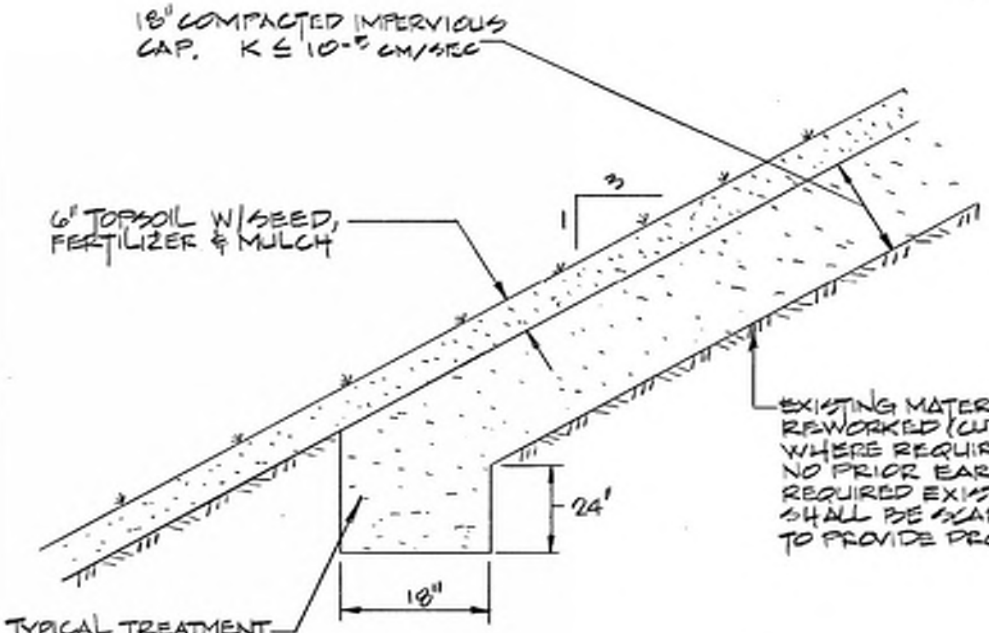
TYPICAL TOPSOI



IMPERVIOUS COVER DETAIL
N.T.S.

4 STAPLES
& END OF
STAPLES @
AS SHOWN

No.	DATE	REVISION
1	7/20/94	MISC.
2	9/8/94	ADDED DRAINAGE PIPE
3	8/24/95	AS-BUILT DRAWING

CLA Engineers, Inc.
Civil • Structural • Surveying
317 MAIN STREET NORWICH, CT 06360
(203) 886-1965 FAX (203) 886-9165

TOWN OF MONTVILLE

MONTVILLE LANDFILL CLOSURE

DETAILS

PROJECT No.	CL-91-969
DRAWN BY:	T.A.W.
APPROVED BY:	R.A.D.
DATE:	JULY 1994
SHEET No.	2 OF 2

Project: Montville Landfill	Weston & Sampson
Location: Montville, CT	
WSE Project No.: ENG23-0165	55 Walkers brook Dr., Reading, MA 01867 (HQ)
Calculation: 02 - Verneer Stability at top of landfill	Tel: 978.532.1900

Calc. By: J. MacGregor, 6/05/23
Check By: J. Laird, 6/15/23

MONTVILLE LANDFILL SOLAR - GEOTECHNICAL CALCULATIONS

LANDFILL VEENER STABILITY EVALUATION

$$FS = \frac{[(t-h)\Upsilon s + h\Upsilon sat - h\Upsilon w]}{[(t-h)\Upsilon s + h\Upsilon sat]} \times \frac{\tan \emptyset}{\tan \beta}$$

(From R. Theil - Slope Stability Sensitivity of Final Covers - The First Pan American Conference & Exibition, 2008)

Veneer Stability for 18 Percent Slope

Input		
t = thickness of cover soils above FML (ft.)	0.5	Based on 1994 drawings
h = water depth above FML (= t for fully saturated conditions) (ft.)	0.5	
ϒs = dry unit weight of cover soils (topsoil)	90	
ϒsat = saturated unit weight of cover soils (topsoil)	115	
ϒw = unit weight of water	62.4	
Ø = Interface friction angle between sand drainage and clay liner	32	Stark (2021) softened clay, PI = 25 (assumed)
β = Slope angle	6 H:1V	
	0.17	radians
	9.5	Degrees
	~10.5	% Slope

FS = 1.7

Unpaved Road & Subgrade Stabilization

Application Suggestion Summary

Tensar

Design		**Reference**	
Project		**Location**	
Customer		**Designer**	Jennifer MacGregor
Company	Weston & Sampson Engineers, Inc.	**Date**	June 13, 2023

Input checked by J. Laird, 05/15/2023

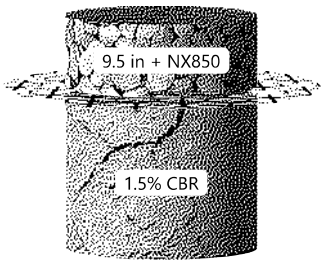
Design Methodology

The Lees Approach to Applied Mechanical Stabilization for stabilizing soft subgrades to support construction and in-service traffic by incorporating the true behavior of mechanically stabilized unbound aggregate layers subjected to dynamic stresses from vehicular loading.

Results

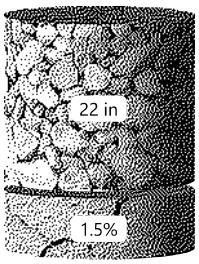
Stabilized

$20.16/yd²



Unstabilized

$32.73/yd²



	Stabilized	Unstabilized
Total thickness	9.5 in	22 in
Surface rut depth	1 in	1 in
Enhanced modulus, M_r	16,000 psi	
Required ESALs	1,100	1,100
Subgrade protection level	ADEQUATE	UNPROTECTED
Controlling design	Surface rut depth	Bearing capacity

Total cost	$140,013	$227,266
Unit cost	$20.16/yd²	$32.73/yd²
Construction time	8.2 days	17 days
Dump truck visits	383	885
Fuel required	2,043 gal	4,720 gal
Water required	45,822 gal	106,115 gal
Carbon emissions	86,310 lbCO_2e	167,150 lbCO_2e

Construction Cost

YOU SAVE

$87,253 (38%)

Stabilized: $140,013

Unstabilized: $227,266

Construction Time

YOU SAVE

8 days (49%)

Stabilized: 8.2 days

Unstabilized: 16.2 days

Environmental Cost

YOU SAVE

80,840 lbCO_2e (48%)

Stabilized: 86,310 lbCO_2e

Unstabilized: 167,150 lbCO_2e

Parameters

Construction Traffic

Axle load	18 kip
Axle passes	1,000
Tire width	385 mm
Tire pressure	110 psi
Wheel configuration	Single wheel
Wander	3 ft

In-Service Traffic

Axle load	18 kip
Axle passes	100
Tire width	295 mm
Tire pressure	110 psi
Wheel configuration	Dual wheel
Wander	3 ft

Aggregate

Unit weight	135 pcf
Surface rut depth	1 in
D_{100}	3 in
D_{50}	1.2 in

Subgrade

Soil type	Clay
Plasticity	High (CH)
CBR	1.5%
Separation geosynthetic	No
Subgrade protection level	Adequate

Dimensions

Project area	62,500 ft²

Material Costs

Aggregate cost	$25.00/ton

Geosynthetic Costs

NX850	$6.03/yd²

Grading Requirements

Grade offset	Meet existing grade
Excavation cost	$8.00/yd³

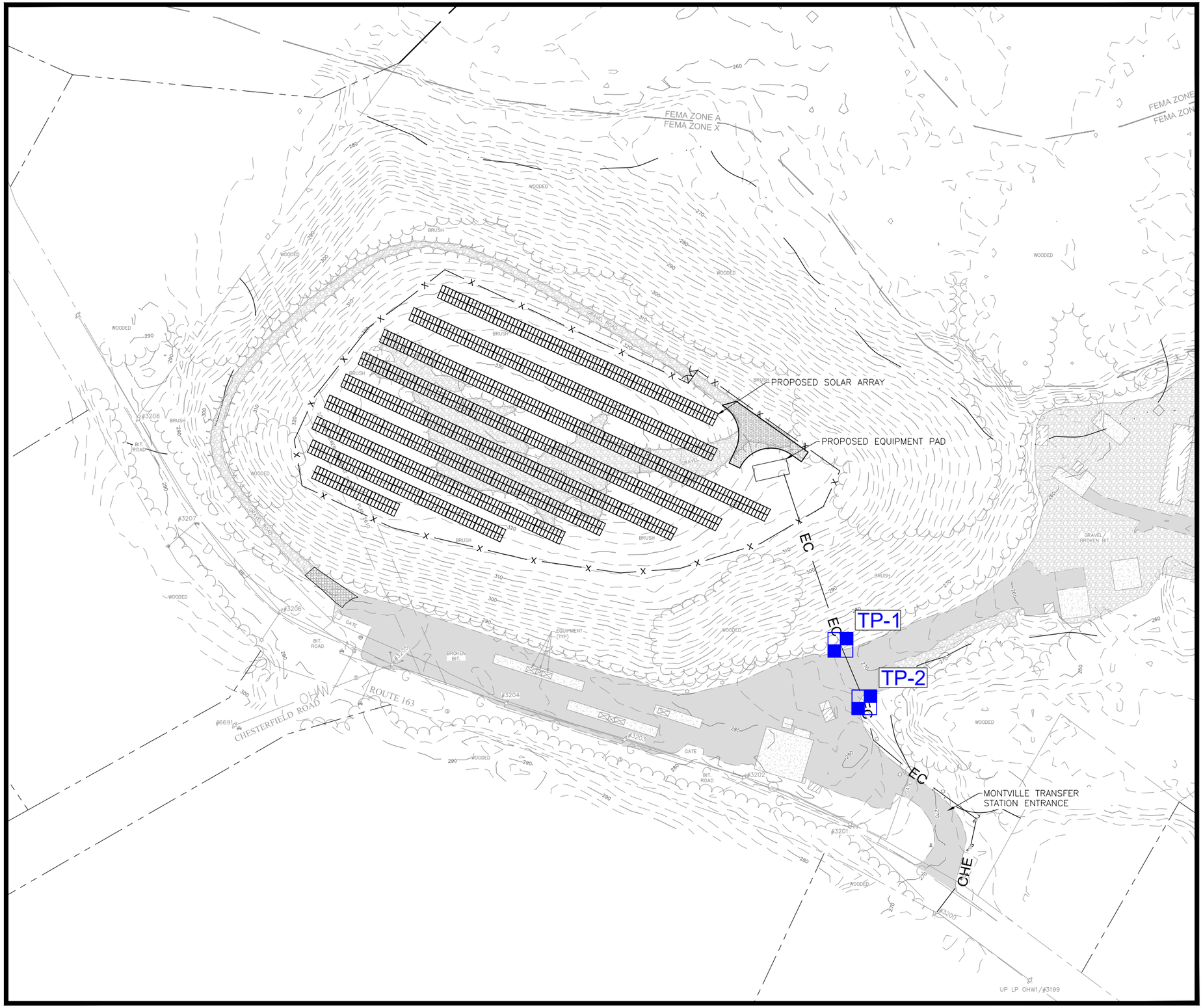
Specification

To protect the performance and value achieved, a specification is generated/attached to accompany the completed design. The content of the specification provides the most effective protection to the achieved performance in a format that can be used within any project documentation.

Supporting Documents

To provide further support and advice for your completed Tensar design, documents relating to this application can be found in the "Resources" section of Tensar+. These include installation advice, background to the available value and project case studies.

Test Pit Information



P:\Private\Verogy Solar\Montville, CT Landfill\Design\Geotechnical\Figures\Figure 2 - Site Plan.dwg

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

NOTES

1. THIS PLAN IS BASED ON A PROPOSED SITE PLAN PREPARED BY WESTON & SAMPSON ENGINEERS, INC. DATED MAY 2023.
2. TEST PITS WERE COMPLETED BY WESTON & SAMPSON ENGINEERS ON JUNE 2, 2023.
3. TEST PIT LOCATIONS WERE LOCATED USING A HANDHELD GPS.

LEGEND

TP-X — DESIGNATION AND APPROXIMATE LOCATION OF TEST PIT

GRAPHIC SCALE

100 50 0 100 200

SCALE: 1"=100'

ORIENTATION	TITLE
N	SITE PLAN
	PROJECT: MONTVILLE LANDFILL SOLAR 669 ROUTE 163 MONTVILLE, CT 06353

DATE	06/2023
DRWN BY	AC
CHKD BY	DD
PRJ. NO.	ENG23-0165
REV. NO.	-

FIGURE: FIGURE 2

Weston & Sampson

Montville, CT Landfill Solar

TEST PIT ID: TP-1

WSE Project: ENG23-0165

669 Route 163, Montville, CT

CONTRACTOR:	**Weston & Sampson Engineers**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**June 2, 2023**
OPERATOR:	**A. Chabot**	PLAN DIMENSIONS:	**Length: 1.5 ft. , Width: 1.5 ft.**	DATE FINISH:	**June 2, 2023**
LOGGED BY:	**A. Chabot**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**Not Available**
CHECKED BY:	**T. Blair, PE**	CAVING REMARKS:	**No Caving Observed**	FINAL DEPTH:	**2.0 ft.**
EQUIPMENT:	**Hand Shovel**	BACKFILL MATERIAL:	**Excavated Soil**	GRID COORDS:	**N:730178 ± / E:1162923 ±**
BUCKET TYPE:	**N/A**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (CT)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
			Surface: Grass area.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
	G		**Silty sand (SM)** - Dark brown; mostly fine to medium SAND, some non plastic fines; common roots and wood chips. **[VEGETATIVE SUPPORT]**		
	G		**Well graded sand with gravel (SW)** - Light brown; moist; mostly fine to coarse SAND, little fine to coarse gravel, trace non plastic fines.		
					Exploration ended at 2.0 ft. Top of landfill cap not encountered.
5				-5	

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

Weston & Sampson

Montville, CT Landfill Solar

TEST PIT ID: TP-2

WSE Project: ENG23-0165

669 Route 163, Montville, CT

CONTRACTOR:	**Weston & Sampson Engineers**	TEST PIT LOCATION:	**See Attached Figure**	DATE START:	**June 2, 2023**
OPERATOR:	**A. Chabot**	PLAN DIMENSIONS:	**Length: 1.5 ft. , Width: 1.5 ft.**	DATE FINISH:	**June 2, 2023**
LOGGED BY:	**A. Chabot**	SEEPAGE REMARKS:	**No Seepage Observed**	GROUND EL:	**Not Available**
CHECKED BY:	**T. Blair, PE**	CAVING REMARKS:	**No Caving Observed**	FINAL DEPTH:	**2.0 ft.**
EQUIPMENT:	**Hand Shovel**	BACKFILL MATERIAL:	**Excavated Soil**	GRID COORDS:	**N:730125 ± / E:1162945 ±**
BUCKET TYPE:	**N/A**	OTHER COMMENTS:		GRID SYSTEM:	**NAD83 State Plane (CT)**

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
			Surface: Grass area.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
	G		**Silty sand with gravel (SM)** - Brown; moist; mostly fine to coarse SAND, little fine to coarse gravel, little non plastic fines; occasional debris (asphalt), trace debris (brick, plastic, glass). **[VEGETATIVE SUPPORT]**		
					Exploration ended at 2.0 ft. Top of landfill cap not encountered.
5				-5	

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

GUIDE TO SUBSURFACE EXPLORATION LOGS

Weston & Sampson℠

INDEX SHEET 1 GENERAL INFORMATION

GENERAL NOTES AND USE OF LOGS

1.) Explorations were made by ordinary and conventional methods and with care adequate for Weston & Sampson's study and/or design purposes. The exploration logs are part of a specific report prepared by Weston & Sampson for the referenced project and client, and are an integral part of that report. Information and interpretations are subject to the explanations and limitations stated in the report. Weston & Sampson is not responsible for any interpretations, assumptions, projections, or interpolations made by others.

2.) Exploration logs represent general conditions observed at the point of exploration on the date(s) stated. Boundary lines separating soil and rock layers (strata) represent approximate boundaries only and are shown as solid lines where observed and dashed lines where inferred based on drilling action. Actual transitions may be gradual and changes may occur over time.

3.) Soil and rock descriptions are based on visual-manual examination of recovered samples, direct observation in test pits (when permissible), and laboratory testing (when conducted).

4.) Water level observations were made at the times and under the conditions stated. Fluctuations should be be expected to vary with seasons and other factors. Use of fluids during drilling may affect water level observations. The absence of water level observations does not necessarily mean the exploration was dry or that subsurface water will not be encountered during construction.

5.) Standard split spoon samplers may not recover particles with any dimension larger than 1-3/8 inches. Reported gravel conditions or poor sample recovery may not reflect actual in-situ conditions.

6.) Sections of this guide provide a general overview of Weston & Sampson's practices and procedures for *identifying* and *describing* soil and rock. These procedures are predominantly based on ASTM D2488, *Standard Practice for Description and Identification of Soils (Visual-Manual Procedures)*, the International Society of Rock Mechanics (ISRM) standards, and the *Engineering Geology Field Manual* published by the Bureau of Reclamation. Not all aspects of this guide relating to description and identification procedures of soil and rock may be applicable in all circumstances.

SAMPLER GRAPHICS

- Split Spoon (Standard) 2" OD, 1-3/8" ID
- Split Spoon (Oversize) 3" OD, 2-3/8" ID
- Shelby or Piston Tube 3" OD, 2-7/8" ID
- Double-Tube Rock Core Barrel 2" Core Diameter
- Direct Push with Acetate Liner Various Liner Sizes
- A — Auger Sample *(from cuttings or hand auger)*
- G — Grab Sample *(manual, from discrete point)*
- C — Composite Sample *(multiple grab samples)*

WELL GRAPHICS

- Cement concrete seal around casing or riser pipe
- Bentonite seal around casing or riser pipe
- Cement grout seal around casing or riser pipe
- Soil backfill around riser pipe or beneath screen
- Gravel backfill around screen or riser pipe
- Sand backfill around screen or riser pipe (filter sand)
- Solid-wall riser; Sch. 40 PVC, 1" ID unless noted otherwise
- Slotted screen; Sch. 40 PVC, 1" ID with machined slots

CAVING / SEEPAGE TERMS

The following caving and/or seepage terms may appear on a test pit log.

Caving Term	Criteria
Minor	less than 1 cubic ft.
Moderate	1 to 3 cubic ft.
Severe	greater than 3 cubic ft.

Seepage Term	Criteria
Slow	less than 1 gpm
Moderate	1 to 3 gpm
Fast	greater than 3 gpm

KEY TO WATER LEVELS

- Observed in exploration during advancement.
- Measured in exploration at completion, prior to backfilling or well installation.
- Measured in exploration after the stated stabilization period, prior to backfilling, or in well installation if noted.

DEFINITIONS OF COMMON TERMS

Sample Recovery Ratio - The length of material recovered in a drive or push type sampler over the length of sampler penetration, in inches (e.g. 18/24).

Standard Penetration Test (*SPT*) - An in-situ test where a standard split-spoon sampler is driven a distance of 12 or 18 inches (after an initial 6-inch seating interval) using a 140-lb. hammer falling 30 inches for each blow.

SPT Blows - The number of hammer blows required to drive a split-spoon sampler each consecutive 6-inch interval during a *Standard Penetration Test*. If no discernable advancement of a split spoon sampler is made after 50 consecutive hammer blows, 50/X indicates *sampler refusal* and is the number of blows required to drive the sampler X inches.

SPT N-Value (*N*) - The uncorrected blow count representation of a soil's penetration resistance over a 12-inch interval after an initial 6-in. seating interval, reported in blows per foot (bpf). The N-value is correlated to soil engineering properties.

Auger Refusal - No discernable advancement of the auger over a period of 5 minutes with full rig down pressure applied.

Casing Refusal (Driven) - Casing penetration of less than 6 inches after a minimum 50 blows of a drop hammer weighing 300 lbs. or a minimum 100 blows of a drop hammer weighing 140 lbs.

PID Measurement - A measurement (electronic reading) taken in the field using a photoionization detector (PID) to detect the presence of volatile organic compounds in a soil sample. Values are reported as benzene equivalent units in parts per million (ppm) unless noted otherwise.

Rock Quality Designation (RQD) - A qualitative index measure of the degree of jointing and fracture of a rock core taken from a borehole. The RQD is defined as the sum length of solid core pieces 4 inches or longer divided by the run (cored) length, expressed as a percentage. Higher RQD values may indicate fewer joints and fractures in the rock mass.

Fill (Made Ground) - A deposit of soil and/or artificial waste materials that has been placed or altered by human processes.

LABORATORY TESTS AND FIELD MEASUREMENTS

MC	Moisture Content
OC	Organic Content
PL	Plastic Limit
LL	Liquid Limit
GC	Gravel Content
SC	Sand Content
FC	Fines Content
DS	Direct Shear
IC	1D Incremental Consolidation
VS	Laboratory Vane Shear
US	Unconfined Compression
TC	Triaxial Compression
PP	Pocket (Hand) Penetrometer
TV	Torvane (Hand Vane)
PID	Photoionization Detector
FID	Flame Ionization Detector

BORING ADVANCEMENT METHODS

Hollow-Stem Auger Drilling - Utilizes continuous flight auger sections with hollow stems to advance the borehole. Drill rods and a plug are inserted into the auger stem to prevent the entrance of soil cuttings into the augers.

Rotary Wash Drilling - Utilizes downward pressure and rotary action applied to a non-coring bit while washing the cuttings to the surface using a circulating fluid injected down the drill rods. The borehole is supported with either steel casing or the drilling fluid. Where a casing is used, the borehole is advanced sequentially by driving the casing to the desired depth and then cleaning out the casing. The process of driving and cleaning the casing is commonly referred to as the 'drive-and-wash' technique.

Continuous Sampling - Includes a variety of methods and procedures during which the borehole is advanced via continuous recovery of soil samples. *Direct Push* sampling is a common method that uses static downward pressure combined with percussive energy to drive a steel mandrel into the ground at continuous intervals while recovering soil samples in disposable acetate liners.

Rock Coring - Utilizes downward pressure and rotary action applied to a core barrel equipped with a diamond-set or tungsten carbide coring bit. During conventional coring, the entire barrel is retrieved from the hole upon completion of a core run. Wireline coring allows for removal of the inner barrel assembly containing the actual core while the the drill rods and outer barrel remain in the hole. Various types and sizes of core barrels and bits are used.

GUIDE TO SUBSURFACE EXPLORATION LOGS

Weston & Sampson℠

INDEX SHEET 2
SOIL DESCRIPTION

SOIL CONSTITUENTS

Naturally occurring soils consist of one or more of the following matrix constituents defined in terms of particle size.

Constituent		U.S. Sieve Size			Observed Size (in.)		
Gravel	(Coarse)	3/4 in.	-	3 in.	3/4	-	3
Gravel	(Fine)	No. 4	-	3/4 in.	1/5	-	3/4
Sand	(Coarse)	No. 10	-	No. 40	1/16	-	1/5
Sand	(Medium)	No. 40	-	No. 10	1/64	-	1/16
Sand	(Fine)	No. 200	-	No. 40	1/300	-	1/64
Fines	(Silt or Clay)	Smaller than		No. 200	Less than		1/300

SOIL IDENTIFICATION

Soil identification refers to the grouping of soils with similar physical characteristics into a category defined by a **group name** and corresponding **group symbol** based on estimation of the matrix soil constituents to the nearest 5% and simple manual tests. Proportions of cobbles, boulders, and other non-matrix soil materials are not considered during this procedure but are included in the overall soil description if observed or thought to be present. Refer to the following descriptions and tables adapted from ASTM D2488.

Coarse-Grained Soil - Coarse-grained soils contain fewer than 50% fines and are identified based on the following table.

Primary Constituent	Fines Percent	Type of Fines and Gradation		Group Symbol	Group Name [1]
GRAVEL *% gravel > % sand*	≤ 5%	well graded		GW	Well graded gravel
		poorly graded		GP	Poorly graded gravel
	10%	clayey fines	well graded	GW-GC	Well graded gravel with clay
			poorly graded	GP-GC	Poorly graded gravel with clay
		silty fines	well graded	GW-GM	Well graded gravel wth silt
			poorly graded	GP-GM	Poorly graded gravel with silt
	15% to 45%	clay fines		GC	Clayey gravel
		silt fines		GM	Silty gravel
SAND *% sand ≥ % gravel*	≤ 5%	well graded		SW	Well graded sand
		poorly graded		SP	Poorly graded sand
	10%	clayey fines	well graded	SW-SC	Well graded sand with clay
			poorly graded	SP-SC	Poorly graded sand with clay
		silty fines	well graded	SW-SM	Well graded sand with silt
			poorly graded	SP-SM	Poorly graded sand with silt
	15% to 45%	clay fines		SC	Clayey sand
		silt fines		SM	Silty sand

[1] If soil is a gravel and contains 15% or more sand, add "with sand" to the group name. If soil is a sand and contains 15% of more gravel, add "with gravel" to the group name.

Inorganic Fine-Grained Soil - Fine-grained soils contain 50% or more fines and are identified based on the following table.

Plasticity Criteria	Dry Strength	Coarse Fraction S = Sand, G = Gravel		Group Symbol	Group Name [1]
Medium	Medium to high	< 15% S + G		CL	Lean clay
		≥ 30%	% S ≥ % G	CL	Sandy lean clay
		S + G	% S < % G	CL	Gravelly lean clay
Non-plastic	None to low	< 15% S + G		ML	Silt
		≥ 30%	% S ≥ % G	ML	Sandy silt
		S + G	% S < % G	ML	Gravelly silt
High	High to very high	< 15% S + G		CH	Fat clay
		≥ 30%	% S ≥ % G	CH	Sandy fat clay
		S + G	% S < % G	CH	Gravelly fat clay
Low to Medium	Low to medium	< 15% S + G		MH	Elastic silt
		≥ 30%	% S ≥ % G	MH	Sandy elastic silt
		S + G	% S < % G	MH	Gravelly elastic silt

[1] If soil contains 15% to 25% sand or gravel, add "with sand" or "with gravel" to the group name.

Organic Fine-Grained Soil - Fine-grained soils that contain enough organic particles to influence the soil properties are identified as Organic Soil and assigned the group symbol **OL** or **OH**.

Highly Organic Soil (Peat) - Soils composed primarily of plant remains in various stages of decomposition are identified as Peat and given the group symbol **PT**. Peat usually has an organic odor, a dark brown to black color, and a texture ranging from fibrous (original plant structure intact or mostly intact) to amorphous (plant structure decomposed to fine particles).

SOIL DESCRIPTION

Soils are *described* in the following general sequence. Deviations may occur in some instances.

Identification Components

(1) Group Name and Group Symbol

Description Components

(2) Consistency (Fine-Grained) or Apparent Density (Coarse-Grained)
(3) Color (*note, the term "to" may be used to indicate a gradational change*)
(4) Soil Moisture
(5) Matrix Soil Constituents (Gravel, Sand, Fines)
  └► Proportion (*by weight*), particle size, plasticity of fines, angularity, etc.
(6) Non-Matrix Soil Materials and Proportions (*by volume*)
(7) Other Descriptive Information (Unusual Odor, Structure, Texture, etc.)
(8) [Geologic Formation Name or Soil Survey Unit]

SPT N-VALUE CORRELATIONS

Consistency	SPT N-Value	Apparent Density	SPT N-Value
Very soft	0 - 2	Very loose	0 - 5
Soft	2 - 4	Loose	5 - 10
Medium stiff	4 - 8	Medium dense	10 - 30
Stiff	8 - 15	Dense	30 - 50
Very stiff	15 - 30	Very dense	> 50
Hard	> 30		

SOIL MOISTURE

Dry..... Apparent absence of moisture; dry to the touch.
Moist..... Damp but no visible water.
Wet..... Visible free water; saturated.

PROPORTIONS / PERCENTAGES

Proportions of gravel, sand, and fines (excluding cobbles, boulders, and other constituents) are stated in the following terms indicating a range of percentages by weight (to nearest 5%) of the minus 3-in. soil fraction and add up to 100%.

Mostly ..... 50% - 100%
Some ..... 30% - 45%
Little ..... 15% - 25%
Few ..... 5% - 10%
Trace..... Less than 5%

Proportions of cobbles, boulders, and other non-matrix soil materials including artificial debris, roots, plant fibers, etc. are stated in the following terms indicating a range of percentages by volume (to the nearest 5%) of the total soil.

Numerous ..... 40% - 50%
Common ..... 25% - 35%
Occasional ..... 10% - 20%
Trace..... Less than 5%

PLASTICITY (FINES ONLY)

Non-plastic.....Dry specimen ball falls apart easily. Cannot be rolled into thread at any moisture content.
Low.....Dry specimen ball easily crushed with fingers. Can be rolled into 1/8-in. thread with some difficulty.
Medium.....Difficult to crush dry specimen ball with fingers. Easily rolled into 1/8-in. thread.
High.....Cannot crush dry specimen ball with fingers. Easily rolled and re-rolled into 1/8-in. thread.

COBBLES AND BOULDERS

Cobbles - Particles of rock that will pass a 12-in. square opening and be retained on a 3-in. sieve.

Boulders - Particles of rock that will not pass a 12-in. square opening.

Note: Where the percentage (by volume) of cobbles and/or boulders cannot be accurately or reliably estimated, the terms "with cobbles", "with boulders", or "with cobbles and boulders" may be used to indicate observed or inferred presence.

GUIDE TO SUBSURFACE EXPLORATION LOGS

Weston & Sampson℠

INDEX SHEET 3
ROCK DESCRIPTION

ROCK DEFINITION

Where reported on an exploration log, *rock* is defined as any naturally formed aggregate of mineral matter occurring in larges masses or fragments. This definition of rock should not be taken as a replacement for any definitions relating to rock and/or rock excavation defined in construction documents. Intensely weathered or decomposed rock that is friable and can be reduced to gravel size particles or smaller by normal hand pressure is identified and described as soil. Poorly indurated formational materials which display both rock-like and soil-like properties are identified and described as rock followed by the soil description. In such cases, the term "poorly indurated" or "weakly cemented" is added to the rock name (e.g. weakly cemented sandstone).

ROCK IDENTIFICATION

Rock is identified by a combination of *rock type* (igneous, metamorphic, or sedimentary) followed by the the *rock name* (e.g. granite, schist, sandstone).

ROCK DESCRIPTION

Rock descriptions are presented in the following general sequence. The detail of description is dictated by the complexity and objectives of the project.

Identification Components

(1) Rock Type and Name

Description Components

(2) Rock Grain Size (*for clastic sedimentary rock*)
(3) Crystal Size (*for igneous and metamorphic rock*)
(4) Bedding Spacing (*for sedimentary rock*)
(5) Color
(6) Hardness and Weathering Descriptors
(7) Fracture Density
(8) [Geologic Formation Name]

ROCK QUALITY DESIGNATION

$$\text{RQD (\%)} = \frac{\Sigma \text{ Length of intact core pieces} \geq 4 \text{ inches}}{\text{Total length of core run (inches)}} \times 100$$

The RQD should correlate with the fracture density in most cases. Higher RDQ values generally indicate fewer joints and fractures.

GRAIN / CRYSTAL SIZE

Grain Size for Clastic Sedimentary Rock

The names of clastic sedimentary rocks are generally based on their predominant clast or grain size (e.g. fine sandstone, medium sandstone, coarse gravel conglomerate, cobble conglomerate, siltstone, claystone).

Crystal Size for Igneous and Metamorphic Rock

Grain Size Description	Average Crystal Size (in.)
Very coarse grained (pegmatitic)	Greater than or equal to 3/8
Coarse-grained	Between 3/16 and 3/8
Medium-grained	Between 1/32 and 3/16
Fine-grained	Between 1/250 and 1/32
Aphanitic	Less than or equal to 1/250

BEDDING SPACING

Bedding Description	Thickness / Spacing
Massive	Less than 10 ft.
Very thickly bedded	3 ft. to 10 ft.
Thickly bedded	1 ft. to 3 ft.
Moderately bedded	4 in. to 1 ft.
Thinly bedded	1 in. to 4 in.
Very thinly bedded	1/4 in. to 1 in.
Laminated	Less than 1/4 in.

Note: Bedding is generally only applicable to sedimentary or bedded volcanic rocks.

HARDNESS

Hardness	Criteria
Extremely hard	Cannot be scratched with a pocketknife or sharp pick. Can only be chipped with repeated heavy hammer blows.
Very hard	Cannot be scratched with a pocketknife or sharp pick with difficulty. Breaks with repeated heavy hammer blows.
Hard	Can be scratched with with a pocketknife or sharp pick with difficulty. Breaks with heavy hammer blows.
Moderately hard	Can be scratched with a pocketknife or sharp pick with light or moderate pressure. Breaks with moderate hammer blows.
Moderately soft	Can be grooved 1/16 in. deep with a pocketknife or sharp pick with moderate or heavy pressure. Breaks with light hammer blow or heavy manual pressure.
Soft	Can be grooved or gouged easily with a pocketknife or sharp pick. Breaks with light to moderate manual pressure.
Very soft	Can be readily indented, grooved, or gouged with fingernail, or carved with a pocketknife. Breaks with light manual pressure.

WEATHERING (INTACT ROCK)

Weathering Description	Discoloration and/or Oxidation	General Characteristics
Fresh	Body of rock and fracture surfaces are not discolored or oxidized.	Rock texture unchanged. Hammer rings when crystalline rocks are struck.
Slightly weathered	Discoloration or oxidation limited to surface of, or short distance from, fractures. Most surfaces exhibit minor to complete discoloration.	Rock texture preserved. Hammer rings when crystalline rocks are struck. Body of rock not weakened.
Moderately weathered	Discoloration or oxidation extends usually throughout. Fe-Mg minerals appear rusty. All fracture surfaces are discolored or oxidized.	Rock texture generally preserved. Hammer does not ring when rock is struck. Body of rock slightly weakened.
Intensely weathered	Discoloration or oxidation throughout. Feldspar and Fe-Mg minerals altered to clay to some extent. All fracture surfaces are discolored or oxidized and friable.	Rock texture altered by chemical disintegration. Can usually be broken with moderate to heavy manual pressure or by light hammer blow . Body of rock is significantly weakened.
Decomposed	Discoloration or oxidation throughout but resistant minerals such as quartz may be unaltered. All feldspar and Fe-Mg minerals are completely altered to clay.	Resembles a soil; partial or complete remnant rock structure may be preserved. Can be granulated by hand. Resistant minerals may present as stringers or dikes.

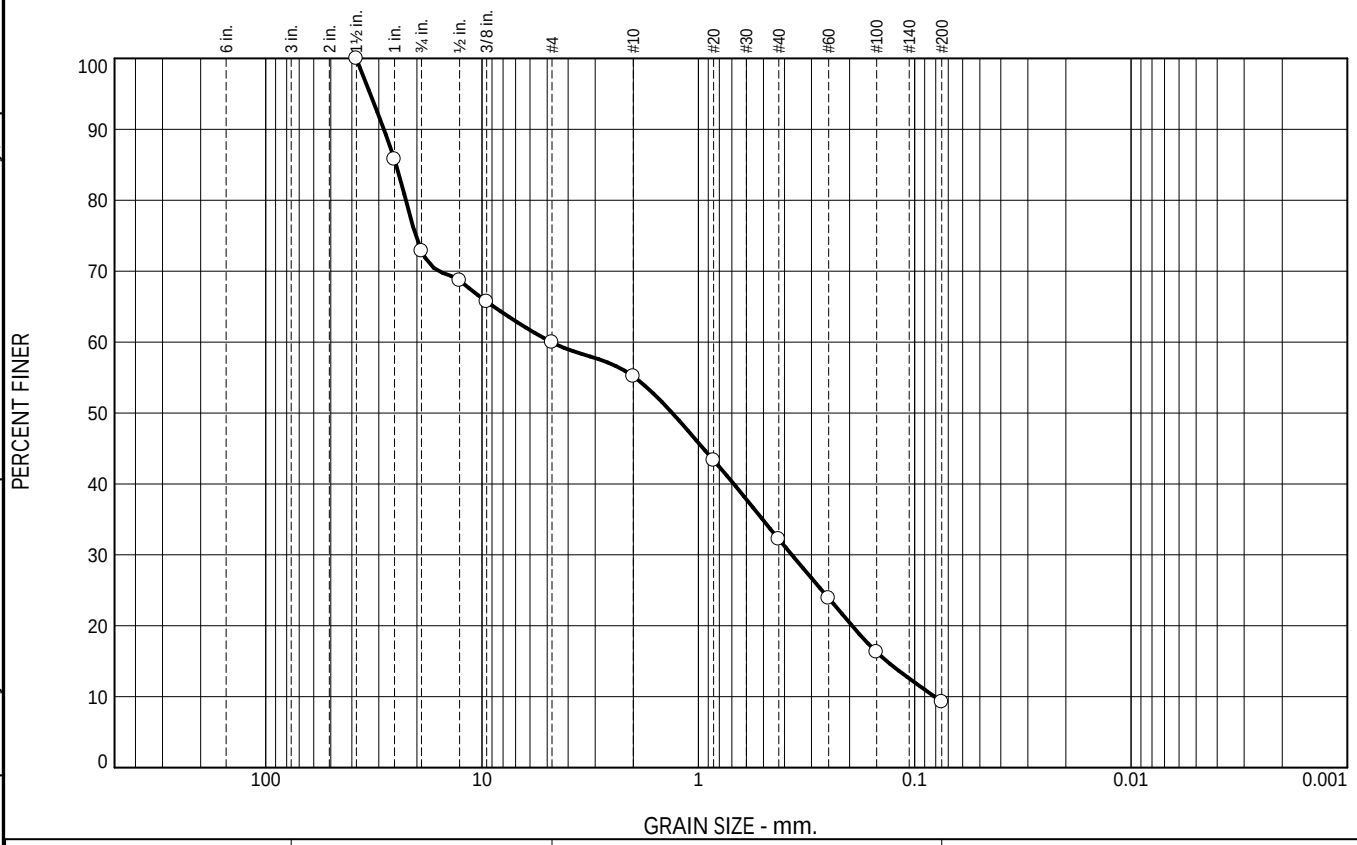
FRACTURE DENSITY

Description	Observed Fracture Density
Unfractured	No fractures
Very slightly fractured	Core lengths greater than 3 ft.
Slightly fractured	Core lengths mostly from 1 ft. to 3 ft.
Moderately fractured	Core lengths mostly from 4 in. to 1 ft.
Intensely fractured	Core lengths mostly from 1 in. to 4 in.
Very intensely fractured	Mostly chips and fragments

Note: Fracture density is based on the fracture spacing in recovered core, measured along the core axis (excluding mechanical breaks).

Stockpile Sample Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	27.2	12.8	4.8	23.0	23.0	9.2	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	85.8		
3/4"	72.8		
1/2"	68.7		
3/8"	65.7		
#4	60.0		
#10	55.2		
#20	43.3		
#40	32.2		
#60	23.9		
#100	16.3		
#200	9.2		

* (no specification provided)

Soil Description

Brown f-m SAND and f-c GRAVEL, trace Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 28.4163 D_{85}= 24.9333 D_{60}= 4.7779
D_{50}= 1.3205 D_{30}= 0.3697 D_{15}= 0.1345
D_{10}= 0.0810 C_u= 58.98 C_c= 0.35

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Source of Sample: Stockpile
Sample Number: SP-1 / G-1

Date: 06.14.23

Thielsch Engineering Inc.

Cranston, RI

Client: Weston & Sampson
Project: Montville Landfill Solar
Montville, CT
Project No: ENG23-0165 Figure 23-S-B400

Tested By: AV / SF Checked By: Andrew Vanasse

Stockpile 1

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	15.2	22.7	7.2	35.7	18.0	1.2	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2"	100.0		
1 1/2"	94.9		
1"	88.0		
3/4"	84.8		
1/2"	77.6		
3/8"	71.9		
#4	62.1		
#10	54.9		
#20	40.0		
#40	19.2		
#60	8.4		
#100	3.0		
#200	1.2		

* (no specification provided)

Soil Description

Brown f-c SAND and f-c GRAVEL, trace Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 28.8388 D_{85}= 19.3280 D_{60}= 3.7762
D_{50}= 1.4197 D_{30}= 0.6063 D_{15}= 0.3555
D_{10}= 0.2752 C_u= 13.72 C_c= 0.35

Classification

USCS= SP AASHTO= A-1-b

Remarks

Source of Sample: Stockpile
Sample Number: SP-2 / G-1

Date: 06.14.23

Thielsch Engineering Inc.

Cranston, RI

Client: Weston & Sampson
Project: Montville Landfill Solar
Montville, CT
Project No: ENG23-0165 Figure 23-S-B401

Tested By: AV / SF Checked By: Andrew Vanasse

Stockpile 2

APPENDIX F

Stormwater Calculations

Weston & Sampson

westonandsampson.com

Weston & Sampson Engineers, Inc.
712 Brook Street, Suite 103
Rocky Hill, CT 06067
tel. 860.513.1473

REPORT

June 2023

VCP Montville LF, LLC

Town of Montville Landfill
Solar PV Development

669 Oakdale Road (CT RT 163)
Montville, CT 06353

Stormwater Report

TABLE OF CONTENTS

Applicant/Project Name: VCF Montville LF, LLC
Town of Montville Landfill Solar PV Development

Project Location: 669 Oakdale Road (CT RT 163), Montville, CT 06353

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

Introduction

Weston & Sampson Engineers, Inc. (Weston & Sampson) has prepared this stormwater report on behalf of VCP Montville LF, LLC (Verogy) to develop a ground mounted solar photovoltaic (PV) array at the closed landfill, located at 669 Oakdale Road (CT RT 163) in Montville, Connecticut.

The existing Town of Montville Landfill covers an area of approximately 8-acres within a property that is approximately 25.5 acres. The site is currently used as a transfer station and is bounded by Oakdale Road (CT RT 163) to the south, the Fox Family Cemetery to the west, Fox Brook and Oxoboxo Brook to the north, and Wheeler Pond to the east.

The capped landfill slopes to all sides at an approximate 30% slope with an un-maintained meadow/brush ground cover. The top of the existing landfill is currently being used as sand/gravel stockpile storage. The landfill is in the southwest section of the property and the transfer station is in the southeast section of the property. The southern entrance and transfer station areas are covered by pavement and broken bituminous asphalt. There is an existing unpaved access road leading from the southern entrance, traversing the landfill cap counterclockwise, which culminates atop the landfill cap.

Wetland delineations performed determined three existing wetlands are onsite. The first is a bordering vegetated wetland north of the landfill and associated with Fox Brook. The second is an isolated vegetated wetland to the southwest of the landfill associated with a low point past the toe of the slope of the landfill and crosses the property line. The third is a bordering vegetated wetland in the southeast corner of the site associated with a natural drainage path draining easterly towards Wheeler Pond.

The proposed project will have minimum impact within the 50-foot upland review area adjacent to on-Site wetlands, with only two small areas of the proposed project within the outermost edges of the upland review area. Stabilization and maintenance of the existing access road, if necessary, will occur within approximately 386 square feet of the upland review area on the western side of the site. Subsurface electrical conduit will run from the eastern side of the access road to above-ground utility poles. There is an area of approximately 531 square feet within the upland review area where the proposed trench will pass through. This disturbance will be temporary as, once the conduit is installed, the area will be stabilized and re-vegetated.

No part of the project area is within a Federal Emergency Management Agency National Flood Hazard Zone. A Zone-A Flood Hazard Zone is associated with Fox Brook to the north of the project area.

Proposed Project

The proposed project includes deploying ground-mounted solar on the existing landfill cap. The total capacity of the proposed ground mounted solar installation is approximately 776 kilowatt (kW) direct current (DC) (600 kW alternating current (AC)).

The on-cap solar PV array is to be supported on precast concrete ballasted foundations and will have a low bearing pressure that is designed to maintain the integrity of the existing engineered landfill cap. Each block will be placed on dense-graded crushed stone to level the blocks to meet the foundation manufacturer's requirements. Panel racking will be installed above the precast concrete ballasted foundations and solar PV

modules will be attached to the racking. The series of PV panels will be connected using above ground cables, cable trays, and conduits that bring the wiring to a central equipment pad located atop the landfill cap directly east of the solar PV array.

A chain link fence is proposed atop the landfill cap to provide security and separation of any unqualified personnel from any electrical conductors, as required by the National Electric Code. The total area of the array within the fence limits is approximately 2.4 acres. The proposed fence will be supported on ballast blocks as opposed to ground-driven poles to protect the existing engineered landfill cap.

A Locus Map of the project location is included as Figure 1 in **Attachment A.**

Erosion and Sediment Control

The erosion and sediment controls have been designed in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control. Straw wattle is proposed as the sediment barrier for perimeter controls. When used on the cap, sandbags will be used to weigh the straw wattle down if needed. Any piercing activities such as driving stakes in the ground to keep straw wattle in place is prohibited while on the landfill cap to not damage the cap. A construction entrance/exit is proposed where the existing access road meets the paved area south of the landfill. A concrete washout basin is proposed near the construction entrance/exit.

Stormwater Analysis

Stormwater runoff patterns for the Town of Montville Landfill will not be altered as part of the proposed project. Existing and proposed peak design flows were assessed using the National Resources Conservation Service (NRCS) Technical Release 20 (TR-20) methodology. HydroCAD® version 10.20-2d stormwater modeling software was used to analyze stormwater conditions. It is a comprehensive hydrodynamic modeling program which analyzes and designs site hydrology, surface drainage systems, and storm drains. It can manage a variety of flow situations such as overland flow, drainage swales, ponds, and piping systems.

The National Resources Conservation Service (NRCS) Web Soil Survey database was used to determine the hydrologic soil group (HSG) for the onsite soils. Stormwater rainfall event data is derived from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Precipitation Frequency data for the site. The 2-, 10-, 25-, and 100- year, 24-hour, Type-III storm events were used to compare post-development conditions to pre-development conditions. The NRCS report and NOAA data are included in **Attachment B**.

A summary of the analysis is provided below, the full stormwater model and drainage area maps are included in **Attachment C.**

Existing Stormwater Flow

The Town of Montville Landfill does not have an existing stormwater management system and stormwater currently flows off the landfill cap in all directions via overland flow. The limits of the stormwater analysis for this project include the landfill cap, the southern paved area, the majority of the eastern transfer station area, and the northern meadow/woodlands between the landfill cap and Fox Brook. HSG-A, B, C and D soils are all determined to be onsite, and coverages were accounted for accordingly based on HSG soil boundaries.

Pre-development conditions have been modeled assuming the landfill cap has been maintained as it was designed with meadow coverage.

HSG-D soils are assumed to be consistent with the landfill limit of waste which is assumed to extend to the landfill toe of slope.

Four points of analysis, each with their own drainage area, were analyzed. Figure 2 of Attachment C displays the limits of each drainage area, flow paths, and existing ground covers. A description of each drainage area is below:

- Drainage Area A – Northern portion of the landfill draining northerly towards Fox Brook,
- Drainage Area B – Southwest portion of the landfill draining southwesterly offsite,
- Drainage Area C – Southern portion of the landfill draining southeasterly offsite,
- Drainage Area D – Eastern portion of the landfill draining easterly offsite towards Wheeler Pond

Proposed Stormwater Flow

The stormwater analysis assumes the array concrete ballast blocks and equipment pad will be considered disconnected impervious area in the post-development stormwater model. Figure 3 of Attachment C displays the limits of each drainage area, flow paths, and proposed ground covers. The dimensions of the ballast blocks are assumed to be 2.5-ft wide by 9-ft long. Two ballast blocks will be used for each table with each table consisting of approximately 16 solar PV modules.

Stormwater flow patterns do not change based on the proposed solar PV layout as there are no proposed grading changes. Post-development drainage areas are denoted with a suffix of "1" and are consistent with pre-development drainage areas.

The post-development coverage conditions remain consistent with the pre-development conditions for the majority of the site. The only difference being minor trimming to the woods coverage in the northeast corner of the site, and the addition of the concrete ballast blocks and gravel turnaround areas as unconnected impervious coverage. These changes do not change the overall runoff curve numbers (CN) of the drainage areas.

The time of concentrations (Tc) are consistent from pre- to post- development conditions. All Tcs begin with 100-feet of sheet flow followed by shallow concentrated flow until flow reaches the drainage area boundary.

Peak Discharge Summary

As the overall CN and Tc for each drainage area remain consistent from pre- to post-development conditions, the project results in no changes in peak runoff discharge rate or volume for all design storms. The pre- and post-development conditions comparative table reflecting the HydroCAD results are shown in Table 1 below.

The project considers the following as impervious coverage: the existing access road, the existing paved areas, the existing broken bituminous areas, the proposed gravel turnaround area atop the landfill, the proposed concrete ballast blocks for the array, and the proposed concrete equipment pad.

TABLE 1: PRE-, POST-DEVELOPMENT COMPARATIVE RESULTS							
OFF-SITE SUMMARY		FLOW			VOLUME		
Point of Analysis	24-hour Storm Event	Pre-Development Receiving Peak Runoff (cfs)	Post-Development Recieving Peak Runoff (cfs)	**Difference in Peak Runoff (cfs)**	Pre-Development Receiving Discharge Volume (af)	Post-Development Recieving Discharge Volume (af)	**Difference in Volume (af)**
POA-A Northern Wetland	2	7.73	7.73	0.00	0.610	0.610	0.000
	10	15.14	15.14	0.00	1.177	1.177	0.000
	25	20.05	20.05	0.00	1.560	1.560	0.000
	100	27.70	27.70	0.00	2.170	2.170	0.000
POA-B Offsite - West	2	0.47	0.47	0.00	0.040	0.040	0.000
	10	0.91	0.91	0.00	0.075	0.075	0.000
	25	1.20	1.20	0.00	0.100	0.100	0.000
	100	1.65	1.65	0.00	0.138	0.138	0.000
POA-C Southeast Wetland	2	2.14	2.14	0.00	0.215	0.215	0.000
	10	4.20	4.20	0.00	0.415	0.415	0.000
	25	5.57	5.57	0.00	0.550	0.550	0.000
	100	7.70	7.70	0.00	0.765	0.765	0.000
POA-D Offsite - East	2	6.67	6.67	0.00	0.607	0.607	0.000
	10	12.20	12.20	0.00	1.111	1.111	0.000
	25	15.78	15.78	0.00	1.444	1.444	0.000
	100	21.29	21.29	0.00	1.968	1.968	0.000

Conclusion

The proposed solar PV array located at the Town of Montville Landfill will include minor vegetation trimming within the array area, minor access road improvements, and the implementation of erosion and sediment controls. The analysis shows no change in peak discharge runoff rates for post-development conditions compared to pre-development conditions.

No stormwater management system is proposed as there is no increase in stormwater runoff rate or volume. Similarly, water quality volume calculations and treatment per the 2004 Connecticut Stormwater Quality Manual are not provided for this project.

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Attachment A - Locus Map

FIGURE 1
TOWN OF MONTVILLE LANDFILL SOLAR PV DEVELOPMENT
669 OAKDALE ROAD (CT RT 163), MONTVILLE, CT 06353
VCP MONTVILLE LF, LLC

LOCUS MAP

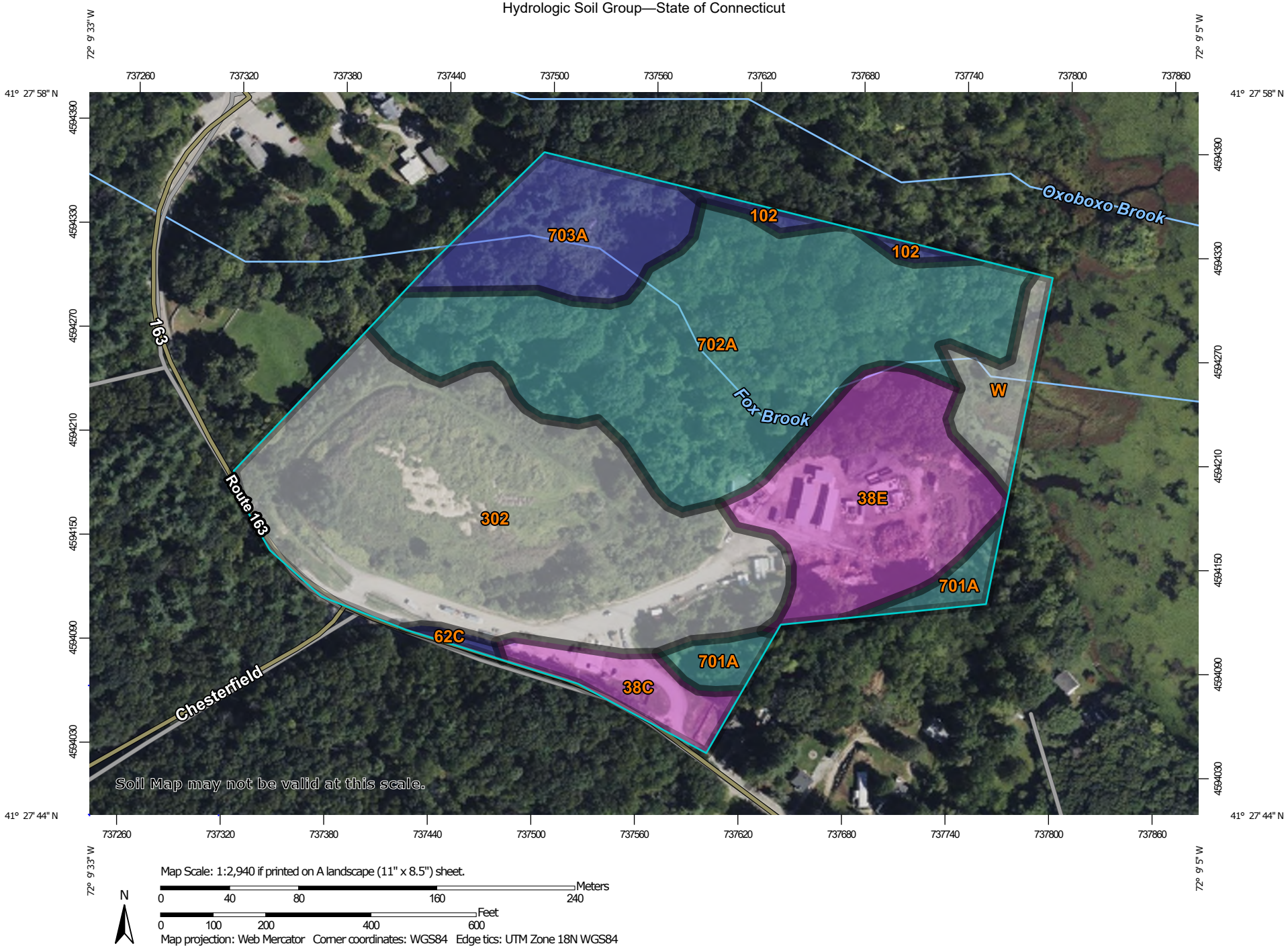
2,000 0 2,000

Scale In Feet

Weston & Sampson

Path: \\wse03.local\WSE\Projects\Private\Keroggy Solar\Montville, CT Landfill\Design\GIS\Fig-1-Locus Map.aprx User: Granata Nicholas Saved: 6/5/2023 12:08 PM Opened: 6/5/2023 12:16 PM

Attachment B - NRCS Web Soil Survey Map & Report: Hydrologic Soils Group,
FEMA FIRMette,
NOAA Atlas 14 Rainfall Data



Map Scale: 1:2,940 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

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

- 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 1:12,000.

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: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

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

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 2022

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
38C	Hinckley loamy sand, 3 to 15 percent slopes	A	0.9	3.5%
38E	Hinckley loamy sand, 15 to 45 percent slopes	A	3.6	14.0%
62C	Canton and Charlton fine sandy loams, 3 to 15 percent slopes, extremely stony	B	0.1	0.4%
102	Pootatuck fine sandy loam	B	0.3	1.1%
302	Dumps		8.9	34.9%
701A	Ninigret fine sandy loam, 0 to 3 percent slopes	C	0.7	2.8%
702A	Tisbury silt loam, 0 to 3 percent slopes	C	7.9	31.1%
703A	Haven silt loam, 0 to 3 percent slopes	B	2.2	8.8%
W	Water		0.8	3.3%
Totals for Area of Interest			**25.4**	**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

NOAA Atlas 14, Volume 10, Version 3
Location name: Montville, Connecticut, USA*
Latitude: 41.4635°, Longitude: -72.1574°
Elevation: 288 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]

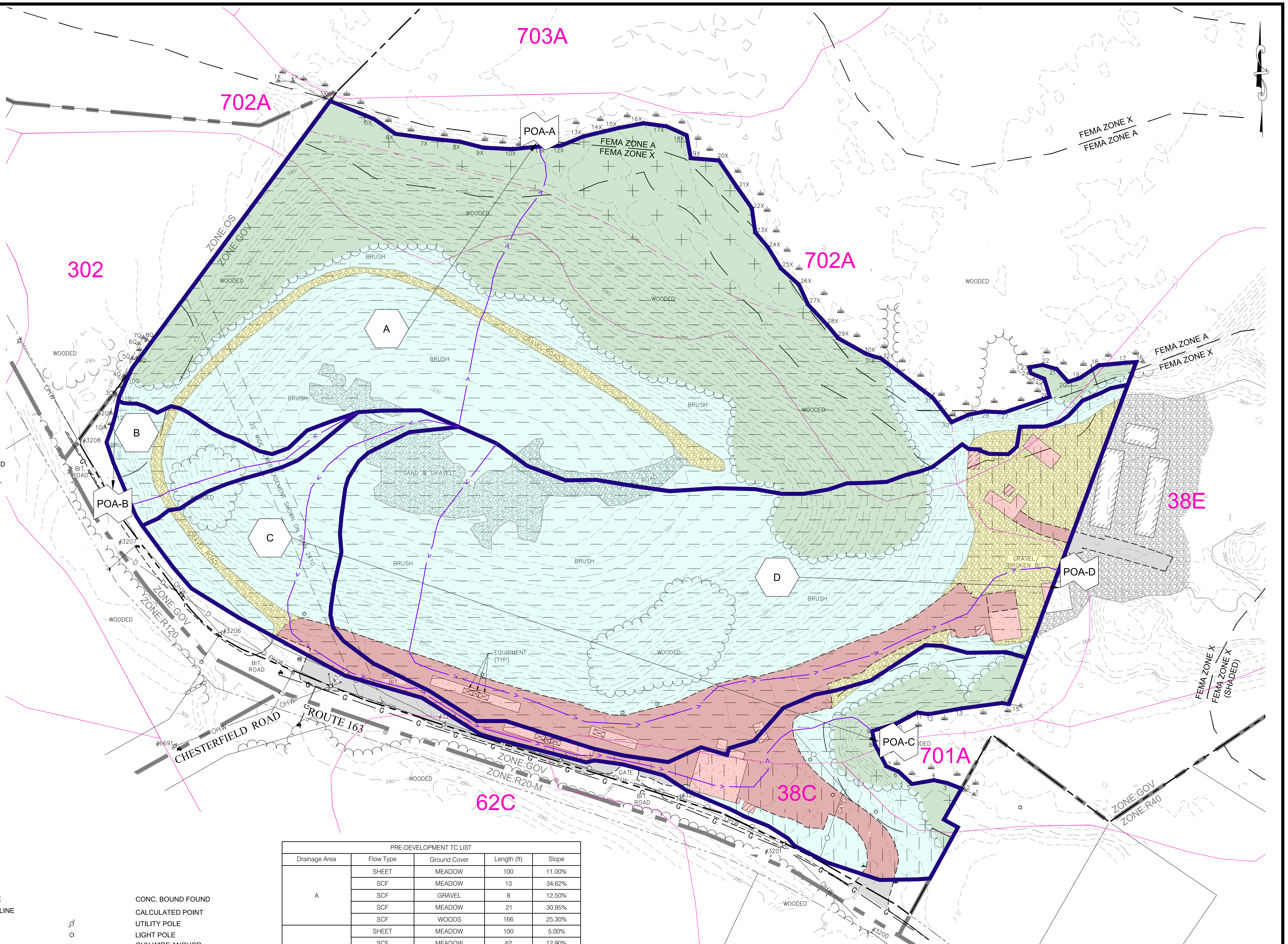
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.340** (0.264-0.427)	**0.406** (0.316-0.510)	**0.515** (0.398-0.647)	**0.605** (0.466-0.765)	**0.729** (0.544-0.956)	**0.822** (0.602-1.10)	**0.920** (0.654-1.27)	**1.03** (0.693-1.44)	**1.19** (0.772-1.72)	**1.32** (0.836-1.94)
10-min	**0.481** (0.374-0.604)	**0.575** (0.447-0.723)	**0.729** (0.564-0.919)	**0.856** (0.659-1.08)	**1.03** (0.770-1.36)	**1.16** (0.851-1.56)	**1.30** (0.926-1.80)	**1.46** (0.983-2.04)	**1.69** (1.09-2.43)	**1.87** (1.18-2.74)
15-min	**0.566** (0.440-0.711)	**0.677** (0.526-0.851)	**0.858** (0.664-1.08)	**1.01** (0.776-1.28)	**1.21** (0.906-1.59)	**1.37** (1.00-1.83)	**1.53** (1.09-2.11)	**1.72** (1.16-2.40)	**1.98** (1.28-2.86)	**2.20** (1.39-3.22)
30-min	**0.795** (0.618-0.998)	**0.950** (0.738-1.19)	**1.20** (0.932-1.52)	**1.41** (1.09-1.79)	**1.70** (1.27-2.24)	**1.92** (1.40-2.56)	**2.15** (1.53-2.96)	**2.41** (1.62-3.37)	**2.78** (1.80-4.00)	**3.08** (1.95-4.51)
60-min	**1.02** (0.795-1.28)	**1.22** (0.950-1.54)	**1.55** (1.20-1.95)	**1.82** (1.40-2.30)	**2.19** (1.64-2.88)	**2.47** (1.81-3.30)	**2.77** (1.96-3.81)	**3.10** (2.08-4.33)	**3.57** (2.32-5.14)	**3.96** (2.51-5.80)
2-hr	**1.34** (1.05-1.68)	**1.60** (1.25-2.00)	**2.03** (1.58-2.54)	**2.38** (1.84-2.99)	**2.86** (2.15-3.73)	**3.22** (2.37-4.28)	**3.60** (2.58-4.94)	**4.05** (2.74-5.62)	**4.70** (3.06-6.71)	**5.24** (3.33-7.61)
3-hr	**1.56** (1.23-1.94)	**1.86** (1.46-2.31)	**2.35** (1.84-2.92)	**2.75** (2.14-3.44)	**3.31** (2.50-4.30)	**3.72** (2.75-4.92)	**4.16** (3.00-5.69)	**4.68** (3.17-6.46)	**5.44** (3.55-7.73)	**6.09** (3.88-8.78)
6-hr	**1.99** (1.58-2.45)	**2.36** (1.87-2.92)	**2.97** (2.34-3.68)	**3.48** (2.72-4.32)	**4.17** (3.17-5.38)	**4.69** (3.49-6.16)	**5.24** (3.80-7.11)	**5.89** (4.01-8.07)	**6.85** (4.49-9.64)	**7.66** (4.90-11.0)
12-hr	**2.46** (1.97-3.02)	**2.92** (2.33-3.58)	**3.67** (2.92-4.52)	**4.30** (3.39-5.30)	**5.15** (3.94-6.59)	**5.79** (4.33-7.54)	**6.47** (4.70-8.69)	**7.26** (4.97-9.86)	**8.42** (5.54-11.7)	**9.39** (6.02-13.3)
24-hr	**2.89** (2.32-3.52)	**3.45** (2.77-4.20)	**4.36** (3.49-5.33)	**5.12** (4.07-6.28)	**6.17** (4.74-7.84)	**6.94** (5.23-8.98)	**7.78** (5.69-10.4)	**8.74** (6.01-11.8)	**10.2** (6.72-14.1)	**11.4** (7.33-16.0)
2-day	**3.24** (2.62-3.92)	**3.91** (3.16-4.73)	**5.00** (4.03-6.07)	**5.91** (4.73-7.20)	**7.16** (5.55-9.05)	**8.08** (6.14-10.4)	**9.08** (6.70-12.1)	**10.3** (7.10-13.7)	**12.1** (8.00-16.5)	**13.6** (8.80-18.9)
3-day	**3.52** (2.86-4.24)	**4.24** (3.45-5.12)	**5.43** (4.39-6.56)	**6.41** (5.16-7.78)	**7.77** (6.04-9.77)	**8.77** (6.68-11.2)	**9.85** (7.30-13.0)	**11.2** (7.73-14.8)	**13.1** (8.72-17.9)	**14.8** (9.60-20.5)
4-day	**3.78** (3.08-4.54)	**4.54** (3.70-5.46)	**5.79** (4.70-6.98)	**6.83** (5.51-8.25)	**8.25** (6.44-10.3)	**9.31** (7.11-11.9)	**10.4** (7.76-13.8)	**11.8** (8.20-15.6)	**13.9** (9.24-18.8)	**15.7** (10.2-21.6)
7-day	**4.51** (3.70-5.38)	**5.35** (4.38-6.39)	**6.72** (5.49-8.05)	**7.86** (6.37-9.44)	**9.42** (7.39-11.7)	**10.6** (8.12-13.4)	**11.8** (8.81-15.4)	**13.3** (9.28-17.5)	**15.5** (10.4-20.9)	**17.4** (11.3-23.8)
10-day	**5.23** (4.31-6.22)	**6.11** (5.03-7.28)	**7.55** (6.19-9.01)	**8.74** (7.12-10.5)	**10.4** (8.16-12.8)	**11.6** (8.93-14.6)	**12.9** (9.61-16.7)	**14.4** (10.1-18.8)	**16.6** (11.2-22.3)	**18.5** (12.1-25.1)
20-day	**7.45** (6.18-8.80)	**8.38** (6.95-9.91)	**9.92** (8.19-11.8)	**11.2** (9.18-13.3)	**12.9** (10.2-15.8)	**14.3** (11.0-17.7)	**15.6** (11.6-19.8)	**17.1** (12.0-22.1)	**19.1** (12.8-25.2)	**20.6** (13.5-27.7)
30-day	**9.29** (7.75-10.9)	**10.3** (8.55-12.1)	**11.9** (9.83-14.0)	**13.2** (10.9-15.6)	**15.0** (11.9-18.2)	**16.4** (12.6-20.1)	**17.8** (13.2-22.2)	**19.1** (13.5-24.6)	**20.9** (14.1-27.5)	**22.2** (14.6-29.7)
45-day	**11.6** (9.69-13.6)	**12.6** (10.5-14.8)	**14.3** (11.9-16.7)	**15.6** (12.9-18.4)	**17.5** (13.9-21.1)	**19.0** (14.7-23.2)	**20.5** (15.1-25.3)	**21.7** (15.4-27.8)	**23.3** (15.8-30.5)	**24.3** (16.0-32.4)
60-day	**13.5** (11.3-15.7)	**14.5** (12.2-17.0)	**16.3** (13.6-19.1)	**17.7** (14.7-20.8)	**19.7** (15.7-23.6)	**21.3** (16.5-25.8)	**22.8** (16.8-28.0)	**24.0** (17.1-30.5)	**25.5** (17.3-33.2)	**26.3** (17.4-34.9)

[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.

Attachment C - Drainage Area Maps & HydroCAD Reports



NOTES:

1. BASEMAPPING DERIVED FROM SURVEY PROVIDED BY NORTHEAST SURVEY CONSULTANTS ENTITLED "PLAN OF LAND IN MONTVILLE, CT, 669 ROUTE 163, PREPARED FOR VEROGY" AND DATED 4-4-2023.
2. SOIL DATA PROVIDED BY NATIONAL RESOURCE CONSERVATION SERVICE (NRCS) WEB SOIL SURVEY.
3. SOIL GEOGRAPHIC INFORMATION SYSTEM (GIS) DATA DERIVED FROM CONNECTICUT DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION GIS OPEN DATA WEBSITE SOIL SURVEY GEOGRAPHIC DATABASE SOILS (SSURGO).
4. HYDROLOGIC SOIL GROUP (HSG) D SOILS ASSUMED TO BE WITHIN THE FOOTPRINT OF THE LIMIT OF WASTE WHICH IS ASSUMED TO EXTEND TO LANDFILL TOE OF SLOPE.

LEGEND DRAINAGE AREA MAP:

HYDROLOGY:

- FLOW PATH / TIME OF CONCENTRATION
- SUBBASIN LABEL
- POINT OF ANALYSIS
- BASIN BMP
- MEADOW
- WOODLAND
- GRAVEL
- IMPERVIOUS
- WATERSHED BOUNDARY
- NRCS SOIL BOUNDARY
- ASSUMED HSG-D SOIL BOUNDARY
- 922B NRCS SOIL MAP UNIT
- HYDROLOGIC SOIL GROUP A
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D

EXISTING LEGEND:

- LOCUS PROPERTY LINE
- ABUTTERS PROPERTY LINE
- EASEMENT LINE
- 2' CONTOUR LINE
- CHAIN LINK FENCE
- WETLAND LINE
- 50' UPLAND REVIEW AREA
- TREE LINE
- TREE LINE
- FEMA FLOOD ZONE LINE
- ZONING LINE
- OVERHEAD WIRES
- BURIED GAS LINE
- BURIED DRAINAGE LINE
- CONC. BOUND FOUND
- CALCULATED POINT
- UTILITY POLE
- LIGHT POLE
- GUY WIRE ANCHOR
- CATCH BASIN
- MANHOLE
- WETLAND FLAG WITH IDENTIFIER
- SIGN POST
- GAS VALVE
- CONCRETE PAD
- GRAVEL
- SAND AND GRAVEL
- PAVEMENT
- STRUCTURE

PRE-DEVELOPMENT TC LIST				
Drainage Area	Flow Type	Ground Cover	Length (ft)	Slope
A	SHEET	MEADOW	100	11.00%
	SCF	MEADOW	13	34.62%
	SCF	GRAVEL	8	12.50%
	SCF	MEADOW	21	30.95%
	SCF	WOODS	166	25.30%
B	SHEET	MEADOW	100	5.00%
	SCF	MEADOW	62	12.90%
	SCF	MEADOW	51	33.33%
	SCF	GRAVEL	10	10.00%
	SCF	MEADOW	31	29.03%
C	SHEET	MEADOW	100	3.00%
	SCF	MEADOW	126	7.94%
	SCF	MEADOW	80	33.75%
	SCF	PAVEMENT	607	2.64%
	SCF	MEADOW	44	11.36%
	SCF	WOODS	44	25.00%
D	SHEET	MEADOW	100	6.00%
	SCF	MEADOW	73	17.81%
	SCF	MEADOW	64	42.19%
	SCF	PAVEMENT	634	3.94%
	SCF	GRAVEL	94	0.53%

Soil Data		
Map Unit Symbol	Map Unit Name	HSG Rating
38C	Hinckley loamy sand, 3 to 15 percent slopes	A
38E	Hinckley loamy sand, 15 to 45 percent slopes	A
62C	Canton and Charlton fine sandy loams, 3 to 15 percent slopes, extremely stony	B
302	Dumps	D
701A	Ninigret fine sandy loam, 0 to 3 percent slopes	C
702A	Tisbury silt loam, 0 to 3 percent slopes	C

50 25 0 50 100
SCALE: 1"=50'

NOT FOR CONSTRUCTION

Project:
TOWN OF MONTVILLE LANDFILL SOLAR PV DEVELOPMENT

669 ROUTE 163
MONTVILLE, CT 06353

Weston & Sampson
WESTON & SAMPSON ENGINEERS, INC.
712 BROOK STREET, SUITE 103
ROCKY HILL, CT 06067
860.513.1473 800.SAMPSON
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150 TRUMBULL STREET
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Revisions:

No.	Date	Description
0	06/06/2023	ISSUED FOR PERMITTING

Seal:

Issued For:
PERMITTING

Scale: AS SHOWN
Date Created: 06/06/2023
Drawn By: NVG
Reviewed By: MRC
Approved By: RJB

W&S Project No.: ENG23-1066
W&S File No.: Verogy Montville

Drawing Title:
PRE- DEVELOPMENT DRAINAGE AREA MAP

Sheet Number:
FIG 2

NOTES:

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LEGEND DRAINAGE AREA MAP:

HYDROLOGY:

- FLOW PATH / TIME OF CONCENTRATION
- X# SUBBASIN LABEL
- XL POINT OF ANALYSIS
- XP BASIN BMP
- MEADOW
- WOODLAND
- GRAVEL
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- NRCS SOIL BOUNDARY
- ASSUMED HSG-D SOIL BOUNDARY
- 922B NRCS SOIL MAP UNIT
- HYDROLOGIC SOIL GROUP A
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D

PROPOSED LEGEND:

- LOW LOW — LIMIT OF WORK
- SB SB SB SB — SEDIMENT BARRIER
- x x x — FENCE
- EC EC — ELECTRIC CONDUIT
- OHE OHE — OVERHEAD ELECTRIC
- SOLAR PV RACK
- UTILITY POLE
- ACCESS ROAD (4 / C-502)

EXISTING LEGEND:

- LOCUS PROPERTY LINE
- ABUTTERS PROPERTY LINE
- EASEMENT LINE
- 2' CONTOUR LINE
- CHAIN LINK FENCE
- WETLAND LINE
- 50' UPLAND REVIEW AREA
- TREE LINE
- TREE LINE
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- CONCRETE PAD
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- SAND AND GRAVEL
- PAVEMENT
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POST-DEVELOPMENT TC LIST				
Drainage Area	Flow Type	Ground Cover	Length (ft)	Slope
A1	SHEET	MEADOW	100	11.00%
	SCF	MEADOW	13	34.62%
	SCF	GRAVEL	8	12.50%
	SCF	MEADOW	21	30.95%
	SCF	WOODS	166	25.30%
B1	SHEET	MEADOW	100	5.00%
	SCF	MEADOW	62	12.90%
	SCF	MEADOW	51	33.33%
	SCF	GRAVEL	10	10.00%
	SCF	MEADOW	31	29.03%
C1	SHEET	MEADOW	100	3.00%
	SCF	MEADOW	126	7.94%
	SCF	MEADOW	80	33.75%
	SCF	PAVEMENT	607	2.64%
	SCF	MEADOW	44	11.36%
	SCF	WOODS	44	25.00%
D1	SHEET	MEADOW	100	6.00%
	SCF	MEADOW	73	17.81%
	SCF	MEADOW	64	42.19%
	SCF	PAVEMENT	634	3.94%
	SCF	GRAVEL	94	0.53%

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Map Unit Symbol	Map Unit Name	HSG Rating
38C	Hinckley loamy sand, 3 to 15 percent slopes	A
38E	Hinckley loamy sand, 15 to 45 percent slopes	A
62C	Canton and Charlton fine sandy loams, 3 to 15 percent slopes, extremely stony	B
302	Dumps	D
701A	Ninigret fine sandy loam, 0 to 3 percent slopes	C
702A	Tisbury silt loam, 0 to 3 percent slopes	C

50 25 0 50 100
SCALE: 1"=50'

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LANDFILL
SOLAR PV DEVELOPMENT

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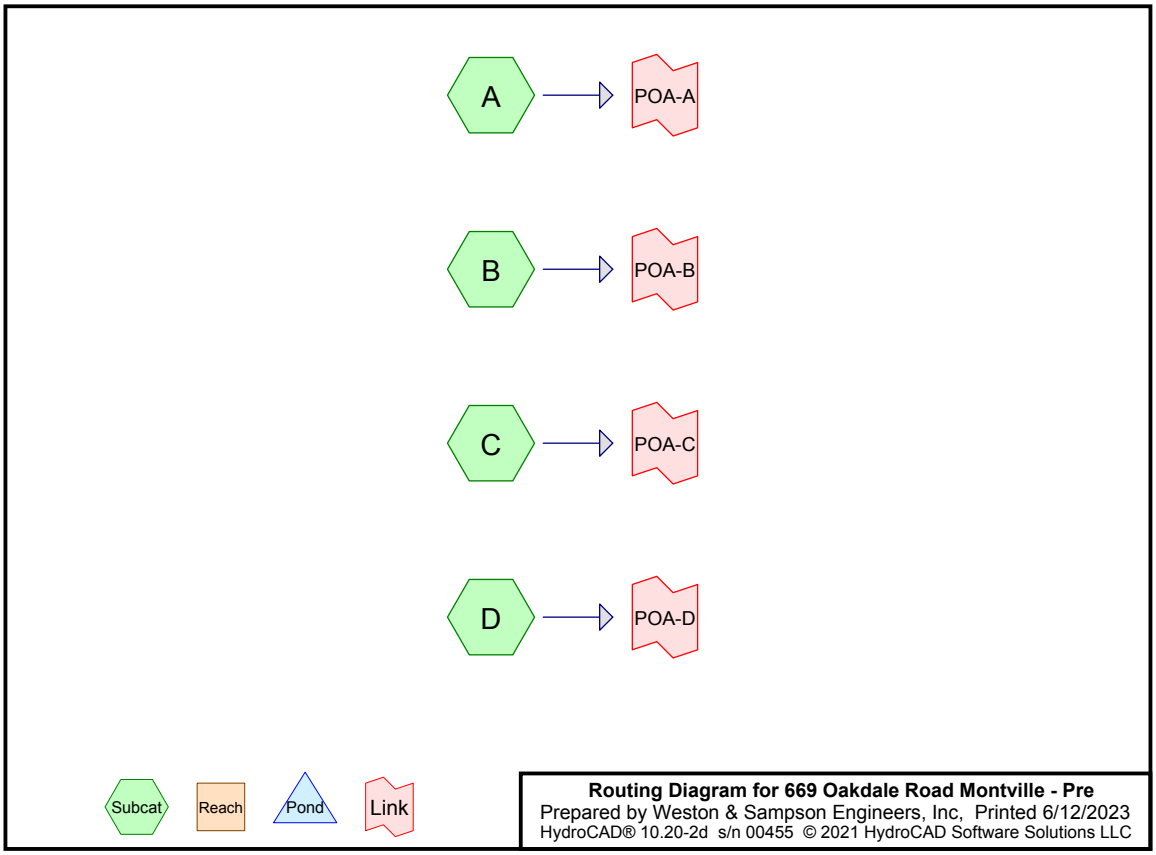
W&S File No.:	Verogy Montville

Drawing Title:
POST- DEVELOPMENT DRAINAGE AREA MAP

Sheet Number:
FIG 3



Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Type III 24-hr		Default	24.00	1	3.45	2
2	10-yr	Type III 24-hr		Default	24.00	1	5.12	2
3	25-yr	Type III 24-hr		Default	24.00	1	6.17	2
4	100-yr	Type III 24-hr		Default	24.00	1	7.78	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.231	76	Gravel roads, HSG A (D)
0.043	89	Gravel roads, HSG C (A, D)
0.432	91	Gravel roads, HSG D (A, B, C, D)
0.229	30	Meadow, non-grazed, HSG A (A, C, D)
0.114	71	Meadow, non-grazed, HSG C (A, C, D)
5.644	78	Meadow, non-grazed, HSG D (A, B, C, D)
0.357	98	Paved parking, HSG A (C, D)
0.014	98	Paved parking, HSG B (C)
0.008	98	Paved parking, HSG C (D)
0.819	98	Paved parking, HSG D (C, D)
0.023	36	Woods, Fair, HSG A (A, C)
0.842	73	Woods, Fair, HSG C (A, C)
2.528	79	Woods, Fair, HSG D (A, C, D)
11.283	**79**	**TOTAL AREA**

Summary for Subcatchment A:

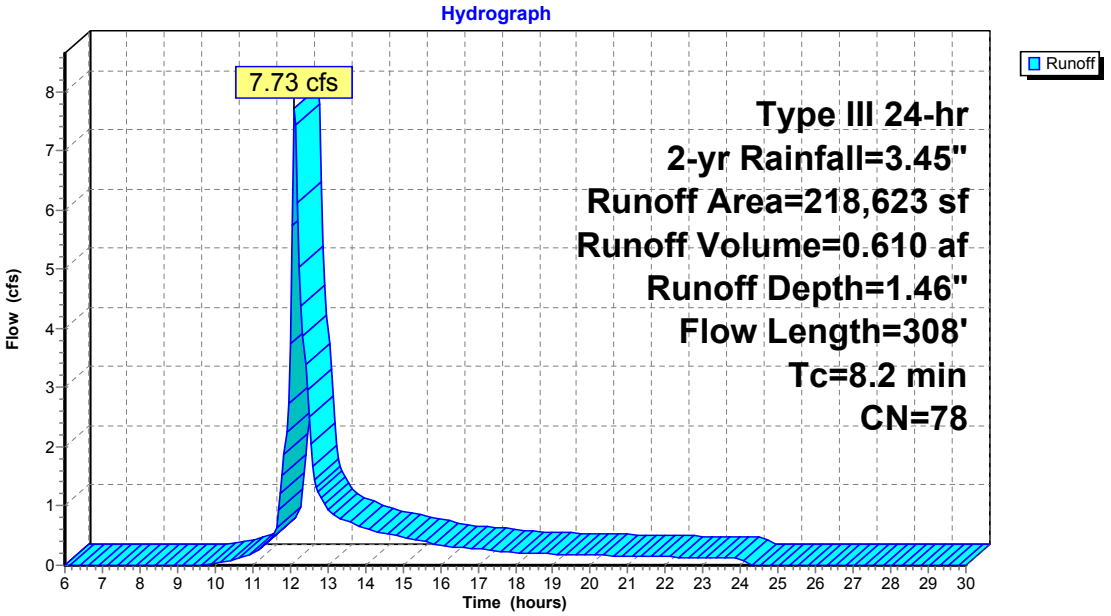
Runoff = 7.73 cfs @ 12.12 hrs, Volume= 0.610 af, Depth= 1.46"
Routed to Link POA-A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.45"

Area (sf)	CN	Description
13,906	78	Meadow, non-grazed, HSG D
1,075	71	Meadow, non-grazed, HSG C
670	30	Meadow, non-grazed, HSG A
66,841	78	Meadow, non-grazed, HSG D
1,720	71	Meadow, non-grazed, HSG C
92,438	79	Woods, Fair, HSG D
33,692	73	Woods, Fair, HSG C
662	36	Woods, Fair, HSG A
6,666	91	Gravel roads, HSG D
953	89	Gravel roads, HSG C
218,623	78	Weighted Average
218,623		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.1100	0.24		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.1	13	0.3462	4.12		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.0	8	0.1250	5.69		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
0.1	21	0.3095	3.89		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.1	166	0.2530	2.51		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
8.2	308	Total			

Subcatchment A:



Summary for Subcatchment B:

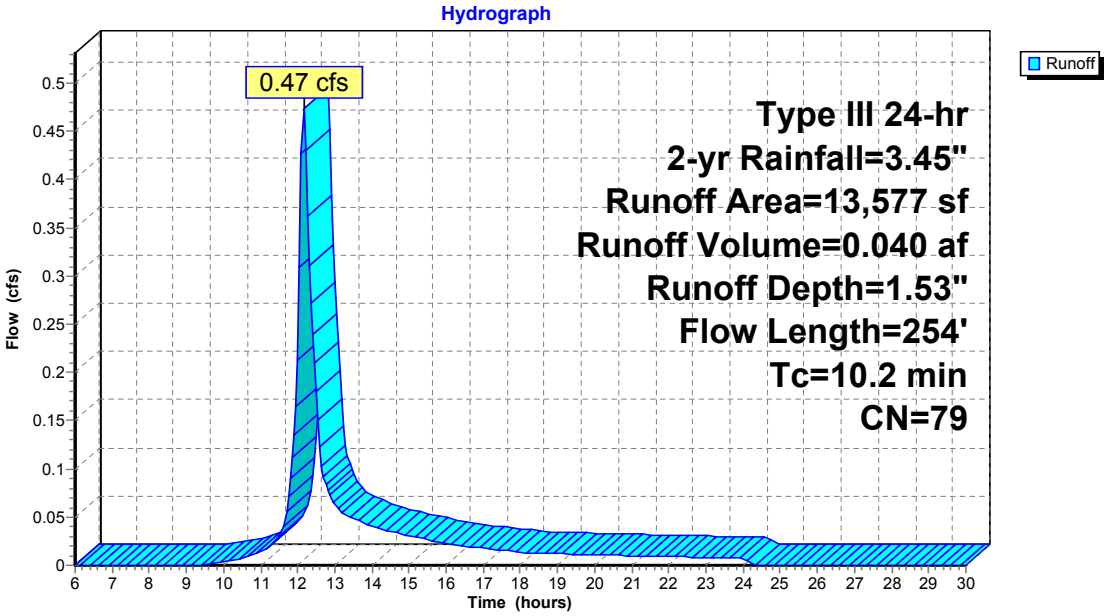
Runoff = 0.47 cfs @ 12.15 hrs, Volume= 0.040 af, Depth= 1.53"
Routed to Link POA-B :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.45"

Area (sf)	CN	Description
3,577	78	Meadow, non-grazed, HSG D
8,878	78	Meadow, non-grazed, HSG D
1,122	91	Gravel roads, HSG D
13,577	79	Weighted Average
13,577		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.4	62	0.1290	2.51		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.2	51	0.3333	4.04		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.0	10	0.1000	5.09		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
0.1	31	0.2903	3.77		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
10.2	254	Total			

Subcatchment B:



Summary for Subcatchment C:

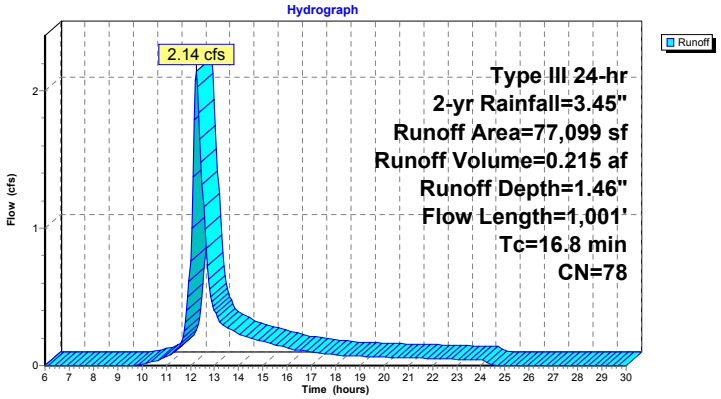
Runoff = 2.14 cfs @ 12.24 hrs, Volume= 0.215 af, Depth= 1.46"
Routed to Link POA-C :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.45"

Area (sf)	CN	Description
13,937	78	Meadow, non-grazed, HSG D
1,693	71	Meadow, non-grazed, HSG C
8,141	30	Meadow, non-grazed, HSG A
18,914	78	Meadow, non-grazed, HSG D
7,463	79	Woods, Fair, HSG D
2,986	73	Woods, Fair, HSG C
336	36	Woods, Fair, HSG A
2,453	91	Gravel roads, HSG D
8,413	98	Paved parking, HSG D
620	98	Paved parking, HSG B
12,143	98	Paved parking, HSG A
77,099	78	Weighted Average
55,923		72.53% Pervious Area
21,176		27.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0300	0.14		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
1.1	126	0.0794	1.97		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	80	0.3375	4.07		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
3.1	607	0.0264	3.30		**Shallow Concentrated Flow, Shallow - Pavement** Paved Kv= 20.3 fps
0.3	44	0.1136	2.36		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	44	0.2500	2.50		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
16.8	1,001	Total			

Subcatchment C:



Summary for Subcatchment D:

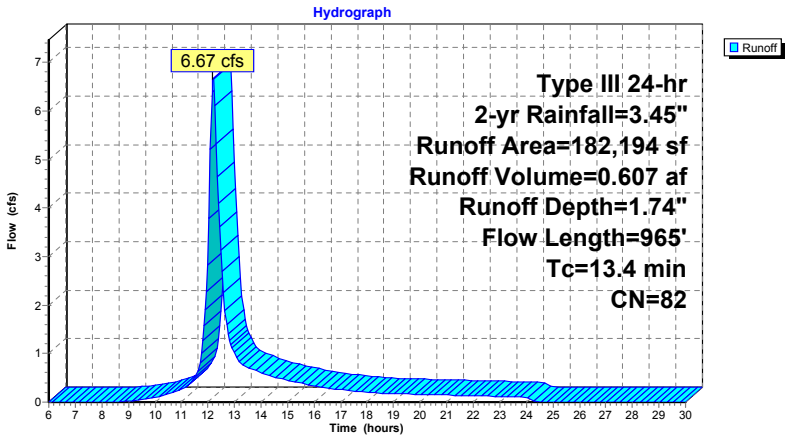
Runoff = 6.67 cfs @ 12.19 hrs, Volume= 0.607 af, Depth= 1.74"
Routed to Link POA-D :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.45"

Area (sf)	CN	Description
38,983	78	Meadow, non-grazed, HSG D
0	71	Meadow, non-grazed, HSG C
1,146	30	Meadow, non-grazed, HSG A
80,797	78	Meadow, non-grazed, HSG D
489	71	Meadow, non-grazed, HSG C
10,224	79	Woods, Fair, HSG D
0	73	Woods, Fair, HSG C
8,558	91	Gravel roads, HSG D
940	89	Gravel roads, HSG C
10,060	76	Gravel roads, HSG A
27,271	98	Paved parking, HSG D
329	98	Paved parking, HSG C
3,397	98	Paved parking, HSG A
182,194	82	Weighted Average
151,197		82.99% Pervious Area
30,997		17.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0600	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.4	73	0.1781	2.95		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.2	64	0.4219	4.55		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.6	634	0.0394	4.03		**Shallow Concentrated Flow, Shallow - Pavement** Paved Kv= 20.3 fps
1.3	94	0.0053	1.17		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
13.4	965	Total			

Subcatchment D:

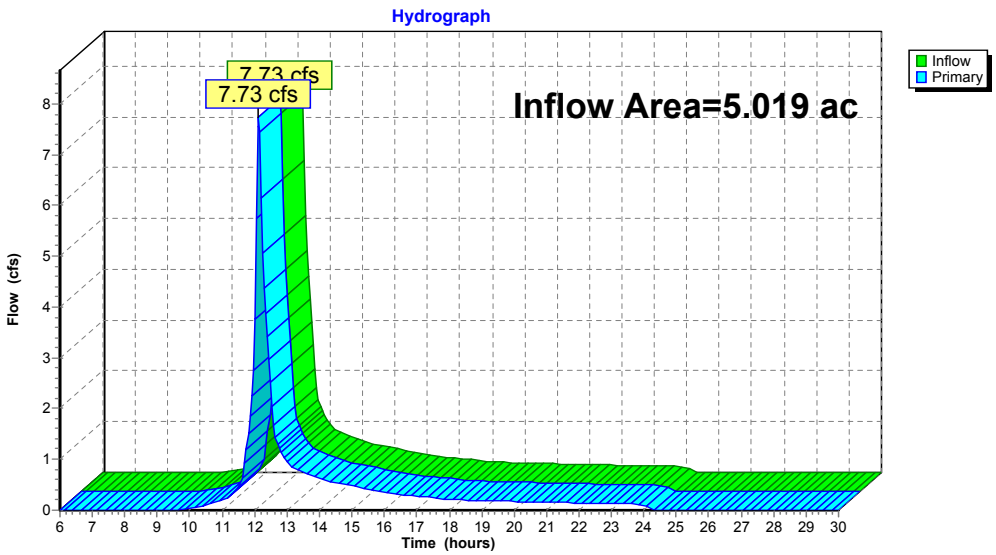


Summary for Link POA-A:

Inflow Area = 5.019 ac, 0.00% Impervious, Inflow Depth = 1.46" for 2-yr event
Inflow = 7.73 cfs @ 12.12 hrs, Volume= 0.610 af
Primary = 7.73 cfs @ 12.12 hrs, Volume= 0.610 af, Atten= 0%, Lag= 0.0 min

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

Link POA-A:

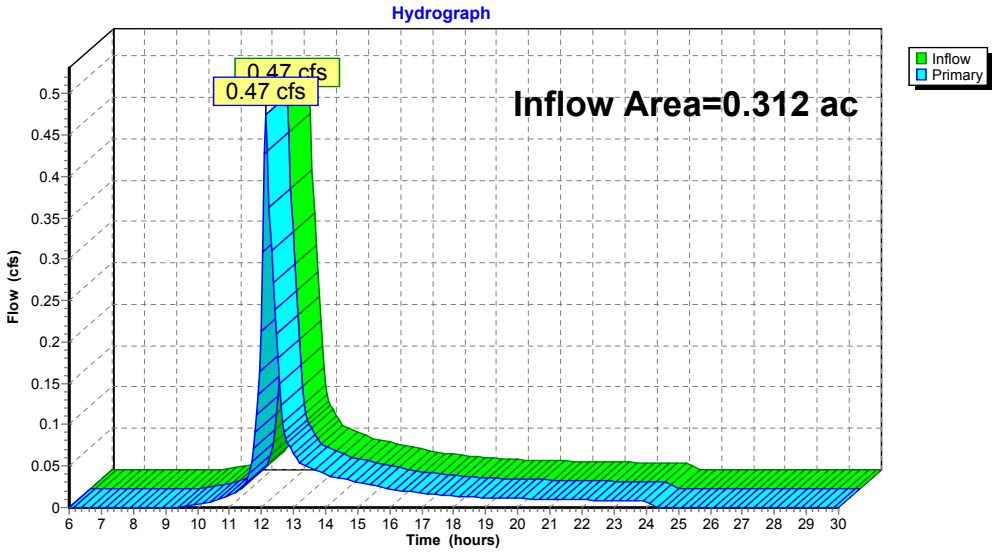


Summary for Link POA-B:

Inflow Area = 0.312 ac, 0.00% Impervious, Inflow Depth = 1.53" for 2-yr event
Inflow = 0.47 cfs @ 12.15 hrs, Volume= 0.040 af
Primary = 0.47 cfs @ 12.15 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.0 min

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

Link POA-B:

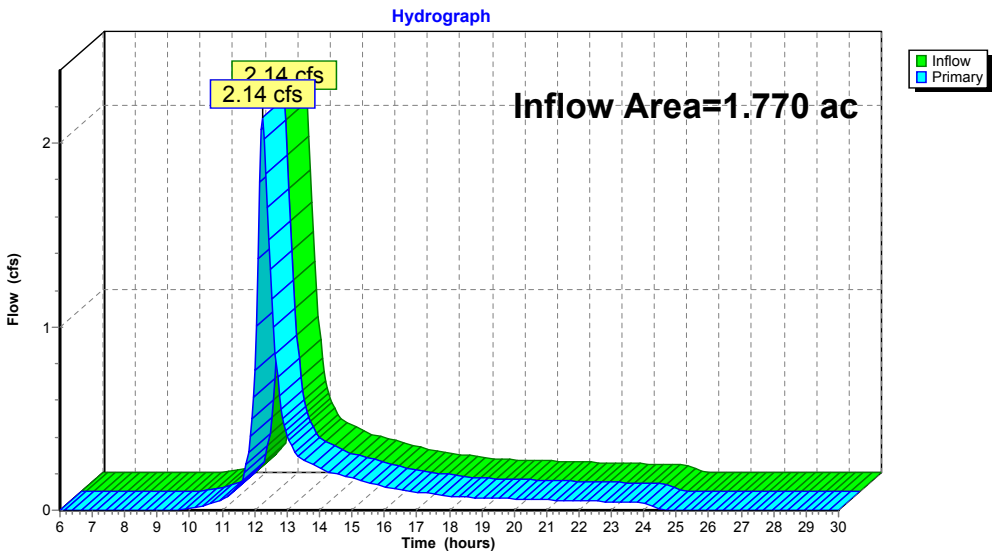


Summary for Link POA-C:

Inflow Area = 1.770 ac, 27.47% Impervious, Inflow Depth = 1.46" for 2-yr event
Inflow = 2.14 cfs @ 12.24 hrs, Volume= 0.215 af
Primary = 2.14 cfs @ 12.24 hrs, Volume= 0.215 af, Atten= 0%, Lag= 0.0 min

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

Link POA-C:

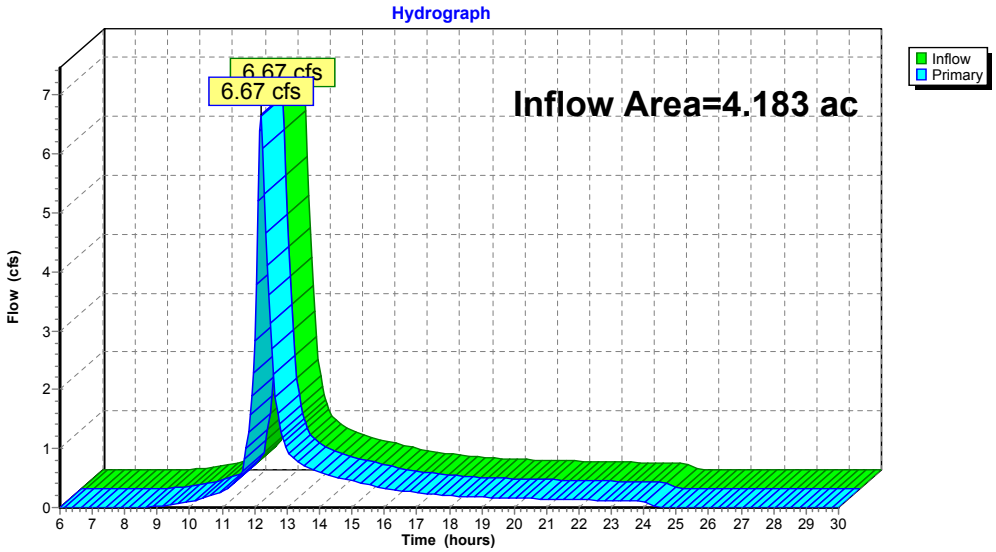


Summary for Link POA-D:

Inflow Area = 4.183 ac, 17.01% Impervious, Inflow Depth = 1.74" for 2-yr event
Inflow = 6.67 cfs @ 12.19 hrs, Volume= 0.607 af
Primary = 6.67 cfs @ 12.19 hrs, Volume= 0.607 af, Atten= 0%, Lag= 0.0 min

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

Link POA-D:



Summary for Subcatchment A:

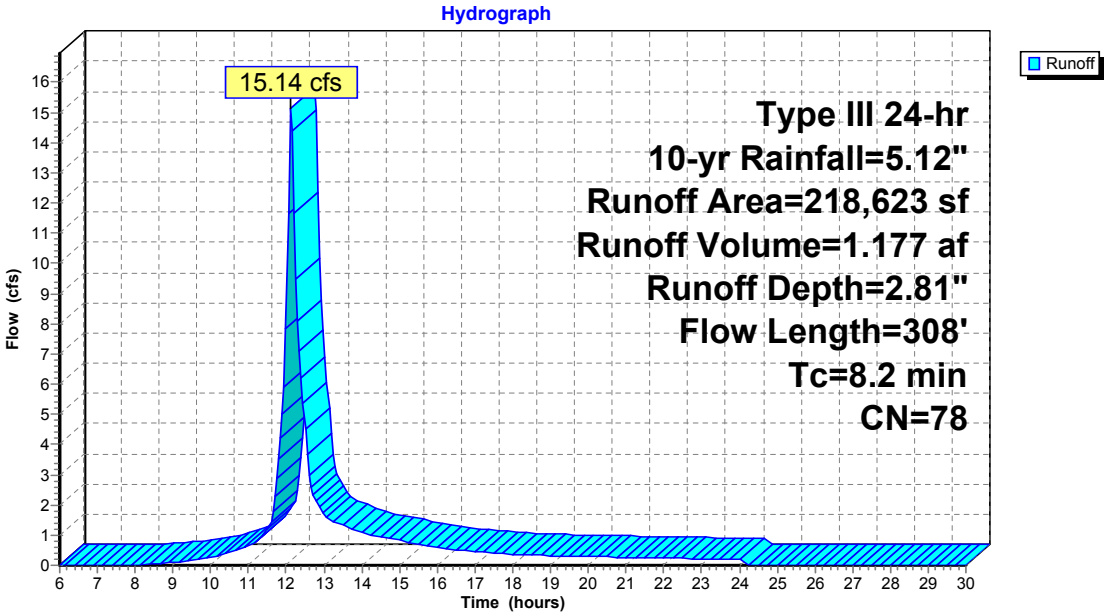
Runoff = 15.14 cfs @ 12.12 hrs, Volume= 1.177 af, Depth= 2.81"
Routed to Link POA-A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.12"

Area (sf)	CN	Description
13,906	78	Meadow, non-grazed, HSG D
1,075	71	Meadow, non-grazed, HSG C
670	30	Meadow, non-grazed, HSG A
66,841	78	Meadow, non-grazed, HSG D
1,720	71	Meadow, non-grazed, HSG C
92,438	79	Woods, Fair, HSG D
33,692	73	Woods, Fair, HSG C
662	36	Woods, Fair, HSG A
6,666	91	Gravel roads, HSG D
953	89	Gravel roads, HSG C
218,623	78	Weighted Average
218,623		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.1100	0.24		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.1	13	0.3462	4.12		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.0	8	0.1250	5.69		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
0.1	21	0.3095	3.89		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.1	166	0.2530	2.51		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
8.2	308	Total			

Subcatchment A:



Summary for Subcatchment B:

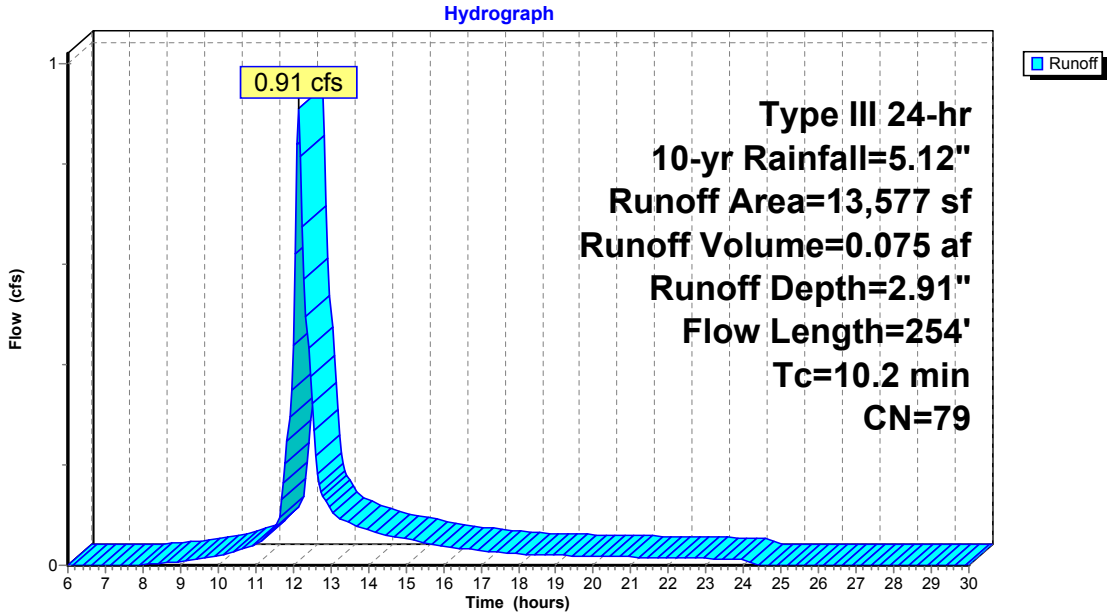
Runoff = 0.91 cfs @ 12.15 hrs, Volume= 0.075 af, Depth= 2.91"
Routed to Link POA-B :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.12"

Area (sf)	CN	Description
3,577	78	Meadow, non-grazed, HSG D
8,878	78	Meadow, non-grazed, HSG D
1,122	91	Gravel roads, HSG D
13,577	79	Weighted Average
13,577		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.4	62	0.1290	2.51		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.2	51	0.3333	4.04		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.0	10	0.1000	5.09		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
0.1	31	0.2903	3.77		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
10.2	254	Total			

Subcatchment B:



Summary for Subcatchment C:

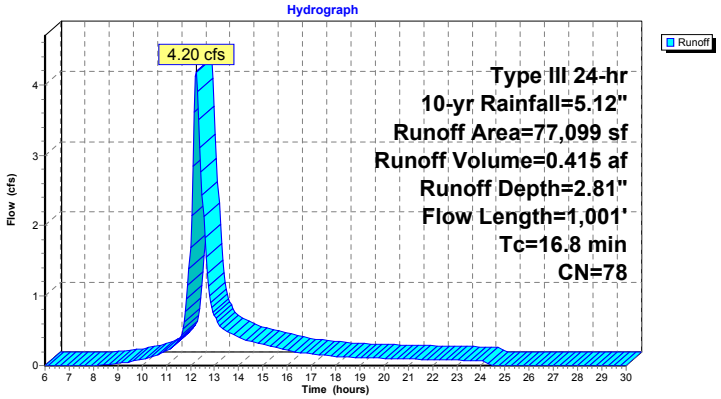
Runoff = 4.20 cfs @ 12.23 hrs, Volume= 0.415 af, Depth= 2.81"
Routed to Link POA-C :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.12"

Area (sf)	CN	Description
13,937	78	Meadow, non-grazed, HSG D
1,693	71	Meadow, non-grazed, HSG C
8,141	30	Meadow, non-grazed, HSG A
18,914	78	Meadow, non-grazed, HSG D
7,463	79	Woods, Fair, HSG D
2,986	73	Woods, Fair, HSG C
336	36	Woods, Fair, HSG A
2,453	91	Gravel roads, HSG D
8,413	98	Paved parking, HSG D
620	98	Paved parking, HSG B
12,143	98	Paved parking, HSG A
77,099	78	Weighted Average
55,923		72.53% Pervious Area
21,176		27.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0300	0.14		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
1.1	126	0.0794	1.97		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	80	0.3375	4.07		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
3.1	607	0.0264	3.30		**Shallow Concentrated Flow, Shallow - Pavement** Paved Kv= 20.3 fps
0.3	44	0.1136	2.36		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	44	0.2500	2.50		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
16.8	1,001	Total			

Subcatchment C:



Summary for Subcatchment D:

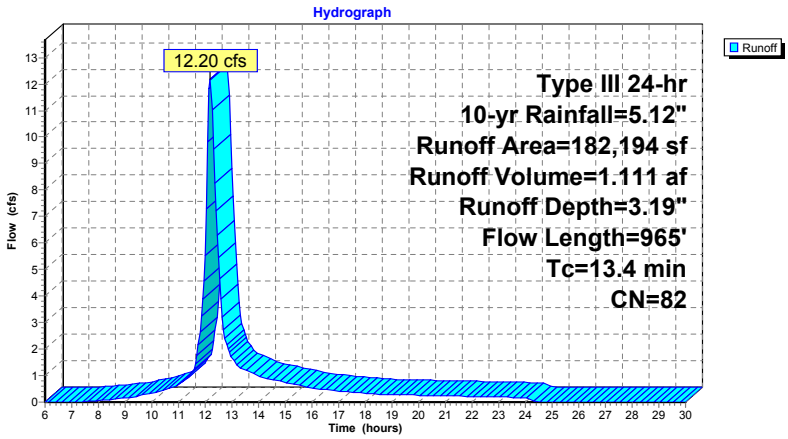
Runoff = 12.20 cfs @ 12.19 hrs, Volume= 1.111 af, Depth= 3.19"
Routed to Link POA-D :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.12"

Area (sf)	CN	Description
38,983	78	Meadow, non-grazed, HSG D
0	71	Meadow, non-grazed, HSG C
1,146	30	Meadow, non-grazed, HSG A
80,797	78	Meadow, non-grazed, HSG D
489	71	Meadow, non-grazed, HSG C
10,224	79	Woods, Fair, HSG D
0	73	Woods, Fair, HSG C
8,558	91	Gravel roads, HSG D
940	89	Gravel roads, HSG C
10,060	76	Gravel roads, HSG A
27,271	98	Paved parking, HSG D
329	98	Paved parking, HSG C
3,397	98	Paved parking, HSG A
182,194	82	Weighted Average
151,197		82.99% Pervious Area
30,997		17.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0600	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.4	73	0.1781	2.95		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.2	64	0.4219	4.55		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.6	634	0.0394	4.03		**Shallow Concentrated Flow, Shallow - Pavement** Paved Kv= 20.3 fps
1.3	94	0.0053	1.17		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
13.4	965	Total			

Subcatchment D:

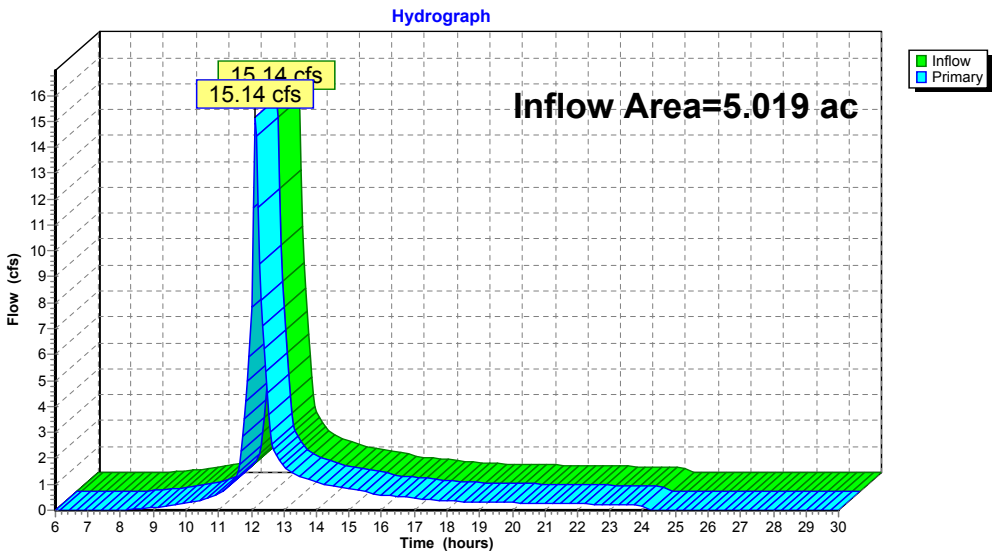


Summary for Link POA-A:

Inflow Area = 5.019 ac, 0.00% Impervious, Inflow Depth = 2.81" for 10-yr event
Inflow = 15.14 cfs @ 12.12 hrs, Volume= 1.177 af
Primary = 15.14 cfs @ 12.12 hrs, Volume= 1.177 af, Atten= 0%, Lag= 0.0 min

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

Link POA-A:

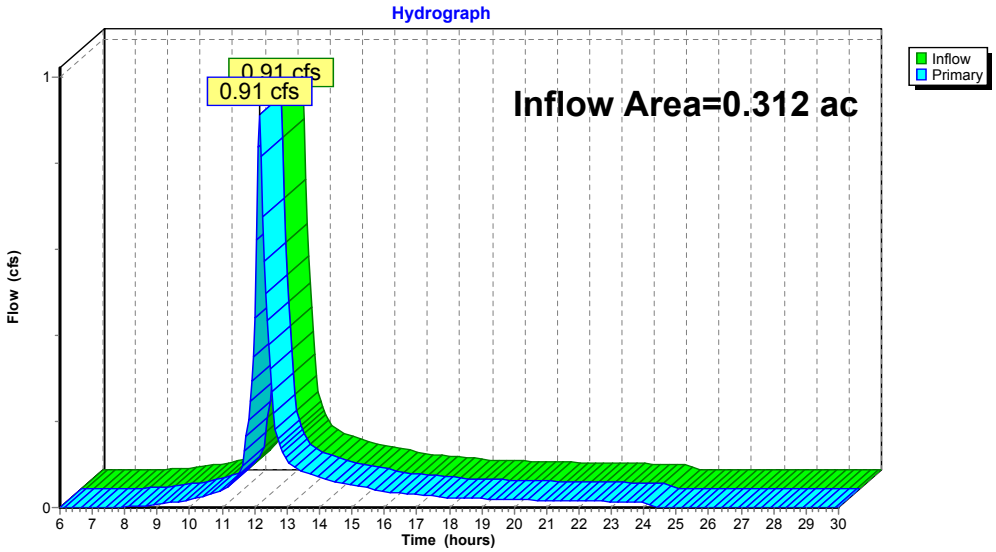


Summary for Link POA-B:

Inflow Area = 0.312 ac, 0.00% Impervious, Inflow Depth = 2.91" for 10-yr event
Inflow = 0.91 cfs @ 12.15 hrs, Volume= 0.075 af
Primary = 0.91 cfs @ 12.15 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.0 min

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

Link POA-B:

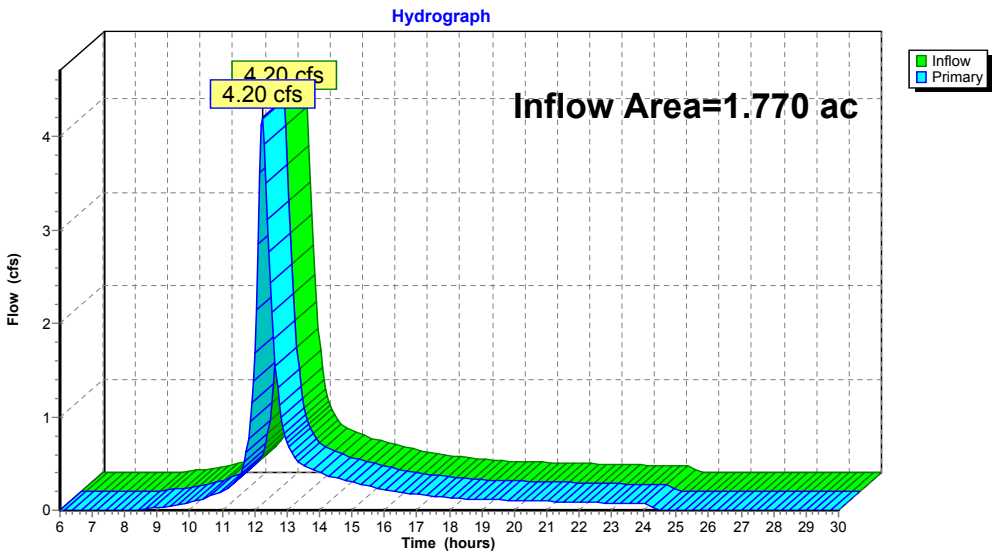


Summary for Link POA-C:

Inflow Area = 1.770 ac, 27.47% Impervious, Inflow Depth = 2.81" for 10-yr event
Inflow = 4.20 cfs @ 12.23 hrs, Volume= 0.415 af
Primary = 4.20 cfs @ 12.23 hrs, Volume= 0.415 af, Atten= 0%, Lag= 0.0 min

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

Link POA-C:

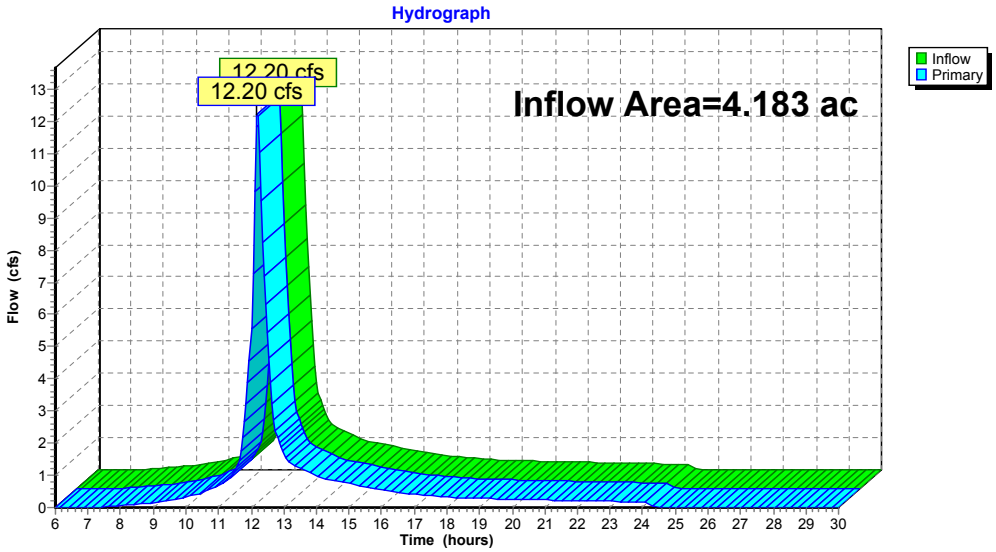


Summary for Link POA-D:

Inflow Area = 4.183 ac, 17.01% Impervious, Inflow Depth = 3.19" for 10-yr event
Inflow = 12.20 cfs @ 12.19 hrs, Volume= 1.111 af
Primary = 12.20 cfs @ 12.19 hrs, Volume= 1.111 af, Atten= 0%, Lag= 0.0 min

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

Link POA-D:



Summary for Subcatchment A:

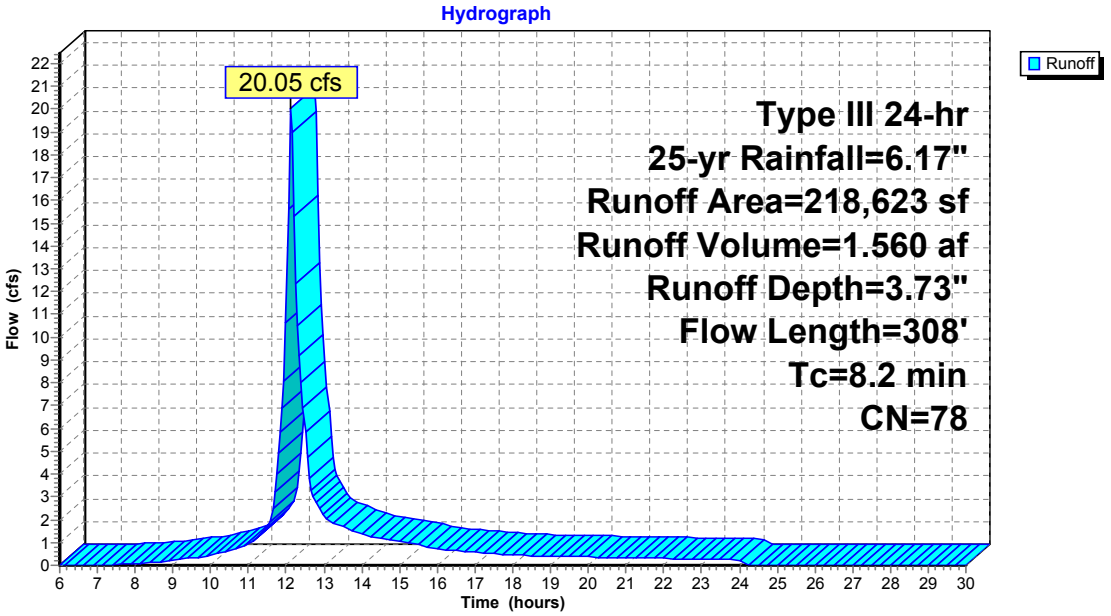
Runoff = 20.05 cfs @ 12.12 hrs, Volume= 1.560 af, Depth= 3.73"
Routed to Link POA-A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.17"

Area (sf)	CN	Description
13,906	78	Meadow, non-grazed, HSG D
1,075	71	Meadow, non-grazed, HSG C
670	30	Meadow, non-grazed, HSG A
66,841	78	Meadow, non-grazed, HSG D
1,720	71	Meadow, non-grazed, HSG C
92,438	79	Woods, Fair, HSG D
33,692	73	Woods, Fair, HSG C
662	36	Woods, Fair, HSG A
6,666	91	Gravel roads, HSG D
953	89	Gravel roads, HSG C
218,623	78	Weighted Average
218,623		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.1100	0.24		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.1	13	0.3462	4.12		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.0	8	0.1250	5.69		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
0.1	21	0.3095	3.89		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.1	166	0.2530	2.51		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
8.2	308	Total			

Subcatchment A:



Summary for Subcatchment B:

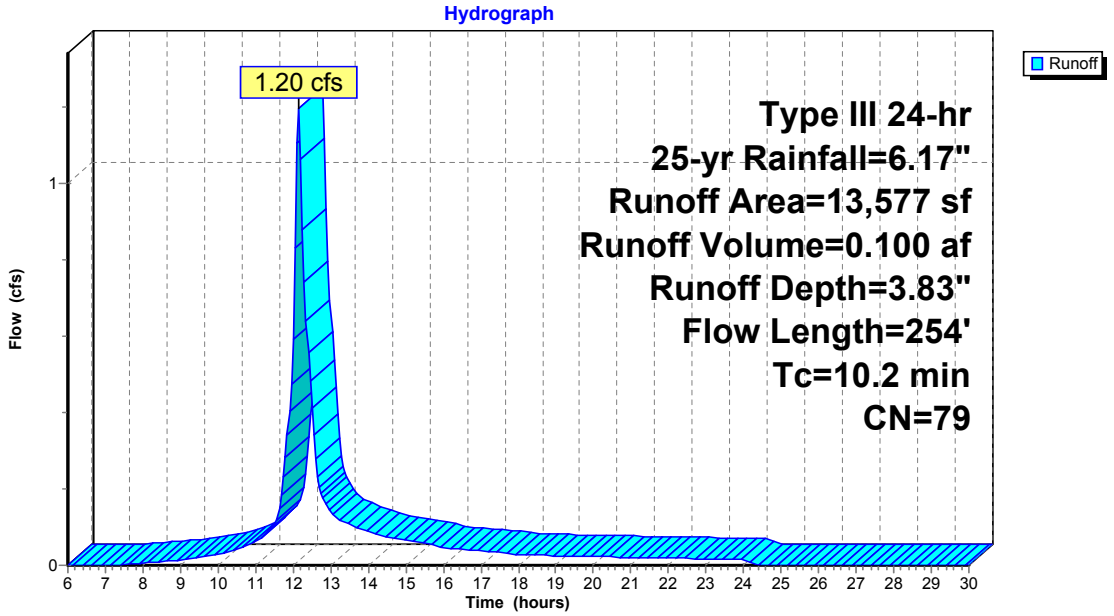
Runoff = 1.20 cfs @ 12.15 hrs, Volume= 0.100 af, Depth= 3.83"
Routed to Link POA-B :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.17"

Area (sf)	CN	Description
3,577	78	Meadow, non-grazed, HSG D
8,878	78	Meadow, non-grazed, HSG D
1,122	91	Gravel roads, HSG D
13,577	79	Weighted Average
13,577		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.4	62	0.1290	2.51		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.2	51	0.3333	4.04		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.0	10	0.1000	5.09		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
0.1	31	0.2903	3.77		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
10.2	254	Total			

Subcatchment B:



Summary for Subcatchment C:

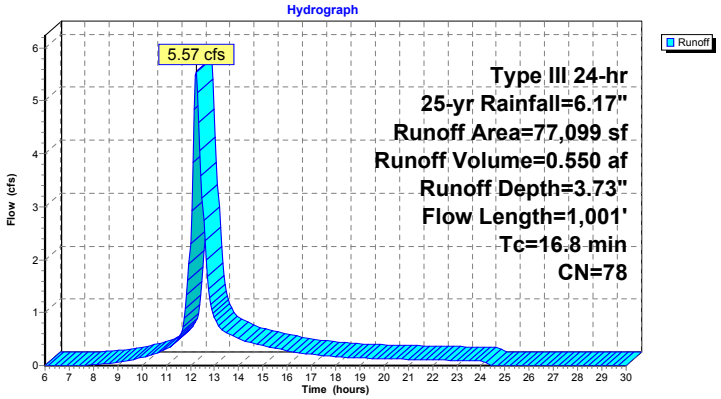
Runoff = 5.57 cfs @ 12.23 hrs, Volume= 0.550 af, Depth= 3.73"
Routed to Link POA-C :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.17"

Area (sf)	CN	Description
13,937	78	Meadow, non-grazed, HSG D
1,693	71	Meadow, non-grazed, HSG C
8,141	30	Meadow, non-grazed, HSG A
18,914	78	Meadow, non-grazed, HSG D
7,463	79	Woods, Fair, HSG D
2,986	73	Woods, Fair, HSG C
336	36	Woods, Fair, HSG A
2,453	91	Gravel roads, HSG D
8,413	98	Paved parking, HSG D
620	98	Paved parking, HSG B
12,143	98	Paved parking, HSG A
77,099	78	Weighted Average
55,923		72.53% Pervious Area
21,176		27.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0300	0.14		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
1.1	126	0.0794	1.97		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	80	0.3375	4.07		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
3.1	607	0.0264	3.30		**Shallow Concentrated Flow, Shallow - Pavement** Paved Kv= 20.3 fps
0.3	44	0.1136	2.36		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	44	0.2500	2.50		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
16.8	1,001	Total			

Subcatchment C:



Summary for Subcatchment D:

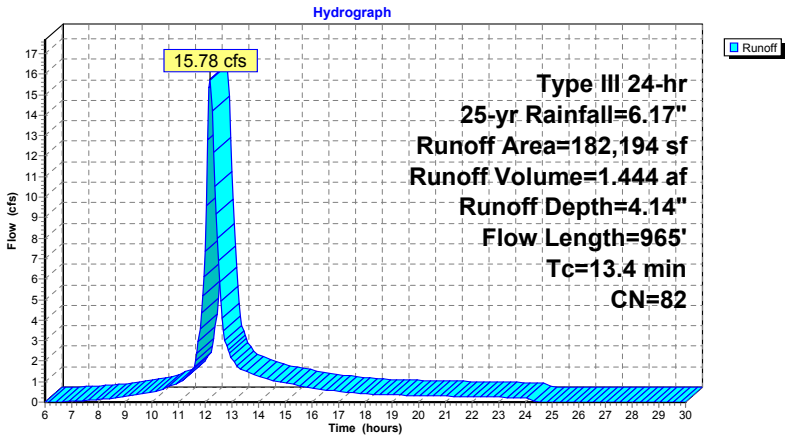
Runoff = 15.78 cfs @ 12.18 hrs, Volume= 1.444 af, Depth= 4.14"
Routed to Link POA-D :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.17"

Area (sf)	CN	Description
38,983	78	Meadow, non-grazed, HSG D
0	71	Meadow, non-grazed, HSG C
1,146	30	Meadow, non-grazed, HSG A
80,797	78	Meadow, non-grazed, HSG D
489	71	Meadow, non-grazed, HSG C
10,224	79	Woods, Fair, HSG D
0	73	Woods, Fair, HSG C
8,558	91	Gravel roads, HSG D
940	89	Gravel roads, HSG C
10,060	76	Gravel roads, HSG A
27,271	98	Paved parking, HSG D
329	98	Paved parking, HSG C
3,397	98	Paved parking, HSG A
182,194	82	Weighted Average
151,197		82.99% Pervious Area
30,997		17.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0600	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.4	73	0.1781	2.95		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.2	64	0.4219	4.55		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.6	634	0.0394	4.03		**Shallow Concentrated Flow, Shallow - Pavement** Paved Kv= 20.3 fps
1.3	94	0.0053	1.17		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
13.4	965	Total			

Subcatchment D:

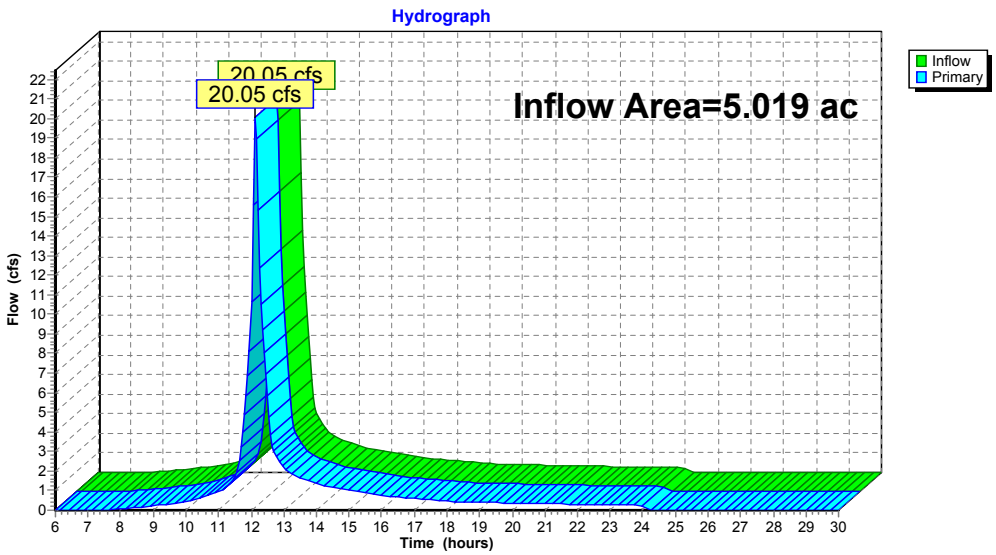


Summary for Link POA-A:

Inflow Area = 5.019 ac, 0.00% Impervious, Inflow Depth = 3.73" for 25-yr event
Inflow = 20.05 cfs @ 12.12 hrs, Volume= 1.560 af
Primary = 20.05 cfs @ 12.12 hrs, Volume= 1.560 af, Atten= 0%, Lag= 0.0 min

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

Link POA-A:

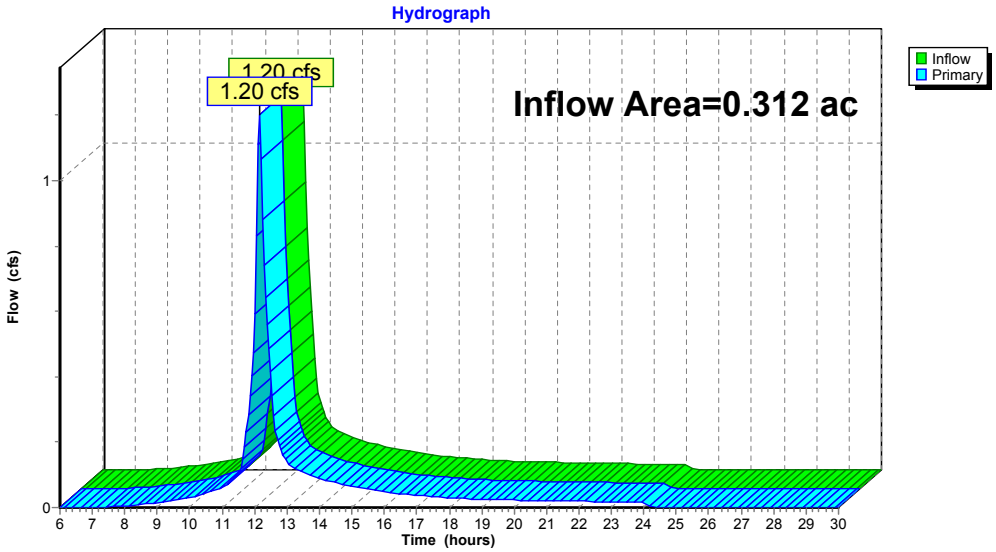


Summary for Link POA-B:

Inflow Area = 0.312 ac, 0.00% Impervious, Inflow Depth = 3.83" for 25-yr event
Inflow = 1.20 cfs @ 12.15 hrs, Volume= 0.100 af
Primary = 1.20 cfs @ 12.15 hrs, Volume= 0.100 af, Atten= 0%, Lag= 0.0 min

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

Link POA-B:

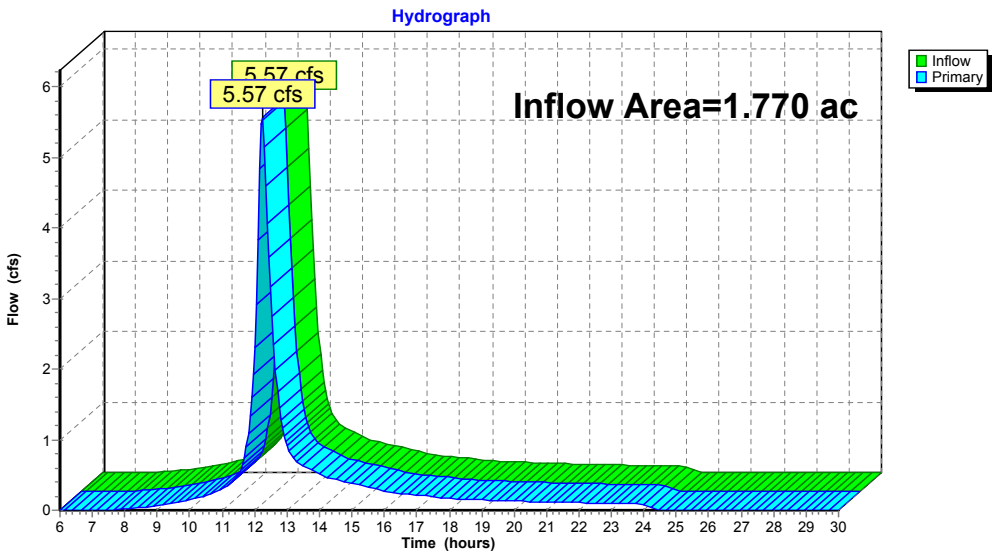


Summary for Link POA-C:

Inflow Area = 1.770 ac, 27.47% Impervious, Inflow Depth = 3.73" for 25-yr event
Inflow = 5.57 cfs @ 12.23 hrs, Volume= 0.550 af
Primary = 5.57 cfs @ 12.23 hrs, Volume= 0.550 af, Atten= 0%, Lag= 0.0 min

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

Link POA-C:

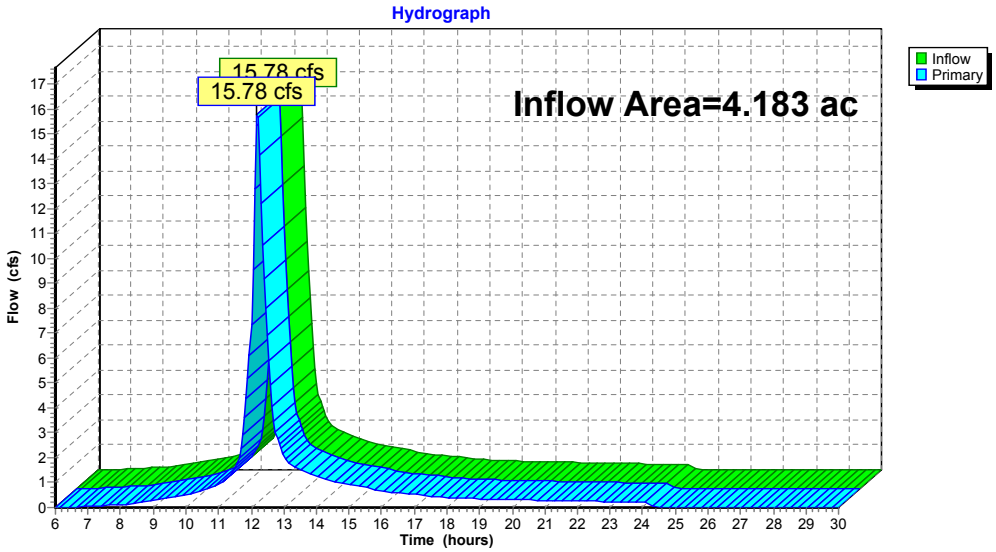


Summary for Link POA-D:

Inflow Area = 4.183 ac, 17.01% Impervious, Inflow Depth = 4.14" for 25-yr event
Inflow = 15.78 cfs @ 12.18 hrs, Volume= 1.444 af
Primary = 15.78 cfs @ 12.18 hrs, Volume= 1.444 af, Atten= 0%, Lag= 0.0 min

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

Link POA-D:



Summary for Subcatchment A:

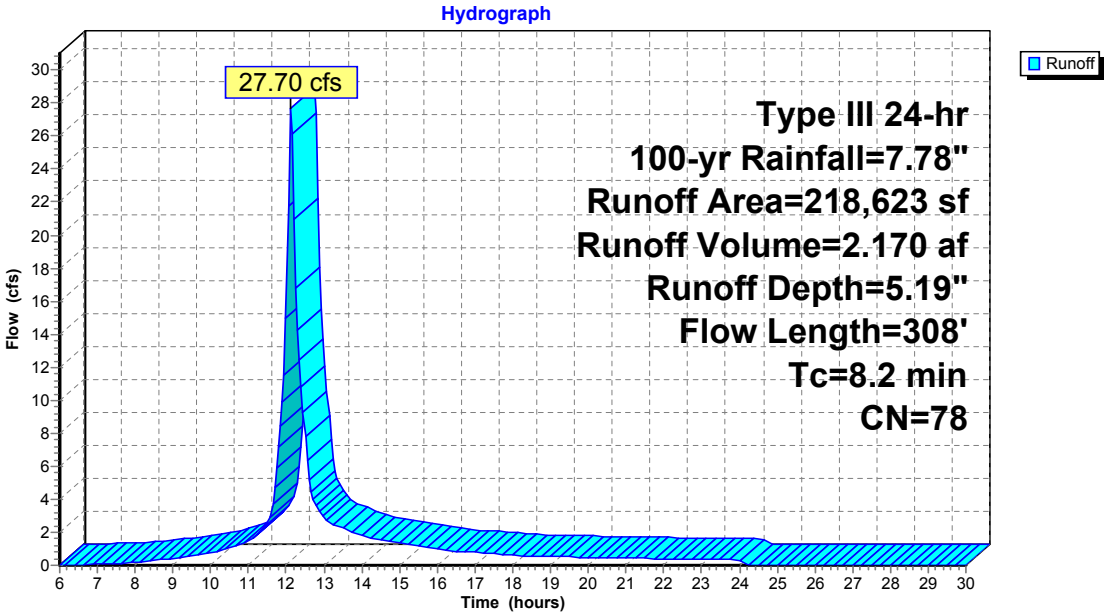
Runoff = 27.70 cfs @ 12.12 hrs, Volume= 2.170 af, Depth= 5.19"
Routed to Link POA-A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.78"

Area (sf)	CN	Description
13,906	78	Meadow, non-grazed, HSG D
1,075	71	Meadow, non-grazed, HSG C
670	30	Meadow, non-grazed, HSG A
66,841	78	Meadow, non-grazed, HSG D
1,720	71	Meadow, non-grazed, HSG C
92,438	79	Woods, Fair, HSG D
33,692	73	Woods, Fair, HSG C
662	36	Woods, Fair, HSG A
6,666	91	Gravel roads, HSG D
953	89	Gravel roads, HSG C
218,623	78	Weighted Average
218,623		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.1100	0.24		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.1	13	0.3462	4.12		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.0	8	0.1250	5.69		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
0.1	21	0.3095	3.89		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.1	166	0.2530	2.51		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
8.2	308	Total			

Subcatchment A:



Summary for Subcatchment B:

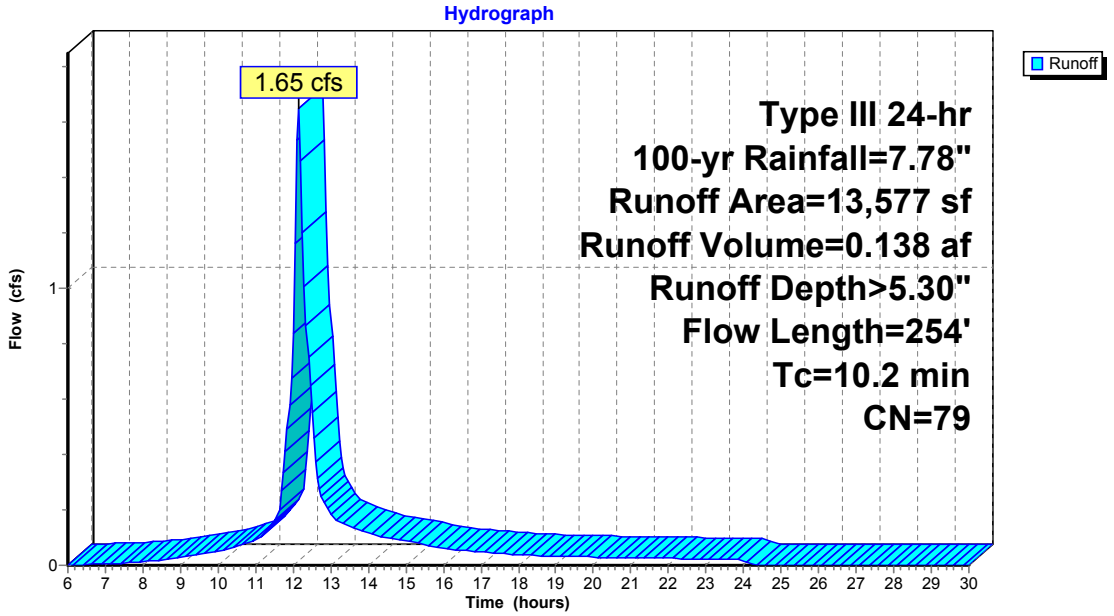
Runoff = 1.65 cfs @ 12.14 hrs, Volume= 0.138 af, Depth> 5.30"
Routed to Link POA-B :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.78"

Area (sf)	CN	Description
3,577	78	Meadow, non-grazed, HSG D
8,878	78	Meadow, non-grazed, HSG D
1,122	91	Gravel roads, HSG D
13,577	79	Weighted Average
13,577		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.4	62	0.1290	2.51		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.2	51	0.3333	4.04		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.0	10	0.1000	5.09		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
0.1	31	0.2903	3.77		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
10.2	254	Total			

Subcatchment B:



Summary for Subcatchment C:

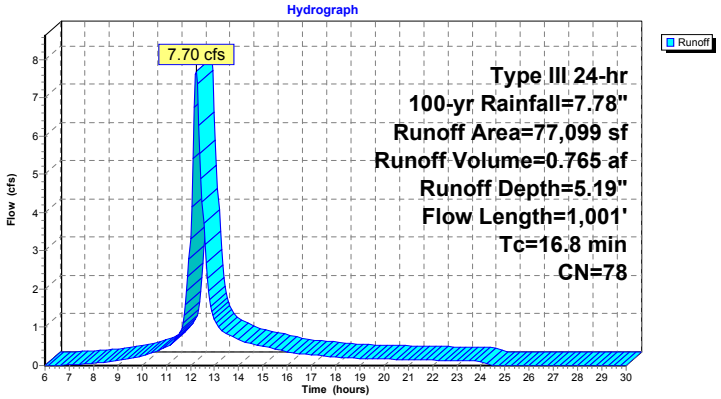
Runoff = 7.70 cfs @ 12.23 hrs, Volume= 0.765 af, Depth= 5.19"
Routed to Link POA-C :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.78"

Area (sf)	CN	Description
13,937	78	Meadow, non-grazed, HSG D
1,693	71	Meadow, non-grazed, HSG C
8,141	30	Meadow, non-grazed, HSG A
18,914	78	Meadow, non-grazed, HSG D
7,463	79	Woods, Fair, HSG D
2,986	73	Woods, Fair, HSG C
336	36	Woods, Fair, HSG A
2,453	91	Gravel roads, HSG D
8,413	98	Paved parking, HSG D
620	98	Paved parking, HSG B
12,143	98	Paved parking, HSG A
77,099	78	Weighted Average
55,923		72.53% Pervious Area
21,176		27.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0300	0.14		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
1.1	126	0.0794	1.97		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	80	0.3375	4.07		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
3.1	607	0.0264	3.30		**Shallow Concentrated Flow, Shallow - Pavement** Paved Kv= 20.3 fps
0.3	44	0.1136	2.36		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	44	0.2500	2.50		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
16.8	1,001	Total			

Subcatchment C:



Summary for Subcatchment D:

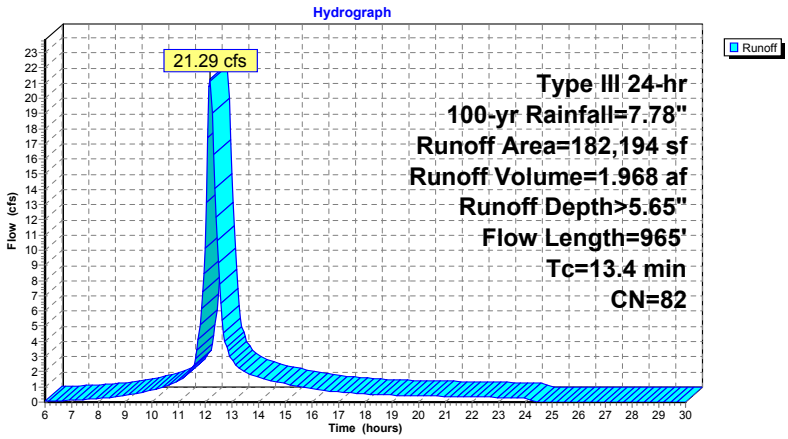
Runoff = 21.29 cfs @ 12.18 hrs, Volume= 1.968 af, Depth> 5.65"
Routed to Link POA-D :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.78"

Area (sf)	CN	Description
38,983	78	Meadow, non-grazed, HSG D
0	71	Meadow, non-grazed, HSG C
1,146	30	Meadow, non-grazed, HSG A
80,797	78	Meadow, non-grazed, HSG D
489	71	Meadow, non-grazed, HSG C
10,224	79	Woods, Fair, HSG D
0	73	Woods, Fair, HSG C
8,558	91	Gravel roads, HSG D
940	89	Gravel roads, HSG C
10,060	76	Gravel roads, HSG A
27,271	98	Paved parking, HSG D
329	98	Paved parking, HSG C
3,397	98	Paved parking, HSG A
182,194	82	Weighted Average
151,197		82.99% Pervious Area
30,997		17.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0600	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.4	73	0.1781	2.95		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.2	64	0.4219	4.55		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.6	634	0.0394	4.03		**Shallow Concentrated Flow, Shallow - Pavement** Paved Kv= 20.3 fps
1.3	94	0.0053	1.17		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
13.4	965	Total			

Subcatchment D:

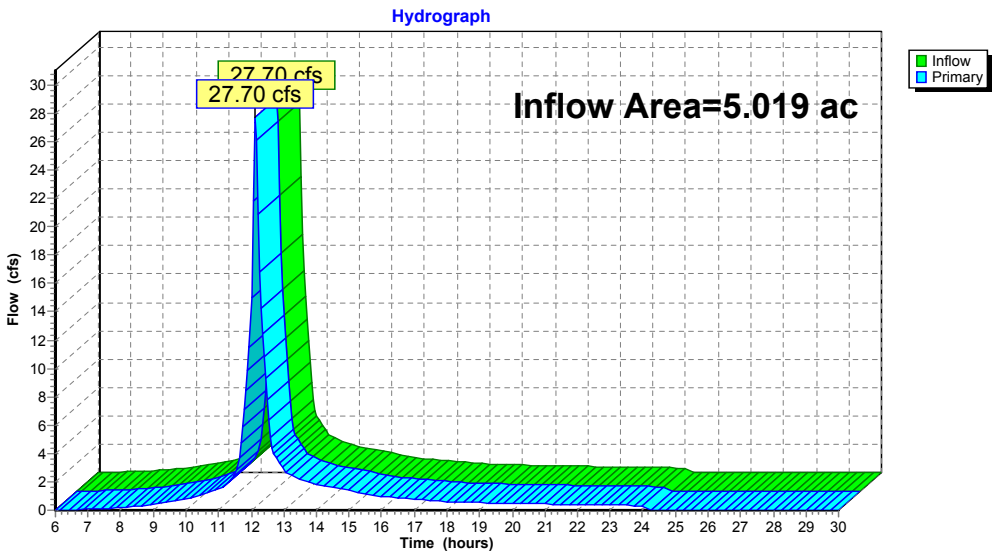


Summary for Link POA-A:

Inflow Area = 5.019 ac, 0.00% Impervious, Inflow Depth = 5.19" for 100-yr event
Inflow = 27.70 cfs @ 12.12 hrs, Volume= 2.170 af
Primary = 27.70 cfs @ 12.12 hrs, Volume= 2.170 af, Atten= 0%, Lag= 0.0 min

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

Link POA-A:

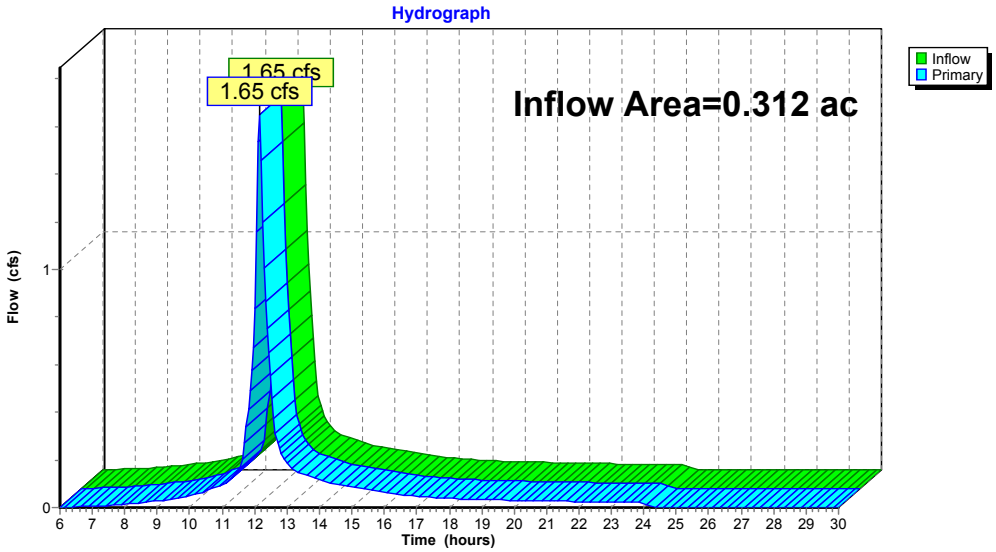


Summary for Link POA-B:

Inflow Area = 0.312 ac, 0.00% Impervious, Inflow Depth > 5.30" for 100-yr event
Inflow = 1.65 cfs @ 12.14 hrs, Volume= 0.138 af
Primary = 1.65 cfs @ 12.14 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.0 min

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

Link POA-B:

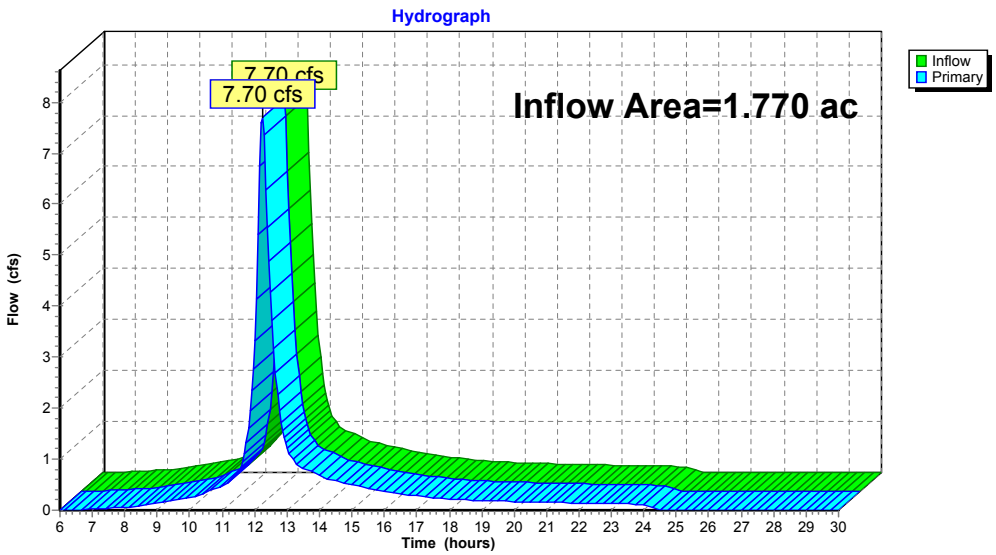


Summary for Link POA-C:

Inflow Area = 1.770 ac, 27.47% Impervious, Inflow Depth = 5.19" for 100-yr event
Inflow = 7.70 cfs @ 12.23 hrs, Volume= 0.765 af
Primary = 7.70 cfs @ 12.23 hrs, Volume= 0.765 af, Atten= 0%, Lag= 0.0 min

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

Link POA-C:

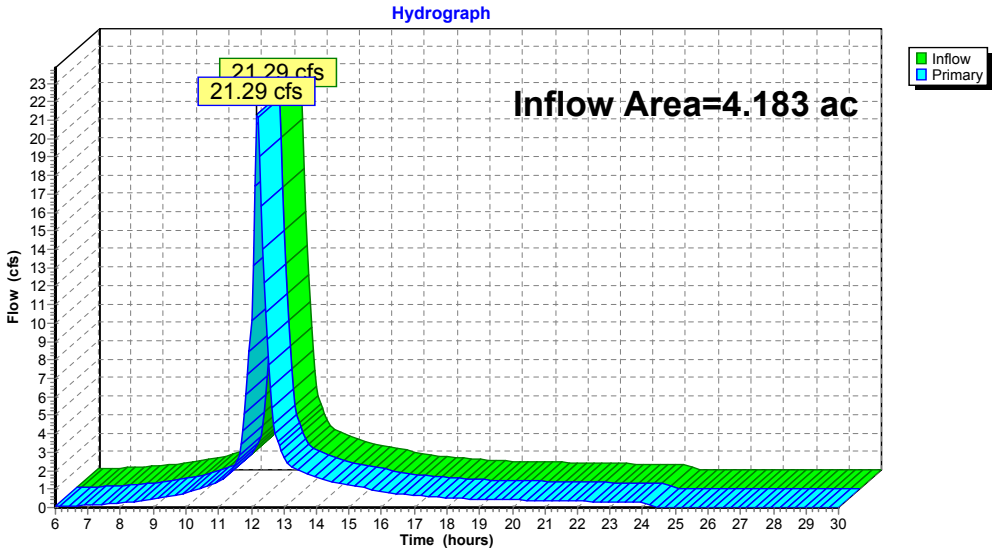


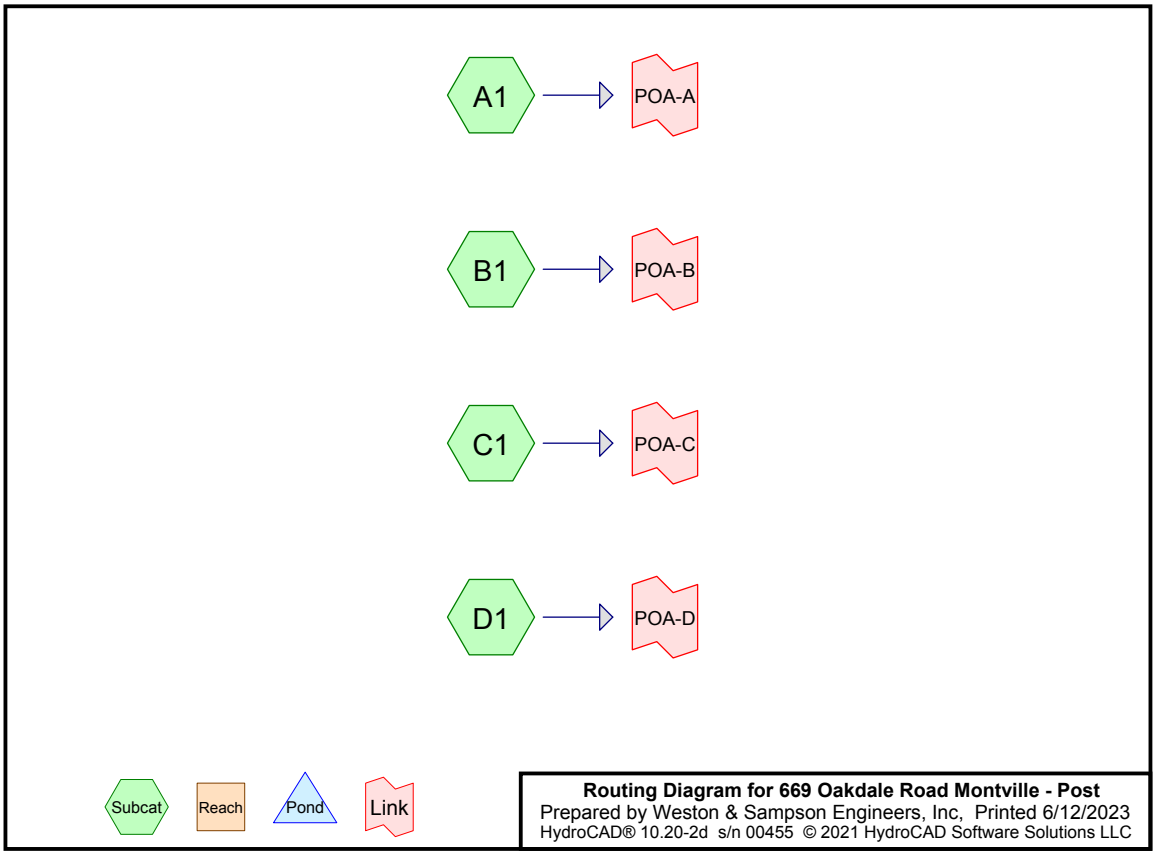
Summary for Link POA-D:

Inflow Area = 4.183 ac, 17.01% Impervious, Inflow Depth > 5.65" for 100-yr event
Inflow = 21.29 cfs @ 12.18 hrs, Volume= 1.968 af
Primary = 21.29 cfs @ 12.18 hrs, Volume= 1.968 af, Atten= 0%, Lag= 0.0 min

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

Link POA-D:





Routing Diagram for 669 Oakdale Road Montville - Post
Prepared by Weston & Sampson Engineers, Inc, Printed 6/12/2023
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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Type III 24-hr		Default	24.00	1	3.45	2
2	10-yr	Type III 24-hr		Default	24.00	1	5.12	2
3	25-yr	Type III 24-hr		Default	24.00	1	6.17	2
4	100-yr	Type III 24-hr		Default	24.00	1	7.78	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.231	76	Gravel roads, HSG A (D1)
0.043	89	Gravel roads, HSG C (A1, D1)
0.446	91	Gravel roads, HSG D (A1, B1, C1, D1)
0.229	30	Meadow, non-grazed, HSG A (A1, C1, D1)
0.114	71	Meadow, non-grazed, HSG C (A1, C1, D1)
5.556	78	Meadow, non-grazed, HSG D (A1, B1, C1, D1)
0.357	98	Paved parking, HSG A (C1, D1)
0.014	98	Paved parking, HSG B (C1)
0.008	98	Paved parking, HSG C (D1)
0.832	98	Paved parking, HSG D (C1, D1)
0.092	98	Unconnected pavement, HSG D (A1, B1, C1, D1)
0.023	36	Woods, Fair, HSG A (A1, C1)
0.842	73	Woods, Fair, HSG C (A1, C1)
2.496	79	Woods, Fair, HSG D (A1, C1, D1)
11.283	**80**	**TOTAL AREA**

Summary for Subcatchment A1:

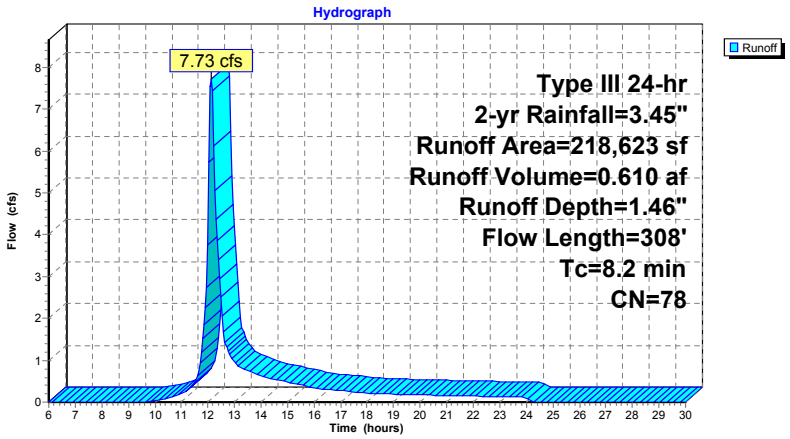
Runoff = 7.73 cfs @ 12.12 hrs, Volume= 0.610 af, Depth= 1.46"
Routed to Link POA-A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.45"

Area (sf)	CN	Description
54,384	78	Meadow, non-grazed, HSG D
1,075	71	Meadow, non-grazed, HSG C
670	30	Meadow, non-grazed, HSG A
24,778	78	Meadow, non-grazed, HSG D
1,720	71	Meadow, non-grazed, HSG C
91,474	79	Woods, Fair, HSG D
33,692	73	Woods, Fair, HSG C
662	36	Woods, Fair, HSG A
7,640	91	Gravel roads, HSG D
953	89	Gravel roads, HSG C
1,575	98	Unconnected pavement, HSG D
218,623	78	Weighted Average
217,048		99.28% Pervious Area
1,575		0.72% Impervious Area
1,575		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.1100	0.24		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.1	13	0.3462	4.12		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.0	8	0.1250	5.69		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
0.1	21	0.3095	3.89		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.1	166	0.2530	2.51		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
8.2	308	Total			

Subcatchment A1:



Summary for Subcatchment B1:

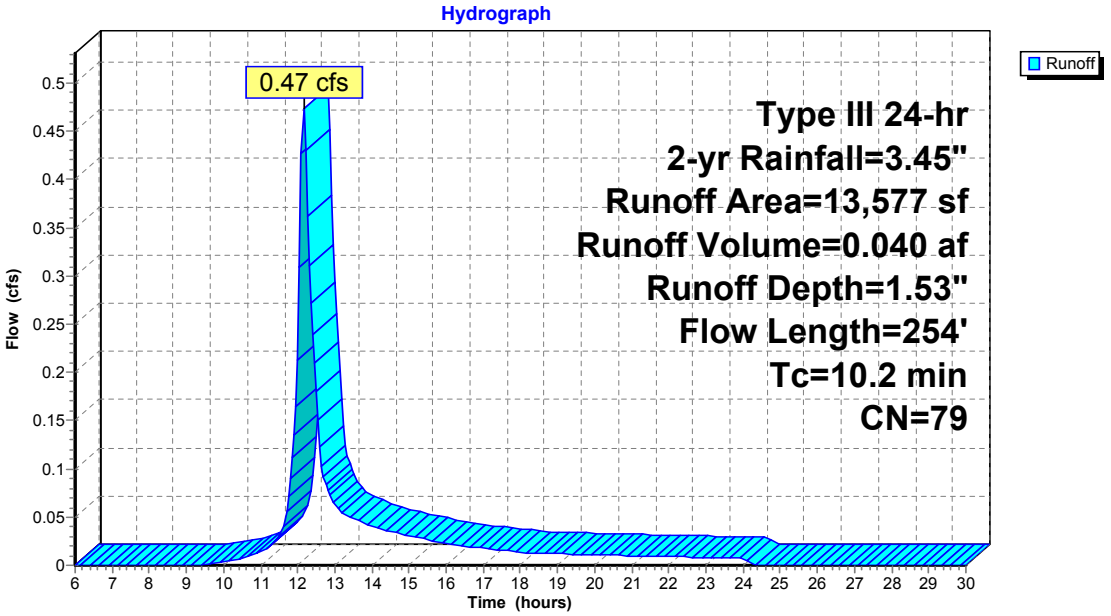
Runoff = 0.47 cfs @ 12.15 hrs, Volume= 0.040 af, Depth= 1.53"
Routed to Link POA-B :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.45"

Area (sf)	CN	Description
6,112	78	Meadow, non-grazed, HSG D
6,218	78	Meadow, non-grazed, HSG D
1,112	91	Gravel roads, HSG D
135	98	Unconnected pavement, HSG D
13,577	79	Weighted Average
13,442		99.01% Pervious Area
135		0.99% Impervious Area
135		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.4	62	0.1290	2.51		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.2	51	0.3333	4.04		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.0	10	0.1000	5.09		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
0.1	31	0.2903	3.77		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
10.2	254	Total			

Subcatchment B1:



Summary for Subcatchment C1:

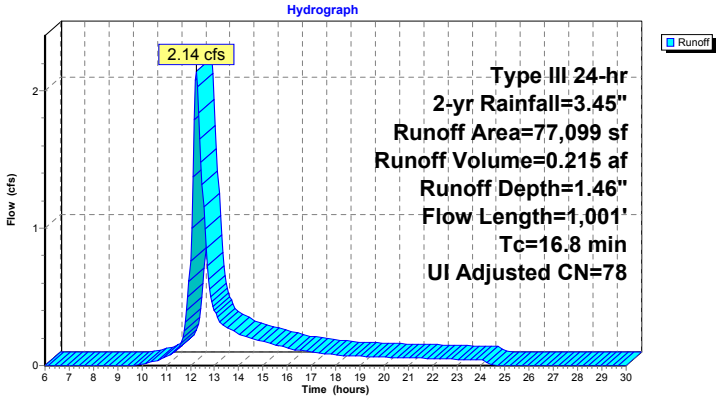
Runoff = 2.14 cfs @ 12.24 hrs, Volume= 0.215 af, Depth= 1.46"
Routed to Link POA-C :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.45"

Area (sf)	CN	Adj	Description
25,170	78		Meadow, non-grazed, HSG D
1,693	71		Meadow, non-grazed, HSG C
8,141	30		Meadow, non-grazed, HSG A
7,191	78		Meadow, non-grazed, HSG D
7,463	79		Woods, Fair, HSG D
2,986	73		Woods, Fair, HSG C
336	36		Woods, Fair, HSG A
2,358	91		Gravel roads, HSG D
8,413	98		Paved parking, HSG D
620	98		Paved parking, HSG B
12,143	98		Paved parking, HSG A
585	98		Unconnected pavement, HSG D
77,099	79	78	Weighted Average, UI Adjusted
55,338			71.78% Pervious Area
21,761			28.22% Impervious Area
585			2.69% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0300	0.14		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
1.1	126	0.0794	1.97		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	80	0.3375	4.07		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
3.1	607	0.0264	3.30		**Shallow Concentrated Flow, Shallow - Pavement** Paved Kv= 20.3 fps
0.3	44	0.1136	2.36		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	44	0.2500	2.50		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
16.8	1,001	Total			

Subcatchment C1:



Summary for Subcatchment D1:

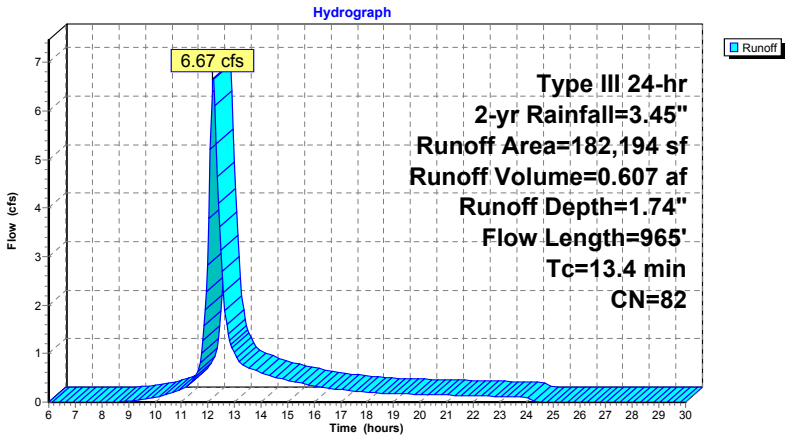
Runoff = 6.67 cfs @ 12.19 hrs, Volume= 0.607 af, Depth= 1.74"
Routed to Link POA-D :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.45"

Area (sf)	CN	Description
80,169	78	Meadow, non-grazed, HSG D
0	71	Meadow, non-grazed, HSG C
1,146	30	Meadow, non-grazed, HSG A
38,003	78	Meadow, non-grazed, HSG D
489	71	Meadow, non-grazed, HSG C
9,808	79	Woods, Fair, HSG D
0	73	Woods, Fair, HSG C
8,312	91	Gravel roads, HSG D
940	89	Gravel roads, HSG C
10,060	76	Gravel roads, HSG A
27,831	98	Paved parking, HSG D
329	98	Paved parking, HSG C
3,397	98	Paved parking, HSG A
1,710	98	Unconnected pavement, HSG D
182,194	82	Weighted Average
148,927		81.74% Pervious Area
33,267		18.26% Impervious Area
1,710		5.14% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0600	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.4	73	0.1781	2.95		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.2	64	0.4219	4.55		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.6	634	0.0394	4.03		**Shallow Concentrated Flow, Shallow - Pavement** Paved Kv= 20.3 fps
1.3	94	0.0053	1.17		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
13.4	965	Total			

Subcatchment D1:

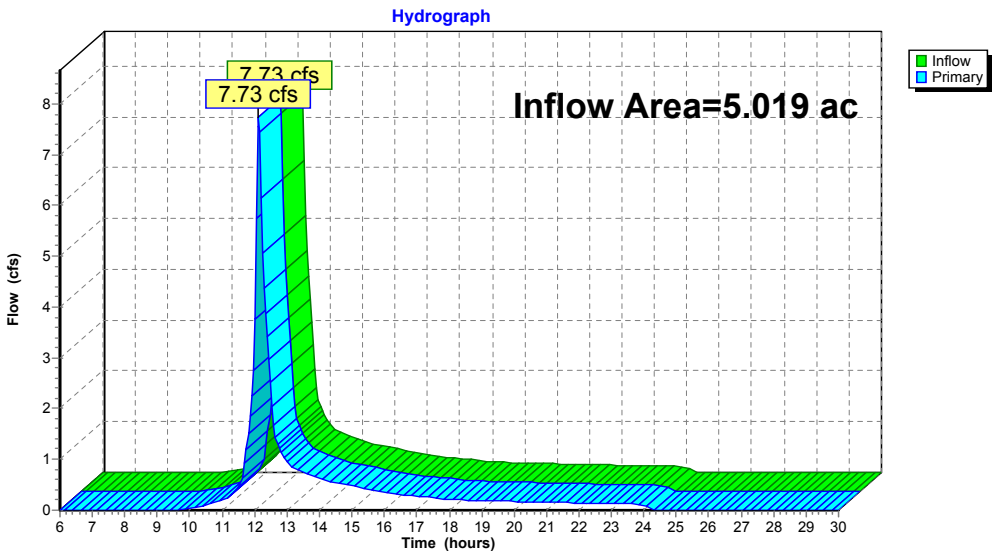


Summary for Link POA-A:

Inflow Area = 5.019 ac, 0.72% Impervious, Inflow Depth = 1.46" for 2-yr event
Inflow = 7.73 cfs @ 12.12 hrs, Volume= 0.610 af
Primary = 7.73 cfs @ 12.12 hrs, Volume= 0.610 af, Atten= 0%, Lag= 0.0 min

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

Link POA-A:

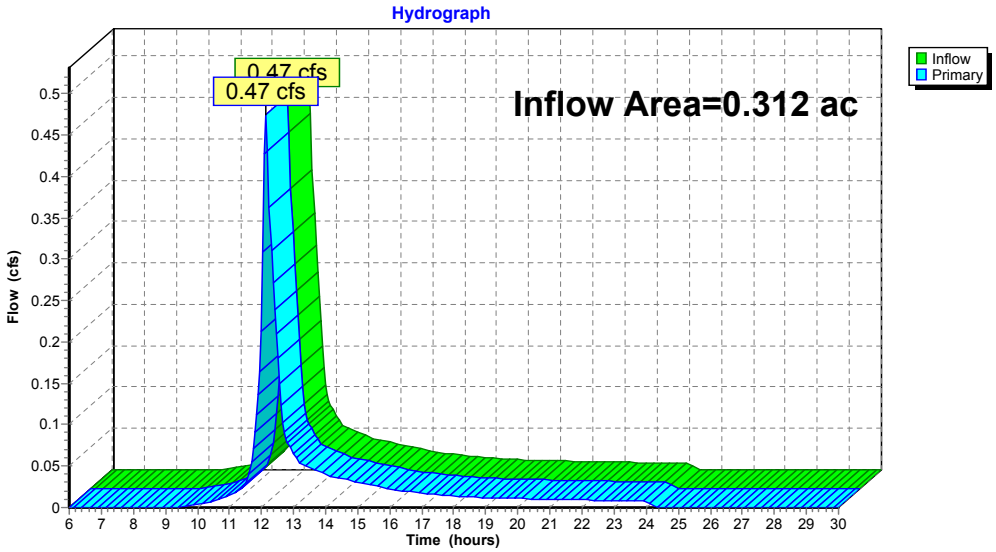


Summary for Link POA-B:

Inflow Area = 0.312 ac, 0.99% Impervious, Inflow Depth = 1.53" for 2-yr event
Inflow = 0.47 cfs @ 12.15 hrs, Volume= 0.040 af
Primary = 0.47 cfs @ 12.15 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.0 min

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

Link POA-B:

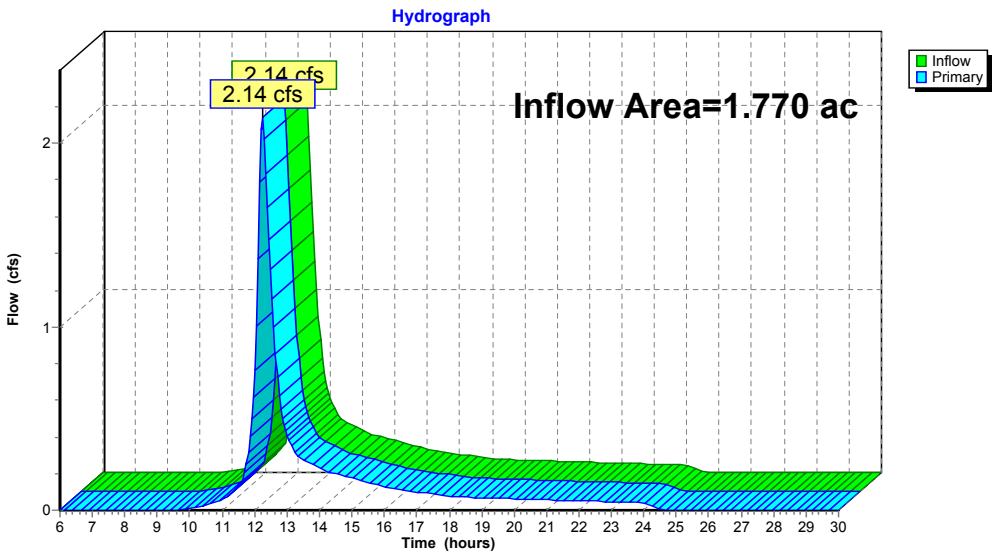


Summary for Link POA-C:

Inflow Area = 1.770 ac, 28.22% Impervious, Inflow Depth = 1.46" for 2-yr event
Inflow = 2.14 cfs @ 12.24 hrs, Volume= 0.215 af
Primary = 2.14 cfs @ 12.24 hrs, Volume= 0.215 af, Atten= 0%, Lag= 0.0 min

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

Link POA-C:

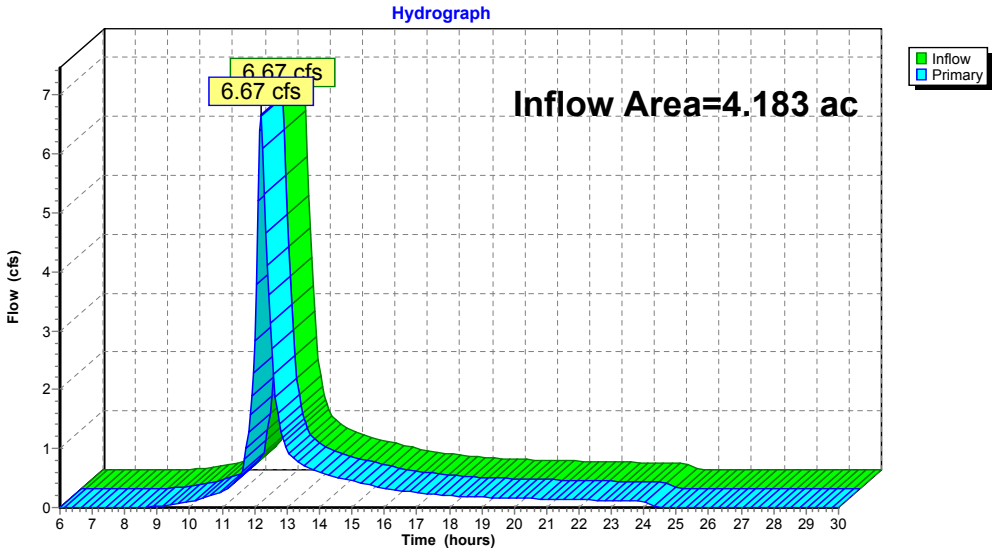


Summary for Link POA-D:

Inflow Area = 4.183 ac, 18.26% Impervious, Inflow Depth = 1.74" for 2-yr event
Inflow = 6.67 cfs @ 12.19 hrs, Volume= 0.607 af
Primary = 6.67 cfs @ 12.19 hrs, Volume= 0.607 af, Atten= 0%, Lag= 0.0 min

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

Link POA-D:



Summary for Subcatchment A1:

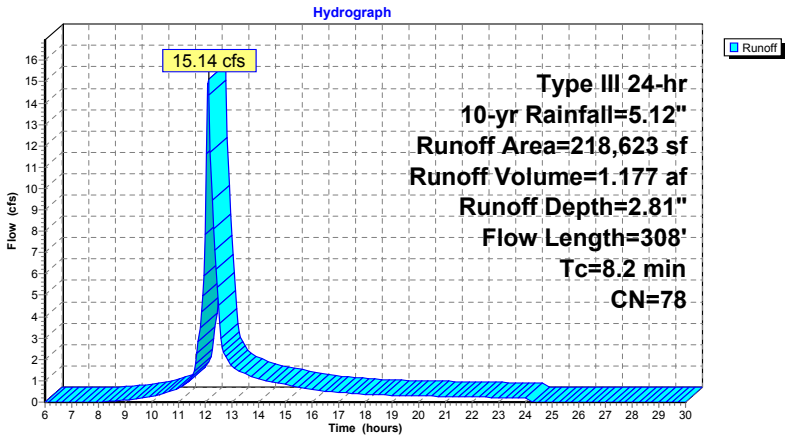
Runoff = 15.14 cfs @ 12.12 hrs, Volume= 1.177 af, Depth= 2.81"
Routed to Link POA-A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.12"

Area (sf)	CN	Description
54,384	78	Meadow, non-grazed, HSG D
1,075	71	Meadow, non-grazed, HSG C
670	30	Meadow, non-grazed, HSG A
24,778	78	Meadow, non-grazed, HSG D
1,720	71	Meadow, non-grazed, HSG C
91,474	79	Woods, Fair, HSG D
33,692	73	Woods, Fair, HSG C
662	36	Woods, Fair, HSG A
7,640	91	Gravel roads, HSG D
953	89	Gravel roads, HSG C
1,575	98	Unconnected pavement, HSG D
218,623	78	Weighted Average
217,048		99.28% Pervious Area
1,575		0.72% Impervious Area
1,575		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.1100	0.24		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.1	13	0.3462	4.12		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.0	8	0.1250	5.69		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
0.1	21	0.3095	3.89		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.1	166	0.2530	2.51		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
8.2	308	Total			

Subcatchment A1:



Summary for Subcatchment B1:

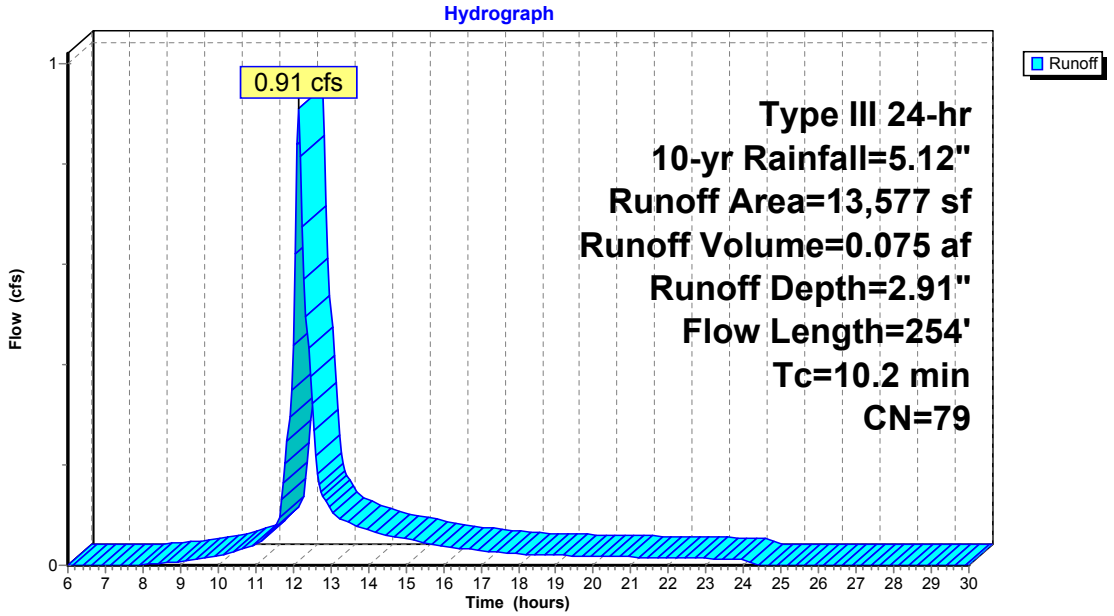
Runoff = 0.91 cfs @ 12.15 hrs, Volume= 0.075 af, Depth= 2.91"
Routed to Link POA-B :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.12"

Area (sf)	CN	Description
6,112	78	Meadow, non-grazed, HSG D
6,218	78	Meadow, non-grazed, HSG D
1,112	91	Gravel roads, HSG D
135	98	Unconnected pavement, HSG D
13,577	79	Weighted Average
13,442		99.01% Pervious Area
135		0.99% Impervious Area
135		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.4	62	0.1290	2.51		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.2	51	0.3333	4.04		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.0	10	0.1000	5.09		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
0.1	31	0.2903	3.77		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
10.2	254	Total			

Subcatchment B1:



Summary for Subcatchment C1:

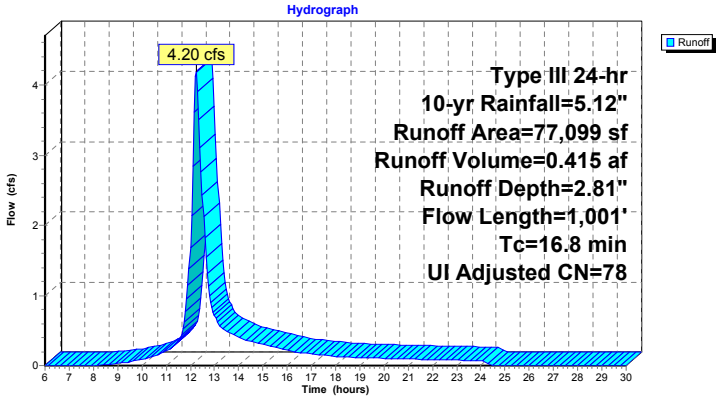
Runoff = 4.20 cfs @ 12.23 hrs, Volume= 0.415 af, Depth= 2.81"
Routed to Link POA-C :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.12"

Area (sf)	CN	Adj	Description
25,170	78		Meadow, non-grazed, HSG D
1,693	71		Meadow, non-grazed, HSG C
8,141	30		Meadow, non-grazed, HSG A
7,191	78		Meadow, non-grazed, HSG D
7,463	79		Woods, Fair, HSG D
2,986	73		Woods, Fair, HSG C
336	36		Woods, Fair, HSG A
2,358	91		Gravel roads, HSG D
8,413	98		Paved parking, HSG D
620	98		Paved parking, HSG B
12,143	98		Paved parking, HSG A
585	98		Unconnected pavement, HSG D
77,099	79	78	Weighted Average, UI Adjusted
55,338			71.78% Pervious Area
21,761			28.22% Impervious Area
585			2.69% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0300	0.14		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
1.1	126	0.0794	1.97		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	80	0.3375	4.07		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
3.1	607	0.0264	3.30		**Shallow Concentrated Flow, Shallow - Pavement** Paved Kv= 20.3 fps
0.3	44	0.1136	2.36		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	44	0.2500	2.50		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
16.8	1,001	Total			

Subcatchment C1:



Summary for Subcatchment D1:

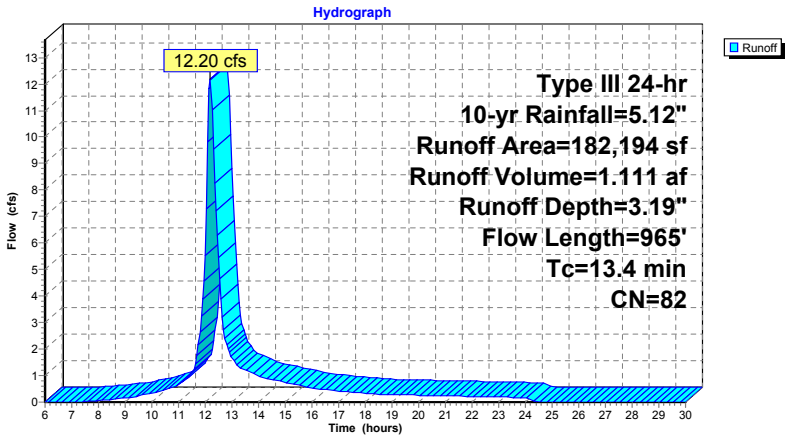
Runoff = 12.20 cfs @ 12.19 hrs, Volume= 1.111 af, Depth= 3.19"
Routed to Link POA-D :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.12"

Area (sf)	CN	Description
80,169	78	Meadow, non-grazed, HSG D
0	71	Meadow, non-grazed, HSG C
1,146	30	Meadow, non-grazed, HSG A
38,003	78	Meadow, non-grazed, HSG D
489	71	Meadow, non-grazed, HSG C
9,808	79	Woods, Fair, HSG D
0	73	Woods, Fair, HSG C
8,312	91	Gravel roads, HSG D
940	89	Gravel roads, HSG C
10,060	76	Gravel roads, HSG A
27,831	98	Paved parking, HSG D
329	98	Paved parking, HSG C
3,397	98	Paved parking, HSG A
1,710	98	Unconnected pavement, HSG D
182,194	82	Weighted Average
148,927		81.74% Pervious Area
33,267		18.26% Impervious Area
1,710		5.14% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0600	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.4	73	0.1781	2.95		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.2	64	0.4219	4.55		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.6	634	0.0394	4.03		**Shallow Concentrated Flow, Shallow - Pavement** Paved Kv= 20.3 fps
1.3	94	0.0053	1.17		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
13.4	965	Total			

Subcatchment D1:

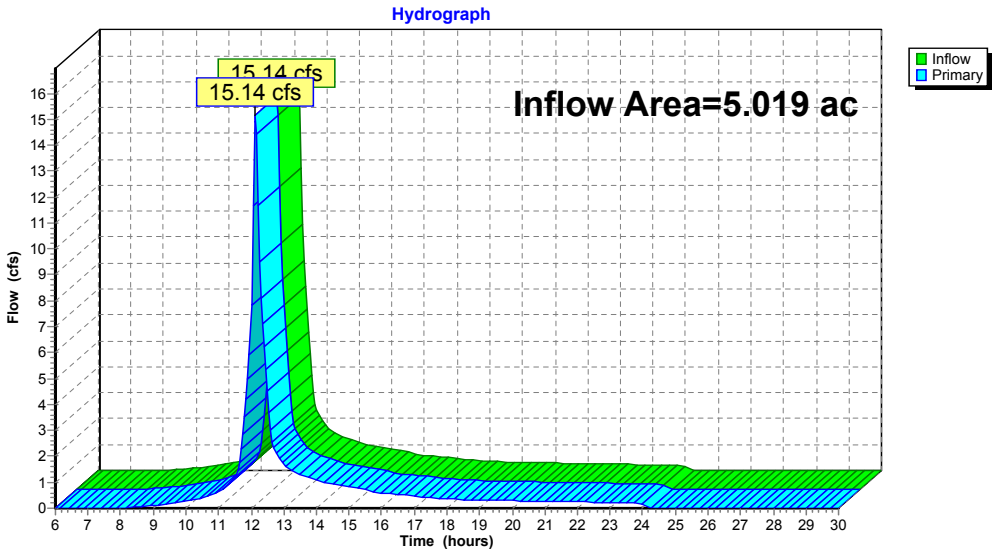


Summary for Link POA-A:

Inflow Area = 5.019 ac, 0.72% Impervious, Inflow Depth = 2.81" for 10-yr event
Inflow = 15.14 cfs @ 12.12 hrs, Volume= 1.177 af
Primary = 15.14 cfs @ 12.12 hrs, Volume= 1.177 af, Atten= 0%, Lag= 0.0 min

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

Link POA-A:

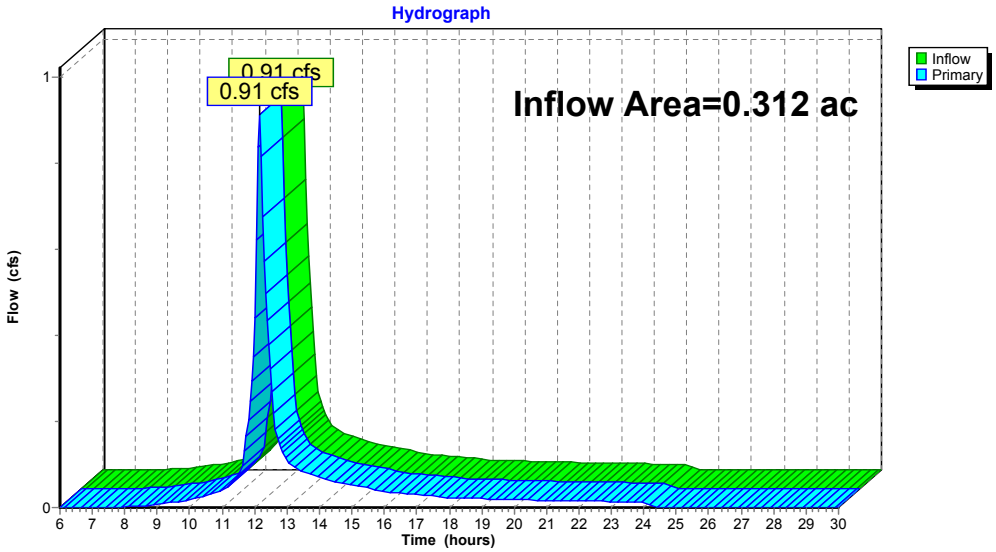


Summary for Link POA-B:

Inflow Area = 0.312 ac, 0.99% Impervious, Inflow Depth = 2.91" for 10-yr event
Inflow = 0.91 cfs @ 12.15 hrs, Volume= 0.075 af
Primary = 0.91 cfs @ 12.15 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.0 min

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

Link POA-B:

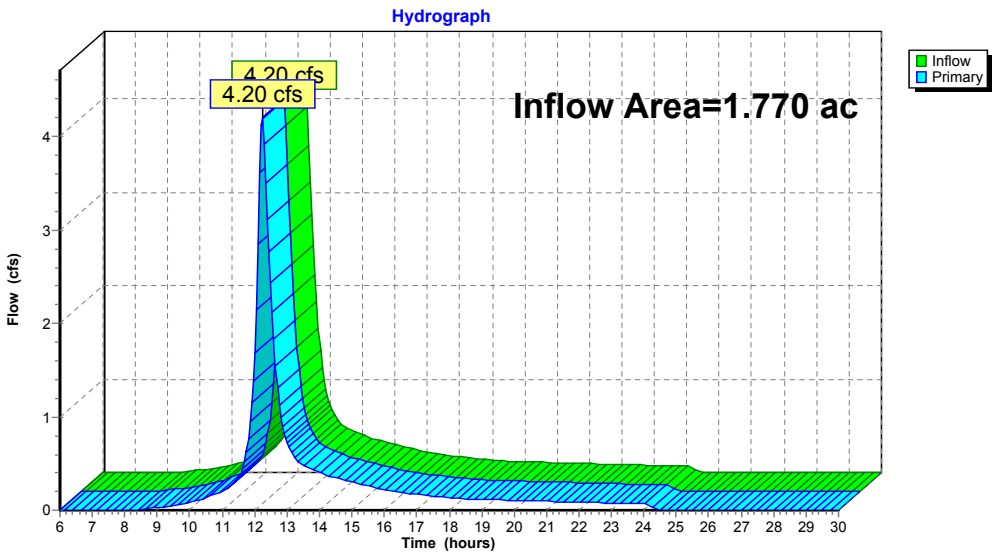


Summary for Link POA-C:

Inflow Area = 1.770 ac, 28.22% Impervious, Inflow Depth = 2.81" for 10-yr event
Inflow = 4.20 cfs @ 12.23 hrs, Volume= 0.415 af
Primary = 4.20 cfs @ 12.23 hrs, Volume= 0.415 af, Atten= 0%, Lag= 0.0 min

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

Link POA-C:

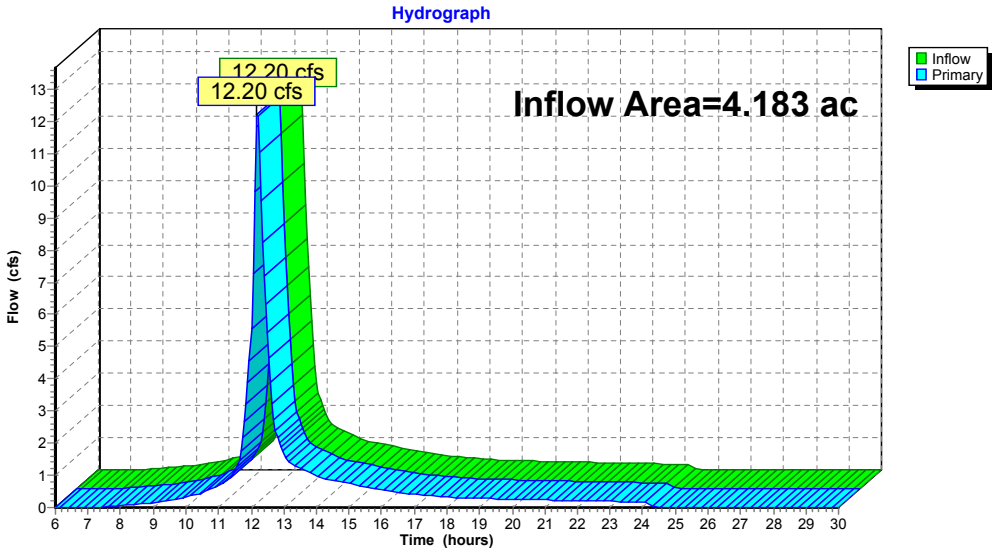


Summary for Link POA-D:

Inflow Area = 4.183 ac, 18.26% Impervious, Inflow Depth = 3.19" for 10-yr event
Inflow = 12.20 cfs @ 12.19 hrs, Volume= 1.111 af
Primary = 12.20 cfs @ 12.19 hrs, Volume= 1.111 af, Atten= 0%, Lag= 0.0 min

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

Link POA-D:



Summary for Subcatchment A1:

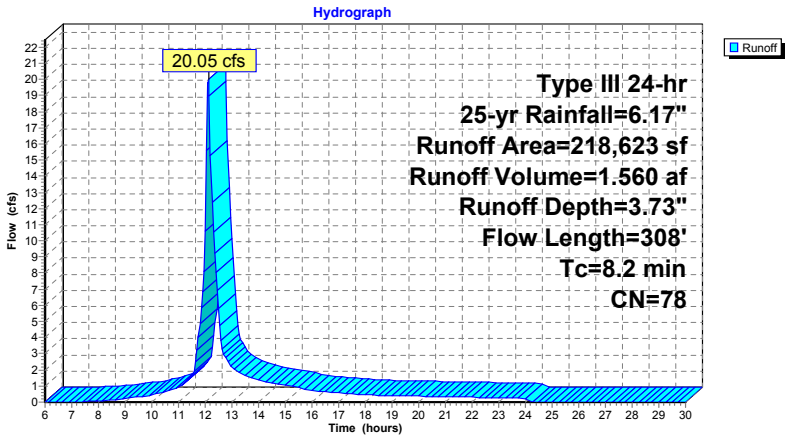
Runoff = 20.05 cfs @ 12.12 hrs, Volume= 1.560 af, Depth= 3.73"
Routed to Link POA-A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.17"

Area (sf)	CN	Description
54,384	78	Meadow, non-grazed, HSG D
1,075	71	Meadow, non-grazed, HSG C
670	30	Meadow, non-grazed, HSG A
24,778	78	Meadow, non-grazed, HSG D
1,720	71	Meadow, non-grazed, HSG C
91,474	79	Woods, Fair, HSG D
33,692	73	Woods, Fair, HSG C
662	36	Woods, Fair, HSG A
7,640	91	Gravel roads, HSG D
953	89	Gravel roads, HSG C
1,575	98	Unconnected pavement, HSG D
218,623	78	Weighted Average
217,048		99.28% Pervious Area
1,575		0.72% Impervious Area
1,575		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.1100	0.24		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.1	13	0.3462	4.12		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.0	8	0.1250	5.69		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
0.1	21	0.3095	3.89		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.1	166	0.2530	2.51		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
8.2	308	Total			

Subcatchment A1:



Summary for Subcatchment B1:

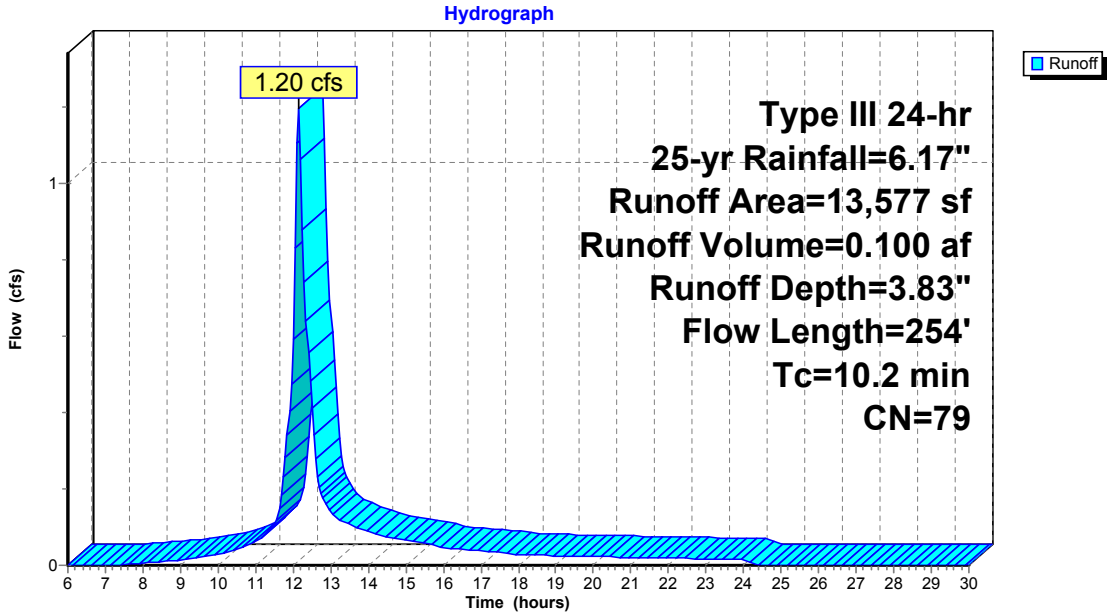
Runoff = 1.20 cfs @ 12.15 hrs, Volume= 0.100 af, Depth= 3.83"
Routed to Link POA-B :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.17"

Area (sf)	CN	Description
6,112	78	Meadow, non-grazed, HSG D
6,218	78	Meadow, non-grazed, HSG D
1,112	91	Gravel roads, HSG D
135	98	Unconnected pavement, HSG D
13,577	79	Weighted Average
13,442		99.01% Pervious Area
135		0.99% Impervious Area
135		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.4	62	0.1290	2.51		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.2	51	0.3333	4.04		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.0	10	0.1000	5.09		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
0.1	31	0.2903	3.77		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
10.2	254	Total			

Subcatchment B1:



Summary for Subcatchment C1:

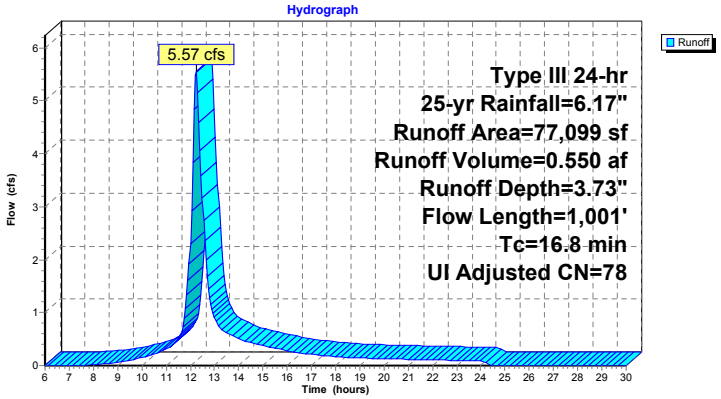
Runoff = 5.57 cfs @ 12.23 hrs, Volume= 0.550 af, Depth= 3.73"
Routed to Link POA-C :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.17"

Area (sf)	CN	Adj	Description
25,170	78		Meadow, non-grazed, HSG D
1,693	71		Meadow, non-grazed, HSG C
8,141	30		Meadow, non-grazed, HSG A
7,191	78		Meadow, non-grazed, HSG D
7,463	79		Woods, Fair, HSG D
2,986	73		Woods, Fair, HSG C
336	36		Woods, Fair, HSG A
2,358	91		Gravel roads, HSG D
8,413	98		Paved parking, HSG D
620	98		Paved parking, HSG B
12,143	98		Paved parking, HSG A
585	98		Unconnected pavement, HSG D
77,099	79	78	Weighted Average, UI Adjusted
55,338			71.78% Pervious Area
21,761			28.22% Impervious Area
585			2.69% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0300	0.14		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
1.1	126	0.0794	1.97		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	80	0.3375	4.07		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
3.1	607	0.0264	3.30		**Shallow Concentrated Flow, Shallow - Pavement** Paved Kv= 20.3 fps
0.3	44	0.1136	2.36		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	44	0.2500	2.50		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
16.8	1,001	Total			

Subcatchment C1:



Summary for Subcatchment D1:

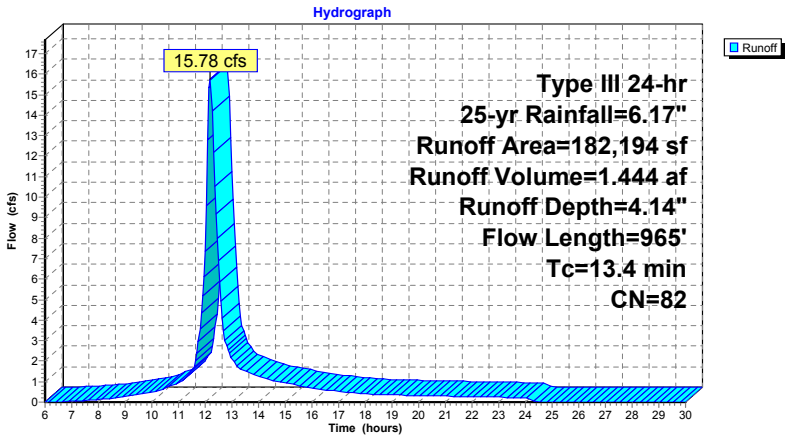
Runoff = 15.78 cfs @ 12.18 hrs, Volume= 1.444 af, Depth= 4.14"
Routed to Link POA-D :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.17"

Area (sf)	CN	Description
80,169	78	Meadow, non-grazed, HSG D
0	71	Meadow, non-grazed, HSG C
1,146	30	Meadow, non-grazed, HSG A
38,003	78	Meadow, non-grazed, HSG D
489	71	Meadow, non-grazed, HSG C
9,808	79	Woods, Fair, HSG D
0	73	Woods, Fair, HSG C
8,312	91	Gravel roads, HSG D
940	89	Gravel roads, HSG C
10,060	76	Gravel roads, HSG A
27,831	98	Paved parking, HSG D
329	98	Paved parking, HSG C
3,397	98	Paved parking, HSG A
1,710	98	Unconnected pavement, HSG D
182,194	82	Weighted Average
148,927		81.74% Pervious Area
33,267		18.26% Impervious Area
1,710		5.14% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0600	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.4	73	0.1781	2.95		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.2	64	0.4219	4.55		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.6	634	0.0394	4.03		**Shallow Concentrated Flow, Shallow - Pavement** Paved Kv= 20.3 fps
1.3	94	0.0053	1.17		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
13.4	965	Total			

Subcatchment D1:

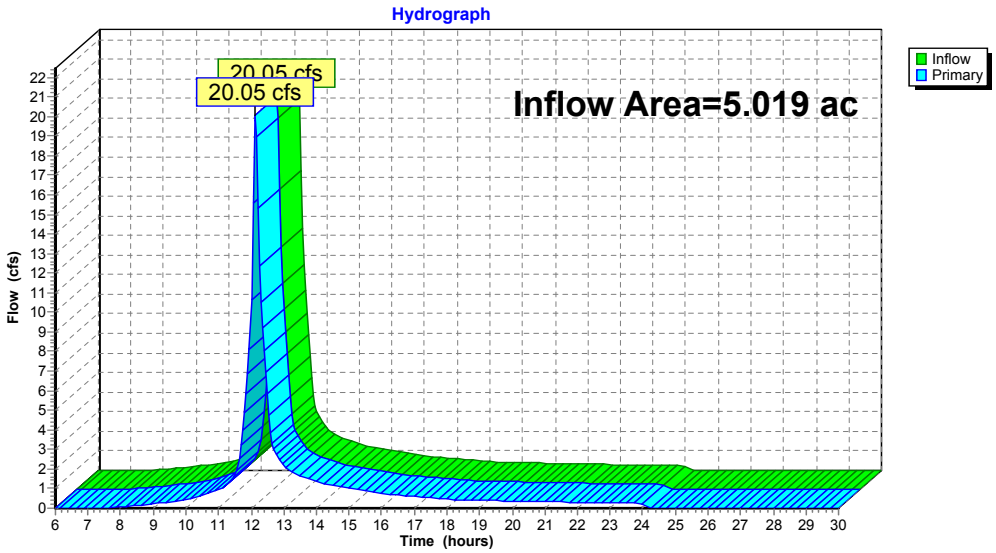


Summary for Link POA-A:

Inflow Area = 5.019 ac, 0.72% Impervious, Inflow Depth = 3.73" for 25-yr event
Inflow = 20.05 cfs @ 12.12 hrs, Volume= 1.560 af
Primary = 20.05 cfs @ 12.12 hrs, Volume= 1.560 af, Atten= 0%, Lag= 0.0 min

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

Link POA-A:

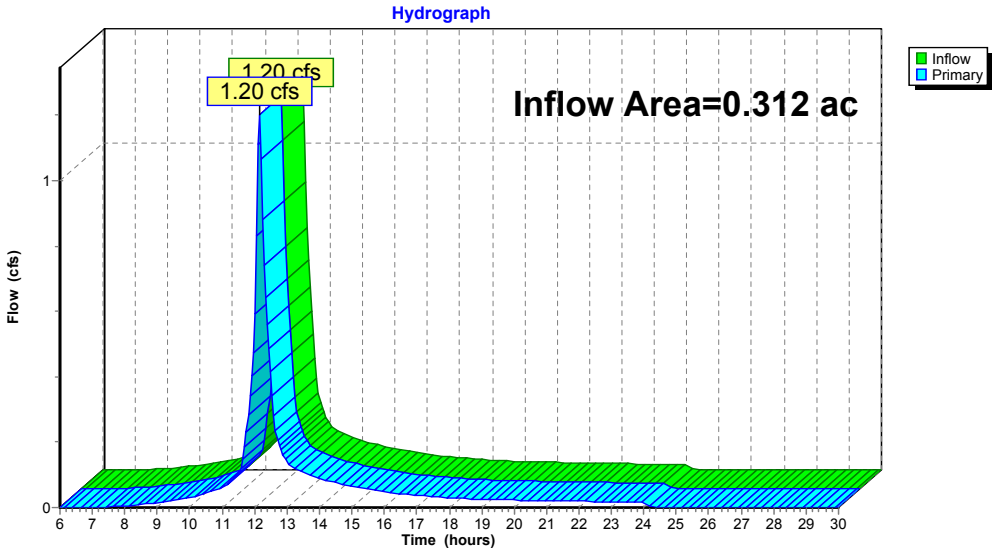


Summary for Link POA-B:

Inflow Area = 0.312 ac, 0.99% Impervious, Inflow Depth = 3.83" for 25-yr event
Inflow = 1.20 cfs @ 12.15 hrs, Volume= 0.100 af
Primary = 1.20 cfs @ 12.15 hrs, Volume= 0.100 af, Atten= 0%, Lag= 0.0 min

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

Link POA-B:

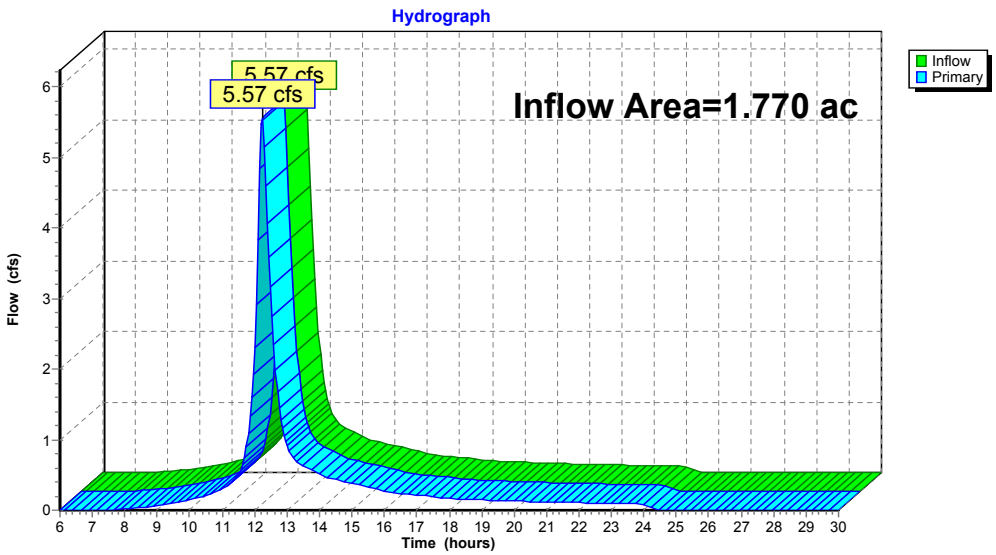


Summary for Link POA-C:

Inflow Area = 1.770 ac, 28.22% Impervious, Inflow Depth = 3.73" for 25-yr event
Inflow = 5.57 cfs @ 12.23 hrs, Volume= 0.550 af
Primary = 5.57 cfs @ 12.23 hrs, Volume= 0.550 af, Atten= 0%, Lag= 0.0 min

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

Link POA-C:

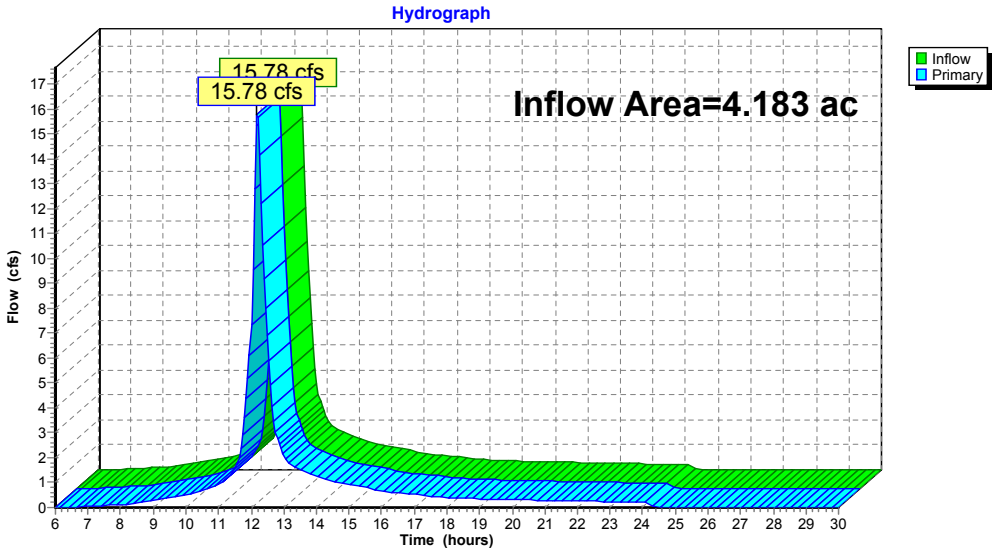


Summary for Link POA-D:

Inflow Area = 4.183 ac, 18.26% Impervious, Inflow Depth = 4.14" for 25-yr event
Inflow = 15.78 cfs @ 12.18 hrs, Volume= 1.444 af
Primary = 15.78 cfs @ 12.18 hrs, Volume= 1.444 af, Atten= 0%, Lag= 0.0 min

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

Link POA-D:



Summary for Subcatchment A1:

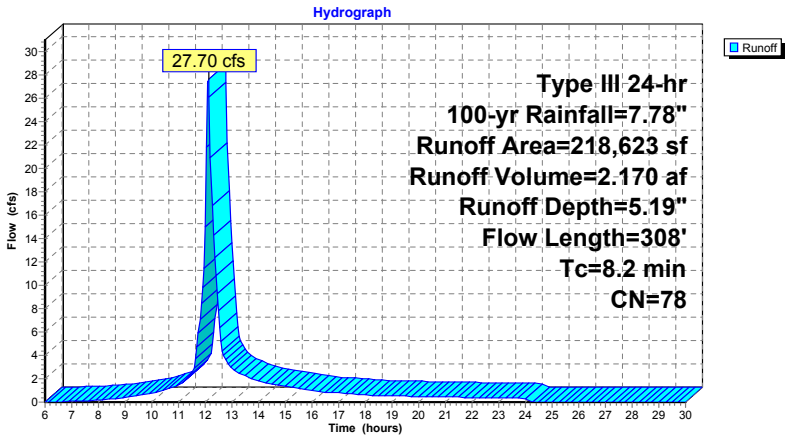
Runoff = 27.70 cfs @ 12.12 hrs, Volume= 2.170 af, Depth= 5.19"
Routed to Link POA-A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.78"

Area (sf)	CN	Description
54,384	78	Meadow, non-grazed, HSG D
1,075	71	Meadow, non-grazed, HSG C
670	30	Meadow, non-grazed, HSG A
24,778	78	Meadow, non-grazed, HSG D
1,720	71	Meadow, non-grazed, HSG C
91,474	79	Woods, Fair, HSG D
33,692	73	Woods, Fair, HSG C
662	36	Woods, Fair, HSG A
7,640	91	Gravel roads, HSG D
953	89	Gravel roads, HSG C
1,575	98	Unconnected pavement, HSG D
218,623	78	Weighted Average
217,048		99.28% Pervious Area
1,575		0.72% Impervious Area
1,575		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	100	0.1100	0.24		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.1	13	0.3462	4.12		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.0	8	0.1250	5.69		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
0.1	21	0.3095	3.89		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
1.1	166	0.2530	2.51		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
8.2	308	Total			

Subcatchment A1:



Summary for Subcatchment B1:

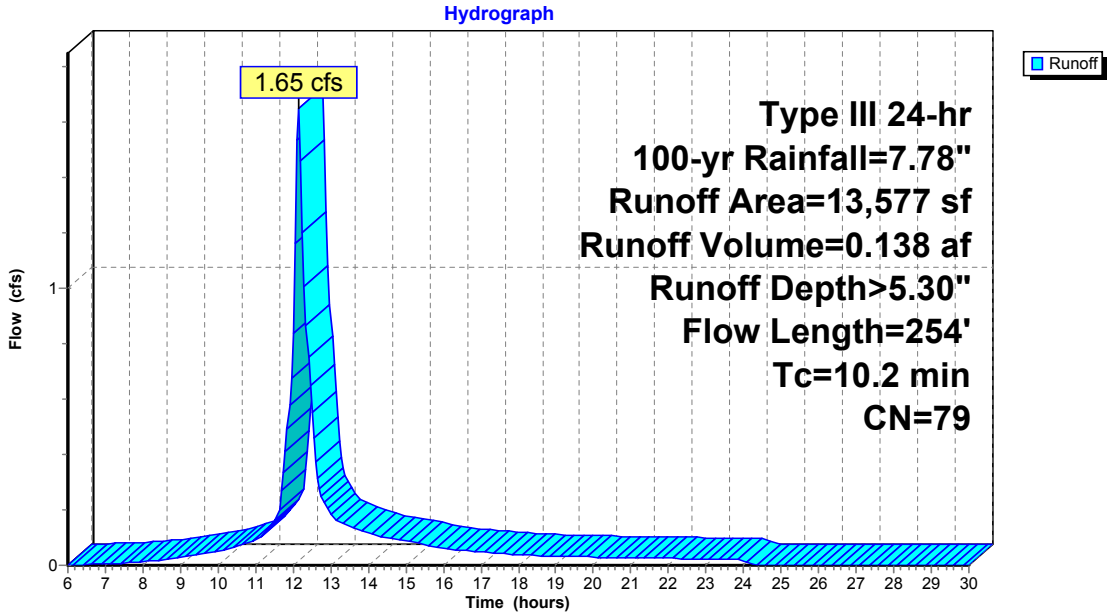
Runoff = 1.65 cfs @ 12.14 hrs, Volume= 0.138 af, Depth> 5.30"
Routed to Link POA-B :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.78"

Area (sf)	CN	Description
6,112	78	Meadow, non-grazed, HSG D
6,218	78	Meadow, non-grazed, HSG D
1,112	91	Gravel roads, HSG D
135	98	Unconnected pavement, HSG D
13,577	79	Weighted Average
13,442		99.01% Pervious Area
135		0.99% Impervious Area
135		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0500	0.17		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.4	62	0.1290	2.51		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.2	51	0.3333	4.04		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.0	10	0.1000	5.09		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
0.1	31	0.2903	3.77		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
10.2	254	Total			

Subcatchment B1:



Summary for Subcatchment C1:

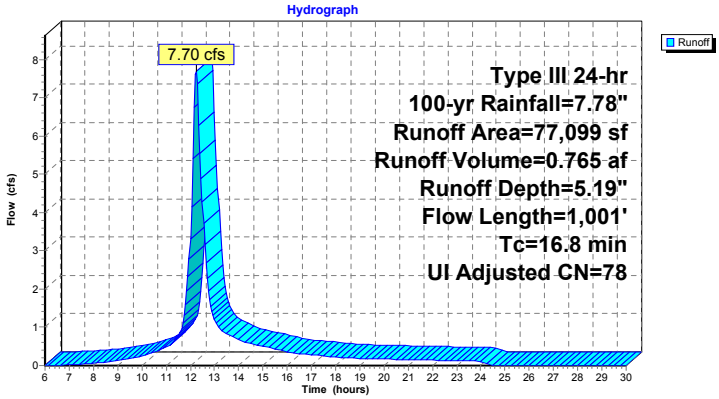
Runoff = 7.70 cfs @ 12.23 hrs, Volume= 0.765 af, Depth= 5.19"
Routed to Link POA-C :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.78"

Area (sf)	CN	Adj	Description
25,170	78		Meadow, non-grazed, HSG D
1,693	71		Meadow, non-grazed, HSG C
8,141	30		Meadow, non-grazed, HSG A
7,191	78		Meadow, non-grazed, HSG D
7,463	79		Woods, Fair, HSG D
2,986	73		Woods, Fair, HSG C
336	36		Woods, Fair, HSG A
2,358	91		Gravel roads, HSG D
8,413	98		Paved parking, HSG D
620	98		Paved parking, HSG B
12,143	98		Paved parking, HSG A
585	98		Unconnected pavement, HSG D
77,099	79	78	Weighted Average, UI Adjusted
55,338			71.78% Pervious Area
21,761			28.22% Impervious Area
585			2.69% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0300	0.14		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
1.1	126	0.0794	1.97		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	80	0.3375	4.07		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
3.1	607	0.0264	3.30		**Shallow Concentrated Flow, Shallow - Pavement** Paved Kv= 20.3 fps
0.3	44	0.1136	2.36		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.3	44	0.2500	2.50		**Shallow Concentrated Flow, Shallow - Woods** Woodland Kv= 5.0 fps
16.8	1,001	Total			

Subcatchment C1:



Summary for Subcatchment D1:

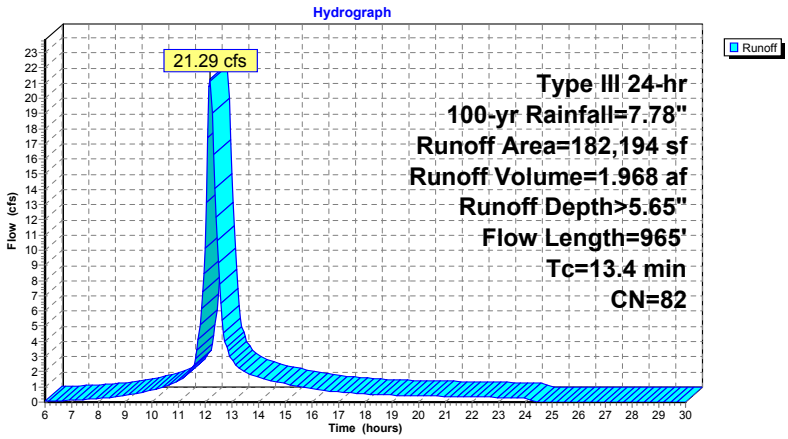
Runoff = 21.29 cfs @ 12.18 hrs, Volume= 1.968 af, Depth> 5.65"
Routed to Link POA-D :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.78"

Area (sf)	CN	Description
80,169	78	Meadow, non-grazed, HSG D
0	71	Meadow, non-grazed, HSG C
1,146	30	Meadow, non-grazed, HSG A
38,003	78	Meadow, non-grazed, HSG D
489	71	Meadow, non-grazed, HSG C
9,808	79	Woods, Fair, HSG D
0	73	Woods, Fair, HSG C
8,312	91	Gravel roads, HSG D
940	89	Gravel roads, HSG C
10,060	76	Gravel roads, HSG A
27,831	98	Paved parking, HSG D
329	98	Paved parking, HSG C
3,397	98	Paved parking, HSG A
1,710	98	Unconnected pavement, HSG D
182,194	82	Weighted Average
148,927		81.74% Pervious Area
33,267		18.26% Impervious Area
1,710		5.14% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0600	0.19		**Sheet Flow, Sheet - Meadow** Grass: Dense n= 0.240 P2= 3.45"
0.4	73	0.1781	2.95		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
0.2	64	0.4219	4.55		**Shallow Concentrated Flow, Shallow - Meadow** Short Grass Pasture Kv= 7.0 fps
2.6	634	0.0394	4.03		**Shallow Concentrated Flow, Shallow - Pavement** Paved Kv= 20.3 fps
1.3	94	0.0053	1.17		**Shallow Concentrated Flow, Shallow - Gravel** Unpaved Kv= 16.1 fps
13.4	965	Total			

Subcatchment D1:

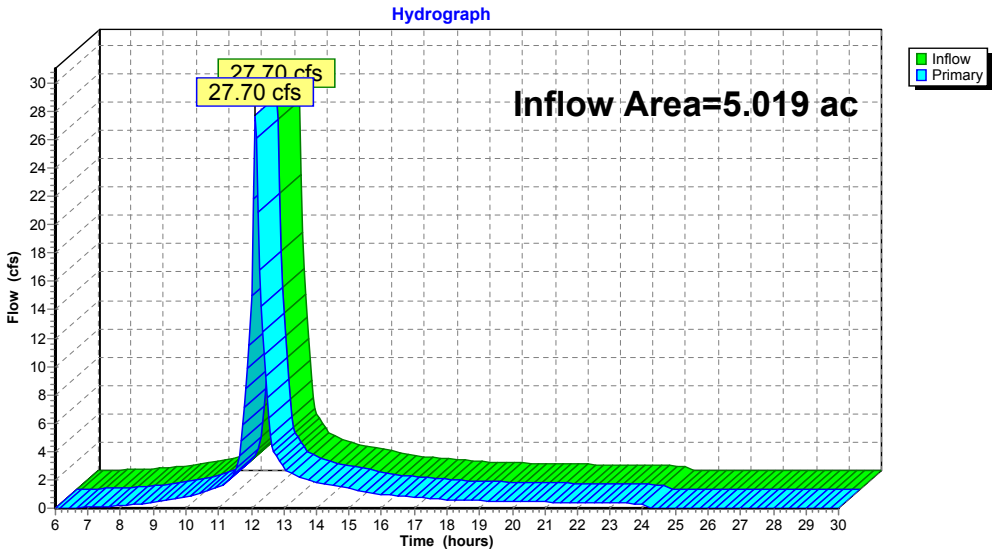


Summary for Link POA-A:

Inflow Area = 5.019 ac, 0.72% Impervious, Inflow Depth = 5.19" for 100-yr event
Inflow = 27.70 cfs @ 12.12 hrs, Volume= 2.170 af
Primary = 27.70 cfs @ 12.12 hrs, Volume= 2.170 af, Atten= 0%, Lag= 0.0 min

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

Link POA-A:

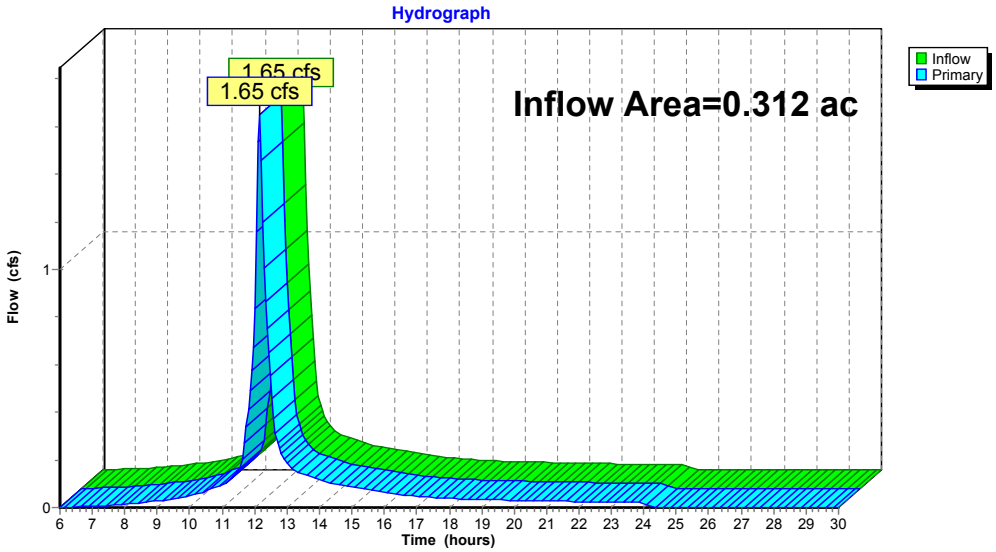


Summary for Link POA-B:

Inflow Area = 0.312 ac, 0.99% Impervious, Inflow Depth > 5.30" for 100-yr event
Inflow = 1.65 cfs @ 12.14 hrs, Volume= 0.138 af
Primary = 1.65 cfs @ 12.14 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.0 min

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

Link POA-B:

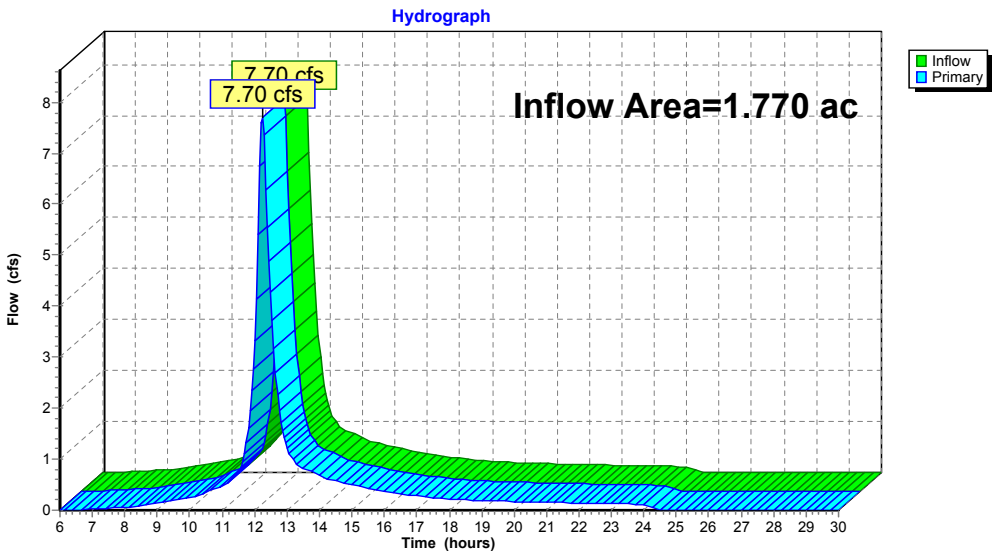


Summary for Link POA-C:

Inflow Area = 1.770 ac, 28.22% Impervious, Inflow Depth = 5.19" for 100-yr event
Inflow = 7.70 cfs @ 12.23 hrs, Volume= 0.765 af
Primary = 7.70 cfs @ 12.23 hrs, Volume= 0.765 af, Atten= 0%, Lag= 0.0 min

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

Link POA-C:

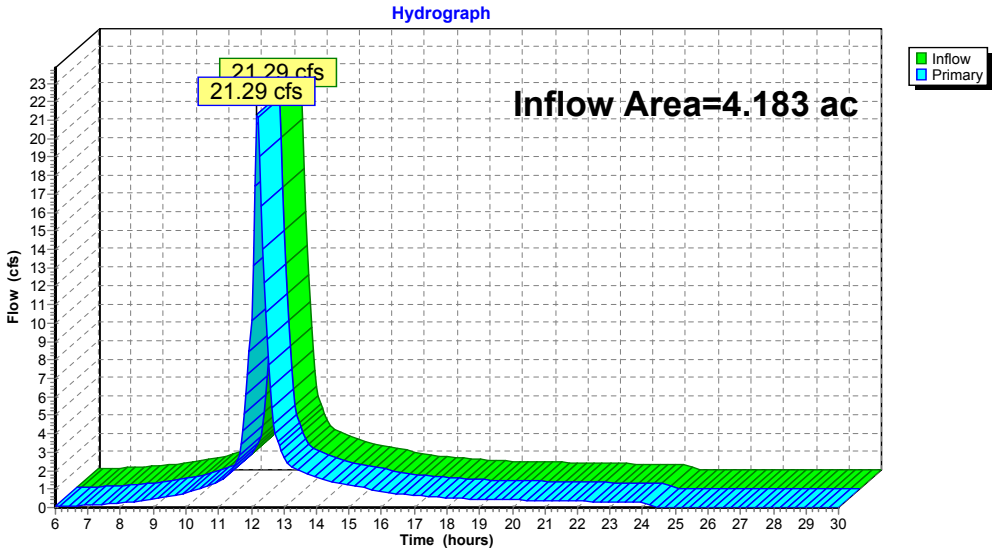


Summary for Link POA-D:

Inflow Area = 4.183 ac, 18.26% Impervious, Inflow Depth > 5.65" for 100-yr event
Inflow = 21.29 cfs @ 12.18 hrs, Volume= 1.968 af
Primary = 21.29 cfs @ 12.18 hrs, Volume= 1.968 af, Atten= 0%, Lag= 0.0 min

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

Link POA-D:



APPENDIX G

Draft Health and Safety Plan

Site Specific Health and Safety Plan

For:
Montville Landfill Solar PV Development
669 Oakdale Road
Montville, Connecticut

Prepared By:

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive
Reading, Massachusetts

June 2023

TABLE OF CONTENTS

1. Introduction

This Health and Safety Plan (HASP) has been prepared for construction oversight activities to be performed by Weston & Sampson Engineers, Inc. (Weston & Sampson) at Montville Landfill located at 669 Oakdale Road in Montville, Connecticut (the Site). The Landfill site consists of an approximately 29.09-acre lot of land on which the Town's transfer station is also operated. The Montville landfill was capped in the 1990s with 18 inches of impervious soil overlain by 6 inches of vegetated topsoil.

Site activities will consist of the construction of the Solar Photovoltaic (PV) Array (the Project) being performed by Verogy. The HASP has been prepared in response to hazardous conditions likely to be encountered at the Site. This HASP will be reviewed by Weston & Sampson employees working on this project, and a copy will be kept onsite during field activities associated with the Project.

2. Description of Work

Weston & Sampson will oversee the daily construction of an approximately 770 kilowatt (KW) direct current (DC) solar PV facility. Work that will be performed by Verogy and their subcontractors includes installation of temporary erosion and sedimentation controls, construction of a gravel turnaround area, setting of concrete ballast support blocks, conduit routing, installation of an electrical equipment pad, fence modifications and installation, and other tasks related to the construction of the solar PV array. Weston & Sampson will be onsite daily during land disturbance activities to monitor Verogy and their subcontractors for compliance with the requirements of the Connecticut Department of Energy and Environmental Protection (CT DEEP) Authorization Application for Disruption of a Solid Waste Disposal Area and local permit approval conditions. Periodic monitoring of landfill gas conditions will be performed daily, using a hand-held portable four-gas meter, for hydrogen sulfide (H_2S), oxygen (O_2), and lower explosive limit (LEL) concentrations during construction activities at the Site.

3. Project Organization

Management of the landfill project is as follows:

Verogy (Solar Developer)
Brad Parsons, PE, PMP
Director of Design and Permitting
(203) 814-6866

Civil Contractor To be Determined

Weston & Sampson
Mick Brown
Health & Safety Manager
351-322-4799

Robert J. Bukowski, P.E.
Project Manager
978-532-1900

This HASP has been prepared to ensure that on Site personnel are advised of know or expected hazards and work activities are performed in accordance with applicable local, state, and Occupational Safety & Health Administration (OSHA) regulations.

All project-related incidents will be reported to the Weston & Sampson Project Manager and Weston & Sampson Health & Safety Manager, within 24 hours of occurrence. A project-related "incident" includes the following types of events:

- Workplace injury (i.e., abrasions, cuts, twisted ankle) or fatality
- Illness (i.e., infection, reaction to a plant exposure or insect bite)
- Major equipment damage or failure
- Property damage (equipment, facility, vehicle, fire, vandalism)
- Unplanned environmental release or exposure (hazardous material)
- Motor Vehicle Accident
- Any work stoppage due to a safety issue (near-miss)

4. Project Staff

Weston & Sampson personnel are responsible for their personal health and safety and that of their colleagues and must adhere to the procedures established in this HASP. Personnel shall maintain an awareness of Site conditions and exercise sound judgment when confronted with an unsafe and/or (potentially) hazardous condition. If the procedures identified in this HASP do not address an unsafe and/or (potentially) hazardous condition present at the project Site, then Weston & Sampson personnel shall follow a safe course of action and contact the Project Manager or Health & Safety Manager. All Weston & Sampson personnel have the authority to stop work if they become aware of any new unsafe condition or observe unsafe acts by others. These safety-related work stoppages will be immediately reported to the Project Manager and/or Health & Safety Manager. Any unsafe conditions or work practices will be evaluated and corrected prior to re-starting site activities.

5. Hazard Evaluation and Control

During construction oversight, personnel have the potential to experience warm and cold weather conditions, trip and fall conditions, levels of hydrogen sulfide higher than the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) of 20 parts per million (ppm) (Threshold Limit Value (TLV))/1 ppm (Time Weighted Average (TWA)).

Weston & Sampson employees should dress appropriately with personal protective equipment (PPE) including safety glasses, steel-toe boots, and outerwear consistent with the anticipated temperatures (Level D).

6. Site Hazards

6 a. Chemical Hazards

Equipment fuel (gasoline or diesel) and hydrogen sulfide are potential chemical hazards that are associated with the Site activities. Further information regarding these chemicals is summarized in the table below.

Table 1. Hazardous Chemicals

Contaminant	Physical Properties	OSHA PEL	Exposure Routes	Signs/ Symptoms of Acute Exposure
Hydrogen Sulfide (H_2S)	Colorless, odorous gas ("rotten eggs")	20 ppm 1ppm TWA 5 ppm STEL	Inhalation, skin and/or eye contact	Eye, nose and throat irritation, headaches, dizziness, nausea/vomiting, edema, convulsions

It is possible that site personnel will encounter Hydrogen Sulfide (H_2S) gas during work activities. The OSHA PEL for H_2S is 20ppm. H_2S concentrations will be monitored using a 4-gas meter in the worker breathing zone periodically during work activities. All air monitoring results will be recorded on an Air-Monitoring log-sheet (see Appendix D). If air monitoring indicates concentrations of H_2S gas in excess of 1ppm sustained (5 minutes or more), work will be stopped and all personnel will be removed from the work area to a safe location. A plan of action will be developed and implemented to mitigate the elevated H_2S and work will be resumed following confirmation of safe working conditions (below 10ppm for 15-minutes or more).

See Section 9 for additional information regarding air monitoring and action levels.

Personnel shall adhere to the following safe work practices when conducting monitoring:

- Smoking, or any other activities that could present an ignition source (i.e., flames, sparks) are strictly prohibited at the Site.
- Avoid confined spaces.

6 b. Physical Hazards

Table 2. Physical Hazards

Types of Hazards	Description/Routes of Exposure	Hazard Mitigation Techniques
Slips, Trips & Falls	Falls from height or traditional walking surfaces caused by poor housekeeping, uneven surfaces, walking around equipment, walking in/near excavated areas, etc.	• Inspect work areas prior to start of work • Use good housekeeping practices to avoid having extra materials/equipment on-site or blocking traffic • Post warning signs and/or barricades where appropriate • Maintain awareness of site conditions
Mechanical Equipment (heavy equipment)	Body parts exposed to crushing, caught-between, struck-by, pinch-points or falling objects associated with heavy equipment.	• Maintain line of sight with equipment operators • Coordinate equipment movement with foreman • Develop a system of communication between equipment operators and personnel in the vicinity of moving equipment • Establish and delineate the work zone and maintain access to authorized personnel only • Maintain safe distance from moving/operating equipment • Inspect all equipment prior to use, including kill switches • Set up traffic controls/signage (as applicable) • Wear a hard hat and high-visibility vest (or equivalent) when working in the vicinity of moving

Types of Hazards	Description/Routes of Exposure	Hazard Mitigation Techniques
		equipment
Noise	Noise levels that result in hearing damage or difficulty communicating safety information between on-site personnel.	• Review site activities before work begins or in an area where communication is easy • Establish alternate means of communication if verbal commands will be difficult to hear • Use ear plugs or other forms of hearing protection as necessary for sustained noise levels exceeding 85 decibels
Physical/Lifting	Excessive loads or improper lifting techniques resulting in bodily injuries.	• Use proper lifting methods, team lifting or assistance devices • Use cut-resistance gloves when handling materials • Wear appropriate safety footwear (steel-toe boots or equivalent) protecting against dropped objects • Use a mechanical device or obtain assistance from other to lift loads greater than 50 pounds
Vehicular Traffic	Injuries from impacts with vehicular traffic or projectiles caused by passing vehicular traffic and/or heavy equipment	• Survey work area, identify traffic patterns, and set up traffic controls in accordance with SOPs and traffic management plan • Establish and delineate the work zone and maintain access to authorized personnel only • All personnel will wear high-visibility clothing (minimum Class 2 vest) • Use of traffic control signs • Coordinate work with police details
Extreme Temperature	Temperatures that result in heat or cold stress (exhaustion, hypothermia, etc.)	• Check weather before going to work • Wear appropriate clothing for predicted weather conditions (i.e., hats, layers for cold, cooling or wicking fabrics for heat) • Maintain adequate hydration • Monitor other staff for signs of heat/cold related illness • Use sun block and other protectants in addition to regular PPE • Maintain open communication with staff

Types of Hazards	Description/Routes of Exposure	Hazard Mitigation Techniques
Inclement Weather	Weather conditions (rain, snow, ice, etc.) resulting in unsafe site conditions (e.g., slippery surface) and reduced visibility.	• Select appropriate clothing based on forecast. • Wear safety footwear with adequate soles for traction • Add traction grips to footwear in icy-snowy conditions • Maintain travel ways and walkways on site for snow, ice, and rain conditions
Biologic	Insect/animal bites, stings and exposures to allergens, sun exposure	• Wash and sanitize hands frequently • Use insect repellants as needed • Use sunscreen and UV protective clothing as needed • Wear appropriate clothing and perform tick checks if working in fields or forested areas
Dust & Airborne Silica	Inhalation, dermal exposure	• Monitor construction activities for sustained visible dust • Use engineering controls, such as wetting, as needed to minimize dust in workers' breathing zone

7. Communication Methods

Site personnel shall have ready access to a mobile telephone or other means of communication (e.g., cellular telephone, two-way radio) for external emergency contact purposes during work activities.

8. Personal Protective Equipment

PPE will be used when necessary to reduce exposures to specific worksite hazards. PPE is used when engineering and/or work practice controls cannot eliminate or minimize the hazard to an acceptable safe level. Optional items are identified but may become mandatory PPE as Site hazard conditions change.

Level D protection shall be used during Site activities. This PPE has been selected based on hazards associated with scheduled work activities and anticipated Site conditions. Level D protection includes the mandatory use of the following PPE at all times on site:

- American National Standards Institute (ANSI) approved (Z87.1) safety glasses with side shields
- Safety-toed boots (6" minimum – over the ankle)
- ANSI Class 2 Hi-Vis vests (or equivalent)
- Nitrile gloves, as required for specific tasks where there is a potential for chemical exposure
- Hard hat, as required during heavy equipment use and/or when overhead hazards exist
- Hearing protection, as required for specific tasks where sustained noise levels exceed 85 dB

The following are required equipment for onsite activities but are not PPE or Level D requirements:

- Stocked first aid kit (typical 10-person or equivalent)
- Fire extinguisher (A-B-C rated, 5 lb. minimum)
- Portable eye-wash station (minimum of two 32 oz. bottles)
- Four-gas meter (hydrogen sulfide, oxygen, and LEL)
- Adequate supply of drinking water
- Insect repellent
- Sunscreen
- Cut resistant work gloves (A-2 minimum)
- Portable phone
- Traffic cones
- Caution tape

9. Environmental Monitoring

Landfill gas monitoring will be conducted in the operator breathing zone (OBZ) periodically during construction at the Site. Landfill gas tends to collect in low-lying areas under certain atmospheric conditions (e.g., low wind, high humidity, etc.). Landfill gas can migrate upward through the landfill surface into the landfill gas collection system (if present) or other openings, through the surface soils into ambient air. Landfill gas can also migrate horizontally through solid waste, in utility conduits or structures, etc. The following constituents may be associated with landfill gas.

Hydrogen Sulfide - is gas that is colorless, odiferous (rotten egg smell), flammable, and heavier than air. Hydrogen sulfide is often produced from decaying waste and organic matter which are common in a capped landfill. Hydrogen sulfide is toxic at relatively low concentrations. The ACGIH TLV is 1 ppm, and the short-term exposure limit (STEL) is 5 ppm; therefore, a conservative action level has been set for the site at <1 ppm.

Flammable Gases/Vapors – these will be measured (collectively) as a percentage of the LEL. The site action level is set at 5% LEL.

Oxygen (O_2) - the established safe oxygen range per OSHA is 19.5% - 23.5%. An atmosphere containing oxygen at concentrations <19.5% is considered to be oxygen deficient and a condition that is immediately dangerous to life and health (IDLH). An atmosphere containing oxygen at concentrations >23.5% is considered to be oxygen enriched. Oxygen concentrations below 8% do not support the combustion process.

The established action levels for the parameters described above at the point of operation and OBZ are outlined below:

Table 3. Point of Operation and Operator Breathing Zone

Hydrogen Sulfide	LEL	Oxygen	Action
Monitor OBZ	Monitor Source	Monitor OBZ	
<1ppm	<10%	19.5% - 23.5%	Proceed with work. Use caution by checking the meter frequently.
≥1ppm	≥ 10%	<19.5 % or > 23.5%	Stop current activities and move away from the area to allow time for landfill gas to dissipate. Continue to monitor at the work area and the surrounding area perimeter. Measure LEL and O_2 values again. If after 20 minutes, the action levels continue to be outside of the established limits, evacuate the area and contract the Project Manager and Health & Safety Manager. Tools and equipment/materials that can create a spark or could generate static electricity must stay outside of the work area if LEL readings are detected at 10% or greater. The project team may need to consider the use of engineering controls (e.g., fan, intrinsically safe equipment, non-sparking tools, spark arrestors) if LEL readings at source are 10% or consider return with ventilation system and spark proof/ intrinsically safe equipment.

The presence of nuisance odors, vapors or dust shall immediately warrant the implementation of engineering controls to mitigate emissions. If nuisance odors continue after the implementation of these controls, then activities will be temporarily suspended, and additional measures shall be discussed to remove the source of odor. Personnel will remain upwind of the detected nuisance odors until the situation has dissipated or additional measures have been authorized. The PPE required to provide the appropriate level of dermal and respiratory protection shall be determined based on the results of air monitoring performed and the standards set forth herein.

Table 4. LEL Measurements

LEL Measurement	Condition	Action
10%	Release to the environment that results in the presence of oil and/or hazardous vapors (landfill gases) within buildings, structures, or underground utility conduits (excluding gas control, gas recovery and leachate collection system components) at a concentration of 10% (or greater) of the LEL. This does not include gas control, gas recovery and leachate collection system components.	1. Take immediate action to protect human health and safety;
25%	Concentration of the explosive gases exceed 25% of the LEL for individual components, LEL for individual components or total LEL at the property boundary or beyond (not including off-site buildings, structures or utility conduits covered under 10% of the LEL condition above).	1. Take immediate action to protect human health and safety;

10. Training and Medical Surveillance

a. Training

Personnel conducting site work shall have completed the Initial Training as required by the OSHA in 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response (HAZWOPER) course and a minimum of three days of supervised actual field experience. Site employees shall also receive annual 8-hour HAZWOPER refresher training.

Site employees will be provided with a copy of this HASP. Site employees are expected to thoroughly read and understand information contained in the HASP prior to conducting site activities. Staff will acknowledge their receipt and understanding of this HASP by signature in the form provided as Appendix B.

b. Medical Surveillance

All personnel involved in the project may be required to participate in the Weston & Sampson's medical surveillance program. This program follows the provisions set forth by OSHA in 29 CFR 1910.120,and includes the performance of annual occupational medical examinations under a licensed occupational physician.

11. Site Control Measures

a. General Control Measures

The following general Site control measures shall be implemented by Weston & Sampson employees working on this project:

- The work area shall be carefully assessed for safety hazards prior to conducting work.
- Visibly contaminated areas should be avoided when possible.

- No eating, drinking, or smoking is allowed in contaminated areas or decontamination zones.

b. Safety Briefings

The On-Site Coordinator shall conduct a Site safety briefing (Daily Tailgate Meetings) before starting field activities or as tasks and/or site conditions change.

Site safety briefings will consist of a general discussion of the HASP, Site-specific hazards, hazards associated with specific tasks and/or equipment, location of work zones, PPE requirements, equipment, special procedures, emergency procedures, and any other pertinent health and safety information. All daily safety briefings, including topics discussed and attendees, will be documented using the "Daily Tailgate Meeting" form provided as Appendix C.

c. Worksite Set Up

When setting up the worksite, Weston & Sampson employees shall review these procedures. However, based on location and traffic, a work set-up zone as described may not be necessary. Therefore, portions of the section will be used as appropriate:

- Secure area from unauthorized entry by erecting traffic cones, pylons, or other diversion devices around the work zone. Caution tape can also be used with cones/pylons to further delineate work zones.
- Establish decontamination procedures as needed
- Utilize access control at the entry and exit from the work zone.
- Establish onsite communications, as appropriate. These consist of line-of-sight, hand signals, and verbal communication.
- Establish emergency signals, as appropriate.
- Establish a "buddy system."
- Establish procedures for disposal of waste materials generated onsite.

The On-Site Coordinator will conduct periodic assessments of work practices to evaluate the effectiveness of this HASP, as necessary. Deficiencies in personnel adherence to work practices identified in this HASP will immediately be corrected. Deficiencies in the HASP itself will be corrected by the Health & Safety Manager prior to implementation.

Personnel shall wash hands and other affected body parts with soap and water prior to breaks, when leaving the Site, and when potentially contaminated equipment/material comes in direct contact with the skin.

Wastes (e.g., PPE – gloves, safety glasses, etc.) generated from decontamination activities shall be bagged and properly disposed.

12. Emergency Response

a. Pre-Planning Activities

The On-Site Coordinator shall perform the following pre-planning activities prior to the initiation of field activities:

- Locate nearest telephone to the work site and assess on-site communications.
- Identify chemical and safety hazards.
- Confirm emergency telephone numbers and route(s) to hospital (see Appendix A).
- Review project plan for anticipated Site conditions, any alterations in on-site operations, and personnel availability.
- Ensure the project team has travel first aid kits, portable eyewash, and working fire extinguisher.
- Check Site emergency equipment operational status and supply inventory.
- Locate emergency information (e.g., evacuation routes) and designated assembly point on site map.
- Assemble emergency contact, hospital route, evacuation route, and assembly point information.

Emergency pre-planning information is detailed in Appendix A of this HASP.

b. Evacuation Procedures

In the event of an emergency at the worksite, Weston & Sampson personnel will immediately evacuate the work area and proceed to the designated muster point (see Figure 1.). Site personnel shall then begin notifying appropriate emergency and Weston & Sampson contacts as identified in Appendix A.

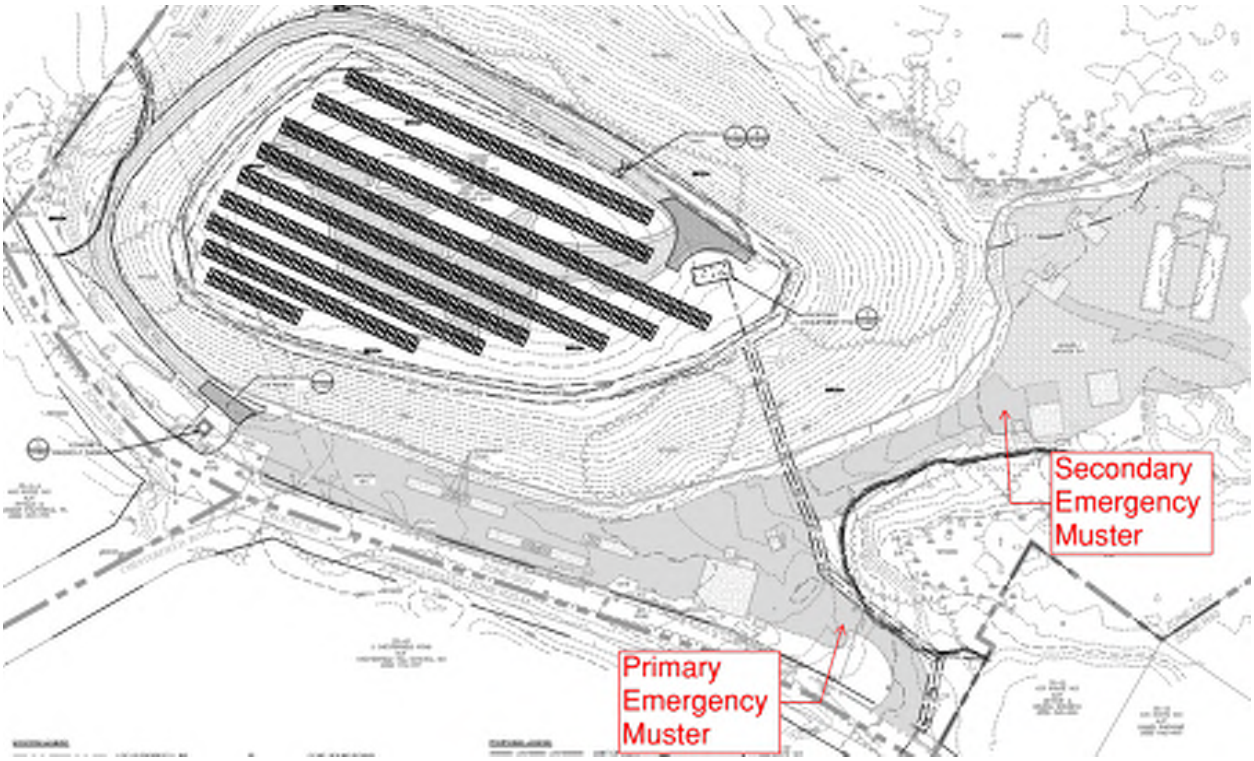


Figure 1. Emergency Evacuation Muster Locations

c. Medical Emergencies

The local medical emergency facility for the project is:

Backus Hospital
326 Washington St.
Norwich, CT 06360
(860) 889-8331

A map and directions to Backus Hospital is provided in Appendix A.

The following procedures shall be implemented by Weston & Sampson employees in the event of a medical emergency:

- Stop field work activities.
- Summon assistance (on and offsite), as necessary.
- Prevent further injury and maintain personal safety.
- Maintain scene safety and prevent access by unauthorized personnel.
- If the scene is safe, and if trained in and comfortable with performing first aid tasks, initiate first aid, as appropriate.
- Supply medical providers with information about the accident/incident.
- Notify the Project Manager, the Health & Safety Manager and the HR Manager of the accident/incident.

d. Accident/Incident Reports

The On-Site Coordinator shall complete an Incident Report Form (obtained from the Health & Safety Manager) as soon as possible, but no later than 24 hours, after any accident/incident occurrence. Copies of these forms shall be sent to the Project Manager, Health & Safety Manager, and the Human Resources Manager.

13. Plan Approval

This HASP for the Montville Landfill Solar Construction has been written for use by Weston & Sampson employees. Weston & Sampson claims no responsibility for its use by others, unless specified and defined in project or contract documents. This HASP is written for the specific Site conditions, purposes, dates, and personnel specified and must be amended if these conditions change.

APPENDIX A

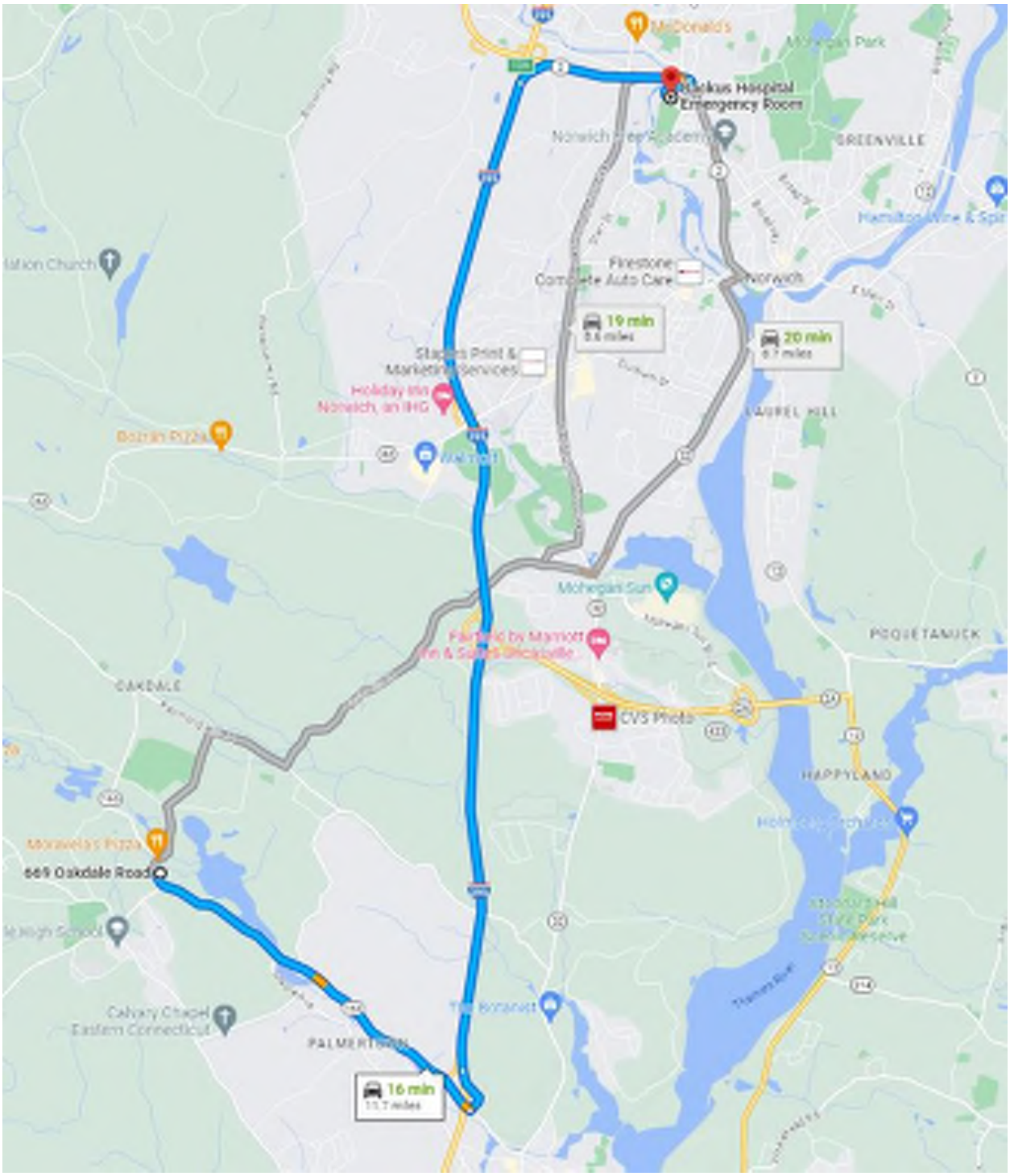
EMERGENCY CONTACT INFORMATION AND PROCEDURES

Nearest Telephone:	Cell phone
Chemical and Safety Hazards Not Covered in General HASP:	None
Utility Clearance Permit Number:	
Emergency Telephone Numbers:	
Local Police:	911
Fire Department:	911
Ambulance:	911
State Police:	(860) 685-8190
Hospital/Emergency Care:	Backus Hospital 326 Washington St. Norwich, CT 06360 (860) 889-8331
Weston & Sampson: Health & Safety Manager Project Manager:	 Mick Brown (351) 322-4799 Robert Bukowski (978) 532-1900

HOSPITAL DIRECTIONS
Backus Hospital - Norwich

- Starting route at 669 Oakdale Rd. Montville, CT 06370 Travel to I-395N from Oakdale Rd and CT-163 toward Chesterfield Rd (3.1 mi)
- Continue on I-395 (7 mi)
- Take exit 13A to merge onto CT-2 E/CT-32 S toward Norwich (1.2 mi)
- Take the CT-2 E/CT-32 S exit toward Downtown (341 ft)
- Turn right onto CT-2 E/CT-32 S/Washington St. (289 ft)
- Turn right onto Backus St, destination will be on right (203 ft)
- Arrive at Backus Hospital, 326 Washington St, Norwich, CT 06360

BACKUS HOSPITAL MAP
326 Washington St.
Norwich, CT



APPENDIX B

EMPLOYEE HASP REVIEW SIGNATURE SHEET

"By signing this form, I verify that I have been provided with a copy of this HASP and have read it. I understand and agree to abide by the provisions of this HASP."

EMPLOYEE NAME (print)	EMPLOYEE SIGNATURE	DATE

APPENDIX C

DAILY TAILGATE MEETING ATTENDANCE RECORD

Daily Tailgate Meetings should be conducted by the Weston & Sampson project/site safety manager and/or field supervisor. All tasks planned, associated hazards, and actions to mitigate those hazards should be reviewed. All personnel in attendance are to sign below.

Meeting Held By: _____

Topics Reviewed:

_____
_____
_____

"By signing this form, I verify that I have attended a Site health and safety tailgate meeting prior to commencement of field activities"

PRINT NAME AND COMPANY	SIGNATURE	DATE

APPENDIX D

AIR MONITORING LOG SHEET

worksafe

Weston & Sampson Air Monitoring Log

Date	Attendant Initials	Time	O2 (%)	H2S (ppm)	CO (ppm)	LEL (%)	Comments