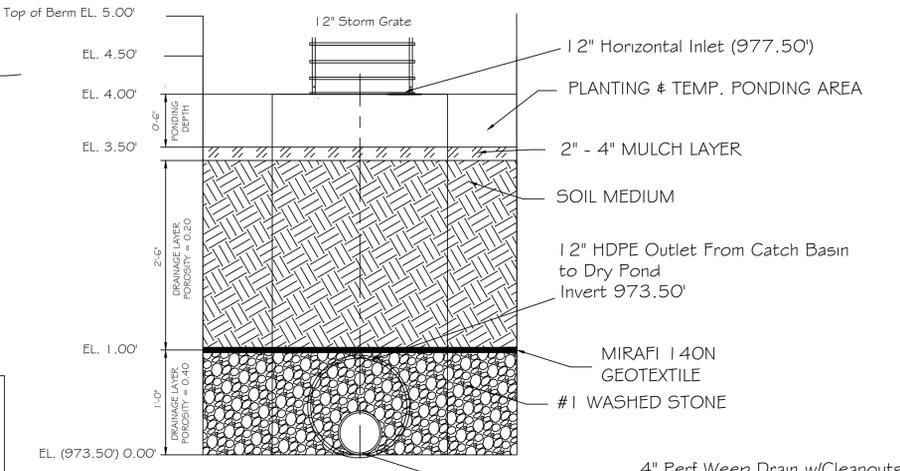


**Cross-Section Bioretention Area**  
DIMENSIONS VARY AS PER PLAN



**Bioretention Underdrain Layers, BR**

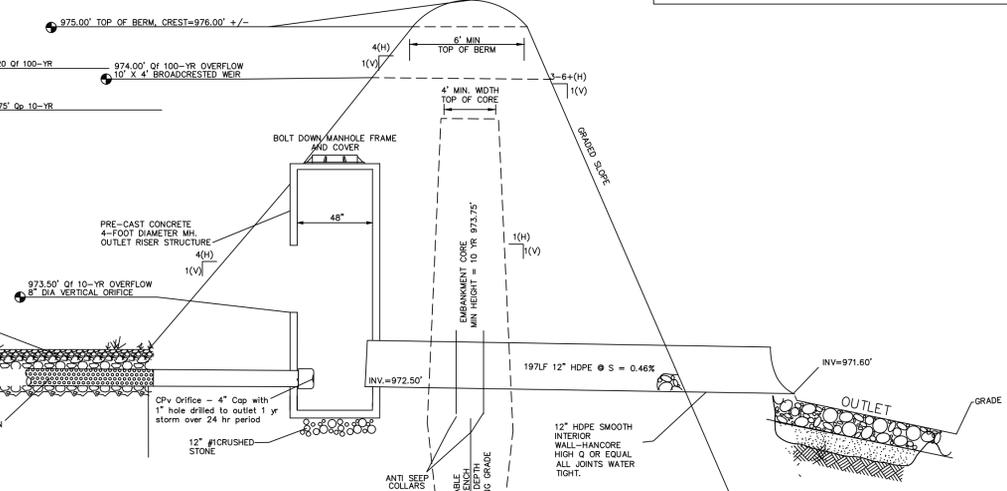
**BASIN VOLUME AND AS-BUILT CERTIFICATION:**  
Upon completion of construction, a basin volume certification and as-built must be certified by a licensed professional engineer or land surveyor to ensure that each structure meets the conditions and requirements with the details of this sheet. Provide location and elevation of all pipes, structures, and impoundments with respect to property lines. Certification shall be submitted to the local reviewing jurisdiction for approval.

**SPECIFICATIONS FOR BIORETENTION SYSTEMS**  
**Planting Soil**  
The soil shall be a uniform mix, free of stones, stumps, roots or other similar objects larger than two inches. No other materials or substances shall be mixed or dumped within the bioretention area that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations. The planting soil shall be free of noxious weeds.  
**Planting soil** shall be of a sandy loam consistency containing approximately 75% concrete sand, 25% top soil and organics.  
**Compaction**  
Minimize compaction of both the base of the bioretention area and the required backfill. Place soil in lifts 12" or greater. Do not use heavy equipment within the bioretention area basin.

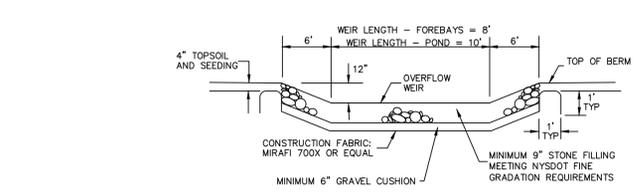
**NOTES:**  
**POND EMBANKMENT CONSTRUCTION:**

- EMBANKMENT MATERIAL SPECIFICATIONS:** EMBANKMENT CORE AND CUT OFF TRENCH MATERIAL SHALL BE MATERIAL CONFORMING TO UNIFIED SOIL CLASSIFICATION GC, SC, CH, OR CL WITH AT LEAST 30% PASSING #200 SIEVE. CORE AND CUT OFF TRENCH MATERIAL SHALL BE STOCKPILED SEPARATELY FROM OUTER SHELL MATERIAL. MATERIAL SHALL BE FREE OF ROOTS, STUMPS, WOOD, RUBBISH, STONES GREATER THAN 6-INCHES, FROZEN OR OTHER OBJECTIONABLE MATERIALS. STOCKPILED MATERIAL SHALL BE COVERED AND PROTECTED FROM WATER, TRAFFIC AND OTHER DELETERIOUS SUBSTANCES OR PROCESSES.
- EMBANKMENT COMPACTION:** EMBANKMENT FILL SHALL BE PLACED IN 12-INCH LIFTS MAXIMUM AND COMPACTED. THE MINIMUM REQUIRED DENSITY SHALL NOT BE LESS THAN 95% OF MAXIMUM DRY DENSITY WITH A MOISTURE CONTENT WITHIN 2% OF OPTIMUM. ALL COMPACTION TO BE DETERMINED BY AASHTO METHOD 99 STANDARD PROCTOR.
- EMBANKMENT CORE DIMENSIONS:** THE CORE SHALL BE PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE TOP WIDTH OF THE CORE SHALL BE A MINIMUM OF FOUR FEET. THE HEIGHT SHALL EXTEND UP TO AT LEAST THE 10 YEAR WATER ELEVATION OR AS SHOWN ON THE PLANS. THE SIDE SLOPES SHALL BE 1 TO 1 OR FLATTER. THE CORE SHALL BE COMPACTED WITH CONSTRUCTION COMPACTION EQUIPMENT, ROLLERS, OR TAMPS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY. THE CORE SHALL BE CONSTRUCTED/PLACED CONCURRENTLY WITH THE OUTER SHELL OF THE EMBANKMENT.
- EMBANKMENT SURFACE:** A 4-INCH LAYER OF TOPSOIL SHALL BE PLACED ON ENTIRE SURFACE AREA OF THE EMBANKMENT. GOOD GRASSSED COVER SHALL BE ESTABLISHED BY SEEDING, LIMING, FERTILIZING, MULCHING, ETC. IN ACCORDANCE WITH NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL. EMBANKMENT SHALL BE KEPT FREE OF WOODY PLANT GROWTH AND TREES.

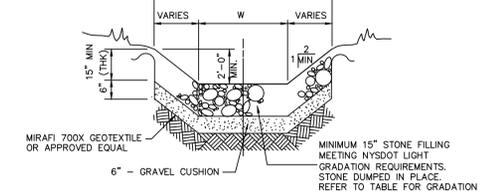
**DRY POND PLAN**



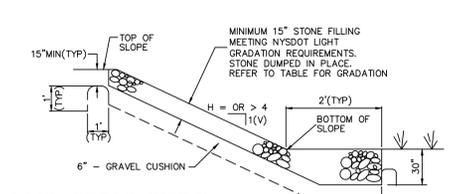
**DRY POND SECTION**



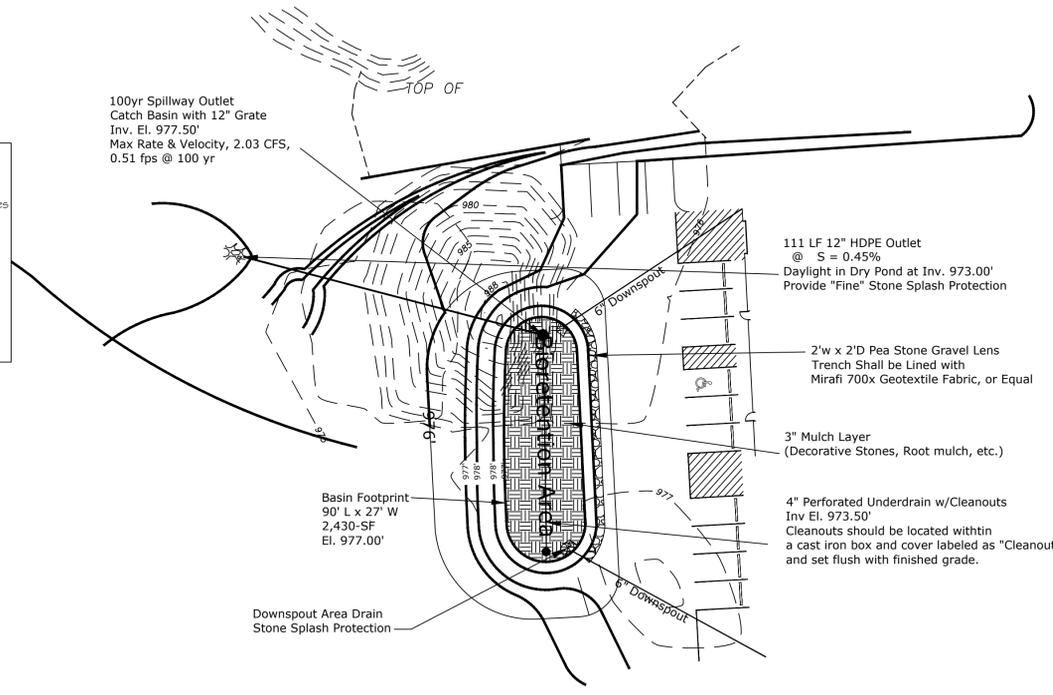
**FOREBAY, & POND OUTLET WEIRS**



**STONE LINED CHANNELS**



**SPILLWAY SLOPES FOREBAY & POND**



**BIORETENTION AREA PLAN**

STONE LINING FOR STORMWATER CONVEYANCE SECTIONS						
MIN THICKNESS (THK)	STONE FILLING ITEM	V MAX <sup>2</sup> 2' DEPTH	SEE NOTES	STONE SIZE <sup>1</sup>	PERCENT OF TOTAL BY WEIGHT	MANNING'S ROUGHNESS COEFF "N"
9"	FINE	11.0 FPS	2,3,4	SMALLER THAN 8" LARGER THAN 3" SMALLER THAN NO. 10 SIEVE	90-100 50-100 0-10	0.0314
15"	LIGHT	13.0 FPS	2,3,4	LIGHTER THAN 100 LBS LARGER THAN 6" SMALLER THAN 1/2"	90-100 50-100 0-10	0.0352
18"	MEDIUM	15.5 FPS	2,3,4	HEAVIER THAN 100 LBS SMALLER THAN 4"	50-100 0-10	0.0395
30"	HEAVY	17.0 FPS	2,3,4	HEAVIER THAN 100 LBS SMALLER THAN 6"	50-100 0-10	0.0423

<sup>1</sup> SOURCE: HYDRAULIC ENGINEERING CIRCULAR NO. 15 DESIGN OF STABLE CHANNELS WITH FLEXIBLE LININGS  
<sup>2</sup> SOURCE: SOILS DESIGN PROCEDURE SDP2, BANK AND CHANNEL PROTECTIVE LINING DESIGN PROCEDURES

- NOTES:**
- STONE SIZES, OTHER THAN WEIGHTS, REFER TO THE AVERAGE OF THE MAXIMUM AND MINIMUM DIMENSIONS OF A STONE PARTICLE AS ESTIMATED BY THE ENGINEER.
  - MATERIALS SHALL CONTAIN LESS THAN 20 PERCENT OF STONES WITH A RATIO OF MAXIMUM TO MINIMUM DIMENSIONS GREATER THAN THREE.
  - AIR-COOLED BLAST FURNACE SLAG, COBBLES OR GRAVEL HAVING AT LEAST ONE FRACTURED FACE PER ACCEPTABLE SUBSTITUTES FOR STONE UNDER THESE ITEMS, PROVIDED THAT SOUNDNESS AND GRADATION REQUIREMENTS ARE MET.
  - MATERIALS SHALL CONTAIN A SUFFICIENT AMOUNT OF STONES SMALLER THAN THE AVERAGE STONE SIZE TO FILL THE SPACES BETWEEN THE STONES.

REVISIONS	
No.	Description

**STORMWATER PRACTICE DETAILS**  
NEW BUILDING  
8-18 VERTIZON LANE  
LANSING, NY 14882



**TIMOTHY C. BUHL, P.E.**  
35 FIRE LANE 24, AUBURN, NY 13021

DATE: Oct 4, 2023  
SCALE: 1"=50'  
DRAWN: SDG  
JOB:  
SHEET:  
**C-108**



Existing Subcatchment 2 - ESC-2  
 Existing Site Conditions - Area = 21,518 SF (0.49-AC)

Surface Conditions & Soils:  
 100% Ovid, OaA - Hydrologic Soil Group (HSG) C

Runoff Curve Number = 72, Woods and Brush, Good HSG C Soils  
 Runoff Curve Number = 98, Impervious/Gravel, Good HSG C Soils

Overland Stormwater Runoff - Longest Flowpath = 374 lf +/-  
 Sheet Flow, Woods, Lt. Under - 100 lf @ S = 2.1% avg.  
 Shallow Conc. Flow - Woodland - 137 lf @ S = 1.5% avg.  
 Shallow Conc. Flow - Unpaved - 137 lf @ S = 2.2% avg.

To Design Point 2 - (DPE 2)

Existing Subcatchment 1 - ESC-1  
 Existing Site Conditions - Area = 113,643 SF (2.61-AC)

Surface Conditions & Soils:  
 20% Kendaia, KaB - Hydrologic Soil Group (HSG) B  
 80% Ovid, OaA - Hydrologic Soil Group (HSG) C

Runoff Curve Number = 58, Meadow, Good HSG B Soils  
 Runoff Curve Number = 58, Woods and Brush, Good HSG B Soils  
 Runoff Curve Number = 72, Woods and Brush, Good HSG C Soils  
 Runoff Curve Number = 87, Compacted Dirt, Good HSG C Soils

Overland Stormwater Runoff - Longest Flowpath = 1,101 lf +/-  
 Sheet Flow, Dense Grass - 100 lf @ S = 1.8% avg.  
 Shallow Conc. Flow - Short Grassed Pasture - 250 lf @ S = 2.8% avg.  
 Shallow Conc. Flow - Woodland - 583 lf @ S = 2.91% avg.  
 Shallow Conc. Flow - Unpaved - 168 lf @ S = 2.4% avg.

To Design Point 1 - (DPE 1)

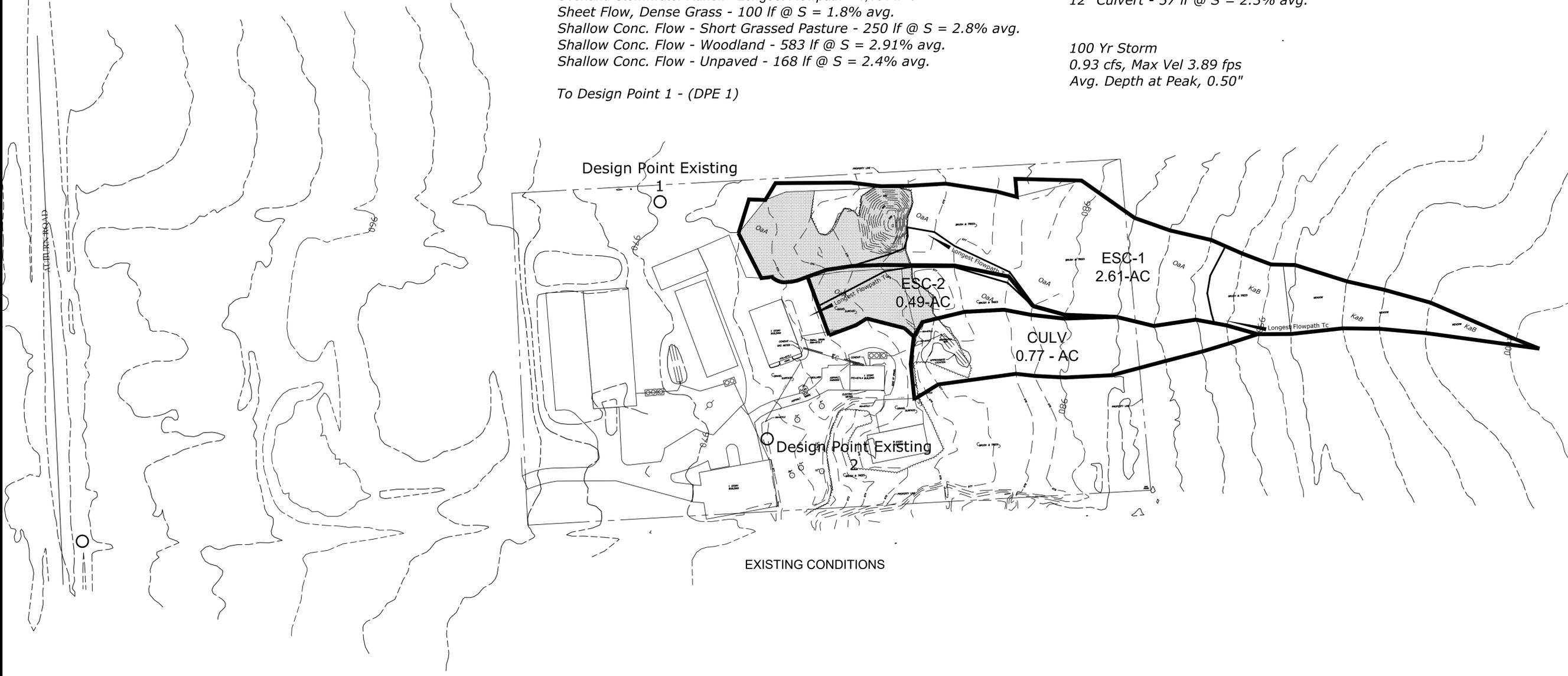
Proposed Culvert Analysis  
 Proposed Site Conditions - PSC-1 Area = 61,729 SF (1.42-AC)  
 Culvert Drainage Area = 33,656 SF (0.77-AC)

Surface Conditions & Soils:  
 100% Ovid, OaA - Hydrologic Soil Group (HSG) C

Runoff Curve Number = 58, Woods and Brush, Good HSG B Soils

Overland Stormwater Runoff - Longest Flowpath = 1,043 lf +/-  
 Sheet Flow, Woods, Lt. Underbrush - 100 lf @ S = 2.0% avg.  
 Shallow Conc. Flow - Woodland - 410 lf @ S = 2.4% avg.  
 6" Culvert - 14 lf @ S = 1.5% avg.  
 Trap/Vee Channel Flow - 72 lf @ S = 0.8% avg.  
 12" Culvert - 57 lf @ S = 2.3% avg.

100 Yr Storm  
 0.93 cfs, Max Vel 3.89 fps  
 Avg. Depth at Peak, 0.50"



REFERENCE HYDROCAD (HYDRAULIC & HYDROLOGIC) MODELING RESULTS PRESENTED WITH THESE PLANS

No.	Date	SYN.	Description

HYDRAULIC AND HYDROLOGIC  
 RUNOFF ANALYSIS WORKSHEET  
 EXISTING CONDITIONS

BILL DUTHIE  
 484 RIDGE ROAD  
 LANCASTER (T) TOMPKINS CO. N.Y.

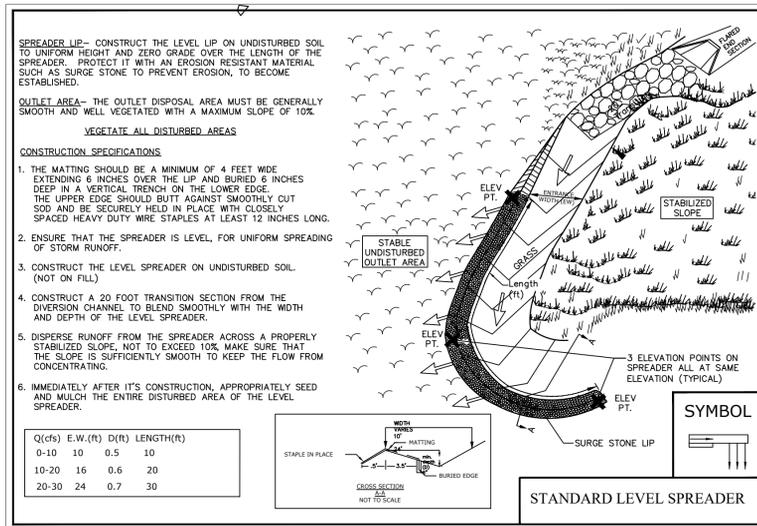
NEW BUILDING  
 8-18 VERTIZON LANE  
 LANCASTING, NY 14882



**TIMOTHY C. BUHL, P.E.**

35 FIRE LANE 24, AUBURN, NY 13021

DATE: Oct 4, 2023  
 SCALE: 1" = 70'  
 DRAWN: SDG  
 JOB:  
 SHEET:  
**C-110**



**Proposed Subcatchment 1 - PSC-1**  
**Proposed Site Conditions - Area = 79,048 SF (1.81-AC)**

**Surface Conditions & Soils:**  
 44% Kendaia, KaB - Hydrologic Soil Group (HSG) B  
 56% Ovid, OaA - Hydrologic Soil Group (HSG) C

Runoff Curve Number = 58, Meadow, Good HSG B Soils  
 Runoff Curve Number = 58, Woods and Brush, Good HSG B Soils  
 Runoff Curve Number = 72, Woods and Brush, Good HSG C Soils

Overland Stormwater Runoff - Longest Flowpath = 1,043 lf +/-  
 Sheet Flow, Dense Grass - 100 lf @ S = 1.8% avg.  
 Shallow Conc. Flow - Short Grassed Pasture - 250 lf @ S = 2.8% avg.  
 Shallow Conc. Flow - Woodland - 379 lf @ S = 3.3% avg.  
 Trap/Vee Channel Flow - 171 lf @ S = 1.75% avg.  
 6" Culvert - 14 lf @ S = 1.5% avg.  
 Trap/Vee Channel Flow - 72 lf @ S = 0.8% avg.  
 12" Culvert - 57 lf @ S = 2.3% avg.

To Design Point 1 - (DPP 1)

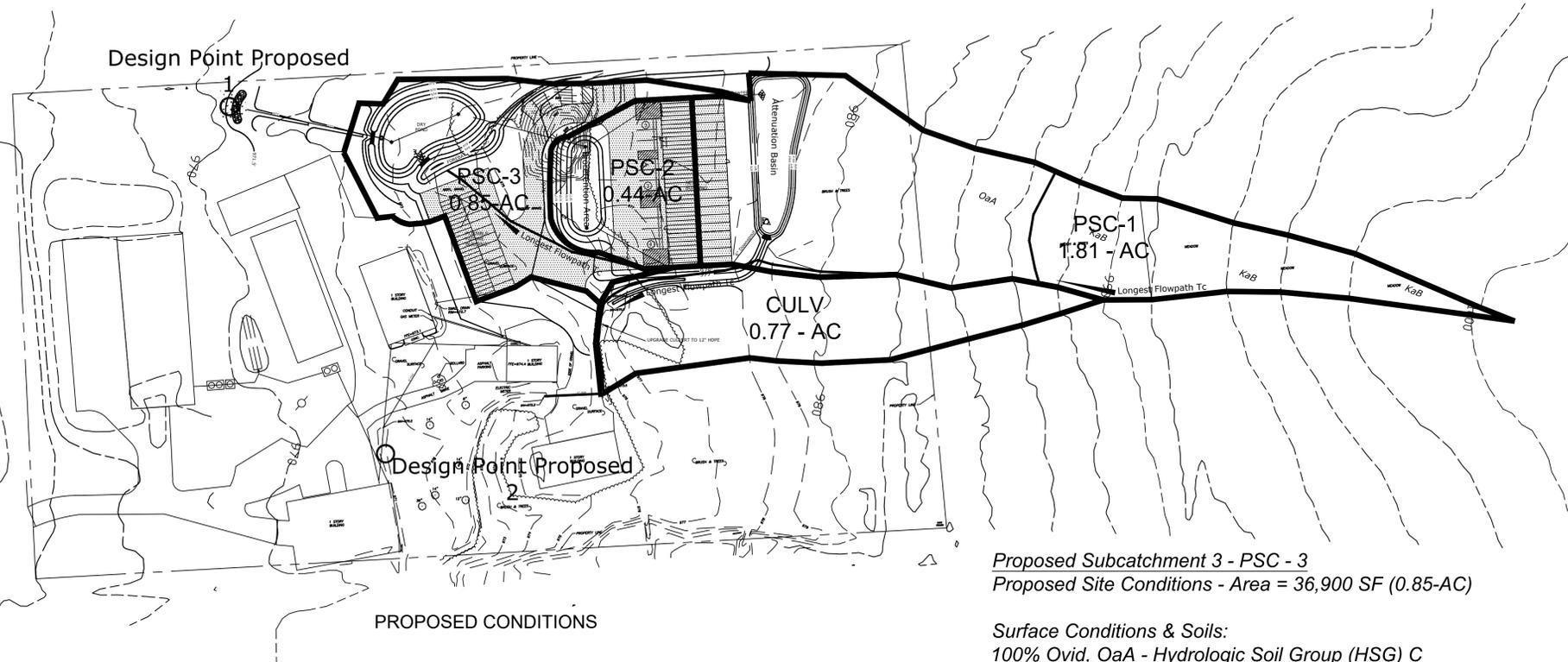
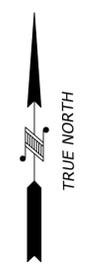
**Proposed Culvert Analysis**  
**Proposed Site Conditions - PSC-1 Area = 61,729 SF (1.42-AC)**  
**Culvert Drainage Area = 33,656 SF (0.77-AC)**

**Surface Conditions & Soils:**  
 100% Ovid, OaA - Hydrologic Soil Group (HSG) C

Runoff Curve Number = 58, Woods and Brush, Good HSG B Soils

Overland Stormwater Runoff - Longest Flowpath = 1,043 lf +/-  
 Sheet Flow, Woods, Lt. Underbrush - 100 lf @ S = 2.0% avg.  
 Shallow Conc. Flow - Woodland - 410 lf @ S = 2.4% avg.  
 12" Culvert - 14 lf @ S = 1.5% avg.  
 Trap/Vee Channel Flow - 72 lf @ S = 0.8% avg.  
 12" Culvert - 57 lf @ S = 2.3% avg.

100 Yr Storm  
 3.79 cfs, Max Vel 6.13 fps  
 Avg. Depth at Peak, 0.73"



**Proposed Subcatchment 2 - PSC - 2**  
**Proposed Site Conditions - Area = 19,189 SF (0.44-AC)**

**Surface Conditions & Soils:**  
 100% Ovid, OaA - Hydrologic Soil Group (HSG) C

Runoff Curve Number = 98, Rooftop, Parking, Good HSG C Soils  
 Runoff Curve Number = 74, >75% Grass, Good HSG C Soils

Overland Stormwater Runoff - Minimum 6 minutes

To Design Point 1 - (DPP 1)

**Proposed Subcatchment 3 - PSC - 3**  
**Proposed Site Conditions - Area = 36,900 SF (0.85-AC)**

**Surface Conditions & Soils:**  
 100% Ovid, OaA - Hydrologic Soil Group (HSG) C

Runoff Curve Number = 98, Rooftop, Parking, Good HSG C Soils  
 Runoff Curve Number = 65, Brush, Good HSG C Soils

Overland Stormwater Runoff - Minimum 6 minutes

To Design Point 1 - (DPP 1)

REFERENCE HYDROCAD (HYDRAULIC & HYDROLOGIC) MODELING RESULTS PRESENTED WITH THESE PLANS

REVISIONS Description No. Date (Y/M)	HYDRAULIC AND HYDROLOGIC RUNOFF ANALYSIS WORKSHEET PROPOSED CONDITIONS	BILL DUTHIE 484 RIDGE ROAD LANSING (T) TOMPKINS CO. N.Y.	NEW BUILDING 8-18 VERTIZON LANE LANSING, NY 14882
<b>TIMOTHY C. BUHL, P.E.</b> 35 FIRE LANE 24, AUBURN, NY 13021			
DATE: Oct 4, 2023 SCALE: 1" = 70' DRAWN: SDG JOB: SHEET:			
<b>C-111</b>			