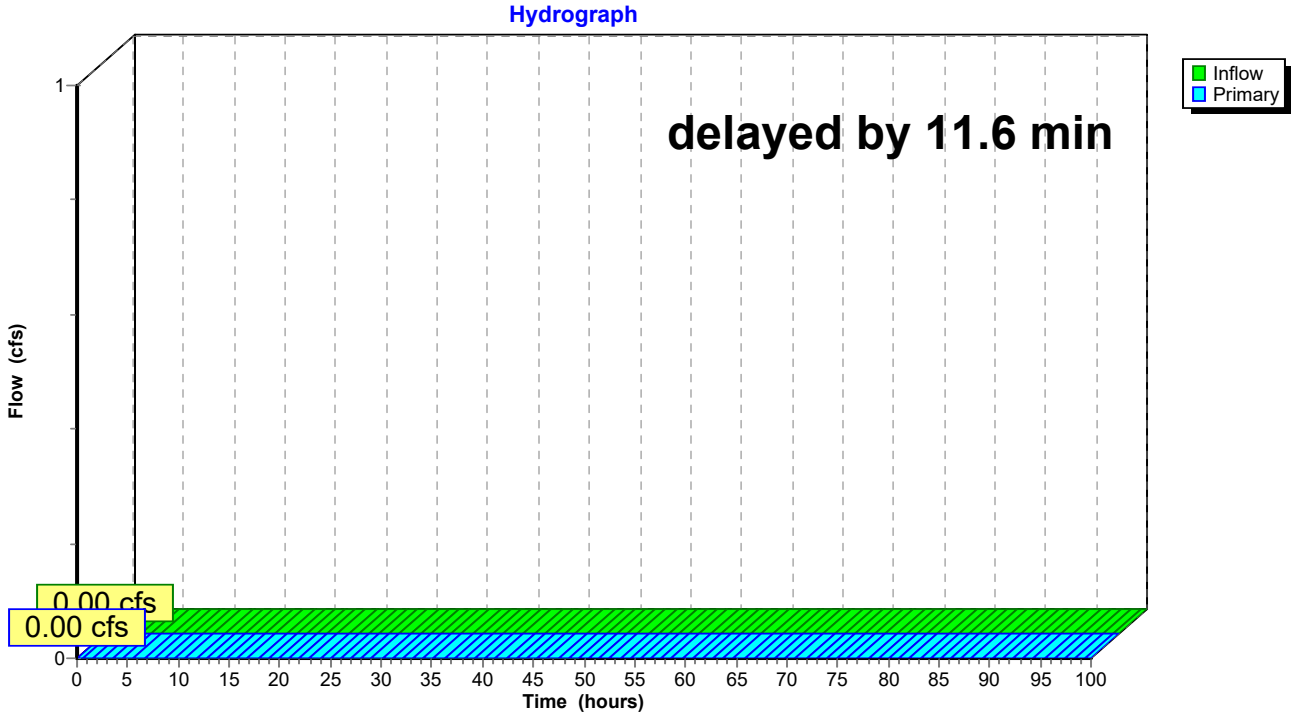


Summary for Link P-L4: Lag

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Routed to Reach P-DP-W : Wards Stream

Primary outflow = Inflow delayed by 11.6 min, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Link P-L4: Lag



Time span=0.00-100.00 hrs, dt=0.02 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 55S: Southwest Runoff Area=2,420,951 sf 0.21% Impervious Runoff Depth=2.66"
Flow Length=2,768' Tc=21.9 min UI Adjusted CN=76 Runoff=112.17 cfs 536,569 cf

Subcatchment 56S: North Runoff Area=809,685 sf 2.09% Impervious Runoff Depth=2.93"
Flow Length=997' Tc=15.5 min CN=79 Runoff=47.71 cfs 197,780 cf

Subcatchment P-S-B: Basin Sub Runoff Area=215,955 sf 0.33% Impervious Runoff Depth=2.66"
Flow Length=995' Tc=18.3 min CN=76 Runoff=10.79 cfs 47,863 cf

Subcatchment P-S-PAD: Pad Sub Runoff Area=24,192 sf 0.00% Impervious Runoff Depth=2.84"
Flow Length=242' Tc=6.0 min CN=78 Runoff=1.85 cfs 5,724 cf

Subcatchment P-S-SE: Southeast Runoff Area=628,783 sf 2.50% Impervious Runoff Depth=2.75"
Flow Length=1,424' Tc=21.1 min CN=77 Runoff=30.64 cfs 144,042 cf

Reach P-DP-U: Unnamed Stream Inflow=30.64 cfs 144,042 cf
Outflow=30.64 cfs 144,042 cf

Reach P-DP-W: Wards Stream Inflow=114.43 cfs 585,470 cf
Outflow=114.43 cfs 585,470 cf

Pond P-B: Basin Peak Elev=1,412.97' Storage=9,312 cf Inflow=10.79 cfs 48,429 cf
ed=0.02 cfs 545 cf Primary=8.86 cfs 47,883 cf Secondary=0.00 cfs 0 cf Tertiary=0.00 cfs 0 cf Outflow=8.88 cfs 48,428 cf

Pond P-DP-P: Pond DP Inflow=47.71 cfs 197,780 cf
Primary=47.71 cfs 197,780 cf

Pond P-PAD: PAD Peak Elev=1,421.67' Storage=3,345 cf Inflow=1.85 cfs 5,724 cf
Discarded=0.02 cfs 4,138 cf Primary=0.05 cfs 566 cf Secondary=0.10 cfs 1,019 cf Outflow=0.17 cfs 5,724 cf

Link P-L3: Lag delayed by 7.0 min Inflow=8.86 cfs 47,883 cf
Primary=8.85 cfs 47,883 cf

Link P-L4: Lag delayed by 11.6 min Inflow=0.10 cfs 1,019 cf
Primary=0.10 cfs 1,019 cf

Total Runoff Area = 4,099,566 sf Runoff Volume = 931,978 cf Average Runoff Depth = 2.73"
99.06% Pervious = 4,061,182 sf 0.94% Impervious = 38,384 sf

Summary for Subcatchment 55S: Southwest

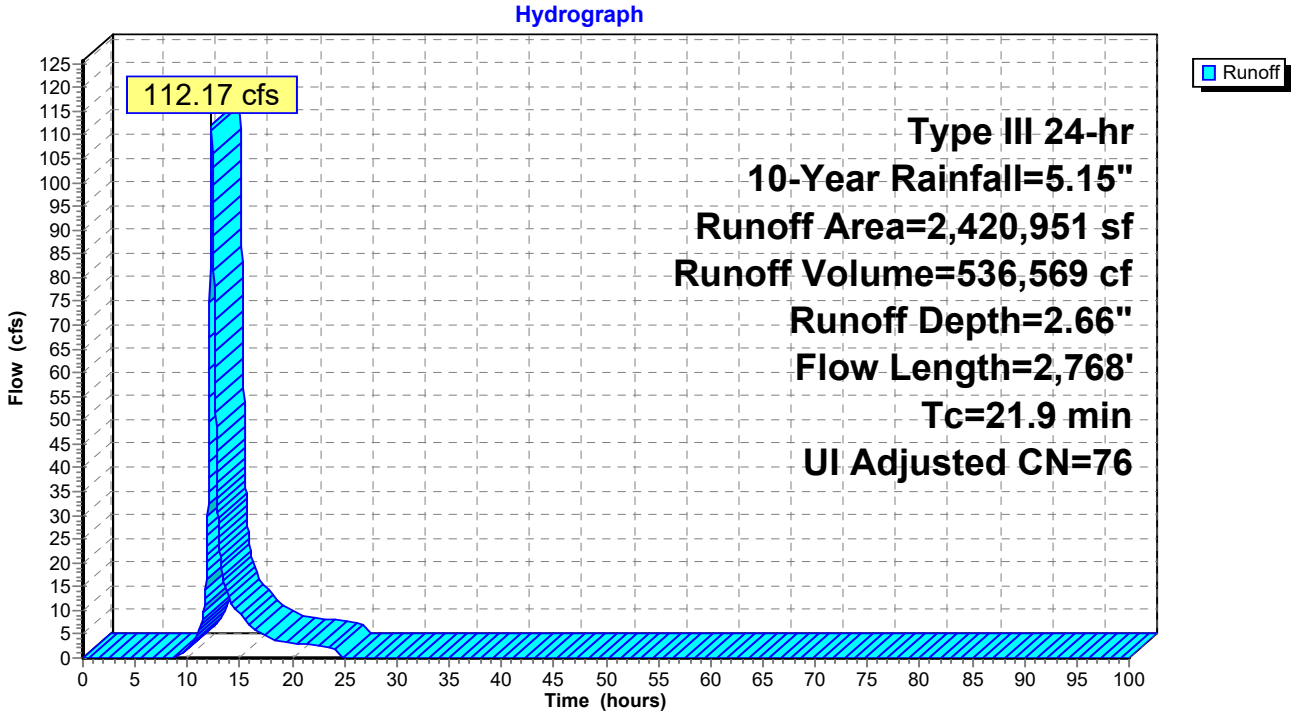
Runoff = 112.17 cfs @ 12.31 hrs, Volume= 536,569 cf, Depth= 2.66"
Routed to Reach P-DP-W : Wards Stream

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=5.15"

Area (sf)	CN	Adj	Description
444,479	74		Pasture/grassland/range, Good, HSG C
154,883	70		Woods, Good, HSG C
1,455	98		Unconnected pavement, HSG C
296,475	80		Pasture/grassland/range, Good, HSG D
1,506,583	77		Woods, Good, HSG D
11,313	96		Gravel surface, HSG D
3,541	98		Unconnected pavement, HSG D
2,222	98		Water Surface, 0% imp, HSG D
2,420,951	77	76	Weighted Average, UI Adjusted
2,415,955			99.79% Pervious Area
4,996			0.21% Impervious Area
4,996			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	29	0.1254	0.13		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.29"
4.8	71	0.0431	0.25		**Sheet Flow, BC** Range n= 0.130 P2= 3.29"
1.7	114	0.0258	1.12		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
3.7	336	0.0476	1.53		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
2.8	298	0.0654	1.79		**Shallow Concentrated Flow, EF** Short Grass Pasture Kv= 7.0 fps
1.8	170	0.1027	1.60		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
1.1	1,008	0.0634	14.98	599.10	**Trap/Vee/Rect Channel Flow, GH** Bot.W=10.00' D=2.00' Z= 5.0 '/' Top.W=30.00' n= 0.030 Earth, grassed & winding
2.2	742		5.67		**Lake or Reservoir, HI** Mean Depth= 1.00'
21.9	2,768	Total			

Subcatchment 55S: Southwest



Summary for Subcatchment 56S: North

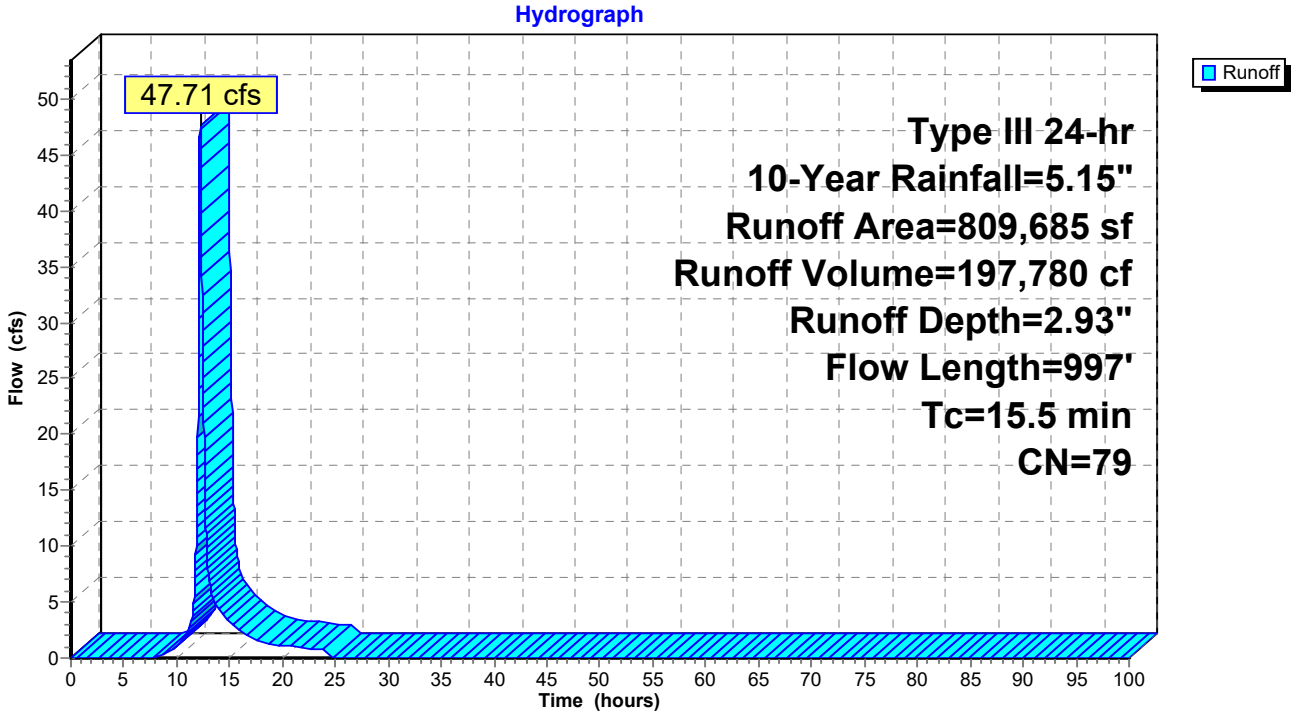
Runoff = 47.71 cfs @ 12.21 hrs, Volume= 197,780 cf, Depth= 2.93"
Routed to Pond P-DP-P : Pond DP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=5.15"

Area (sf)	CN	Description
101	74	Pasture/grassland/range, Good, HSG C
298,075	80	Pasture/grassland/range, Good, HSG D
15,150	98	Unconnected pavement, HSG D
24,690	98	Water Surface, 0% imp, HSG D
458,558	77	Woods, Good, HSG D
1,794	98	Unconnected pavement, HSG C
11,317	96	Gravel surface, HSG D
809,685	79	Weighted Average
792,741		97.91% Pervious Area
16,944		2.09% Impervious Area
16,944		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0568	0.26		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.29"
1.4	113	0.0709	1.33		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
1.5	192	0.0975	2.19		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
6.2	592	0.1004	1.58		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
15.5	997	Total			

Subcatchment 56S: North



Summary for Subcatchment P-S-B: Basin Sub

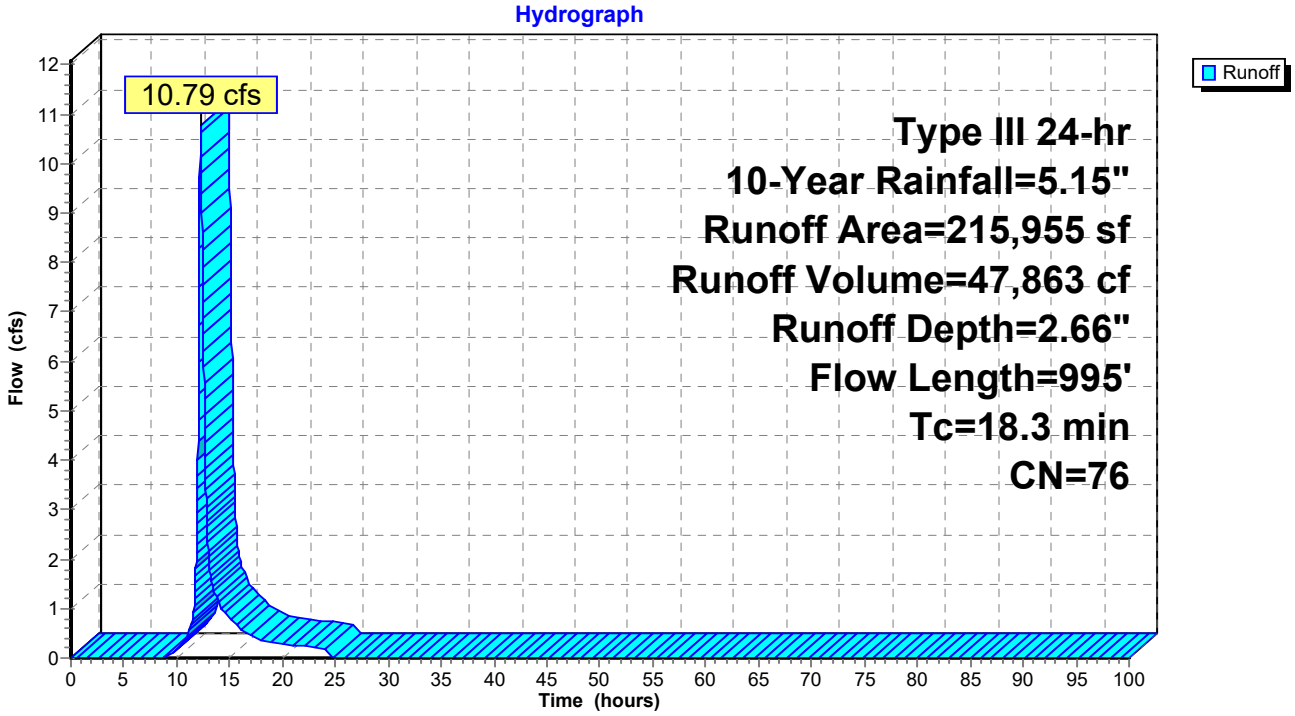
Runoff = 10.79 cfs @ 12.26 hrs, Volume= 47,863 cf, Depth= 2.66"
Routed to Pond P-B : Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=5.15"

Area (sf)	CN	Description
158,743	74	Pasture/grassland/range, Good, HSG C
46,301	80	Pasture/grassland/range, Good, HSG D
637	98	Unconnected pavement, HSG C
70	98	Unconnected pavement, HSG D
1,015	96	Gravel surface, HSG C
9,185	96	Gravel surface, HSG D
4	77	Woods, Good, HSG D
215,955	76	Weighted Average
215,248		99.67% Pervious Area
707		0.33% Impervious Area
707		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0253	0.19		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.29"
1.4	95	0.0264	1.14		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
5.8	456	0.0350	1.31		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
1.9	248	0.0922	2.13		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
0.4	96	0.0621	4.01		**Shallow Concentrated Flow, EF** Unpaved Kv= 16.1 fps
18.3	995	Total			

Subcatchment P-S-B: Basin Sub



Summary for Subcatchment P-S-PAD: Pad Sub

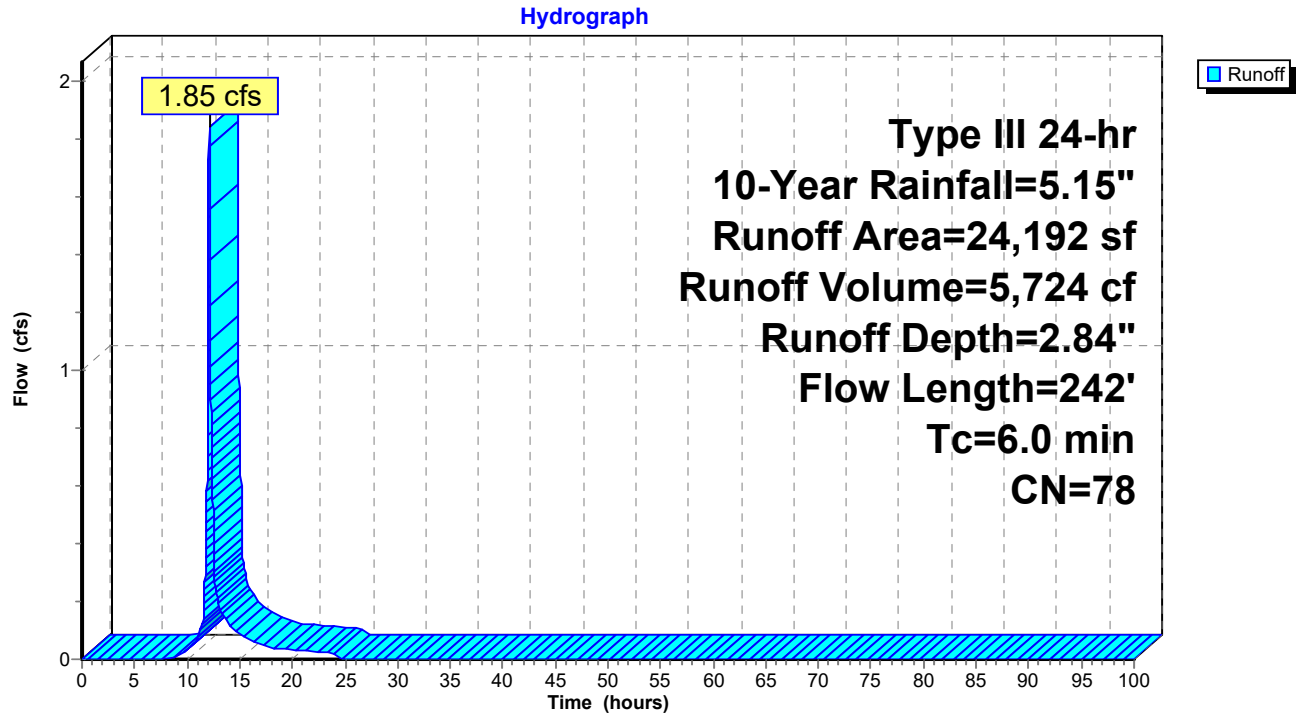
Runoff = 1.85 cfs @ 12.09 hrs, Volume= 5,724 cf, Depth= 2.84"
Routed to Pond P-PAD : PAD

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=5.15"

Area (sf)	CN	Description
19,697	74	Pasture/grassland/range, Good, HSG C
3,170	98	Water Surface, 0% imp, HSG C
1,325	98	Water Surface, 0% imp, HSG D
24,192	78	Weighted Average
24,192		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.0740	0.33		**Sheet Flow, AB** Range n= 0.130 P2= 3.29"
0.9	115	0.0876	2.07		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.0	27	0.2358	41.50	1,120.40	**Trap/Vee/Rect Channel Flow, CD** Bot.W=0.00' D=3.00' Z= 3.0 '/' Top.W=18.00' n= 0.022 Earth, clean & straight
6.0	242	Total			

Subcatchment P-S-PAD: Pad Sub



Summary for Subcatchment P-S-SE: Southeast

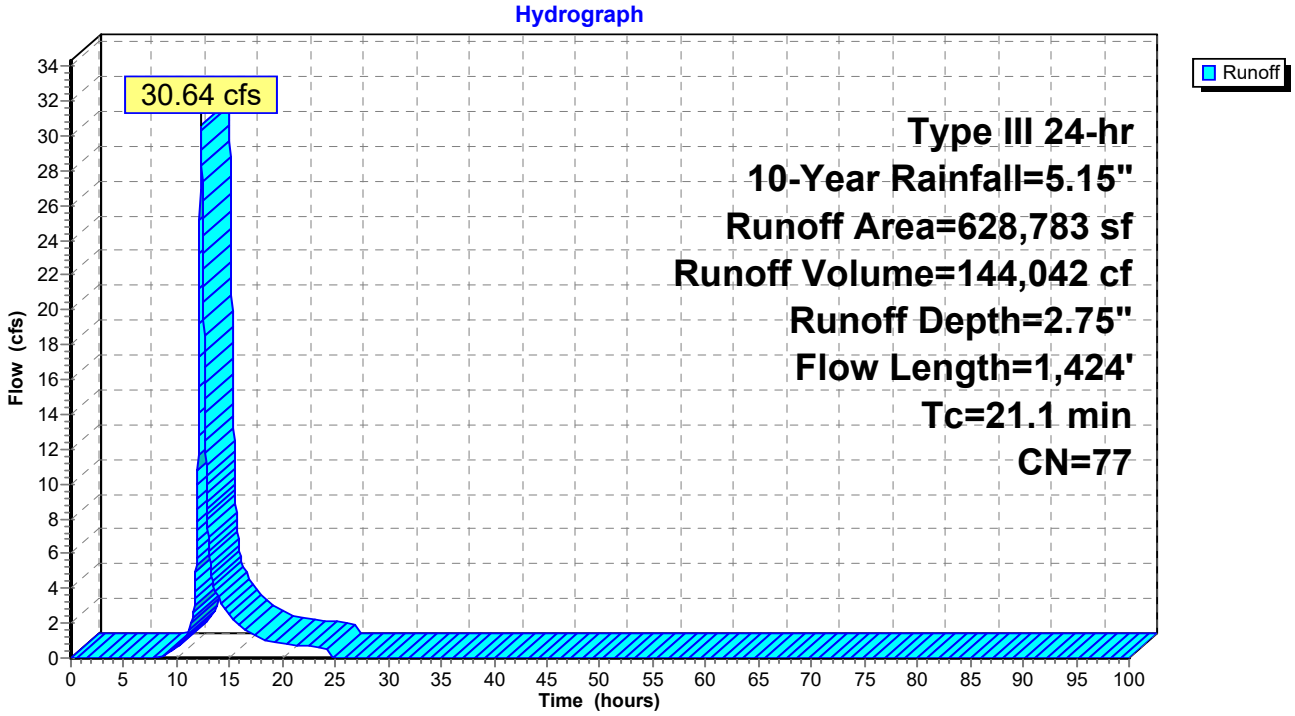
Runoff = 30.64 cfs @ 12.29 hrs, Volume= 144,042 cf, Depth= 2.75"
Routed to Reach P-DP-U : Unnamed Stream

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=5.15"

Area (sf)	CN	Description
98,461	74	Pasture/grassland/range, Good, HSG C
59,295	70	Woods, Good, HSG C
271	98	Unconnected pavement, HSG C
216,105	80	Pasture/grassland/range, Good, HSG D
239,185	77	Woods, Good, HSG D
15,466	98	Unconnected pavement, HSG D
628,783	77	Weighted Average
613,046		97.50% Pervious Area
15,737		2.50% Impervious Area
15,737		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0696	0.28		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.29"
8.7	708	0.0378	1.36		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
6.5	616	0.0502	1.57		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
21.1	1,424	Total			

Subcatchment P-S-SE: Southeast



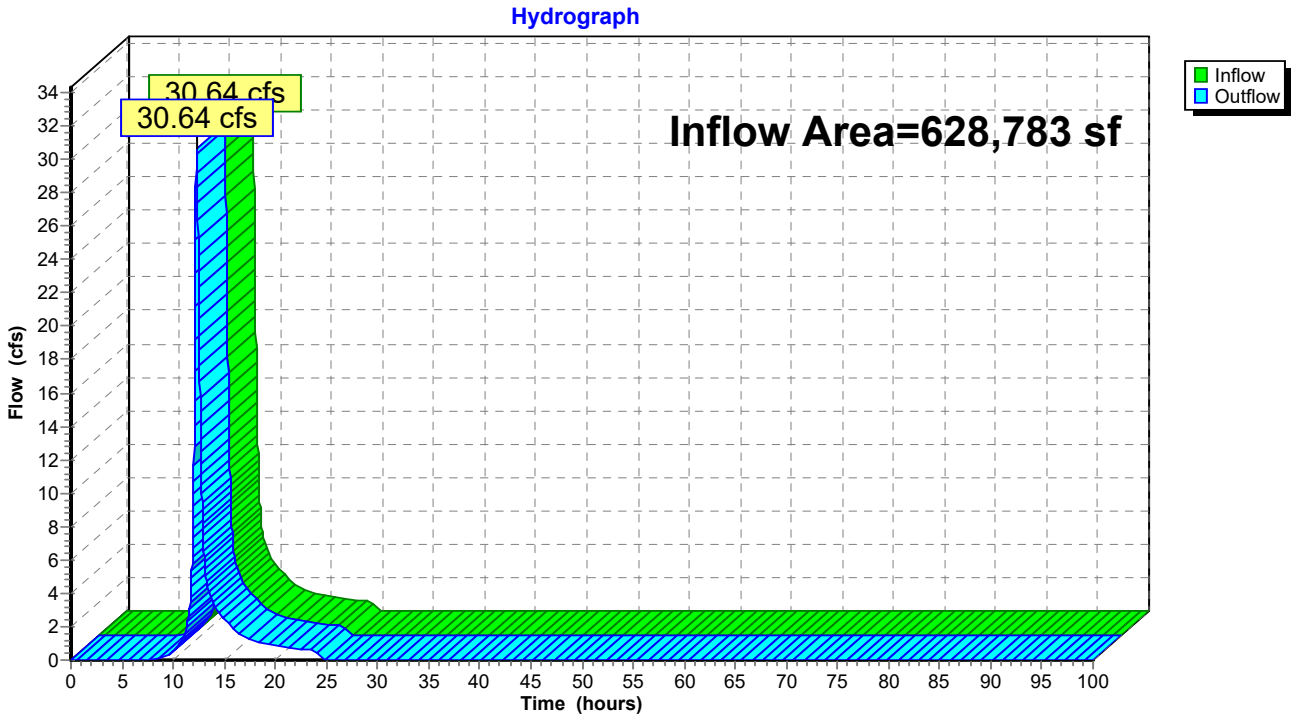
Summary for Reach P-DP-U: Unnamed Stream

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

Inflow Area = 628,783 sf, 2.50% Impervious, Inflow Depth = 2.75" for 10-Year event
Inflow = 30.64 cfs @ 12.29 hrs, Volume= 144,042 cf
Outflow = 30.64 cfs @ 12.29 hrs, Volume= 144,042 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Reach P-DP-U: Unnamed Stream



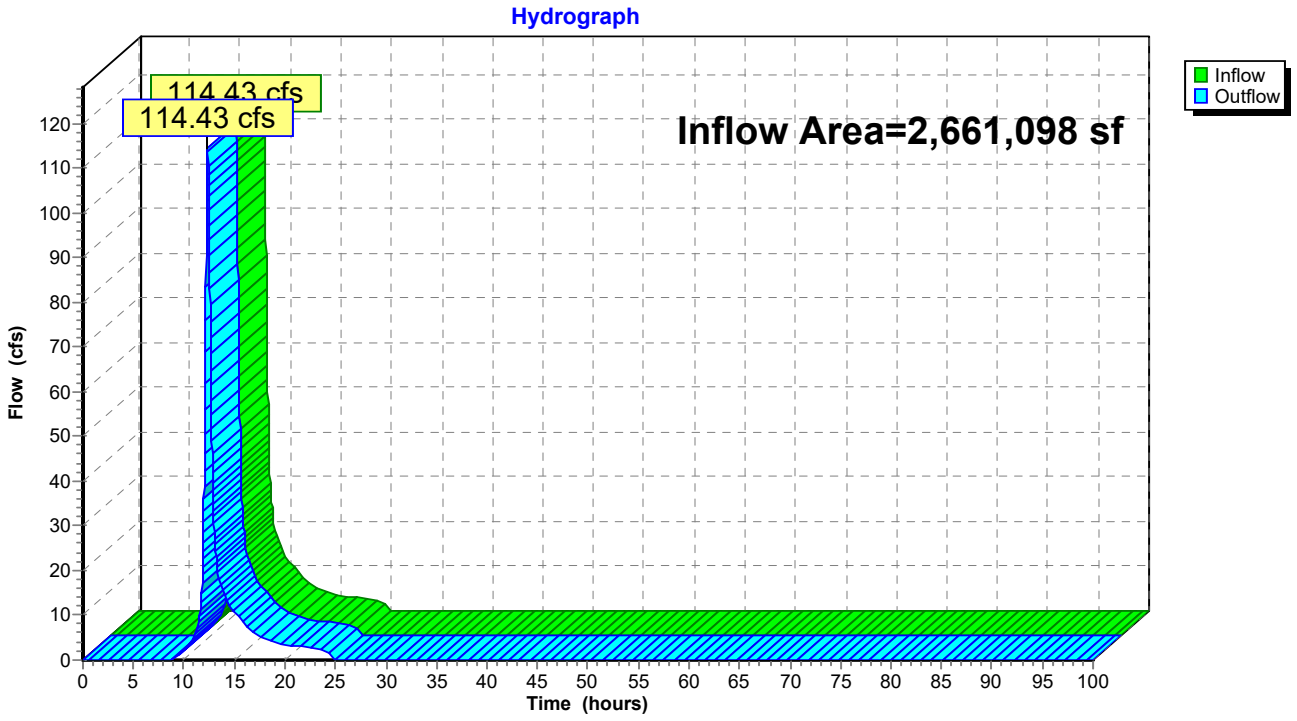
Summary for Reach P-DP-W: Wards Stream

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

Inflow Area = 2,661,098 sf, 0.21% Impervious, Inflow Depth = 2.64" for 10-Year event
Inflow = 114.43 cfs @ 12.31 hrs, Volume= 585,470 cf
Outflow = 114.43 cfs @ 12.31 hrs, Volume= 585,470 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Reach P-DP-W: Wards Stream



Summary for Pond P-B: Basin

Inflow Area = 240,147 sf, 0.29% Impervious, Inflow Depth = 2.42" for 10-Year event
Inflow = 10.79 cfs @ 12.26 hrs, Volume= 48,429 cf
Outflow = 8.88 cfs @ 12.39 hrs, Volume= 48,428 cf, Atten= 18%, Lag= 7.9 min
Discarded = 0.02 cfs @ 12.39 hrs, Volume= 545 cf
Primary = 8.86 cfs @ 12.39 hrs, Volume= 47,883 cf
Routed to Link P-L3 : Lag
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link P-L3 : Lag
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link P-L3 : Lag

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 1,412.97' @ 12.39 hrs Surf.Area= 5,101 sf Storage= 9,312 cf
Flood Elev= 1,414.00' Surf.Area= 6,667 sf Storage= 15,326 cf

Plug-Flow detention time= 33.1 min calculated for 48,428 cf (100% of inflow)
Center-of-Mass det. time= 33.0 min (876.6 - 843.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,410.00'	15,326 cf	**Basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,410.00	1,454	211.2	0	0	1,454
1,411.00	2,461	301.4	1,936	1,936	5,142
1,412.00	3,745	351.2	3,081	5,016	7,749
1,413.00	5,139	389.2	4,424	9,440	10,018
1,414.00	6,667	445.8	5,886	15,326	13,802

Device	Routing	Invert	Outlet Devices
#0	Tertiary	1,414.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	1,410.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Secondary	1,413.00'	**3.0' long + 3.0 '/' SideZ x 8.0' breadth Overflow Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#3	Primary	1,410.00'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,410.00' / 1,409.50' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#4	Device 3	1,410.00'	**6.0" W x 6.0" H Vert. Low Flow Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 3	1,412.00'	**12.0" W x 12.0" H Vert. High Flow Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 3	1,412.70'	**3.5" x 2.5" Horiz. Top of Riser X 5.00 columns** X 6 rows C= 0.600 in 24.0" x 24.0" Grate (46% open area) Limited to weir flow at low heads

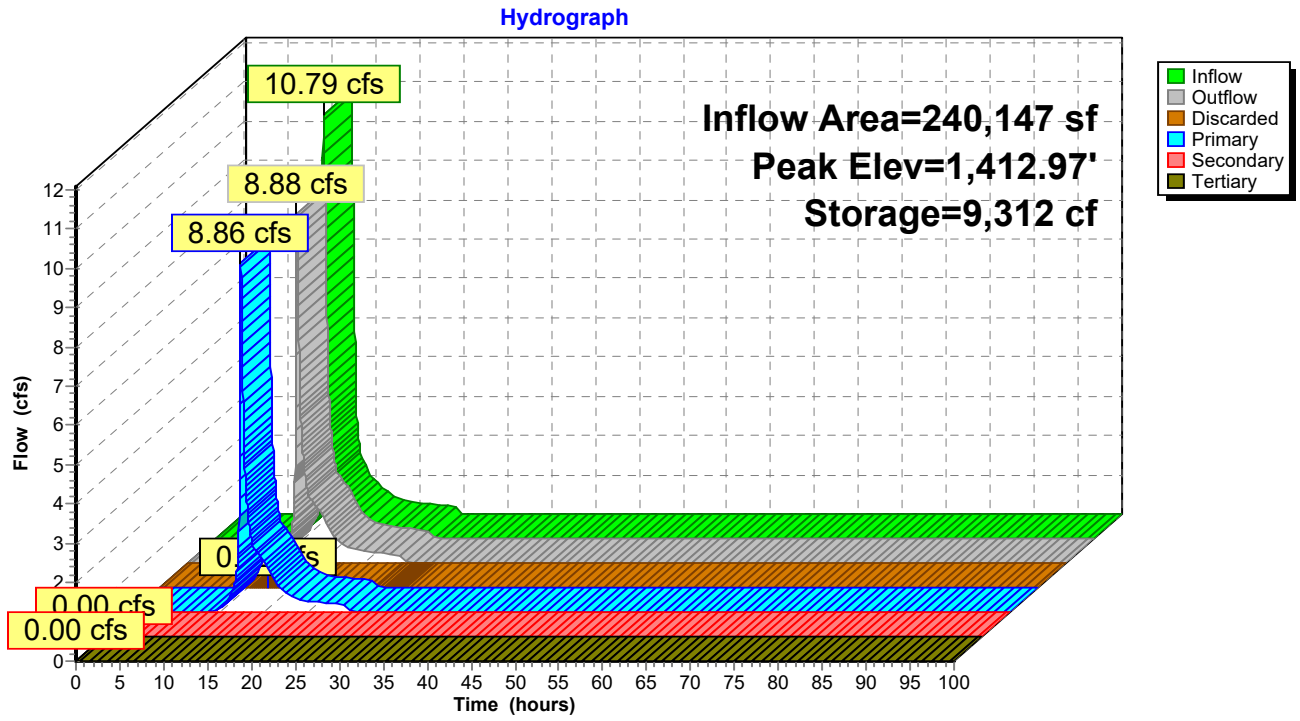
Discarded OutFlow Max=0.02 cfs @ 12.39 hrs HW=1,412.97' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=8.83 cfs @ 12.39 hrs HW=1,412.97' (Free Discharge)
└**3=Culvert** (Passes 8.83 cfs of 12.69 cfs potential flow)
  └**4=Low Flow Orifice** (Orifice Controls 1.99 cfs @ 7.94 fps)
  └**5=High Flow Orifice** (Orifice Controls 3.09 cfs @ 3.17 fps)
  └**6=Top of Riser** (Weir Controls 3.76 cfs @ 1.71 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,410.00' (Free Discharge)
└**2=Overflow Weir** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,410.00' (Free Discharge)

Pond P-B: Basin



Stage-Area-Storage for Pond P-B: Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
1,410.00	1,454	0
1,410.05	1,498	74
1,410.10	1,543	150
1,410.15	1,588	228
1,410.20	1,634	309
1,410.25	1,681	392
1,410.30	1,728	477
1,410.35	1,776	564
1,410.40	1,825	654
1,410.45	1,875	747
1,410.50	1,925	842
1,410.55	1,975	939
1,410.60	2,027	1,039
1,410.65	2,079	1,142
1,410.70	2,131	1,247
1,410.75	2,185	1,355
1,410.80	2,239	1,466
1,410.85	2,293	1,579
1,410.90	2,348	1,695
1,410.95	2,404	1,814
1,411.00	2,461	1,936
1,411.05	2,519	2,060
1,411.10	2,577	2,187
1,411.15	2,636	2,318
1,411.20	2,696	2,451
1,411.25	2,757	2,587
1,411.30	2,818	2,727
1,411.35	2,880	2,869
1,411.40	2,942	3,015
1,411.45	3,006	3,163
1,411.50	3,069	3,315
1,411.55	3,134	3,470
1,411.60	3,199	3,629
1,411.65	3,265	3,790
1,411.70	3,332	3,955
1,411.75	3,399	4,124
1,411.80	3,467	4,295
1,411.85	3,535	4,470
1,411.90	3,605	4,649
1,411.95	3,674	4,831
1,412.00	3,745	5,016
1,412.05	3,809	5,205
1,412.10	3,874	5,397
1,412.15	3,940	5,592
1,412.20	4,006	5,791
1,412.25	4,073	5,993
1,412.30	4,140	6,198
1,412.35	4,208	6,407
1,412.40	4,276	6,619
1,412.45	4,345	6,835
1,412.50	4,414	7,054
1,412.55	4,484	7,276
1,412.60	4,555	7,502
1,412.65	4,626	7,732
1,412.70	4,698	7,965
1,412.75	4,770	8,202
1,412.80	4,843	8,442
1,412.85	4,916	8,686
1,412.90	4,990	8,933
1,412.95	5,064	9,185
1,413.00	5,139	9,440
1,413.05	5,211	9,699
1,413.10	5,283	9,961
1,413.15	5,356	10,227
1,413.20	5,429	10,496
1,413.25	5,502	10,770
1,413.30	5,577	11,047
1,413.35	5,651	11,327
1,413.40	5,726	11,612
1,413.45	5,802	11,900
1,413.50	5,878	12,192
1,413.55	5,955	12,488
1,413.60	6,032	12,788
1,413.65	6,110	13,091
1,413.70	6,188	13,399
1,413.75	6,266	13,710
1,413.80	6,346	14,025
1,413.85	6,425	14,344
1,413.90	6,505	14,668
1,413.95	6,586	14,995
1,414.00	**6,667**	**15,326**

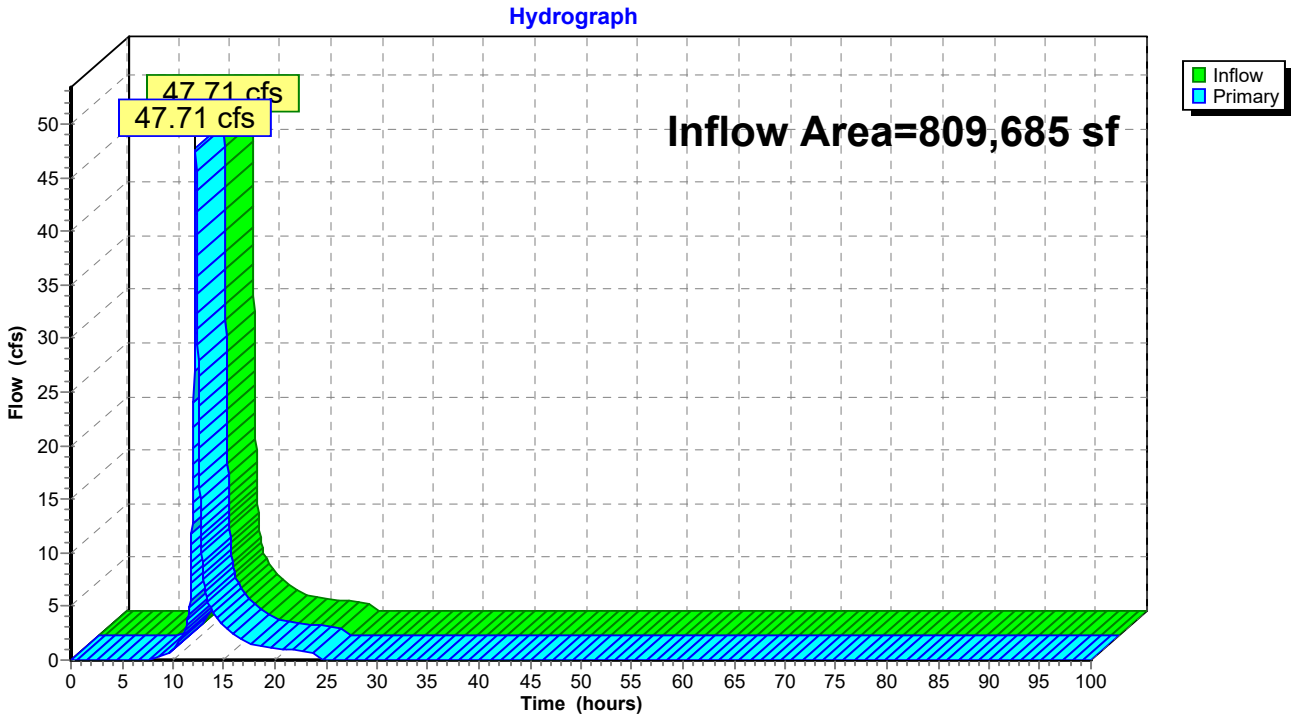
Summary for Pond P-DP-P: Pond DP

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

Inflow Area = 809,685 sf, 2.09% Impervious, Inflow Depth = 2.93" for 10-Year event
Inflow = 47.71 cfs @ 12.21 hrs, Volume= 197,780 cf
Primary = 47.71 cfs @ 12.21 hrs, Volume= 197,780 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Pond P-DP-P: Pond DP



Summary for Pond P-PAD: PAD

Inflow Area = 24,192 sf, 0.00% Impervious, Inflow Depth = 2.84" for 10-Year event
Inflow = 1.85 cfs @ 12.09 hrs, Volume= 5,724 cf
Outflow = 0.17 cfs @ 13.08 hrs, Volume= 5,724 cf, Atten= 91%, Lag= 59.5 min
Discarded = 0.02 cfs @ 9.92 hrs, Volume= 4,138 cf
Primary = 0.05 cfs @ 13.08 hrs, Volume= 566 cf
Routed to Pond P-B : Basin
Secondary = 0.10 cfs @ 13.08 hrs, Volume= 1,019 cf
Routed to Link P-L4 : Lag

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 1,421.67' @ 13.08 hrs Surf.Area= 3,813 sf Storage= 3,345 cf

Plug-Flow detention time= 1,503.0 min calculated for 5,724 cf (100% of inflow)
Center-of-Mass det. time= 1,502.9 min (2,328.7 - 825.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,421.67'	3,813 cf	**Overflow (Prismatic)**Listed below (Recalc) -Impervious
#2	1,421.00'	1,022 cf	**Choker Course (Prismatic)**Listed below (Recalc) -Impervious 2,555 cf Overall x 40.0% Voids
#3	1,420.00'	1,525 cf	**Filter Course (Prismatic)**Listed below (Recalc) -Impervious 3,813 cf Overall x 40.0% Voids
#4	1,419.75'	286 cf	**Filter Blanket (Prismatic)**Listed below (Recalc) -Impervious 953 cf Overall x 30.0% Voids
#5	1,419.42'	503 cf	**Reservoir Course (Prismatic)**Listed below (Recalc) 1,258 cf Overall x 40.0% Voids
		7,149 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,421.67	3,813	0	0
1,422.67	3,813	3,813	3,813

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,421.00	3,813	0	0
1,421.67	3,813	2,555	2,555

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,420.00	3,813	0	0
1,421.00	3,813	3,813	3,813

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,419.75	3,813	0	0
1,420.00	3,813	953	953

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,419.42	3,813	0	0
1,419.75	3,813	1,258	1,258

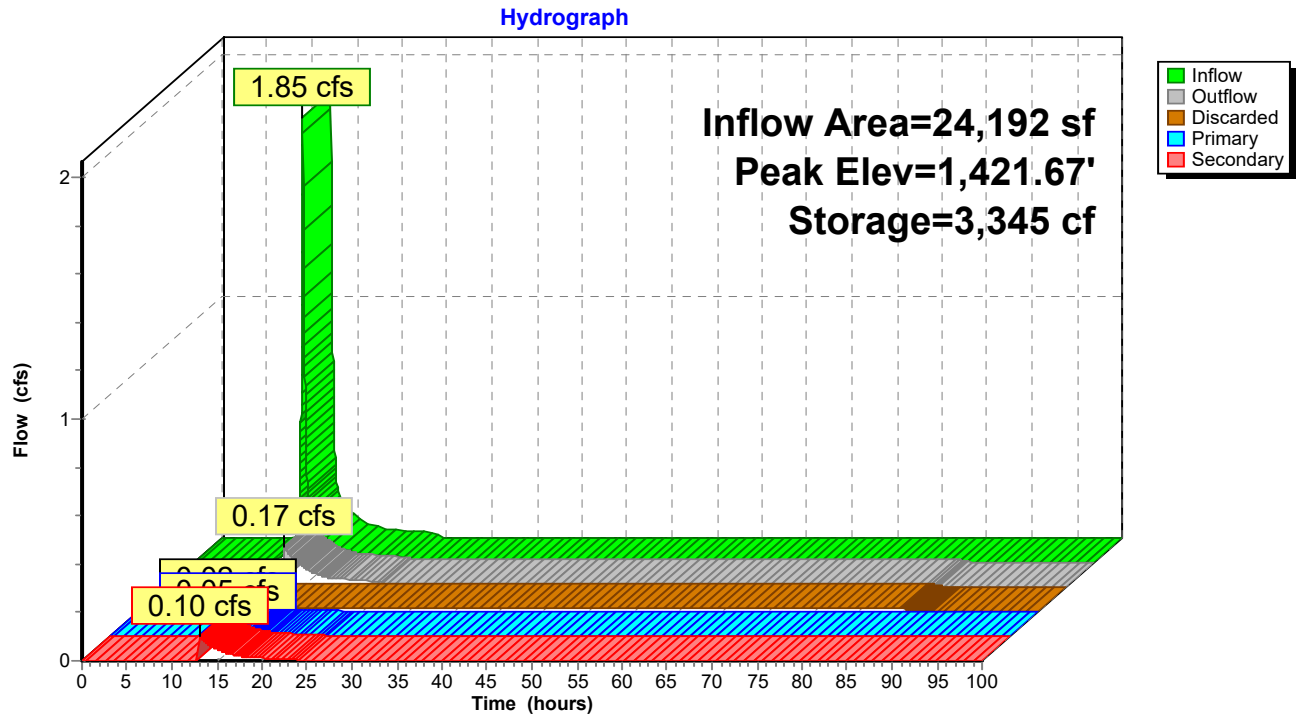
Device	Routing	Invert	Outlet Devices
#1	Discarded	1,419.42'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	1,421.67'	**60.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Secondary	1,421.67'	**108.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.02 cfs @ 9.92 hrs HW=1,419.45' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.02 cfs @ 13.08 hrs HW=1,421.67' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 0.02 cfs @ 0.12 fps)

Secondary OutFlow Max=0.03 cfs @ 13.08 hrs HW=1,421.67' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 0.03 cfs @ 0.12 fps)

Pond P-PAD: PAD



Stage-Area-Storage for Pond P-PAD: PAD

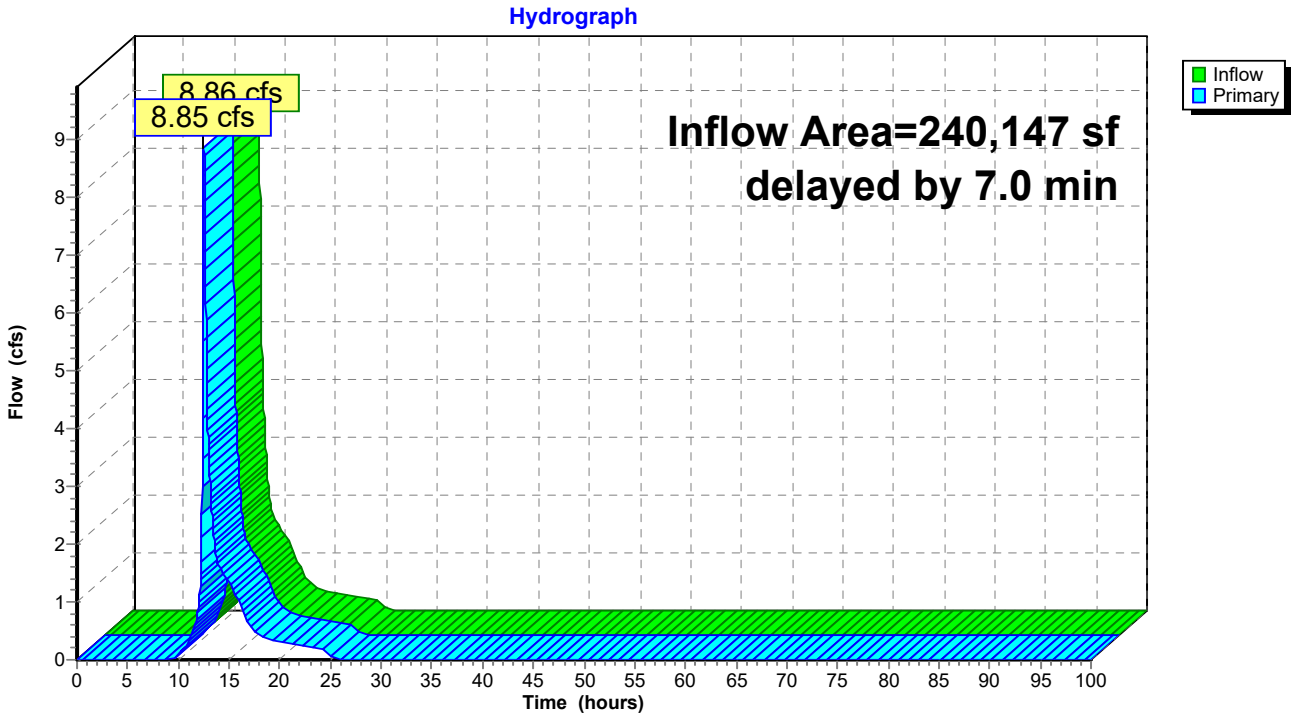
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
1,419.42	**3,813**	0
1,419.47	3,813	76
1,419.52	3,813	153
1,419.57	3,813	229
1,419.62	3,813	305
1,419.67	3,813	381
1,419.72	3,813	458
1,419.77	3,813	526
1,419.82	3,813	583
1,419.87	3,813	641
1,419.92	3,813	698
1,419.97	3,813	755
1,420.02	3,813	820
1,420.07	3,813	896
1,420.12	3,813	972
1,420.17	3,813	1,049
1,420.22	3,813	1,125
1,420.27	3,813	1,201
1,420.32	3,813	1,277
1,420.37	3,813	1,354
1,420.42	3,813	1,430
1,420.47	3,813	1,506
1,420.52	3,813	1,582
1,420.57	3,813	1,659
1,420.62	3,813	1,735
1,420.67	3,813	1,811
1,420.72	3,813	1,887
1,420.77	3,813	1,964
1,420.82	3,813	2,040
1,420.87	3,813	2,116
1,420.92	3,813	2,192
1,420.97	3,813	2,269
1,421.02	3,813	2,345
1,421.07	3,813	2,421
1,421.12	3,813	2,498
1,421.17	3,813	2,574
1,421.22	3,813	2,650
1,421.27	3,813	2,726
1,421.32	3,813	2,803
1,421.37	3,813	2,879
1,421.42	3,813	2,955
1,421.47	3,813	3,031
1,421.52	3,813	3,108
1,421.57	3,813	3,184
1,421.62	3,813	3,260
1,421.67	3,813	3,336
1,421.72	3,813	3,527
1,421.77	3,813	3,718
1,421.82	3,813	3,908
1,421.87	3,813	4,099
1,421.92	3,813	4,290
1,421.97	3,813	4,480
1,422.02	3,813	4,671
1,422.07	3,813	4,862
1,422.12	3,813	5,052
1,422.17	3,813	5,243
1,422.22	3,813	5,434
1,422.27	3,813	5,624
1,422.32	3,813	5,815
1,422.37	3,813	6,005
1,422.42	3,813	6,196
1,422.47	3,813	6,387
1,422.52	3,813	6,577
1,422.57	3,813	6,768
1,422.62	3,813	6,959
1,422.67	3,813	**7,149**

Summary for Link P-L3: Lag

Inflow Area = 240,147 sf, 0.29% Impervious, Inflow Depth = 2.39" for 10-Year event
Inflow = 8.86 cfs @ 12.39 hrs, Volume= 47,883 cf
Primary = 8.85 cfs @ 12.51 hrs, Volume= 47,883 cf, Atten= 0%, Lag= 7.1 min
Routed to Reach P-DP-W : Wards Stream

Primary outflow = Inflow delayed by 7.0 min, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Link P-L3: Lag

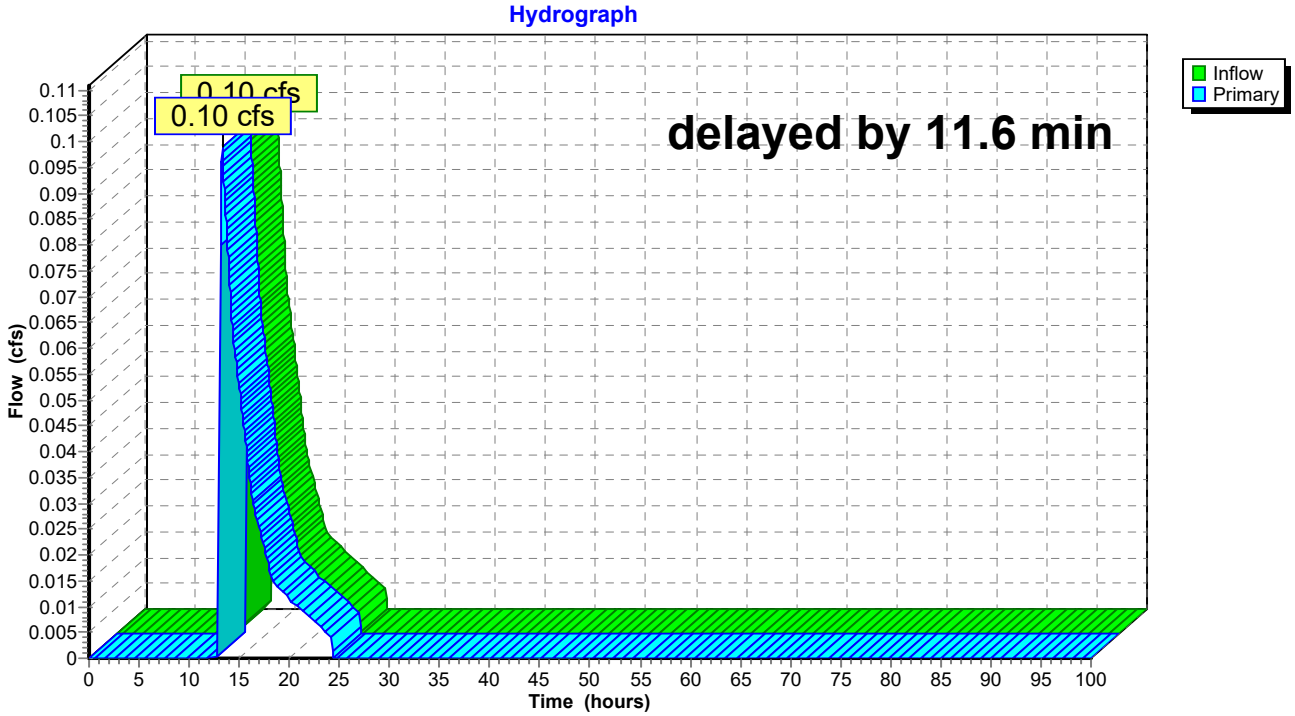


Summary for Link P-L4: Lag

Inflow = 0.10 cfs @ 13.08 hrs, Volume= 1,019 cf
Primary = 0.10 cfs @ 13.29 hrs, Volume= 1,019 cf, Atten= 0%, Lag= 12.5 min
Routed to Reach P-DP-W : Wards Stream

Primary outflow = Inflow delayed by 11.6 min, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Link P-L4: Lag



Time span=0.00-100.00 hrs, dt=0.02 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 55S: Southwest Runoff Area=2,420,951 sf 0.21% Impervious Runoff Depth=5.26"
Flow Length=2,768' Tc=21.9 min UI Adjusted CN=76 Runoff=221.48 cfs 1,060,800 cf

Subcatchment 56S: North Runoff Area=809,685 sf 2.09% Impervious Runoff Depth=5.61"
Flow Length=997' Tc=15.5 min CN=79 Runoff=90.42 cfs 378,556 cf

Subcatchment P-S-B: Basin Sub Runoff Area=215,955 sf 0.33% Impervious Runoff Depth=5.26"
Flow Length=995' Tc=18.3 min CN=76 Runoff=21.28 cfs 94,626 cf

Subcatchment P-S-PAD: Pad Sub Runoff Area=24,192 sf 0.00% Impervious Runoff Depth=5.49"
Flow Length=242' Tc=6.0 min CN=78 Runoff=3.53 cfs 11,073 cf

Subcatchment P-S-SE: Southeast Runoff Area=628,783 sf 2.50% Impervious Runoff Depth=5.38"
Flow Length=1,424' Tc=21.1 min CN=77 Runoff=59.62 cfs 281,661 cf

Reach P-DP-U: Unnamed Stream Inflow=59.62 cfs 281,661 cf
Outflow=59.62 cfs 281,661 cf

Reach P-DP-W: Wards Stream Inflow=238.67 cfs 1,161,568 cf
Outflow=238.67 cfs 1,161,568 cf

Pond P-B: Basin Peak Elev=1,413.60' Storage=12,770 cf Inflow=21.90 cfs 97,069 cf
2 cfs 696 cf Primary=14.36 cfs 90,820 cf Secondary=5.52 cfs 5,552 cf Tertiary=0.00 cfs 0 cf Outflow=19.90 cfs 97,067 cf

Pond P-DP-P: Pond DP Inflow=90.42 cfs 378,556 cf
Primary=90.42 cfs 378,556 cf

Pond P-PAD: PAD Peak Elev=1,421.71' Storage=3,482 cf Inflow=3.53 cfs 11,073 cf
Discarded=0.02 cfs 4,239 cf Primary=1.25 cfs 2,443 cf Secondary=2.25 cfs 4,397 cf Outflow=3.52 cfs 11,079 cf

Link P-L3: Lag delayed by 7.0 min Inflow=19.88 cfs 96,372 cf
Primary=19.86 cfs 96,372 cf

Link P-L4: Lag delayed by 11.6 min Inflow=2.25 cfs 4,397 cf
Primary=2.20 cfs 4,397 cf

Total Runoff Area = 4,099,566 sf Runoff Volume = 1,826,716 cf Average Runoff Depth = 5.35"
99.06% Pervious = 4,061,182 sf 0.94% Impervious = 38,384 sf

Summary for Subcatchment 55S: Southwest

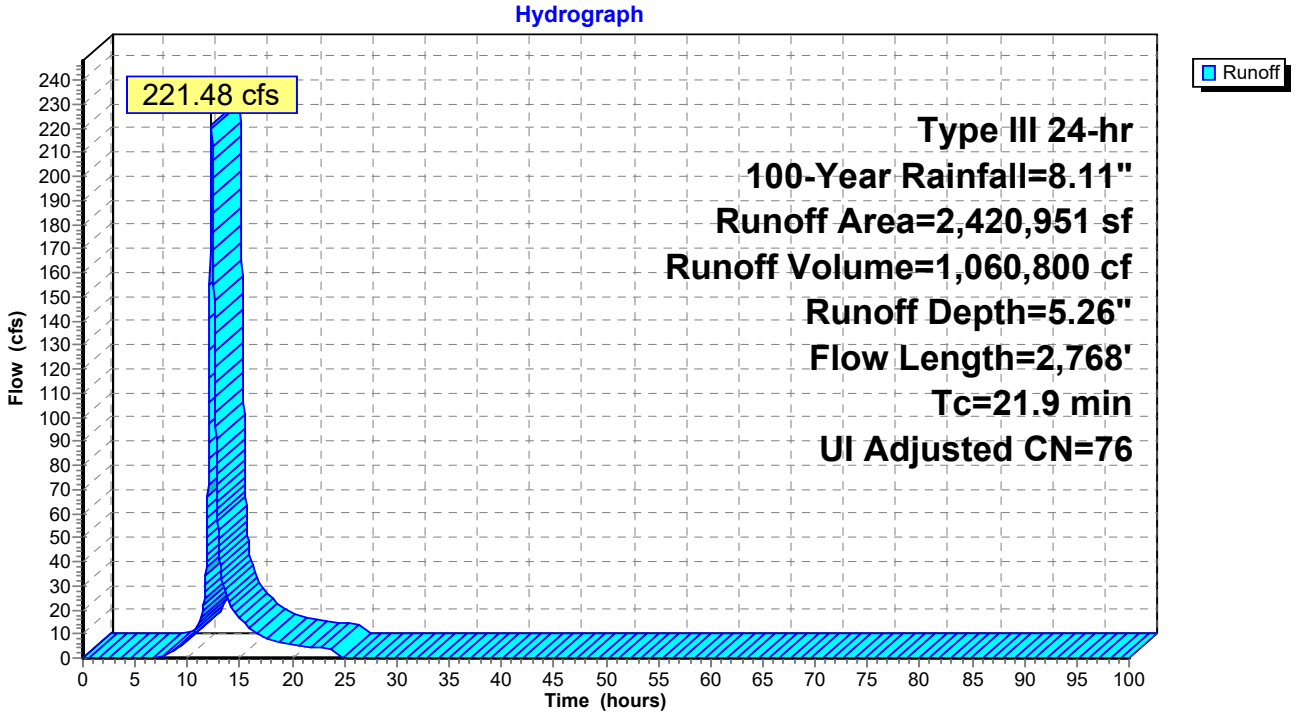
Runoff = 221.48 cfs @ 12.30 hrs, Volume= 1,060,800 cf, Depth= 5.26"
Routed to Reach P-DP-W : Wards Stream

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.11"

Area (sf)	CN	Adj	Description
444,479	74		Pasture/grassland/range, Good, HSG C
154,883	70		Woods, Good, HSG C
1,455	98		Unconnected pavement, HSG C
296,475	80		Pasture/grassland/range, Good, HSG D
1,506,583	77		Woods, Good, HSG D
11,313	96		Gravel surface, HSG D
3,541	98		Unconnected pavement, HSG D
2,222	98		Water Surface, 0% imp, HSG D
2,420,951	77	76	Weighted Average, UI Adjusted
2,415,955			99.79% Pervious Area
4,996			0.21% Impervious Area
4,996			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	29	0.1254	0.13		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.29"
4.8	71	0.0431	0.25		**Sheet Flow, BC** Range n= 0.130 P2= 3.29"
1.7	114	0.0258	1.12		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
3.7	336	0.0476	1.53		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
2.8	298	0.0654	1.79		**Shallow Concentrated Flow, EF** Short Grass Pasture Kv= 7.0 fps
1.8	170	0.1027	1.60		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
1.1	1,008	0.0634	14.98	599.10	**Trap/Vee/Rect Channel Flow, GH** Bot.W=10.00' D=2.00' Z= 5.0 '/' Top.W=30.00' n= 0.030 Earth, grassed & winding
2.2	742		5.67		**Lake or Reservoir, HI** Mean Depth= 1.00'
21.9	2,768	Total			

Subcatchment 55S: Southwest



Summary for Subcatchment 56S: North

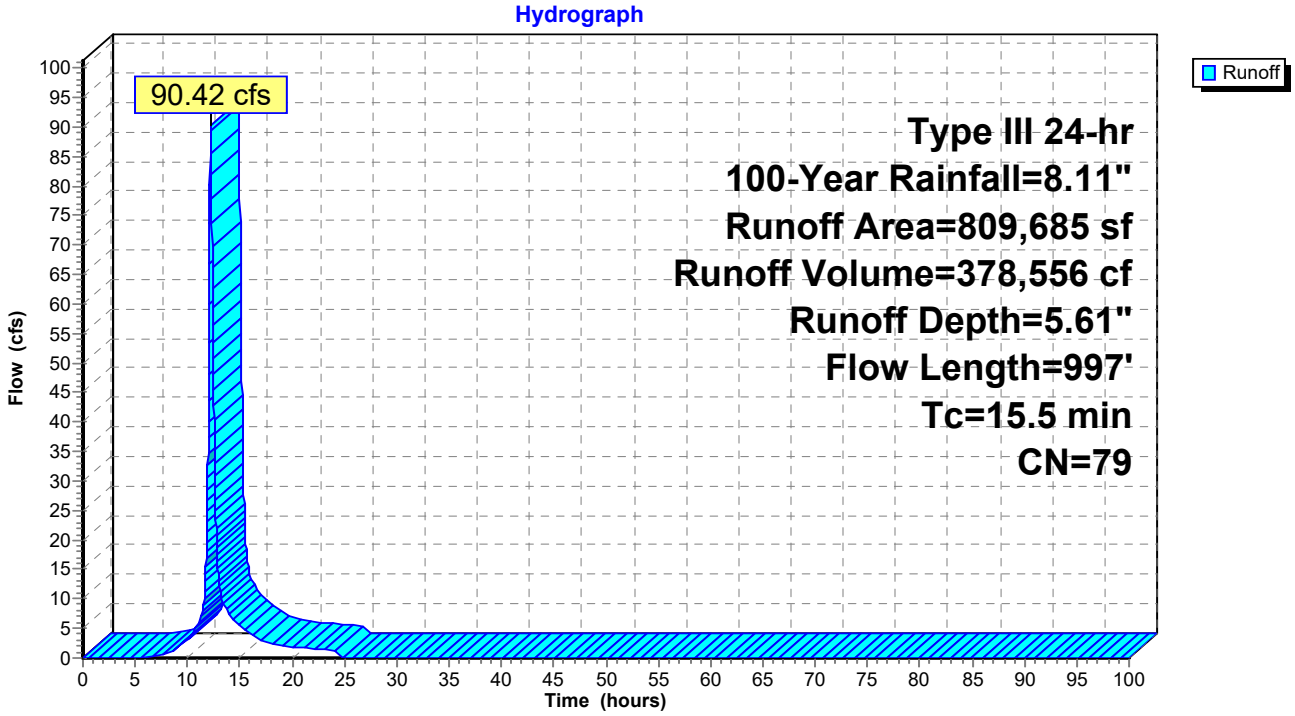
Runoff = 90.42 cfs @ 12.21 hrs, Volume= 378,556 cf, Depth= 5.61"
Routed to Pond P-DP-P : Pond DP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.11"

Area (sf)	CN	Description
101	74	Pasture/grassland/range, Good, HSG C
298,075	80	Pasture/grassland/range, Good, HSG D
15,150	98	Unconnected pavement, HSG D
24,690	98	Water Surface, 0% imp, HSG D
458,558	77	Woods, Good, HSG D
1,794	98	Unconnected pavement, HSG C
11,317	96	Gravel surface, HSG D
809,685	79	Weighted Average
792,741		97.91% Pervious Area
16,944		2.09% Impervious Area
16,944		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0568	0.26		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.29"
1.4	113	0.0709	1.33		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
1.5	192	0.0975	2.19		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
6.2	592	0.1004	1.58		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
15.5	997	Total			

Subcatchment 56S: North



Summary for Subcatchment P-S-B: Basin Sub

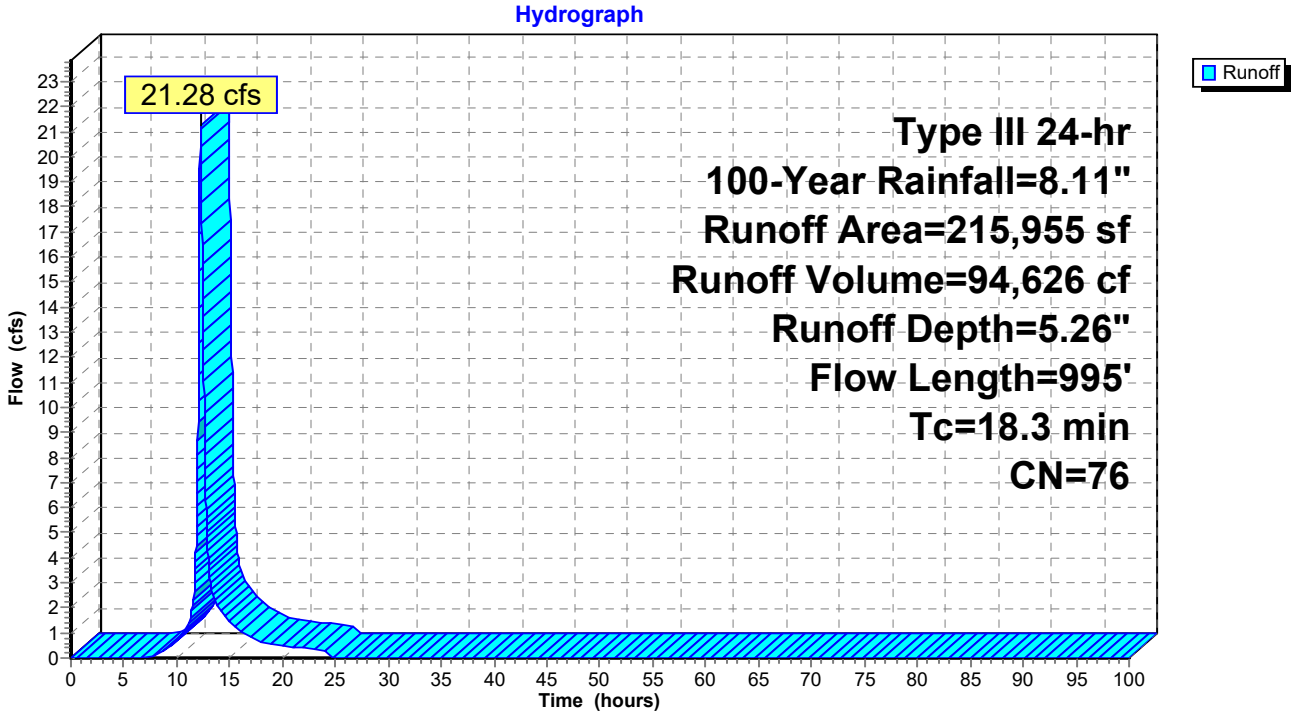
Runoff = 21.28 cfs @ 12.25 hrs, Volume= 94,626 cf, Depth= 5.26"
Routed to Pond P-B : Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.11"

Area (sf)	CN	Description
158,743	74	Pasture/grassland/range, Good, HSG C
46,301	80	Pasture/grassland/range, Good, HSG D
637	98	Unconnected pavement, HSG C
70	98	Unconnected pavement, HSG D
1,015	96	Gravel surface, HSG C
9,185	96	Gravel surface, HSG D
4	77	Woods, Good, HSG D
215,955	76	Weighted Average
215,248		99.67% Pervious Area
707		0.33% Impervious Area
707		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0253	0.19		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.29"
1.4	95	0.0264	1.14		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
5.8	456	0.0350	1.31		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
1.9	248	0.0922	2.13		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
0.4	96	0.0621	4.01		**Shallow Concentrated Flow, EF** Unpaved Kv= 16.1 fps
18.3	995	Total			

Subcatchment P-S-B: Basin Sub



Summary for Subcatchment P-S-PAD: Pad Sub

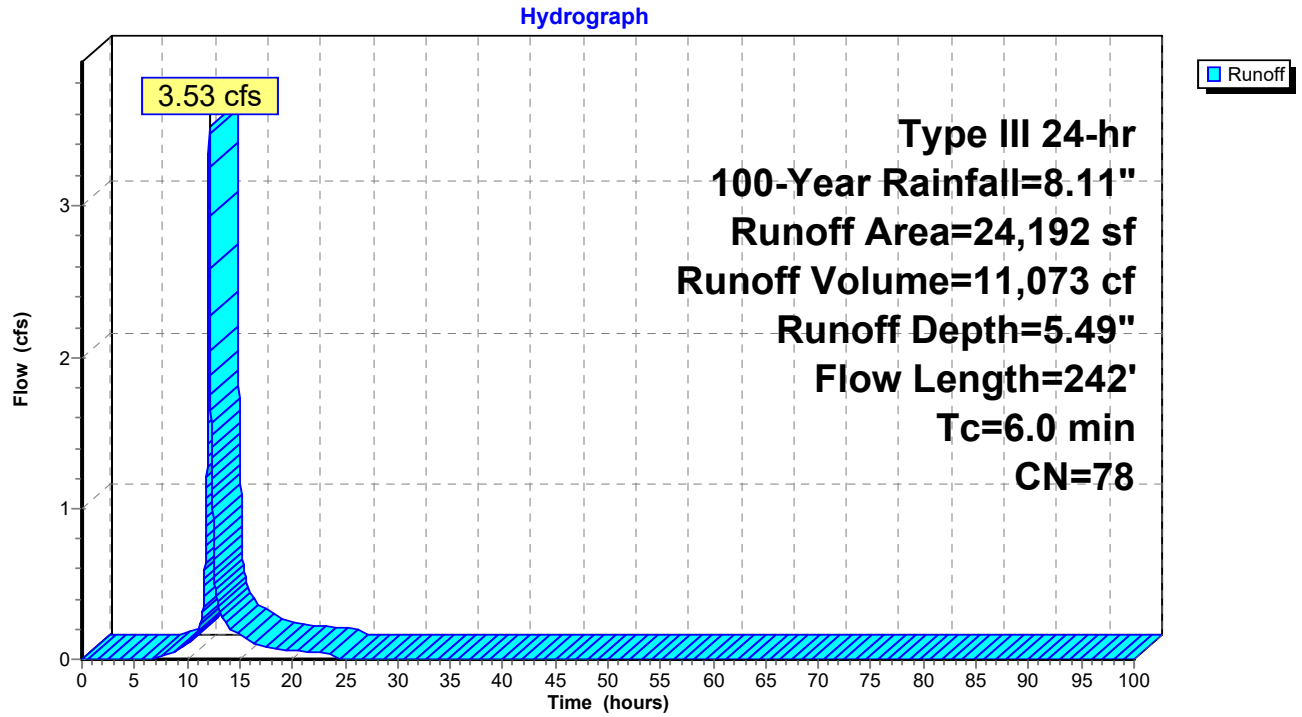
Runoff = 3.53 cfs @ 12.09 hrs, Volume= 11,073 cf, Depth= 5.49"
Routed to Pond P-PAD : PAD

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.11"

Area (sf)	CN	Description
19,697	74	Pasture/grassland/range, Good, HSG C
3,170	98	Water Surface, 0% imp, HSG C
1,325	98	Water Surface, 0% imp, HSG D
24,192	78	Weighted Average
24,192		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.0740	0.33		**Sheet Flow, AB** Range n= 0.130 P2= 3.29"
0.9	115	0.0876	2.07		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.0	27	0.2358	41.50	1,120.40	**Trap/Vee/Rect Channel Flow, CD** Bot.W=0.00' D=3.00' Z= 3.0 '/' Top.W=18.00' n= 0.022 Earth, clean & straight
6.0	242	Total			

Subcatchment P-S-PAD: Pad Sub



Summary for Subcatchment P-S-SE: Southeast

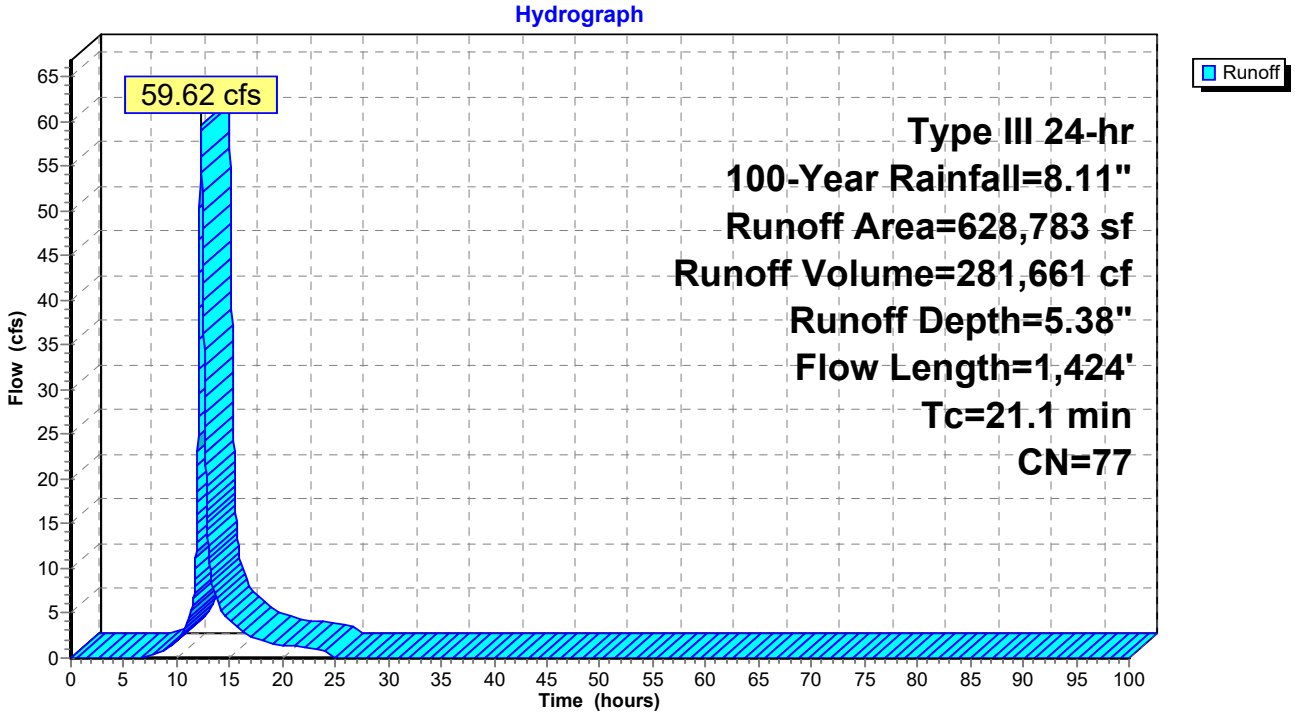
Runoff = 59.62 cfs @ 12.29 hrs, Volume= 281,661 cf, Depth= 5.38"
Routed to Reach P-DP-U : Unnamed Stream

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.11"

Area (sf)	CN	Description
98,461	74	Pasture/grassland/range, Good, HSG C
59,295	70	Woods, Good, HSG C
271	98	Unconnected pavement, HSG C
216,105	80	Pasture/grassland/range, Good, HSG D
239,185	77	Woods, Good, HSG D
15,466	98	Unconnected pavement, HSG D
628,783	77	Weighted Average
613,046		97.50% Pervious Area
15,737		2.50% Impervious Area
15,737		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0696	0.28		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.29"
8.7	708	0.0378	1.36		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
6.5	616	0.0502	1.57		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
21.1	1,424	Total			

Subcatchment P-S-SE: Southeast



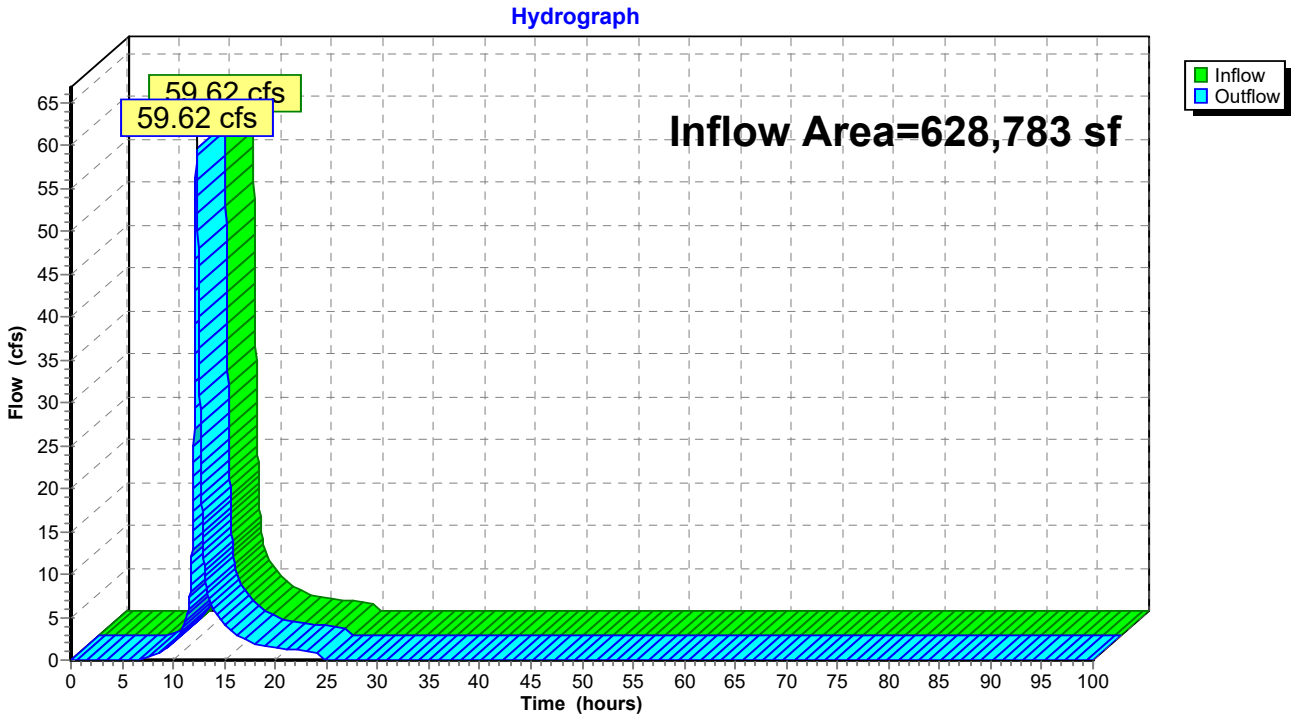
Summary for Reach P-DP-U: Unnamed Stream

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

Inflow Area = 628,783 sf, 2.50% Impervious, Inflow Depth = 5.38" for 100-Year event
Inflow = 59.62 cfs @ 12.29 hrs, Volume= 281,661 cf
Outflow = 59.62 cfs @ 12.29 hrs, Volume= 281,661 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Reach P-DP-U: Unnamed Stream



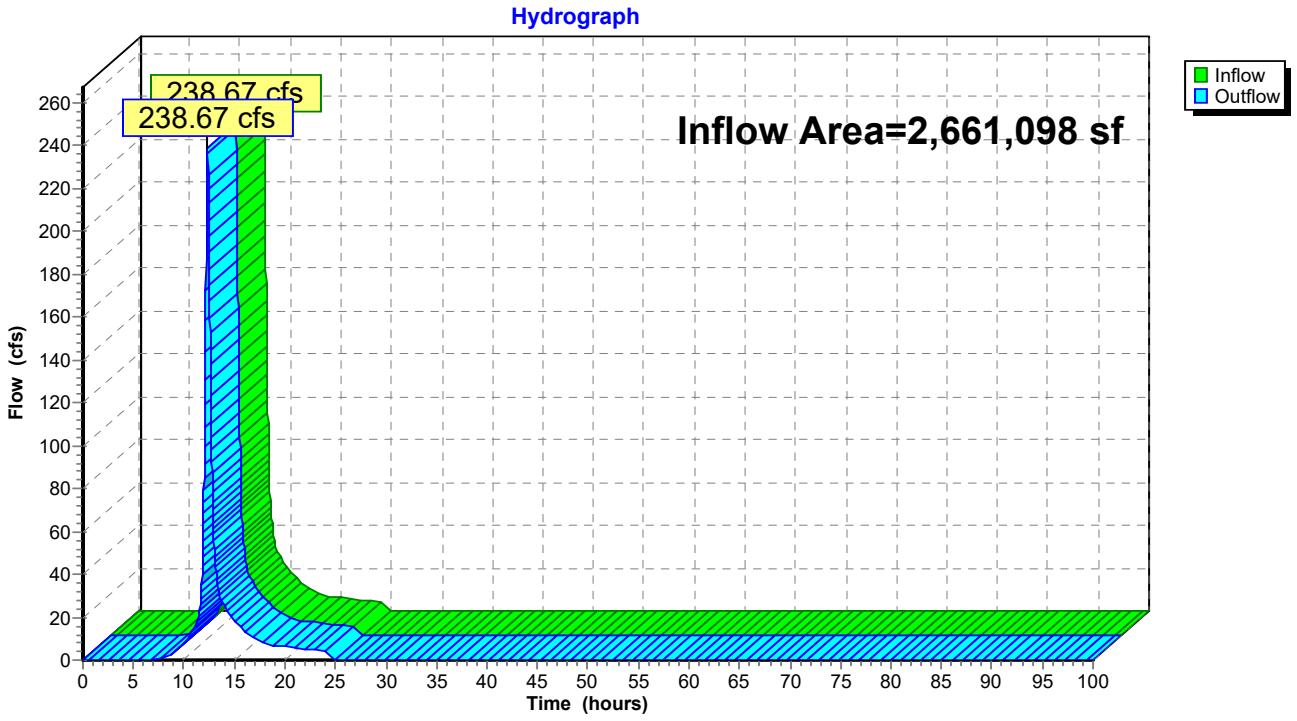
Summary for Reach P-DP-W: Wards Stream

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

Inflow Area = 2,661,098 sf, 0.21% Impervious, Inflow Depth = 5.24" for 100-Year event
Inflow = 238.67 cfs @ 12.31 hrs, Volume= 1,161,568 cf
Outflow = 238.67 cfs @ 12.31 hrs, Volume= 1,161,568 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Reach P-DP-W: Wards Stream



Summary for Pond P-B: Basin

Inflow Area = 240,147 sf, 0.29% Impervious, Inflow Depth = 4.85" for 100-Year event
Inflow = 21.90 cfs @ 12.25 hrs, Volume= 97,069 cf
Outflow = 19.90 cfs @ 12.33 hrs, Volume= 97,067 cf, Atten= 9%, Lag= 5.0 min
Discarded = 0.02 cfs @ 12.33 hrs, Volume= 696 cf
Primary = 14.36 cfs @ 12.33 hrs, Volume= 90,820 cf
Routed to Link P-L3 : Lag
Secondary = 5.52 cfs @ 12.33 hrs, Volume= 5,552 cf
Routed to Link P-L3 : Lag
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link P-L3 : Lag

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 1,413.60' @ 12.33 hrs Surf.Area= 6,028 sf Storage= 12,770 cf
Flood Elev= 1,414.00' Surf.Area= 6,667 sf Storage= 15,326 cf

Plug-Flow detention time= 27.3 min calculated for 97,048 cf (100% of inflow)
Center-of-Mass det. time= 27.4 min (850.9 - 823.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,410.00'	15,326 cf	**Basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,410.00	1,454	211.2	0	0	1,454
1,411.00	2,461	301.4	1,936	1,936	5,142
1,412.00	3,745	351.2	3,081	5,016	7,749
1,413.00	5,139	389.2	4,424	9,440	10,018
1,414.00	6,667	445.8	5,886	15,326	13,802

Device	Routing	Invert	Outlet Devices
#0	Tertiary	1,414.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	1,410.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Secondary	1,413.00'	**3.0' long + 3.0 '/' SideZ x 8.0' breadth Overflow Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#3	Primary	1,410.00'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,410.00' / 1,409.50' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#4	Device 3	1,410.00'	**6.0" W x 6.0" H Vert. Low Flow Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 3	1,412.00'	**12.0" W x 12.0" H Vert. High Flow Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 3	1,412.70'	**3.5" x 2.5" Horiz. Top of Riser X 5.00 columns** X 6 rows C= 0.600 in 24.0" x 24.0" Grate (46% open area) Limited to weir flow at low heads

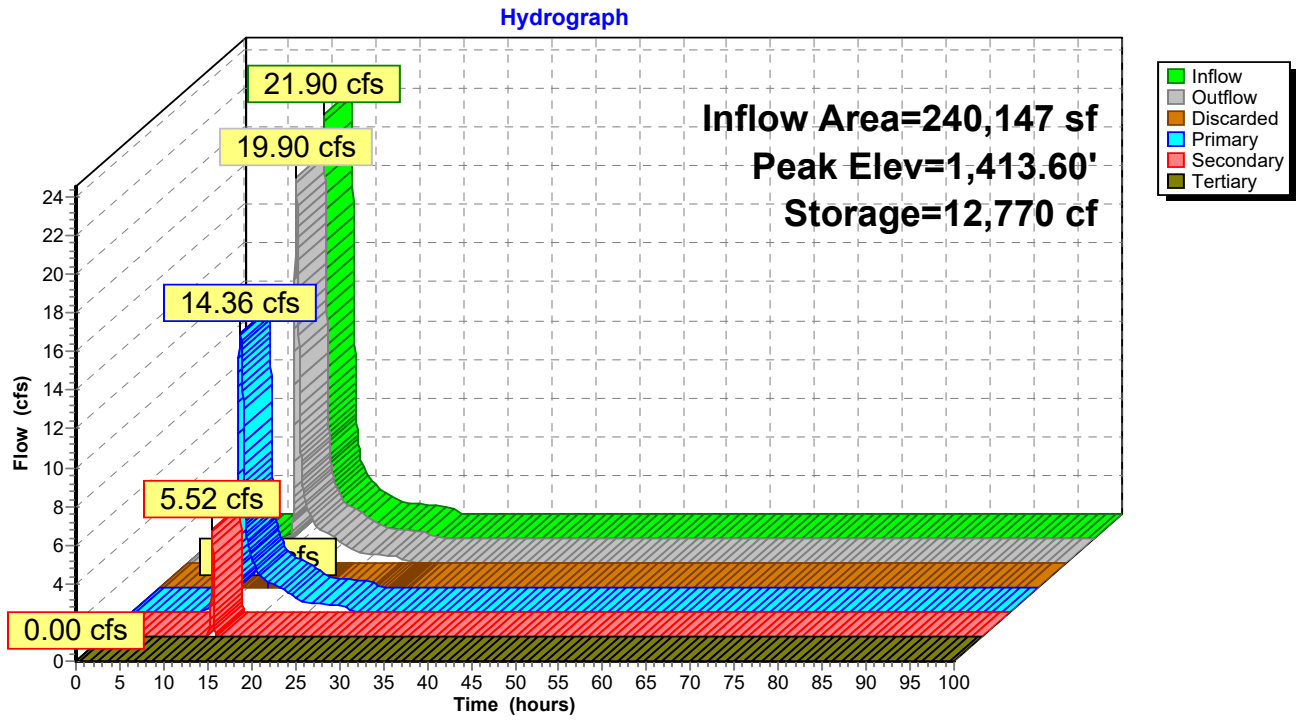
Discarded OutFlow Max=0.02 cfs @ 12.33 hrs HW=1,413.60' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=14.35 cfs @ 12.33 hrs HW=1,413.60' (Free Discharge)
└**3=Culvert** (Inlet Controls 14.35 cfs @ 8.12 fps)
  └**4=Low Flow Orifice** (Passes < 2.20 cfs potential flow)
  └**5=High Flow Orifice** (Passes < 4.99 cfs potential flow)
  └**6=Top of Riser** (Passes < 8.31 cfs potential flow)

Secondary OutFlow Max=5.50 cfs @ 12.33 hrs HW=1,413.60' (Free Discharge)
└**2=Overflow Weir** (Weir Controls 5.50 cfs @ 1.93 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,410.00' (Free Discharge)

Pond P-B: Basin



Stage-Area-Storage for Pond P-B: Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
1,410.00	1,454	0
1,410.05	1,498	74
1,410.10	1,543	150
1,410.15	1,588	228
1,410.20	1,634	309
1,410.25	1,681	392
1,410.30	1,728	477
1,410.35	1,776	564
1,410.40	1,825	654
1,410.45	1,875	747
1,410.50	1,925	842
1,410.55	1,975	939
1,410.60	2,027	1,039
1,410.65	2,079	1,142
1,410.70	2,131	1,247
1,410.75	2,185	1,355
1,410.80	2,239	1,466
1,410.85	2,293	1,579
1,410.90	2,348	1,695
1,410.95	2,404	1,814
1,411.00	2,461	1,936
1,411.05	2,519	2,060
1,411.10	2,577	2,187
1,411.15	2,636	2,318
1,411.20	2,696	2,451
1,411.25	2,757	2,587
1,411.30	2,818	2,727
1,411.35	2,880	2,869
1,411.40	2,942	3,015
1,411.45	3,006	3,163
1,411.50	3,069	3,315
1,411.55	3,134	3,470
1,411.60	3,199	3,629
1,411.65	3,265	3,790
1,411.70	3,332	3,955
1,411.75	3,399	4,124
1,411.80	3,467	4,295
1,411.85	3,535	4,470
1,411.90	3,605	4,649
1,411.95	3,674	4,831
1,412.00	3,745	5,016
1,412.05	3,809	5,205
1,412.10	3,874	5,397
1,412.15	3,940	5,592
1,412.20	4,006	5,791
1,412.25	4,073	5,993
1,412.30	4,140	6,198
1,412.35	4,208	6,407
1,412.40	4,276	6,619
1,412.45	4,345	6,835
1,412.50	4,414	7,054
1,412.55	4,484	7,276
1,412.60	4,555	7,502
1,412.65	4,626	7,732
1,412.70	4,698	7,965
1,412.75	4,770	8,202
1,412.80	4,843	8,442
1,412.85	4,916	8,686
1,412.90	4,990	8,933
1,412.95	5,064	9,185
1,413.00	5,139	9,440
1,413.05	5,211	9,699
1,413.10	5,283	9,961
1,413.15	5,356	10,227
1,413.20	5,429	10,496
1,413.25	5,502	10,770
1,413.30	5,577	11,047
1,413.35	5,651	11,327
1,413.40	5,726	11,612
1,413.45	5,802	11,900
1,413.50	5,878	12,192
1,413.55	5,955	12,488
1,413.60	6,032	12,788
1,413.65	6,110	13,091
1,413.70	6,188	13,399
1,413.75	6,266	13,710
1,413.80	6,346	14,025
1,413.85	6,425	14,344
1,413.90	6,505	14,668
1,413.95	6,586	14,995
1,414.00	**6,667**	**15,326**

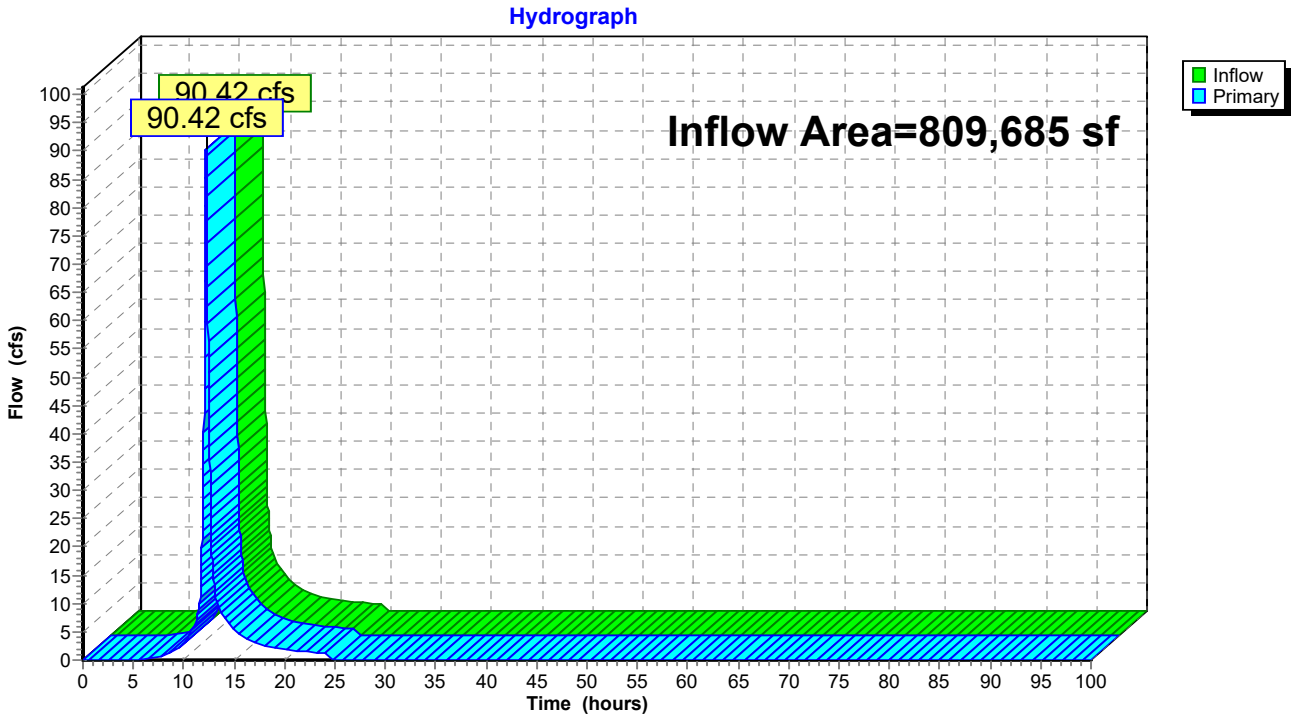
Summary for Pond P-DP-P: Pond DP

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

Inflow Area = 809,685 sf, 2.09% Impervious, Inflow Depth = 5.61" for 100-Year event
Inflow = 90.42 cfs @ 12.21 hrs, Volume= 378,556 cf
Primary = 90.42 cfs @ 12.21 hrs, Volume= 378,556 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Pond P-DP-P: Pond DP



Summary for Pond P-PAD: PAD

Inflow Area = 24,192 sf, 0.00% Impervious, Inflow Depth = 5.49" for 100-Year event
Inflow = 3.53 cfs @ 12.09 hrs, Volume= 11,073 cf
Outflow = 3.52 cfs @ 12.11 hrs, Volume= 11,079 cf, Atten= 0%, Lag= 1.3 min
Discarded = 0.02 cfs @ 8.20 hrs, Volume= 4,239 cf
Primary = 1.25 cfs @ 12.11 hrs, Volume= 2,443 cf
Routed to Pond P-B : Basin
Secondary = 2.25 cfs @ 12.11 hrs, Volume= 4,397 cf
Routed to Link P-L4 : Lag

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 1,421.71' @ 12.10 hrs Surf.Area= 3,813 sf Storage= 3,482 cf

Plug-Flow detention time= 787.3 min calculated for 11,072 cf (100% of inflow)
Center-of-Mass det. time= 789.4 min (1,596.4 - 807.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,421.67'	3,813 cf	**Overflow (Prismatic)**Listed below (Recalc) -Impervious
#2	1,421.00'	1,022 cf	**Choker Course (Prismatic)**Listed below (Recalc) -Impervious 2,555 cf Overall x 40.0% Voids
#3	1,420.00'	1,525 cf	**Filter Course (Prismatic)**Listed below (Recalc) -Impervious 3,813 cf Overall x 40.0% Voids
#4	1,419.75'	286 cf	**Filter Blanket (Prismatic)**Listed below (Recalc) -Impervious 953 cf Overall x 30.0% Voids
#5	1,419.42'	503 cf	**Reservoir Course (Prismatic)**Listed below (Recalc) 1,258 cf Overall x 40.0% Voids
		7,149 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,421.67	3,813	0	0
1,422.67	3,813	3,813	3,813

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,421.00	3,813	0	0
1,421.67	3,813	2,555	2,555

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,420.00	3,813	0	0
1,421.00	3,813	3,813	3,813

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,419.75	3,813	0	0
1,420.00	3,813	953	953

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,419.42	3,813	0	0
1,419.75	3,813	1,258	1,258

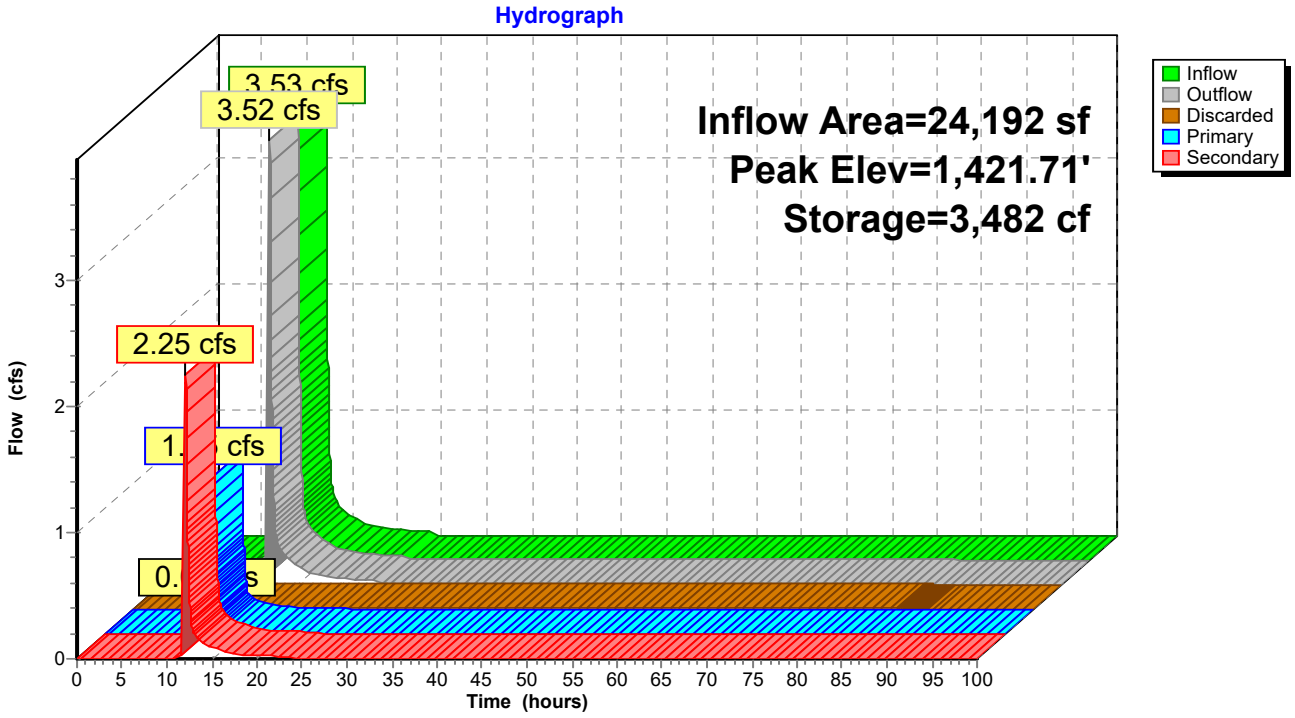
Device	Routing	Invert	Outlet Devices
#1	Discarded	1,419.42'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	1,421.67'	**60.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Secondary	1,421.67'	**108.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.02 cfs @ 8.20 hrs HW=1,419.45' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.13 cfs @ 12.11 hrs HW=1,421.71' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 1.13 cfs @ 0.50 fps)

Secondary OutFlow Max=2.03 cfs @ 12.11 hrs HW=1,421.71' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 2.03 cfs @ 0.50 fps)

Pond P-PAD: PAD



Stage-Area-Storage for Pond P-PAD: PAD

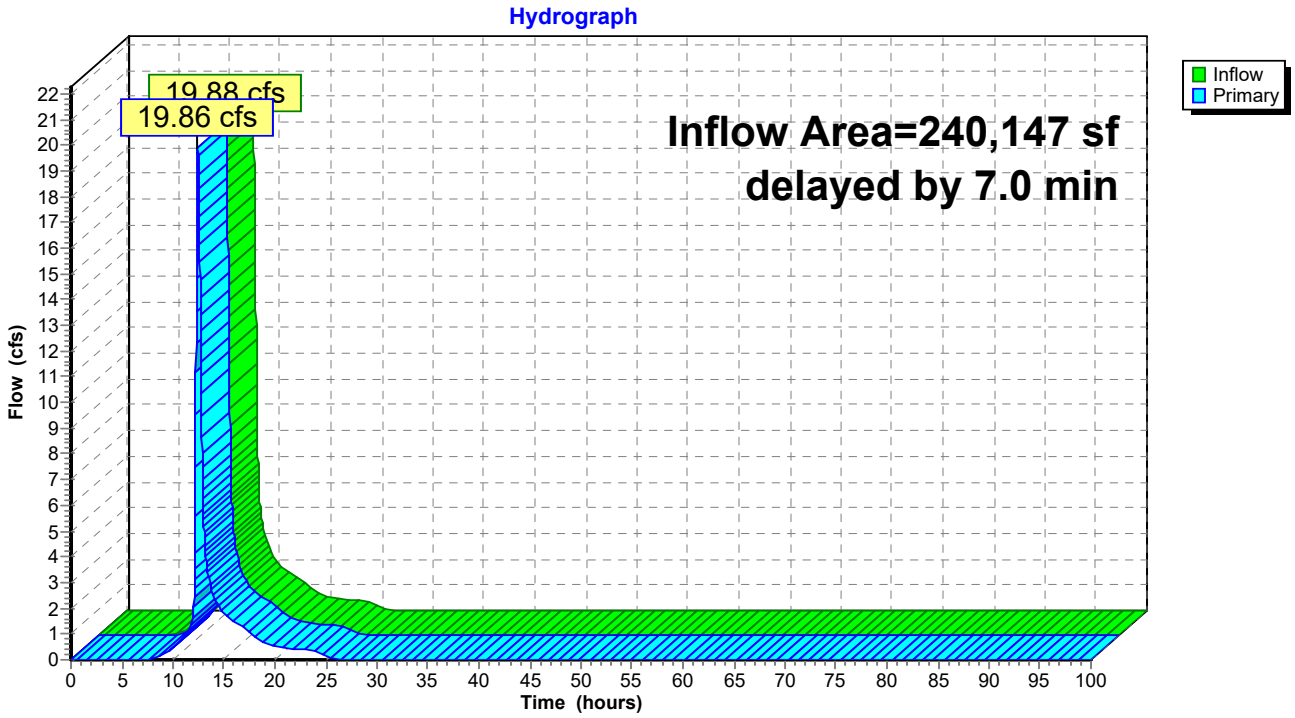
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
1,419.42	**3,813**	0
1,419.47	3,813	76
1,419.52	3,813	153
1,419.57	3,813	229
1,419.62	3,813	305
1,419.67	3,813	381
1,419.72	3,813	458
1,419.77	3,813	526
1,419.82	3,813	583
1,419.87	3,813	641
1,419.92	3,813	698
1,419.97	3,813	755
1,420.02	3,813	820
1,420.07	3,813	896
1,420.12	3,813	972
1,420.17	3,813	1,049
1,420.22	3,813	1,125
1,420.27	3,813	1,201
1,420.32	3,813	1,277
1,420.37	3,813	1,354
1,420.42	3,813	1,430
1,420.47	3,813	1,506
1,420.52	3,813	1,582
1,420.57	3,813	1,659
1,420.62	3,813	1,735
1,420.67	3,813	1,811
1,420.72	3,813	1,887
1,420.77	3,813	1,964
1,420.82	3,813	2,040
1,420.87	3,813	2,116
1,420.92	3,813	2,192
1,420.97	3,813	2,269
1,421.02	3,813	2,345
1,421.07	3,813	2,421
1,421.12	3,813	2,498
1,421.17	3,813	2,574
1,421.22	3,813	2,650
1,421.27	3,813	2,726
1,421.32	3,813	2,803
1,421.37	3,813	2,879
1,421.42	3,813	2,955
1,421.47	3,813	3,031
1,421.52	3,813	3,108
1,421.57	3,813	3,184
1,421.62	3,813	3,260
1,421.67	3,813	3,336
1,421.72	3,813	3,527
1,421.77	3,813	3,718
1,421.82	3,813	3,908
1,421.87	3,813	4,099
1,421.92	3,813	4,290
1,421.97	3,813	4,480
1,422.02	3,813	4,671
1,422.07	3,813	4,862
1,422.12	3,813	5,052
1,422.17	3,813	5,243
1,422.22	3,813	5,434
1,422.27	3,813	5,624
1,422.32	3,813	5,815
1,422.37	3,813	6,005
1,422.42	3,813	6,196
1,422.47	3,813	6,387
1,422.52	3,813	6,577
1,422.57	3,813	6,768
1,422.62	3,813	6,959
1,422.67	3,813	**7,149**

Summary for Link P-L3: Lag

Inflow Area = 240,147 sf, 0.29% Impervious, Inflow Depth = 4.82" for 100-Year event
Inflow = 19.88 cfs @ 12.33 hrs, Volume= 96,372 cf
Primary = 19.86 cfs @ 12.45 hrs, Volume= 96,372 cf, Atten= 0%, Lag= 7.0 min
Routed to Reach P-DP-W : Wards Stream

Primary outflow = Inflow delayed by 7.0 min, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Link P-L3: Lag

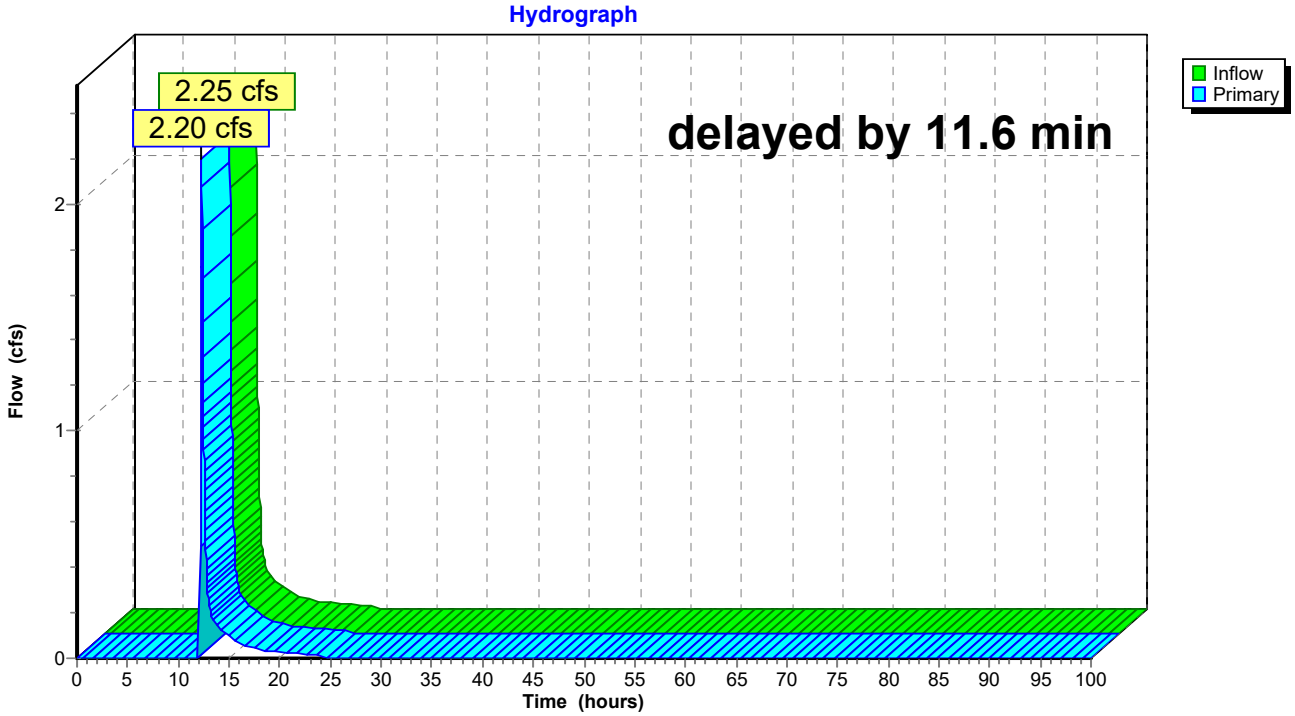


Summary for Link P-L4: Lag

Inflow = 2.25 cfs @ 12.11 hrs, Volume= 4,397 cf
Primary = 2.20 cfs @ 12.31 hrs, Volume= 4,397 cf, Atten= 2%, Lag= 11.9 min
Routed to Reach P-DP-W : Wards Stream

Primary outflow = Inflow delayed by 11.6 min, Time Span= 0.00-100.00 hrs, dt= 0.02 hrs

Link P-L4: Lag



Appendix J – TSS Removal Calculations

INSTRUCTIONS:
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.

Version 1, Automated: Mar. 4, 2008

Location: 105 Old Post Road

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)
Porous Pavement	**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: **BWC Ward Stream, LLC**
Prepared By: **WSP USA, Inc.**
Date: **9/11/2026**

*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

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