SWM CONCEPT AND DEVELOPMENT PLAN SUBMISSION CHECKLIST

--Plan Title shall be " SWM CONCEPT AND DEVELOPMENT PLAN"

--Site and Resource Mapping:

Table 5.1 page 5.7 of SWM design Manual (Discussion of protection & enhancing natural resources present onsite)

--Site Fingerprinting and Development Layout:

- Determine approx. location of buildings, roadways, parking lots and other impervious areas.
- Location of ESD practices

--Better Site Design Technique:

- Discuss one by one all techniques listed in table 5.2

--Determination of final site layout and acreage of total impervious area onsite.

--Proposed topography

--Proposed drainage areas at all points of discharge from the site.

--Proposed SWM volume requirements for ESD targets and quantity control.

--The location and size of ESD practices used to the MEP and all nonstructural, alternative surfaces, and micro-scale practices used.

--Proposed hydrology analysis for runoff rates, storage volumes, and discharge velocities.

--SWM design details and specifications.

Created: February 9, 2023

--Discharge calculations demonstrating stable conveyance of runoff off site.

--Preliminary erosion and sediment control plans showing LOD, sensitive areas, buffers, and forest preservation, proposed phasing, construction sequencing, proposed practices, and stabilization techniques.

--An overlay plan showing the location of SWM ESD practices and proposed erosion and sediment controls.

--A narrative to support the site development design and demonstrate that ESD will be achieved to MEP.

APPLICATION TYPE or PLAN TITLE:

COMBINED SWM CONCEPT & DEVELOPMENT PLAN (PW271185)

FOR

PROJECT NAME:

STANFORD INDUSTRIAL PARK - LOT 12

TAX MAP 094, P/O PARCEL 089

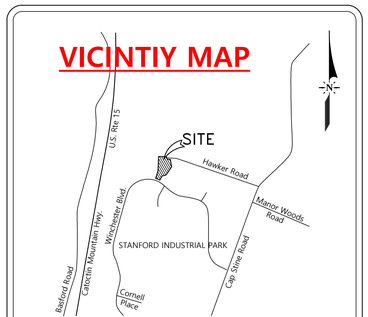
LOCATION OF SITE:

SITUATED AT 4870 WINCHESTER BOULEVARD

JEFFERSON ELECTION DISTRICT No. 14

FREDERICK COUNTY, MARYLAND

VICINTIY MAP



ADC MAP GRID: 37 / B-5

TAX MAP: 094 P/O PARCEL: 097

TAX ID: 01-043927

VICINITY MAP

SCALE: 1" = 1600'

SHEET INDEX

TITLE	SHEET No.
COVER SHEET	1
CONCEPT PLAN	2
STORMWATER MANAGEMENT PLAN & PROFILES	3
SWM NOTES & DETAILS SHEET	4
SWM NOTES & DETAILS SHEET	5
EROSION AND SEDIMENT CONTROL PLAN	6
ESC NOTES AND DETAILS	7
DRAINAGE AREA MAP	8

SHEET INDEX

AGENCY FILE REFERENCES:
PROPERTY TAX ID#s: 01-043935
FRED. CO. DPDR PROJECT No: PW271185
SITE PLAN FILE No.: SP89-06, A/P#:266549

CALL "MISS UTILITY" AT 1-800-257-7777 FOR UTILITY LOCATIONS AT LEAST 48 HOURS PRIOR TO BEGINNING CONSTRUCTION.

GENERAL NOTES

GENERAL NOTES:

1. The property is currently owned by Stanford Trading VI, LLC and is designated on Tax Map 94 as P/O Parcel 89. The deed reference for the property is Liber 6721 at Folio 199. The platted property area is 134,699 square feet or 3.092 acres, and can be found in Tax ID #01-043935.
2. Horizontal Datum is MSP NAD 83/2011. Vertical Datum is NAVD 88. Survey by Lavelle and Associates, Inc. (Dated: August, 2021)
3. This site lies within Zone "X" (0.2% annual chance flood.) per FEMA Panel: 24021C0410D (Effective Date: September 19, 2007).
4. Utility locations shown are based on field locations supplemented with existing available drawings. Their locations should be considered approximate and should be verified before construction begins.
5. This plan prepared without the benefit of a Title Report.
6. This property is zoned: Limited Industrial (LI) and is located within the Adamstown Planning Region.
   The Comprehensive Plan - Land Use is: "Limited Industrial" according to Section § 1-19-6.100.

	PROPOSED	ACTUAL	
Minimum lot area:	20,000 SF	134,699 SF or 3.092 Ac.	
Minimum lot width:	100-Ft.	232.7'	(Along Front Property Line)
Front BRL:	25'	168.6'	
Side BRL:	30' *	31.0'	(* Minimum Equal to Height of Structure: 30-feet)
Rear BRL:	20'	60.9'	
Building Height:	60' Maximum	* 30' Proposed	

7. Soil Types:
   GgC - Glenelg gravelly loam, 8% to 15% slopes; K-Factor: 0.17; HSG - "B"; Lower ½ Restricted Soil **Not a Wet Soil**
   GfB - Glenelg silt loam, 3% to 8% slopes; K-Factor: 0.37; HSG - "C"; Lower ½ Restricted Soil **Not a Wet Soil**
   MeB - Mt. Airy channery loam, 3% to 8% slopes; K Factor: ?.??; HSG - "?"; Lower ½ Restricted Soil **Not a Wet Soil**
8. Existing Site Summary:

Total Site Area:	=	134,699 SF	or 3.092 Ac.	100.0 %
Total Impervious Area:	=	0 SF	or 0.000 Ac.	0.0 %
Remaining Green Space:	=	134,699 SF	or 3.092 Ac.	100.0%

9. Water & Sanitary Sewer Category: No Planned Service

10. No wetlands exist or 100-Yr. Floodplain exist on this property!

NO.	DATE	REVISION	DESCRIPTION	BY
4				
3				
2	5-26-22	Revised per DPP Comments	Comments/Signed	GLM
1	5-18-22	Revised per DPP Comments		GLM

ROUTING STAMP

APPROVED: SEE COUNTY BLOCK ABOVE for FINAL APPROVAL!

FREDERICK COUNTY, MARYLAND
DEVELOPMENT REVIEW, ENGINEERING

Reviewed in accordance with local County requirements. Frederick County assumes no liability for design and/or construction. Approval is valid for two (2) years from approval date shown above. The project must be under construction before approval expiration to be considered active. Otherwise, resubmittal of plans, including applicable fees, must be made to Development Review for reapproval. Fees for resubmittal cannot be waived.

REV. #	DATE	REVISION DESCRIPTION *FILL IN THESE BLOCKS FOR REVISIONS ONLY	ENGINEER/ CONSULTANT DATE AND INITIAL		DEV. REVIEW DATE AND INITIAL	

File#:	SP 89-06
A/P #:	PW271185
Due Date:	

PROFESSIONAL ENGINEER'S CERTIFICATION

SIGNED BY: Gerald Miller 5.26.22
GERALD LEE MILLER, JR., PE DATE

MD LICENSE No.: 21401, P.E. EXPIRATION DATE: 11-09-22

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.

STANFORD INDUSTRIAL PARK - LOT 12

Situated at 4870 Winchester Boulevard
Plat Book 81, Plat 190
Jefferson Election District No. 14
Frederick County, Maryland

IMPROVEMENT PLANS - COVER SHEET

Terra Solutions Engineering, LLC
Commercial & Residential Land Planning and Engineering
5216 Chairmans Counte, Suite 105
Frederick, MD 21703
Phone: 301-378-9842 Email: terrasolutionsengineering@gmail.com

Owner/Developer
Stanford Trading VI, LLC
12 West Church Street, Suite 120
Frederick, Maryland 21701

Contract Purchaser
Ruppert Properties
12 West Church Street, Suite 2
Frederick, Maryland 21702
Phone: 301-695-0550, Contact Matt Poffenbarger

STATE OF MARYLAND · GERALD LEE MILLER JR. · No. 21401 · REGISTERED PROFESSIONAL ENGINEER

Seal & Signature

PROJECT No.: 274
DATE: MAY 2022
SCALE: AS SHOWN
SHEET No. 1 of 8

STANFORD INDUSTRIAL PARK - LOT 12

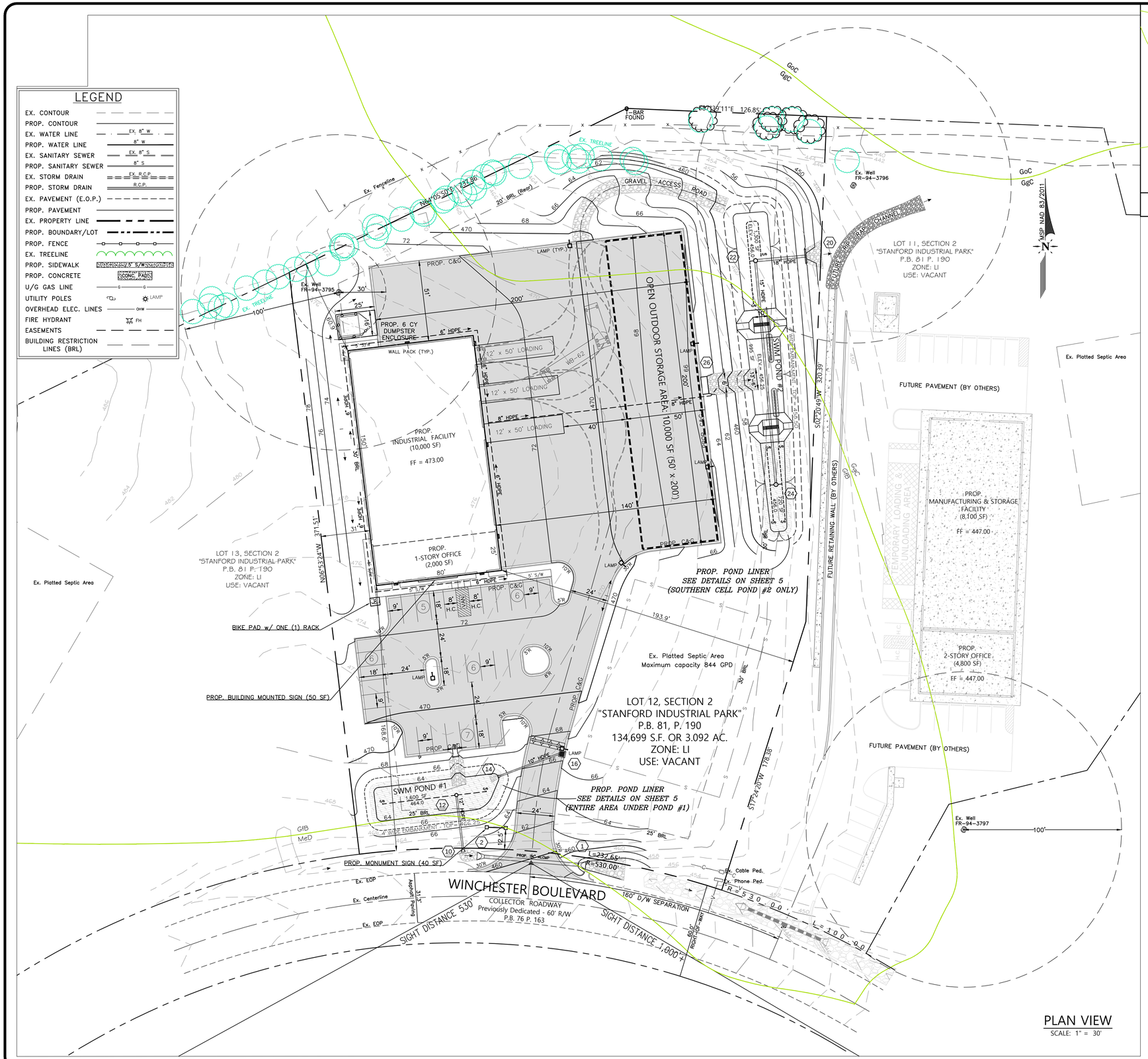
Situated at 4870 Winchester Boulevard
Plat Book 81, Plat 190
Jefferson Election District No. 14
Frederick County, Maryland

CONCEPT PLAN

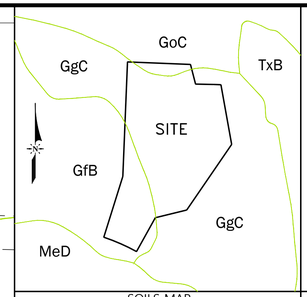
NO.	DATE	REVISION DESCRIPTION	BY
4	–	–	–
3	–	–	–
2	5–26–22	Revised per DPP Comments/Signed	GLM
1	5–18–22	Revised per DPP Comments	GLM

LEGEND

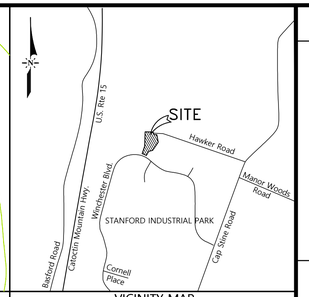
- EX. CONTOUR
- PROP. CONTOUR
- EX. WATER LINE — EX. 8" W
- PROP. WATER LINE — 8" W
- EX. SANITARY SEWER — EX. 8" S
- PROP. SANITARY SEWER — 8" S
- EX. STORM DRAIN — EX. R.C.P.
- PROP. STORM DRAIN — R.C.P.
- EX. PAVEMENT (E.O.P.)
- PROP. PAVEMENT
- EX. PROPERTY LINE
- PROP. BOUNDARY/LOT
- PROP. FENCE
- EX. TREELINE
- PROP. SIDEWALK — 5' S/W
- PROP. CONCRETE — CONC. PADS
- U/G GAS LINE — G
- UTILITY POLES — LAMP
- OVERHEAD ELEC. LINES — OHW
- FIRE HYDRANT — FH
- EASEMENTS
- BUILDING RESTRICTION LINES (BRL)



PLAN VIEW
SCALE: 1" = 30'



SOILS MAP
SCALE: 1" = 200'



VICINITY MAP
SCALE: 1" = 1,600'

TAX MAP: 094 P/O PARCEL: 97

Terra Solutions Engineering, LLC
Commercial & Residential Land Planning and Engineering
5216 Chairmans Counte, Suite 105
Frederick, MD 21703
Phone: 301-378-9842 Email: terrasolutionsengineering@gmail.com

Owner/Developer
Stanford Trading VI, LLC
12 West Church Street, Suite 120
Frederick, Maryland 21701

Contract Purchaser
Ruppert Properties
12 West Church Street, Suite 2
Frederick, Maryland 21702
Phone: 301-695-0550, Contact Matt Poffenbarger

PROFESSIONAL ENGINEER'S CERTIFICATION

SIGNED BY: Gerald L. Miller 5-26-22
GERALD LEE MILLER, JR., PE — DATE

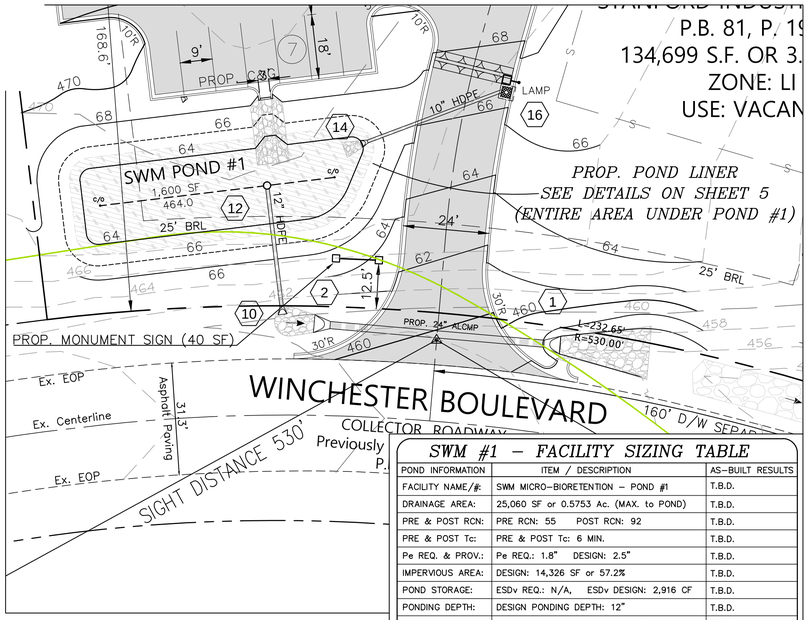
MD LICENSE No.: 21401, P.E. EXPIRATION DATE: 11-09-22

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.

STATE OF MARYLAND — GERALD LEE MILLER JR. — 21401 — REGISTERED PROFESSIONAL ENGINEER

Seal & Signature

PROJECT No.:	274
DATE:	MAY 2022
SCALE:	1" = 30'
SHEET No.	2 of 8

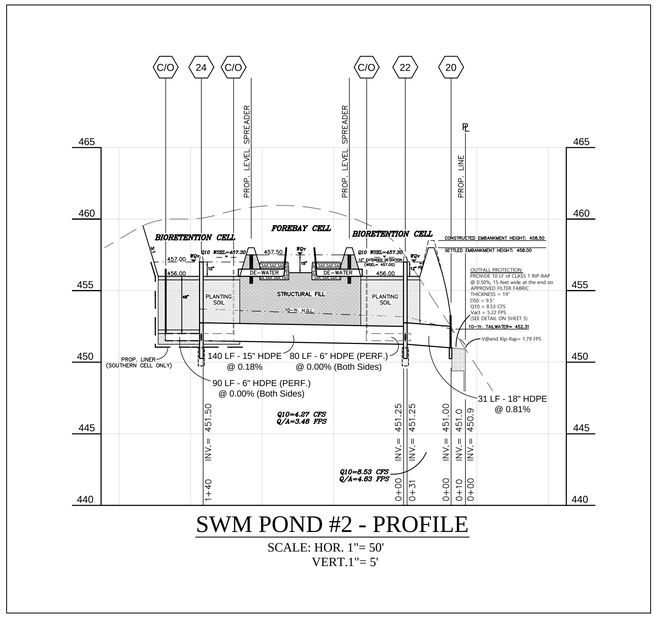


SWM POND # 1

SCALE: HOR. 1"= 20'

SWM #1 – FACILITY SIZING TABLE

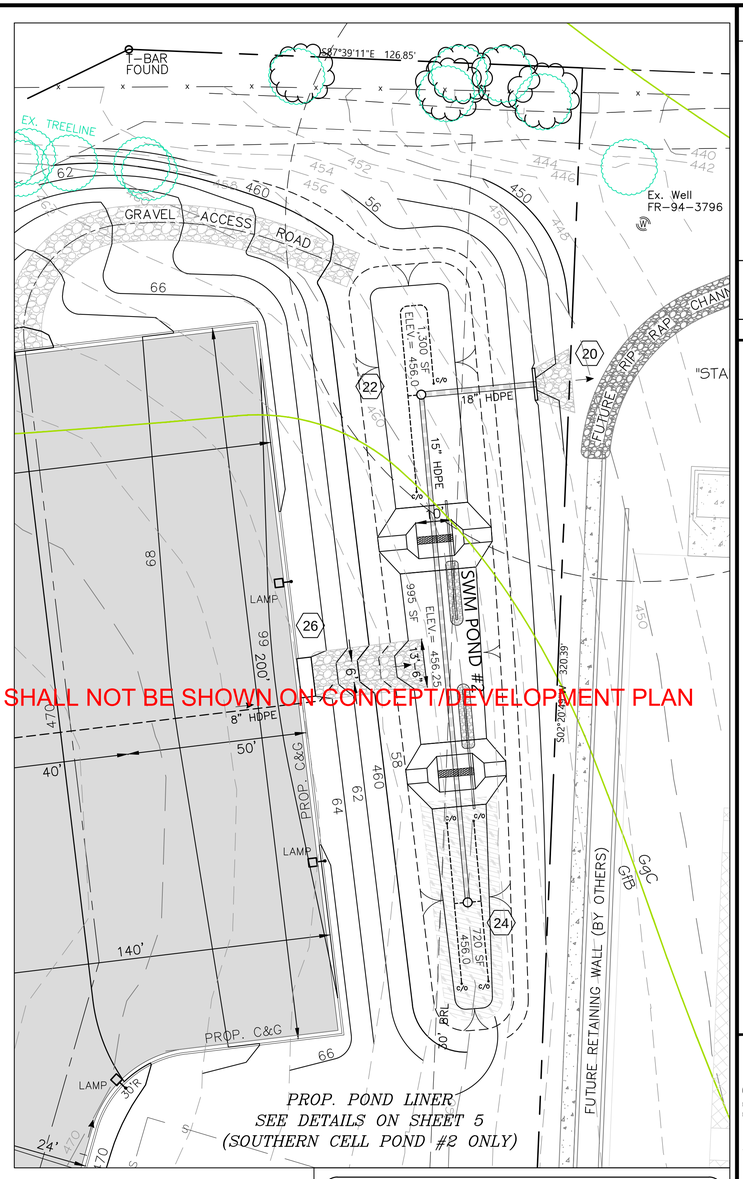
POND INFORMATION	ITEM / DESCRIPTION	AS–BUILT RESULTS
FACILITY NAME/#:	SWM MICRO–BIORETENTION – POND #1	T.B.D.
DRAINAGE AREA:	25,060 SF or 0.5753 Ac. (MAX. to POND)	T.B.D.
PRE & POST RCN:	PRE RCN: 55 POST RCN: 92	T.B.D.
PRE & POST Tc:	PRE & POST Tc: 6 MIN.	T.B.D.
Pe REQ. & PROV.:	Pe REQ.: 1.8" DESIGN: 2.5"	T.B.D.
IMPERVIOUS AREA:	DESIGN: 14,326 SF or 57.2%	T.B.D.
POND STORAGE:	ESDv REQ.: N/A, ESDv DESIGN: 2,916 CF	T.B.D.
PONDING DEPTH:	DESIGN PONDING DEPTH: 12"	T.B.D.
FILTER AREA:	BIORETENTION MEDIA AREA: 1,620 SF	T.B.D.
FILTERING DEPTH:	BIORETENTION STORAGE DEPTH: 24"	T.B.D.
MAX. MEDIA DEPTH:	MEDIA DEPTH w/ MULCH: 21"	T.B.D.
–	–	–



SWM POND #2 - PROFILE

SCALE: HOR. 1"= 50'
VERT.1"= 5'

SWM FACILITITES CONSTRUCTION DETAILS /SECTIONS SHALL NOT BE SHOWN ON CONCEPT/DEVELOPMENT PLAN
THESE SHALL BE ON FUTURE IP'S

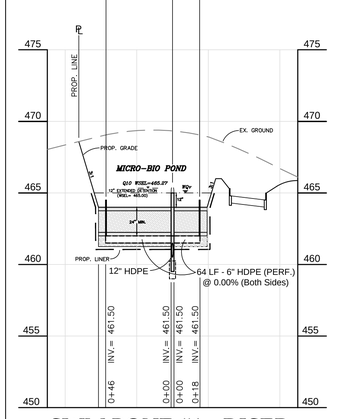


SWM POND # 2

SCALE: HOR. 1"= 20'

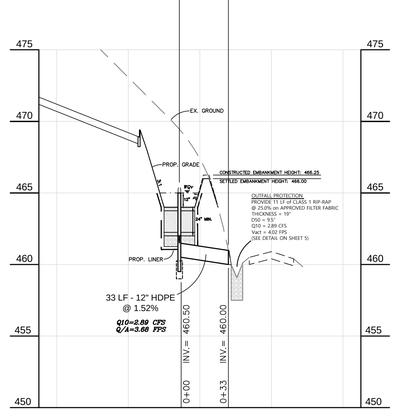
SWM #2 – FACILITY SIZING TABLE

POND INFORMATION	ITEM / DESCRIPTION	AS–BUILT RESULTS
FACILITY NAME/#:	SWM MICRO–BIORETENTION – POND #2	T.B.D.
DRAINAGE AREA:	70,435 SF or 1.6170 Ac. (MAX. to POND)	T.B.D.
PRE & POST RCN:	PRE RCN: 55 POST RCN: 92	T.B.D.
PRE & POST Tc:	PRE & POST Tc: 6 MIN.	T.B.D.
Pe REQ. & PROV.:	Pe REQ.: 1.8" DESIGN: 1.4"	T.B.D.
IMPERVIOUS AREA:	DESIGN: 44,585 SF or 63.3%	T.B.D.
POND STORAGE:	ESDv REQ.: N/A, ESDv DESIGN: 5,252 CF	T.B.D.
PONDING DEPTH:	DESIGN PONDING DEPTH: 12"	T.B.D.
FILTER AREA:	BIORETENTION MEDIA AREA: 2020 SF	T.B.D.
FILTERING DEPTH:	BIORETENTION STORAGE DEPTH: 48"	T.B.D.
MAX. MEDIA DEPTH:	MEDIA DEPTH w/ MULCH: 45"	T.B.D.
FOREBAY STORAGE:	ESDv DESIGN in FOREBAY: 1,244 CF	T.B.D.



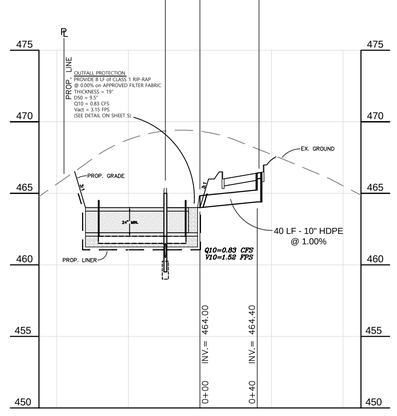
SWM PONE #1 - RISER

SCALE: HOR. 1"= 50'
VERT.1"= 5'



SWM POND #1 - OUTFALL

SCALE: HOR. 1"= 50'
VERT.1"= 5'



STORM DRAIN PROFILE

SCALE: HOR. 1"= 50'
VERT.1"= 5'

STRUCTURE SCHEDULE

NO.	STRUCTURE TYPE	STRUCTURE LOCATION ROAD STA.	STRUCTURE LOCATION OFFSET	ELEVATIONS	BASE WIDTH	STEP LOCATION	REMARKS
10	12" HDPE – END SECTION	–	–	–	–	–	MSHA STD. DET. No. MD–370.01 (HDPE)
12	24" ADS NYLOPLAST RISER	–	–	RISER CREST ELEV.= 465.00	–	–	ADS CUSTOM RISER
–	–	–	–	–	–	–	–
20	18"ø TYPE 'C' ENDWALL	–	–	–	–	–	MSHA STD. DET. No. MD–354.01 (18" OPENING)
22	30" ADS NYLOPLAST RISER	–	–	RISER CREST ELEV.= 457.00	–	–	ADS CUSTOM RISER
24	30" ADS NYLOPLAST RISER	–	–	RISER CREST ELEV.= 457.00	–	–	ADS CUSTOM RISER
26	10'–COG (OPEN–BACK INLET)	–	–	T.C. @ GUTTERLINE= 465.60	–	–	MSHA STD No. MD–374.68 (L=11', T=10', & S=4') REAR INVERT= 464.00
–	–	–	–	–	–	–	–
1	24" ALCMP END–SECTION	–	–	–	–	–	MSHA STD No. MD–370.01
2	24" ALCMP END–SECTION	–	–	–	–	–	MSHA STD No. MD–370.01
–	–	–	–	–	–	–	–
14	10" HDPE END–SECTION	–	–	–	–	–	MSHA STD. DET. No. MD–370.01 (HDPE)
16	SINGLE WR–INLET	–	–	T.C.= 467.00 / T.C.= 466.80	–	–	MSHA STD No. MD–374.23 (GRATE ELEV.= 466.40)

PIPE SCHEDULE

SIZE	MATERIAL	LENGTH
6"	HIGH DENSITY POLYETHYLENE (HDPE)–(TYPE–'S') (AASHTO M252) – ROOF–DRAIN	456'
6"	"PERFORATED" HIGH DENSITY POLYETHYLENE (HDPE)–(AASHTO M252) (4" to 10")	234'
–	–	–
8"	HIGH DENSITY POLYETHYLENE (HDPE)–(TYPE–'S') (AASHTO M252) – ROOF–DRAIN	150'
–	–	–
12"	HIGH DENSITY POLYETHYLENE (HDPE)–(TYPE–'S') (AASHTO M294) (12" to 60")	33'
–	–	–
15"	HIGH DENSITY POLYETHYLENE (HDPE)–(TYPE–'S') (AASHTO M294) (12" to 60")	140'
–	–	–
18"	HIGH DENSITY POLYETHYLENE (HDPE)–(TYPE–'S') (AASHTO M294) (12" to 60")	30'
–	–	–
24"	ALUMINIZED CORRUGATED METAL PIPE (ALCMP) – TYPE 2	60'
–	–	–

SEE SWM DETAILS ON SHEETS 2 & 3 FOR 6" HDPE UNDERDRAIN PIPE LOCATIONS

PROFESSIONAL ENGINEER'S "AS–BUILT" CERTIFICATION

I hereby certify that the facility shown on this plan as being constructed in conformance with the signed Improvement Plans and as highlighted on the as–built plans provided.

Signature Date

P.E. Number: 21401

PROFESSIONAL ENGINEER'S CERTIFICATION

SIGNED BY: Gerald Miller 5-26-22
GERALD LEE MILLER, JR., PE DATE

MD LICENSE No.: 21401, P.E. EXPIRATION DATE: 11–09–22

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.

NO.	DATE	REVISION DESCRIPTION	BY
4	–	–	–
3	5–26–22	Revised per DPP Comments/Signed	GLM
2	5–26–22	Revised per DPP Comments	GLM
1	5–18–22	–	–

STANFORD INDUSTRIAL PARK - LOT 12

Situated at 4870 Winchester Boulevard
Plat Book 81, Plat 190
Jefferson Election District No. 14
Frederick County, Maryland

STORMWATER MANAGEMENT PLANS, PROFILES, & DETAILS

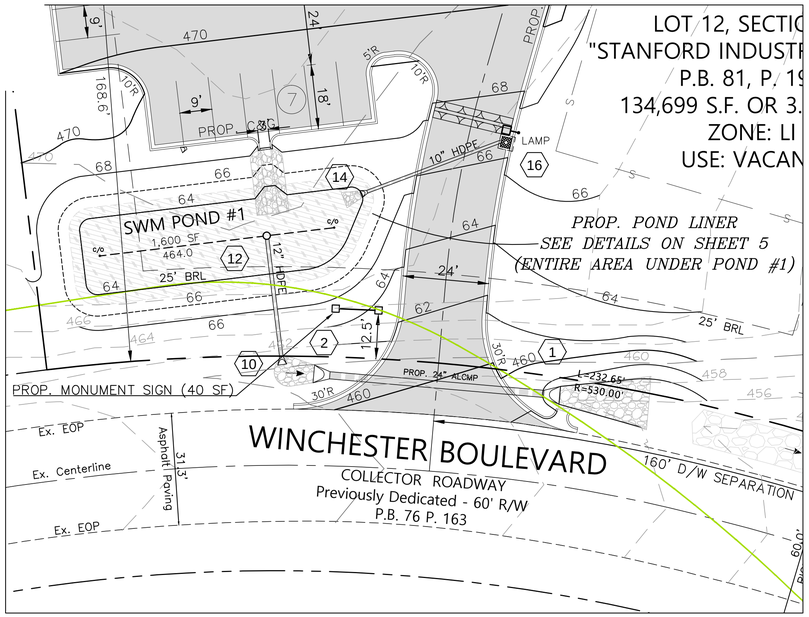
Terra Solutions Engineering, LLC
Commercial & Residential Land Planning and Engineering
5216 Chairmans Courte, Suite 105
Frederick, MD 21703
Phone: 301-378-9842 Email: terrasolutionsengineering@gmail.com

Owner/Developer
Stanford Trading VI, LLC
12 West Church Street, Suite 120
Frederick, Maryland 21701

Contract Purchaser
Ruppert Properties
12 West Church Street, Suite 2
Frederick, Maryland 21702
Phone: 301-695-0590, Contact Matt Poffenbarger

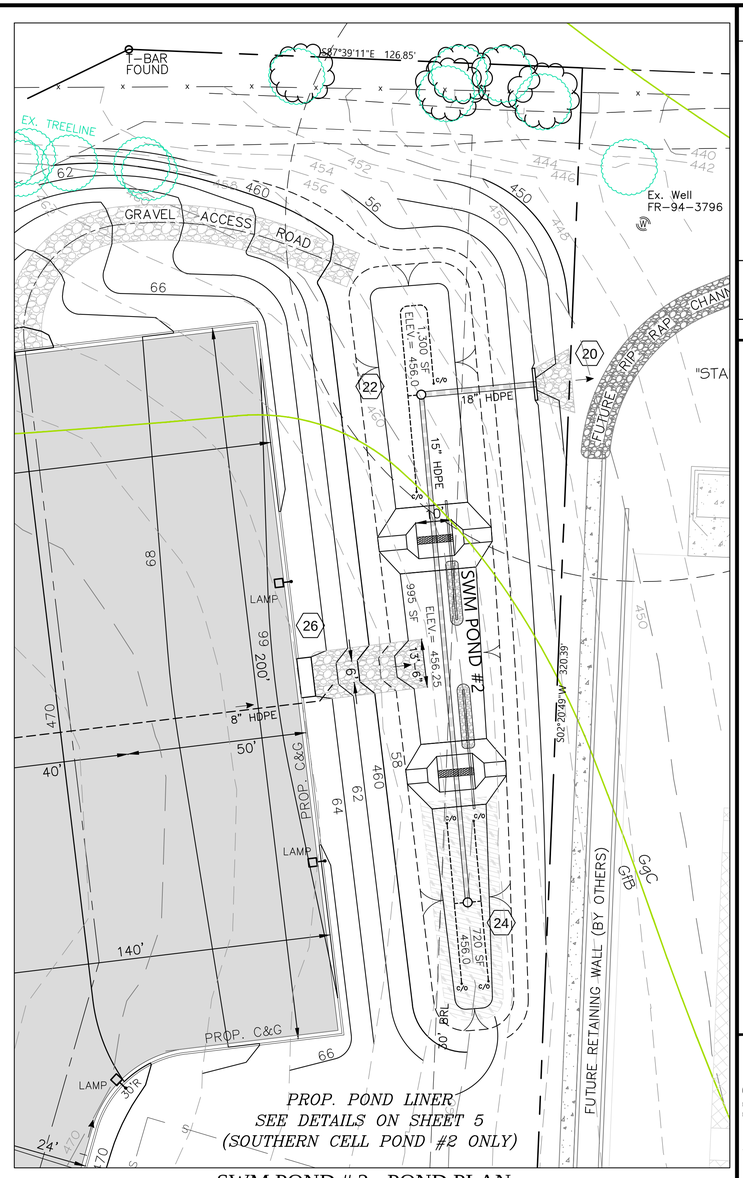
STATE OF MARYLAND
GERALD LEE MILLER JR.
No. 21401
REGISTERED PROFESSIONAL ENGINEER
Gerald L. Miller
Seal & Signature

PROJECT No.: 274
DATE: MAY 2022
SCALE: AS SHOWN
SHEET No. 3 of 8



SWM POND # 1 - POND PLAN

SCALE: HOR. 1"= 20'



SWM POND # 2 - POND PLAN

SCALE: HOR. 1"= 20'

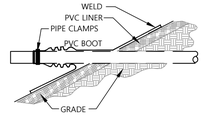
* A liner is required under SWM #1 and the southern portion of SWM #2 "ONLY"!

SWM/ESD LINER ALTERNATIVES

ALTERNATIVE #1	ALTERNATIVE #2A/B	ALTERNATIVE #3
– 3" PROTECTIVE SOIL COVER LAYER – APPROVED FILTER FABRIC – 12" IMPERMEABLE CLAY MATERIAL – APPROVED/COMPACTED SUB-GRADE	– 12" PROTECTIVE SOIL COVER LAYER (NOT REQUIRED UNDER FACILITY) – APPROVED FILTER FABRIC – 6" PROTECTIVE FINE SOIL COVER – 30 MIL HDPE OR PVC LINER – APPROVED/COMPACTED SUB-GRADE	– 12" PROTECTIVE SOIL COVER LAYER (NOT REQUIRED UNDER FACILITY) – APPROVED FILTER FABRIC – 6" PROTECTIVE FINE SOIL COVER – GEOSYNTHETIC CLAY LINER (GCL) – APPROVED/COMPACTED SUB-GRADE

Material	Specification/Test Method	Liner Thickness	Notes
ALTERNATIVE #1 Impermeable 12" clay liner w/ protective soil cover	Clay liner thickness: ASTM-D5887 (Hydraulic conductivity: 1 x 10-7 cm/sec max.)	12" clay liner	A geotextile fabric should be used to protect liner from material from above. Clay material shall be certified by Geotechnical Engineer.
ALTERNATIVE #2A Textured HDPE liner w/ protective soil cover	GRI GM13- HDPE Geomembranes ASTM-D6392 (Seam shear strength: 57 lb/in, Seam peel strength: 45 lb/in, peel strength break shall occur in ductile mode in geomembrane adjacent to seam)	30 mil thickness	Installation of flexible membrane shall be in accordance with the manufacturer recommendations. HDPE shall be textured not smooth. A geotextile fabric should be used to protect liner from puncture from above.
ALTERNATIVE #2B PVC liner w/ protective soil cover	ASTM-D7176- Non-reinforced PVC Geomembranes ASTM-D882 (Seam shear strength: 58 lb/in, Seam peel strength: 15 lb/in)	30 mil thickness	Installation of flexible membrane shall be in accordance with the manufacturer recommendations. A geotextile fabric should be used to protect liner from puncture from above.
ALTERNATIVE #3 Impermeable geosynthetic clay liner (GCL) w/ protective soil cover	ASTM-D5993 (Bentonite mass: > 0.75 lb/sq.ft.) ASTM-D2216 (max moisture content: 40% dry weight basis) ASTM-D5890 (min. swell index: 24 ml per 2 grams) ASTM-D5891 (max fluid loss: 18 ml) ASTM-D5887 (max. index flux: 1x10-8 m2/m2-s for geotextile backed and 1x10-9 m2/m2-s for geomembrane or geofilm backed at 2 psi or 4.6 feet of head)	0.75 lbs./sq.ft.	Non- or lightly-reinforced GCLs is intended by the manufacturer for use on flat or nearly flat areas shall not be used. Examples of acceptable needle punched & adhesive bound GCL liners: Bentomat CL, GundSeal Textured HDPE, GundSeal ContainMat or Approved Equal.

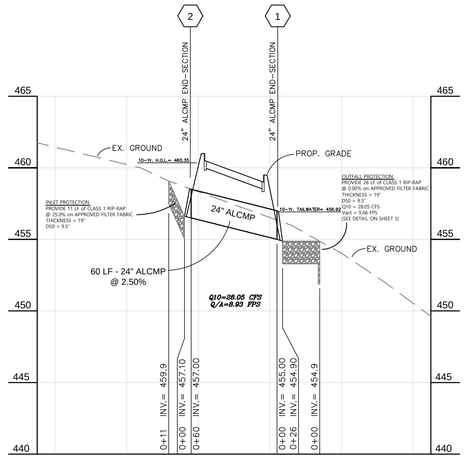
NOTES: See NRCS Practice Standard 521A "Pond Sealing or Lining- Flexible Membrane" for installation of Geomembranes and alternatives..
See NRCS National Standard Materials Specifications, Material Specification 594- Geomembrane Liner for more specifications
See NRCS National Standard Materials Specifications, Material Specification 595- Geosynthetic Clay Liner for more specifications



TYPICAL PVC LINER PIPE BOOT

NTS

NOTE: USE MANUFACTURER'S RECOMMENDATIONS



ENTRANCE CULVERT PROFILE

SCALE: HOR. 1"= 50'
VERT.1"= 5'

PROFESSIONAL ENGINEER'S "AS-BUILT" CERTIFICATION

I hereby certify that the facility shown on this plan as being constructed in conformance with the signed Improvement Plans and as highlighted on the as-built plans provided.

Signature Date

P.E. Number: 21401

PROFESSIONAL ENGINEER'S CERTIFICATION

SIGNED BY: GERALD LEE MILLER, JR., PE DATE 5-26-22

MD LICENSE No.: 21401, P.E. EXPIRATION DATE: 11-09-22

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.

NO.	DATE	REVISION	BY
1	5-18-22	Revised per DPP Comments	GLM
2	5-26-22	Revised per DPP Comments/Signed	GLM
3	-	-	-
4	-	-	-

STANFORD INDUSTRIAL PARK - LOT 12

Situated at 4870 Winchester Boulevard
Plat Book 81, Plat 190
Jefferson Election District No. 14
Frederick County, Maryland

STORMWATER MANAGEMENT PLANS, PROFILES, & DETAILS

Terra Solutions Engineering, LLC
Commercial & Residential Land Planning and Engineering
5216 Chairmans Counte, Suite 105
Frederick, MD 21703
Phone: 301-378-9842 Email: terrasolutionsengineering@gmail.com

Owner/Developer
Stanford Trading VI, LLC
12 West Church Street, Suite 120
Frederick, Maryland 21701

Contract Purchaser
Ruppert Properties
12 West Church Street, Suite 2
Frederick, Maryland 21702
Phone: 301-695-0500, Contact Matt Poffenbarger

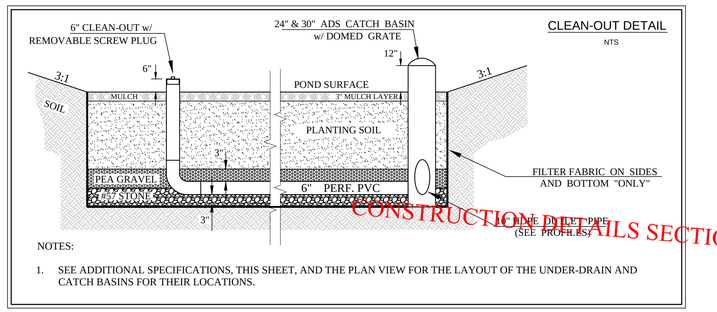
STATE OF MARYLAND
GERALD LEE MILLER JR
No. 21401
REGISTERED
PROFESSIONAL ENGINEER

Seal & Signature

PROJECT No.: 274
DATE: MAY 2022
SCALE: AS SHOWN
SHEET No. 4 of 8

Table B.3.2 Material Specifications for Bioretention

Material	Specification/Test Method	Size	Notes
Plantings	see Appendix A, Table A.4	n/a	plantings are site-specific
Planting Soil [15" deep]	sand (35 – 40%), compost (15 – 20%), silt (30 – 35%), & clay (10 – 15%)	n/a	USDA soil types loamy sand, sandy loam or loam; clay content < 5/%
Mulch	shredded hardwood	n/a	aged 6 months, minimum; no pine or wood chips
geotextile fabric (if required)	ASTM–D–4833 (puncture strength – 125 lb.) ASTM–D–4632 (tensile strength – 300 lb.)	0.08" thick equivalent opening size of #50 sieve	Must maintain 125 gpm per sq. ft. flow rate. Note: a 3" pea gravel layer may be substituted for geotextiles meant to "separate" sand filter layers.
Under–drain gravel (under–drains and infiltration berms)	AASHTO–M–43	No. 57 or No. 6 Aggregate (¾" to 2")	n/a
underdrain piping	F 758, Type PS 28 or AASHTO–M–278	4" – 6" rigid schedule 40 PVC or SDR35	Slotted or perforated pipe; 3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" gravel over & under pipes; stone depth underneath pipes can vary depending groundwater recharge volume requirements.
sand	clean AASHTO–M–6 or ASTM–C–33 concrete sand	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.
concrete (cast–in–place)	MSHA Standards and Specs., Section 902, Mix No. 3, f'c=3,500 psi, normal weight, air–entrained; reinforcing to meet ASTM–615–60	n/a	on–site testing of poured–in–place concrete required: 28 day strength and slump test; all concrete design (cast–in–place or pre–cast) not using previously approved State or local standards requires design drawings sealed and approved by a professional structural engineer licensed in the state of Maryland.
concrete (pre–cast)	per pre–cast manufacturer	n/a	SEE ABOVE NOTE
rebar steel	ASTM A–36	n/a	structural steel to be hot–dipped galvanized ASTM–A–123



NOTES:

1. SEE ADDITIONAL SPECIFICATIONS, THIS SHEET, AND THE PLAN VIEW FOR THE LAYOUT OF THE UNDER-DRAIN AND CATCH BASINS FOR THEIR LOCATIONS.

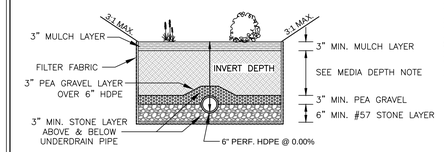
CLEAN-OUT INSTALLATION DETAIL

NOTES:

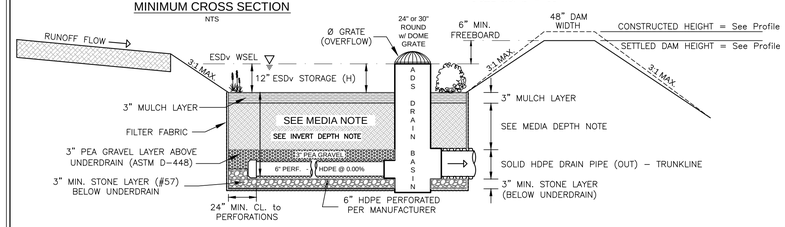
1. IF SIDE SLOPES > 3:1, PROVIDE LOW MAINTENANCE GROUND COVER.
2. PROVIDE NON–WOVEN TYPE 1 GEOTEXTILE ON THE SIDES & BOTTOM ONLY.
3. 6" PERFORATED HDPE PIPE MAY CONNECT DIRECTLY TO ADS DRAIN BASINS OR RISERS.
4. INSTALL CONCRETE RISER BASES (ANCHORS) AS REQUIRED BY THE DESIGN.

NOTE: SEE APPENDIX A IN THE 2000 MARYLAND STORMWATER DESIGN MANUAL, VOLUME II, FOR MORE INFORMATION. DO NOT PLANT TREES OR WOODY SHRUBS ON FILL EMBANKMENTS, DO NOT PLANT TREES WITHIN ANY BIORETENTION FACILITY STRUCTURE ON THIS PROJECT.

TREE OPTIONS:	SHRUB OPTIONS:	HERBACEOUS OPTIONS:
RED MAPLE	BOTTLEBRUSH BUCKEYE	BROOMSEDGE
RIVER BIRCH	BUTTONBUSH	JOE PYE WEED
EASTERN RED CEDAR	HIGHBUSH BLUEBERRY	THREE SQUARE BULRUSH
FRINGE-TREE	INKBERRY	BLUE FLAG
BLACK GUM	WINTERBERRY	CARDINAL FLOWER
PERSIMMON	ARROWWOOD	SWITCHGRASS
SYCAMORE	SPICEBUSH	BROOM PANIC GRASS
PIN OAK	BAYBERRY	TALL CONEFLOWER
WILLOW OAK		WOOLGRASS
BLACK WILLOW		NEW YORK IRONWEED



BIORETENTION MINIMUM CROSS SECTION
NTS



BIORETENTION TYPICAL CROSS SECTION
NTS

SWM FACILITY #1 & #2

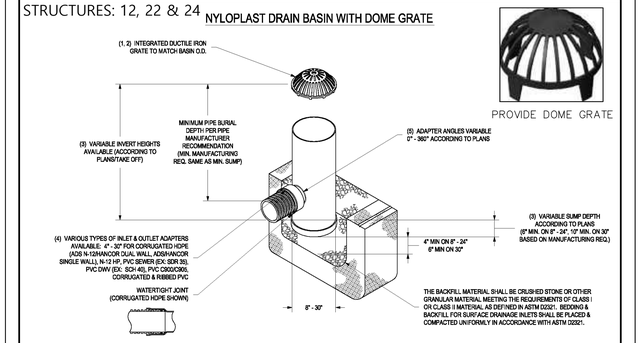
BIORETENTION LANDSCAPE SPECS

PLANTING MEDIA DEPTH:
Pond No. 1 = 18"
Pond No. 2 = 30"

PIPE INVERT DEPTH:
Pond No. 1 = 32"
Pond No. 2 = 44"

BIORETENTION FACILITY - MAIN CELL - TYPICAL DETAIL

STRUCTURES: 12, 22 & 24 NYLOPLAST DRAIN BASIN WITH DOME GRATE



1 - 8" - 30" DOME GRATES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
2 - 8" & 10" DOME GRATES FIT ONTO THE DRAIN BASINS WITH THE USE OF A PVC BODY TOP. SEE DRAWING NO. 7001-110-045.
3 - DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001-110-065.
4 - DRAINAGE CONNECTION STUB JOINT: TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS N-12/MANACOR DUAL WALL), N-12 HP, & PVC SEWER (4"-24").
5 - ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012.
6 - 8" - 30" DOME GRATES HAVE NO LOAD RATING.

"NYLOPLAST STRUCTURE or EQUAL"

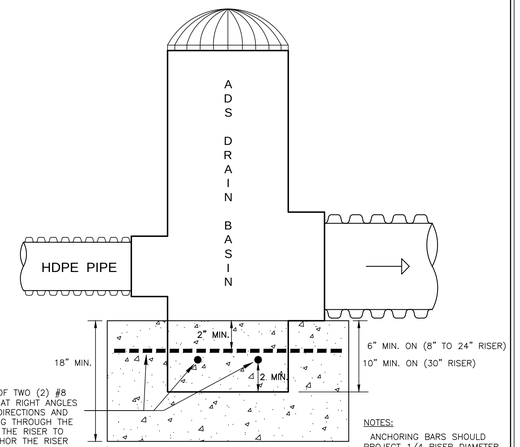
DRAWN BY	EBC
DATE	03-25-10
REVISED BY	CCA
DATE	09-05-13
DWG SIZE	A
SCALE	1:40
SHEET	1 OF 1
MATERIAL	
PROJECT NO./NAME	
DWG NO.	7001-110-097
REV	C

Nyloplast
2100 SPECIALTY AVE.
BUFORD, GA 30518
PHN (770) 932-2443
FAX (770) 932-2490
www.nyloplast-us.com

TITLE: DRAIN BASIN WITH DOME GRATE
QUICK SPEC INSTALLATION DETAIL

RISER BASE / ANCHOR DETAIL

SPECIAL NOTE: SINCE THE HDPE RISERS WILL BE INSTALLED AS PART OF THE INITIAL SEDIMENT TRAP INSTALLATION AND UTILIZED AS TEMPORARY DEWATERING DEVICES, IT WILL BE NECESSARY TO INSTALL PERMANENT RISER ANCHORS ON ALL HDPE RISERS DURING THE INITIAL INSTALLATION PHASE OF THE PROJECT.

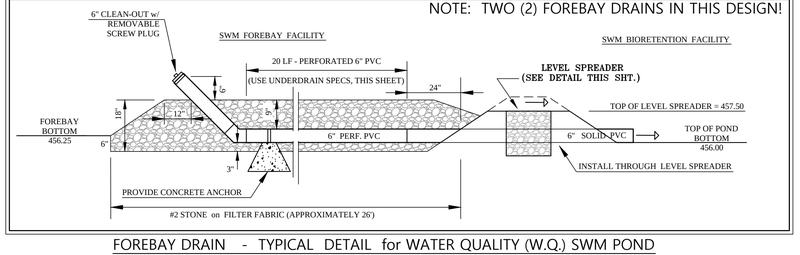


MINIMUM OF TWO (2) #8 RE–BARS AT RIGHT ANGLES IN BOTH DIRECTIONS AND PROJECTING THROUGH THE SIDES OF THE RISER TO HELP ANCHOR THE RISER INTO THE CONCRETE BASE. RE–BARS SHOULD PROJECT 1/4 RISER DIAMETER BEYOND THE OUTSIDE OF THE RISER.

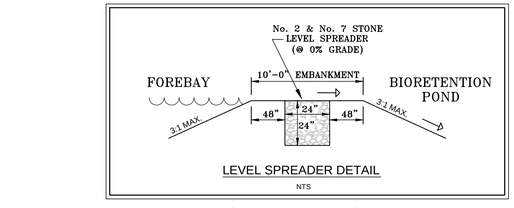
NOTES:

ANCHORING BARS SHOULD PROJECT 1/4 RISER DIAMETER BEYOND THE OUTSIDE OF THE RISER FOR CONNECTION INTO THE CAST CONCRETE.

NOTE: TWO (2) FOREBAY DRAINS IN THIS DESIGN!



FOREBAY DRAIN - TYPICAL DETAIL for WATER QUALITY (W.Q.) SWM POND



LEVEL SPREADER DETAIL
NTS

LEVEL SPREADER - TYPICAL DETAIL

ENVIRONMENTAL SITE DESIGN (ESD) – DRAINAGE AREA No. 1

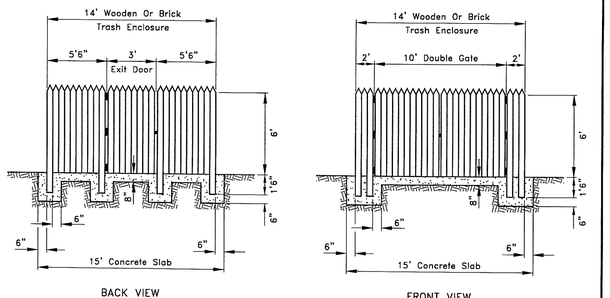
ESD TREATMENT METHODS USED	METHOD / DESCRIPTION	VOLUME TREATED
(3.4) STORMWATER FILTERING SYSTEMS:	–	–
–	–	–
–	–	–
(5.3) ALTERNATIVE SURFACES:	–	–
ALT. SURFACE (A–1)	–	–
ALT. SURFACE (A–2)	–	–
(5.4.2) NON–STRUCTURAL PRACTICES:	–	–
ROOFTOP DISCONNECTION (N–1)	–	–
NON–ROOFTOP DISCONNECTION (N–2)	–	–
SHEETFLOW CONSERVATION AREA (N–3)	–	–
(5.4.3) MICRO–SCALE PRACTICES:	–	–
RAINWATER HARVESTING (M–1)	–	–
SUBMERGED GRAVEL WETLANDS (M–2)	–	–
LANDSCAPE INFILTRATION (M–3)	–	–
INFILTRATION BERMS (M–4)	–	–
DRY WELLS (M–5)	–	–
MICRO–BIORETENTION POND (M–6)	SWM POND No. 1	2,916 CF
RAIN GARDENS (M–7)	–	–
SWALES (M–8)	–	–
ENHANCED FILTERS (M–9)	–	–

ENVIRONMENTAL SITE DESIGN (ESD) – DRAINAGE AREA No. 2

ESD TREATMENT METHODS USED	METHOD / DESCRIPTION	VOLUME TREATED
(3.4) STORMWATER FILTERING SYSTEMS:	–	–
BIORETENTION FACILITY	SWM POND No. 2	6,496 CF
ALT. SURFACE (A–2)	–	–
(5.3) ALTERNATIVE SURFACES:	–	–
ALT. SURFACE (A–1)	–	–
ALT. SURFACE (A–2)	–	–
(5.4.2) NON–STRUCTURAL PRACTICES:	–	–
ROOFTOP DISCONNECTION (N–1)	–	–
NON–ROOFTOP DISCONNECTION (N–2)	–	–
SHEETFLOW CONSERVATION AREA (N–3)	–	–
(5.4.3) MICRO–SCALE PRACTICES:	–	–
RAINWATER HARVESTING (M–1)	–	–
SUBMERGED GRAVEL WETLANDS (M–2)	–	–
LANDSCAPE INFILTRATION (M–3)	–	–
INFILTRATION BERMS (M–4)	–	–
DRY WELLS (M–5)	–	–
MICRO–BIORETENTION POND (M–6)	–	–
RAIN GARDENS (M–7)	–	–
SWALES (M–8)	–	–
ENHANCED FILTERS (M–9)	–	–

NOTES:

1. For Trash Enclosure Top View, Side View And Concrete Slab Detail See Detail Sheet M–3a Continued Sheet 1 Of 2.
2. For Trash Enclosure General Notes See Detail Sheets M–3a Continued Sheet 2 Of 2 And M–3f.

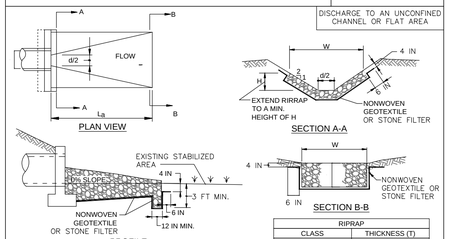


M–3a	DRAWN BY: KAT	SCALE: NONE	REVISIONS:	WOODEN OR BRICK TRASH ENCLOSURE FOR 4, 5 AND 6 CU. YD. CONTAINERS	CITY OF FREDERICK APPROVED Stan Aldridge 7-16-99 DATE

DETAIL D-4-1-C ROCK OUTLET PROTECTION III

STANDARD SYMBOL: ROPIII

DISCHARGE TO AN UNCONFINED CHANNEL OR FLAT AREA



RIPRAP	
CLASS	THICKNESS (T)
I	19 IN
II	32 IN
III	46 IN

CONSTRUCTION SPECIFICATIONS

1. RIPRAP AND STONE MUST CONFORM TO THE SPECIFIED CLASS.
2. USE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, AND PROTECT FROM PUNCTURING, CUTTING, OR TEARING. REPAIR ANY DAMAGE OTHER THAN AN OCCASIONAL SMALL HOLE BY PLACING ANOTHER PIECE OF GEOTEXTILE OVER THE DAMAGED PART OR BY COMPLETELY REPLACING THE GEOTEXTILE. PROVIDE A MINIMUM OF ONE FOOT OVERLAP FOR ALL REPAIRS AND FOR JOINING TWO PIECES OF GEOTEXTILE TOGETHER.
3. PREPARE THE SUBGRADE FOR GEOTEXTILE OR STONE FILTER (⅜ TO 1½ INCH MINIMUM STONE FOR 6 INCH MINIMUM DEPTH) AND RIPRAP TO THE REQUIRED LINES AND GRADES. COMPACT ANY FILL REQUIRED IN THE SUBGRADE TO A DENSITY OF APPROXIMATELY THAT OF THE SURROUNDING UNDISTURBED MATERIAL.
4. EXTEND GEOTEXTILE AT LEAST 6 INCHES BEYOND EDGES OF RIPRAP AND EMBED AT LEAST 4 INCHES AT SIDES OF RIPRAP.
5. CONSTRUCT RIPRAP OUTLET TO FULL COURSE THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO AVOID DISPLACEMENT OF UNDERLYING MATERIALS. PLACE STONE FOR RIPRAP OUTLET IN A MANNER THAT WILL ENSURE THAT IT IS REASONABLY HOMOGENOUS WITH THE SMALLER STONES AND SPALLS FILLING THE VOIDS BETWEEN THE LARGER STONES. PLACE RIPRAP IN A MANNER TO PREVENT DAMAGE TO THE FILTER BLANKET OR GEOTEXTILE. HAND PLACE TO THE EXTENT NECESSARY.
6. WHERE NO ENDWALL IS USED, CONSTRUCT THE UPSTREAM END OF THE APRON SO THAT THE WIDTH IS TWO TIMES THE DIAMETER OF THE OUTLET PIPE, AND EXTEND THE STONE UNDER THE OUTLET BY A MINIMUM OF 18 INCHES.
7. CONSTRUCT APRON WITH 0% SLOPE ALONG ITS LENGTH AND WITHOUT OBSTRUCTIONS. PLACE STONE SO THAT IT BLENDS IN WITH EXISTING GROUND.
8. MAINTAIN LINE, GRADE, AND CROSS SECTION. KEEP OUTLET FREE OF EROSION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. AFTER HIGH FLOWS INSPECT FOR SCOUR AND RIPRAP DISLODGED RIPRAP . MAKE NECESSARY REPAIRS IMMEDIATELY.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

NO.	DATE	REVISION	BY
4	3-1-22	Revised per DPP Comments/Signed	GLM
3	2-25-22	Revised per DPP Comments	GLM
2	1-18-22	Revised per DPP Comments	GLM
1	5-26-22	Revised per DPP Comments/Signed	GLM

STANFORD INDUSTRIAL PARK - LOT 12

Situated at 4870 Winchester Boulevard
Plat Book 81, Plat 190
Jefferson Election District No. 14
Frederick County, Maryland

STORMWATER MANAGEMENT NOTES & DETAILS

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STATE OF MARYLAND
GERALD LEE MILLER, JR.
No. 21401
PROFESSIONAL ENGINEER

Gerald L. Miller
Seal & Signature

PROFESSIONAL ENGINEER'S CERTIFICATION

SIGNED BY: Gerald L. Miller 5.26.22
GERALD LEE MILLER, JR., PE DATE

MD LICENSE No.: 21401, P.E. EXPIRATION DATE: 11-09-22

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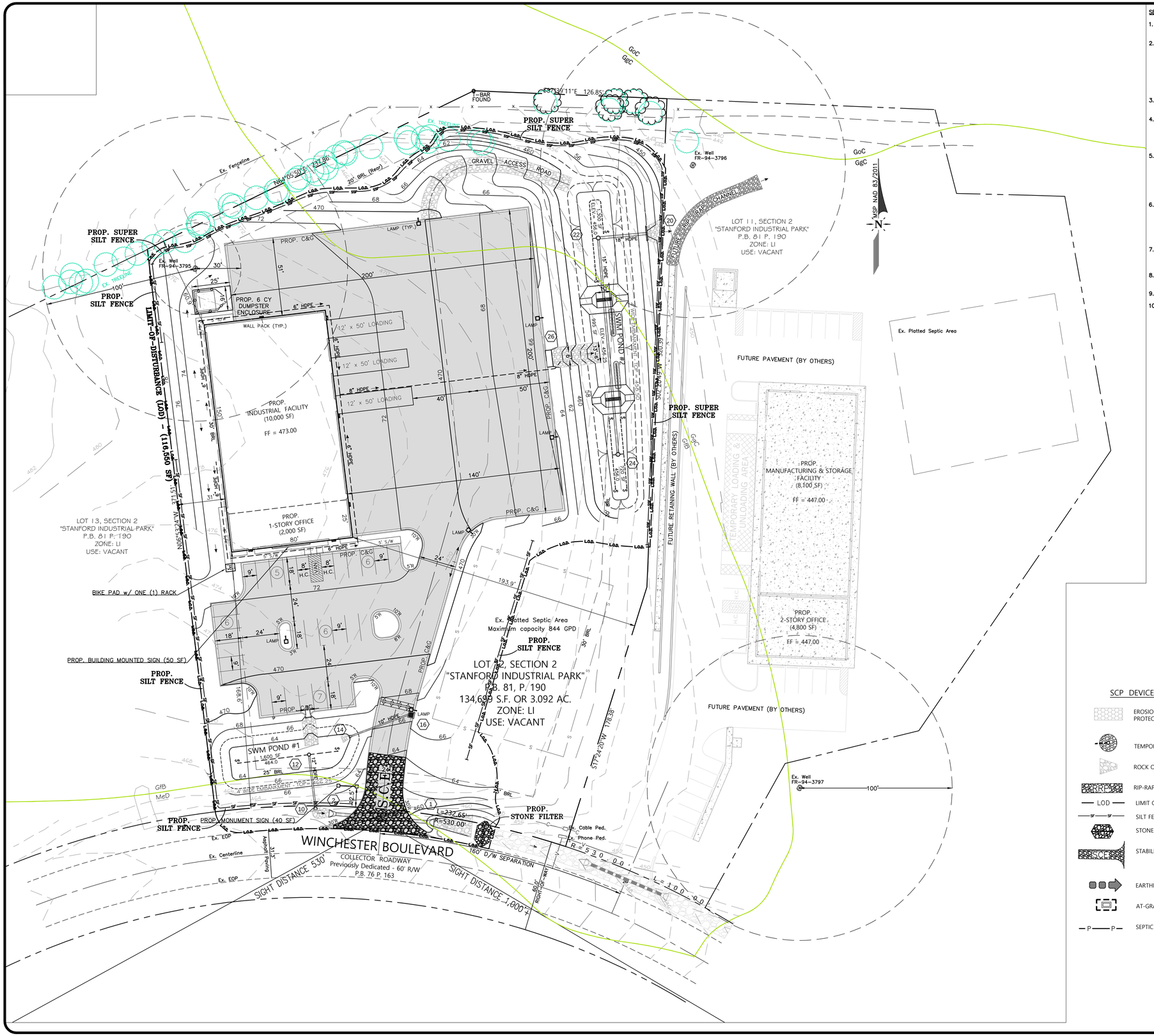
PROJECT No.:	274
DATE:	MAY 2022
SCALE:	AS SHOWN
SHEET No.	5 of 8



SEQUENCE OF CONSTRUCTION:

1. THE CONTRACTOR SHALL NOTIFY MISS UTILITY AT 1-800-257-7777 AT LEAST 3 WORKING DAYS BEFORE PERFORMING ANY WORK.
2. CONTACT THE FREDERICK COUNTY ENVIRONMENTAL COMPLIANCE SECTION (ECS) AT 301-600-3507 TO SCHEDULE A PRE-CONSTRUCTION MEETING AT LEAST 48 HOURS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES. THE LIMITS-OF-DISTURBANCE (LOD) IDEALLY SHOULD BE STAKED-OUT PRIOR TO THE PRE-CONSTRUCTION MEETING. ALSO, FOREST CONSERVATION MITIGATION SHALL BE APPROVED PURSUANT TO THE APPROVED FOREST CONSERVATION PLAN PRIOR TO THE MEETING. BOTH MUST BE INSPECTED AND APPROVED BY THE INSPECTOR PRIOR TO BEGINNING ANY GRADING. AN MDE NPDES/NOI PERMIT IS REQUIRED SINCE THIS PROJECT WILL DISTURB MORE THAN 1.0 ACRE, AND A COPY SHOULD BE PROVIDED TO THE SOIL CONSERVATION DISTRICT (SCD) ONCE AVAILABLE.
3. UPON INSPECTOR APPROVAL, CLEAR, GRUB, AND INSTALL THE STABILIZED CONSTRUCTION ENTRANCES (S.C.E.) AS INDICATED ON THE APPROVED SEDIMENT CONTROL PLAN (SCP).
4. CLEAR, GRUB, AND INSTALL PERIMETER CONTROLS AS INDICATED ON THE SCP, IN THIS ORDER:
   - STONE FILTER
   - SEPTIC FIELD PROTECTION FENCING
   - SUPER SILT FENCE & SILT FENCE
   - STOCKPILE AREA - SILT FENCING
5. COMMENCE WITH SITE IMPROVEMENTS INCLUDING: SITE GRADING, INSTALLATION OF UNDERGROUND UTILITIES, NEW BUILDING CONSTRUCTION, GRAVEL PARKING INSTALLATION, BIORETENTION PONDS, ETC.

   NOTE: SWM FACILITIES AND THEIR EXCAVATION SHALL BE PROTECTED FROM SEDIMENT AND BE INSTALLED LAST, IF POSSIBLE. IT MAY BE NECESSARY TO INSTALL TEMPORARY SILT-FENCE ABOVE THE SWM FACILITY TO ALLOW THE SLOPES TO GERMINATE AND BECOME STABILE, PRIOR TO RUNOFF ENTERING THE NEW FACILITY.
6. FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION MUST BE COMPLETED WITHIN:
   A. THREE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER DIKES, SWALES, DITCHES, PERIMETER SLOPES STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1), AND
   B. SEVEN (7) CALENDAR DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON PROJECT SITE NOT UNDER ACTIVE GRADING.
7. ESTABLISH STOCKPILE AREAS, AS NECESSARY, SURROUNDED BY SILT FENCE. TEMPORARILY SEED AND MULCH ALL STOCKPILES WITHIN THE 3/7 DAY REQUIREMENT. ALSO, SEE THE INCREMENTAL STABILIZATION CRITERIA.
8. ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED, AND WITH THE INSPECTOR'S APPROVAL, REMOVE ALL REMAINING EROSION AND SEDIMENT CONTROL DEVICES.
9. STABILIZE ANY NEW/Y DISTURBED AREAS WITH PERMANENT STABILIZATION.
10. THE CONTRACTOR SHALL BE ALLOWED TO MAKE MINOR ADJUSTMENTS TO THIS SEQUENCE UPON ENGINEER AND/OR ECS INSPECTOR'S APPROVAL.

SCP DEVICE LEGEND

- EROSION CONTROL MATTING PROTECTION
- TEMPORARY DEWATERING DEVICE
- ROCK OUTLET PROTECTION
- RIP-RAP INFLOW PROTECTION
- LOD — LIMIT OF DISTURBANCE
- SF — SF — SILT FENCE
- STONE FILTER
- STABILIZED CONSTRUCTION ENTRANCE
- ED/A-2 EARTHDIKE & CLEAN WATER DIVERSION DIKE
- AT-GRADE INLET PROTECTION
- P — P — SEPTIC AREA PROTECTION FENCING

PROFESSIONAL ENGINEER'S CERTIFICATION

SIGNED BY: Gerald Miller 5.26.22
GERALD LEE MILLER, JR., PE DATE

MD LICENSE No.: 21401, P.E. EXPIRATION DATE: 11-09-22

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STANFORD INDUSTRIAL PARK - LOT 12

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Jefferson Election District No. 14
Frederick County, Maryland

SEDIMENT & EROSION CONTROL PLAN

Terra Solutions Engineering, LLC
Commercial & Residential Land Planning and Engineering
5216 Chairmans Courte, Suite 105
Frederick, MD 21703
Phone: 301-378-3842 Email: terrasolutionsengineering@gmail.com

Owner/Developer
Stanford Trading VI, LLC
12 West Church Street, Suite 120
Frederick, Maryland 21701

Contract Purchaser
Ruppert Properties
12 West Church Street, Suite 2
Frederick, Maryland 21702
Phone: 301-695-0550, Contact Matt Poffenburger

STATE OF MARYLAND — GERALD LEE MILLER JR. — No. 21401 — REGISTERED — PROFESSIONAL ENGINEER

Seal & Signature

PROJECT No.:	274
DATE:	MAY 2022
SCALE:	1" = 30'
SHEET No.	6 of 8

General Sediment Control Notes

1. The permittee shall notify the local Soil Conservation Service (SCS) and Frederick City/County Department of Public Works (DPW) and/or Maryland Department of the Environment (MDE) forty–eight (48) hours prior to commencing any land disturbing activity and, unless waived by SCS, shall be required to hold a pre–construction meeting between themselves, and/or their assigns/representatives, and an authorized representative of SCS (i.e. City, County or State Sediment Control Inspector) as outlined in the approved sequence of construction.
2. The permittee shall obtain inspection and approval from SCS/DPW at the following points:
   a. At the required pre–construction meeting.
   b. Following installation of sediment control measures and prior to any other land disturbing activity.
   c. During the installation of a sediment basin or stormwater management structure at the required inspection points (see inspection checklist on plan). Notification prior to commencing construction is mandatory.
   d. Prior to the removal or modification of any sediment control structure(s).
   e. Prior to final acceptance.
3. The permittee shall construct all erosion and sediment control measures per the approved plan and construction sequence, shall have them inspected and approved by the DPW prior to beginning any other land disturbance, shall ensure that all runoff from disturbed areas is directed to the sediment control devices, and shall not remove any erosion or sediment control measures without prior permission from the DPW.
4. The permittee shall protect all points of construction ingress and egress to prevent the deposition of materials onto traversed public thoroughfare(s). All materials deposited onto public thoroughfare(s) shall be removed immediately.
5. The permittee shall inspect periodically and maintain continuously, in effective operating condition, all erosion and sediment control measures until such time as they are removed with the prior permission of the DPW.
6. All sediment basins, trap embankments, perimeter dikes, and all disturbed slopes steeper or equal to 3:1 shall be stabilized with sod, seed and anchored straw mulch, or other approved stabilization measures, within three (3) calendar days of establishment. All areas disturbed outside of the perimeter sediment control system must be minimized and stabilized immediately. Maintenance must be performed as necessary to ensure continued stabilization.
7. The permittee shall apply sod, seed and anchored straw mulch, or other approved stabilization measures to all disturbed areas within seven (7) calendar days after stripping and grading activities have ceased on that area. Maintenance shall be performed as necessary to ensure continued roadway improvements, and areas within 50–feet of a building under construction may be exempted from this requirement, provided that erosion and sediment control measures are installed and maintained to protect those areas.
8. Prior to removal of sediment control measures, the permittee shall stabilize all contributory disturbed areas using sod or an approved permanent seed mixture with required soil amendments and an approved anchored mulch. Wood fiber mulch may only be used in seeding season where the slope does not exceed 10% and grading has been done to promote sheet flow drainage. Areas brought to finished grade during the seeding season shall be permanently stabilized within seven (7) calendar days of establishment. When property is brought to finished grade during the months of November through February, and permanent stabilization is found to be impractical, and approved temporary seed and straw anchored mulch shall be applied to disturbed areas. The final permanent stabilization of such property shall be completed prior to the following April 15th.
9. The site permit, work, materials, approved SC/SM plans and test reports shall be available at the site for inspection by duly authorized officials of Frederick County.
10. Surface drainage flows over unstabilized cut and fill slopes shall be controlled by either preventing drainage flows from traversing the slopes or by installing mechanical devices to lower the water downslope without causing erosion. Dikes shall be installed and maintained at the top of cut or fill slopes until the slope and drainage area to it are fully stabilized, at which time they must be removed and final grading done to promote sheet flow drainage. Mechanical devices must be provided at points of concentrated flow where erosion is likely to occur.
11. Permanent swales or other points of concentrated water flow shall be stabilized with sod or seed with approved erosion control matting or by other approved stabilization measures.
12. Temporary sediment control devices shall be removed, with the permission of the DPW, within thirty (30) calendar days following establishment of permanent stabilization in all contributory drainage areas. Stormwater management structures used temporarily for sediment control shall be converted to the permanent configuration within this time period as well.
13. No permanent cut or fill slope with a gradient steeper than 3:1 will be permitted in lawn maintenance areas. A slope gradient of up to 3:1 will be permitted in non–maintenance areas provided that those areas are indicated on the erosion and sediment control plan with a low–maintenance ground cover specified for permanent stabilization. Slope gradient's steeper than 2:1 will not be permitted with vegetative stabilization.
14. The permittee shall install a splash–block at the bottom of each downspout unless the downspout is connected with a drain line to an acceptable outlet.
15. For finished grading, the permittee shall provide adequate gradients so as to : (1) prevent water from standing on the surface of lawns more than twenty–four (24) hours after the end of a rainfall, except in designated drainage courses and swale flow areas which may drain as long as forty–eight (48) hours after the end of a rainfall, and (2) provide positive drainage away from all building foundations or openings.
16. Sediment traps or basins are not permitted within 20 feet of a building that exists or is under construction. No building may be constructed within 20 feet of a sediment trap or basin.
17. All inlets in non–sump areas shall have asphalt berms installed at the time of base paving establishment.
18. The sediment control inspector has the option of requiring additional sediment control measures, if deemed necessary.
19. All trap elevations are relative to the outlet elevation, which must be on existing undisturbed ground.
20. Vegetative stabilization shall be performed in accordance with the most current Maryland Standards and Specifications for Soil Erosion and Sediment Control. Refer to Section B–4 for the following when applying: temporary seeding, permanent seeding, mulching, sodding, and ground covers.
21. Temporary sediment trap(s) shall be cleaned out and restored to the original dimensions when sediment has accumulated to a point one–half (1/2) the depth between outlet crest and the bottom of the trap, or as directed by the inspector.
22. Sediment removed from traps shall be placed and stabilized in approved areas, but not within a floodplain.
23. All sediment basins and traps must be surrounded with a welded wire, or approved equal, safety fence. The fence must be at least 42 inches high, have posts spaced no farther apart than eight (8) feet, have mesh openings no greater than 2 inches in width and 4 inches in height with a minimum of 14 gauge wire or equal. Safety fence must be maintained in good condition at all times.
24. No excavation in the area of existing utilities is permitted unless their location has been determined. Call "Miss Utility" at 1–800–257–7777 forty–eight (48) hours prior to the start of work.
25. Off site spoil or borrow areas must have prior approval from SCS.

Frederick S.C.D. Sediment & Erosion Control Notes

1. All erosion and sediment control measures shall be installed and maintained in continuous compliance with the latest version of the "Maryland Standards and Specifications for Soil Erosion and Sediment Control".
2. All disturbed areas are to be seeded within seven (7) days of initial grading. For stabilization methods, see Section B–4, of the "2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control" by the Maryland Department of the Environment (Water Management Administration), Natural Resources Conservation Service and Maryland Association of Soil Conservation Districts.
3. All erosion and sediment control measures are to be placed prior to, or at the initiation of grading.
4. All utilities, such as; storm drain, public water, sanitary sewer, electric power, telephone, cable and gas lines, that are not in paved areas and are not undergoing active grading shall be temporarily or permanently stabilized within three (3) days of initial disturbance.
5. All earth berms/dikes and sediment trap dams are to be mulched and seeded (see Section B–4 of the above referenced standard) within three (3) days after grading. All soil stockpiles are to be mulched and seeded within seven (7) days.
6. The owner/developer or their designate is responsible for conducting routine inspections and required maintenance. The site and controls should be inspected weekly and the next day after each rain event. Any accumulated sediment shall be removed and disposed of in a suitable area and shall be temporarily or permanently stabilized. (See Section B–4 of the above referenced standards). Any project that has a state issued N.O.I permit must document each inspection and maintain an inspection log. See the N.O.I. permit for additional details.
7. The contractor is responsible for maintaining all sediment and erosion control measures until all disturbed areas are stabilized.
8. After fine grading, all disturbed areas are to be permanently mulched and seeded (see Section B–4).
9. No slope shall be greater than 2:1.

10. Following initial soil disturbance or re–disturbance, permanent or temporary stabilization must be completed within:
    A. Three (3) calendar days as to the surface of all perimeter dikes, swales, ditches, perimeter slopes, and all slopes steeper than 3 horizontal to 1 vertical (3:1); and
    B. Seven (7) calendar days as to all other disturbed or graded areas on the project site not under active grading.

This does not apply to those areas that are shown on the plan and are currently being used for material storage or for those areas on which actual construction activities are currently being performed. Maintenance shall be performed as necessary to ensure that stabilized areas continuously meet the appropriate requirements of the "2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control"

Temporary Seeding Notes

General
1. Scope: Planting short–term vegetation to stabilized, cleared or graded areas subject to erosion for a period of seven (7) days or more.
2. Standards: Temporary seeding shall conform to all requirements of the "2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control" published jointly by the Maryland Department of the Environment, Water Management Administration in association with Natural Resources Conservation Service and Maryland Association of Soil Conservation Districts.
3. Sediment and Erosion Control: All perimeter controls must be stabilized in three (3) days. All interior controls must be stabilized within seven (7) days.

Specifications
1. Site Preparation
   A. Prior to seeding, install all required sediment and erosion control measures.
   B. Final grading not required for temporary seeding.
2. Soil Amendments.
   A. Fertilizer shall be applied at the rate of 436 lbs./acre using 10–20–20 or equivalent.
   B. Acid soils shall be limed at a lime rate of 2 tons/acre.
3. Seedbed Preparation
   A. Soil shall be loosened to a depth of 2 to 4 inches by raking, discing, or other acceptable means prior to seeding.
4. Seeding
   A. Select a mixture from table B.1 in the standard specifications.
   B. Apply seed uniformly with a cyclone seeder drill, cultipacker, or hydroseeder.
5. Mulching
   A. Mulch shall be applied immediately after seeding. Mulch materials and applications shall conform to the standard specifications.

Permanent Seeding & Sodding Notes

General
1. Scope: Planting permanent, long–lived vegetative cover on graded or cleared areas.
2. Standards: Permanent seeding shall conform to all requirements of the "2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control" by the Maryland Department of the Environment (Water Management Administration), Natural Resources Conservation Service and Maryland Association of Soil Conservation Districts.

Specifications
1. Site Preparation
   A. Prior to seeding, install all required sediment and erosion control measures.
   B. Fine grading required for permanent seeding.
2. Soil Amendments
   A. Fertilizer shall be applied at the rate of N (45 lbs/acre), P (90 lbs/acre) and K (90 lbs/acre) using 10–20–20 or equivalent.
   B. Acid soils shall be limed at a lime rate of 2 tons/acre.
3. Seedbed Preparation
   A. Soil shall be loosened to a depth of 2 to 4 inches by raking, discing, or other acceptable means prior to seeding.
4. Seeding
   A. Select a mixture from tables B.2 and B.3 in the standard specifications.
   B. Apply seed uniformly with a cyclone seeder, drill, cultipacker seeder or hydroseeder (slurry includes seed and fertilizer on a firm, moist seedbed). Maximum seeding depth should be ¼ inch on clayey soils and ½ inch on sandy soils, when using other than hydroseeder method of application. Note: If hydroseeding is used and the seed and fertilizer is mixed, they will be mixed on site and the seeding shall be immediate without interruption.
5. Mulching
   A. Mulch shall be applied immediately after seeding. Mulch materials and applications shall conform to the standard specifications.

Permanent Stabilization with Sod
1. All specifications, site preparation, installation and maintenance of sod for permanent, long–lived vegetative cover shall conform to Section B–4 of the "2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control" by the Maryland Department of the Environment (Water Management Administration), Natural Resources Conservation Service and Maryland Association of Soil Conservation Districts.

For Utility Work Only or For Off–Site Utility Work

1. Can not exceed 5,000 square feet.
2. Place all excavated material on the high side of the trench.
3. Only do as much work as can be completed in one day so backfilling, final grading, seeding and mulching can occur at the same pace as construction.
4. Any sediment control measures disturbed by construction will be repaired the same day.

Stockpile Notes

1. No stockpile allowed on asphalt.
2. All stockpile left at the end of the day needs to be stabilized until the next re–disturbance.

Stream Closure Statement

As of June 1, 1992, All sediment and erosion control plans and/or stormwater management plans that include in–stream work must have a stream closure date(s) shown in the sequence of construction.

For Utility Work Only or For Off–Site Utility Work

1. Can not exceed 5,000 square feet.
2. Place all excavated material on the high side of the trench.
3. Only do as much work as can be completed in one day so backfilling, final grading, seeding and mulching can occur at the same pace as construction.
4. Any sediment control measures disturbed by construction will be repaired the same day.

Secondary Utility Work (August 7, 2006)

1. All disturbance from secondary utility's such as phone cable, electric cable, TV cable, etc. will be the subcontractors responsibility to bring work area back to grade level that was existing and seed mulch any disturbance from installation of lines or conduit.
2. Sub contractors will be responsible for re–installing or repairing any silt fence of sediment controls that were existing to maintain proper sediment control that might have been damaged.

Stockpile Notes

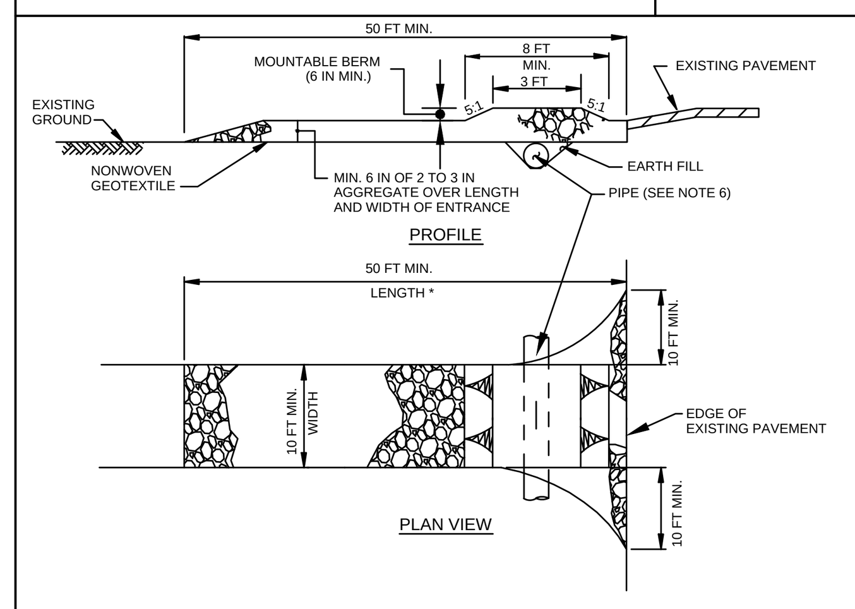
1. No stockpile allowed on asphalt.
2. All stockpile left at the end of the day needs to be stabilized until the next re–disturbance.

Stream Closure Statement

As of June 1, 1992, All sediment and erosion control plans and/or stormwater management plans that include in–stream work must have a stream closure date(s) shown in the sequence of construction.

DETAIL B-1 STABILIZED CONSTRUCTION ENTRANCE

STANDARD SYMBOL: SCE



CONSTRUCTION SPECIFICATIONS

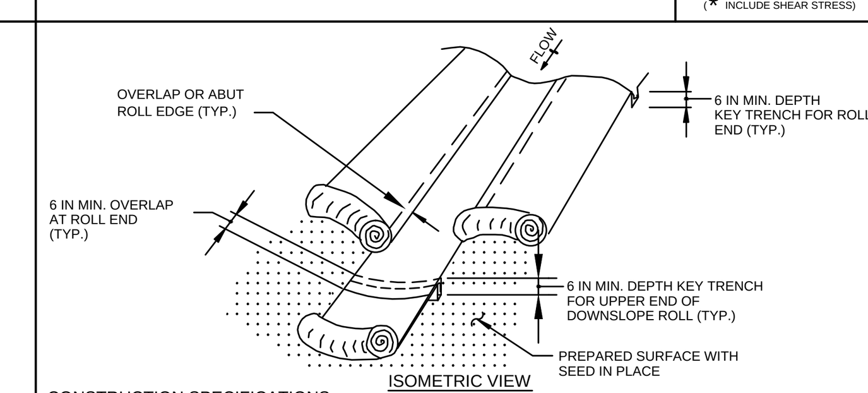
1. PLACE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN. VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SCE. USE MINIMUM LENGTH OF 50 FEET (*30 FEET FOR SINGLE RESIDENCE LOT). USE MINIMUM WIDTH OF 10 FEET. FLARE SCE 10 FEET MINIMUM AT THE EXISTING ROAD TO PROVIDE A TURNING RADIUS.
2. PIPE ALL SURFACE WATER FLOWING TO OR DIVERTED TOWARD THE SCE UNDER THE ENTRANCE, MAINTAINING POSITIVE DRAINAGE. PROTECT PIPE INSTALLED THROUGH THE SCE WITH A MOUNTABLE BERM WITH 5:1 SLOPES AND A MINIMUM OF 12 INCHES OF STONE OVER THE PIPE. PROVIDE PIPE AS SPECIFIED ON APPROVED PLAN. WHEN THE SCE IS LOCATED AT A HIGH SPOT AND HAS NO DRAINAGE TO CONVEY, A PIPE IS NOT NECESSARY. A MOUNTABLE BERM IS REQUIRED WHEN SCE IS NOT LOCATED AT A HIGH SPOT.
3. PREPARE SUBGRADE AND PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS.
4. PLACE CRUSHED AGGREGATE (2 TO 3 INCHES IN SIZE) OR EQUIVALENT RECYCLED CONCRETE (WITHOUT REBAR) AT LEAST 6 INCHES DEEP OVER THE LENGTH AND WIDTH OF THE SCE.
5. MAINTAIN ENTRANCE IN A CONDITION THAT MINIMIZES TRACKING OF SEDIMENT. ADD STONE OR MAKE OTHER REPAIRS AS CONDITIONS DEMAND TO MAINTAIN CLEAN SURFACE, MOUNTABLE BERM, AND SPECIFIED DIMENSIONS. IMMEDIATELY REMOVE STONE AND/OR SEDIMENT SPILLED, DROPPED, OR TRACKED ONTO ADJACENT ROADWAY BY VACUUMING, SCRAPING, AND/OR SWEEPING. WASHING ROADWAY TO REMOVE MUD TRACKED ONTO PAVEMENT IS NOT ACCEPTABLE UNLESS WASH WATER IS DIRECTED TO AN APPROVED SEDIMENT CONTROL PRACTICE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL B-4-6-A TEMPORARY SOIL STABILIZATION MATTING CHANNEL APPLICATION

STANDARD SYMBOL: TSSMC - ★ lb/ft² (★ INCLUDE SHEAR STRESS)



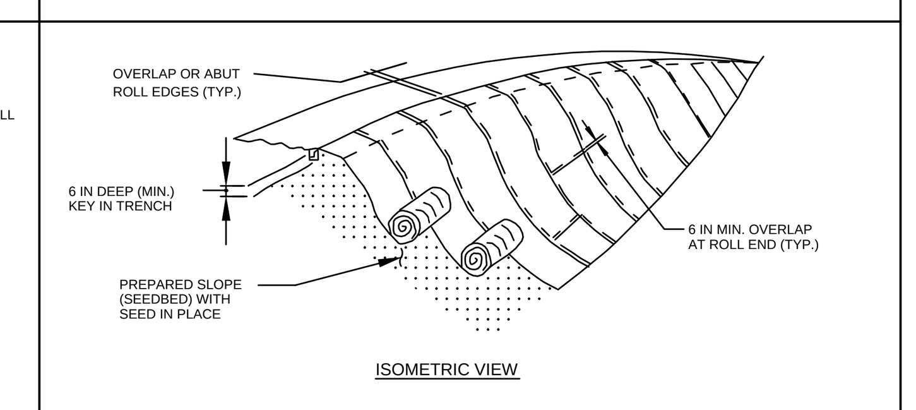
CONSTRUCTION SPECIFICATIONS

1. USE MATTING THAT HAS A DESIGN VALUE FOR SHEAR STRESS EQUAL TO OR HIGHER THAN THE SHEAR STRESS DESIGNATED ON APPROVED PLANS.
2. USE TEMPORARY SOIL STABILIZATION MATTING MADE OF DEGRADABLE (LASTS 6 MONTHS MINIMUM) NATURAL OR MAN-MADE FIBERS (MOSTLY ORGANIC). MAT MUST HAVE UNIFORM THICKNESS AND DISTRIBUTION OF FIBERS THROUGHOUT AND BE SMOLDER RESISTANT. CHEMICALS USED IN THE MAT MUST BE NON-LEACHING AND NON-TOXIC TO VEGETATION AND SEED GERMINATION AND NON-INJURIOUS TO THE SKIN. IF PRESENT, NETTING MUST BE EXTRUDED PLASTIC WITH A MAXIMUM MESH OPENING OF 2x2 INCHES AND SUFFICIENTLY BONDED OR SEWN ON 2 INCH CENTERS ALONG LONGITUDINAL AXIS OF THE MATERIAL TO PREVENT SEPARATION OF THE NET FROM THE PARENT MATERIAL.
3. SECURE MATTING USING STEEL STAPLES, WOOD STAKES, OR BIODEGRADABLE EQUIVALENT. STAPLES MUST BE "U" OR "T" SHAPED STEEL WIRE HAVING A MINIMUM GAUGE OF NO. 11 AND NO. 8 RESPECTIVELY. "U" SHAPED STAPLES MUST AVERAGE 1 TO 1½ INCHES WIDE AND BE A MINIMUM OF 6 INCHES LONG. "T" SHAPED STAPLES MUST HAVE A MINIMUM 8 INCH MAIN LEG, A MINIMUM 1 INCH SECONDARY LEG, AND A MINIMUM 4 INCH HEAD. WOOD STAKES MUST BE ROUGH-SAWN HARDWOOD, 12 TO 24 INCHES IN LENGTH, 1x3 INCH IN CROSS SECTION, AND WEDGE SHAPED AT THE BOTTOM.
4. PERFORM FINAL GRADING, TOPSOIL APPLICATION, SEEDBED PREPARATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATIONS. PLACE MATTING WITHIN 48 HOURS OF COMPLETING SEEDING OPERATIONS UNLESS END OF WORKDAY STABILIZATION IS SPECIFIED ON THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.
5. UNROLL MATTING IN DIRECTION OF WATER FLOW, CENTERING THE FIRST ROLL ON THE CHANNEL CENTERLINE. WORK FROM CENTER OF CHANNEL OUTWARD WHEN PLACING ROLLS. LAY MAT SMOOTHLY AND FIRMLY ON THE SEEDED SURFACE. AVOID STRETCHING THE MATTING.
6. KEY-IN UPSTREAM END OF EACH MAT ROLL BY DIGGING A 6 INCH (MINIMUM) TRENCH AT THE UPSTREAM END OF THE MATTING, PLACING THE ROLL END IN THE TRENCH, STAPLING THE MAT IN PLACE, REPLACING THE EXCAVATED MATERIAL, AND TAMPING TO SECURE THE MAT END.
7. OVERLAP OR ABUT THE ROLL EDGES PER MANUFACTURER RECOMMENDATIONS. OVERLAP ROLL ENDS BY 6 INCHES (MINIMUM), WITH THE UPSTREAM MAT OVERLAPPING ON TOP OF THE NEXT DOWNSTREAM MAT.
8. STAPLE/STAKE MAT IN A STAGGERED PATTERN ON 4 FOOT (MAXIMUM) CENTERS THROUGHOUT AND 2 FOOT (MAXIMUM) CENTERS ALONG SEAMS, JOINTS, AND ROLL ENDS.
9. ESTABLISH AND MAINTAIN VEGETATION SO THAT REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT ARE CONTINUOUSLY MET IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL B-4-6-B TEMPORARY SOIL STABILIZATION MATTING SLOPE APPLICATION



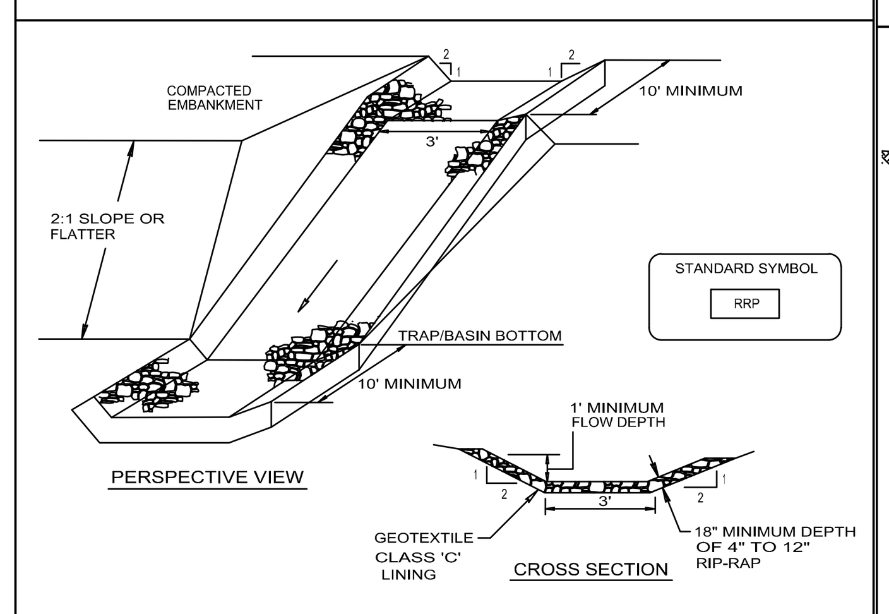
CONSTRUCTION SPECIFICATIONS

1. USE MATTING THAT HAS A DESIGN VALUE FOR SHEAR STRESS EQUAL TO OR HIGHER THAN THE SHEAR STRESS DESIGNATED ON APPROVED PLANS.
2. USE TEMPORARY SOIL STABILIZATION MATTING MADE OF DEGRADABLE (LASTS 6 MONTHS MINIMUM) NATURAL OR MAN-MADE FIBERS (MOSTLY ORGANIC). MAT MUST HAVE UNIFORM THICKNESS AND DISTRIBUTION OF FIBERS THROUGHOUT AND BE SMOLDER RESISTANT. CHEMICALS USED IN THE MAT MUST BE NON-LEACHING AND NON-TOXIC TO VEGETATION AND SEED GERMINATION AND NON-INJURIOUS TO THE SKIN. IF PRESENT, NETTING MUST BE EXTRUDED PLASTIC WITH A MAXIMUM MESH OPENING OF 2x2 INCHES AND SUFFICIENTLY BONDED OR SEWN ON 2 INCH CENTERS ALONG LONGITUDINAL AXIS OF THE MATERIAL TO PREVENT SEPARATION OF THE NET FROM THE PARENT MATERIAL.
3. SECURE MATTING USING STEEL STAPLES, WOOD STAKES, OR BIODEGRADABLE EQUIVALENT. STAPLES MUST BE "U" OR "T" SHAPED STEEL WIRE HAVING A MINIMUM GAUGE OF NO. 11 AND NO. 8 RESPECTIVELY. "U" SHAPED STAPLES MUST AVERAGE 1 TO 1½ INCHES WIDE AND BE A MINIMUM OF 6 INCHES LONG. "T" SHAPED STAPLES MUST HAVE A MINIMUM 8 INCH MAIN LEG, A MINIMUM 1 INCH SECONDARY LEG, AND A MINIMUM 4 INCH HEAD. WOOD STAKES MUST BE ROUGH-SAWN HARDWOOD, 12 TO 24 INCHES IN LENGTH, 1x3 INCH IN CROSS SECTION, AND WEDGE SHAPED AT THE BOTTOM.
4. PERFORM FINAL GRADING, TOPSOIL APPLICATION, SEEDBED PREPARATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATIONS. PLACE MATTING WITHIN 48 HOURS OF COMPLETING SEEDING OPERATIONS UNLESS END OF WORKDAY STABILIZATION IS SPECIFIED ON THE APPROVED EROSION & SEDIMENT CONTROL PLAN.
5. UNROLL MATTING DOWNSLOPE. LAY MAT SMOOTHLY AND FIRMLY UPON THE SEEDED SURFACE. AVOID STRETCHING THE MATTING.
6. OVERLAP OR ABUT ROLL EDGES PER MANUFACTURER RECOMMENDATIONS. OVERLAP ROLL ENDS BY 6 INCHES (MINIMUM), WITH THE UPSLOPE MAT OVERLAPPING ON TOP OF THE DOWNSLOPE MAT.
7. KEY IN THE UPSLOPE END OF MAT 6 INCHES (MINIMUM) BY DIGGING A TRENCH, PLACING THE MATTING ROLL END IN THE TRENCH, STAPLING THE MAT IN PLACE, REPLACING THE EXCAVATED MATERIAL, AND TAMPING TO SECURE THE MAT END IN THE KEY.
8. STAPLE/STAKE MAT IN A STAGGERED PATTERN ON 4 FOOT (MAXIMUM) CENTERS THROUGHOUT AND 2 FOOT (MAXIMUM) CENTERS ALONG SEAMS, JOINTS, AND ROLL ENDS.
9. ESTABLISH AND MAINTAIN VEGETATION SO THAT REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT ARE CONTINUOUSLY MET IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 5 - RIP-RAP INFLOW PROTECTION



Construction Specifications

1. Rip-rap lined inflow channels shall be 1' in depth, have a trapezoidal cross section with 2:1 or flatter side slopes and 3' (min.) bottom width. The channel shall be lined with 4" to 12" rip- rap to a depth of 18".
2. Filter cloth shall be installed under all rip-rap. Filter cloth shall be Geotextile Class C.
3. Entrance and exit sections shall be installed as shown on the detail section.
4. Rip-rap used for the lining may be recycled for permanent outlet protection if the basin is to be converted to a stormwater management facility.
5. Gabion Inflow Protection may be used in lieu of Rip-rap Inflow Protection.
6. Rip-rap should blend into existing ground.
7. Rip-rap Inflow Protection shall be used where the slope is between 4:1 and 10:1, for slopes flatter than 10:1 use Earth Dike or Temporary Swale lining criteria.

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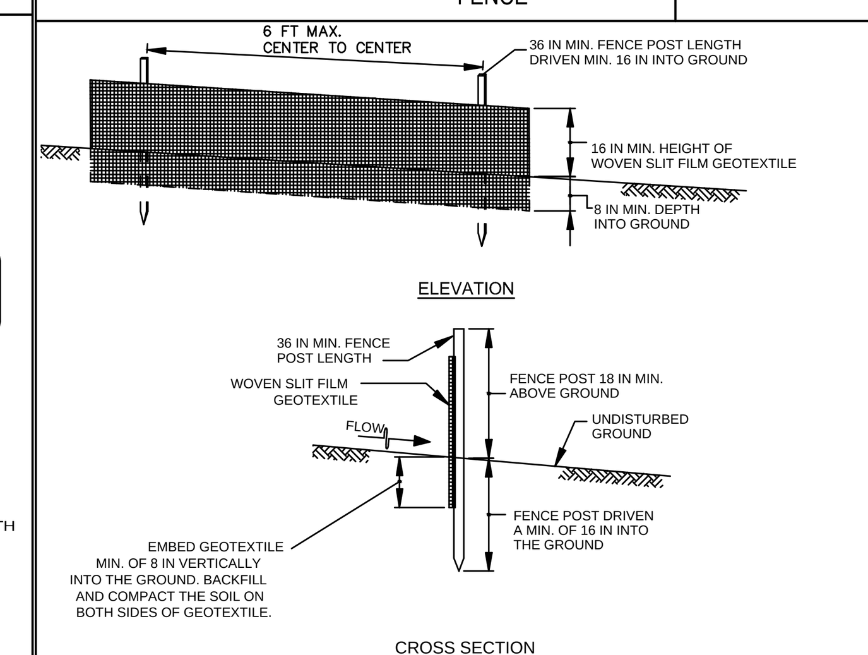
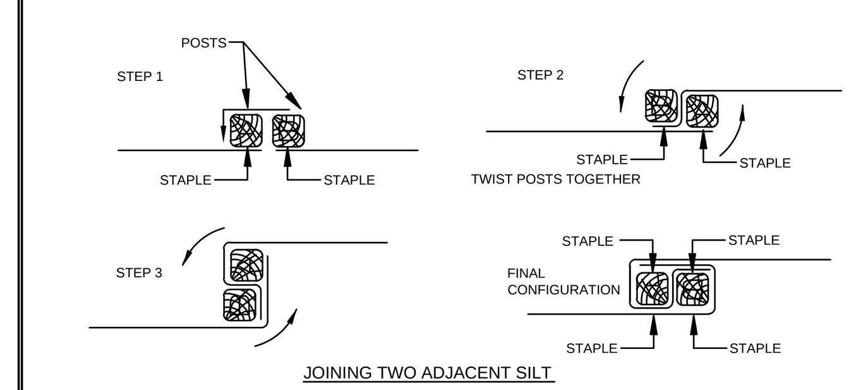
DETAIL E-1 SILT FENCE

STANDARD SYMBOL: —SF—





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MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-1 SILT FENCE

STANDARD SYMBOL: —SF—

CONSTRUCTION SPECIFICATIONS

1. USE WOOD POSTS 1¾ X 1¾ ± 1⁄16 INCH (MINIMUM) SQUARE CUT OF SOUND QUALITY HARDWOOD. AS AN ALTERNATIVE TO WOODEN POST USE STANDARD "T" OR "U" SECTION STEEL POSTS WEIGHING NOT LESS THAN 1 POUND PER LINEAR FOOT.
2. USE 36 INCH MINIMUM POSTS DRIVEN 16 INCH MINIMUM INTO GROUND NO MORE THAN 6 FEET APART.
3. USE WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS AND FASTEN GEOTEXTILE SECURELY TO UPSLOPE SIDE OF FENCE POSTS WITH WIRE TIES OR STAPLES AT TOP AND MID-SECTION.
4. PROVIDE MANUFACTURER CERTIFICATION TO THE AUTHORIZED REPRESENTATIVE OF THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT THE GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
5. EMBED GEOTEXTILE A MINIMUM OF 8 INCHES VERTICALLY INTO THE GROUND. BACKFILL AND COMPACT THE SOIL ON BOTH SIDES OF FABRIC.
6. WHERE TWO SECTIONS OF GEOTEXTILE ADJOIN: OVERLAP, TWIST, AND STAPLE TO POST IN ACCORDANCE WITH THIS DETAIL.
7. EXTEND BOTH ENDS OF THE SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SILT FENCE.
8. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN SILT FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL FENCE.

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MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

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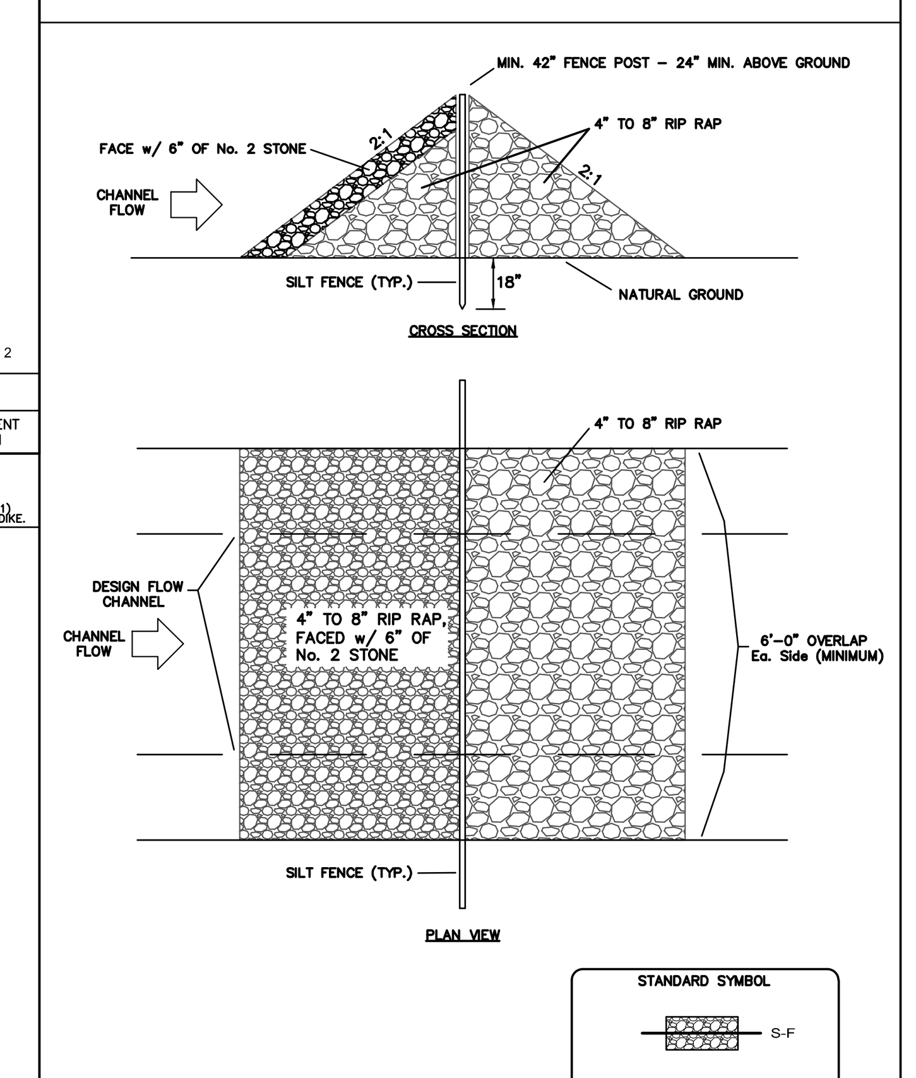

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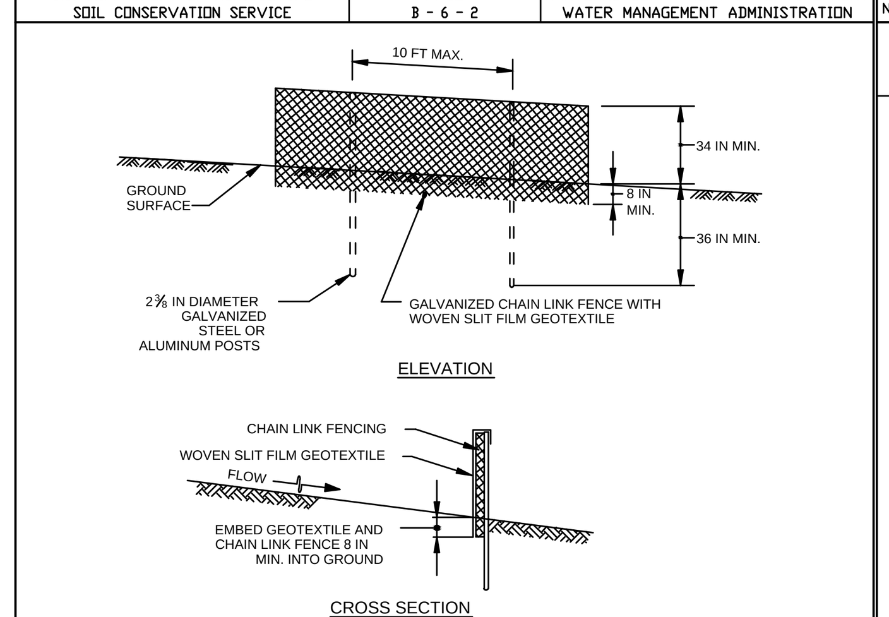
DETAIL E-3 SUPER SILT FENCE

STANDARD SYMBOL: —SSF—

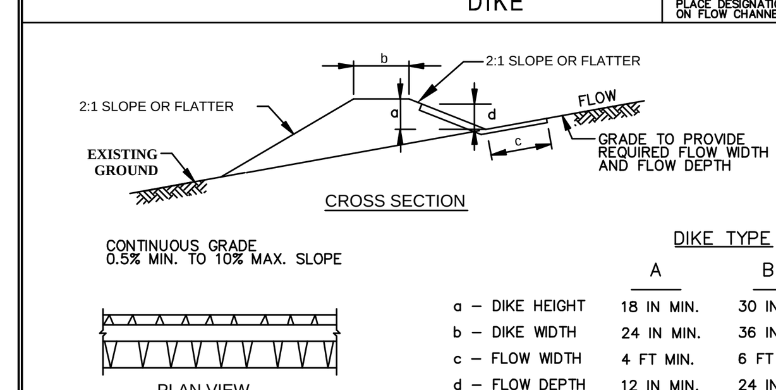


CONSTRUCTION SPECIFICATIONS

1. INSTALL 2⅜ INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND SIX FOOT LENGTH SPACED NO FURTHER THAN 10 FEET APART. DRIVE THE POSTS A MINIMUM OF 36 INCHES INTO THE GROUND.
2. FASTEN 9 GAUGE OR HEAVIER GALVANIZED CHAIN LINK FENCE (2 ⅜ INCH MAXIMUM OPENING) 42 INCHES IN HEIGHT SECURELY TO THE FENCE POSTS WITH WIRE TIES OR HUG RINGS.
3. FASTEN WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS, SECURELY TO THE UPSLOPE SIDE OF CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID SECTION. EMBED GEOTEXTILE AND CHAIN LINK FENCE A MINIMUM OF 8 INCHES INTO THE GROUND.
4. WHERE ENDS OF THE GEOTEXTILE COME TOGETHER, THE ENDS SHALL BE OVERLAPPED BY 6 INCHES, FOLDED, AND STAPLED TO PREVENT SEDIMENT BY PASS.
5. EXTEND BOTH ENDS OF THE SUPER SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SUPER SILT FENCE.
6. PROVIDE MANUFACTURER CERTIFICATION TO THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT

DETAIL C-1 EARTH DIKE

STANDARD SYMBOL: A-1 — PLACE DESIGNATION (e.g. A–1) ON FLOW CHANNEL SIDE OF DIKE.



DIKE TYPE	A	B
a – DIKE HEIGHT	18 IN MIN.	30 IN MIN.
b – DIKE WIDTH	24 IN MIN.	36 IN MIN.
c – FLOW WIDTH	4 FT MIN.	6 FT MIN.
d – FLOW DEPTH	12 IN MIN.	24 IN MIN.

FLOW CHANNEL STABILIZATION

A–1 SEED WITH STRAW MULCH AND TACK. (NOT ALLOWED FOR CLEAR WATER DIVERSION.)
A–2/B–2 SEED WITH SOIL STABILIZATION MATTING OR LINE WITH SOD.
A–3/B–3 4 TO 7 INCH STONE OR EQUIVALENT RECYCLED CONCRETE PRESSED INTO SOIL A MINIMUM OF 7 INCHES AND FLUSH WITH GROUND.

CONSTRUCTION SPECIFICATIONS

1. REMOVE AND DISPOSE OF ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SO AS NOT TO INTERFERE WITH PROPER FUNCTION OF EARTHDIKE.
2. EXCAVATE OR SHAPE EARTH DIKE TO LINE, GRADE, AND CROSS SECTION AS SPECIFIED. BANK PROJECTIONS OR OTHER IRREGULARITIES ARE NOT ALLOWED.
3. COMPACT FILL.
4. CONSTRUCT FLOW CHANNEL ON AN UNINTERRUPTED, CONTINUOUS GRADE, ADJUSTING THE LOCATION DUE TO FIELD CONDITIONS AS NECESSARY TO MAINTAIN POSITIVE DRAINAGE.
5. PROVIDE OUTLET PROTECTION AS REQUIRED ON APPROVED PLAN.
6. STABILIZE EARTH DIKE WITHIN THREE DAYS OF INSTALLATION. STABILIZE FLOW CHANNEL FOR CLEAR WATER DIVERSION WITHIN 24 HOURS OF INSTALLATION.
7. MAINTAIN LINE, GRADE, AND CROSS SECTION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS, AND MAINTAIN POSITIVE DRAINAGE. KEEP EARTH DIKE AND POINT OF DISCHARGE FREE OF EROSION, AND CONTINUOUSLY MEET REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.
8. UPON REMOVAL OF EARTH DIKE, GRADE AREA FLUSH WITH EXISTING GROUND. WITHIN 24 HOURS OF REMOVAL STABILIZE DISTURBED AREA WITH TOPSOIL, SEED, AND MULCH, OR AS SPECIFIED ON APPROVED PLAN.

SEDIMENT CONTROL/STORMWATER MANAGEMENT REQUIRED INSPECTIONS

YOU MUST NOTIFY THE COUNTY SEDIMENT CONTROL AND STORMWATER MANAGEMENT OFFICE AT 301–600–3507 BEFORE 9:00 AM 24 HOURS PRIOR TO THE REQUIRED INSPECTION. FAILURE TO NOTIFY THIS OFFICE WILL RESULT IN A STOP WORK ORDER OR OTHER PENALTIES AS OUTLINED IN FREDERICK COUNTY CODES.

***** NOTICE *****

THIS LIST IS FOR SEQUENCE OF CONSTRUCTION ONLY. THIS OFFICE ASSUMES NO RESPONSIBILITY OF LIABILITY FOR IMPROPER INSTALLATION OR ANY ITEMS ON THIS CHECKLIST. THIS OFFICE RECOMMENDS THAT A PROFESSIONAL ENGINEER BE PRESENT FOR EACH OF THE REQUIRED INSPECTIONS.

TYPE OF INSPECTIONS:	COMMENTS/INITIALS
1) PRE–CONSTRUCTION MEETING	
2) COMPLETION OF SEDIMENT CONTROL INSTALLATION (IF USING A BASIN SEE #6 BELOW)	N/A
3) PRIOR TO MODIFICATION OR REMOVAL OF SED. CONTROL	
4) INFILTRATION SYSTEMS	
A. SITE READINESS PER SEQUENCE OF CONSTRUCTION	
B. INFILTRATION AREA PROTECTION FROM SEDIMENTATION	
C. DIMENSIONS (PRIOR TO FILLER INSTALLATION)	
D. FILTERING MATERIAL (TYPE/DEPTH)	
E. PLACEMENT OF FILLER MATERIAL	
F. SIZE, PLACEMENT, TYPE OF PIPING (IF APPLICABLE)	
G. OBSERVATION WELL	
H. COVER/STABILIZATION	
5) OPEN CHANNEL FLOW ATTENUATION	
A. SITE READINESS PER SEQUENCE OF CONSTRUCTION	N/A
B. CROSS SECTION CONFORMANCE	N/A
C. LINER MATERIAL (TYPE/SIZE)	N/A
D. STABILIZATION	N/A
6) RETENTION/DETENTION STRUCTURES (BASINS/PONDS)	
A. SUBGRADE PREPARATION	N/A
1. CORE TRENCH	N/A
2. SUITABLE MATERIAL/COMPACTION	N/A
B. EMBANKMENT CONSTRUCTION	
1. SUITABLE MATERIAL/COMPACTION	
2. SLOPE GRADE	
3. DIMENSIONS	
C. BARREL AND RISER ASSEMBLY	
1. CORRECT MATERIAL ON–SITE	
2. SIZING	
3. ANTI–SEEP COLLARS	N/A
4. ANTI–VORTEX DEVICE	N/A
5. CONCRETE CRADLE (R.C.P. REQUIRED)	N/A
6. INSTALLATION/BACKFILL/COMPACTION	
D. CONCRETE STRUCTURES	N/A
1. FOOTER DIMENSIONS	N/A
2. REINFORCING MATERIAL (TYPE, SIZE, PLACEMENT)	N/A
3. WEIR POUR/MATERIAL/SLUMP TEST	N/A
4. FORM STRIP AND FINISHING	N/A
E. IMPOUNDING AREA	N/A
1. LOW FLOW CHANNELS/STABILIZATION	N/A
2. DEWATERING DEVICE	N/A
3. EMERGENCY SPILLWAY	N/A
4. EXTENDED DETENTION DEVICE	N/A
F. OUTFALL AREA (LEVEL SPREADER, RIP–RAP CHANNEL, ETC.)	
G. VEGETATIVE STABILIZATION	
H. MISCELLANEOUS:	N/A

PROFESSIONAL ENGINEER'S CERTIFICATION

SIGNED BY: GERALD LEE MILLER, JR., PE   DATE: 5·26·22

MD LICENSE No.: 21401, P.E. EXPIRATION DATE: 11–09–22

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.

NO.	DATE	REVISION DESCRIPTION	BY
1	5–18–22	Revised per DPP Comments	GLM
2	5–26–22	Revised per DPP Comments/Signed	GLM
3	–	–	–
4	–	–	–

STANFORD INDUSTRIAL PARK - LOT 12

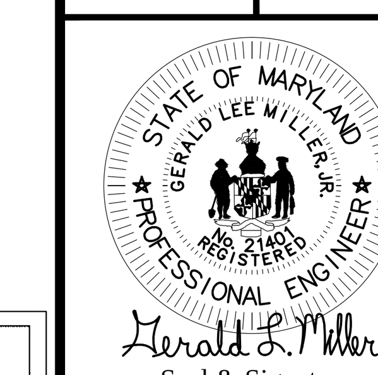
Situated at 4870 Winchester Boulevard
Plat Book 81, Plat 190
Jefferson Election District No. 14
Frederick County, Maryland

SEDIMENT & EROSION CONTROL NOTES & DETAILS

Terra Solutions Engineering, LLC
Commercial & Residential Land Planning and Engineering
5216 Chairmans Courte, Suite 105
Frederick, MD 21703
Phone: 301-378-9842 Email: terrasolutionsengineering@gmail.com

Owner/Developer
Stanford Trading VI, LLC
12 West Church Street, Suite 120
Frederick, Maryland 21701

Contract Purchaser
Ruppert Properties
12 West Church Street, Suite 2
Frederick, Maryland 21702
Phone: 301-695-0550, Contact Matt Poffenbarger



Seal & Signature

PROJECT No.:	274
DATE:	MAY 2022
SCALE:	AS SHOWN
SHEET No.	7 of 8

DRAINAGE AREA DIVIDE:

TIME-OF-CONCENTRATION FLOW PATH: B A

FILTER BED AREA:

D.A.= 70,435 SF

IMP.= 44,585 SF

IMP.= 14,325 SF

D.A.= 25,165 SF

IMP.= 2,510 SF

D.A.= 5,630 SF

LOT 13, SECTION 2
"STANFORD INDUSTRIAL PARK"
P.B. 81 P. 190
ZONE: LI
USE: VACANT

LOT 11, SECTION 2
"STANFORD INDUSTRIAL PARK"
P.B. 81 P. 190
ZONE: LI
USE: VACANT

LOT 12, SECTION 2
"STANFORD INDUSTRIAL PARK"
P.B. 81, P. 190
134,699 S.F. OR 3.092 AC.
ZONE: LI
USE: VACANT

PROP. INDUSTRIAL FACILITY (10,000 SF)
FF = 473.00

PROP. 1-STORY OFFICE (2,000 SF)
FF = 473.70

PROP. MANUFACTURING & STORAGE FACILITY (8,100 SF)
FF = 447.00

PROP. 2-STORY OFFICE (4,800 SF)
FF = 447.00

PROP. 6 CY DUMPSTER ENCLOSURE

SWM POND #1
1,600 SF
464.0
25' BRL

STUDY Pt. #1

STUDY Pt. #2

STUDY Pt. #3

Ex. Well FR-94-3795

Ex. Well FR-94-3796

Ex. Well FR-94-3797

Ex. Platted Septic Area
Maximum capacity 844 GPD

FUTURE PAVEMENT (BY OTHERS)

FUTURE RETAINING WALL (BY OTHERS)

TEMPORARY LOADING & UNLOADING AREA

GRAVEL ACCESS ROAD

FUTURE RIP-RAP CHANNEL

Ex. TREELINE

Ex. Fenceline

NMP 05 STYLE 231.86

20' BRL (Rear)

30' BRL

25' BRL

WALL PACK (TYP.)

LAMP (TYP.)

12' x 50' LOADING

BIKE PAD w/ ONE (1) RACK

PROP. BUILDING MOUNTED SIGN (50 SF)

PROP. MONUMENT SIGN (40 SF)

WINCHESTER BOULEVARD
COLLECTOR ROADWAY
Previously Dedicated - 60' R/W
P.B. 76 P. 163

Ex. EOP
Ex. Centerline
Asphalt Paving
Ex. EOP

160' D/W SEPARATION

PROP. RIGHT-OF-WAY

Ex. Cable Ped.
Ex. Phone Ped.

T-BAR FOUND

N06°53'24"W 371.51'

S37°20'11"E 126.85'

S07°20'49"W 320.39'

S77°24'20"W 178.88'

R = 530.00'
L = 232.65'

R = 530.00'
L = 100.00'

NSP NAD 83/2011

SWM ESD DA MAP

NO.	DATE	REVISION	BY
4	-	-	-
3	-	-	-
2	5-26-22	Revised per DPP Comments/Signed	GLM
1	5-18-22	Revised per DPP Comments	GLM

STANFORD INDUSTRIAL PARK - LOT 12

Situated at 4870 Winchester Boulevard
Plat Book 81, Plat 190
Jefferson Election District No. 14
Frederick County, Maryland

DRAINAGE AREA MAP

Terra Solutions Engineering, LLC
Commercial & Residential Land Planning and Engineering
5216 Chairmans Courte, Suite 105
Frederick, MD 21703
Phone: 301-378-9842 Email: terrasolutionsengineering@gmail.com

Owner/Developer
Stanford Trading VI, LLC
12 West Church Street, Suite 120
Frederick, Maryland 21701

Contract Purchaser
Ruppert Properties
12 West Church Street, Suite 2
Frederick, Maryland 21702
Phone: 301-695-0550, Contact Matt Poffenbarger

STATE OF MARYLAND
GERALD LEE MILLER, JR.
No. 21401
REGISTERED
PROFESSIONAL ENGINEER

Seal & Signature

PROFESSIONAL ENGINEER'S CERTIFICATION

SIGNED BY: Gerald Miller 5.26.22
GERALD LEE MILLER, JR., PE DATE

MD LICENSE No.: 21401, P.E. EXPIRATION DATE: 11-09-22

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PROJECT No.:	274
DATE:	MAY 2022
SCALE:	1" = 20'
SHEET No.	8 of 8

DRAINAGE AREA DIVIDE:

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FILTER BED AREA:

D.A.= 70,435 SF

IMP.= 44,585 SF

D.A.= 25,165 SF

IMP.= 14,325 SF

D.A.= 5,630 SF

IMP.= 2,530 SF

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P.B. 81, P. 190
134,699 S.F. OR 3.092 AC.
ZONE: LI
USE: VACANT

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LOT 13, SECTION 2
"STANFORD INDUSTRIAL PARK"
P.B. 81 P. 190
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PROP. INDUSTRIAL FACILITY (10,000 SF)
FF = 473.00

PROP. 1-STORY OFFICE (2,000 SF)

PROP. MANUFACTURING & STORAGE FACILITY (8,100 SF)
FF = 447.00

PROP. 2-STORY OFFICE (4,800 SF)
FF = 447.00

OPEN OUTDOOR STORAGE AREA: 10,000 SF (50' x 200')

PROP. 6 CY DUMPSTER ENCLOSURE

SWM POND #1
1,600 SF
464.0
25' BRL

SWM POND #2
1,000 SF
462.5
25' BRL

PROP. SUPER SILT FENCE

GRAVEL ACCESS ROAD

FUTURE RIP-RAP CHANNEL

FUTURE RETAINING WALL (BY OTHERS)

FUTURE PAVEMENT (BY OTHERS)

TEMPORARY LOADING & UNLOADING AREA

Ex. Platted Septic Area

Ex. Platted Septic Area
Maximum capacity 844 GPD

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Ex. Well FR-94-3796

Ex. Well FR-94-3797

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Ex. TREELINE

NMP-05 STYLE

BIKE PAD w/ ONE (1) RACK

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PROP. MONUMENT SIGN (40 SF)

WINCHESTER BOULEVARD
COLLECTOR ROADWAY
Previously Dedicated - 60' R/W
P.B. 76 P. 163

160' D/W SEPARATION

80' RIGHT-OF-WAY

Ex. Cable Ped.

Ex. Phone Ped.

Ex. EOP

Ex. Centerline

Building Restriction Line

T-BAR FOUND

N37°30'11"E 126.85'

S37°24'36"W 178.38'

S02°20'48"W 320.39'

L=237.65'
R=530.00'

L=100.00'
R=530.00'

GoC

GgC

GfB

MeD

NSP NAD 83/2011

SWM DA MAP

PROFESSIONAL ENGINEER'S CERTIFICATION

SIGNED BY:

GERALD LEE MILLER, JR., PE DATE

MD LICENSE No.: 21401, P.E. EXPIRATION DATE: 11-09-22

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.

NO.	DATE	REVISION	DESCRIPTION	BY
4	-	-	-	-
3	-	-	-	-
2	-	-	-	-
1	-	-	-	-

STANFORD INDUSTRIAL PARK - LOT 12

Situated at 4870 Winchester Boulevard
Plat Book 81, Plat 190
Jefferson Election District No. 14
Frederick County, Maryland

DRAINAGE AREA MAP

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Commercial & Residential Land Planning and Engineering
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Owner/Developer
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Contract Purchaser
Ruppert Properties
12 West Church Street, Suite 2
Frederick, Maryland 21702
Phone: 301-695-0590, Contact Matt Poffenbarger

Seal & Signature

PROJECT No.: 274
DATE: MARCH 2022
SCALE: 1" = 20'
SHEET No. 9 of 9

Combined SWM Concept & Development Plan Computations

REPORT TITLE CORRESPONDING TO TYPE OF PLANS SUBMITTED

for

Stanford Industrial Park – Lot 12

(Plat Book 81, Plat 190)

Situated at 4870 Winchester Boulevard
Frederick County, Maryland

Prepared for:

Ruppert Properties
12 West Church Street, Suite 2
Frederick, Maryland 21702

Phone: 301-695-0550

Engineering by:

Terra Solutions Engineering, LLC
5216 Chairmans Court, Suite 105
Frederick, Maryland 21703

Phone: 301-378-9842
Contact: Gerald Lee Miller, P.E.

May 18, 2022

Concept Design / SWM Narrative

1. Stormwater Management (SWM) Concept – Narrative:

Terra Solutions Engineering, LLC (TSE) is pleased to be working for Ruppert Properties (Ruppert) on the design of their new industrial-office building, which will be located on Lot 12 in Stanford Industrial Park. The existing site is currently vacant, and the proposed improvements will include building a new parking lot to accommodate 30 vehicles and three (3) large loading spaces for the proposed industrial operation. The existing site consists of both type "B" & "C" soils, but the proposed development occurs within an area that is approximately 99.9% type "B" soil. Two (2) stormwater management (SWM) facilities will be required and constructed on-site, with one near the entrance of the property, and the other below the large truck parking and material storage area. The drainage area and impervious area to the front SWM facility (SWM #1) is approximately 25,165 square feet (SF) and 14,325 SF, respectively; therefore, the percent imperviousness is approximately 56.9%. SWM facility #2 captures approximately 70,435 SF of runoff and intercepts approximately 44,585 SF of impervious area; therefore, the percent imperviousness for SWM #2 is approximately 63.3%. Since the drainage area to SWM facility #1 is just above 20,000 SF (i.e., 25,165 SF), it was designed as a micro-bioretention facility. Drainage area #2 was considerably larger and couldn't be reduced or broken into smaller subareas easily due to the site configuration; therefore, SWM facility #2 was designed as a Chapter 3 Bioretention facility with a central forebay design. The forebay assists by slowing the storm runoff as it enters the SWM facility and with the removal of a portion of the sediment before it enters the water quality or 2nd cells within the pond; thereby, extending the life of the two (2) water quality cells....one at each end of SWM Pond #2. The proposed micro-bioretention (SWM #1) and bioretention pond (SWM #2) will provide full WQv control for the runoff from the proposed development, and no additional WQv or ESD treatment is required to meet the 2000 Maryland SWM Design Manual guidelines. There are existing Regional SWM Ponds located within Stanford Industrial Park that provide additional SWM control for both the 10-year & 100-year storms. We have excluded any credit for the existing Regional Ponds from this design; thereby, assuring additional SWM control is provided within our project and for the Industrial Park as a whole. The site is bordered to the north by farm land (Ag), and to the east, west, and south by Limited Industrial (LI) zoned property. The subject property is located within Stanford Industrial Park and will be developed in accordance with the allowable LI zoning guidelines, as permitted, and as was approved on Site Plan (SP266549).

2. Site & Resource Mapping:

Natural Resources & Corresponding Regulatory Authority for this Project:

Federal		State		Local (County)	
	• Wetlands		• Tidal & non-tidal wetlands		• Steep Slopes
	• Major Waterways		• Wetlands (State concern)		• Highly erodible soils
	• Floodplains		• Wetland buffers		• Enhanced stream buffers
			• Stream buffers	X	• Topography / Slopes
			• Perennial streams		• Springs
			• Floodplains		• Seeps
			• Forest Impacts & Mitigation		• Intermittent streams
			• Forest buffers	X	• Vegetative cover
			• Critical Areas	X	• Soils
					• Bedrock / geology
				X	• Existing drainage areas

Natural Resource Discussion:

There are no forested areas on-site, although a Forest Resource Ordinance (FRO) Plan was prepared and submitted per the standard Site Plan requirements. There is a band of existing trees along the northern property, which we've tried to avoid, but approximately four (4) trees could not be avoided and will be removed as part of providing access to SWM Pond #2. No stream or wetland impacts are proposed by the development of this property. No other State or Federal natural resources will be impacted by the proposed site improvements; therefore, only local agency permitting is anticipated necessary for the project at this time. Since the proposed site improvements will disturb more than one acre, a NPDES General Permit for Stormwater Associated with a Construction Activity will be required and will obtained from the Maryland Department of the Environment (MDE) as part of the standard construction permitting for this project.

As illustrated on the plan, the site topography is moderate with existing slopes ranging from to 4% to 20% across the site. The existing on-site soils consist of Glenelg silt loam (GfB, 3% to 8%) & Glenelg gravelly loam (GgC, 8% to 15%) slopes (HSG: 'B'), and Mt. Airy channery loam (15% to 25% slopes, MeB, HSG: 'C'). The soil types are hydrologic soil group 'B' & 'C' soils. The in-situ soils have moderate erodibility factors ranging from 0.15 (MeD), 0.17 (GgC) and 0.37 (GfB). The moderate slopes across the site and final stabilization will help to mitigate any erodibility concerns. Within the proposed construction area, the slopes have been kept gentle, except for the maximum constructed slopes, which will be kept at 3:1 or less. There are no long slopes (>50-feet) of grading proposed within the limits of this project, and off-site water is naturally diverted around the site, which helps reduce its impact on the proposed site grading.

3. Site Fingerprinting & Development Layout:

The site does not have any major natural resources and the existing vegetative cover will remain or be replaced as a maintained grass yard in most areas. The natural drainage patterns will not direct runoff into the proposed development areas of this site. This project will not be required to provide excessive additional on-site SWM control for any off-site rainfall.

4. Locating ESD Practices:

The proposed micro-bioretention (M-6) SWM Pond #1 and bioretention (F-6) SWM Pond #2 have been designed immediately down-hill from the proposed commercial building and parking areas for this development. The proposed WQv facilities, by the nature of their size, configuration, and the use of curb-&-gutter to convey the site runoff from the property into the SWM facilities, will help reduce the chance of failure and/or the bypassing of any contaminated runoff.

5. Summary of Site Development Strategies – Better Site Design Techniques:

A. Using narrower short streets, right-of-ways, and sidewalks:

There are no extensions or impacts to local streets or right-of-way proposed by this project. Only on-site asphalt parking and concrete sidewalks are required and/or used within this project. We have worked to minimize the use of any additional impervious materials (i.e., trash dumpster, gravel access driveway) wherever possible throughout the site.

B. Cul-de-sacs:

A cul-de-sac is not necessary on this site.

C. Open vegetated channels:

Unfortunately, open vegetated channels were not possible for this site due to its layout and the use of curb-&-gutter to convey runoff. Multiple rip-rap channels were positioned to carry a major portion of the off-site runoff into the two SWM ponds. Conveyance of concentrated runoff has been minimized and controlled into both SWM ponds.

D. Parking ratios, parking codes, parking lots, and structured parking:

Parking is proposed at the minimum parking requirement of 30 spaces, and no additional off-site parking is required for this project. The large truck parking lot was necessary for the intended use of this property as an Industrial Facility and is being constructed in accordance with the approved Site Plan.

E. Parking lot runoff:

The micro-bioretention and bioretention facilities have been located below the parking area. Sheet flow across the parking lot will be directed into the two (2) new facilities and the possibility of bypass has almost been eliminated by the use of curb-&-gutter directing runoff into each facility.

F. Open space:

All impervious area has been clustered in the design, and the limited project size (3.09 acres) also limits the possibility of creating major open space areas, but it should be noted that approximately 53.8% (i.e., 1.66 acres) of the site remains green space, and effectively open space.

G. Setbacks and frontages:

The setbacks and frontage used for this project match those allowed within the Frederick County zoning ordinance for the Limited Industrial (LI) district.

H. Driveways:

The proposed parking lot and internal drive aisles were reduced in both length and width where applicable.

I. Rooftop runoff:

Rooftop runoff and drainage from the proposed commercial building will be collected in the downspouts and piped to the proposed bioretention facility - SWM #2, as illustrated on the final SWM Improvement Plans.

J. Buffer systems:

Forest Banking and/or the payment of fee-in-lieu will be investigated and utilized to meet the balance of the Forest Conservation Ordinance requirements, as necessary for the project.

K. Clearing & grading:

Clearing, grading, and earth disturbance is limited to that required to buildout the proposed development.

L. Tree conservation:

As discussed in Item J, above; off-site forest banking credits will be purchased and utilized.

M. Conservation incentives:

The site takes advantage of the natural drainage patterns to divert runoff around the site, and then captures and treats the maximum on-site development runoff possible.

6. Detailed Step-by-step SWM Design discussion:

Utilizing the Maryland 2000 SWM Design Manual (MSDM) methodology, TSE determined the required Environmental Site Design (ESD) Volume (ESDv) to be 9,407 cubic feet (CF). This volume meets the required ESDv for the approximate 3.09 acre site. Since the existing site drained in multiple directions, it was necessary to design two (2) SWM facilities to capture and fully control the proposed site development as mentioned in Section One - SWM Concept Narrative, above. Approximately 25,060 square feet (SF) drained towards the front of the property and are captured and treated within a single micro-bioretention (M-6) facility. This facility was sized to treat the approximate 14,325 SF of impervious area that drains to it. Due to the limited size of the drainage area (just above 20,000 SF) it was possible to use a single ESD facility (i.e., Micro-bioretention) with a single 24" Advanced Design Systems (ADS) riser near the center of Pond #1.

Based on MSDM methodology, TSE determined that SWM Pond #2 wouldn't work as an ESD facility due to the large drainage area, primarily caused by the 12,000 SF building and approximate 30,000 SF+ of asphalt that drain directly towards Pond #2. Due to site constraints (i.e., major slopes), it wasn't possible to break up the drainage areas into multiple smaller facilities. SWM Pond #2 has a total drainage area of approximately 70,435 SF, of which approximately 44,585 SF is impervious area. Closed curb & gutter provides the major site control that directs runoff around the site and into both SWM Pond #1 & #2. SWM Pond #1 utilizes a 3-foot wide curb-cut to direct runoff into a rip-rap channel that then flows down into the pond. SWM Pond #2 utilizes a 10-foot wide open-back inlet to direct runoff into another rip-rap channel and down into the central forebay of the pond. Water entering the forebay of SWM Pond #2 then flows in opposite directions into the two (2) SWM infiltration chambers (cells) at each end of the facility, where it is then treated by infiltration during smaller storms. Larger storms will overflow the two (2) 30" ADS risers and safely drain through the underground storm drain system to an outfall point adjacent to Lot 11.

Utilizing TR-55, TSE determined that the 10-year Q [2.89 cubic-feet-per-second (CFS)] or runoff will enter SWM Pond #1 at Study Point #1 (i.e., rip-rap channel entering Pond #1). We analyzed the proposed 3-foot wide curb-cut draining into Pond #1 and found that the water would pond a maximum height of 0.44-inches as it flowed through the curb-cut into the rip-rap channel and down into the pond. See the enclosed supporting computations for Pond #1 supporting its safe-conveyance. As a supporting computation, we also analyzed the minor sub-drainage area of 5,630 SF that drains to Study Point #2 and flows directly into storm drain structure No. 16. To fully control the runoff draining towards structure No. 16, we've proposed the installation of an asphalt berm across the entrance driveway to direct all the runoff towards the inlet. Structure No. 16 then diverts all the 10-year runoff (0.83 CFS) through a 10" high-density-polyethylene (HDPE) pipe into SWM Pond #1. Reviewing the computations for Pond #1, we've determined that the total 10-year Q (2.89 CFS) through the 24" ADS riser will pond to a maximum storage depth of 0.27-feet in micro-bioretention Pond #1. The anticipated freeboard in Pond #1 will be more then 9-inches and well above the recommended minimum of 6-inch. A 12" HDPE pipe connects the 24" ADS overflow riser and safely conveys the peak 10-year storm (2.89 CFS) from Pond #1 into a rip-rap channel outfall and then through a 24" aluminized corrugated metal pipe (ALCMP), which flows under the site driveway entrance, adjacent to Winchester Boulevard.

It should be noted that the 24" ALCMP safely conveys the 6.35-acres from both the on-site runoff at Structure #10 and the off-site runoff flowing through the grass-channel located adjacent to Winchester Boulevard. The 24" ALCMP was analyzed and safely passes the 10-year Q (28.05 CFS) without overtopping into Winchester Boulevard as designed. The 10-year runoff then travels through the existing rip-rap channel towards Lot 11, where again it flows through a 24" ALCMP culvert under the new site entrance to Lot 11 and continues downstream. Ultimately, the runoff along Winchester Boulevard is conveyed to an existing regional SWM facility, which was designed to capture and control the larger 10 & 100 year storms generated within Stanford Industrial Park. These regional facilities were designed prior to the 2000 MSDM, and thereby do not eliminate the need for on-site water quality control, but do provide additional major storm control for the entire Industrial Park; thereby, providing additional regional SWM control and safe conveyance for Stanford Industrial Park.

Utilizing TR-55, it was determined that the 10-year Q of 8.53 CFS will enter SWM Pond #2 at Study Point #3. The majority of the runoff will drain into the pond from the large parking lot below the new industrial building, with the site runoff entering the rip-rap channel through an open-back inlet (#26). Based on the following computations, the 10-foot wide open-back inlet will pond approximately 0.40-feet (i.e., 5-inches) as runoff drains through the inlet and into the rip-rap channel behind, and prior to the flow entering the forebay cell of SWM Pond #2. Additional runoff from the 12,000 SF rooftop is collected and piped to the rip-rap channel through a 6" & 8" HDPE storm drain system, as shown on the plan. The proposed rip-rap channel easily conveys the combined 8.53 CFS and safely discharges the runoff into the pond forebay below, where the total flow then drains in opposite directions across two (2) 10-foot wide flow-splitters and into the two (2) infiltrations cells at each end of the SWM pond, as briefly discussed above. A 30" ADS riser is located in each of the two infiltration cells. Reviewing the following computations, we've determined that the maximum Q will be divided in half, since there are two riser structures at the same elevation, and that a maximum ponding storage depth of 0.30-feet is anticipated to pass the 10-year Q of 4.27 CFS through each 30" ADS riser. The anticipated freeboard will be almost 9-inches and well above the minimum 6-inch recommendation. Since both SWM ponds have a storage depth to dam height less than 4-feet, and they store well below 40,000 CF of water, they are considered exempt from the Maryland 378 water impoundment code.

Environmental Site Design (ESD)
Computations

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Frederick, Maryland 21703
Phone: 301-378-9842

STORMWATER MANAGEMENT (SWM) - Concept Design Calculations

Stanford Industrial Park - Lot 12 - (P.B. 81, Plat 190)

Frederick County, MD

Existing Condition:

Site Area, Drainage Area, or LOD:		134,699 SF		3.0923 Acres	
RCN for Soil Type(s):	A	38	Total Drainage Area (Soil A):	0	SF
	B	55	Total Drainage Area (Soil B):	132,659	SF
	C	70	Total Drainage Area (Soil C):	2,040	SF
	D	77	Total Drainage Area (Soil D):	0	SF
Composite RCN :		**55.2**	**Total:**	**134,699**	SF

		Ex. Impervious Area:	0	SF
		N/A	0	SF
Existing Impervious Area:	0 SF	N/A	0	SF
Existing Imperviousness (%):	0%	N/A	0	Sf
		Total:	**0**	SF

When the existing impervious area of a project site exceeds 40% of the Limits of Disturbance (LOD), the project will be considered a redevelopment project according to the Maryland SWM Design Manual (MSDM).

Redevelopment Project: NO! Follow Environmental Site Design Criteria - MSDM 5.2.2, pg. 5.18

Proposed Condition:

Existing Impervious Area to Remain:	0	SF	Office & Manufacturing Bldg.:	12,000 SF
Total Design Impervious Area:	**62,200**	SF	Prop. Asphalt:	47,100 SF
			Prop. Conc. & Sidewalks:	1,300 SF
Impervious Area Increase:	**62,200**	SF	Prop. Gravel & Rip-Rap:	1,800 SF
Proposed Imperviousness (%):	**46.2%**		**Total:**	**62,200** SF

Target **Pe** per Soil Type(s) for	A	0.0	Inches	0	SF
"Woods in Good Condition"	B	1.8	Inches	132,659	SF
from Table 5.3 using Proposed	C	1.8	Inches	2,040	SF
Imperviousness (%) above:	D	0.0	Inches	0	SF
Average Target **Pe**:		**1.80**		**Total:** **134,699**	SF

Since the existing site in NOT considered a Redevelopment Project, it will be necessary to provide SWM treatment for 100% of the site area or LOD utilizing the ESD practices outlined in Section 5.2.2 of the MSDM.

Not a Redevelopment Project!
Not a Redevelopment Project!
Not a Redevelopment Project!

Required Treatment Areas:

Existing Impervious Area at 50%:	**0**	SF	Existing Impervious Area to Remain!
New Treatment Area at 100%:	**62,200**	SF	
Impervious Area to be Treated:	**62,200**	SF	
Treatment Imperviousness (%):	**46.2%**		

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Compute ESD Targets New-Development Impervious Areas:

$$ESD_v = \frac{Pe \times Rv \times A}{12}$$ MSDM Page 5.18

Target Pe = **1.80** Inches — ESDR Page 1, using A,B,C, & D soils

Total Site Area or Limit-of-Disturbance = **134,699** SF

Treatment I = **46.2%**

Rv = 0.05 +0.009 (I) — MSDM Page 5.18
Rv = 0.4656

Minimum ESD_v or WQ_v = **9,407** Ft^3 — On-site Water Quality Control meeting EDS!

Max Pe, per Facility = 2.5 Inches — Frederick County — (1-year Storm)

Target ESDv Summary:

Total Site, Drainage Area, or Limit-of-Disturbance to be Treated =	**134,699**	**SF**
Target ESDv or WQv to meet Cpv Requirements =	**9,407**	**Ft^3**

References

MSDM	2000 Maryland Stormwater Design Manual with 2009 Chapter Addendum
GSFP	Maryland Stormwater Management Guidelines for State and Federal Projects- July 2010
ESDPC	Environmental Site Design Process and Computations- July 2010
ESDR	Environmental Site Design Redevelopment Examples- Oct. 2010

Table 5.3 Rainfall Targets/Runoff Curve Number Reductions used for ESD

Hydrologic Soil Group A

%I	RCN*	P_E = 1"	1.2"	1.4"	1.6"	1.8"	2.0"	2.2"	2.4"	2.6"
0%	40									
5%	43									
10%	46									
15%	48	**38**								
20%	51	40	**38**	**38**						
25%	54	41	40	39						
30%	57	42	41	39	**38**					
35%	60	44	42	40	39					
40%	61	44	42	40	39					
45%	66	48	46	41	40					
50%	69	51	48	42	41	**38**				
55%	72	54	50	42	41	39				
60%	74	57	52	44	42	40	**38**			
65%	77	61	55	47	44	42	40			
70%	80	66	61	55	50	45	40			
75%	84	71	67	62	56	48	40	**38**		
80%	86	73	70	65	60	52	44	40		
85%	89	77	74	70	65	58	49	42	**38**	
90%	92	81	78	74	70	65	58	48	42	**38**
95%	95	85	82	78	75	70	65	57	50	39
100%	98	89	86	83	80	76	72	66	59	40

Hydrologic Soil Group B

%I	RCN*	P_E = 1"	1.2"	1.4"	1.6"	1.8"	2.0"	2.2"	2.4"	2.6"
0%	61									
5%	63									
10%	65									
15%	67	**55**								
20%	68	60	**55**	**55**						
25%	70	64	61	58						
30%	72	65	62	59	**55**					
35%	74	66	63	60	56					
40%	75	66	63	60	56					
45%	78	68	66	62	58					
50%	80	70	67	64	60					
55%	81	71	68	65	61	**55**				
60%	83	73	70	67	63	58				
65%	85	75	72	69	65	60	**55**			
70%	87	77	74	71	67	62	57			
75%	89	79	76	73	69	65	59			
80%	91	81	78	75	71	66	61			
85%	92	82	79	76	72	67	62	**55**		
90%	94	84	81	78	74	70	65	59	**55**	
95%	96	87	84	81	77	73	69	63	57	
100%	98	89	86	83	80	76	72	66	59	**55**

Cp_v Addressed (RCN = Woods in Good Condition)

RCN Applied to Cp_v Calculations

Table 5.3 Runoff Curve Number Reductions used for Environmental Site Design (continued)

Hydrologic Soil Group C

%I	RCN*	P_E = 1"	1.2"	1.4"	1.6"	1.8"	2.0"	2.2"	2.4"	2.6"
0%	74									
5%	75									
10%	76									
15%	78									
20%	79	**70**								
25%	80	72	**70**	**70**						
30%	81	73	72	71						
35%	82	74	73	72	**70**					
40%	84	77	75	73	71					
45%	85	78	76	74	71					
50%	86	78	76	74	71					
55%	86	78	76	74	71	**70**				
60%	88	80	78	76	73	71				
65%	90	82	80	77	75	72				
70%	91	82	80	78	75	72				
75%	92	83	81	79	75	72				
80%	93	84	82	79	76	72				
85%	94	85	82	79	76	72				
90%	95	86	83	80	77	73	**70**			
95%	97	88	85	82	79	75	71			
100%	98	89	86	83	80	76	72	**70**		

Hydrologic Soil Group D

%I	RCN*	P_E = 1"	1.2"	1.4"	1.6"	1.8"	2.0"	2.2"	2.4"	2.6"
0%	80									
5%	81									
10%	82									
15%	83									
20%	84	**77**								
25%	85	78								
30%	85	78	**77**	**77**						
35%	86	79	78	78						
40%	87	82	81	79	**77**					
45%	88	82	81	79	78					
50%	89	83	82	80	78					
55%	90	84	82	80	78					
60%	91	85	83	81	78					
65%	92	85	83	81	78					
70%	93	86	84	81	78					
75%	94	86	84	81	78					
80%	94	86	84	82	79					
85%	95	86	84	82	79					
90%	96	87	84	82	79	**77**				
95%	97	88	85	82	80	78				
100%	98	89	86	83	80	78	**77**			

☐ Cp_v Addressed (RCN = Woods in Good Condition)

☐ RCN Applied to Cp_v Calculations

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Frederick, Maryland 21703
Phone: 301-378-9842

Micro-Bioretention (M-6) "ESD" Design Worksheet

SWM Pond # 1

Balance of ESDv to meet Cpv Treatment before Micro-Bioretention:	9,407	cf	
Minimum Micro-Bioretention Volume Required (100% of ESDv or WQv):	9,407	cf	See Section 3.4.4
Micro-Bioretention ESDv Treatment:	2,916	cf	
Balance of ESDv to meet Cpv Treatment after Micro-bioretention:	6,491	cf	
	Need more ESD volume!		

Facility/DA Area ID	Drainage Area (sq. ft)	Impervious Area (sq. ft)	Pervious (%)	Impervious (I) (%)	Rv (.05+.009 I)	Filter Bed Area (Af) (sq. ft)	Af / DA (x > 2%)
Micro-Bio SWM #1	25,060	14,325	42.84%	57.16%	0.56	1620	6.46%

Max ESD Volume ESDv=Pe*Rv*A/12 Pe= 1-yr storm (cubic ft.)	Provided Soil and Gravel Bed Depth (ft.)	Provided Ponding Depth (ft.)	ESD Volume Below Grade (Porosity=0.4) (cubic ft.)	ESD Volume Above Grade (End Area Method) (cubic ft.)	Total ESD Volume Provided (cubic ft.)	Provided ESDv Treatment (cubic ft.)	Provided Pe (inches)
2947	2.00	1.00	1296	1620	2916	2916	2.5

Facility/DA Area ID	Drainage Area (sq. ft)	Impervious Area (sq. ft)	Pervious (%)	Impervious (I) (%)	Rv (.05+.009 I)	Filter Bed Area (Af) (sq. ft)	Af / DA (x > 2%)
N/A	1	0	100.00%	0.00%	0.05	0	0.00%

Max ESD Volume ESDv=Pe*Rv*A/12 Pe= 1-yr storm (cubic ft.)	Provided Soil and Gravel Bed Depth (ft.)	Provided Ponding Depth (ft.)	ESD Volume Below Grade (Porosity=0.4) (cubic ft.)	ESD Volume Above Grade (End Area Method) (cubic ft.)	Total ESD Volume Provided (cubic ft.)	Provided ESDv Treatment (cubic ft.)	Provided Pe (inches)
0	4.00	1.00	0	0	0	0	0.0

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Bioretention - SWM Pond (F-6) "ESD" Design Worksheet

SWM Pond #2

Balance of ESDv to meet Cpv Treatment before Bioretention Pond:	6,491	cf	
Minimum ESD Volume Required prior to Treatment (75% of ESDv or WQv):	4,868	cf	See Section 3.4.4
Total Bioretention ESDv Treatment Volume:	6,496	cf	
Balance of ESDv to meet Cpv Treatment after Bioretention Pond	0	cf	

Required ESDv fully satisfied!!

Facility/DA Area ID	Drainage Area (sq. ft)	Impervious Area (sq. ft) above pond	Pervious (%)	Impervious (I) (%)	Rv (.05+.009 I)	Filter Bed Area (Af) (sq. ft)	Req. Filter Bed (Af) (Af Min.)
SWM Pond #2	70,435	44,585	36.70%	63.30%	0.62	2020	1082

Max ESD Volume ESDv=Pe*Rv*A/12 Pe= 1-yr storm (cubic ft.)	Provided Soil, Sand or Grave Bed Depth (ft.)	Provided Ponding Depth (ft.)	ESD Volume Below Grade (Porosity=0.4) (cubic ft.)	ESD Volume Above Grade (End Area Method) (cubic ft.)	Total ESD Volume Provided (cubic ft.)	Provided ESDv Treatment (cubic ft.)	Provided Pe (inches)
9093	4.00	1.00	3232	2020	5252	5252	1.4

	Type
Filter Design Method Selected:	**Bio-Soil**
Permeability (k) =	0.5
Filter Bed Drain Time =	2.0

Bed Drain Time: 1.67 Days (sand) or 2.0 Days (bio-soil)

Sand: 3.5 _Ft / Day
Peat: 2.0 _Ft / Day
Leaf Compost: 8.7 _Ft / Day
Bioretention Soil: 0.5 _Ft / Day

Forebay Ponding Area (SF)	Forebay Depth (Ft.)	Forebay Ponding Volume (CF)
995	1.25	1244

MSDM	2000 Maryland Stormwater Design Manual with 2009 Chapter Addendum	July 2010
GSFP	Maryland Stormwater Management Guidelines for State and Federal Projects	July 2010
ESDPC	Environmental Site Design Process and Computations	Oct 2010
ESDR	Environmental Site Design Redevelopment Examples	

SWM Computations for Pond #1

TR-55 Peak Discharge, Micro-Bioretention
&
Orifice Design

Worksheet 2: Runoff Curve Number and Runoff

Project: Stanford Industrial Park - Lot 12 **By:** GLM **Date:** 04/30/22

Location: SWM Pond #1 **Checked:** **Date:** 04/30/22

Circle One: Present | Developed

1. Runoff curve number (CN):

Soil name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected / connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Fig. 2-3	CN 1/ Fig. 2-4	Area (X)	Area	Product of CN x Area
					X	acres	
						miles^2	
						%	
Mt. Airy MeD	Mt. Airy channery loam, 15% to 25% slp.: HSG: C Industrial Property	91				0.02	2.00
Glenelg GfB, GgB, & GgC	silt & channery loam, 3 to 15% slopes; HSG: B Industrial Property	88				0.56	48.84
						0.00	0.00
						0.00	0.00
						0.00	0.00
						0.00	0.00
						0.00	0.00
						0.00	0.00
						0.00	0.00
						0.00	0.00
HSG: B, C, & D	Impervious area (street and roads)					0.00	0.00
					Totals =	0.58	50.84

CN (weighted) = Total Product / Total Area = 50.84 / 0.58 **Use CN = 88.11**

2. Runoff (Q):

		Storm #1	Storm #2	Storm #3
Frequency	Yr.	2	10	100
Rainfall, P (24-hour)	in	3.10	5.00	7.00
Runoff, Q	in	1.90	3.66	5.58

(Use P & CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 3: Time of concentration (Tc) or travel time (Tt)

Project: Stanford Industrial Park - Lot 12 **By:** GLM **Date:** 04/30/22

Location: SWM Pond #1 **Checked:** 0 **Date:** 04/30/22

Circle One: Present **Developed**

Circle One: **Tc** Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet. Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc Only)		Segment ID:	AB	BC	
1	Surface description (table 3-1)		Unpaved	Unpaved	
2	Manning's roughness coefficient, n (table 3-1)		0.24	0.24	
3	Flow length, L (total L < 300 ft.)	ft	50	20	
4	Two-Yr. 24-Hour rainfall, P_2	in	3.1	3.1	
5	Land slope, S	ft/ft	0.03	0.33	
6	$Tt = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,S^{0.4}}$ Compute Tt	hr	0.12 +	0.02 =	**0.14**

Shallow concentrated flow		Segment ID:	CD	-	
7	Surface description (paved or unpaved)		Unpaved	N/A	
8	Flow length, L	ft	129	0	
9	Watercourse slope, S	ft/ft	0.01	1	
10	Average velocity, V (figure 3-1)	ft/s	1.6	0.0001	
11	$Tt = \frac{L}{3600\,V}$ Compute Tt	hr	0.02 +	0.00 =	**0.02**

Channel flow		Segment ID:	DE	-	
12	Cross section flow area, A	ft^2	1.00	1.00	
13	Wetted perimeter, Pw	ft	1.00	1.00	
14	Hydraulic radius, R = A/Pw Compute R	ft	1.00	1.00	
15	Channel slope, S	ft/ft	0.0250	0.1000	
16	Manning's roughness coefficient, n		0.015	0.100	
17	$Velocity = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$ Compute V	ft/s	15.71	4.71	
18	Flow length, L	ft	135	0	
19	$Tt = \frac{L}{3600\,V}$ Compute Tt	hr	0.00 +	0.00 =	**0.00**
20	Watershed or subarea Tc or Tt (add Tt in steps 6, 11 & 19)		Total:	hr.	**0.16**

Worksheet 4: Graphical Peak Discharge Method

Project: Stanford Industrial Park - Lot 12 **By:** GLM **Date:** 04/30/22

Location: SWM Pond #1 **Checked:** **Date:** 04/30/22

Circle One: Present | **Developed**

1 Data:

Drainage area, A_m	A_m =	0.58	acres (Ac.)	
	A_m =	0.000902	$mile^2$	
Runoff curve number (RCN)		88	(From worksheet #2)	
Time of conentration (Tc)		0.16	hr. (From worksheet #3)	
Rainfall distribution type		II	(I, IA, II, or III)	
Pond & swamp areas spread throughout the watershed	swamp =	1.0	% of A_m	0.00 Ac.

		Storm #1	Storm #2	Storm #3
2 Storm Frequency	Yr.	2	10	100
3 Rainfall, P (24-hour)	in	3.10	5.00	7.00
4 Initial abstructions, Ia ..... (use CN with Table 4-1)	in	0.247	0.247	0.247
5 Computed Ia/P		0.080	0.049	0.035
6 Unit peak discharge, qu ..... (use Tc & Ia/P with exhibit 4- II)	csm/in	875	875	875
7 Runoff, Q ..... (From worksheet #2)	in	1.90	3.66	5.58
8 Pond and swamp adjustment factor, F_p ..... (use percent pond and swamp area with Table 4-2. Factor is 1.0 for zero (0%) percent pond and swamp area.)		1.00	1.00	1.00
9 Peak discharge, qp ..... (where qp = qu x A_m x Q x F_p)	cfs	1.50	2.89	4.40

Culvert Report

SWM Pond No.1 - Culvert Outfall Analysis

Invert Elev Dn (ft)	=	460.00
Pipe Length (ft)	=	33.00
Slope (%)	=	1.52
Invert Elev Up (ft)	=	460.50
Rise (in)	=	12.0
Shape	=	Cir
Span (in)	=	12.0
No. Barrels	=	1
n-Value	=	0.011
Inlet Edge	=	Sq Edge
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

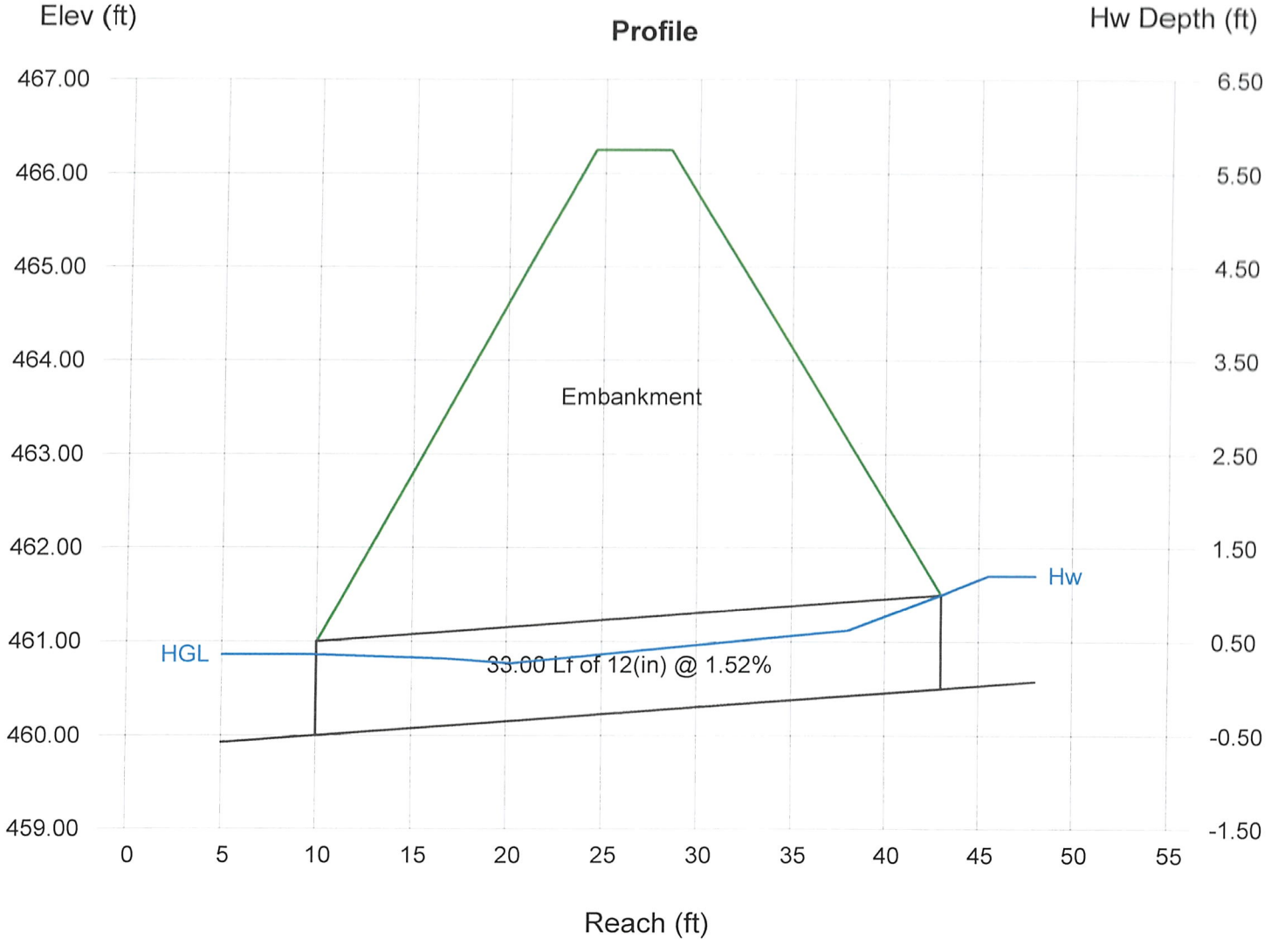
Top Elevation (ft)	=	466.25
Top Width (ft)	=	4.00
Crest Width (ft)	=	100.00

Calculations

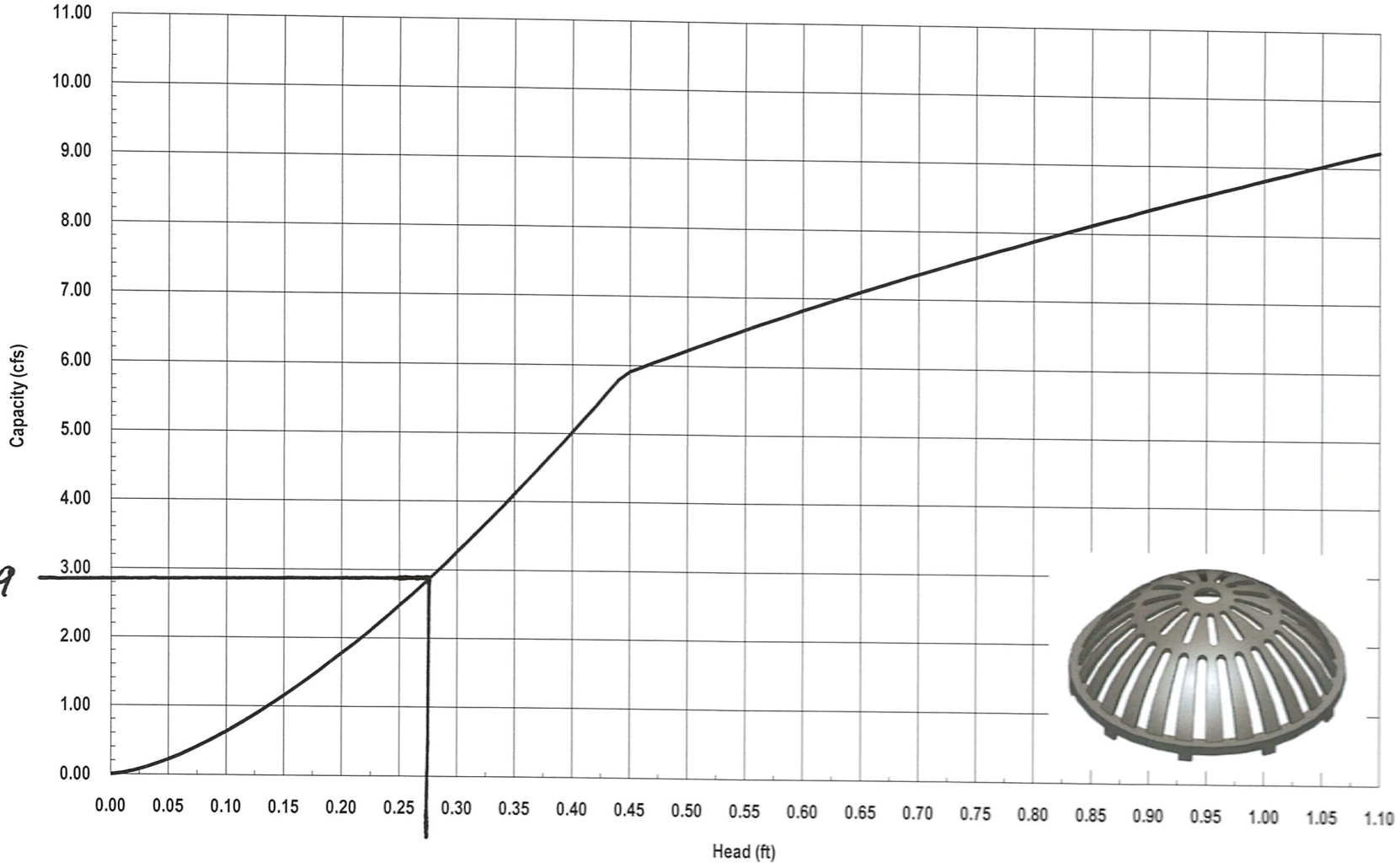
Qmin (cfs)	=	2.89
Qmax (cfs)	=	2.89
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	2.89
Qpipe (cfs)	=	2.89
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	4.02
Veloc Up (ft/s)	=	4.77
HGL Dn (ft)	=	460.86
HGL Up (ft)	=	461.22
Hw Elev (ft)	=	461.70
Hw/D (ft)	=	1.20
Flow Regime	=	Inlet Control



Nyloplast 24" Dome Grate Inlet Capacity Chart



2.89

0.27

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POND No. 1

10 yr. Q = 2.89 CFS

Weir Report

Hydraflow Express by Intelisolve — Saturday, Apr 30 2022, 3:41 PM

Curb-Cut into Pond #1

Rectangular Weir

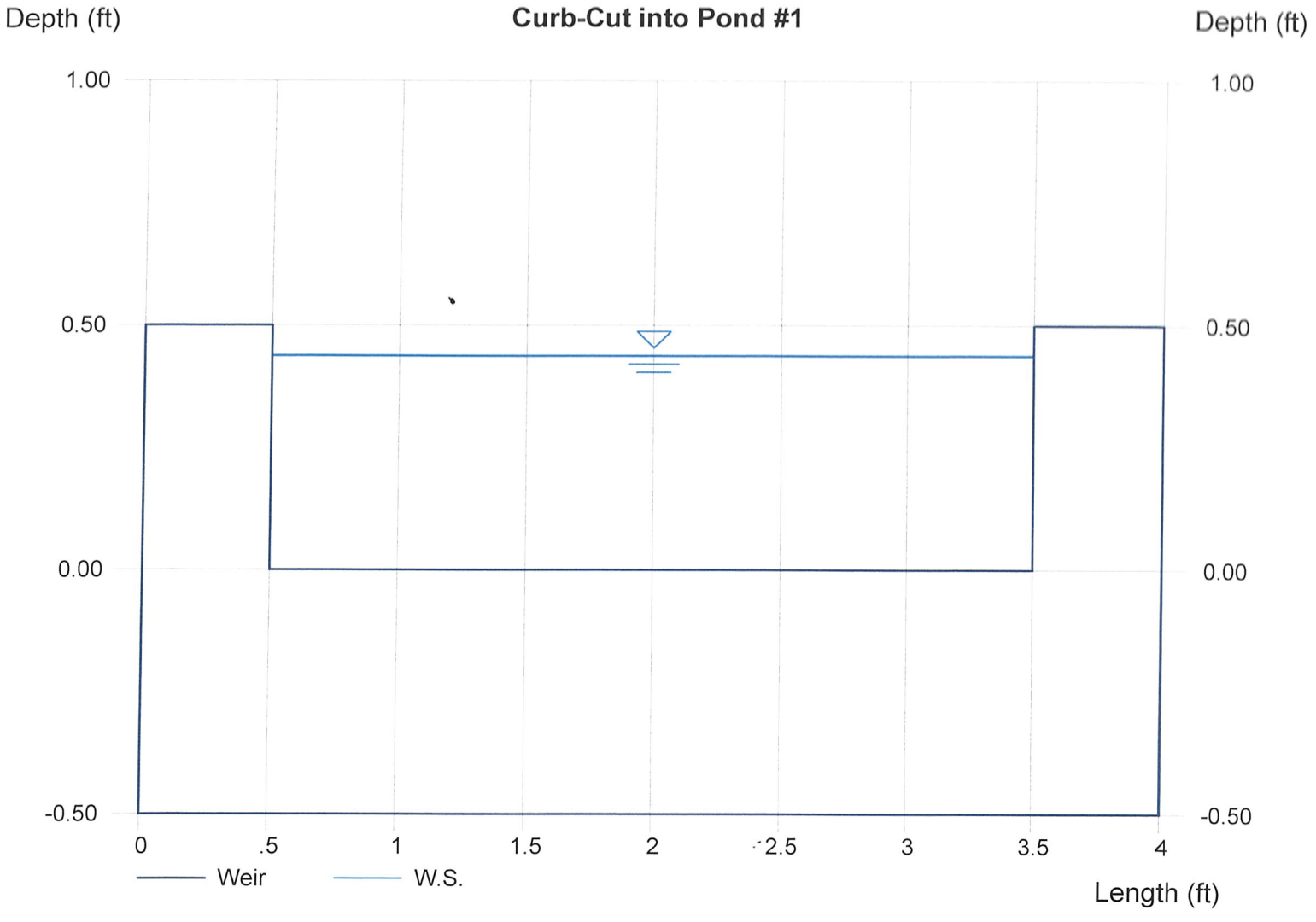
Crest	= Sharp
Bottom Length (ft)	= 3.00
Total Depth (ft)	= 0.50

Calculations

Weir Coeff. Cw	= 3.33
Compute by:	Known Q
Known Q (cfs)	= 2.89

Highlighted

Depth (ft)	= 0.44
Q (cfs)	= 2.890
Area (sqft)	= 1.31
Velocity (ft/s)	= 2.20
Top Width (ft)	= 3.00



Channel Report

Rip-Rap Channel into Pond #1

Trapezoidal

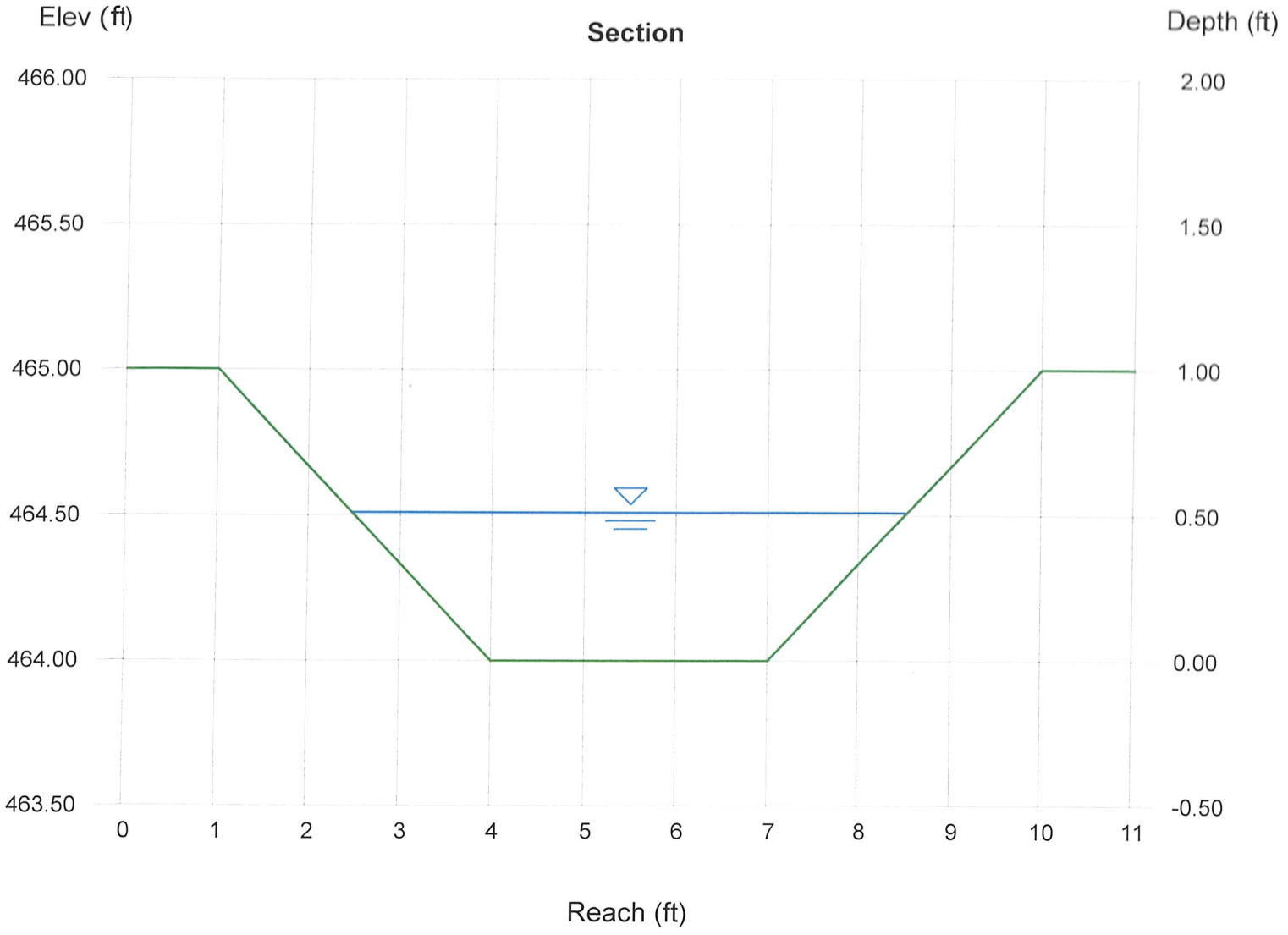
Botom Width (ft)	= 3.00
Side Slope (z:1)	= 3.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 464.00
Slope (%)	= 0.33
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.89

Highlighted

Depth (ft)	= 0.51
Q (cfs)	= 2.890
Area (sqft)	= 2.31
Velocity (ft/s)	= 1.25
Wetted Perim (ft)	= 6.23
Crit Depth, Yc (ft)	= 0.28
Top Width (ft)	= 6.06
EGL (ft)	= 0.53



Worksheet 2: Runoff Curve Number and Runoff

Project: Stanford Industrial Park - Lot 12 **By:** GLM **Date:** 04/30/22

Location: Structure 16 - Pond #1 **Checked:** **Date:** -

Circle One: Present | Developed

1. Runoff curve number (CN):

Soil name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected / connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Fig. 2-3	CN 1/ Fig. 2-4	Area (X) acres / miles² / %	Product of CN x Area
Glenelg GfB, GgB, & GgC	silt & channery loam, 3 to 15% slopes; HSG: B Commercial Property	92			0.13	11.89
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
HSG: B, C, & D	Impervious area (street and roads)				0.00	0.00
				Totals =	0.13	11.89

CN (weighted) = Total Product / Total Area = 11.89 / 0.13 **Use CN = 92.00**

2. Runoff (Q):

		Storm #1	Storm #2	Storm #3
Frequency	Yr.	2	10	100
Rainfall, P (24-hour)	in	3.10	5.00	7.00
Runoff, Q	in	2.26	4.09	6.06

(Use P & CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 3: Time of concentration (Tc) or travel time (Tt)

Project: Stanford Industrial Park - Lot 12 **By:** GLM **Date:** 04/30/22

Location: Structure 16 - Pond #1 **Checked:** 0 **Date:** -

Circle One: Present Developed

Circle One: Tc Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet. Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc Only)

			Segment ID:	AB	-	
1	Surface description (table 3-1)			Paved	N/A	
2	Manning's roughness coefficient, n (table 3-1)			0.02	0.00	
3	Flow length, L (total L < 300 ft.)		ft	40	1	
4	Two-Yr. 24-Hour rainfall, P_2		in	3.1	3.1	
5	Land slope, S		ft/ft	0.026	0.0001	
6	$Tt = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,S^{0.4}}$	Compute Tt	hr	0.01 +	0.00 =	**0.01**

Shallow concentrated flow

			Segment ID:	BC	-	
7	Surface description (paved or unpaved)			Paved	N/A	
8	Flow length, L		ft	100	0	
9	Watercourse slope, S		ft/ft	0.026	1	
10	Average velocity, V (figure 3-1)		ft/s	3.4	0.0001	
11	$Tt = \frac{L}{3600\,V}$	Compute Tt	hr	0.01 +	0.00 =	**0.01**

Channel flow

			Segment ID:	CD	-
12	Cross section flow area, A		ft^2	1.00	1.00
13	Wetted perimeter, Pw		ft	1.00	1.00
14	Hydraulic radius, R = A/Pw	Compute R	ft	1.00	1.00
15	Channel slope, S		ft/ft	0.0100	0.1000
16	Manning's roughness coefficient, n			0.015	0.100
17	$Velocity = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$	Compute V	ft/s	9.93	4.71
18	Flow length, L		ft	1	0
19	$Tt = \frac{L}{3600\,V}$	Compute Tt	hr	0.00 +	0.00 =	**0.00**

20 Watershed or subarea Tc or Tt (add Tt in steps 6, 11 & 19) ..... Total: hr. **0.02**

NOTE: Use 0.10 minimum Tc

Worksheet 4: Graphical Peak Discharge Method

Project: Stanford Industrial Park - Lot 12 **By:** GLM **Date:** 04/30/22

Location: Structure 16 - Pond #1 **Checked:** **Date:** -

Circle One: Present Developed

1 Data:

Drainage area, A_m	A_m =	0.13	acres (Ac.)	
	A_m =	0.000202	$mile^2$	
Runoff curve number (RCN)		92	(From worksheet #2)	
Time of conentration (Tc)		0.02	hr. (From worksheet #3)	
Rainfall distribution type		II	(I, IA, II, or III)	
Pond & swamp areas spread throughout the watershed	swamp =	1.0	% of A_m	0.00 Ac.

		Storm #1	Storm #2	Storm #3
2 Storm Frequency	Yr.	2	10	100
3 Rainfall, P (24-hour)	in	3.10	5.00	7.00
4 Initial abstructions, Ia (use CN with Table 4-1)	in	0.151	0.151	0.151
5 Computed Ia/P		0.049	0.030	0.022
6 Unit peak discharge, qu (use Tc & Ia/P with exhibit 4- II)	csm/in	1000	1000	1000
		Based on minimum Tc = 0.10 Min.		
7 Runoff, Q (From worksheet #2)	in	2.26	4.09	6.06
8 Pond and swamp adjustment factor, F_p (use percent pond and swamp area with Table 4-2. Factor is 1.0 for zero (0%) percent pond and swamp area.)		1.00	1.00	1.00
9 Peak discharge, qp (where qp = qu x A_m x Q x F_p)	cfs	0.46	0.83	1.22

Culvert Report

Hydraflow Express by Intelisolve

Saturday, Apr 2 2022, 8:55 AM

SWM Pond No. 1 - Structure No.16 Outfall into Pond

Invert Elev Dn (ft)	= 464.00
Pipe Length (ft)	= 40.00
Slope (%)	= 1.00
Invert Elev Up (ft)	= 464.40
Rise (in)	= 10.0
Shape	= Cir
Span (in)	= 10.0
No. Barrels	= 1
n-Value	= 0.011
Inlet Edge	= Sq Edge
Coeff. K,M,c,Y,k	= 0.0098, 2, 0.0398, 0.67, 0.5

Embankment

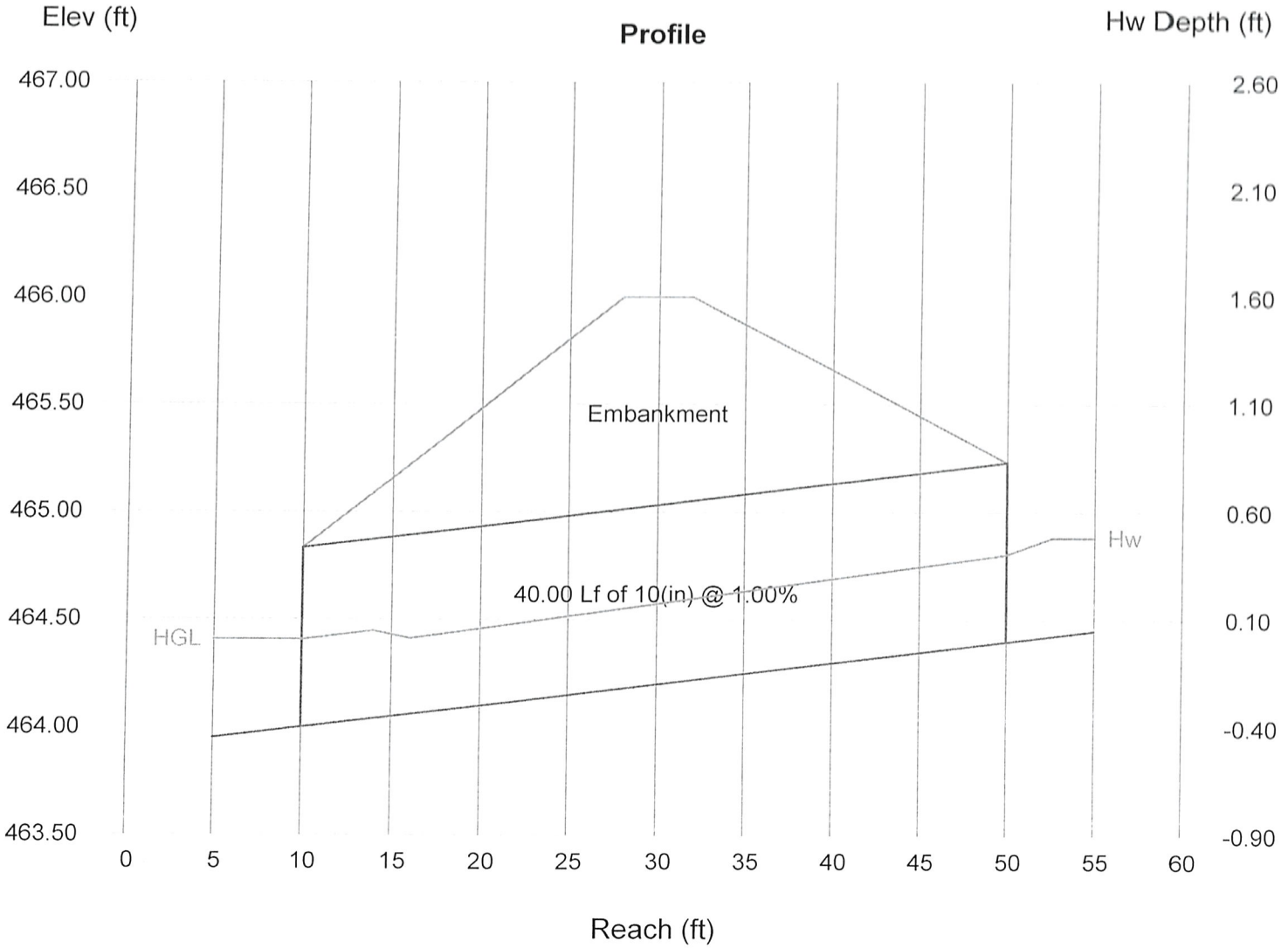
Top Elevation (ft)	= 466.00
Top Width (ft)	= 4.00
Crest Width (ft)	= 100.00

Calculations

Qmin (cfs)	= 0.83
Qmax (cfs)	= 0.83
Tailwater Elev (ft)	= 464.25

Highlighted

Qtotal (cfs)	= 0.83
Qpipe (cfs)	= 0.83
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 3.15
Veloc Up (ft/s)	= 3.15
HGL Dn (ft)	= 464.41
HGL Up (ft)	= 464.81
Hw Elev (ft)	= 464.88
Hw/D (ft)	= 0.58
Flow Regime	= Outlet Control



SWM Computations for Pond #2

TR-55 Peak Discharge, Bioretention Design, & Orifice Design

Worksheet 2: Runoff Curve Number and Runoff

Project: Stanford Industrial Park - Lot 12 **By:** GLM **Date:** 04/30/22

Location: SWM Pond #2 **Checked:** **Date:** -

Circle One: Present | Developed

1. Runoff curve number (CN):

Soil name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected / connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Fig. 2-3	CN 1/ Fig. 2-4	Area X acres / miles² / %	Product of CN x Area
Glenelg GfB, GgB, & GgC	silt & channery loam, 3 to 15% slopes; HSG: B Industrial Property	88			1.62	142.29
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
HSG: B, C, & D	Impervious area (street and roads)				0.00	0.00
				Totals =	1.62	142.29

CN (weighted) = Total Product / Total Area = 142.29 / 1.62 **Use CN = 88.00**

2. Runoff (Q):

		Storm #1	Storm #2	Storm #3
Frequency	Yr.	2	10	100
Rainfall, P (24-hour)	in	3.10	5.00	7.00
Runoff, Q	in	2.26	4.09	6.06

(Use P & CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 3: Time of concentration (Tc) or travel time (Tt)

Project: Stanford Industrial Park - Lot 12 **By:** GLM **Date:** 04/30/22

Location: SWM Pond #2 **Checked:** 0 **Date:** -

Circle One: Present Developed

Circle One: Tc Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet. Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc Only)		Segment ID:	AB	-	
1	Surface description (table 3-1)		Unpaved	N/A	
2	Manning's roughness coefficient, n (table 3-1)		0.24	0.00	
3	Flow length, L (total L < 300 ft.)	ft	100	1	
4	Two-Yr. 24-Hour rainfall, P_2	in	3.1	3.1	
5	Land slope, S	ft/ft	0.0400	0.0001	
6	$Tt = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,S^{0.4}}$ Compute Tt	hr	0.18 +	0.00 =	**0.18**

Shallow concentrated flow		Segment ID:	BC	-	
7	Surface description (paved or unpaved)		Unpaved	N/A	
8	Flow length, L	ft	60	0	
9	Watercourse slope, S	ft/ft	0.1000	1.0000	
10	Average velocity, V (figure 3-1)	ft/s	5	0.0001	
11	$Tt = \frac{L}{3600\,V}$ Compute Tt	hr	0.00 +	0.00 =	**0.00**

Channel flow		Segment ID:	CD	-	
12	Cross section flow area, A	ft^2	1.00	1.00	
13	Wetted perimeter, Pw	ft	1.00	1.00	
14	Hydraulic radius, R = A/Pw Compute R	ft	1.00	1.00	
15	Channel slope, S	ft/ft	0.0200	0.1000	
16	Manning's roughness coefficient, n		0.015	0.100	
17	$Velocity = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$ Compute V	ft/s	14.05	4.71	
18	Flow length, L	ft	330	0	
19	$Tt = \frac{L}{3600\,V}$ Compute Tt	hr	0.01 +	0.00 =	**0.01**
20	Watershed or subarea Tc or Tt (add Tt in steps 6, 11 & 19)		Total:	hr.	**0.19**

Worksheet 4: Graphical Peak Discharge Method

Project: Stanford Industrial Park - Lot 12 **By:** GLM **Date:** 04/30/22

Location: SWM Pond #2 **Checked:** **Date:** -

Circle One: Present Developed

1 Data:

Drainage area, A_m	A_m =	1.62	acres (Ac.)
	A_m =	0.002527	$mile^2$
Runoff curve number (RCN)		88	(From worksheet #2)
Time of conentration (Tc)		0.19	hr. (From worksheet #3)
Rainfall distribution type		II	(I, IA, II, or III)
Pond & swamp areas spread throughout the watershed	swamp =	1.0	% of A_m 0.00 Ac.

			Storm #1	Storm #2	Storm #3
2	Storm Frequency	Yr.	2	10	100
3	Rainfall, P (24-hour)	in	3.10	5.00	7.00
4	Initial abstructions, Ia ..... (use CN with Table 4-1)	in	0.247	0.247	0.247
5	Computed Ia/P		0.080	0.049	0.035
6	Unit peak discharge, qu ..... (use Tc & Ia/P with exhibit 4- II)	csm/in	825	825	825
7	Runoff, Q ..... (From worksheet #2)	in	2.26	4.09	6.06
8	Pond and swamp adjustment factor, F_p ..... (use percent pond and swamp area with Table 4-2. Factor is 1.0 for zero (0%) percent pond and swamp area.)		1.00	1.00	1.00
9	Peak discharge, qp ..... (where qp = qu x A_m x Q x F_p)	cfs	4.71	8.53	12.63

Culvert Report

HydraFlow Express by Intelisolve — Monday, May 16 2022, 2:2 PM

SWM Pond No. 2 - Culvert Outfall Analysis - Structure No. 20

Invert Elev Dn (ft)	=	451.00
Pipe Length (ft)	=	30.00
Slope (%)	=	0.83
Invert Elev Up (ft)	=	451.25
Rise (in)	=	18.0
Shape	=	Cir
Span (in)	=	18.0
No. Barrels	=	1
n-Value	=	0.011
Inlet Edge	=	Sq Edge
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

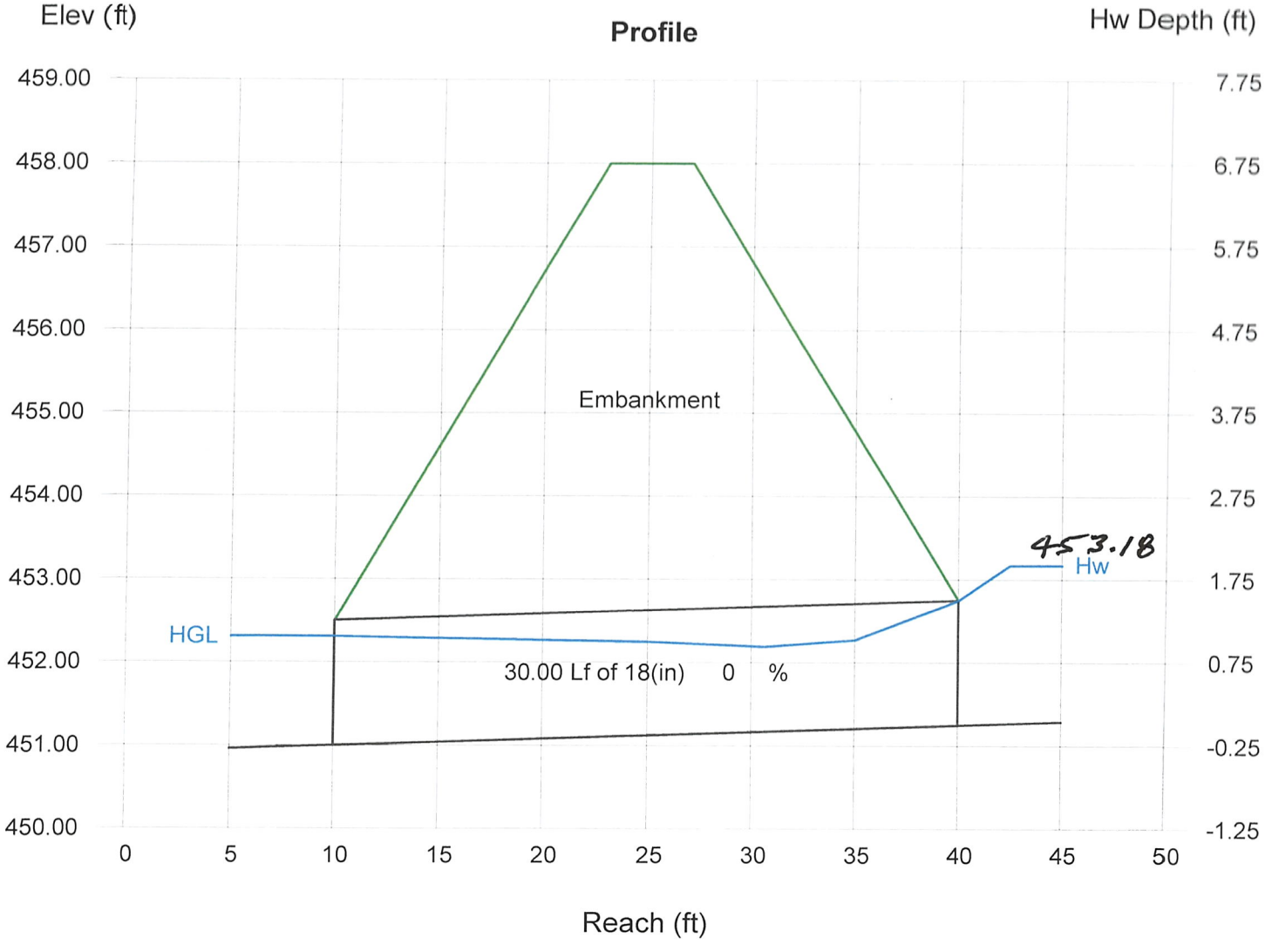
Top Elevation (ft)	=	458.00
Top Width (ft)	=	4.00
Crest Width (ft)	=	100.00

Calculations

Qmin (cfs)	=	8.53
Qmax (cfs)	=	8.53
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	8.53
Qpipe (cfs)	=	8.53
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	5.22
Veloc Up (ft/s)	=	6.06
HGL Dn (ft)	=	452.31
HGL Up (ft)	=	452.36
Hw Elev (ft)	=	453.18
Hw/D (ft)	=	1.28
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express by Intelisolve — Monday, May 16 2022, 2:9 PM

SWM Pond No. 2 - Flow Analysis Structure 24 to 22

Invert Elev Dn (ft)	= 451.25
Pipe Length (ft)	= 140.00
Slope (%)	= 0.18
Invert Elev Up (ft)	= 451.50
Rise (in)	= 15.0
Shape	= Cir
Span (in)	= 15.0
No. Barrels	= 1
n-Value	= 0.011
Inlet Edge	= Sq Edge
Coeff. K,M,c,Y,k	= 0.0098, 2, 0.0398, 0.67, 0.5

Embankment

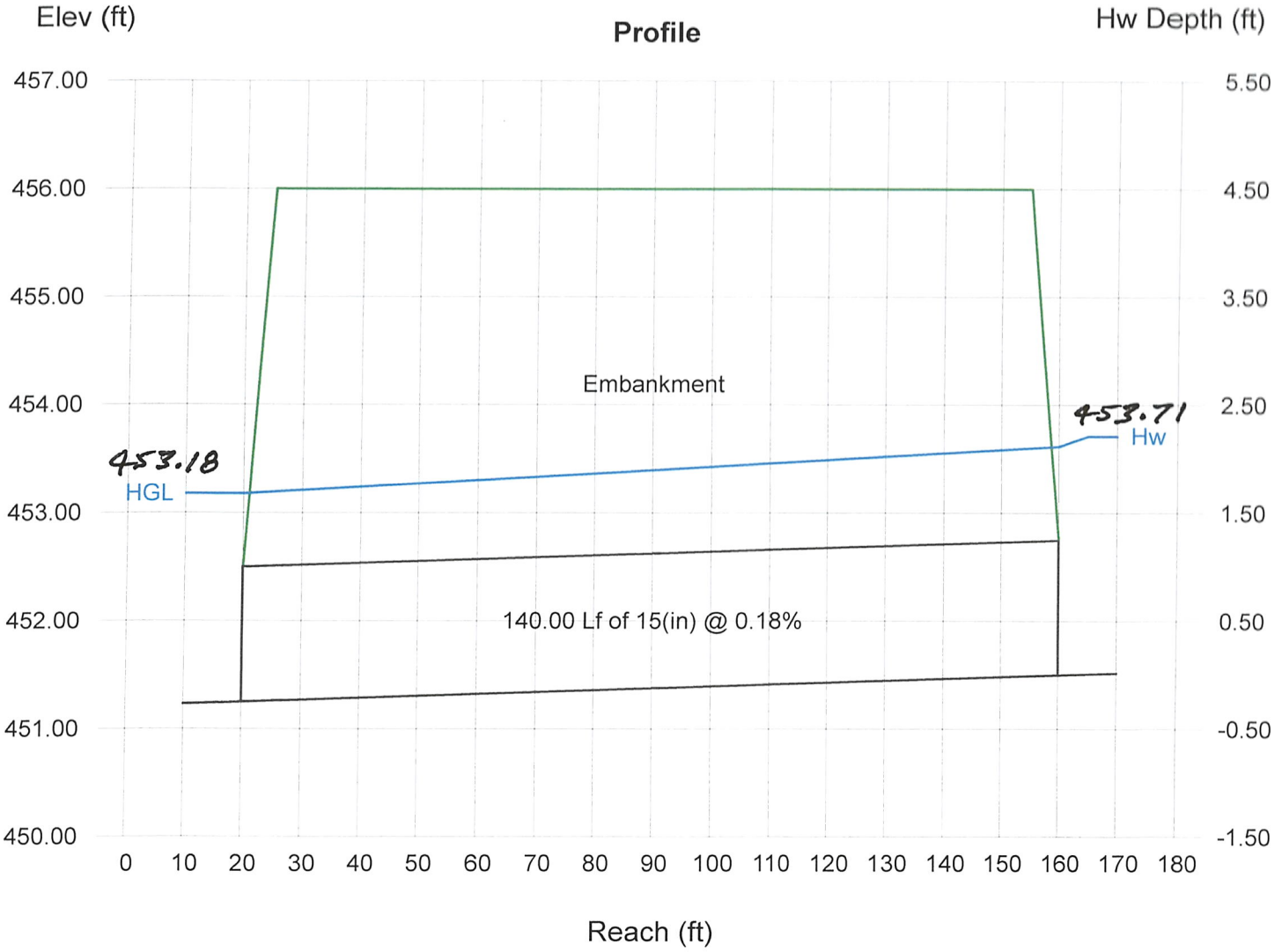
Top Elevation (ft)	= 456.00
Top Width (ft)	= 130.00
Crest Width (ft)	= 100.00

Calculations

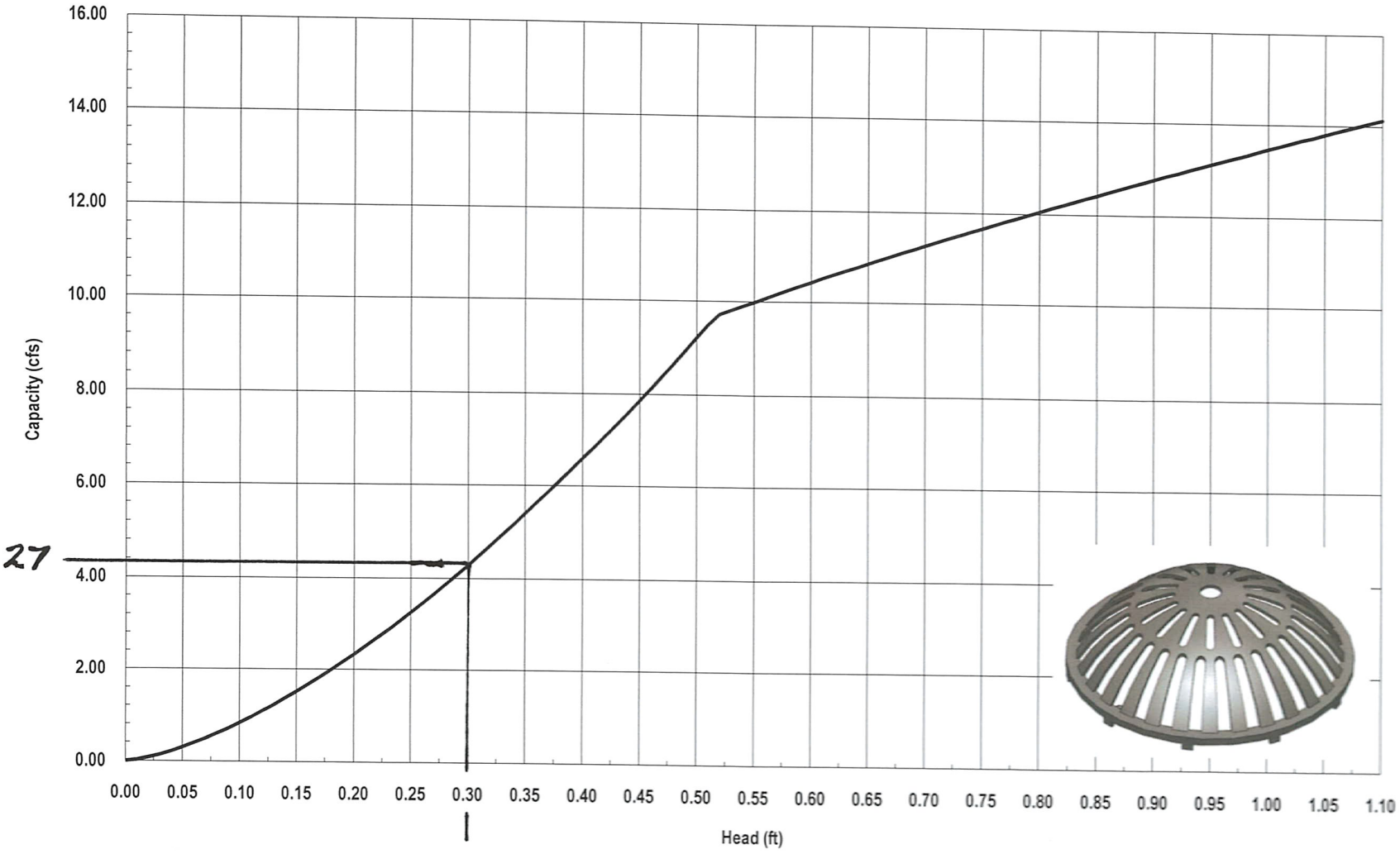
Qmin (cfs)	= 4.27
Qmax (cfs)	= 4.27
Tailwater Elev (ft)	= 453.18

Highlighted

Qtotal (cfs)	= 4.27
Qpipe (cfs)	= 4.27
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 3.48
Veloc Up (ft/s)	= 3.48
HGL Dn (ft)	= 453.18
HGL Up (ft)	= 453.62
Hw Elev (ft)	= 453.71
Hw/D (ft)	= 1.77
Flow Regime	= Outlet Control



Nyloplast 30" Dome Grate Inlet Capacity Chart



8.53/2 = 4.27 CFS

Nyloplast
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POND NO. 2

10 YR Q = 8.53 CFS

2 - GRATES

Weir Report

Hydraflow Express by Intelisolve — Saturday, Apr 30 2022, 3:1 PM

Open-Back Inlet into SWM Pond #2

Rectangular Weir

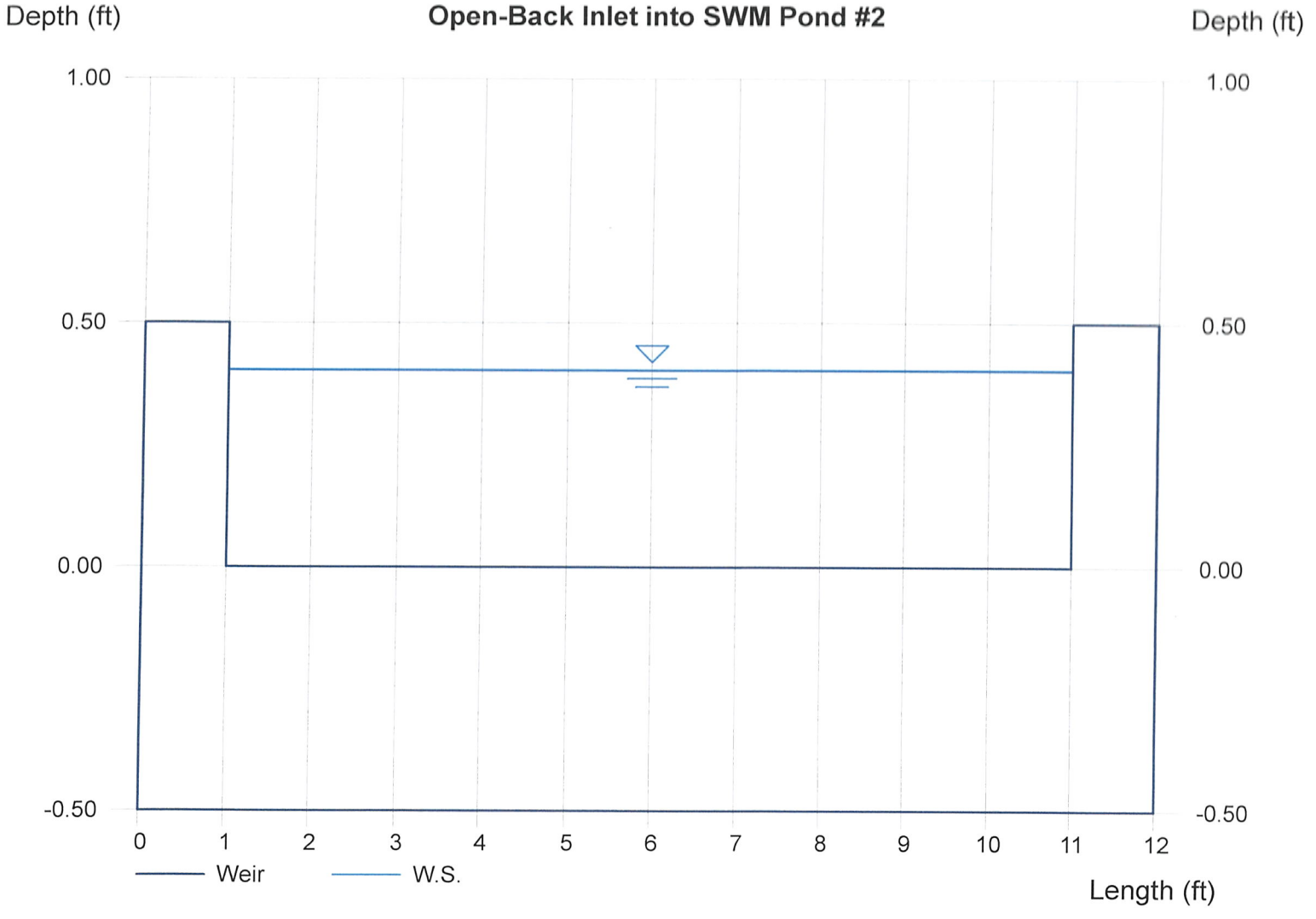
Crest	= Sharp
Bottom Length (ft)	= 10.00
Total Depth (ft)	= 0.50

Calculations

Weir Coeff. Cw	= 3.33
Compute by:	Known Q
Known Q (cfs)	= 8.53

Highlighted

Depth (ft)	= 0.40
Q (cfs)	= 8.530
Area (sqft)	= 4.03
Velocity (ft/s)	= 2.12
Top Width (ft)	= 10.00



Channel Report

Hydraflow Express by Intelisolve

Saturday, Apr 30 2022, 3:47 PM

Rip-Rap Channel into Pond #2

Trapezoidal

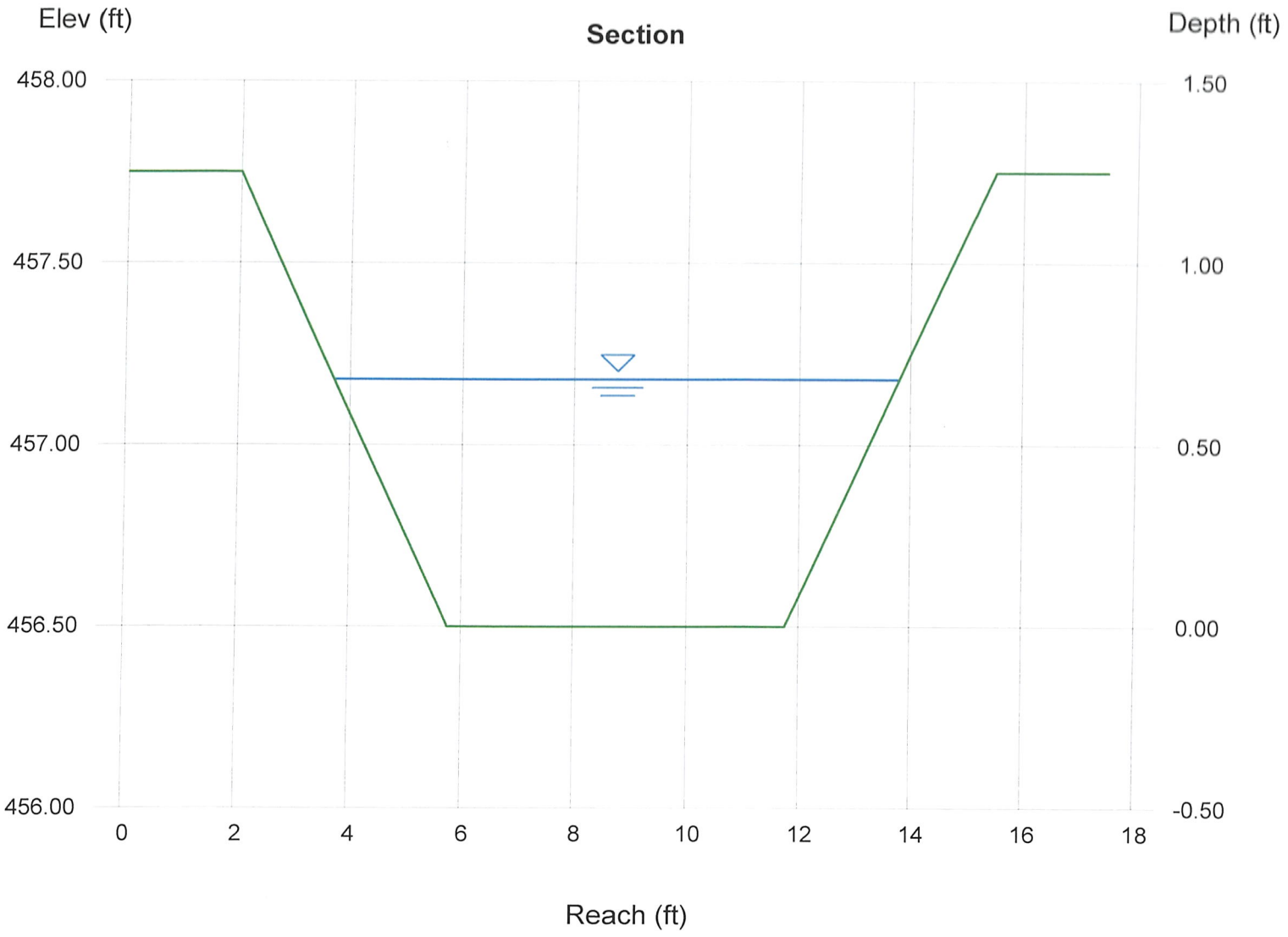
Botom Width (ft)	= 6.00
Side Slope (z:1)	= 3.00
Total Depth (ft)	= 1.25
Invert Elev (ft)	= 456.50
Slope (%)	= 0.33
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 8.53

Highlighted

Depth (ft)	= 0.68
Q (cfs)	= 8.530
Area (sqft)	= 5.47
Velocity (ft/s)	= 1.56
Wetted Perim (ft)	= 10.30
Crit Depth, Yc (ft)	= 0.38
Top Width (ft)	= 10.08
EGL (ft)	= 0.72



Weir Report

Forebay & W.Q. Cell Weir - Level-Spreader - (Max. Flow - Q=4.27 CFS ea. side)

Trapezoidal Weir

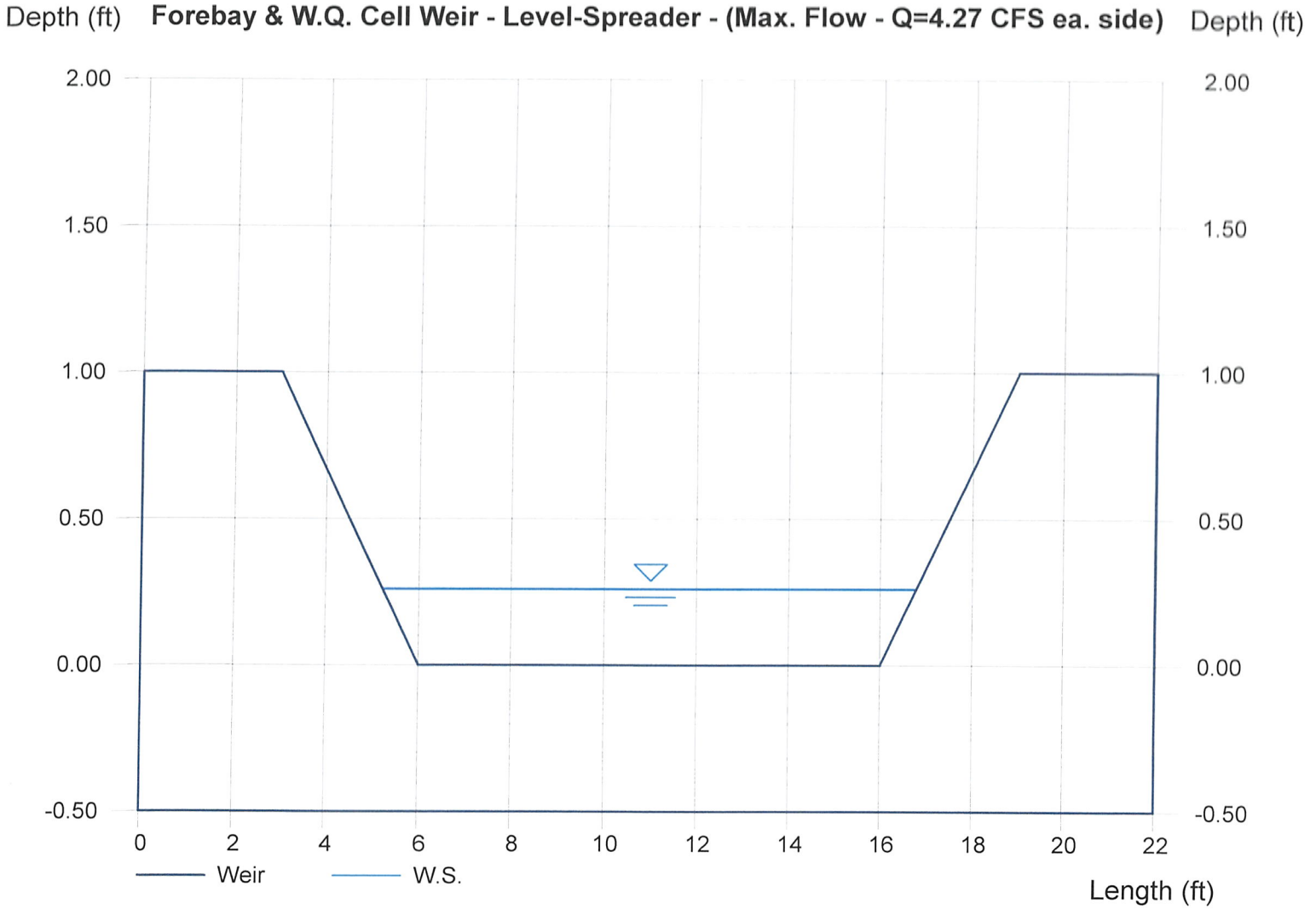
Crest	= Sharp
Bottom Length (ft)	= 10.00
Total Depth (ft)	= 1.00
Side Slope (z:1)	= 3.00

Highlighted

Depth (ft)	= 0.26
Q (cfs)	= 4.270
Area (sqft)	= 2.80
Velocity (ft/s)	= 1.52
Top Width (ft)	= 11.56

Calculations

Weir Coeff. Cw	= 3.10
Compute by:	Known Q
Known Q (cfs)	= 4.27



Channel Report

Hydraflow Express by Intelisolve — Wednesday, May 18 2022, 12:35 PM

Rip-Rap Outfall Channel - SWM Pond #2

Trapezoidal

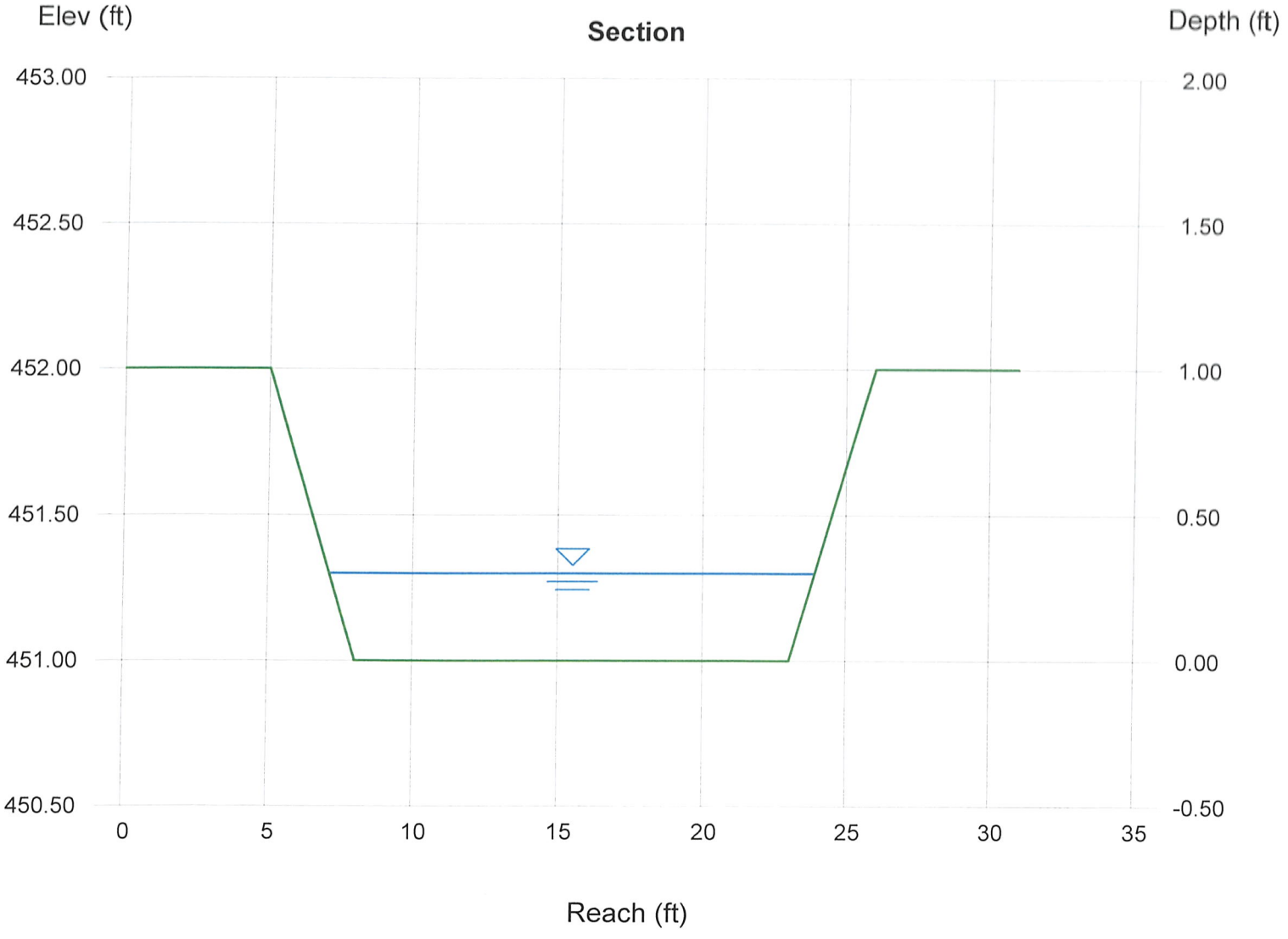
Botom Width (ft)	= 15.00
Side Slope (z:1)	= 3.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 451.00
Slope (%)	= 1.00
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 8.53

Highlighted

Depth (ft)	= 0.30
Q (cfs)	= 8.530
Area (sqft)	= 4.77
Velocity (ft/s)	= 1.79
Wetted Perim (ft)	= 16.90
Crit Depth, Yc (ft)	= 0.22
Top Width (ft)	= 16.80
EGL (ft)	= 0.35



24" Entrance Culvert

TR-55 Peak Discharge & Hydra Flow Computations

Worksheet 2: Runoff Curve Number and Runoff

Project: Stanford Industrial Park - Lot 11 **By:** GLM **Date:** 03/26/22

Location: 24" Entrance Culvert **Checked:** **Date:** 03/26/22

Circle One: Present | Developed

1. Runoff curve number (CN):

Soil name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected / connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Fig. 2-3	CN 1/ Fig. 2-4	Area X acres / miles² / %	Product of CN x Area
Glenelg GfB, GgB, & GgC	silt & channery loam, 3 to 15% slopes; HSG: B Industrial Property	88			4.44	390.72
Mt. Airy (MeD)	Mt. Airy Channery loam, 15 - 25% slopes; HSG: C Industrial Property	91			1.91	173.81
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
HSG: B, C, & D	Impervious area (street and roads)				0.00	0.00
				Totals =	6.35	564.53

CN (weighted) = Total Product / Total Area = 564.53 / 6.35 **Use CN = 88.90**

2. Runoff (Q):

		Storm #1	Storm #2	Storm #3
Frequency	Yr.	2	10	100
Rainfall, P (24-hour)	in	3.10	5.00	7.00
Runoff, Q	in	1.99	3.77	5.71

(Use P & CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 3: Time of concentration (Tc) or travel time (Tt)

Project: Stanford Industrial Park - Lot 11 **By:** GLM **Date:** 03/26/22

Location: 24" Entrance Culvert **Checked:** 0 **Date:** 03/26/22

Circle One: Present Developed

Circle One: Tc Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet. Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc Only)

			Segment ID:	AB	-	
1	Surface description (table 3-1)			Unpaved	N/A	
2	Manning's roughness coefficient, n (table 3-1)			0.24	0.00	
3	Flow length, L (total L < 300 ft.)		ft	100	1	
4	Two-Yr. 24-Hour rainfall, P_2		in	3.1	3.1	
5	Land slope, S		ft/ft	0.03	0.0001	
6	$Tt = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,S^{0.4}}$	Compute Tt	hr	0.21 +	0.00 =	**0.21**

Shallow concentrated flow

			Segment ID:	BC	CD	
7	Surface description (paved or unpaved)			Unpaved	Unpaved	
8	Flow length, L		ft	140	95	
9	Watercourse slope, S		ft/ft	0.08	0.11	
10	Average velocity, V (figure 3-1)		ft/s	4.4	5.3	
11	$Tt = \frac{L}{3600\,V}$	Compute Tt	hr	0.01 +	0.00 =	**0.01**

Channel flow

			Segment ID:	DE	EF	
12	Cross section flow area, A		ft^2	5.00	6.00	
13	Wetted perimeter, Pw		ft	5.00	5.00	
14	Hydraulic radius, R = A/Pw	Compute R	ft	1.00	1.20	
15	Channel slope, S		ft/ft	0.0270	0.0316	
16	Manning's roughness coefficient, n			0.040	0.035	
17	$Velocity = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$	Compute V	ft/s	6.12	8.54	
18	Flow length, L		ft	485	380	
19	$Tt = \frac{L}{3600\,V}$	Compute Tt	hr	0.02 +	0.01 =	**0.03**

20 Watershed or subarea Tc or Tt (add Tt in steps 6, 11 & 19) ..... Total: hr. **0.25**

Worksheet 4: Graphical Peak Discharge Method

Project: Stanford Industrial Park - Lot 11 **By:** GLM **Date:** 03/26/22

Location: 24" Entrance Culvert **Checked:** **Date:** 03/26/22

Circle One: Present Developed

1 Data:

Drainage area, A_m	A_m =	6.35	acres (Ac.)
	A_m =	0.009922	$mile^2$
Runoff curve number (RCN)		89	(From worksheet #2)
Time of conentration (Tc)		0.25	hr. (From worksheet #3)
Rainfall distribution type		II	(I, IA, II, or III)
Pond & swamp areas spread throughout the watershed	swamp =	1.0	% of A_m 0.00 Ac.

		Storm #1	Storm #2	Storm #3
2 Storm Frequency	Yr.	2	10	100
3 Rainfall, P (24-hour)	in	3.10	5.00	7.00
4 Initial abstructions, Ia (use CN with Table 4-1)	in	0.247	0.247	0.247
5 Computed Ia/P		0.080	0.049	0.035
6 Unit peak discharge, qu (use Tc & Ia/P with exhibit 4-II)	csm/in	750	750	750
7 Runoff, Q (From worksheet #2)	in	1.99	3.77	5.71
8 Pond and swamp adjustment factor, F_p (use percent pond and swamp area with Table 4-2. Factor is 1.0 for zero (0%) percent pond and swamp area.)		1.00	1.00	1.00
9 Peak discharge, qp (where qp = qu x A_m x Q x F_p)	cfs	14.81	28.05	42.49

Culvert Report

Hydraflow Express by Intelisolve

Saturday, Apr 2 2022, 4:10 PM

24-Inch Entrance Culvert Analysis

Invert Elev Dn (ft)	= 455.00
Pipe Length (ft)	= 60.00
Slope (%)	= 2.50
Invert Elev Up (ft)	= 456.50
Rise (in)	= 24.0
Shape	= Cir
Span (in)	= 24.0
No. Barrels	= 1
n-Value	= 0.019
Inlet Edge	= Beveled
Coeff. K,M,c,Y,k	= 0.0018, 2.5, 0.03, 0.74, 0.2

Embankment

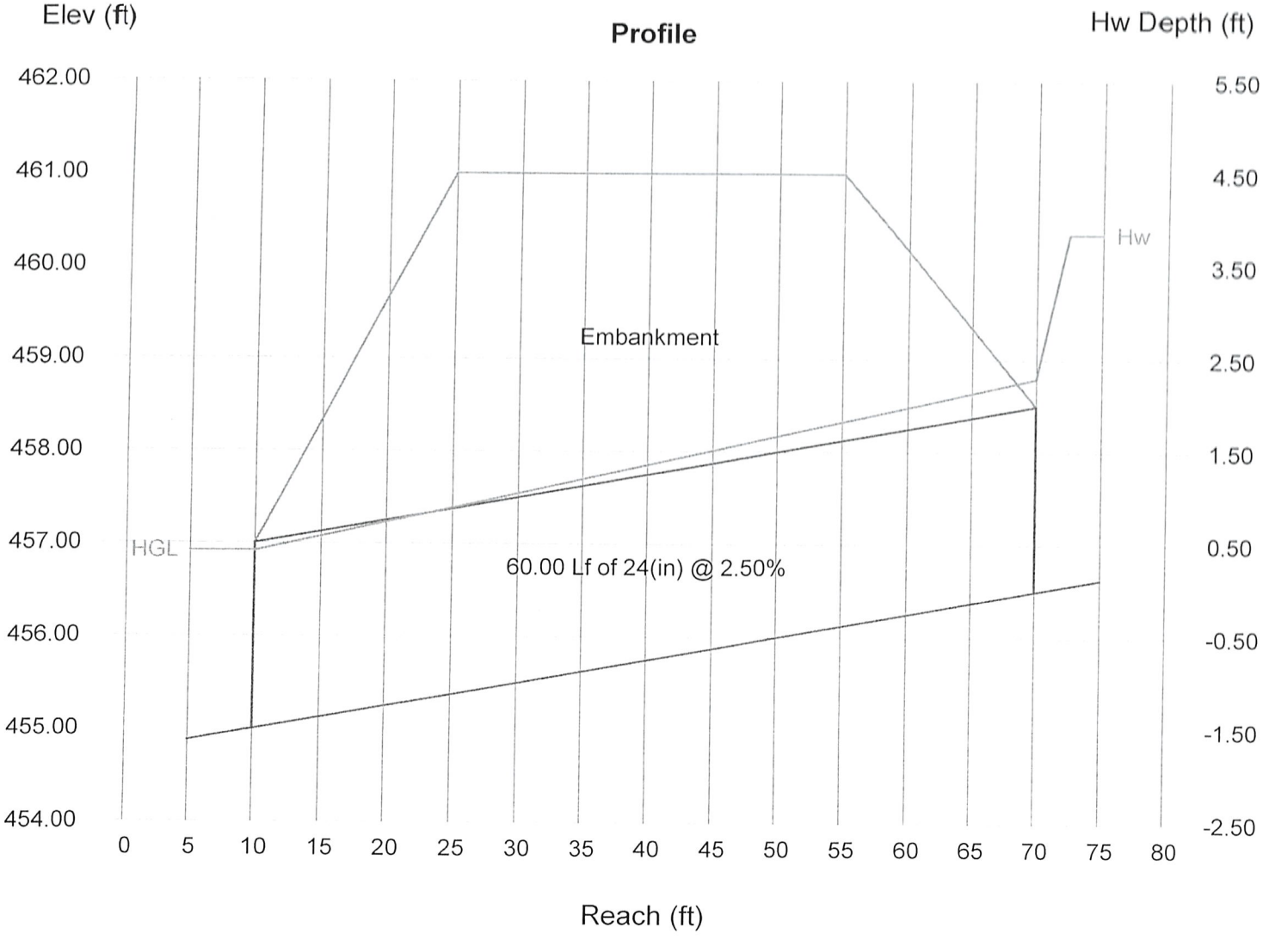
Top Elevation (ft)	= 461.00
Top Width (ft)	= 30.00
Crest Width (ft)	= 50.00

Calculations

Qmin (cfs)	= 28.05
Qmax (cfs)	= 28.05
Tailwater Elev (ft)	= (dc+D)/2

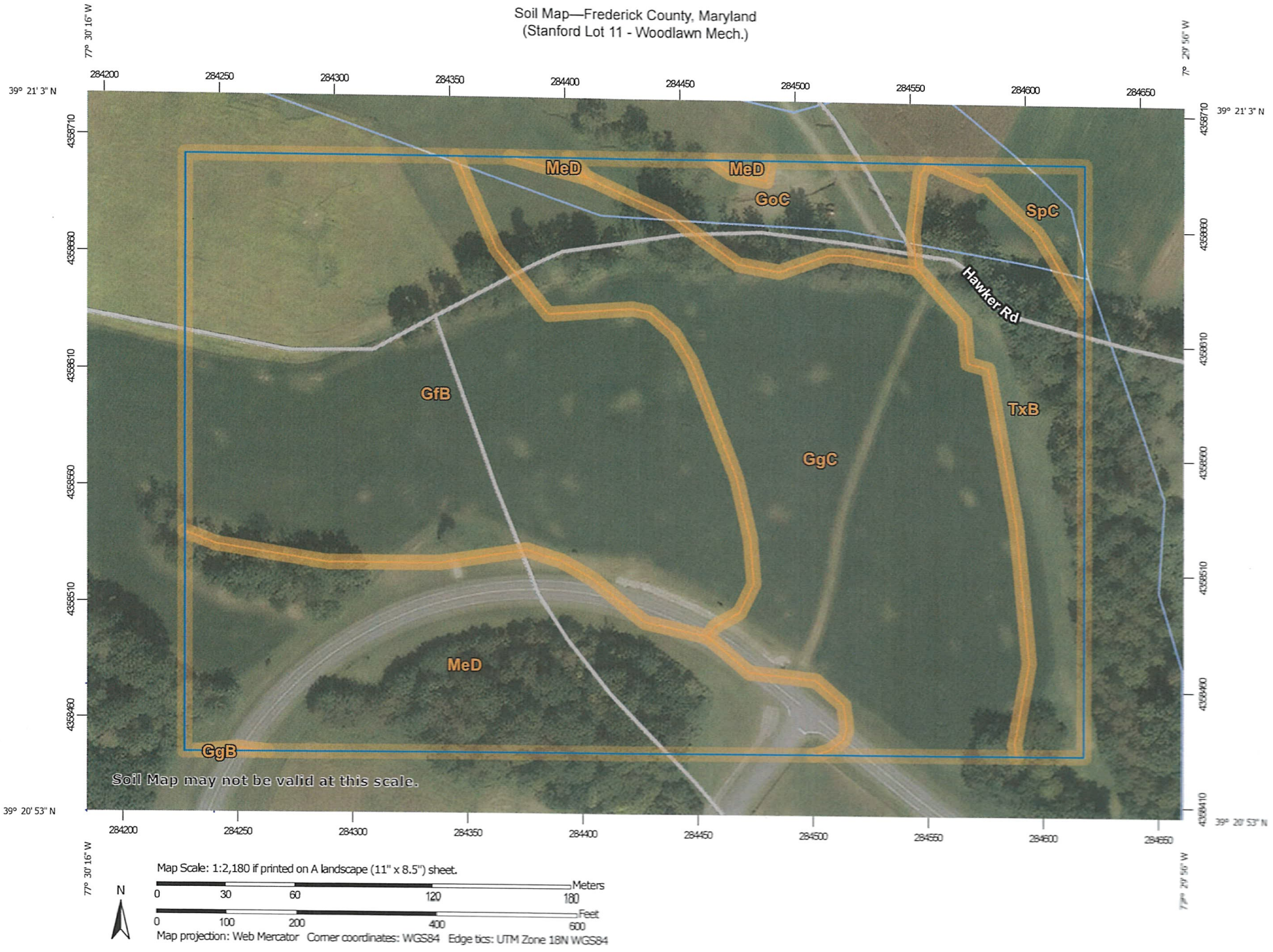
Highlighted

Qtotal (cfs)	= 28.05
Qpipe (cfs)	= 28.05
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 9.06
Veloc Up (ft/s)	= 8.93
HGL Dn (ft)	= 456.92
HGL Up (ft)	= 458.80
Hw Elev (ft)	= 460.35
Hw/D (ft)	= 1.92
Flow Regime	= Inlet Control



USDA – NRCS Soils Mapping

Soil Map—Frederick County, Maryland
(Stanford Lot 11 - Woodlawn Mech.)



Map Scale: 1:2,180 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 30 60 120 180

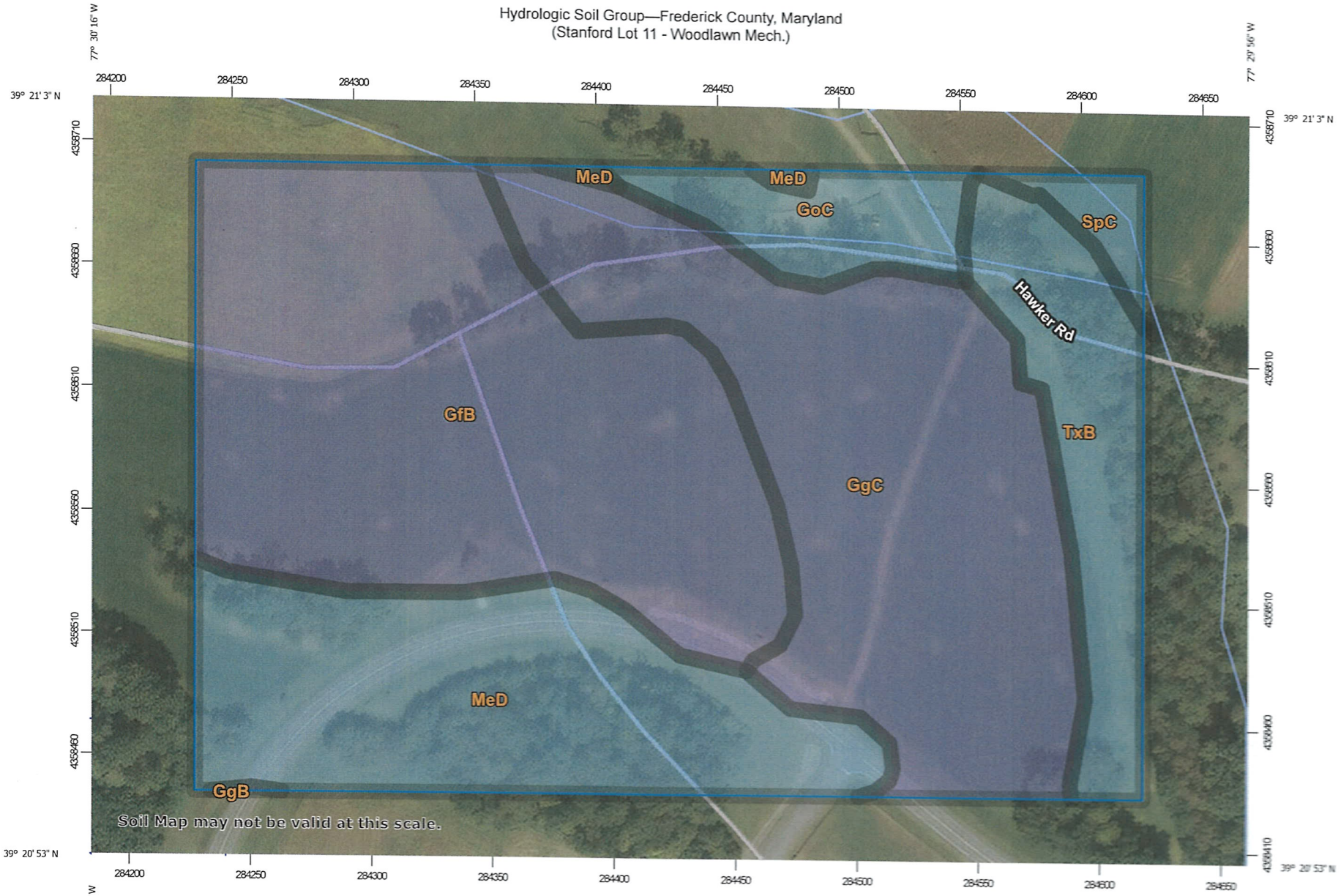
Feet: 0 100 200 400 600

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

USDA **Natural Resources Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

Hydrologic Soil Group—Frederick County, Maryland
(Stanford Lot 11 - Woodlawn Mech.)



Map Scale: 1:2,180 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

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

USDA **Natural Resources Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
GfB	Glenelg silt loam, 3 to 8 percent slopes	B	8.7	35.0%
GgB	Glenelg channery loam, 3 to 8 percent slopes	B	0.0	0.0%
GgC	Glenelg gravelly loam, 8 to 15 percent slopes	B	7.2	29.1%
GoC	Glenville silt loam, 8 to 15 percent slopes	C	1.2	4.9%
MeD	Mt. Airy channery loam, 15 to 25 percent slopes	C	5.0	20.2%
SpC	Springwood gravelly loam, 8 to 15 percent slopes	C	0.4	1.5%
TxB	Trego-Foxville complex, 0 to 8 percent slopes	C	2.3	9.4%
Totals for Area of Interest			**24.9**	**100.0%**