Technical Training

2026 NJCD Employee Association

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Agenda

01. Beginning a Review

02. Identifying Key Standards

03. Interpreting Contours

04. Reviewing Calculations

05. Stream Crossings

06. Common Issues

07. Summary: Completing a Ch. 251 Plan Review

08. Frequently Asked Questions and Scenarios

09. Agricultural Projects

10. How to Get Help from the Engineers

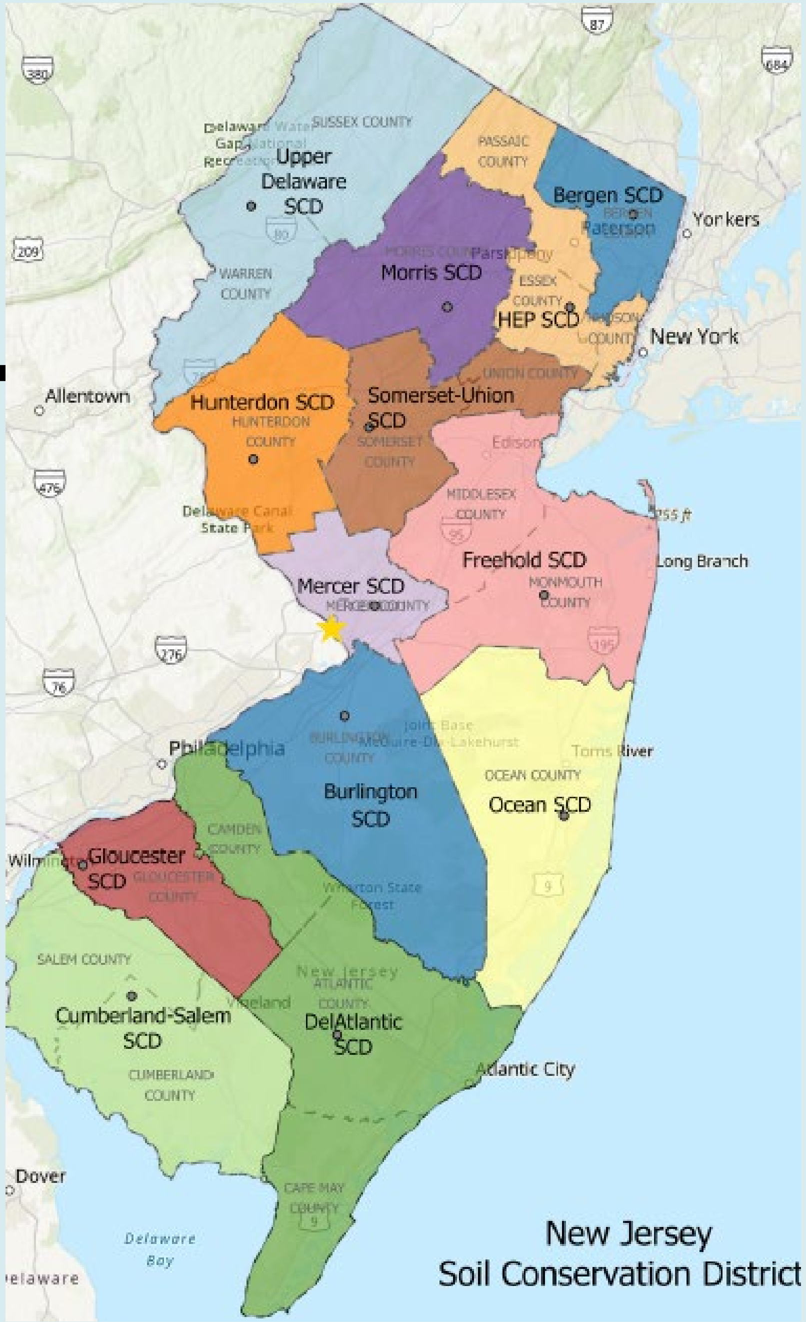
Introduction

Goal:

- Uniform review
- Consistent comments
- Adherence to the Standards

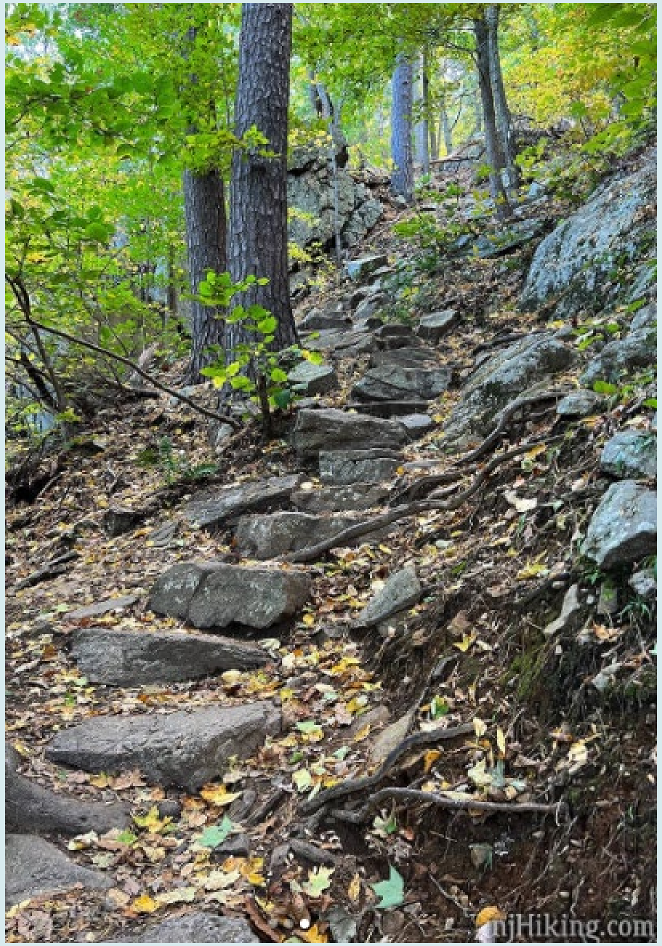
Reality:

- 13 districts
- Dozens of reviewers and inspectors
- Thousands of past experiences



Let’s not forget the physical differences across the state.

- Climate
- Slope
- Soils
- Development patterns
- Highlands
- Pinelands/Coastal Plain
- Piedmont
- Ridge and Valley



Course aggregate says, "Hey Sand, how are you?"

Sand replies, "I'm fine"

https://www.geoplastglobal.com/en/blog/the-best-civil-engineering-jokes-in-the-industry/

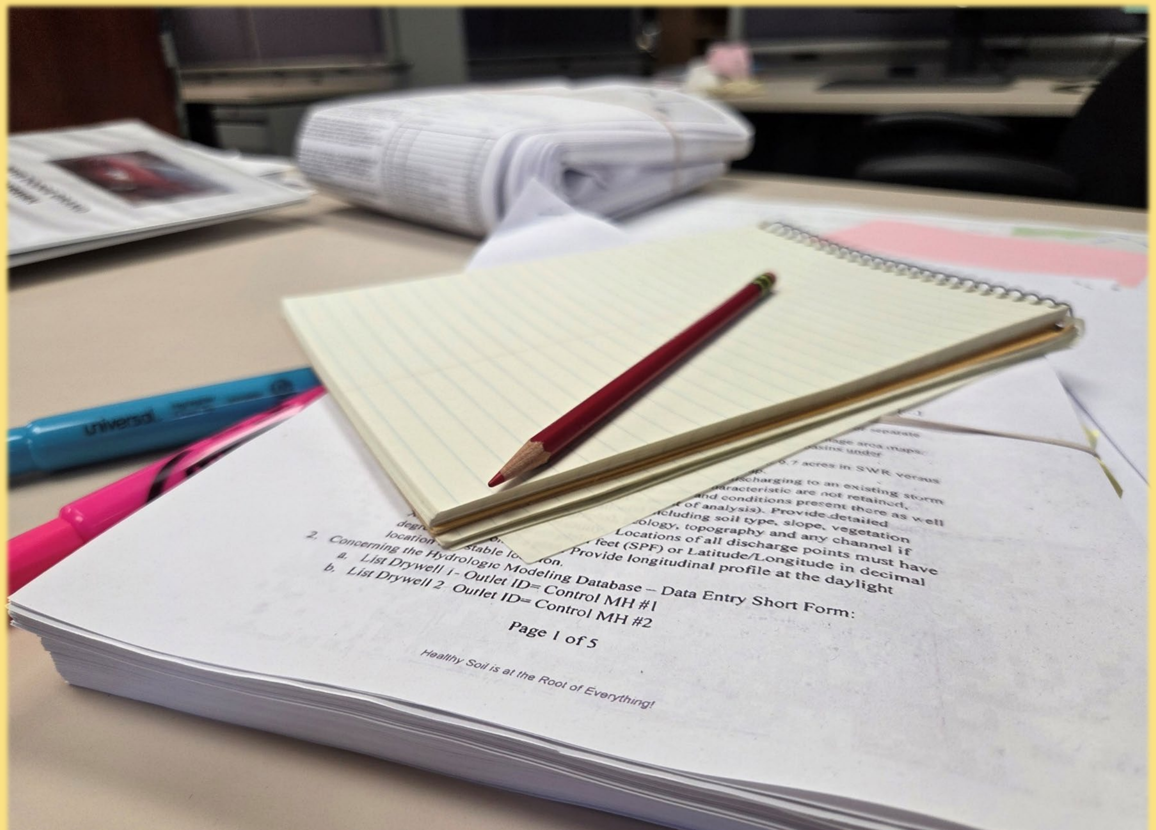
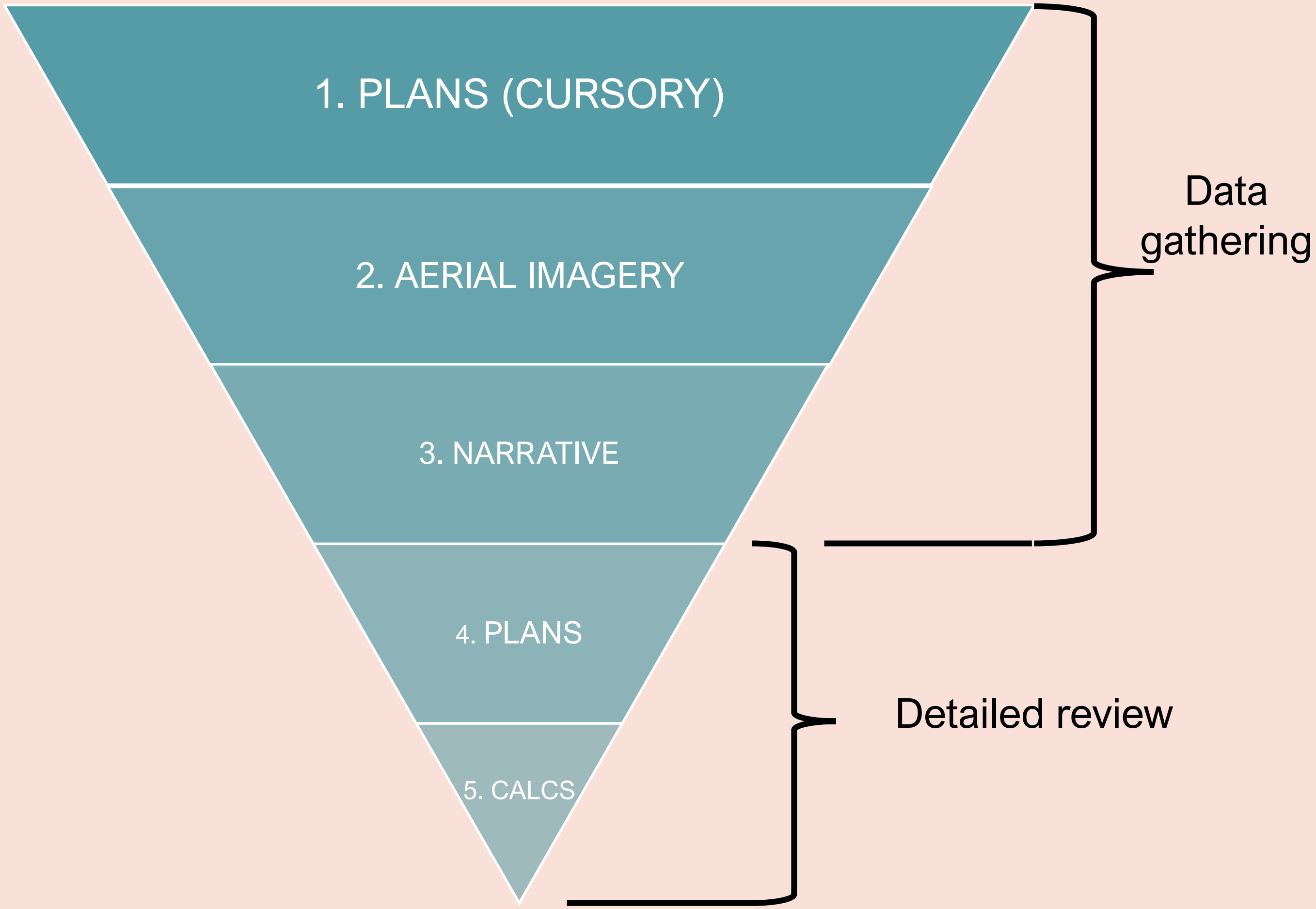


Photo credit: Kelly Doyle

01. Beginning a Review

You received plans…now what?

- Start with big picture
- Check multiple sources
- Gather more information
- Get into the details
- Iterate
- Issue comments



Cursory Plan Review

1

- Planset – first check:
  - Overall plan sheet
  - Detail sheets
  - Drainage area maps

- Try to understand:
  - Project magnitude
  - Project type
  - Design intent
  - SESC measures that are proposed

- Don't worry about the details…yet!

Photo credit: Kelly Doyle

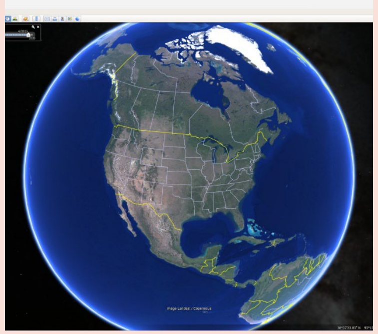
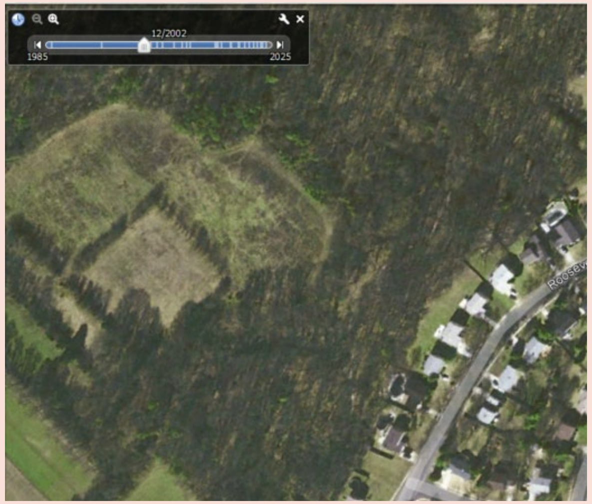
In other words, we are not sad…yet!

Find the Site

2

- Locate the site
  - Google Earth (try Historical Imagery)
  - Google Maps (don’t forget Street View!)
  - Nearmap (look for leaf-off image)
  - Bing Maps – 3D

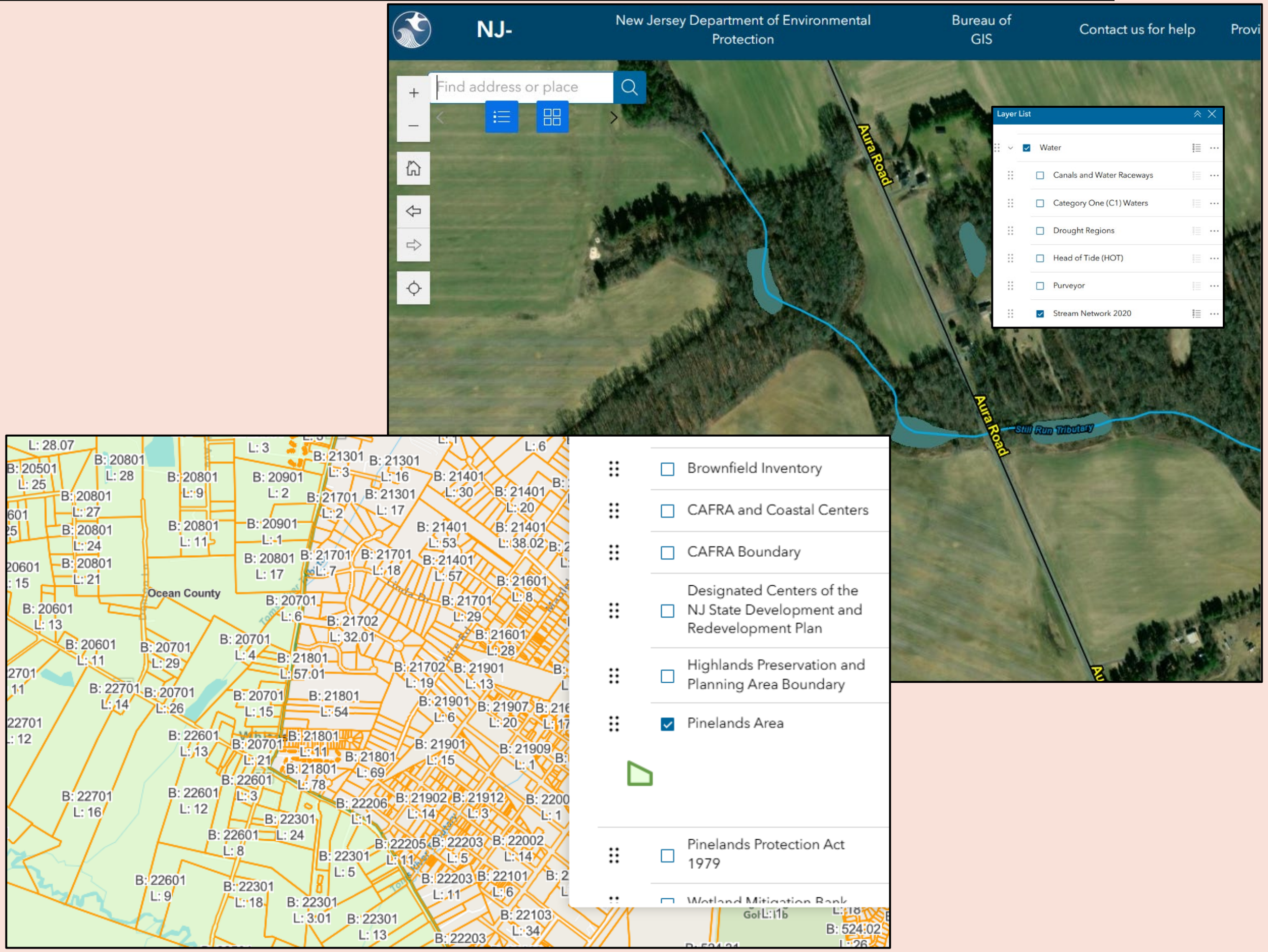
- Questions to consider:
  - Have I been here before?
  - What is the existing condition of the site?
  - How it has been used historically?
  - What are the neighboring properties or features?
  - Are there storm sewers nearby?
  - What kind of terrain is on site?

Gather More Data

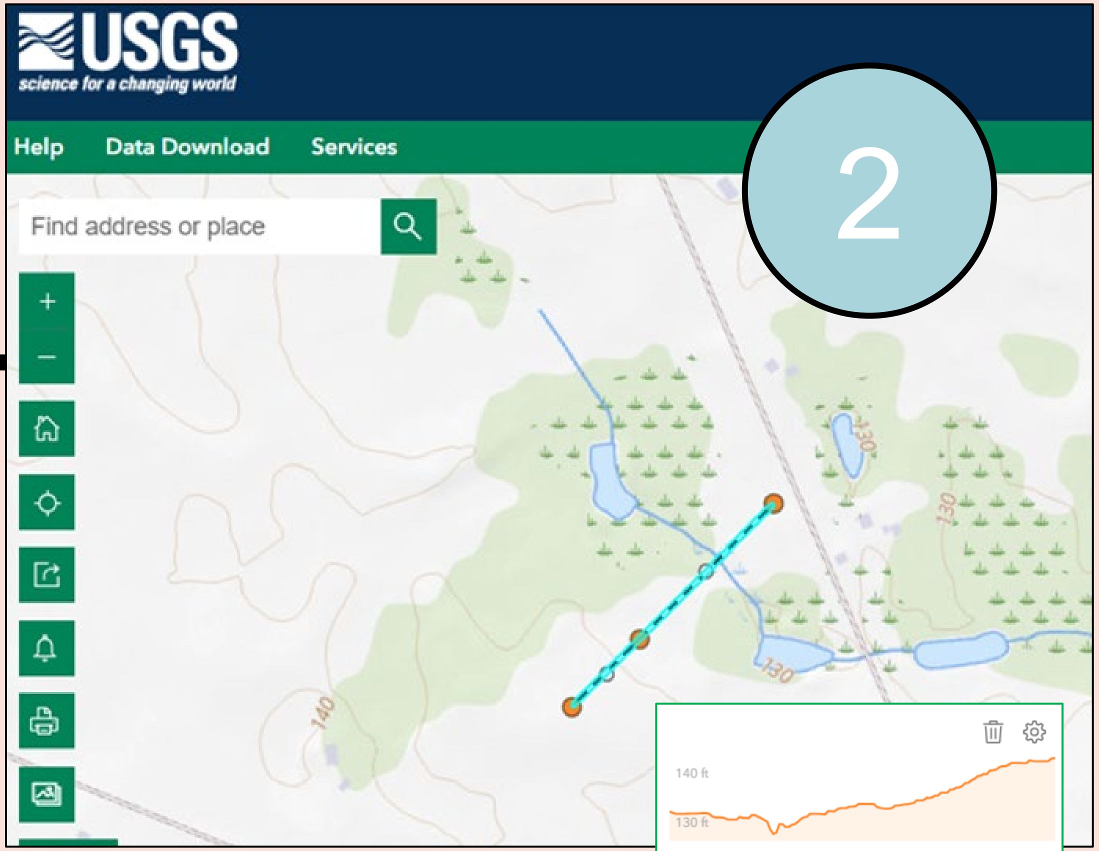
2

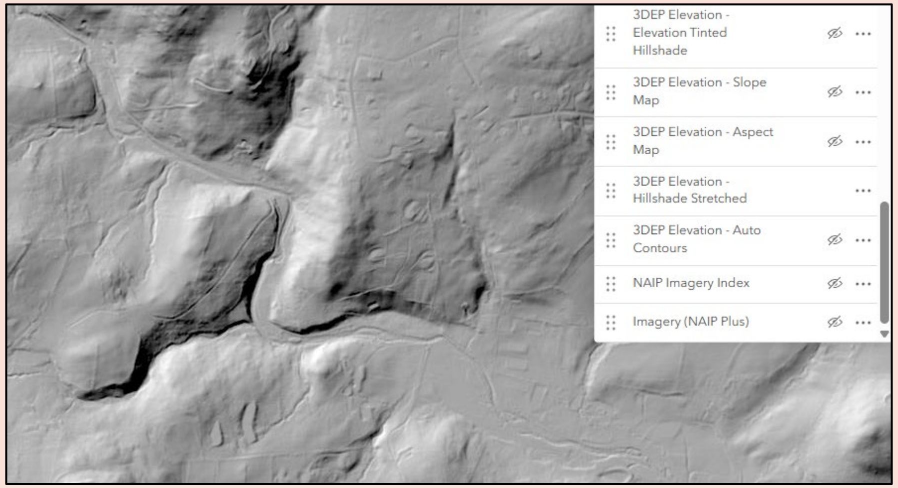
- Locate the site on the NJDEP GeoWeb
  - https://dep.nj.gov/gis/nj-geoweb/
- Helpful layers:
  - Land » Wetlands 2020
  - Water » Stream Network 2020
  - Water » Waterbody 2020
  - Planning Areas » Pinelands/Highlands
- Questions to consider:
  - What are the nearest bodies of water that the project could impact?
  - Are there other regulations that could influence the design?

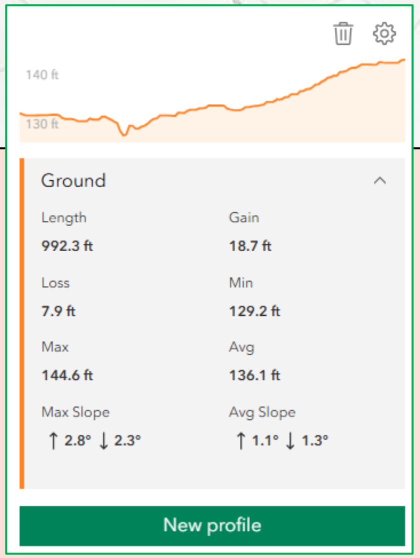


Check Other Sources

- Check the USGS National Map
  - https://apps.nationalmap.gov/viewer/
- Examine topographic features:
  - Contour layers
  - Elevation profile tool
  - 3D Hillshade
- Questions to consider:
  - What is the general topography of the site and its surroundings?
  - Are there big elevation changes?
  - What are the general runoff patterns?



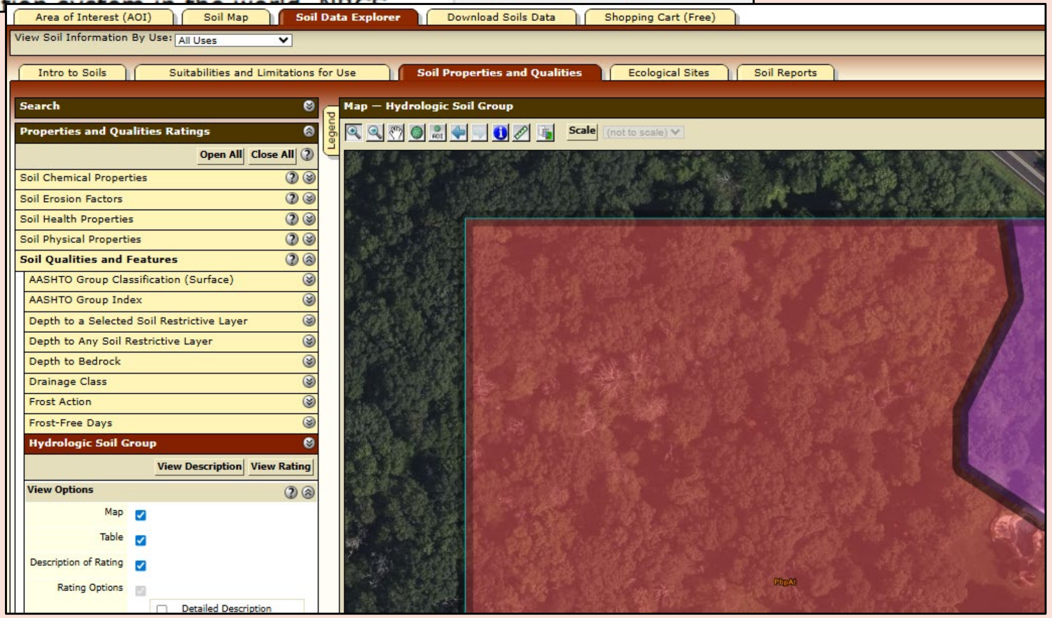




Look at the Soils

- Check the USGS Web Soil Survey
  - https://websoilsurvey.nrcs.usda.gov/app/
- Find information on soils and their characteristics.
  - Hydrologic Soil Group (HSG)
  - Typical slopes
- Questions to consider:
  - What type of soils are at the site?
  - What type of soils surround the site?

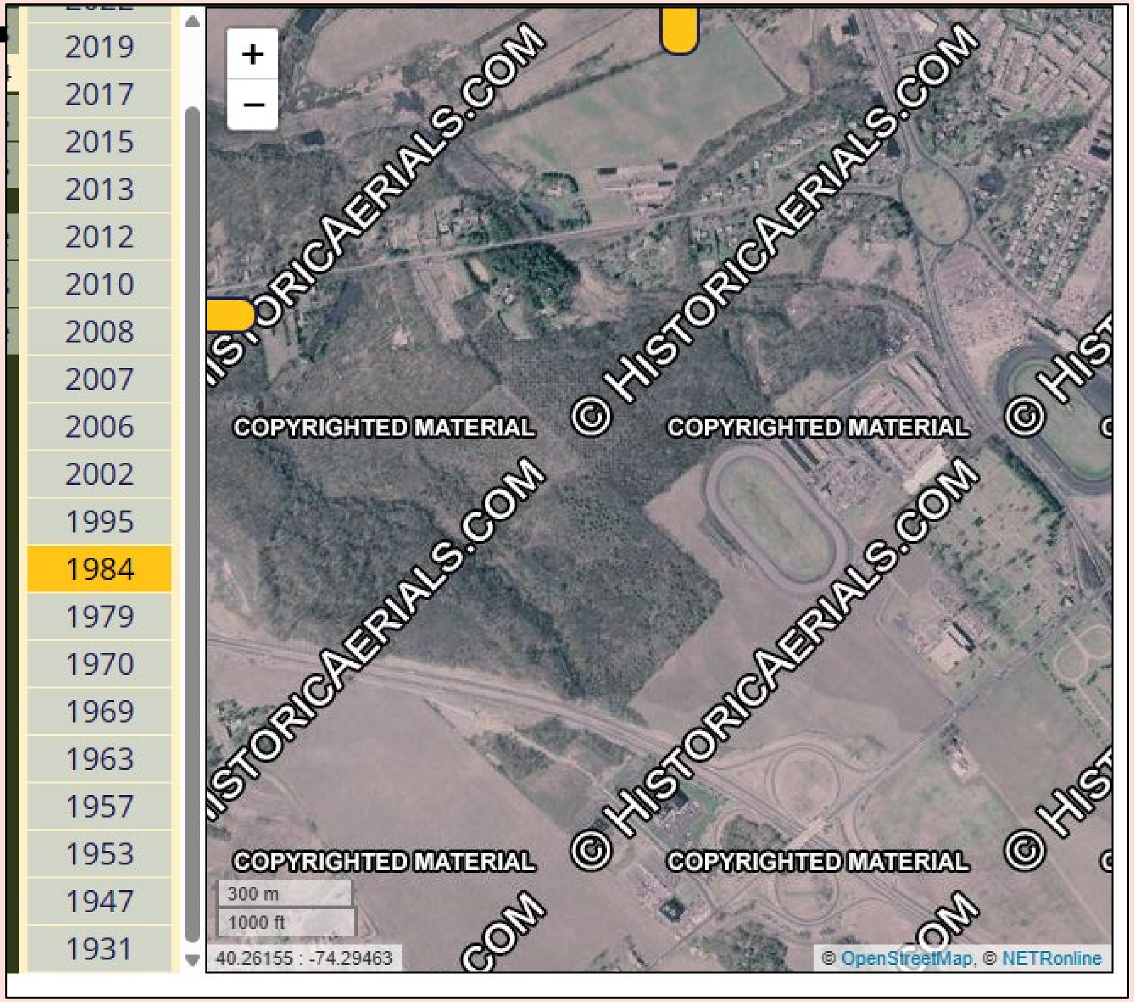
2



Other Imagery Resources

2

- Historical Aerial Imagery 1930s to recent
  - https://www.historicaerials.com/viewer
- Farmland Preservation Interactive Web Map
  - https://www.nj.gov/agriculture/sadc/



2

VISIT THE SITE!

3

Dive into the Project

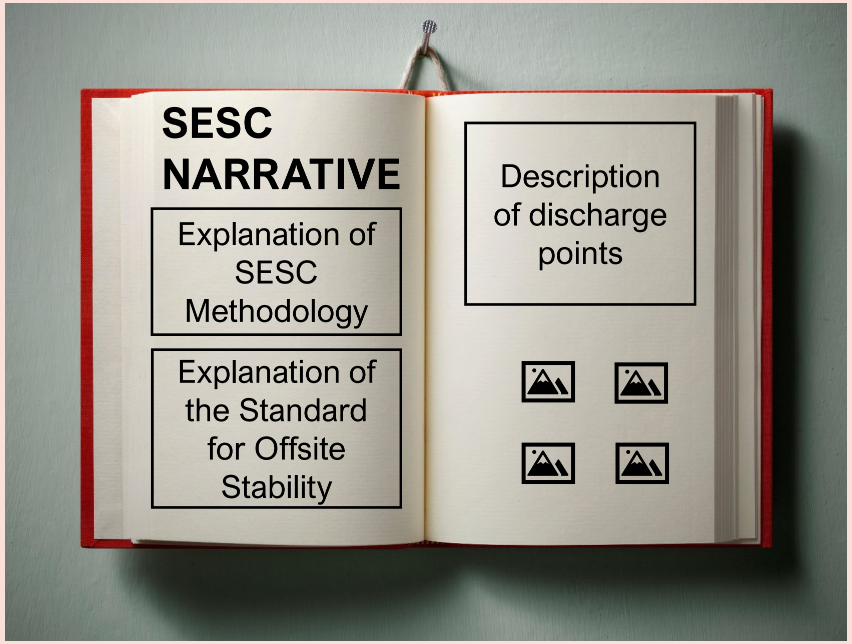
- Read the Stormwater Management Report narrative

- Look for:
  - Description of the pre-developed condition
  - Description of the proposed development
  - The stormwater management strategy
    - Proposed practices
    - Number of basins
    - Infiltration assumptions
  - Tables with pre- and post- flow rates at outfalls across the site

TABLE OF CONTENTS

Identify the Erosion Control Sections

- Find the Soil Erosion and Sediment Control narrative.
- From this, you will find:
  - Proposed SESC practices
  - DETAILED methodology for meeting the Offsite Stability Standard both for Point of Discharge and Downstream
  - DETAILED description of flow paths and locations of all site discharges and references to applicable standards
  - Methodology for all modeling and sizing assumptions
  - References for where to find supporting calculations
  - Descriptions and photographs of all discharge locations



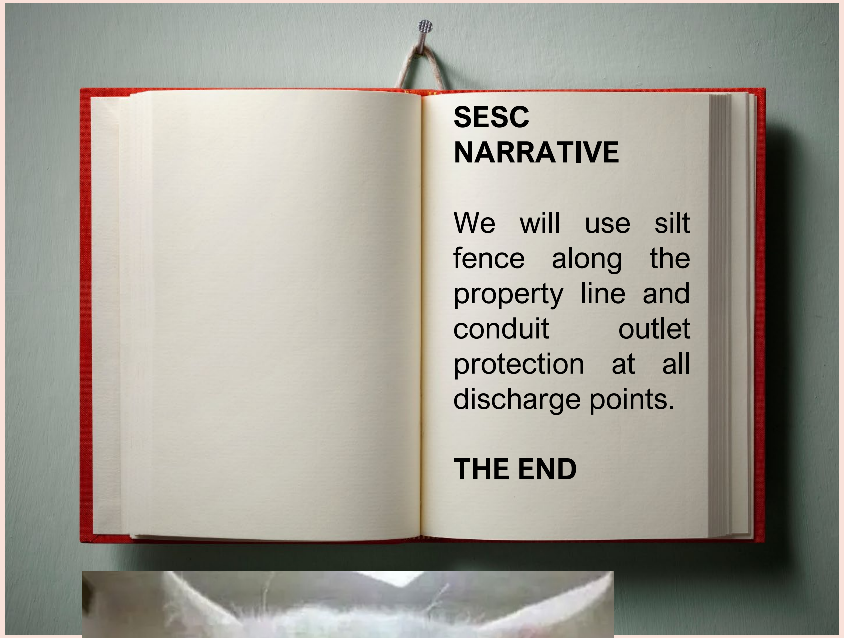

3
And then we wake up from our dream…

Identify Deficiencies in the Erosion Control Sections

3

- Find the Soil Erosion and Sediment Control narrative, hopefully.

- From this, you will find:
  - Off-site stability is only COP
  - A claim that all SESC standards are met because stormwater standards were met

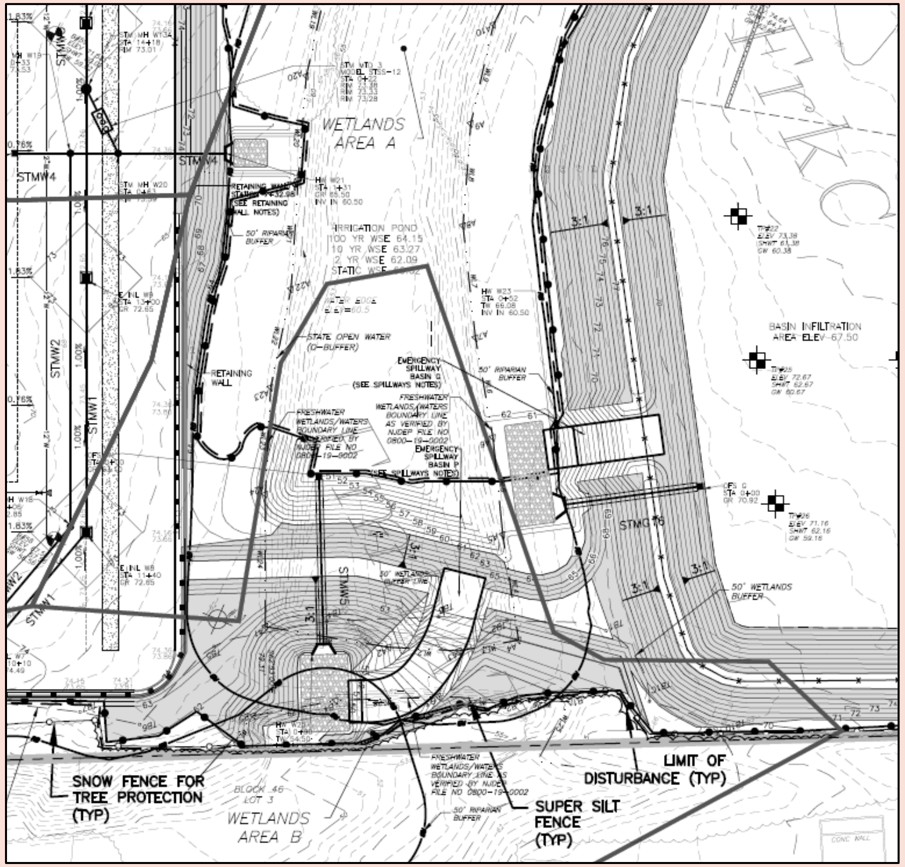


Now we are starting to get sad.

- Good time to start a list

4

Getting into the SESC Plan



- ✓ General understanding of the site
- ✓ List of preliminary questions

- ▪ Time to dive in
  - Look at the SESC plan - try to flag “big items”

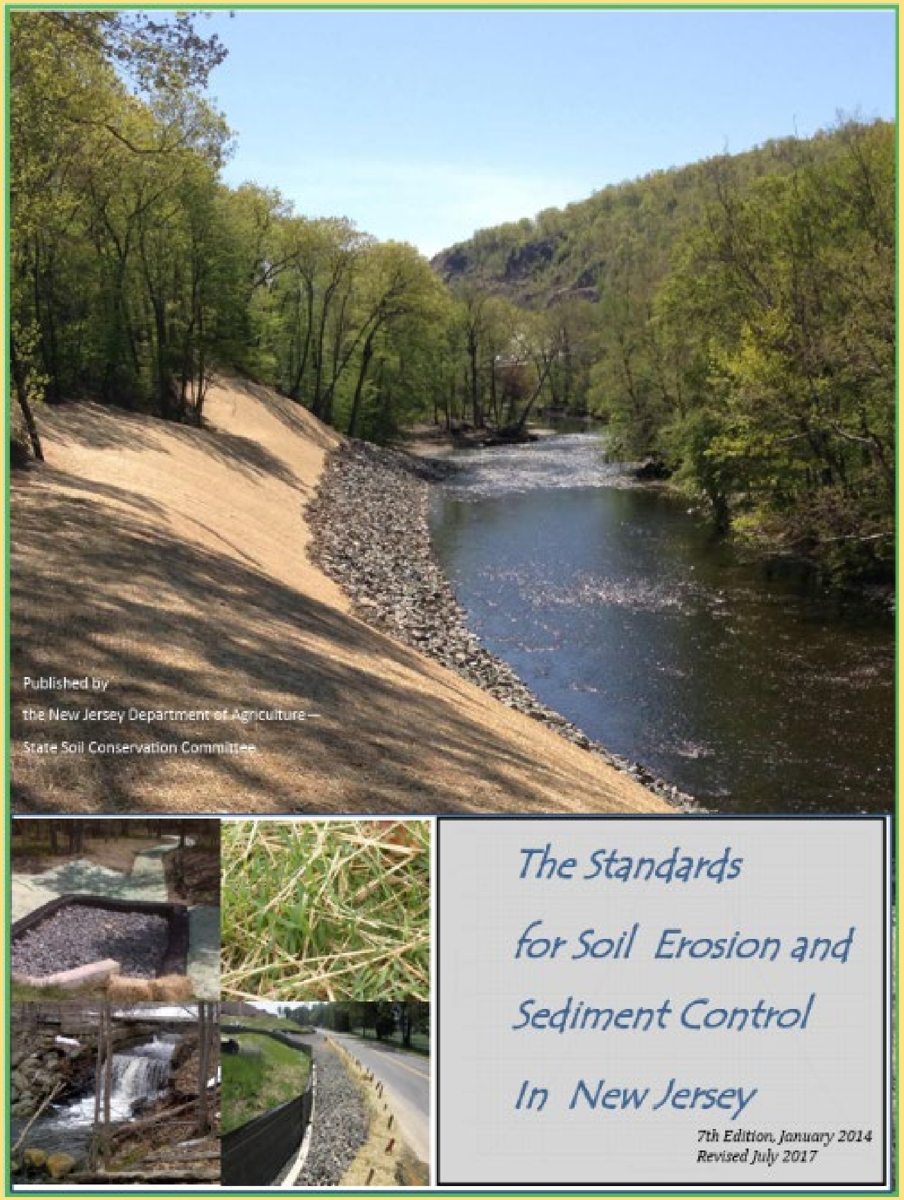
- Where are the discharge points?
- Overland conveyance features?
  - Swales
  - Ditches
  - Conduit Outlet Protection
- Steep slopes?

Data Gathering Recap

- **By now you should have:**
  - A good understanding of the project
  - A list of questions or design concerns
  - An idea of what sections need extra attention
- **You should know:**
  - How large is the site?
  - What is the existing condition of the site?
  - What is being proposed?
  - What are the neighboring properties or features?
  - What are the nearest bodies of water that the project could impact?
  - What is the general topography of the site?
  - What are the general runoff patterns?
  - What kinds of soils are on the site?

Photo credit: Dave Clapp

02. Identifying Key Standards



What is a soil scientist's favorite coffee?

Fresh ground

Key Standards

12 - Conduit Outlet Protection

18 - Grassed Waterways

21 - Off-Site Stability

22 - Riprap

24 - Sediment Basins

Photo credit: Kelly Doyle

12- Conduit Outlet Protection (COP)

- If calculated velocity in conduit is greater than values listed in Table 12-1.
- Often proposed at all discharge points.
- During plan review, look for:
  - Are the dimensions, stone size, and filter provided in the plans?
  - Is the COP shown flat?
  - Is the COP in a confined area, and if so, is it designed accordingly?
  - Is there a detail provided?
  - Are calcs included?

TABLE 12-1 ALLOWABLE VELOCITIES FOR VARIOUS SOILS

SOIL TEXTURE	ALLOWABLE VELOCITY (ft./sec.)
Sand	1.8
Sandy loam	2.5
Silt loam (also high lime clay), loam	3.0
Sandy clay loam	3.5
Clay loam	4.0
Clay, fine gravel, graded loam to gravel	5.0
Cobbles	5.5
Shale (non-weathered)	6.0


Photo credit: John Showler

18- Grassed Waterways
22- Riprap (Riprap-Lined Channels)

- Apply when swales, ditches, etc. are proposed.
- Both Standards are limited to channels with a longitudinal grade of 10%.
- During plan review, consider:
  - Are there any contours that indicate the presence of concentrated surface runoff?
  - Were calcs provided?

Photo credit: Kelly Doyle

24- Sediment Basins

- Not explicitly required if other controls are in place.
- During plan review, look for:
  - Length = 2x Width
  - Volume is larger of
    - 70% trap efficiency
    - Sediment storage capacity + 2-year storm
  - Skimmer kept off basin bottom.

Photo credit: Kelly Doyle

21- Off-site Stability (OSS)

- **THE MOST IMPORTANT OF THE STANDARDS.**
- Ensures stability beyond the LOD and after the project is completed.
- During plan review, consider:
  - How many site discharge points?
  - What are the conditions at the outfalls?
  - “No well-defined waterway” vs. “well-defined waterway”?
- For now, identify where OSS needs to be met.

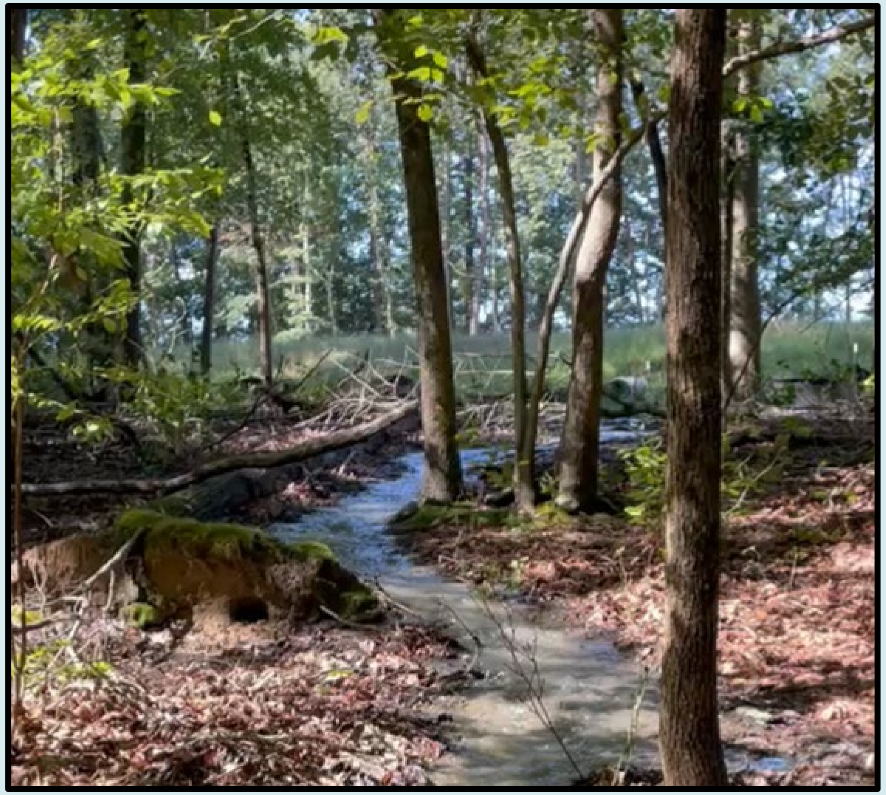


Photo credit: Ocean SCD

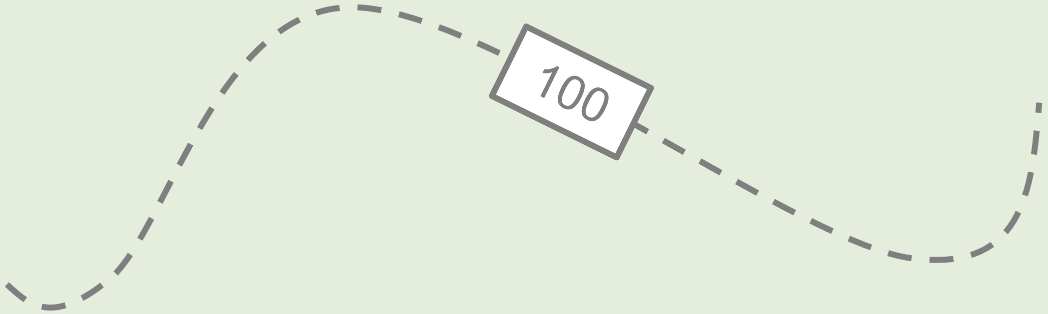
03. Interpreting Contours

What is a contour line?

- “A line drawn on a plan which connects all points of **equal elevation** above or below a known or assumed reference point.”
- They are a two-dimensional graphical representation of a three-dimensional ground form.

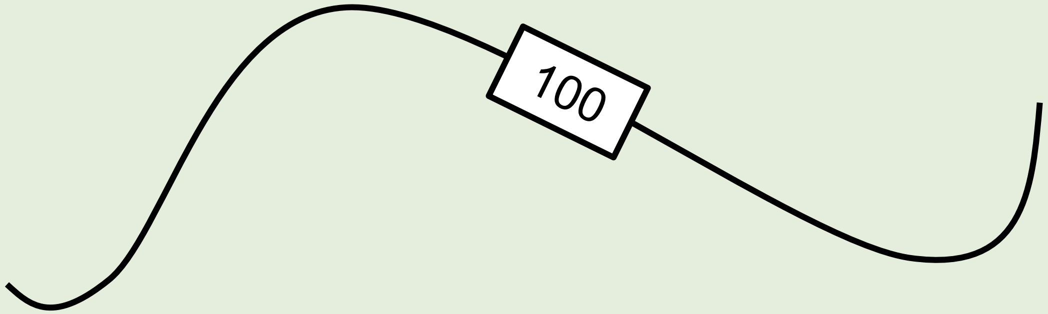
Existing Contours

- Dashed and usually screened (lighter shade).



Proposed Contours

- Solid and dark.



How are contour lines generated?

- They are the result of the data (spot elevation) collected via topographical surveys.
- Most contours prepared for engineering plans are generated from:

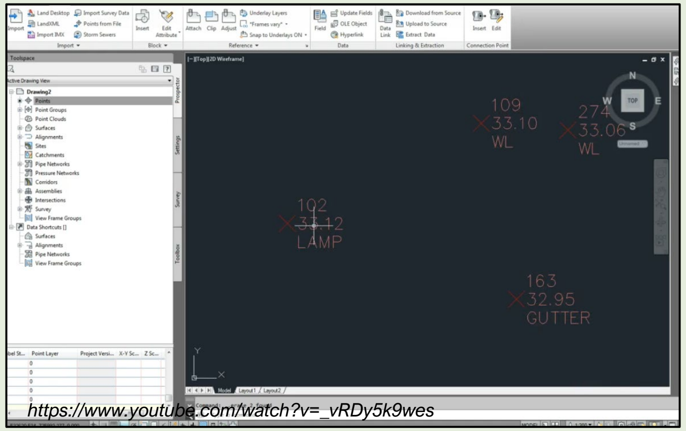
Aerial LIDAR (Light Detection And Ranging)

Traditional Land Surveying

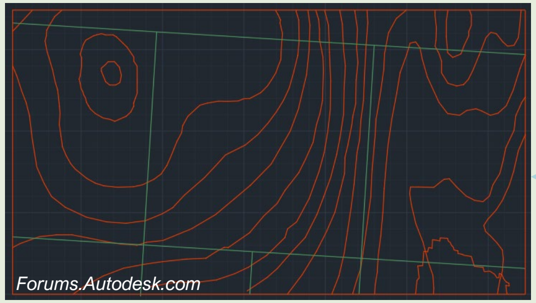
1 Surveyor finds a benchmark (a permanent monument with an established elevation and coordinates).

2 From the benchmark, the surveyor sets control points around the site.

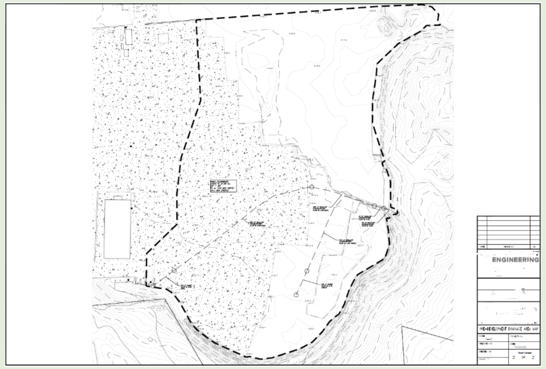
3 From the control points, the surveyor uses their equipment to collect data points for all topographic features around the site.



4 The surveyor imports their data points into CAD software. Each data point has a coordinate, an elevation, and a classification.

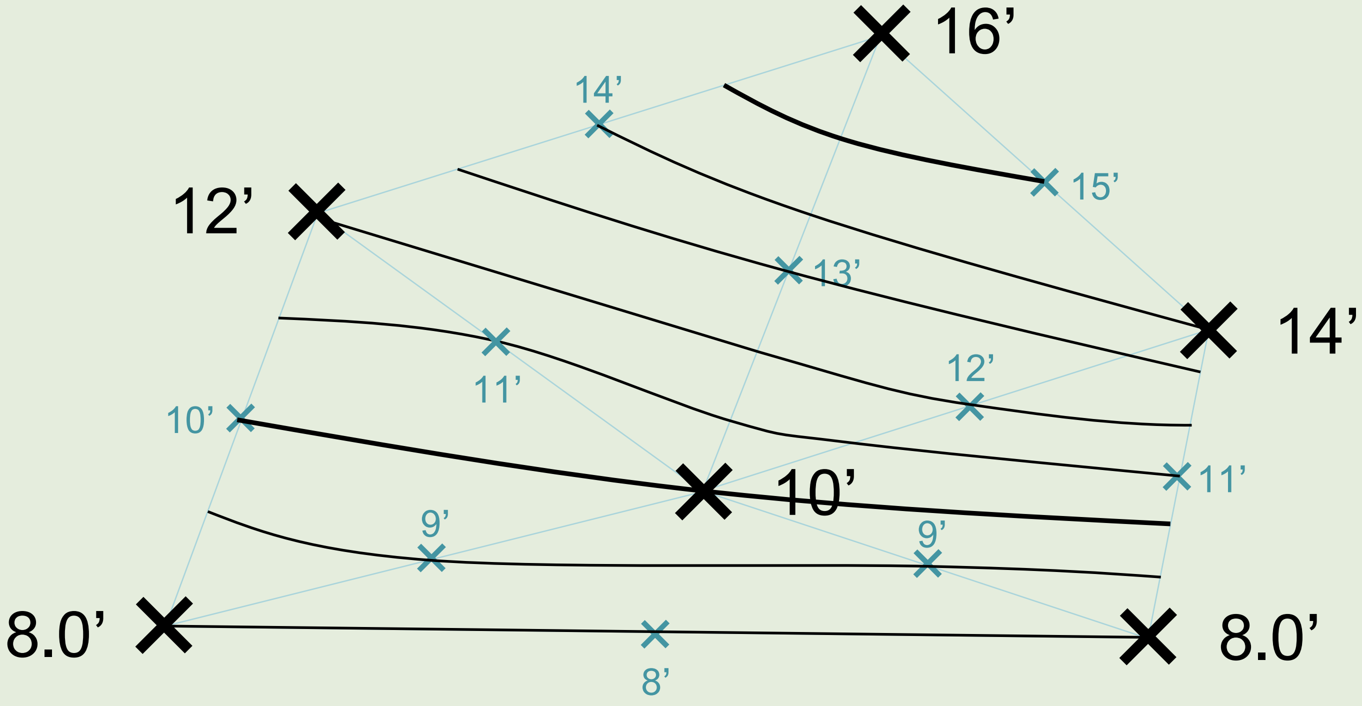


5 Using CAD, the data is processed and "cleaned up" by the surveyor in order to draft a plan.

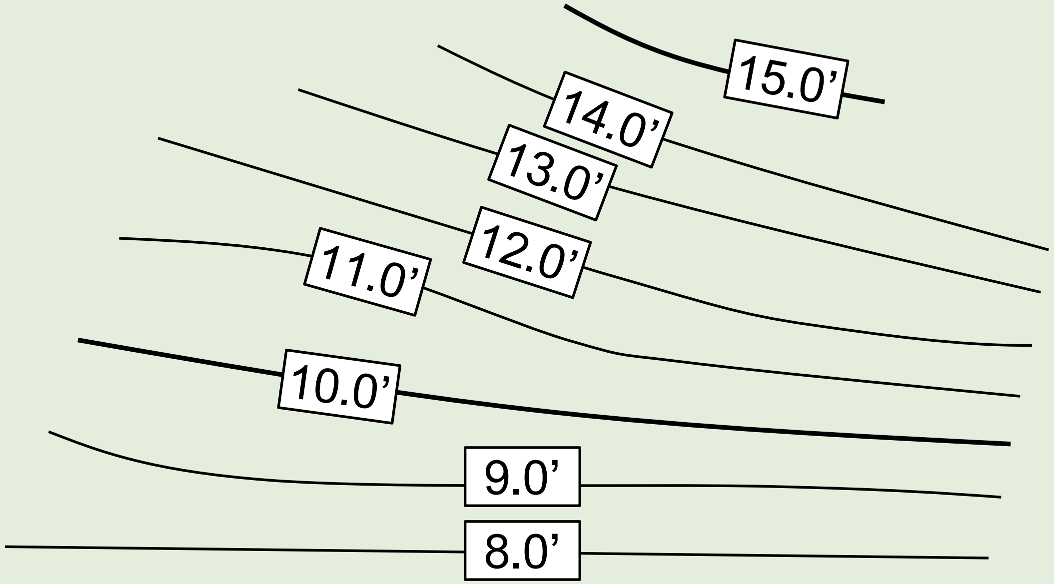


6 The plan is drafted and issued.

Contour generation



Contour generation

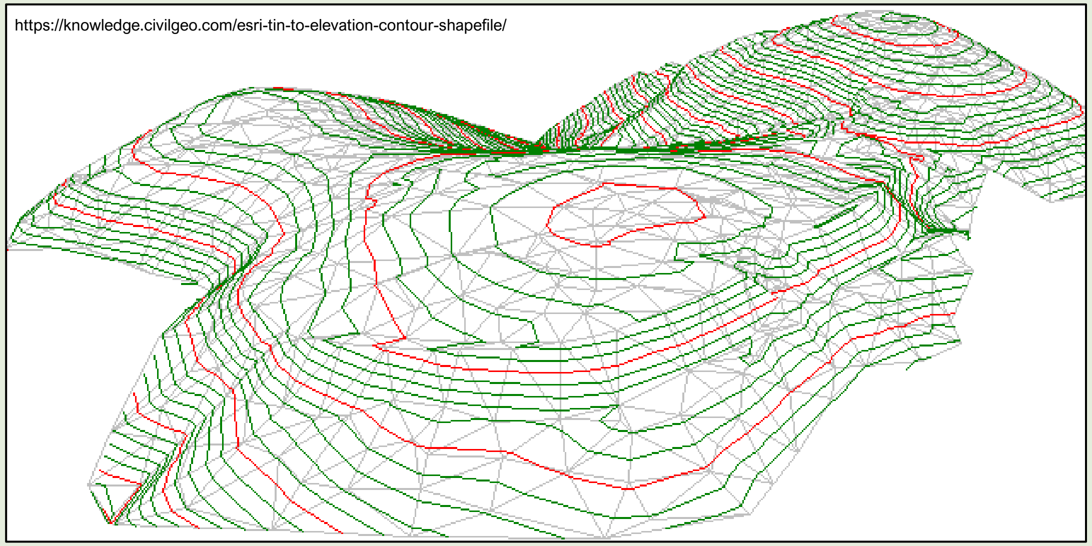


- Pay attention to contour label intervals!
  - 5 ft
  - 2 ft
  - 1 ft

Contour generation

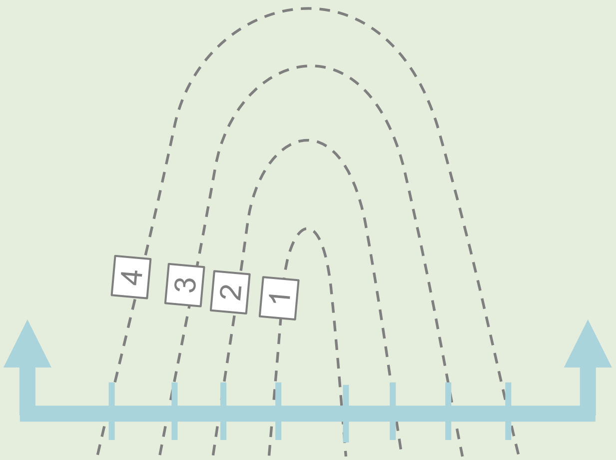
- Nowadays, the process is mostly done with CAD or GIS software.

- The image on the right shows:
  - The "TIN" (Triangular Irregular Network) in grey.
  - Minor contours in green.
  - Major contours in red.

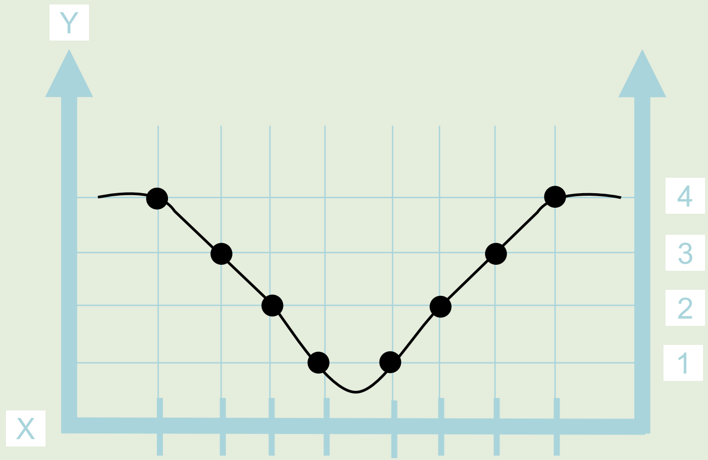


Landforms as contours

Parabolic Swale



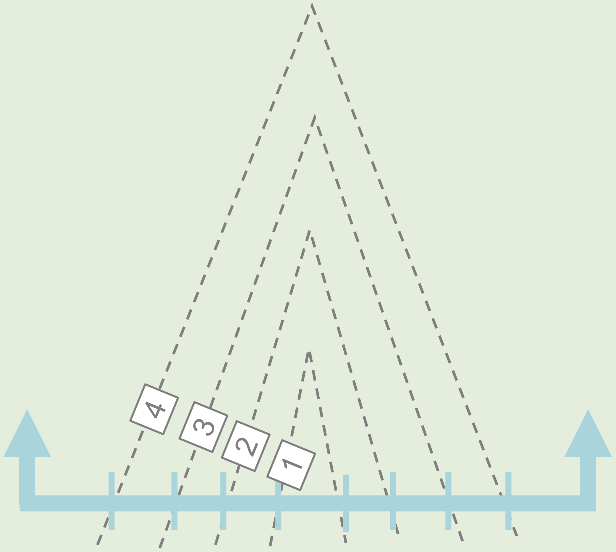
Plan



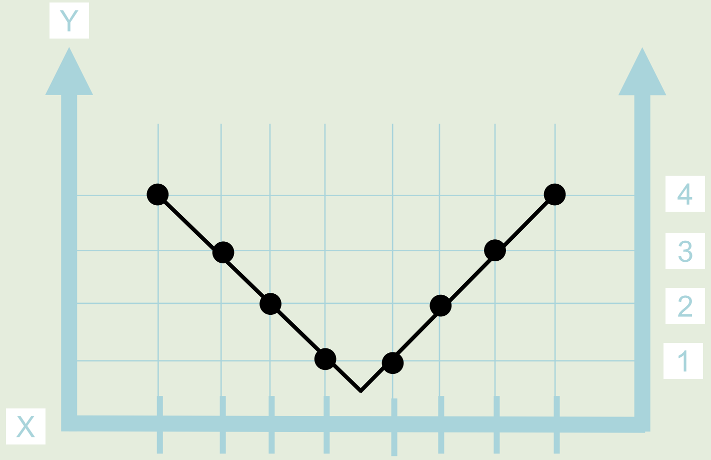
Profile

Landforms as contours

Triangular Swale



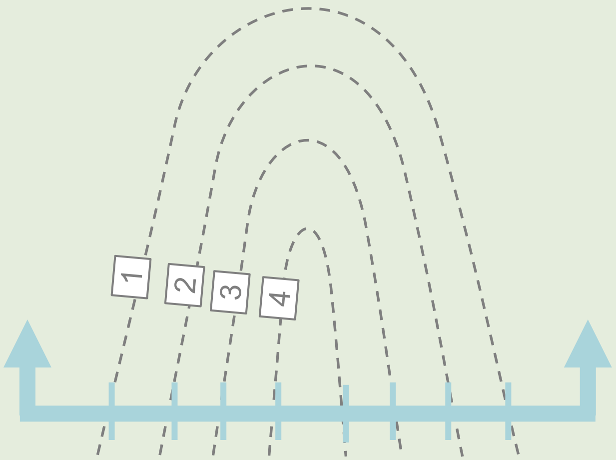
Plan



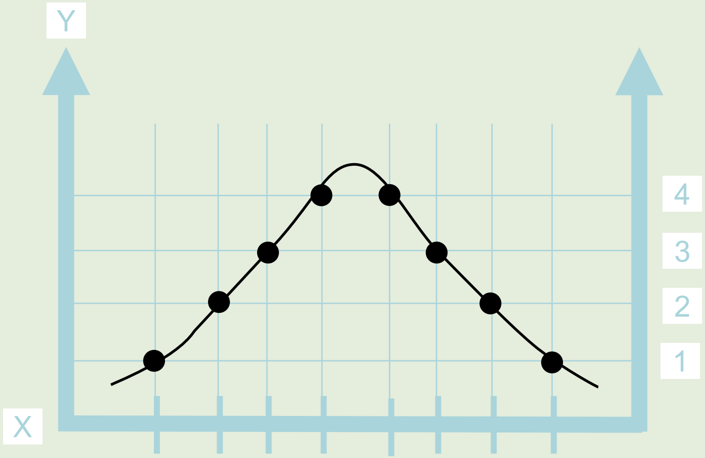
Profile

Landforms as contours

Ridge/Berm



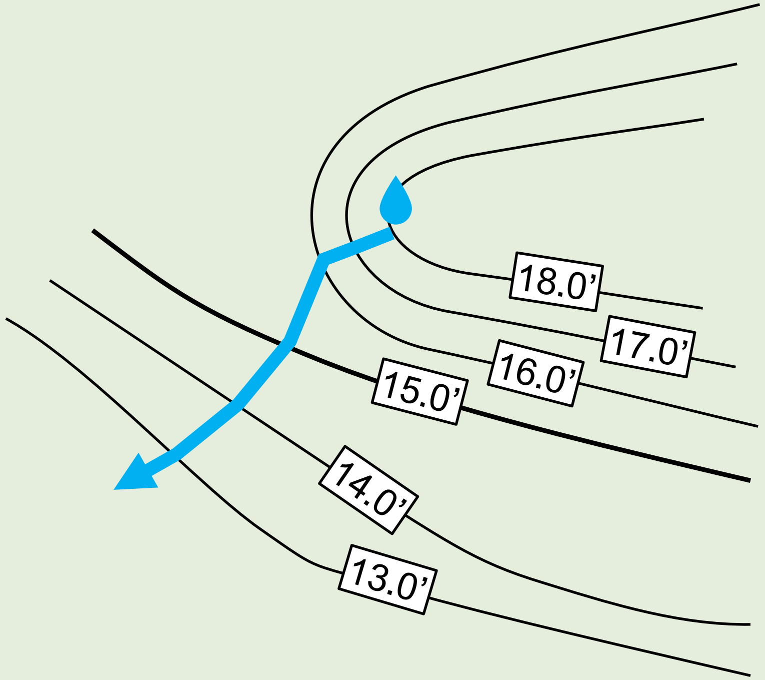
Plan



Profile

Additional notes on contours

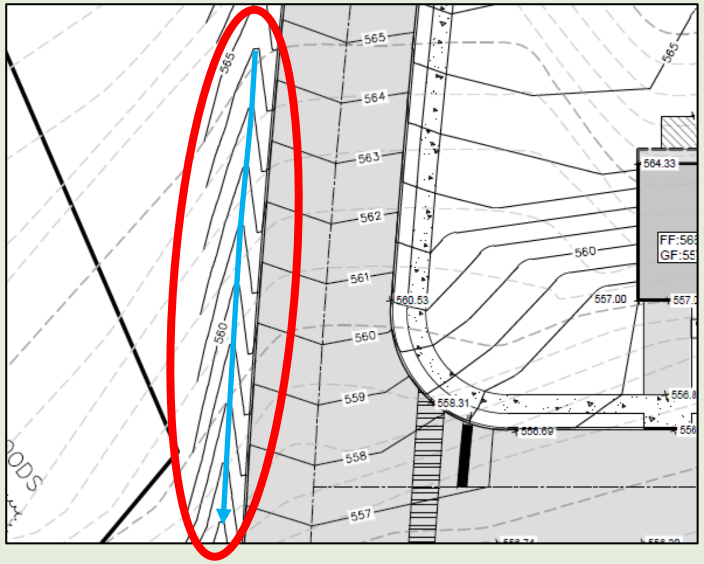
- Major contours are depicted differently than minor contours (usually bolder).
  - Major contours usually occur at intervals of 5’ or 10’.
- Contours **never** intersect.
- Runoff flows perpendicular to contours.
- Drainage areas are delineated using an understanding of contours and runoff patterns.

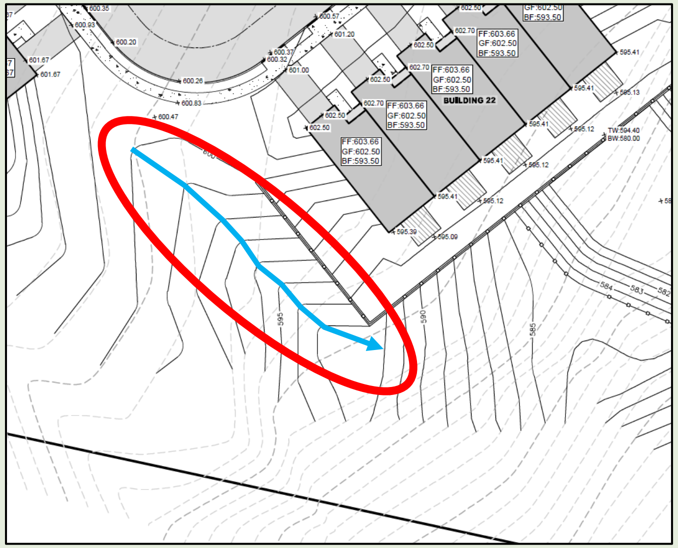


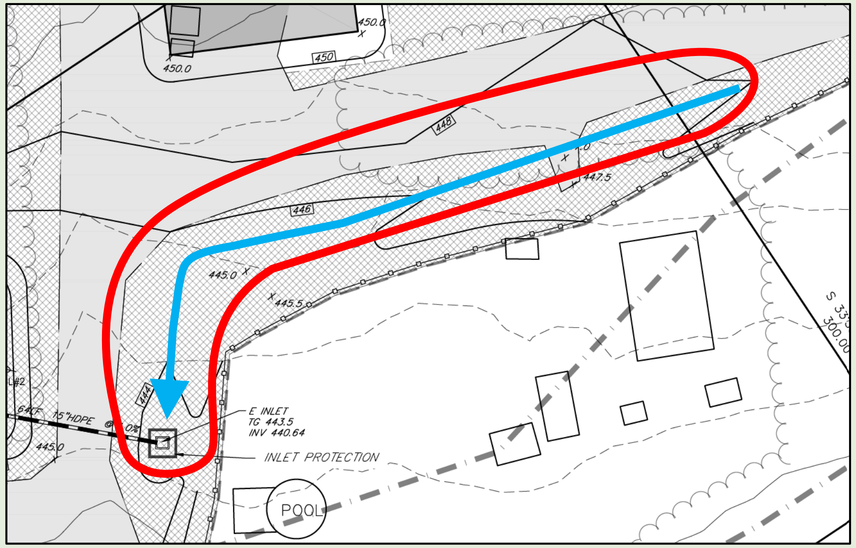
4

All of this to say…

- Be on the lookout for contours that indicate the presence of a swale since the Standards can apply to them.







Soil particles are terrible employees.

They're always leaving the field.

Microsoft Copilot

04. Reviewing Calculations

12 - Conduit Outlet Protection

- Typically, two tables are provided:
  - Worksheet with the COP calculations.
  - The output from a storm sewer design software that has the pipe flows for the design storm.

- Spreadsheets can be used to plug in the designer's numbers and perform our own checks.

- Let us know if you need a spreadsheet!

Figure 12-1 Configuration of Conduit Outlet Protection

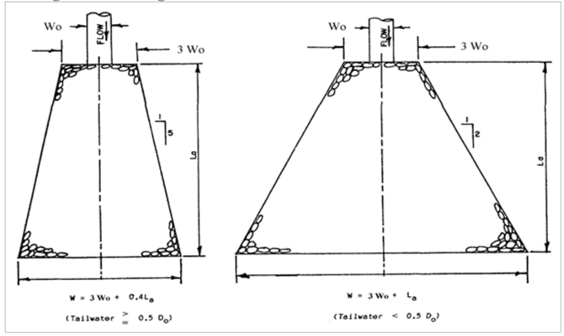


Photo credit: Kelly Doyle

RIPRAP APRON CALCULATIONS

As per the Standard for Conduit Outlet Protection, NJ SESC Standards

Project: 12/8/2025

Location:

Structure ID: **Test**

Inputs

D_o =	1.25	ft.	Q =	3.16	cfs
W_o =	1.25	ft.	q =	2.53	cfs/ft.
T_w =	0.3	ft.			

Apron Dimensions

Equation:

$TW < \frac{1}{2} D_o$: $La = 1.8\left(\frac{q}{Do^{0.5}}\right) + 7Do$ $Wa = 3Wo + La$

$TW \geq \frac{1}{2} D_o$: $La = 3\left(\frac{q}{Do^{0.5}}\right)$ $Wa = 3Wo + 0.4La$

$T_w > 0.5D_o$? NO

L_a =	12.8	ft.
W_a =	16.6	ft.

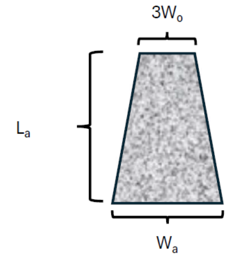
Riprap Size

Equation:

$d_{50} = \frac{0.02}{Tw} q^{1.33}$ where $q = \frac{Q}{Wo}$

d_{50} =	0.23	ft.
d_{50} =	2.76	in.

Design Summary



Filter fabric?	=	☑	
Apron length (L_a)	=	12.8	ft.
Apron width (W_a)	=	16.6	ft.
Stone size (d_{50})	=	3	in.
Riprap thickness	=	6	in.

Variables

D_o	= Maximum inside culvert height in feet
W_o	= Maximum inside culvert width in feet
L_a	= Apron length
W_a	= Apron width
d_{50}	= Median stone diameter
Q	= Conduit flow for design storm or the 25-year storm, whichever is greater
T_w	= Tailwater height (for areas where Tw cannot be computed, use Tw = 0.2Do)

Workbook Instructions

1. Enter inputs into yellow cells. Gray cells automaticaly calculate values.
2. Check box to indicate whether design will make use of filter fabric.

Worksheet Examples

PREFORMED SCOUR HOLE DESIGN CALCULATIONS

Structure:	Basin Protection	***Q (cfs)(100-year storm)=**	1.74
TW (ft) =**	0.42	**q (cfs)=Q/Wo=**	5.28
Do (ft) =	0.33		
Wo (ft) =	0.33		

*Q shown above obtained from 100-year DELMARVA Hydraflow Hydrographs
**for discharge into BMP, Tw shall equal the 2 year DELMARVA storm elevation in the BMP.

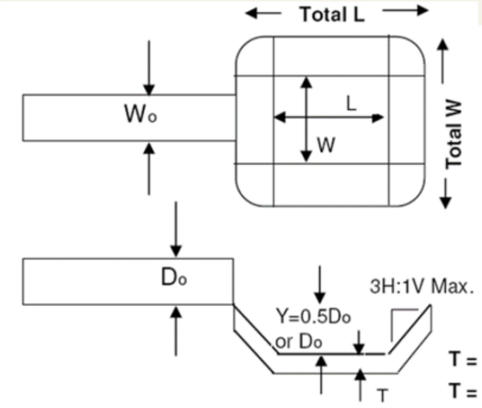
*****d50 Stone Size (When Y = 1/2 Do)** **Y (ft) = 0.1165**

$d_{50} = \frac{0.0125 * q^{1.33}}{TW}$ = 0.27 ft — **4 inches Calculated**; **6 inches Provided**

*****d50 Stone Size (When Y = Do)** **Y (ft) = 0.33**

$d_{50} = \frac{0.0082 * q^{1.33}}{TW}$ = 0.18 ft — **3 inches Calculated**; **6 inches Provided**

*** NJ Standards require a minimum d50 of 3", NJDOT requires a minimum d50 of 6"



L (ft) = 3*Do = 1.00
W (ft) = 2*Wo = 0.66

If Y = 1/2 Do then:
Total L (ft) = 2.00
Total W (ft) = 1.66

If Y = Do then:
Total L (ft) = 3.00
Total W (ft) = 2.66

Thickness
T = d50 stone size x 2 if filter fabric is provided
T = d50 stone size x 3 if filter fabric is not provided

Scour Hole Design Criteria and Summary

Y = 1/2 Do Use Filter Fabric

L (ft) =	**1.00**
W (ft) =	**0.66**
Y (ft) =	**0.17**
d50 Stone Size (inches) =	**6**
Thickness - T (inches) =	**12**
Volume (cy) =	**0.12**
Total L (ft) =	**2.00**
Total W (ft) =	**1.66**

SOIL TYPE: [redacted]
HYDROLOGIC GROUP:

CONDUIT OUTLET PROTECTION CALCULATION - Structure 2-1

CONDUIT EXIT VELOCITY: 3.7 F.P.S. <-- From Storm Sewer Tabulation
VELOCITY EXCEEDS VALUES PROVIDED IN TABLE 12-1, THEREFORE
CONDUIT OUTLET PROTECTION IS REQUIRED.

CONDUIT DESCRIPTION:	RIPRAP		
CONDUIT INVERT:	65.50	FT.	
TAILWATER ELEV.:	67.52	FT.	<-- 25 year W.S.E.

$$L_{APRON} = \left(3\frac{q}{D_o^{1/2}}\right) \quad \text{for} \quad TW > \tfrac{1}{2}D_o$$

CONDUIT HEIGHT:	15.00	IN.	
CONDUIT WIDTH:	15.00	IN.	
FLOW RATE:	3.00	C.F.S.	<-- From Storm Sewer Tabulation
UNIT DISCHARGE:	2.40	S.F.S.	
APRON LENGTH:	6.44	FT.	
USE:	**7.00**	FT.	

$$W_{APRON} = 3W_o + 0.4L_{APRON}$$

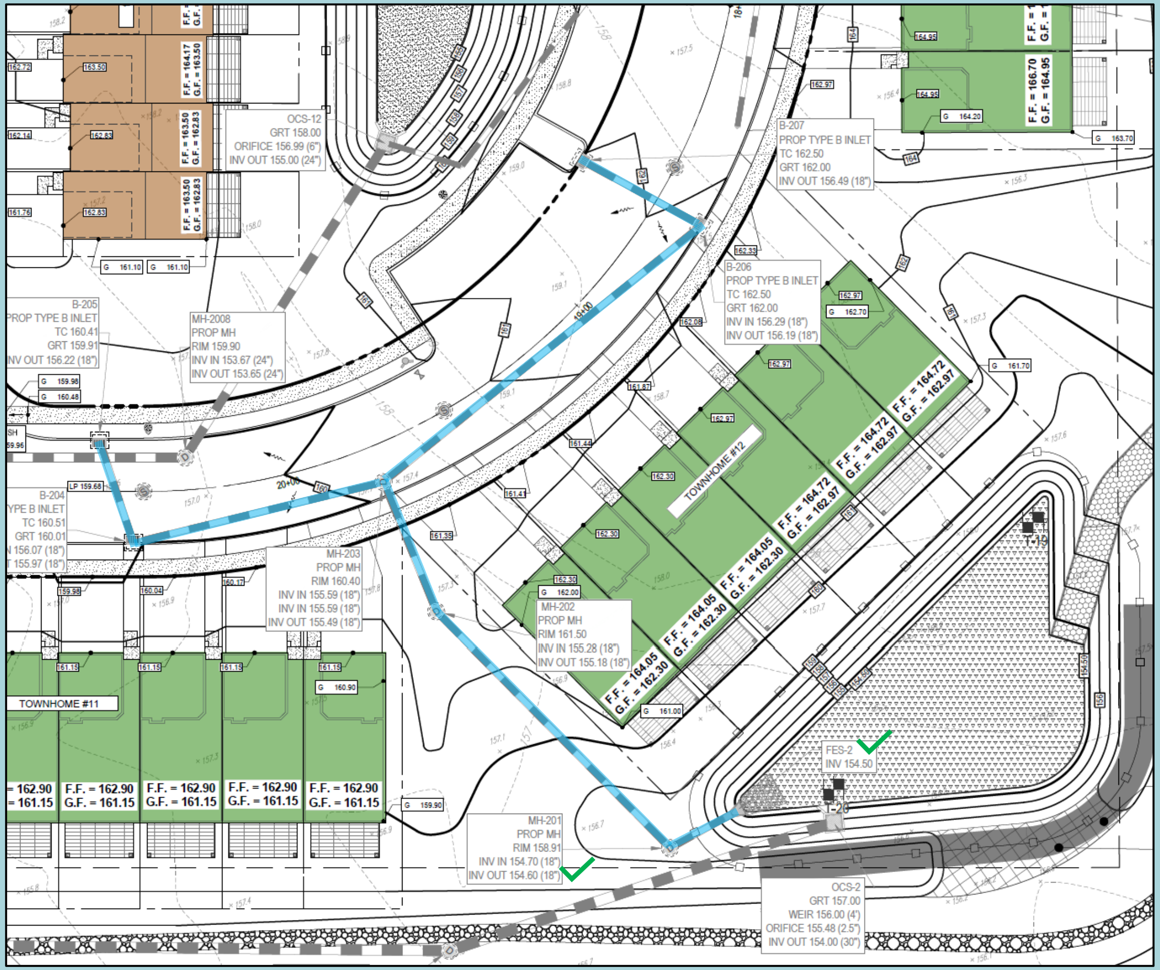
APRON WIDTH:	6.55	
USE:	**7.00**	FT.

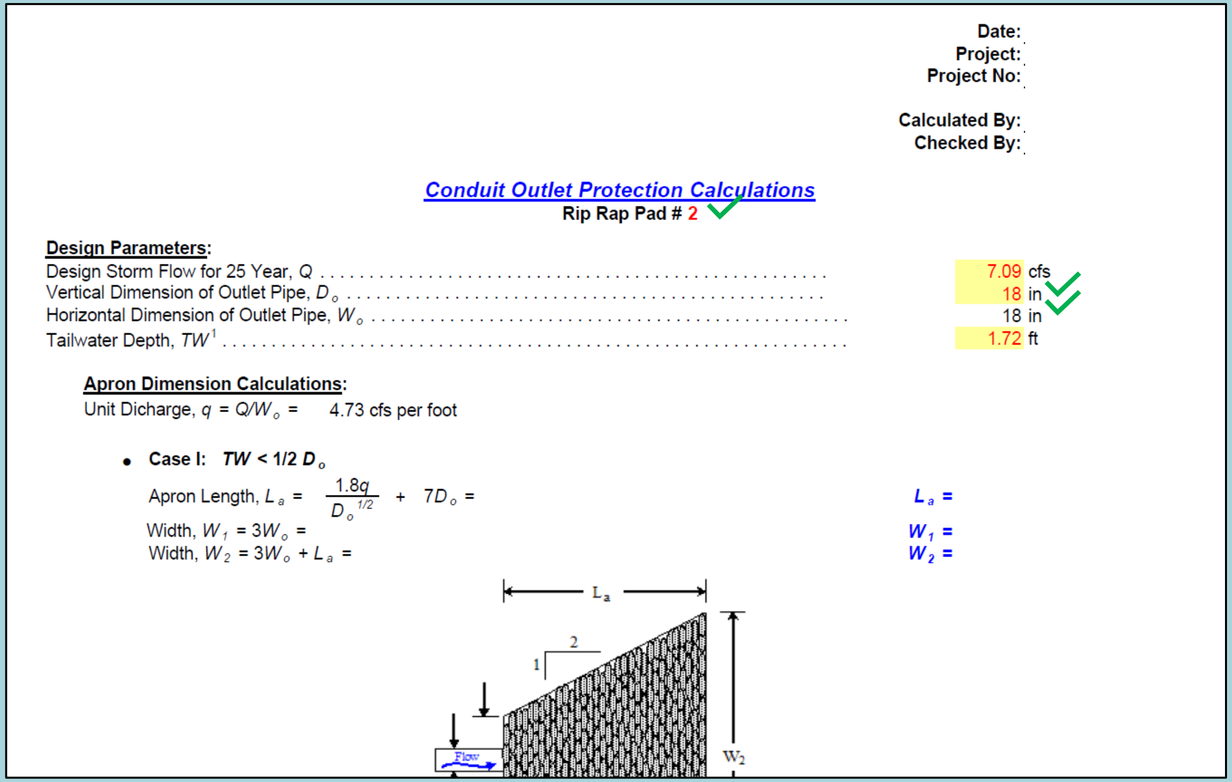
$$D_{50} = \frac{0.016}{T_w}q^{1.33}$$

RIPRAP MEDIAN STONE DIA.:	0.0254	FT.
USE:	**1.00**	IN.
APRON VOLUME (w/ fltr. fabric)	2.4	CY

COP Calculation Review

1. Identify which COP you are reviewing and find it on the plans.
2. Verify the dimensions of the pipe match what is shown on the plans.





Date:
Project:
Project No:

Calculated By:
Checked By:

Conduit Outlet Protection Calculations
Rip Rap Pad # 2

Design Parameters:

Design Storm Flow for 25 Year, Q	7.09	cfs
Vertical Dimension of Outlet Pipe, D_o	18	in
Horizontal Dimension of Outlet Pipe, W_o	18	in
Tailwater Depth, TW[1]	1.72	ft

Apron Dimension Calculations:

Unit Discharge, $q = Q/W_o =$ 4.73 cfs per foot

- **Case I: $TW < 1/2\ D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o =$ $L_a =$

Width, $W_1 = 3W_o =$ $W_1 =$

Width, $W_2 = 3W_o + L_a =$ $W_2 =$

COP Calculation Review

3. Locate the structure that has the COP in the Storm Sewer Tabulations.
4. Verify the correct storm event is being used (typically 25 yr).
5. Verify the Q used in the worksheet and crosscheck it with the results in the Storm Sewer Tabulations.

Storm Sewer Tabulation

Page 1

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	19.389	0.00	1.46	0.00	0.00	1.23	10.0	13.5	5.8	7.09	7.54	5.21	18	0.52	154.50	154.60	155.53	155.74	156.30	158.95	FES-2 - MH-201
2	1	97.409	0.00	1.46	0.00	0.00	1.23	10.0	13.2	5.8	7.17	7.37	4.29	18	0.49	154.70	155.18	156.10	156.48	158.95	161.25	MH-201 - MH-202
3	2	40.902	0.00	1.46	0.00	0.00	1.23	10.0	13.0	5.9	7.21	7.52	4.43	18	0.51	155.28	155.49	156.61	156.76	161.25	160.40	MH-202 - MH-203
4	3	119.796	0.19	0.35	0.90	0.17	0.32	10.0	11.3	6.2	1.95	7.43	2.32	18	0.50	155.59	156.19	157.08	156.72	160.40	162.00	MH-203 - B-206
5	4	40.037	0.16	0.16	0.90	0.14	0.14	10.0	10.0	6.5	0.93	7.42	2.56	18	0.50	156.29	156.49	156.72	156.85	162.00	162.00	B-206 - B-207
6	3	75.401	0.50	1.11	0.90	0.45	0.91	10.0	10.3	6.4	5.85	7.45	3.46	18	0.50	155.59	155.97	157.08	157.26	160.40	160.01	MH-203 - B-204
7	6	31.596	0.61	0.61	0.76	0.46	0.46	10.0	10.0	6.5	3.00	7.24	1.74	18	0.47	156.07	156.22	157.57	157.59	160.01	159.91	B-204 - B-205

Conduit Outlet Protection Calculations

Rip Rap Pad # 2

Design Parameters:

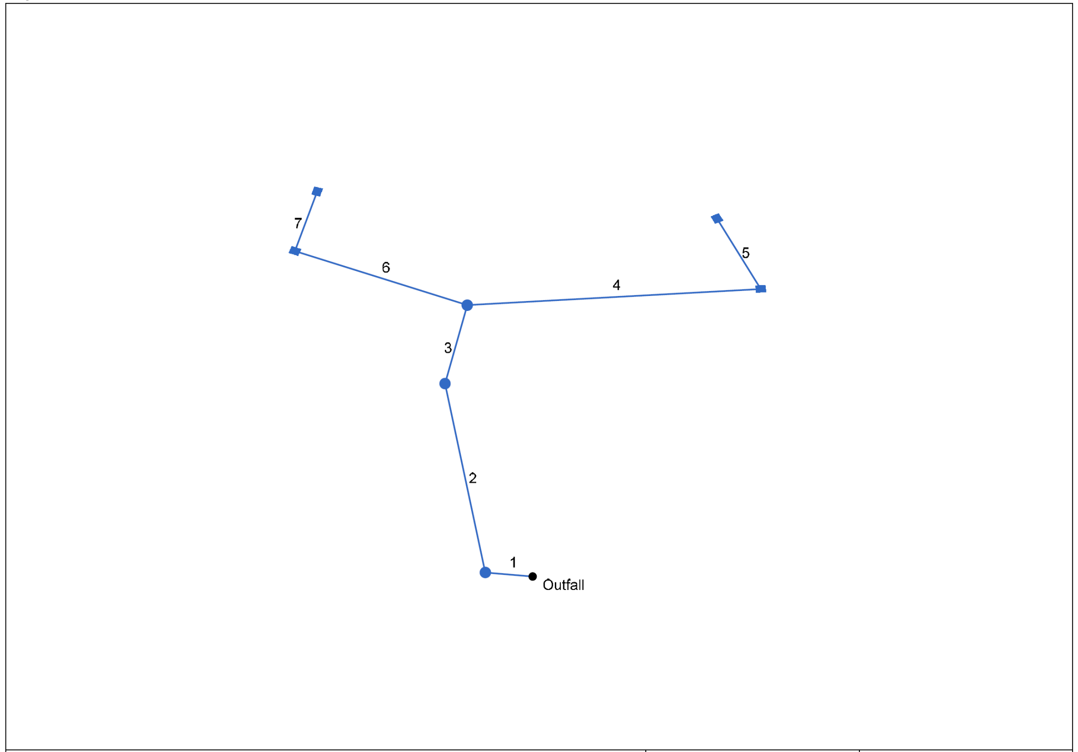
Design Storm Flow for 25 Year, Q	7.09 cfs
Vertical Dimension of Outlet Pipe, D_o	18 in
Horizontal Dimension of Outlet Pipe, W_o	18 in
Tailwater Depth, TW^1	1.72 ft

Project File: Basin 2.stm | Number of lines: 7 | Run Date: 10/24/2025

NOTES:Intensity = 182.59 / (Inlet time + 19.10) ^ 0.99; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewers v2024.00

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



COP Calculation Review

6. Verify the Tw used in the worksheet is correct by cross-checking it with the hydrologic model output.
   - Per the Standard for COP, when discharging into a basin, Tw shall equal the 2-year storm elevation in the basin.

NOAA 24-hr C 2-Year-2020 Rainfall=3.45", P2=3.45"
Printed 10/28/2025
HydroCAD® 10.20-7a s/n 03478 © 2025 HydroCAD Software Solutions LLC
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Summary for Pond 2P: BIORETENTION BASIN #2

Inflow Area = 2.300 ac, 56.52% Impervious, Inflow Depth = 2.06" for 2-Year-2020 event
Inflow = 4.86 cfs @ 12.12 hrs, Volume= 0.394 af
Outflow = 1.38 cfs @ 12.40 hrs, Volume= 0.281 af, Atten= 72%, Lag= 16.9 min
Primary = 1.38 cfs @ 12.40 hrs, Volume= 0.281 af
Routed to Pond 1W : WET POND #1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Peak Elev= 156.21' @ 12.40 hrs Surf.Area= 6,278 sf Storage= 9,155 cf

Plug-Flow detention time= 443.7 min calculated for 0.281 af (71% of inflow)
Center-of-Mass det. time= 342.5 min (1,116.8 - 774.3)

Volume	Invert	Avail.Storage	Storage Description
#1	154.50'	30,345 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
154.50	4,451	0	0
155.00	4,966	2,354	2,354
156.00	6,040	5,503	7,857
157.00	7,170	6,605	14,462
158.00	8,007	7,589	22,051
159.00	8,582	8,295	30,345

Device	Routing	Invert	Outlet Devices
#1	Primary	154.00'	**30.0" Round Culvert** L= 118.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 154.00' / 153.65' S= 0.0030 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf
#2	Device 1	155.48'	**2.5" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	156.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Device 1	157.00'	**48.0" x 48.0" Horiz. Grate** C= 0.600 in 48.0" x 48.0" Grate (100% open area) Limited to weir flow at low heads
#5	Secondary	157.25'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Tw = Peak Elevation – Invert of Pipe
Tw = 156.21 – 154.50
Tw = 1.71 ✓ (close enough)

Conduit Outlet Protection Calculations
Rip Rap Pad # 2 ✓

Design Parameters:

Design Storm Flow for 25 Year, Q	7.09	cfs ✓
Vertical Dimension of Outlet Pipe, D_o	18	in ✓
Horizontal Dimension of Outlet Pipe, W_o	18	in ✓
Tailwater Depth, TW^1	1.72	ft ✓

Apron Dimension Calculations:

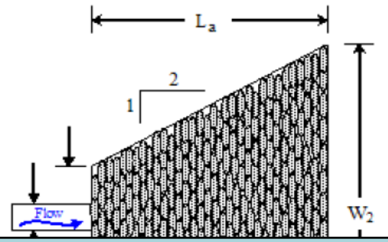
Unit Dicharge, $q = Q/W_o$ = 4.73 cfs per foot

- **Case I: $TW < 1/2\ D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o =$ L_a =

Width, $W_1 = 3W_o =$ W_1 =

Width, $W_2 = 3W_o + L_a =$ W_2 =



COP Calculation Review

7. Verify if formula used for sizing conduit outlet protection is correct.

   - Is $T_w < 0.5D_o$ or is $T_w \geq 0.5D_o$?

     Tw = 1.71'
     $0.5D_o$ = 0.5 (1.5') = 0.75'
     $T_w > 0.5D_o$ so use the corresponding equations.

8. Verify calculations of apron dimensions.

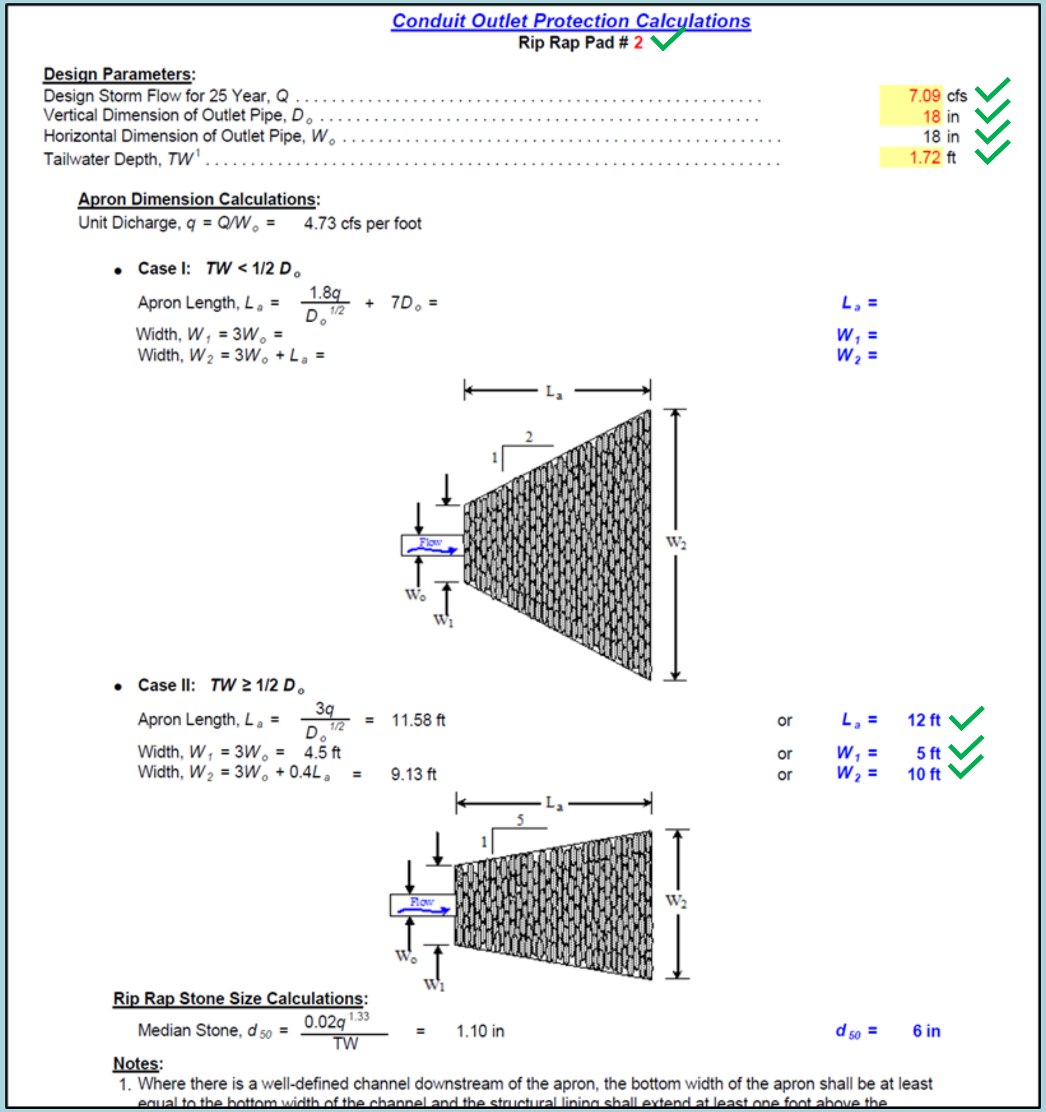
   - In this case, $T_w \geq 0.5D_o$

     $$L_a = \frac{3q}{D^{0.5}} = \frac{3(4.73)}{1.5^{0.5}} = 11.58'$$ ✓

     $W = 3D_o = 3(1.5) = 4.5'$ ✓

     $W_a = 3W_o + 0.4L_a = 3(1.5) + 0.4(11.58) = 9.13'$ ✓

   Engineer rounded up each dimension most likely for constructability.


Conduit Outlet Protection Calculations
Rip Rap Pad # 2 ✓

Design Parameters:
Design Storm Flow for 25 Year, Q .... 7.09 cfs ✓
Vertical Dimension of Outlet Pipe, D_o .... 18 in ✓
Horizontal Dimension of Outlet Pipe, W_o .... 18 in ✓
Tailwater Depth, TW[1] .... 1.72 ft ✓

Apron Dimension Calculations:
Unit Dicharge, $q = Q/W_o$ = 4.73 cfs per foot

- **Case I: $TW < 1/2\ D_o$**
  Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = — L_a =
  Width, $W_1 = 3W_o$ = — W_1 =
  Width, $W_2 = 3W_o + L_a$ = — W_2 =

- **Case II: $TW \geq 1/2\ D_o$**
  Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 11.58 ft — or L_a = 12 ft ✓
  Width, $W_1 = 3W_o$ = 4.5 ft — or W_1 = 5 ft ✓
  Width, $W_2 = 3W_o + 0.4L_a$ = 9.13 ft — or W_2 = 10 ft ✓

Rip Rap Stone Size Calculations:
Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 1.10 in — d_{50} = 6 in

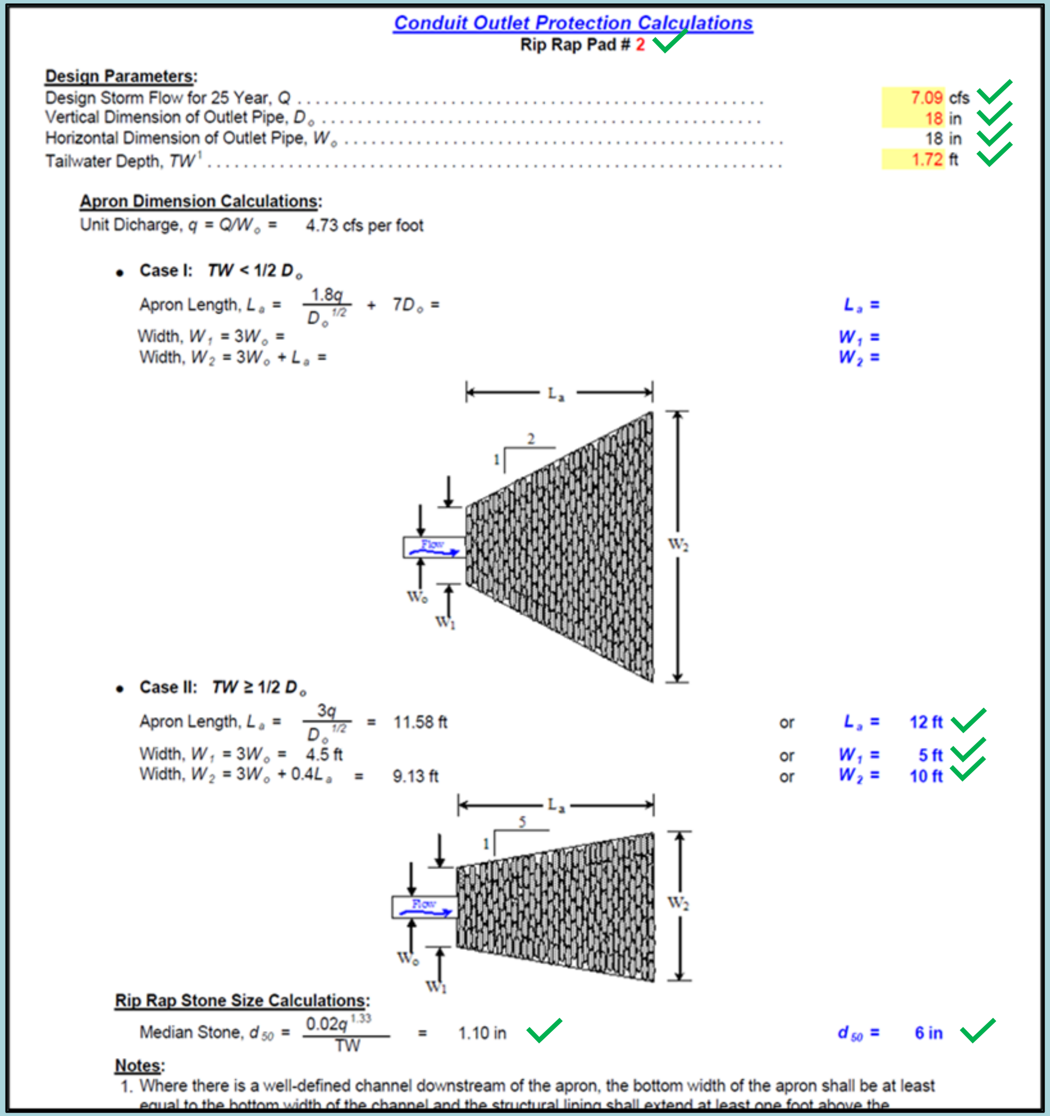
Notes:
1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the

COP Calculation Review

9. Verify calculations of riprap stone size.

$$d_{50} = \frac{0.02}{Tw}(q^{1.33}) = \frac{0.02}{1.71}(4.73^{1.33}) = 0.09' = 1.1"$$ ✓

Engineer elected to use a d_{50} of 6". ✓



Conduit Outlet Protection Calculations

Rip Rap Pad # 2 ✓

Design Parameters:

Design Storm Flow for 25 Year, Q	7.09	cfs ✓
Vertical Dimension of Outlet Pipe, D_o	18	in ✓
Horizontal Dimension of Outlet Pipe, W_o	18	in ✓
Tailwater Depth, TW^1	1.72	ft ✓

Apron Dimension Calculations:

Unit Dicharge, $q = Q/W_o =$ 4.73 cfs per foot

- **Case I: $TW < 1/2\ D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o =$ — $L_a =$

Width, $W_1 = 3W_o =$ — $W_1 =$

Width, $W_2 = 3W_o + L_a =$ — $W_2 =$

- **Case II: $TW \geq 1/2\ D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}} =$ 11.58 ft — or — $L_a =$ 12 ft ✓

Width, $W_1 = 3W_o =$ 4.5 ft — or — $W_1 =$ 5 ft ✓

Width, $W_2 = 3W_o + 0.4L_a =$ 9.13 ft — or — $W_2 =$ 10 ft ✓

Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW} =$ 1.10 in ✓ — $d_{50} =$ 6 in ✓

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the

COP Calculation Review

10. Verify thickness of COP lining.

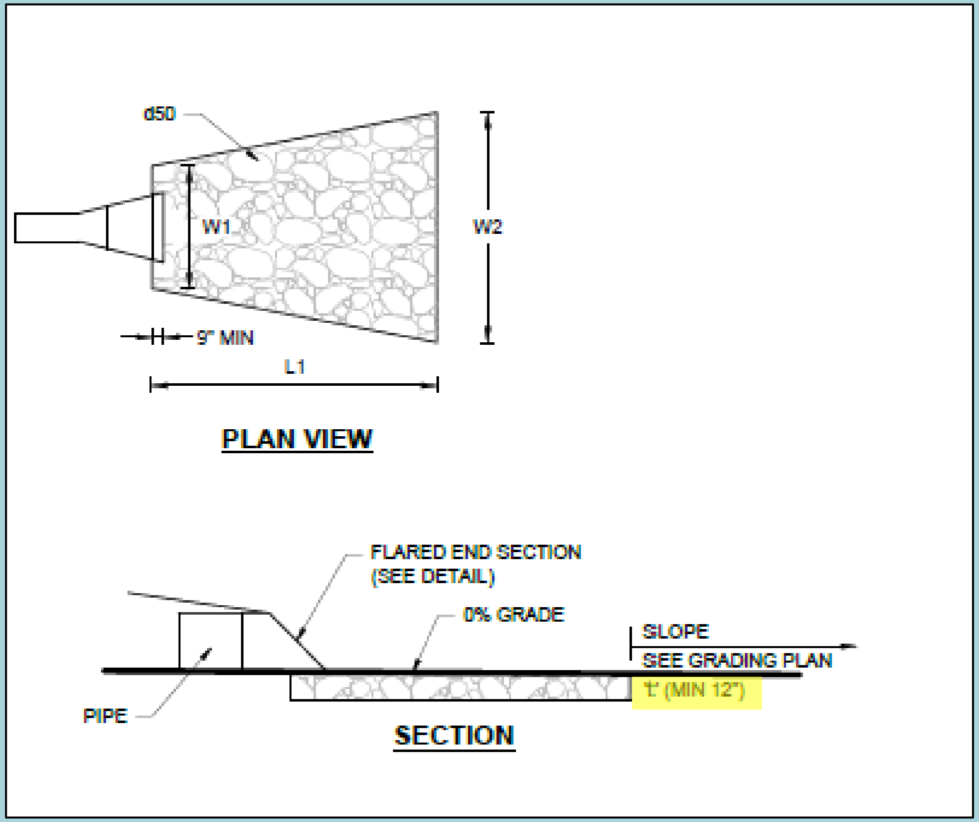
- Per the Standard for Riprap, the thickness of riprap lining shall meet at least one of the following two criteria:

  (1) A thickness of at least three times the d_{50} size if a filter layer is not used.

  (2) A thickness of at least two times the d_{50} size if a filter layer is used.

- Engineer used a thickness of at least two times the d_{50} size but did not mention or depict the filter layer on the plans. **A review comment was issued as a result.**

11. Verify that all information necessary to build the conduit outlet protection (such as dimensions and the presence of a filter layer, if applicable) are included in the plans or details.



When reviewing Conduit Outlet Protection…

- ❑ Look for a worksheet or calculations.
- ❑ Verify that the procedure and criteria listed in the Standards is followed.
- ❑ Use a spreadsheet to plug in their numbers to verify their outputs.
- ❑ Make sure the dimensions and filter needed to build the COP are shown on the plans and not just provided in the report.
- ❑ If the site has a lot of COP, make sure to review the COP at **each ultimate discharge point**, and spot review the COP throughout the site.

18 - Grassed Waterway

- Generally, capacity and stability are designed for the 10-year storm.

- Procedure uses Vegetative Retardance factors E and D.
  - E is for Stability (shorter grass = less resistance = higher velocity)
  - D is for Capacity (taller grass = more resistance = more depth = more area of flow)

- The Standard references Appendix A6 which has several nomographs that can be used to carry out the procedure.

Photo credit: Kelly Doyle

Example Submission

Given Parameters:

- Channel shape: Trapezoidal ← Established by designer
- Soil type: Clay loam ← Determined from Web Soil Survey (most common) or site soil testing
- Maximum allowable velocity (V): 4 ft/s ← Determined from Table 11-1
- Channel slope = 0.8% = 0.008 ft/ft ← Established by the designer's grading
- Side slopes = 5:1 ← Established by the designer's grading
- Peak discharge (Q) = 30.92 cfs ← Calculated by designer

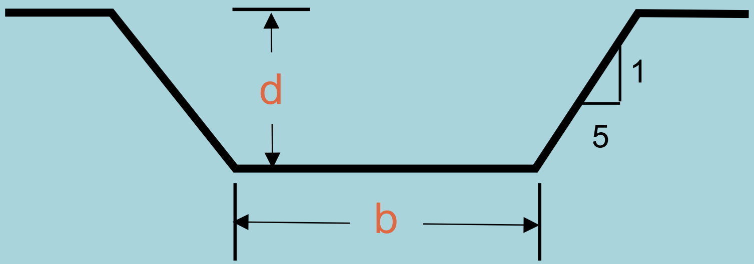
Example Submission

Given Parameters:

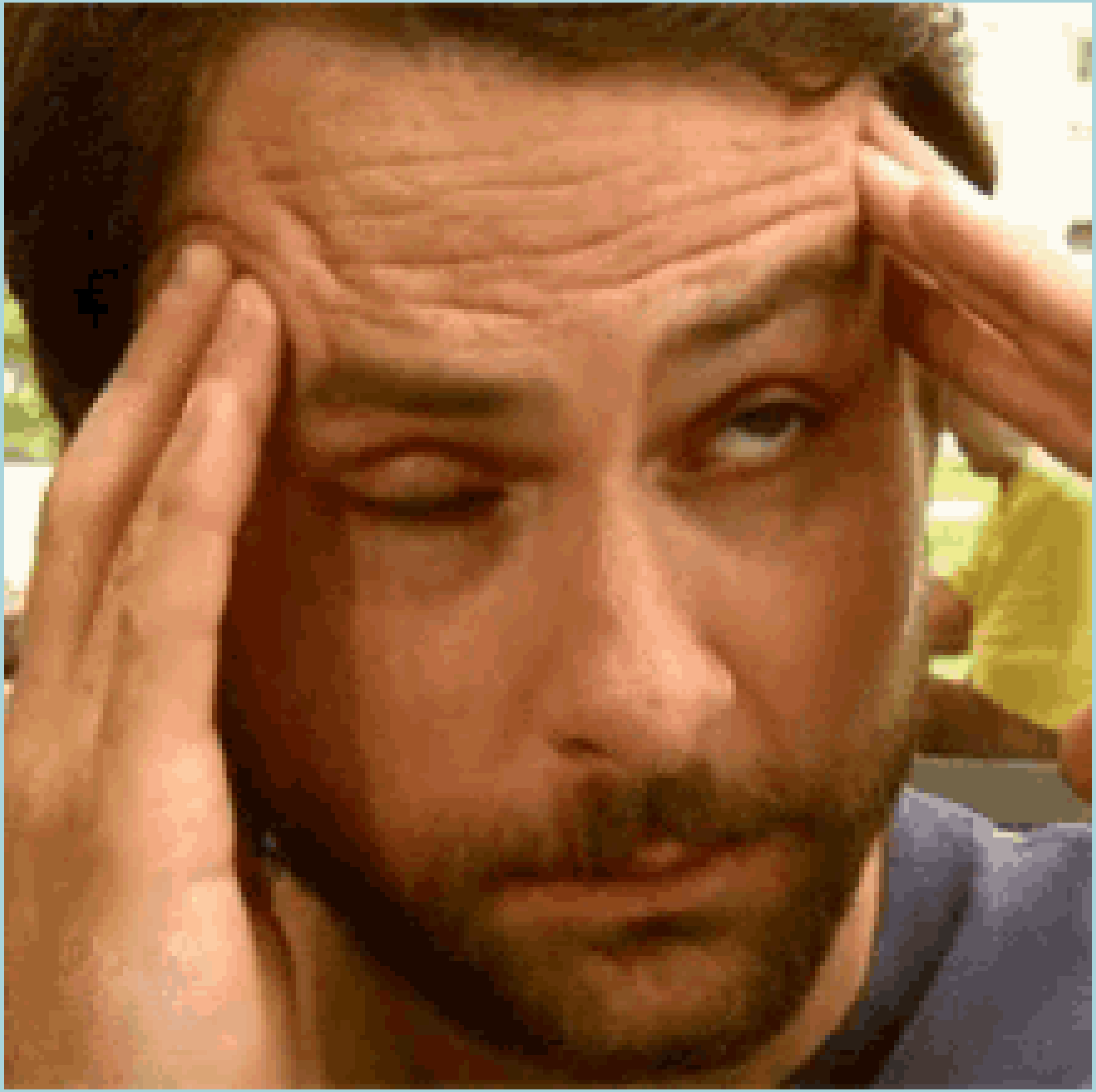
- Channel shape: Trapezoidal
- Soil type: Clay loam
- Maximum allowable velocity (V): 4 ft/s
- Channel slope = 0.8% = 0.008 ft/ft
- Side slopes = 5:1
- Peak discharge (Q) = 30.92 cfs

Missing Parameters:

- Channel depth (d)
- Channel bottom width (b)



Time for a headache…



THE PROCEDURE SHOULD BEGIN WITH FIGURE A6-4 (RETARDANCE E).

1. Locate Figure A6-4.
2. Enter with Max Permissible Velocity and draw horizontal line.
3. Find intersection with channel slope curve.
4. Draw vertical line from intersection to find hydraulic radius.
5. Verify 'R'.

V = 4.00 FT/S (Permissible Velocity)
Slope = 0.008 FT/FT
find R = 0.72

Q/V = A = 30.92/4.00 = 7.73 S.F.

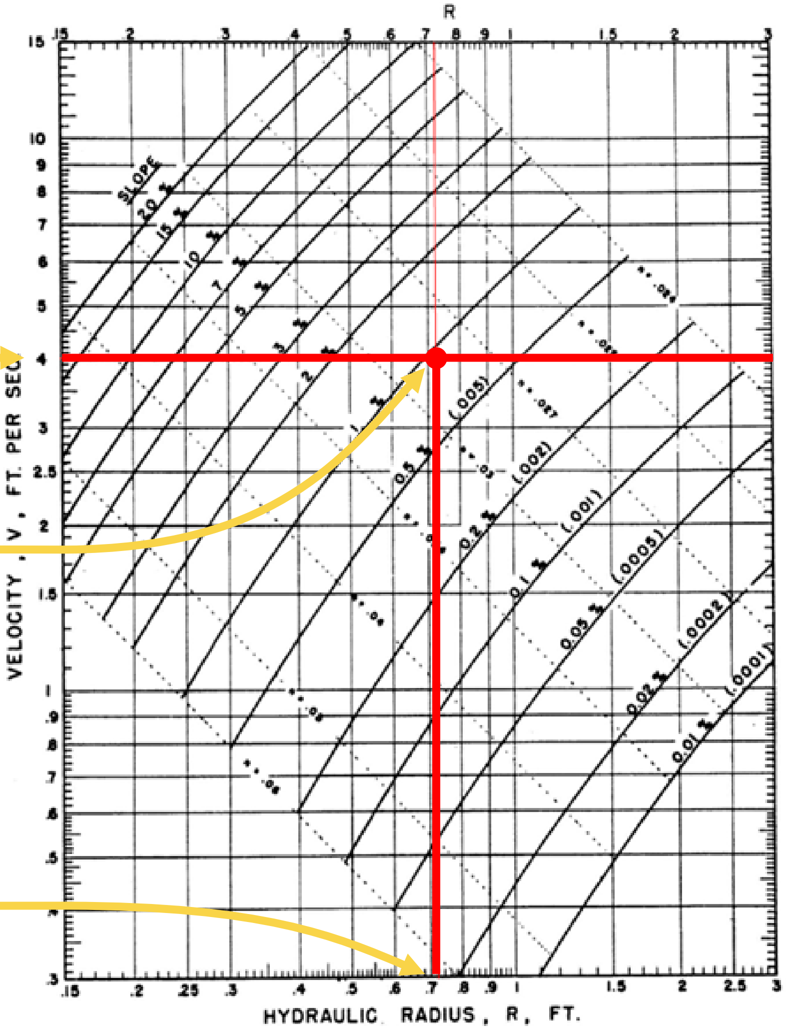


FIGURE A6-4

SOLUTION OF THE MANNING FORMULA FOR RETARDANCE E (VERY LOW VEGETAL RETARDANCE)

BY THE END OF THIS PART, THE DESIGNER HAS OBTAINED PRELIMINARY CHANNEL DIMENSIONS.

R = 0.72 and A= 7.73 SF from figure A6-4

b = 5 FT (Use 5FT To Be Conservative, Plots Off Chart)

Result

d = 1.1 FT

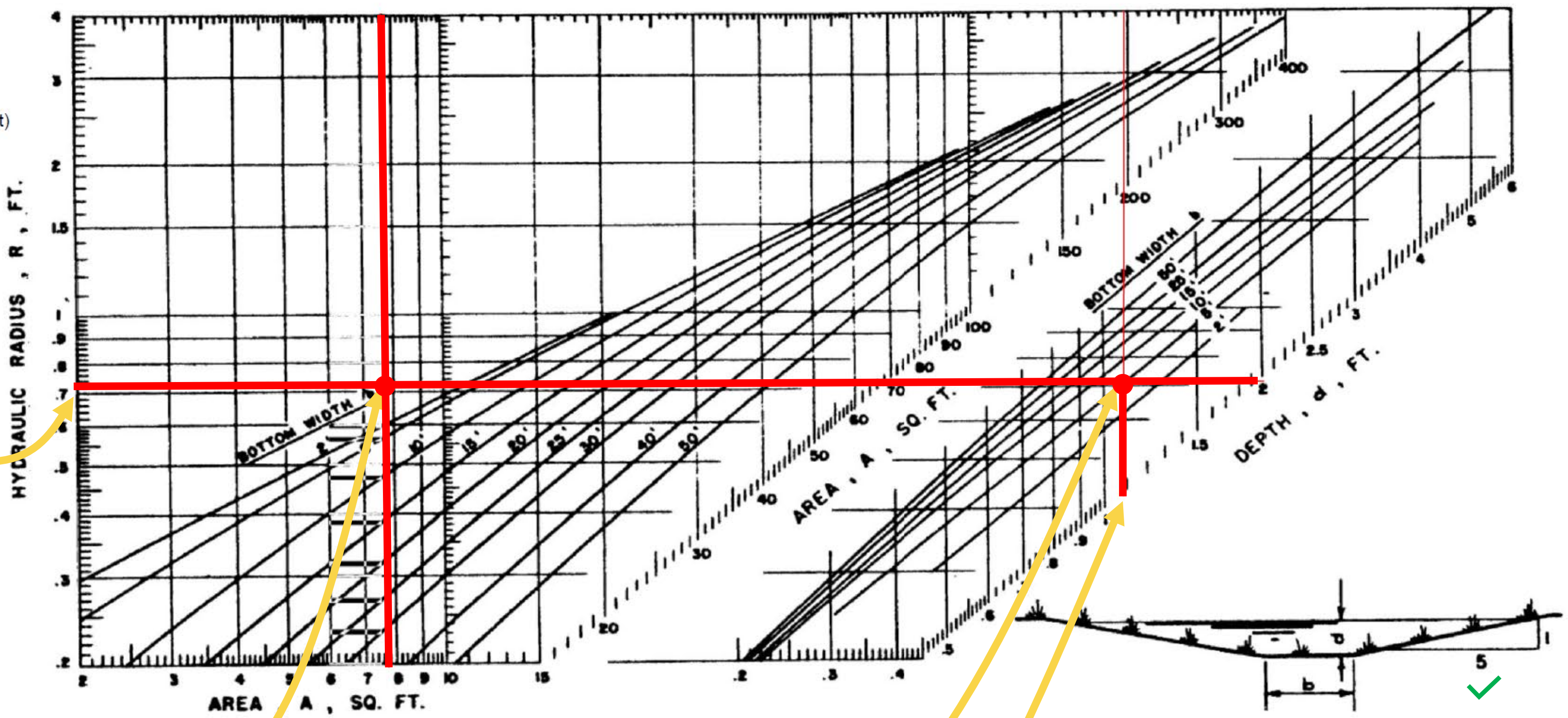


FIGURE A6-6

DIMENSIONS OF TRAPEZIODAL CHANNELS WITH 5 TO 1 SIDE SLOPES

6 Check that the correct figure based on channel shape and side slope was used.

7 Starting on the left side, draw horizontal line using ‘R’ determined from previous steps.

8 Draw vertical line corresponding to area, where A = Q/V.

9 Determine bottom width (b) from intersection point. In this case, designer upsized to b = 5’.

10 Extending to the right side, find a second intersection point using R and bottom width.

11 Draw vertical line from intersection point to determine depth (d).

THE ITERATIVE PROCESS BEGINS HERE.

Trial 1
choose d=1.0 FT, b=5 FT
find R=0.66, A=10 SF

Trial 2
choose d=1.2 FT, b=5 FT
find R=0.76, A=13.1 SF

Trial 3
choose d=1.14 FT, b=5 FT
find R=0.725, A=12.2 SF

12 Starting on the right side and using preliminary 'd' and 'b', determine new 'R' and 'A'.

13 Verify the results. In this case, R_1 = 0.66 and A_1 = 10 SF.

14 Now we go to Figure A6-3 with these values from the 1st Trial to verify if Retardance D is satisfied.

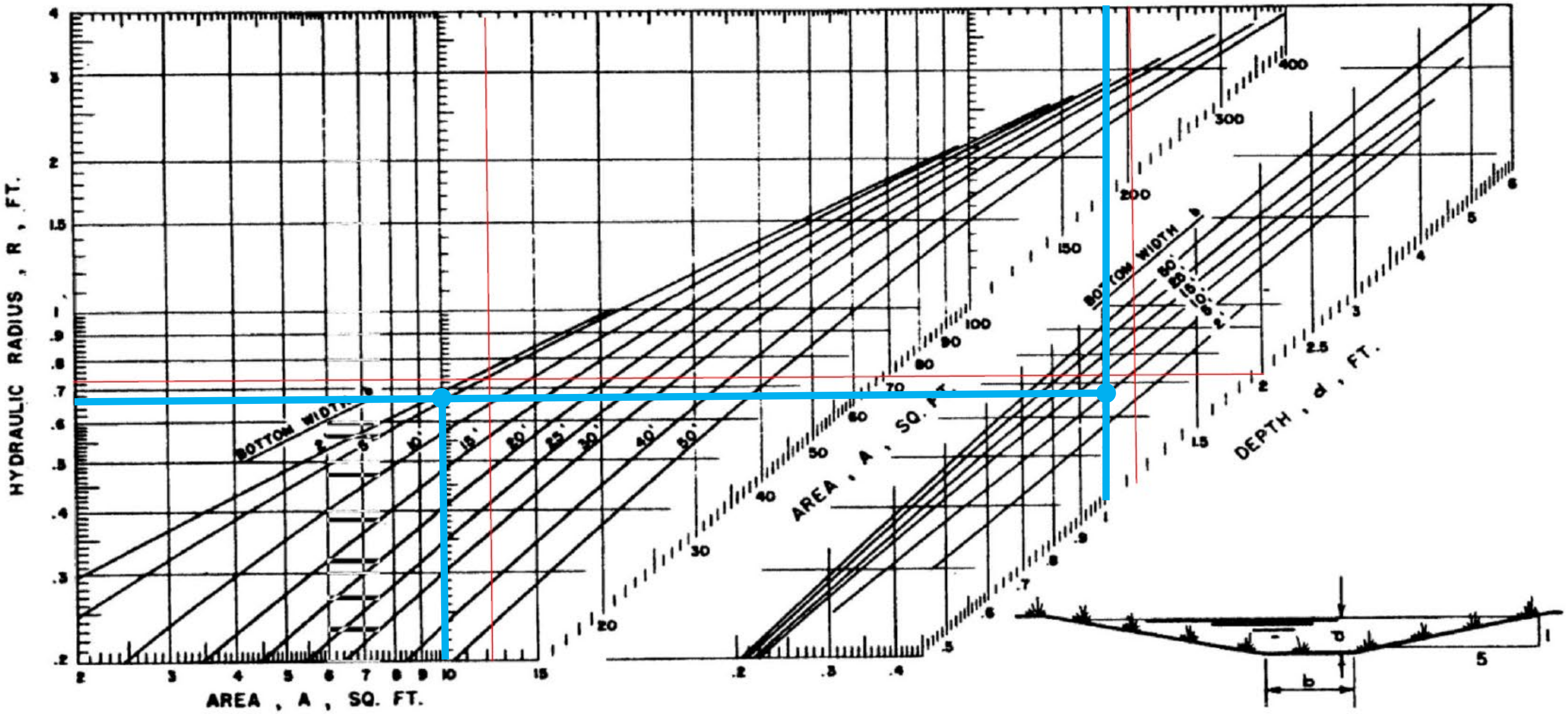


FIGURE A6-6

DIMENSIONS OF TRAPEZIODAL CHANNELS WITH 5 TO 1 SIDE SLOPES

THE PROCEDURE ENDS WITH FIGURE A6-4 (RETARDANCE D).

15 Draw vertical line from new 'R' until it intersects with channel slope.

16 Draw horizontal line left from the intersection to determine V_1.

17 Calculate Q_1 using

$Q_1 = V_1 A_1$.

$Q_1 = 2.1\ (10) = 21$ CFS

18 Compare Q_1 to initial Q (Peak discharge).

<u>We are looking for Q_1 to equal or be as close to Q as possible.</u>

Q_1 CANNOT BE LESS THAN Q.

19 In this case, since Q1 < Q, return to Step 12 and begin a second trial with new dimensions. Repeat until solved.

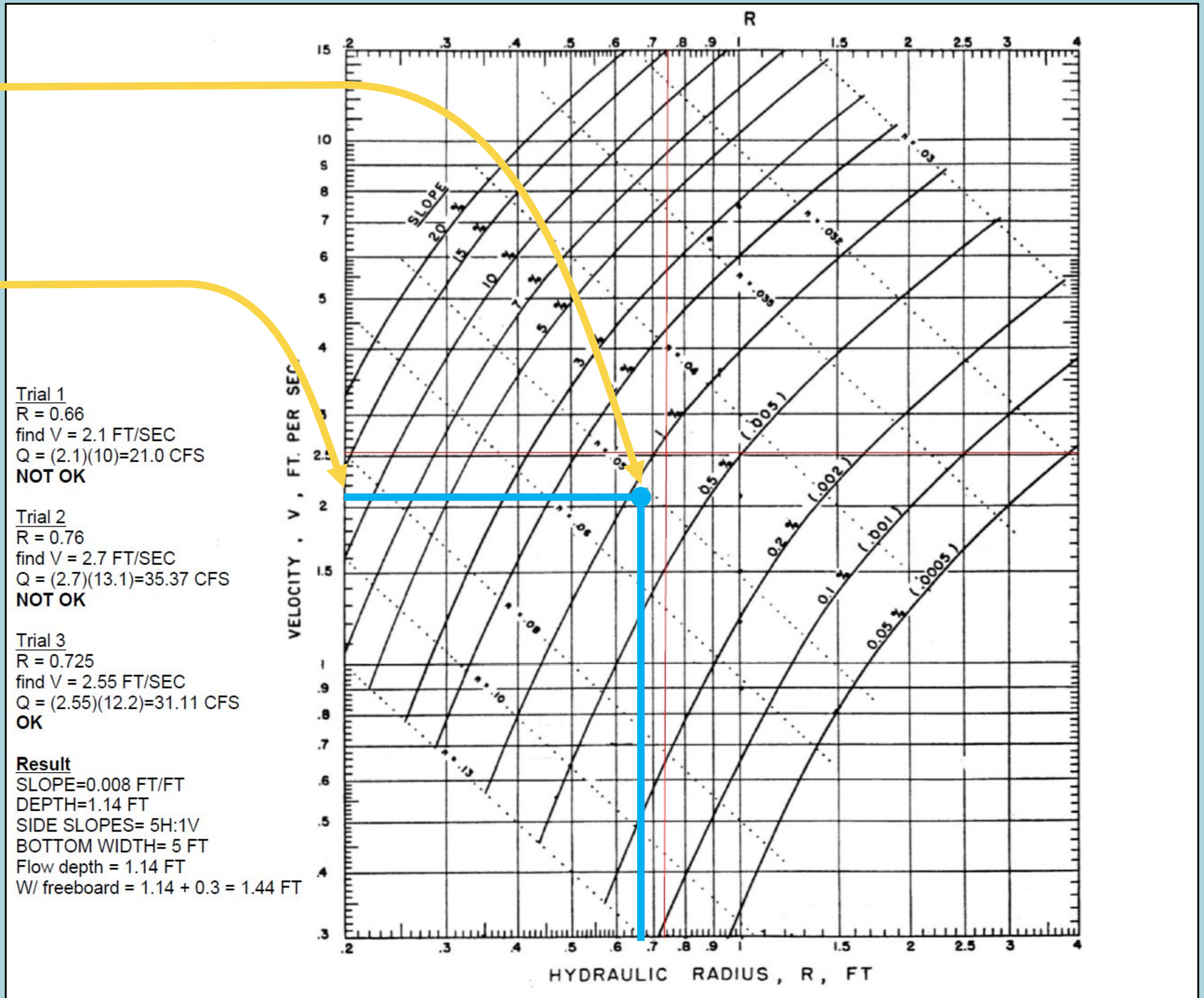


FIGURE A6-3

SOLUTION OF THE MANNING FORMULA FOR RETARDANCE D (LOW VEGETAL RETARDANCE)

When reviewing Grassed Waterways…

- ❑ Start by checking if they reference the Standard.
- ❑ Verify that the Vegetal Retardance factors are used/mentioned.

} Low-hanging fruit

If none of the above are done, an example comment is:

> *"Provide a design and supporting calculations for the swale in accordance with the Standard for Grassed Waterways."*

When reviewing Grassed Waterways…

- Verify that the procedure and criteria listed in the Standards is followed.
  - Design storm = 10-year
  - Longitudinal slope < 10%
  - Minimum top width of waterway = 10’
  - Maximum top width of waterway = 50’

- Verify that a cross-section and profile of the grassed swale are provided.

- Verify that the swale outlets to a stable area.

22 - Riprap-Lined Channels

- Should follow the “Recommended Design Procedure for Riprap-Lined Channels” in p. 22-6 which has procedures for both Trapezoidal and Triangular channels.

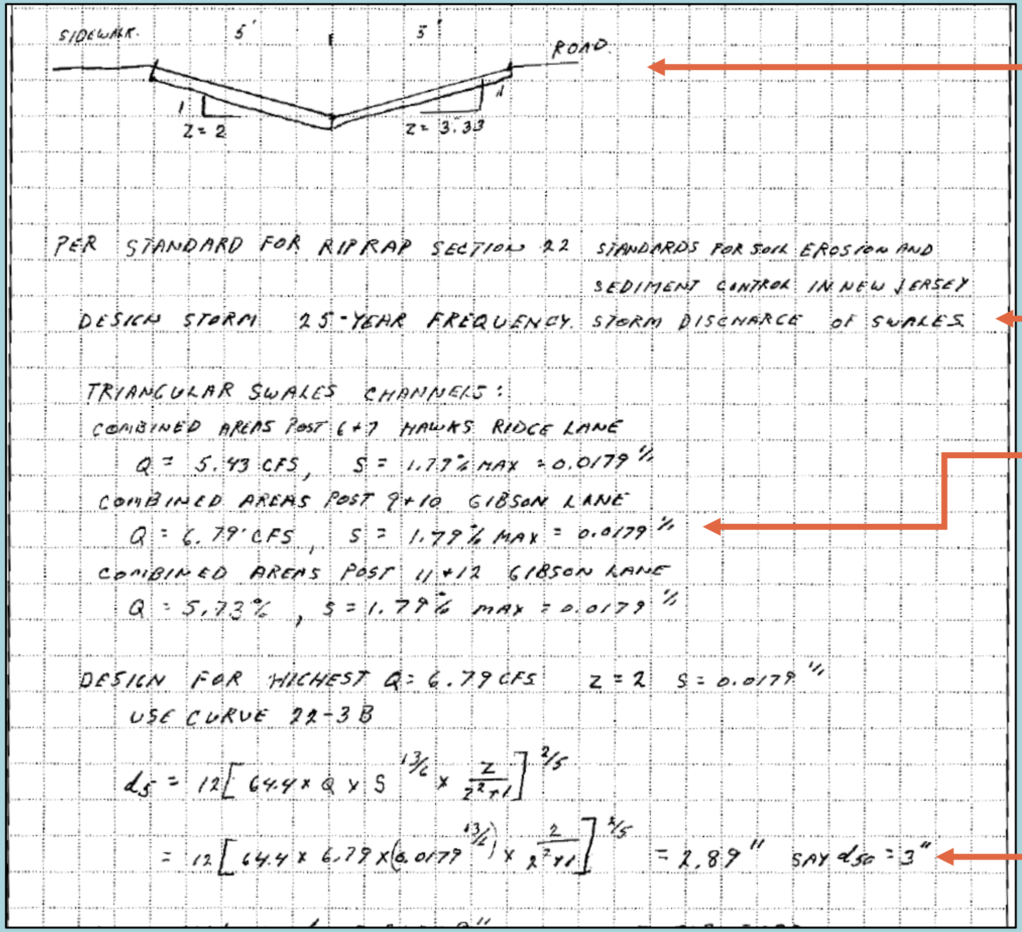
- Capacity and stability are designed for whichever is greater between the design storm or 25-year storm.

- The procedure assumes the channel dimensions are known and the engineer uses the procedure to determine a stable rock size.

- The procedure has considerations for channel bends and side slopes.

Photo credit: Kelly Doyle

Example Submission


SIDEWALK 5' 5' ROAD
1 Z = 2 Z = 3.33 1

PER STANDARD FOR RIPRAP SECTION 22 STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL IN NEW JERSEY

DESIGN STORM 25-YEAR FREQUENCY STORM DISCHARGE OF SWALES

TRIANGULAR SWALES CHANNELS:

COMBINED AREAS POST 6+7 HAWKS RIDGE LANE

Q = 5.43 CFS, S = 1.79% MAX = 0.0179 '/,

COMBINED AREAS POST 9+10 GIBSON LANE

Q = 6.79 CFS, S = 1.79% MAX = 0.0179 '/,

COMBINED AREAS POST 11+12 GIBSON LANE

Q = 5.73%, S = 1.79% MAX = 0.0179 '/,

DESIGN FOR HIGHEST Q = 6.79 CFS Z = 2 S = 0.0179 '/,

USE CURVE 22-3B

$$d_{50} = 12\left[64.4 \times Q \times S^{13/6} \times \frac{Z}{Z^2+1}\right]^{2/5}$$

$$= 12\left[64.4 \times 6.79 \times (0.0179^{13/6}) \times \frac{2}{2^2+1}\right]^{2/5} = 2.89'' \quad \text{SAY } d_{50} = 3''$$

Section provided with channel dimensions:

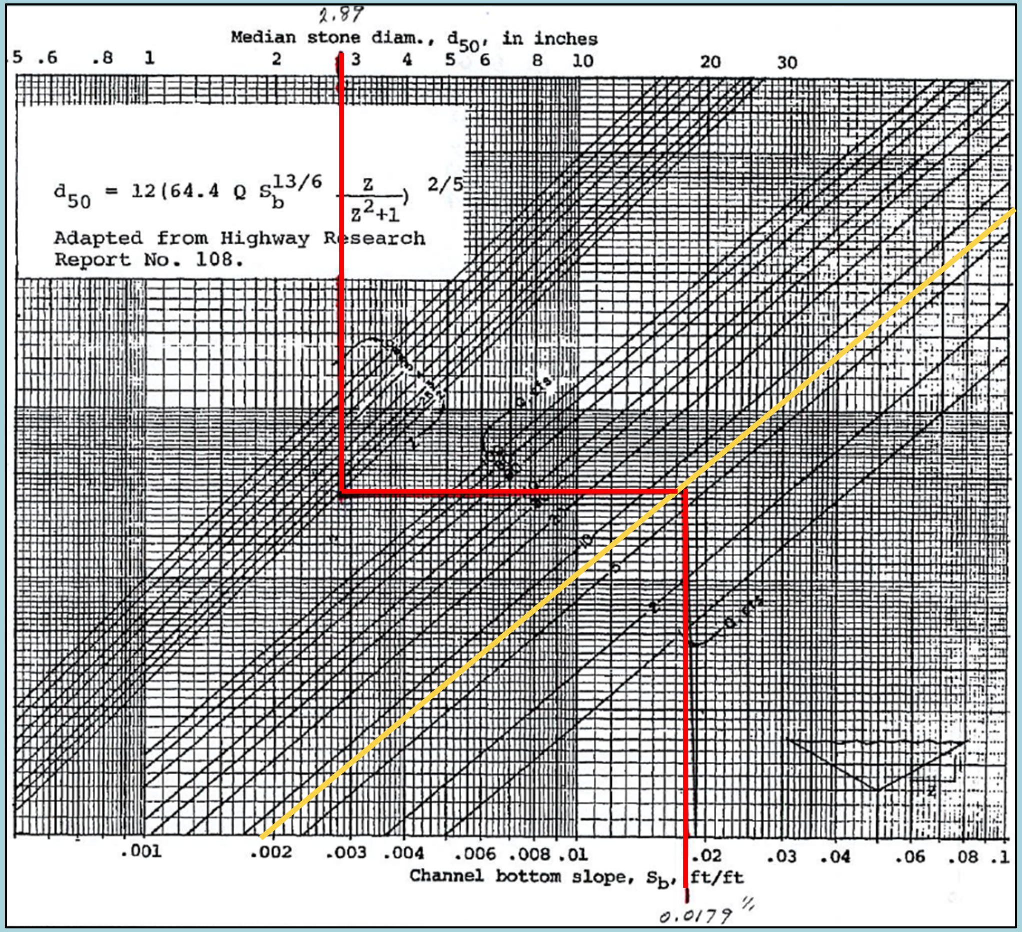
- Triangular
- 10’ surface width
- Side slopes (z) of 2:1 and 3.33:1

25-year storm design used.

Designer calculated the peak runoff to each section of swale and used the highest value; designer noted the highest longitudinal slope.

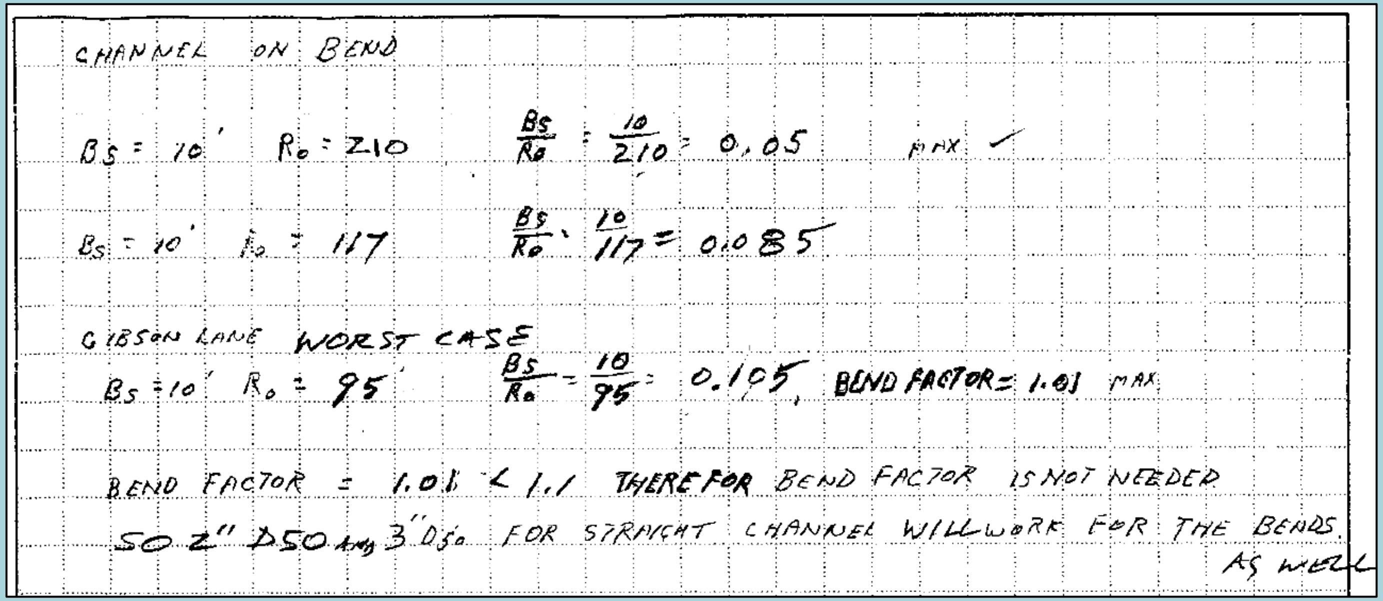
Designer used the equation corresponding to Curve 22-3B in the Standard to obtain riprap size.

Example Submission (continued)



- Designer also provided a print-out of Curve 22-3B and showed the solution of the nomograph.
- Nomograph solution yields the same value as the equation (2.89" in this case).
- Either option is satisfactory.

Example Submission (continued)



CHANNEL ON BEND

BS = 10' R0 = 210 BS/R0 = 10/210 = 0.05 MAX ✓

BS = 10' R0 = 117 BS/R0 = 10/117 = 0.085

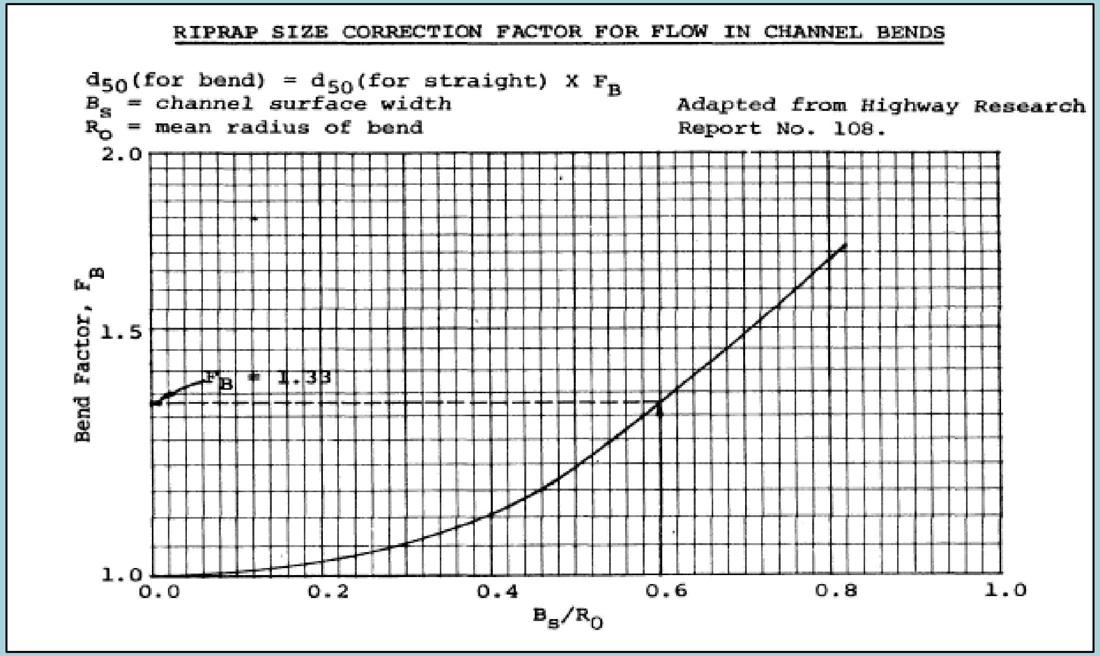
GIBSON LANE WORST CASE

BS = 10' R0 = 95' BS/R0 = 10/95 = 0.105, BEND FACTOR = 1.01 MAX

BEND FACTOR = 1.01 < 1.1 THEREFOR BEND FACTOR IS NOT NEEDED

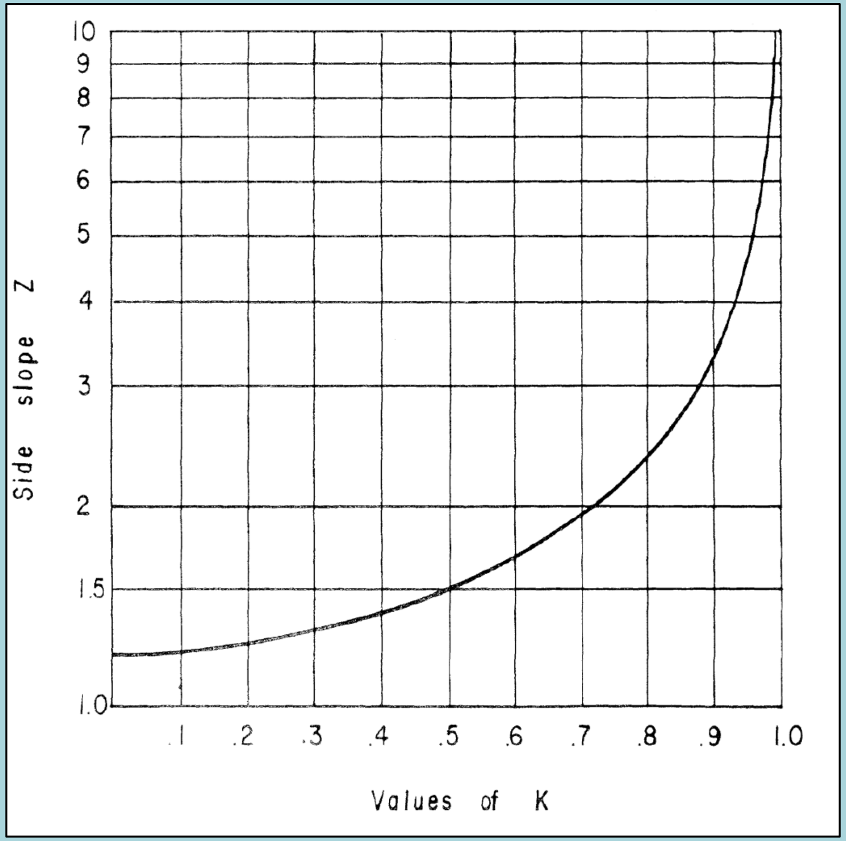
SO 2" D50 and 3" D50 FOR STRAIGHT CHANNEL WILL WORK FOR THE BENDS AS WELL

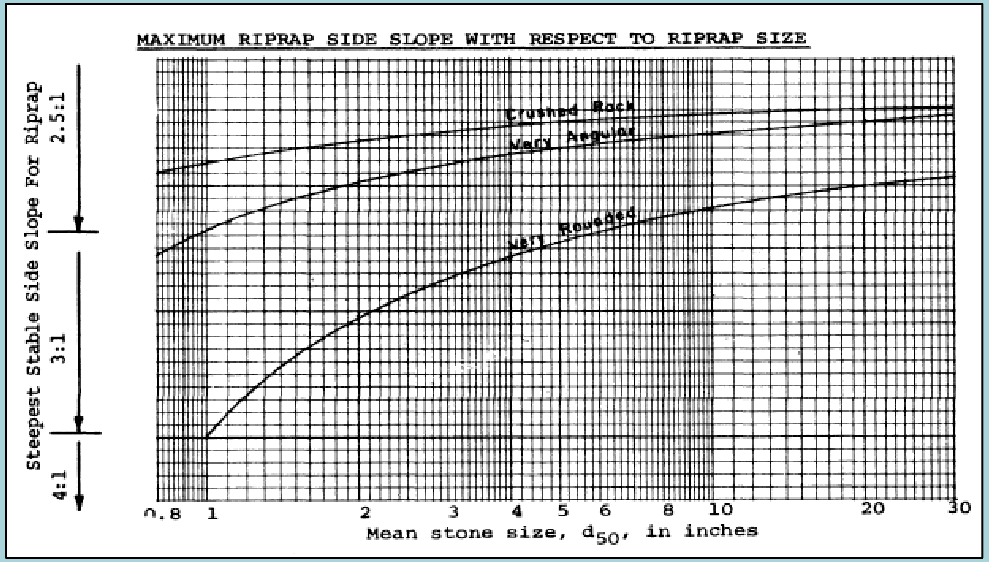
- Designer evaluated the riprap at the bends and determined no upsizing was needed.



Example Submission (continued)

- Additional items the engineer should have done:
  - Evaluated the stability of the riprap size on the proposed side slope using Curves 22-5 and 22-6 of the Standards.
  - Provided an open channel model/calculation that uses the newly calculated Manning's roughness coefficient.





When reviewing Riprap-Lined Channels…

Photo credit: Dave Clapp

- ❑ Start by checking if they reference the Standard.
- ❑ Verify that the equations and/or graphs are used.

} Low-hanging fruit

If none of the above are done, an example comment is:

> *"Provide a design and supporting calculations for the riprap-lined channel in accordance with the Standard for Riprap."*

When reviewing Riprap-Lined Channels…

- ❑ Verify that the procedure is followed.
  - ❑ Design storm = 25-year
  - ❑ Longitudinal slope < 10%
  - ❑ Stone d_{50} obtained from Curves 22-3A/22-3B or their associated equations.
  - ❑ Channel bends verified for correction factor.
  - ❑ Side slope stability verified using Curves 22-5 and 22-6.
  - ❑ Manning's n obtained from equation on p. 22-6 or Curve 22-1.
- ❑ Verify that an open channel model/calculation that uses the newly calculated Manning's roughness coefficient was provided.
- ❑ Verify that a cross-section and profile of the riprap-lined swale are provided.
- ❑ Verify that the channel outlets to a stable area.

21 – Off-site Stability

Photo credit: Dave Clapp

- In an ideal world, you will get:
  - A narrative with a description of the satisfaction of the Standard for OSS.
  - Summary tables for the evaluation of point of discharge and downstream stability.
  - Software output with the hydrographs (in the “failed condition” when infiltration is proposed).
- Personally, I focus more on the Point of Discharge when reviewing because I find that to be the more “difficult” one to prove.

When are 2-, 10-, or 25-year hydrographs required in OSS?

Point of Discharge

- Analysis of the 25-year storm is only required under method 1b of the Point of Discharge Requirements.

- Analysis of the 2- and 10-year storms are required for the rest of the options.

Downstream Stability

- Only evaluates the 2- and 10-year storms.

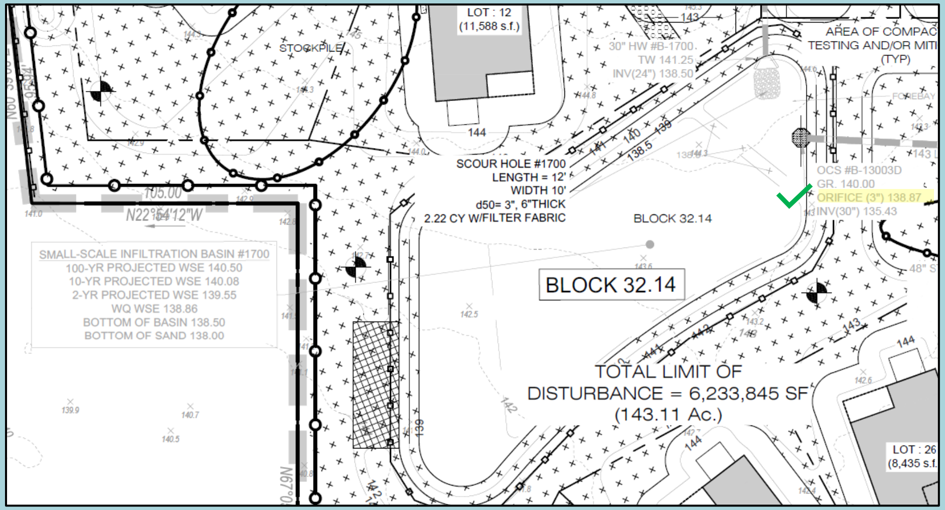
OSS (Point of Discharge) Calculation Review

1. Using the plans, aerial imagery, or field observations, identify each point of discharge and the ultimate condition below it:
   - When the condition is "No well-defined waterway", the designer should provide software outputs for the 2-, 10-, or 25-year storm (the model should be in the *failed* condition if infiltration is proposed).
   - When the condition is "Well-defined waterway", the designer should provide software outputs for the 2- and 10-year storm (the model should be in the *failed* condition if infiltration is proposed).
2. Locate the software outputs, which is usually located in the appendix of the stormwater management report.
3. If infiltration is proposed, verify that the modeling of the basins in the failed condition has been done correctly. This will require the plans in addition to the software output.
   - The modeling can be done in several ways depending on the software.
   - The most important thing to look for are the **starting elevation** and the **exfiltration rate**.

HydroCAD Output Example

- The plan shows the lowest orifice for this basin at 138.87’.
- Under the failed condition model, the starting elevation of the pond should be shown at 138.87, which it is.
- Under Devices and Primary Outflow, there should be no “Discarded Outflows” or “Exfiltration” listed, which in this case, there are not.

This basin has been modeled correctly for the failed condition.



Plan showing SSI Basin #1700

Proposed Drainage Analysis SB - FAILURE *NOAA 24-hr C 25-YR Rainfall=6.36"*
Printed 2/24/2025
HydroCAD® 10.20-3h s/n 09754 © 2024 HydroCAD Software Solutions LLC Page 1277

Summary for Pond 17P: SMALL-SCALE INFILTRATION BASIN #1700

Inflow Area = 2.400 ac, 45.42% Impervious, Inflow Depth = 4.01" for 25-YR event
Inflow = 9.19 cfs @ 12.14 hrs, Volume= 0.802 af
Outflow = 2.54 cfs @ 12.55 hrs, Volume= 0.793 af, Atten= 72%, Lag= 24.9 min
Primary = 2.54 cfs @ 12.55 hrs, Volume= 0.793 af
Routed to Pond 1A : WET POND 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Peak Elev= 140.13' @ 12.55 hrs Surf.Area= 15,396 sf Storage= 17,484 cf

Plug-Flow detention time= 647.9 min calculated for 0.793 af (99% of inflow)
Center-of-Mass det. time= 641.2 min (1,424.7 - 783.5)

Volume	Invert	Avail.Storage	Storage Description
#1	138.87'	31,705 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
138.87	9,000	0	0
139.00	13,000	1,430	1,430
140.00	15,100	14,050	15,480
141.00	17,350	16,225	31,705

Device	Routing	Invert	Outlet Devices
#1	Primary	135.43'	**30.0" Round Culvert** L= 143.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 135.43' / 135.00' S= 0.0030 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#2	Device 1	138.87'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	140.00'	**14.7' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=2.54 cfs @ 12.55 hrs HW=140.13' TW=134.58' (Dynamic Tailwater)
└1=**Culvert** (Passes 2.54 cfs of 41.88 cfs potential flow)
  ├2=**Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.13 fps)
  └3=**Sharp-Crested Rectangular Weir** (Weir Controls 2.29 cfs @ 1.19 fps)

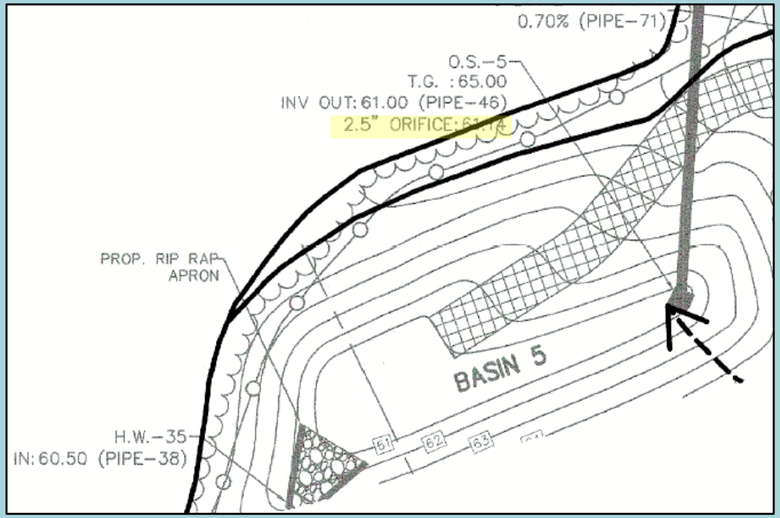
Software Output showing Summary for SSI Basin #1700

Pondpack Output Example

- The plan shows the lowest orifice for this basin at 61.14'.
- Under the failed condition model, the initial water surface elevation of the pond should be shown at 61.14', which it is.

- Infiltration Method should appear as "No Infiltration", which it does.

<u>This basin has been modeled correctly for the failed condition.</u>



Plan showing Basin 5

Subsection: Level Pool Pond Routing Summary
Label: Basin 5 (IN)
Scenario: Post-Development 2019 - 10 Yr

Return Event: 10 years
Storm Event: Adjusted 10yr Ocean County

Infiltration	
Infiltration Method (Computed)	No Infiltration ✓

Initial Conditions	
Elevation (Water Surface, Initial)	61.14 ft ✓
Volume (Initial)	0.014 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.68 ft³/s	Time to Peak (Flow, In)	12.200 hours
Flow (Peak Outlet)	0.16 ft³/s	Time to Peak (Flow, Outlet)	13.650 hours

Elevation (Water Surface, Peak)	62.19 ft
Volume (Peak)	0.054 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.014 ac-ft
Volume (Total Inflow)	0.131 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	0.131 ac-ft
Volume (Retained)	0.014 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Software Output showing Basin 5

OSS (Point of Discharge) Calculation Review

4. Evaluate the calculated flows depending on the condition of the point of discharge.
   - If proposed discharge is to a “No-well defined waterway” condition, you will most likely be using Table 21-1 and the Stability Criteria in pages 21-4 and 21-5.
     - Verify the slope below the point of discharge against Table 21-1 depending on the soil type.

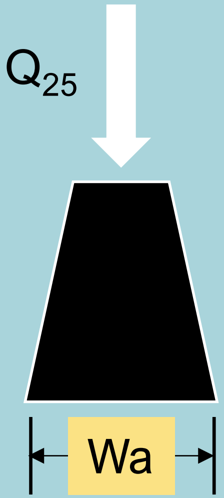
Table 21-1 Non-Erosive Velocities for Point Discharges

Maximum Stable Slope for Point Discharges for Various Soils	
Soil Type	**Perennial, Natural Vegetation**
	Maximum Slope (%)
Sands	1.8
Sandy loam	2.0
Silt loam, loam	2.5
Sandy clay loam	3.5
Clay loam	5.0
Graded loam to gravel	8.0

   - Verify if the peak flow for the 25-year storm failed condition is less than 10 cfs.
   - If multiple outlets are used, verify that they are not within 50’ of each other.

OSS (Point of Discharge) Calculation Review

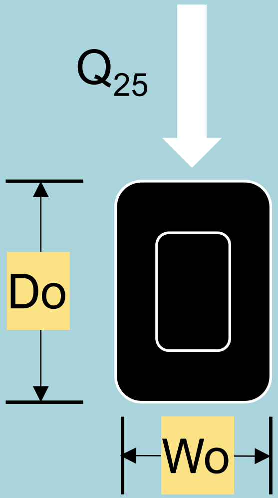
- Verify that flows over the outlet area are less than 0.5 cfs/ft.



CHECK:

$$\frac{Q_{25}}{Wa} < 0.5 \text{ cfs/ft}$$

When Riprap Apron is Used

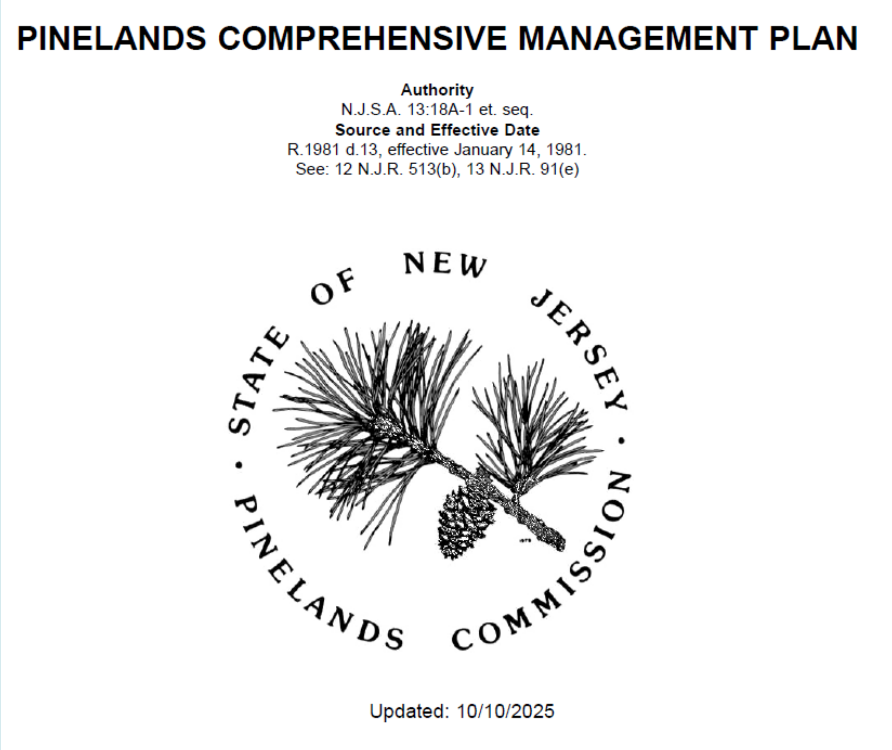


CHECK:

$$\frac{Q_{25}}{2Do + Wo} < 0.5 \text{ cfs/ft}$$

When Scour Hole is Used

Pineland Comprehensive Management Plan


PINELANDS COMPREHENSIVE MANAGEMENT PLAN

Authority
N.J.S.A. 13:18A-1 et. seq.
Source and Effective Date
R.1981 d.13, effective January 14, 1981.
See: 12 N.J.R. 513(b), 13 N.J.R. 91(e)

Updated: 10/10/2025

N.J.A.C. 7:50-6.84

- “There will be no direct discharge into any surface water body”
- Could be in conflict with the Standard for Offsite Stability
- Interpretation of OSS Standard may differ in Pinelands
- Ask if you are unsure!

The applicant said, “I don’t have an erosion problem”

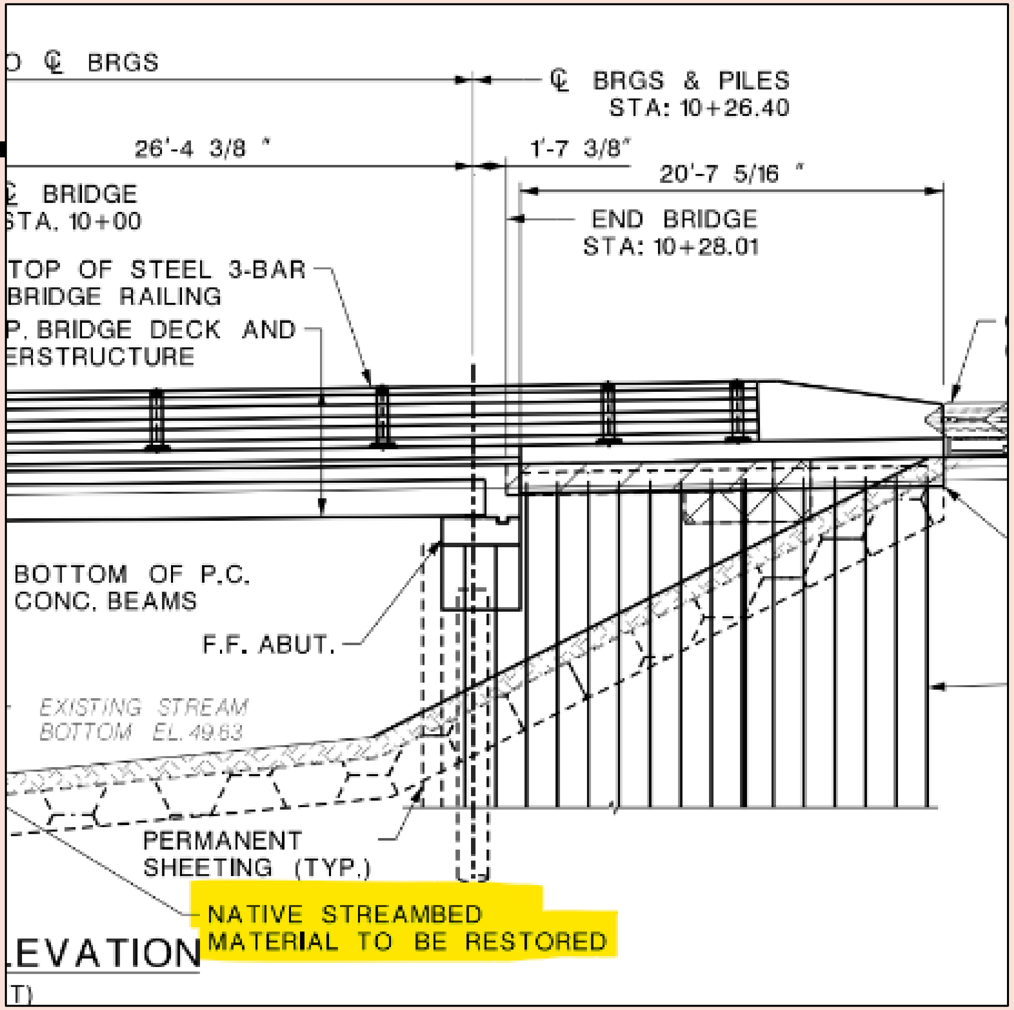
The district staffer said, “Sir, your topsoil just filed a change-of-address form”

Microsoft Copilot

05. Stream Crossing Calculations

29- Stream Crossing

- This standard is commonly applied on bridge replacements and culvert crossing projects.
- "Complex sites requiring bridge scour studies are beyond the scope of this standard."
- During plan review, look for:
  - Is topsoil or native streambed material proposed under the bridge/culvert?
  - Do velocities exceed those listed in Table 11-1?

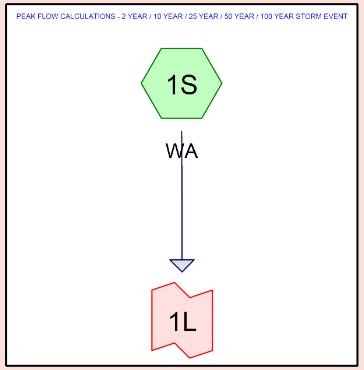


29 – Stream Crossing

- Usually provide a HEC-RAS model for the existing and proposed conditions.
- HEC-RAS model contains stationing that corresponds to the plan, and hydraulic information is provided for each station.
- Most of these projects are designed in accordance with NJDEP requirements at N.J.A.C. 7:13-12.7 (Requirements for a bridge or culvert) and in accordance with the NJDOT Design Manual for Bridges and Structures, which references technical documents of the FHWA.
- We are only concerned with the stability of the stream surface material (anything related to bridge/culvert scour as it pertains to structural integrity is out of the scope of our program).

Example Submission – Bridge Replacement

1. Check their hydrograph routing software to determine the size of the watershed.
   - In this case, 12,543.72 ac = 19.60 sq. mi.



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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
12,543.720	60	Watershed (1S)
12,543.720	**60**	**TOTAL AREA**

   - Since the drainage area is greater than 1 sq. mi., the criteria in p. 11-3 applies.

Channel Stability (drainage area greater than one square mile)

Channels must be stable under conditions existing immediately after construction (as-built condition) and under conditions existing during effective design life (aged condition). Channel stability shall be determined for discharges under these conditions as follows:

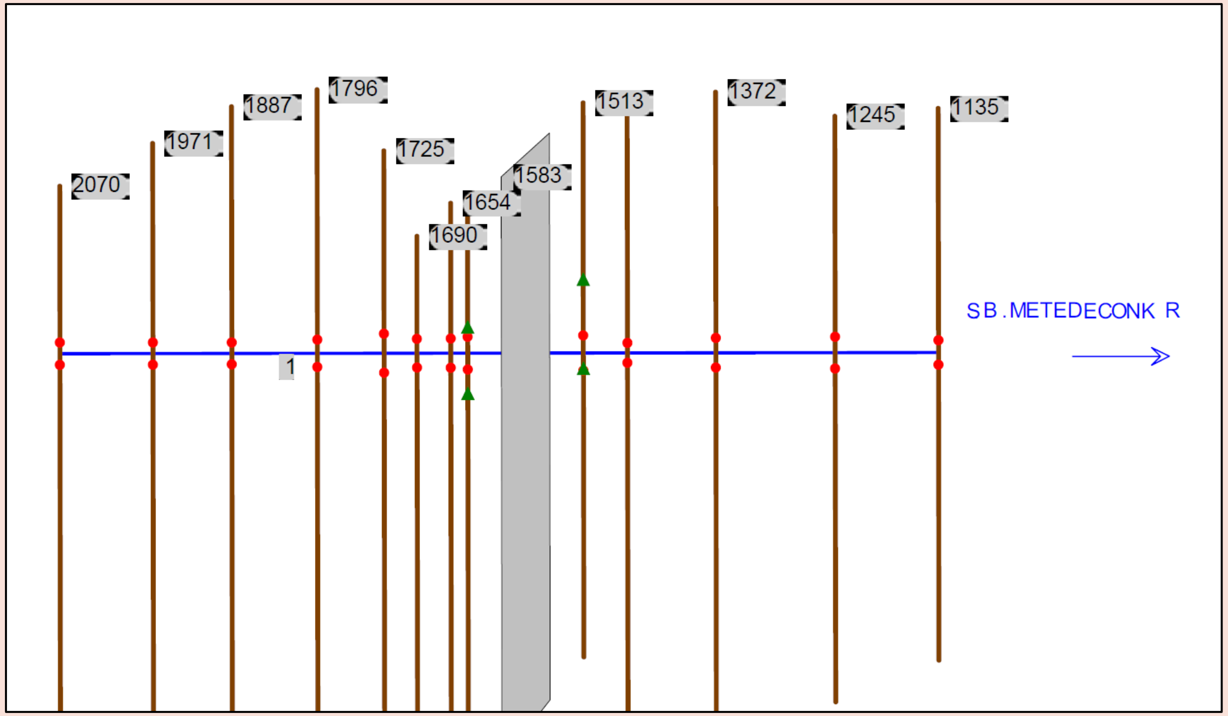
1. As-built condition - Bankfull flow, design discharge, or 10-year frequency flow, whichever is smallest, but not less than 50% of design discharge.

2. Aged condition - Bankfull flow or design discharge, whichever is larger, except that it is not necessary to check stability for discharges greater than the 100-year frequency.

Stability checks are not required if the actual velocity is 1.8 fps or less.

Example Submission – Bridge Replacement

2. Look at their HEC-RAS model stationing plan to identify which sections of the stream to verify. Of greatest concern, it is the stations immediately adjacent to the bridge as these are the areas where in-situ material is being disturbed.
    - In this case, STA 15+13 and STA 16+54.



Example Submission – Bridge Replacement

3. Check their HEC-RAS model for the proposed condition and the 100-year design storm at these locations.

In the below example, we are checking the channel velocity at STA 15+13.

```
RIVER: S.B.METEDECONK R
REACH: 1                    RS: 1513

INPUT
Description: STA 15+13
Station Elevation Data     num=      19
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
  736.62       70   858.45       65   942.23       60   967.46       57    978.5       53
  988.38    52.74   989.54     50.6   995.22       49     1000       49  1015.54       50
 1022.11       51  1026.18    51.61  1027.74       53  1040.59       55   1079.6       55
 1131.19       55  1137.34       56   1174.7       62     1336       70

Manning's n Values         num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
  736.62       .1   988.38     .035  1026.18       .1

Bank Sta: Left    Right    Lengths: Left Channel    Right       Coeff Contr.     Expan.
        988.38 1026.18                 47       47       47                .3         .5
Ineffective Flow       num=       2
   Sta L    Sta R     Elev  Permanent
  736.62   929.74    63.33          F
  1026.3     1336    63.33          F
```

```
CROSS SECTION OUTPUT  Profile #100-YR

  E.G. Elev (ft)               61.56   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                 1.10   Wt. n-Val.                   0.100      0.035      0.100
  W.S. Elev (ft)               60.47   Reach Len. (ft)              47.00      47.00      47.00
  Crit W.S. (ft)               56.61   Flow Area (sq ft)           186.94     398.86       1.06
  E.G. Slope (ft/ft)        0.001929   Area (sq ft)                186.94     398.86     684.00
  Q Total (cfs)              3755.77   Flow (cfs)                  276.13    3477.22       2.42
  Top Width (ft)              230.78   Top Width (ft)               54.00      37.80     138.98
  Vel Total (ft/s)              6.40   Avg. Vel. (ft/s)              1.48       8.72       2.29
  Max Chl Dpth (ft)            11.47   Hydr. Depth (ft)              3.46      10.55       8.80
  Conv. Total (cfs)          85519.7   Conv. (cfs)                 6287.5    79177.1       55.1
  Length Wtd. (ft)             47.00   Wetted Per. (ft)             54.89      39.45       0.16
  Min Ch El (ft)               49.00   Shear (lb/sq ft)              0.41       1.22       0.79
  Alpha                         1.72   Stream Power (lb/ft s)        0.61      10.61       1.81
  Frctn Loss (ft)               0.14   Cum Volume (acre-ft)          1.57       2.52       4.31
  C & E Loss (ft)               0.26   Cum SA (acres)                0.49       0.26       1.55
```

Example Submission – Bridge Replacement

Sometimes a summary table is provided that simplifies the previous step.

In this case, the velocities at STA 16+36 and 15+13 are 7.64 ft/s and 8.72 ft/s, respectively.

TABLE 2

SUMMARY OF VELOCITY IN CHANNEL - STEADY FLOW ANALYSIS

EXISTING VELOCITY

	STREAM SECTION	2 YR.	10 YR.	25 YR	50 YR	100 YR	NJFHA
UPSTREAM	20+70	4.02	5.53	5.96	5.07	6.18	6.98
	19+71	3.76	5.88	6.37	5.23	6.39	7.06
	18+87	4.14	6.08	6.43	5.16	6.32	6.97
	17+96	2.66	3.83	4.25	3.71	4.62	5.43
	17+25	2.13	3.32	3.78	3.41	4.29	5.17
	16+90	3.57	5.09	5.56	4.74	5.96	6.92
	16+54	3.43	4.86	5.33	4.56	5.77	6.93
	16+36	3.20	4.65	5.66	5.66	6.19	7.24
EX & PRO BRIDGE	15+83						
	15+13	2.83	4.62	5.9	6.81	8.72	13.59
	14+66	5.57	8.14	10.19	12.79	13.26	14.28
	13+72	2.98	5.26	6.46	7.34	8.33	10.06
	12+45	4.74	6.24	7.05	7.7	8.52	10.25
DOWNSTREAM	11+35	5.49	8.25	9.61	10.55	11.58	13.33

PROPOSED VELOCITY

STREAM SECTION	2 YR.	10 YR.	25 YR	50 YR	100 YR	NJFHA
20+70	4.05	5.55	6.01	6.09	6.23	7.14
19+71	3.78	5.89	6.43	6.42	6.45	7.24
18+87	4.18	6.10	6.50	6.40	6.38	7.15
17+96	2.68	3.84	4.28	4.44	4.66	5.54
17+25	2.14	3.32	3.81	4.03	4.32	5.28
16+90	3.61	5.11	5.61	5.76	6.01	7.10
16+54	3.47	4.87	5.38	5.54	5.82	7.08
16+36	3.25	4.66	5.71	6.49	7.64	7.43
15+83						
15+13	2.83	4.62	5.90	6.81	8.72	13.59
14+66	5.57	8.14	10.19	12.79	13.26	14.28
13+72	2.98	5.26	6.46	7.34	8.33	10.06
12+45	4.74	6.24	7.05	7.70	8.52	10.25
11+35	5.49	8.25	9.61	10.55	11.58	13.33

CHANGE IN VELOCITY

STREAM SECTION	2 YR.	10 YR.	25 YR	50 YR	100 YR	NJFHA
20+70	0.03	0.02	0.05	1.02	0.05	0.16
19+71	0.02	0.01	0.06	1.19	0.06	0.18
18+87	0.04	0.02	0.07	1.24	0.06	0.18
17+96	0.02	0.01	0.03	0.73	0.04	0.11
17+25	0.01	0.00	0.03	0.62	0.03	0.11
16+90	0.04	0.02	0.05	1.02	0.05	0.18
16+54	0.04	0.01	0.05	0.98	0.05	0.15
16+36	0.05	0.01	0.05	0.83	1.45	0.19
15+83						
15+13	0.00	0.00	0.00	0.00	0.00	0.00
14+66	0.00	0.00	0.00	0.00	0.00	0.00
13+72	0.00	0.00	0.00	0.00	0.00	0.00
12+45	0.00	0.00	0.00	0.00	0.00	0.00
11+35	0.00	0.00	0.00	0.00	0.00	0.00

Example Submission – Bridge Replacement

4. Check the velocities in the channel against its corresponding soil type in Table 11-1.

    - In this case, the soil texture for the channel was characterized as silty clay.

    - The calculated velocity for the proposed condition exceeds 4.0 ft/s. The following comment was issued:

        “The HEC-RAS model indicates an expected velocity that exceeds the allowable velocity for the streambed soil type per Table 11-1 of the Standard for Channel Stabilization. As such, the disturbed portion of the streambed should be lined with an erosion resistant material such as riprap. The lining shall extend along the banks to the design storm elevation.”

Table 11-1
Allowable velocity for various soil textures

SOIL TEXTURE	ALLOWABLE VELOCITY ft./sec.
Sand	1.8
Sandy loam	2.5
Silt loam, loam	3.0
Sandy clay loam	3.5
Clay loam	4.0
Clay, fine gravel, graded loam to gravel	5.0
Cobbles	5.5
Shale (non weathered shale)	6.0

A hydraulic engineer that could not swim determined that the average depth of a river was 3.57 feet.

He tried to wade across and drowned.

https://collaborate.asce.org/professionaltopics/discussion/civil-engineering-jokes

Photo credit: Kelly Doyle

06. Common Issues

Designer states OSS Standard is satisfied because they use COP.

SPOILER ALERT:

CONDUIT OUTLET PROTECTION

≠

OFF-SITE STABILITY

COMMENT:

"The Standard for Conduit Outlet Protection and the Standard for Off-site Stability have two different sets of requirements. In addition to the Conduit Outlet Protection provided, demonstrate satisfaction of the Standard for Off-site Stability; refer to p. 21-1 of the Standards."

Designer states OSS Standard is satisfied because they met the Downstream reductions.

- **Spoiler #2: Stormwater Quantity Reductions ≠ Point of Discharge Standards**

- Engineers claim OSS Standard is satisfied because they met the 2- and 10-year reductions that are part of the "Downstream" requirements

- The Standard for OSS is made up of **two** components:
  - Point of Discharge
  - Downstream (of the Point of Discharge)

- **BOTH have to be satisfied.**

Standards for Soil Erosion and Sediment Control in New Jersey *January 2014*

Point of Discharge Stability Analysis

When infiltration practices are proposed, an alternate analysis (failure analysis) must be provided which ignores infiltration (no dead storage volume available, no static or dynamic infiltration loss rates in the routing calculations, etc) and demonstrates that no erosion will occur at the point of discharge if infiltration fails to function. Flow rates based solely upon basin inlet and outlet hydraulics must be used in comparison to Table 21-1 (below) to document a stable outlet.

Downstream (off-site) Stability Analysis.

Infiltration may be used to meet peak flow reduction requirements (outlined below) for the purposes of documenting stability of the downstream receiving channel, provided that the complete loss of infiltration function does not result in an increase in peak flow values above the predevelopment levels.

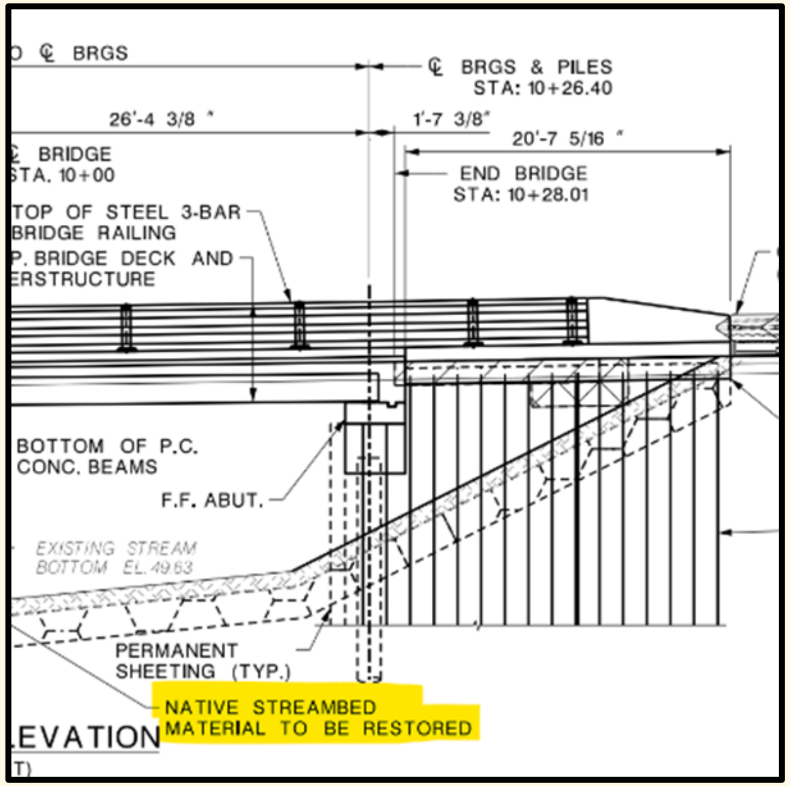
A generalized procedure for assessing point and offsite stability is depicted in figure 21-1:

Native Substrate Proposed in Culvert or Under a Bridge

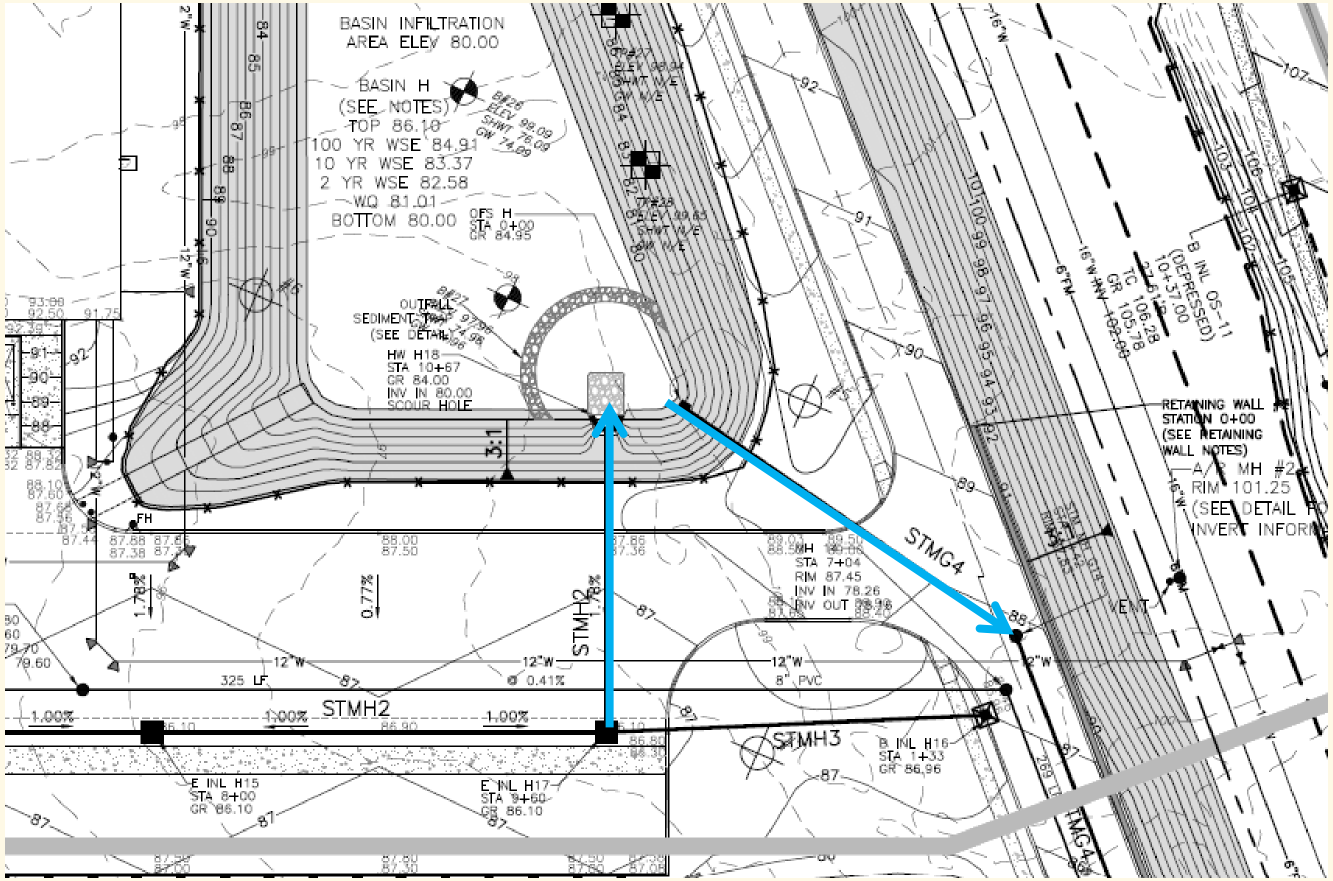
- Check velocity against Table 11-1.
- If velocity exceeds the max velocity in Table 11-1, additional stabilization measures are needed.

COMMENT:

"The model indicates an expected velocity that exceeds the allowable velocity for the streambed soil type per Table 11-1 of the Standard for Channel Stabilization. The disturbed portion of the streambed should be lined with an erosion resistant material such as riprap. The lining should extend along the banks to the design storm elevation."



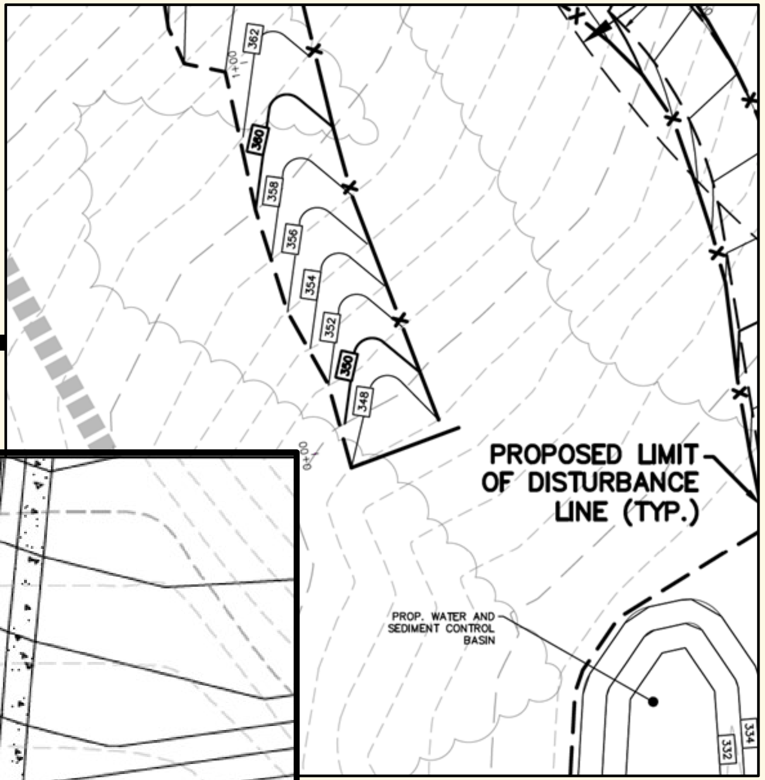
Ineffective Length of Sediment Basin

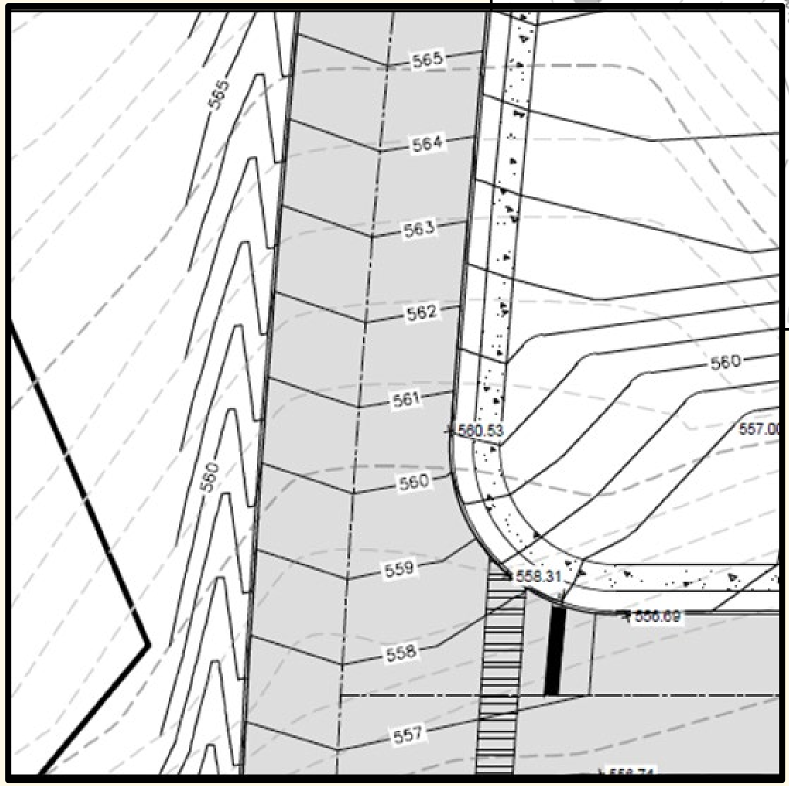


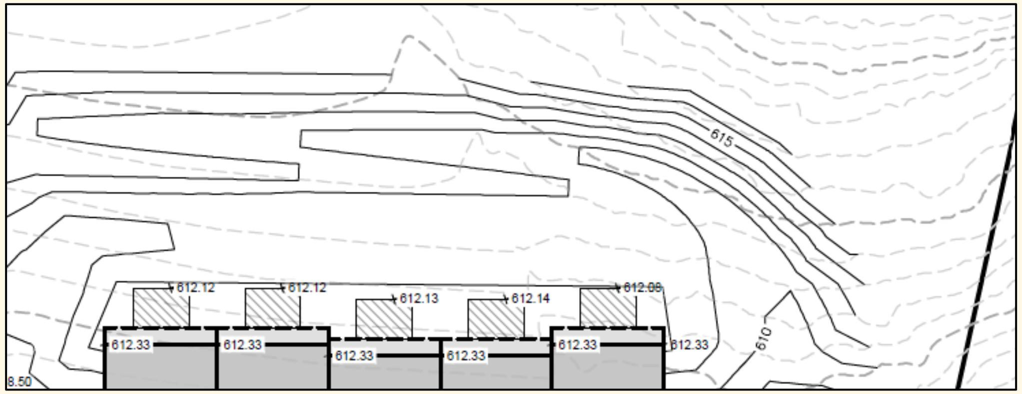
COMMENT: “*Outlet structure is located very close to an inlet pipe within the sediment basin. Demonstrate that the Standard for Sediment Basins has been met for shape and depth for all proposed sediment basins. Baffles may be used to meet shape requirements; refer to p. 24-2 of the Standards.*”

Insufficient Swale Design

- No supporting calculations for capacity
- No velocity checks
- Not evaluated for OSS
- *Swale must be designed to meet:*
  - *Standard for Grassed Waterways*
  - *Standard for Offsite Stability*
  - *Standard for Slope Protection Structures*







Mannings Equation for Open Channel Flow

$$Q = VA = \left(\frac{1.49}{n}\right) A R^{\frac{2}{3}} \sqrt{S} \quad [\text{U.S.}]$$

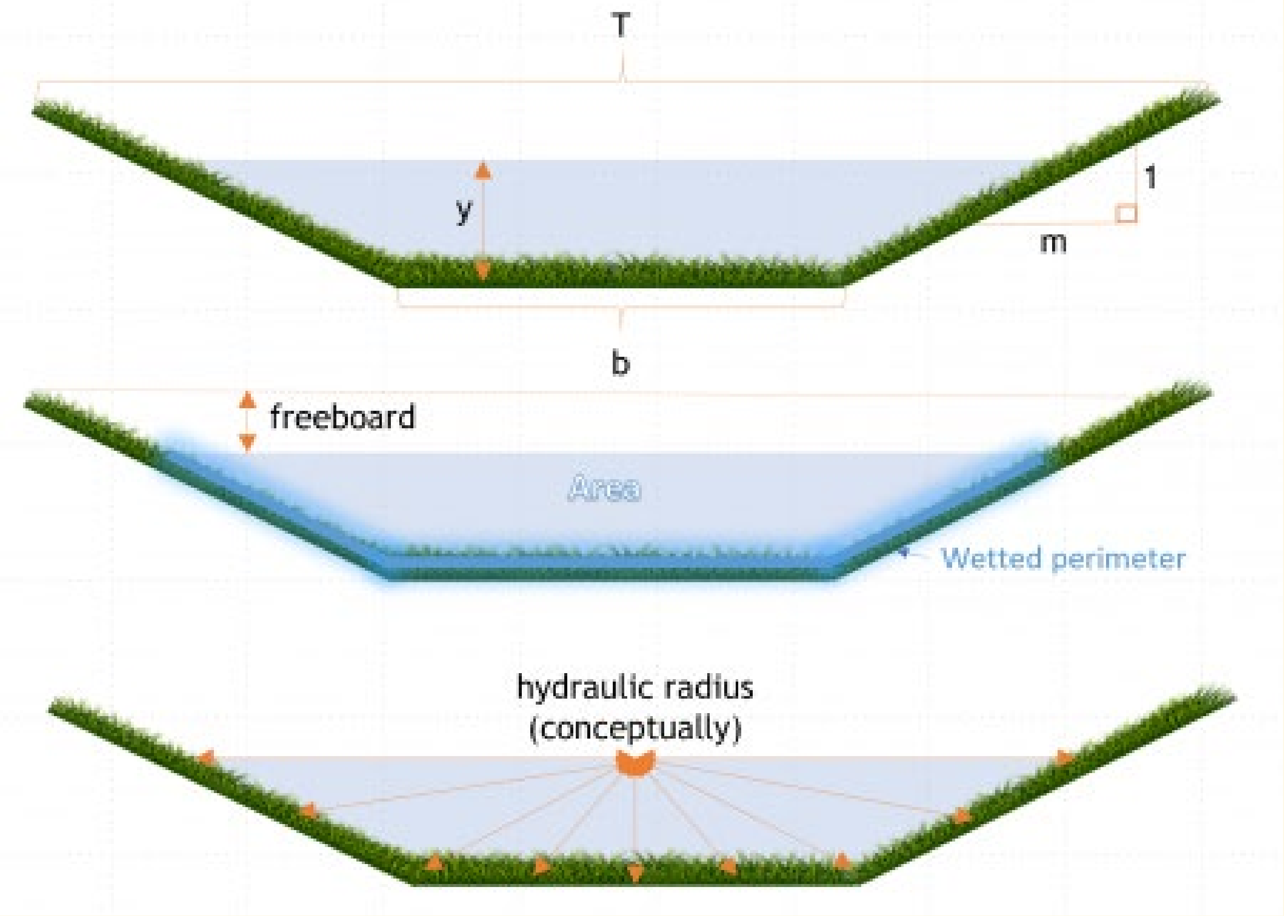
$$R = A/P$$

- Q = flow (cfs)
- V = velocity (fps)
- A = area of flow (sf)
- n = Manning's roughness coefficient
- R = hydraulic radius (ft)
- S = channel slope (ft/ft)
- P = wetted perimeter (ft)

Applicable in

- Standard for Grassed Waterways
- Standard for Lined Waterways
- Standard for Riprap
- Standard for Soil Bioengineering
- Standard for Subsurface Drainage

https://wiki.sustainabletechnologies.ca/wiki/Flow_in_a_swale



Typical Mannings “n” Values

- Larger “n” = rougher surface (lower velocity)
- Smaller “n” = smoother surface (higher velocity)
- Tables easy to find online

Manning's n for Channels (Chow, 1959).

Type of Channel and Description	Minimum	Normal	Maximum
Natural streams - minor streams (top width at floodstage < 100 ft)			
1. Main Channels			
a. clean, straight, full stage, no rifts or deep pools	0.025	0.030	0.033
b. same as above, but more stones and weeds	0.030	0.035	0.040
c. clean, winding, some pools and shoals	0.033	0.040	0.045
d. same as above, but some weeds and stones	0.035	0.045	0.050
e. same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055
f. same as "d" with more stones	0.045	0.050	0.060
g. sluggish reaches, weedy, deep pools	0.050	0.070	0.080
h. very weedy reaches, deep pools, or floodways with heavy stand of timber and underbrush	0.075	0.100	0.150

5. Lined or Constructed Channels			
a. Cement			
1. neat surface	0.010	0.011	0.013
2. mortar	0.011	0.013	0.015
b. Wood			
1. planed, untreated	0.010	0.012	0.014
2. planed, creosoted	0.011	0.012	0.015
3. unplaned	0.011	0.013	0.015
4. plank with battens	0.012	0.015	0.018
5. lined with roofing paper	0.010	0.014	0.017
h. Dressed ashlar/stone paving	0.013	0.015	0.017
i. Asphalt			
1. smooth	0.013	0.013	
2. rough	0.016	0.016	
j. Vegetal lining	0.030		0.500

What is an open channel's favorite dance move? The Hydraulic Jump (when Fr = 1)

Subcritical Flow and Supercritical Flow

- Subcritical flow
  - Slow moving, deep water (stable!)
- Supercritical flow
  - Fast moving, shallow water (erosive!)

$$Fr = \frac{V}{\sqrt{gD}}$$

- Fr = Froude number (dimensionless)
- V = velocity (fps)
- g = acceleration due to gravity (32.2 fps^2)
- D = hydraulic depth (ft)
- D = cross sectional area / top width

IN THE STANDARDS:

Fr < 0.90 (Subcritical flow)

https://www.openchannelflow.com/blog/supercritical-flows-and-parshall-flumes

Grassed Waterway Design Issues

Worksheet for Trapezoidal Channel - Swale 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.050
Channel Slope	0.080 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	2.00 ft
Discharge	2.54 cfs

Results

Normal Depth	3.6 in
Flow Area	0.8 ft²
Wetted Perimeter	3.6 ft
Hydraulic Radius	2.7 in
Top Width	3.48 ft
Critical Depth	3.8 in
Critical Slope	0.061 ft/ft
Velocity	3.12 ft/s
Velocity Head	0.15 ft
Specific Energy	0.45 ft
Froude Number	1.139
Flow Type	Supercritical

No supporting design calcs for vegetative retardance/Mannings "n"

Velocity above max for site soils

Fr> 0.90 supercritical flow

COMMENT:

"The grassed swale must be designed in accordance with the procedure listed in the Standard for Grassed Waterways which accounts for vegetative retardance."

Concentrated Flow Down a Slope

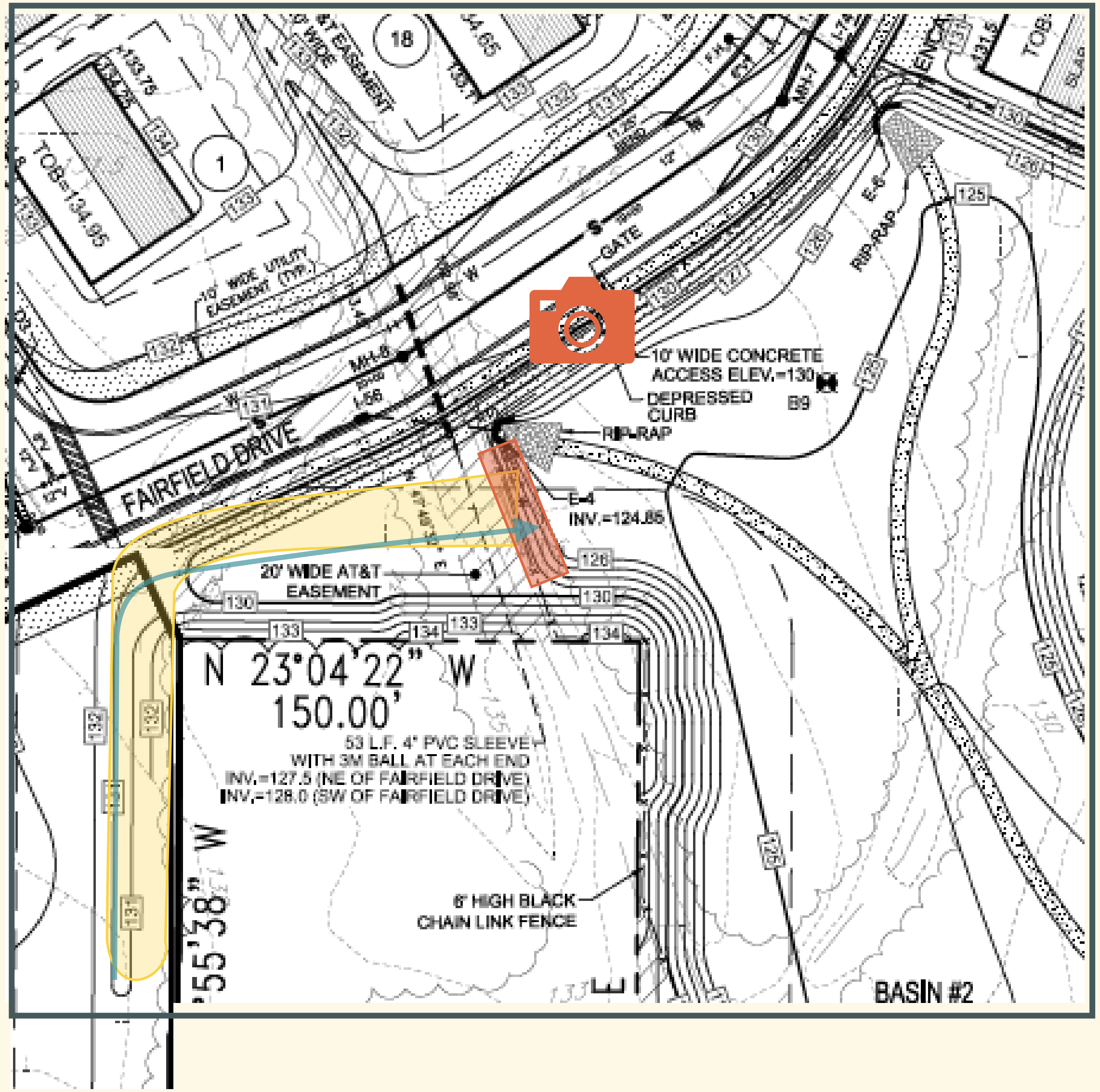
A swale is proposed but ends above a basin.

COMMENT:

"Provide a means to safely convey concentrated surface runoff from the top of the basin slope to the bottom of the basin. Refer to the Standard for Slope Protection Structures."

Photo credit: Kelly Doyle

Plan


10' WIDE CONCRETE ACCESS ELEV.=130
DEPRESSED CURB
B9
RIP-RAP
E-4
INV.=124.85
20' WIDE AT&T EASEMENT
FAIRFIELD DRIVE
10' WIDE UTILITY EASEMENT (TYP.)
MH-8
GATE
E-6
N 23°04'22" W
150.00'
53 L.F. 4" PVC SLEEVE WITH 3M BALL AT EACH END
INV.=127.5 (NE OF FAIRFIELD DRIVE)
INV.=128.0 (SW OF FAIRFIELD DRIVE)
6' HIGH BLACK CHAIN LINK FENCE
BASIN #2

Field

Offsite erosion impacts are like gossip

It starts small, travels fast, and soon the whole watershed knows

07. Summary: Completing a Chapter 251 Plan Review

Writing the Review Letter

DO NOT

- Tell the engineer how to design the project
- Make design decisions
- Give explicit values or text to use
- Include comments outside of SESC Standards

DO

- Reference specific standards
- Point out where proposed values seem wrong
- Ask for clarification/calculations
- Reach out to us for help

Photo credit: Kelly Doyle

Prioritizing Comments

- Project-stopping comments first
- Comments needing clarity second
- Incidental comments last

X Comments about issues outside the Standards

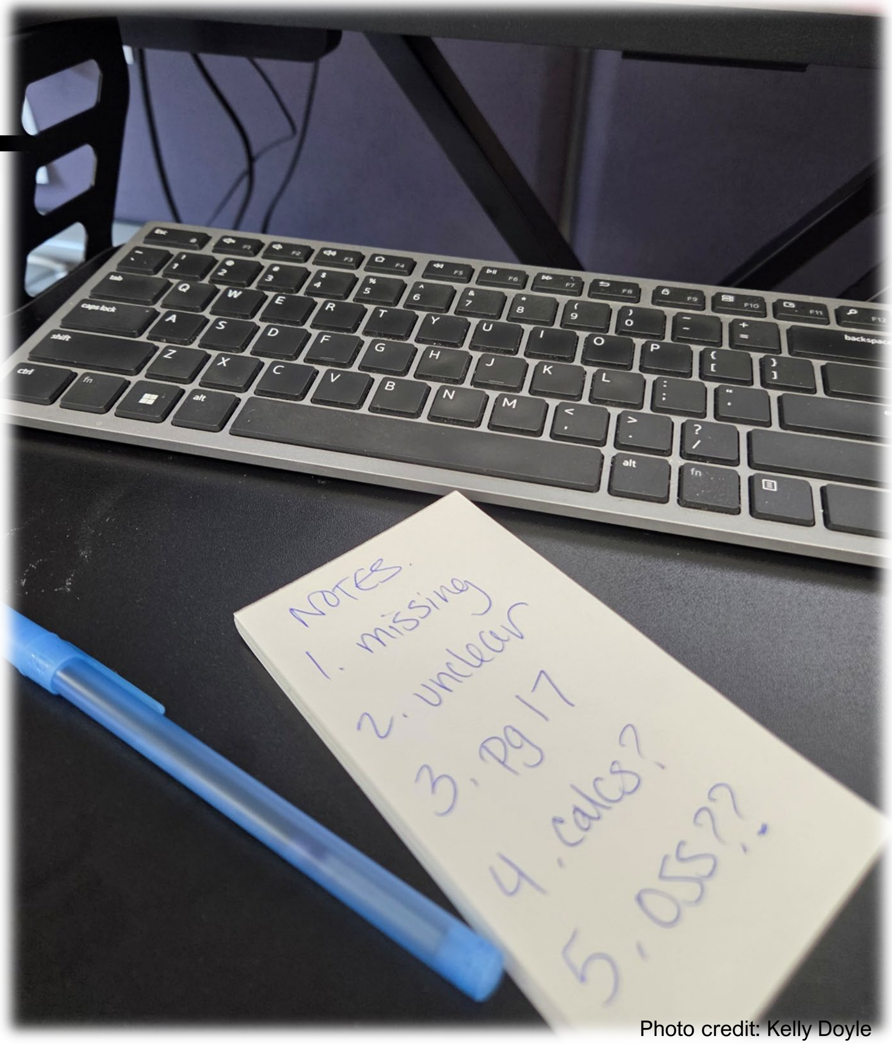


Photo credit: Kelly Doyle

When to Recommend Denial

- Plan is grossly insufficient
- Applicant is unwilling to make requested modifications after multiple attempts

X No hydrologic analysis

X No pre-post conditions

X No stormwater management

X No construction sequence

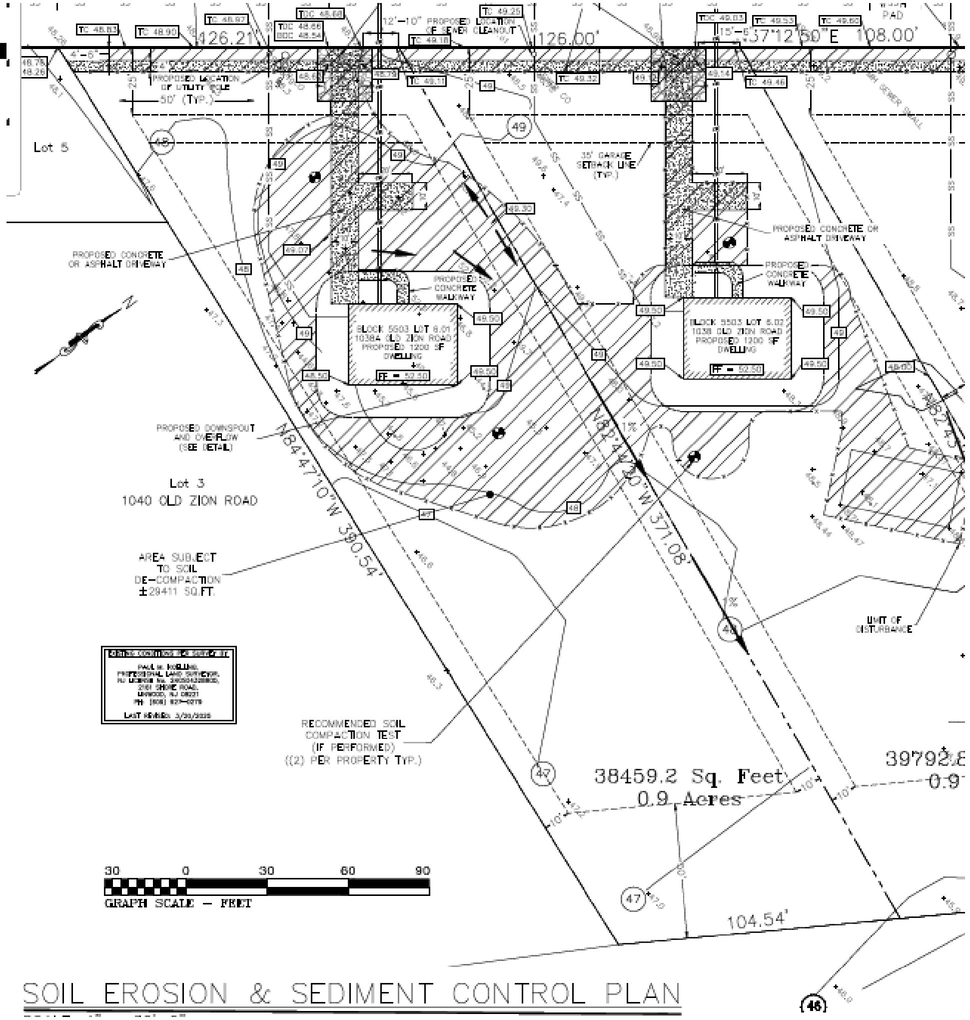
X No stockpiles

X No HSG or soils info

X No OSS

X Arguing

X Refusal to make modifications



During the Review:

Find a workflow that works for you.

Everyone will review plans differently.

Think critically about the project.

Ask, “Does this pose a major threat for erosion?”

Trust your gut if something doesn’t seem right.

Ask us if you are unsure.

Place an extra emphasis on the Standard for Off-site Stability.

It is that important.

At the end of the day when you think you've done all that you can, take comfort in the thought…someone else, somewhere else has messed up worse than you.

- John Showler, PE (retired State Erosion Control Engineer)

Why did the soil particles get divorced?

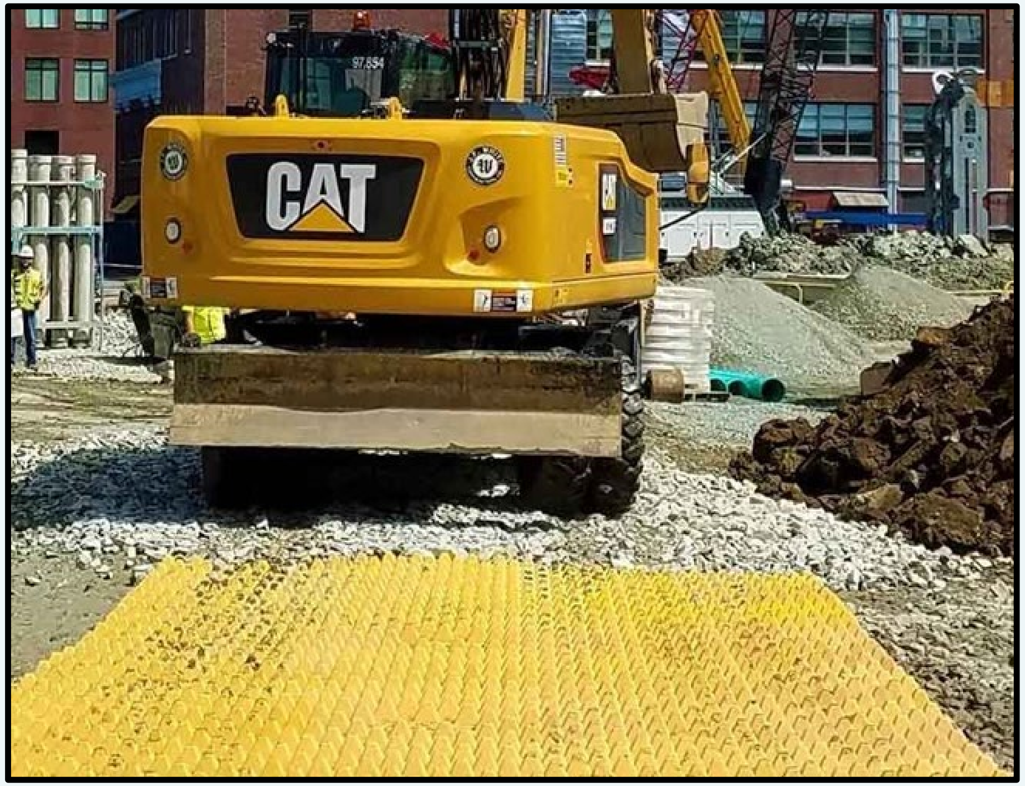
Because their relationship eroded

08. Frequently Asked Questions and Scenarios

Alternate Products

- **Can Trackout Control Mats such as FODS (Foreign Object Debris System) be used as a stabilized construction access?**

- GUIDANCE: Refer applicant to the procedure for new/alternative products section in the Standards.



https://getfods.com/industries/urban-construction

Photo credit: Nick Chaballa

Sediment Basins

- **Are sediment basins required?**

- Sediment basins are NOT a requirement; however, limitations to other measures make it so that sediment basins are the most practical solution, especially on sites with significant grading and land clearing operations.

- As an example, the Standard for Sediment Barrier states it is to be used "where no other practice is feasible." This is in addition to the limitations on contributing drainage area, slope, etc.

Conditions Where Practice Applies

The sediment barrier is used where:

1. No other practice is feasible,

Photo credit: Nick Lund

"This practice applies where physical conditions, land ownership, or construction activities preclude the treatment of the sediment source by the installation of or erosion control measures to keep soil and other material in place, or a sediment basin offers the most practical solution to the problem."

- p. 24-1 and 24-2 of the Standard for Sediment Basins

Photo credit: Nick Chaballa

- If sediment basins are omitted on a large site, then the District should expect to see the designer make use of:
  - The Standards for Diversions
  - The Standard for Slope Protection Structures
  - The Standard for Sediment Barriers
  - Interim grading plans (N.J.A.C. 2:90 - 1.9;m)
  - Detailed sequence of construction that minimizes exposed surfaces (N.J.A.C. 2:90- 1.9;l)

Photo credit: Nick Chaballa

- Food for thought...

State	Sediment Trap[1]	Sediment Basin
New Jersey	NA	< 320 acres
Pennsylvania	< 5 acres	> 5 acres
Delaware	< 15 acres	< 100 acres
Virginia	< 3 acres	< 100 acres
Maryland	< 10 acres	< 100 acres

[1] In some States, the drainage area requirement varies depending on the outlet type.

Re-certification of Old Projects

- **When should older projects follow the latest version of the Standards?**

- Projects being re-certified ***without*** revisions should NOT be "re-reviewed", regardless of the year they were first certified

- Older, certified projects **can** be held to the latest version of the Standards when:
    - Major revisions are proposed
    - Signs of erosion warrant revisions to the certified plan

Photo credit: Nick Lund

"Revisions to the certified plan shall be submitted to the district for reevaluation and certification prior to implementation of the change. ***Such changes shall be in accordance with the standards in effect on the date that revisions to the plan are being submitted to the district."***

- N.J.A.C. 2:90 – 1.10b

Discharge to Existing Outfall

- **If the project discharges to an existing outfall, is the designer expected to improve the condition of the existing outfall?**

- "Improvements" refer to:
  - Re-construction of outfall
  - Installation of conduit outlet protection

- **GUIDANCE: If the discharge to the existing outfall is less than or equal to the flow rate of the pre-developed condition, then the designer is not expected to improve it.**

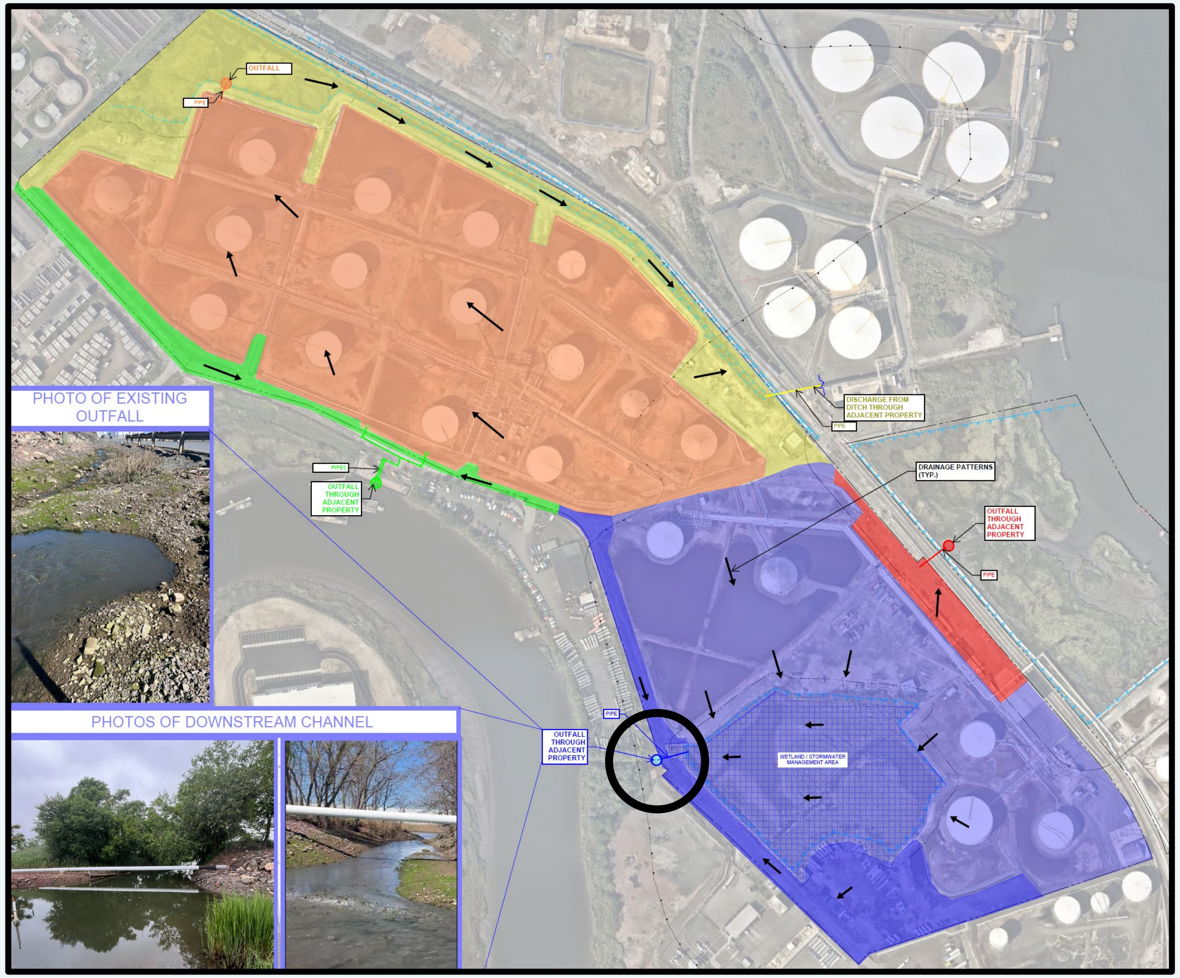
EXAMPLE: A landlocked project was proposing to tie into existing storm infrastructure. The existing storm infrastructure discharged on the neighboring properties.

- The engineer requested a pre-application meeting with the District. NJDA attended at the District’s request.

- There was concern at one outfall, where the neighboring owner did not want to allow access to their property.

- The engineer provided a comparative analysis of the pre- and post-development drainage areas to each outfall along with estimated flows.

- Because the proposed flows did not exceed the pre-development flows, the engineer was not required to improve the condition at the outfall.

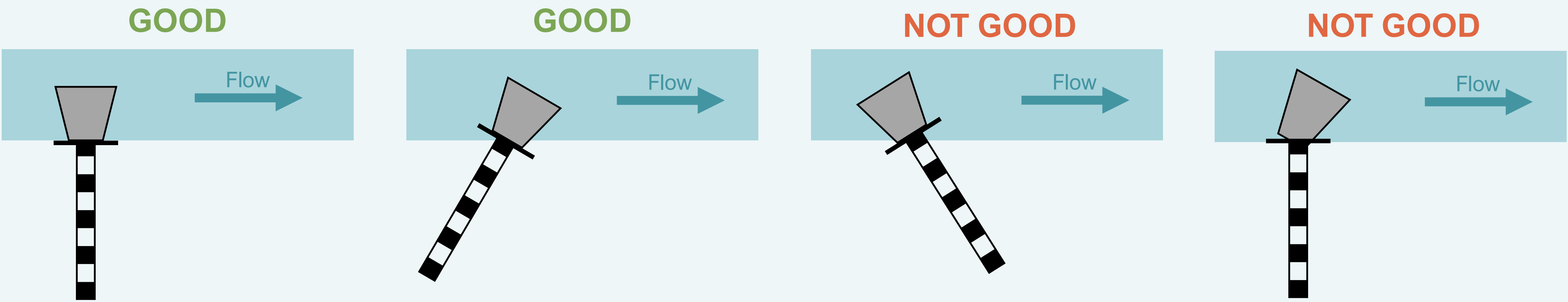


Pre-development Drainage Areas

Post-development Drainage Areas

Angled Discharge

- Can pipes discharge at an angle into receiving waterways?
- Angled pipe discharge into ditches/waterways is acceptable so long as it is in the direction of the flow of the waterway.



Why did the soil go to its friend's house?

It had a clay date

Photo credit: Kelly Doyle

09. Agricultural Projects

Ag Exemption from the SESC Act

"Project" means any disturbance of more than 5,000 square feet of the surface area of land

- (1) for the accommodation of construction for which the State Uniform Construction Code would require a construction permit, except that the construction of a single-family dwelling unit shall not be deemed a "project" under this act unless such unit is part of a proposed subdivision, site plan, conditional use, zoning variance, planned development or construction permit application involving two or more such single family dwelling units,
- (2) for the demolition of one or more structures,
- (3) for the construction of a parking lot,
- (4) for the construction of a public facility,
- (5) for the operation of any mining or quarrying activity, or
- (6) for the clearing or grading of any land for other than agricultural or horticultural purposes.

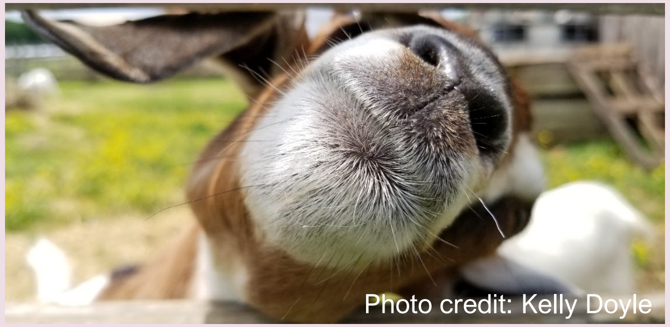


Photo credit: Kelly Doyle

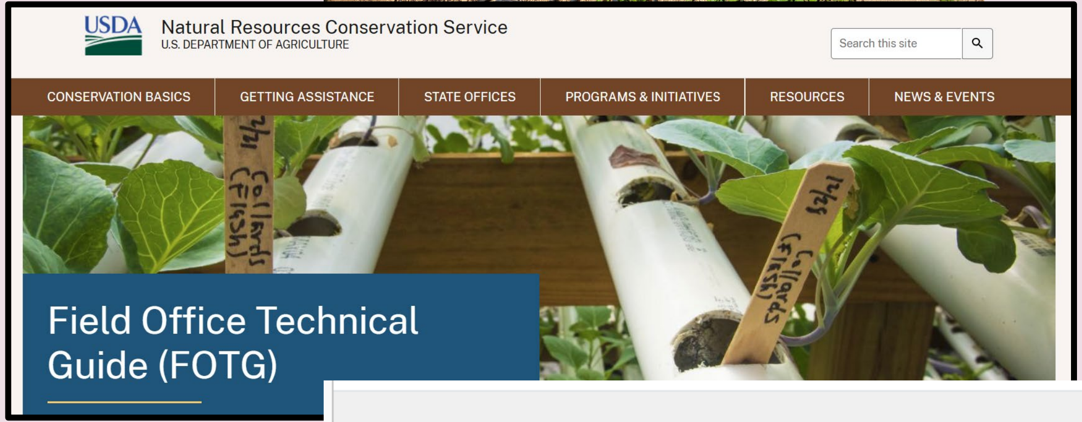
Farm Conservation Plan following eFOTG Standards

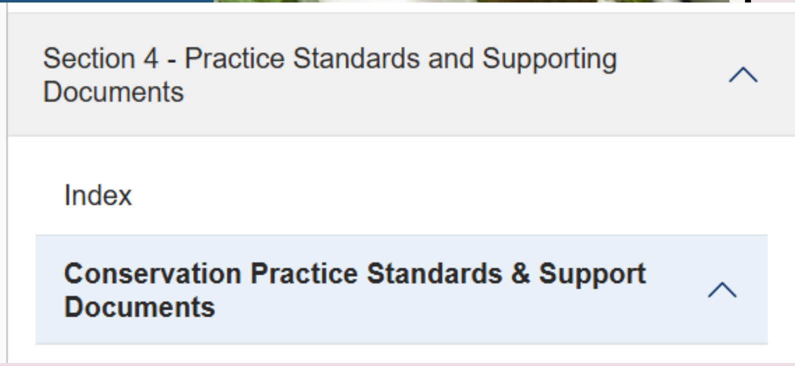
NRCS Projects & Ch. 251

- Is there a farm conservation plan? Yes
- Are all the proposed practices found in the eFOTG? Yes

✓ A Ch. 251 Plan is NOT required

- (e.g. diversions, stone-lined waterway, high tunnels)





- Is the conservation plan limited in scope or missing? Yes
- Is work proposed that is not in the eFOTG? Yes
- Is the project larger than 5,000 sf? Yes

X A Ch. 251 Plan IS required and must follow the Standards

- (e.g. barn, riding arena, farmhouse, greenhouse)

N.J.A.C. 7:8-5.2 (k) Ag Stormwater

Photo credit: Kelly Doyle

- **Any application for a new agricultural development** that meets the definition of major development at N.J.A.C. 7:8-1.2 **shall be submitted to the Soil Conservation District for review** and approval in accordance with the requirements at N.J.A.C. 7:8-5.4 and 5.6 and any applicable Soil Conservation District guidelines for stormwater runoff quantity and erosion control.
- For purposes of this section, **"agricultural development"** means land uses normally associated with the **production of food, fiber, and livestock for sale.** Such uses do not include the development of land for the processing or sale of food and the manufacture of agriculturally related products.
- In the case of **development on agricultural land**, development means: any activity that **requires a State permit**; any activity reviewed by the County Agricultural Boards (CAB) and the State Agricultural Development Committee (SADC), and **municipal review of any activity** not exempted by the Right to Farm Act, N.J.S.A. 4:1C-1 et seq.

Ag Projects Needing Stormwater Review

- Buildings:
  - Barns
  - Greenhouses
  - Farm markets
  - Equine arenas
  - Residential buildings
- Motor vehicle surfaces:
  - Driveways
  - Parking areas
- Other
  - Tents
  - Solar panels

Photo credit: Kelly Doyle

Ag Projects NOT Needing Stormwater Review

- Terraces
- Diversions
- Hoop houses
- Tillage
- Farm lanes
- Geotextile

Photo credit: Kelly Doyle

"Major Development" Thresholds

Photo credit: Kelly Doyle

1. Disturbance of 1 or more acres of land since 2004.
2. Creation of ¼ acre or more of regulated impervious surface since 2004.
3. Creation of ¼ acre or more of regulated motor vehicle surface since 2021.
4. Reconstruction of ¼ acre or more of motor vehicle surface or impervious surface since 2026.
5. Combination of 2-4 totaling more than ¼ acre.

NJDEP
Rule Proposal Notice

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

WATERSHED AND LAND MANAGEMENT

Public Notice of Proposal to Extend the Resilient Environment and Landscapes (REAL) Rules Legacy Period

I was going to make a joke about Acid Sulfate Soils

But it was too dirty

10. How to Get Help from the Engineers

When to request assistance from NJDA staff?

Chapter 251

- General, non-project specific questions are always welcome
- Project specific questions: after District staff has done most of review and question cannot be answered internally

Agricultural Development SWM Review 7:8

- Project meets thresholds for major development and the SWM Rules apply, then District should submit a "Request for Assistance" form to NJDA

Ag Stormwater Review

NJDA- SSCC Request for Assistance for Stormwater Plan Review for Agricultural Development

The ______________________________ Soil Conservation District is hereby requesting assistance from the New Jersey Department of Agriculture- State Soil Conservation Committee (Committee) in the review of engineering designs prepared in compliance with N.J.A.C. 7:8-5.4(b), requiring agricultural development which meets the criteria of major development at N.J.A.C. 7:8-1.2 to prepare a stormwater management plan for submission to and approval by the local soil conservation district.

This request is authorized by N.J.S.A. 4:24-6(b) which empowers the Committee to offer assistance to District Supervisors as may be appropriate in the carrying out of any of their powers and programs.

- Who should send the form?
  - District Manager
- Who should it be sent to?
  - The State Erosion Control Engineers
  - CC: Frank Minch
- What info is needed?
  - Request for Assistance form
  - Stormwater Report
  - Planset

- Unless buildings and development are specifically covered by a Conservation Plan, Ch. 251 review may also be required – to be completed by the District

When Requesting Assistance, Please Include:

- Project name in the subject line
- Due date
- Brief history of the project
  - First date of submittal
  - Prior approvals
  - What changed in the design
- Electronic copies of stormwater report and engineering plans
- Specific questions
- Comments that you have already drafted


Photo credit: Kelly Doyle

When Requesting Assistance, PLEASE:

- GIVE US TIME (more than 1 day!)
- Context
- History
- More than a photo of a corner of a dark, wrinkled planset

THANK YOU!

What do rocks say when they agree with one another?

My sediments exactly.