

Kimley»»Horn

Willow Lake Dam and Spillway Rehabilitation Project
Sugarland Run HOA Board Meeting
Wednesday, August 17th, 2022



Presentation Outline

- Willow Lake Dam Existing Conditions and Deficiencies
- Dam and Spillway Rehabilitation Design Overview
- Benefits of the Rehabilitation
- Project Summary
- Questions



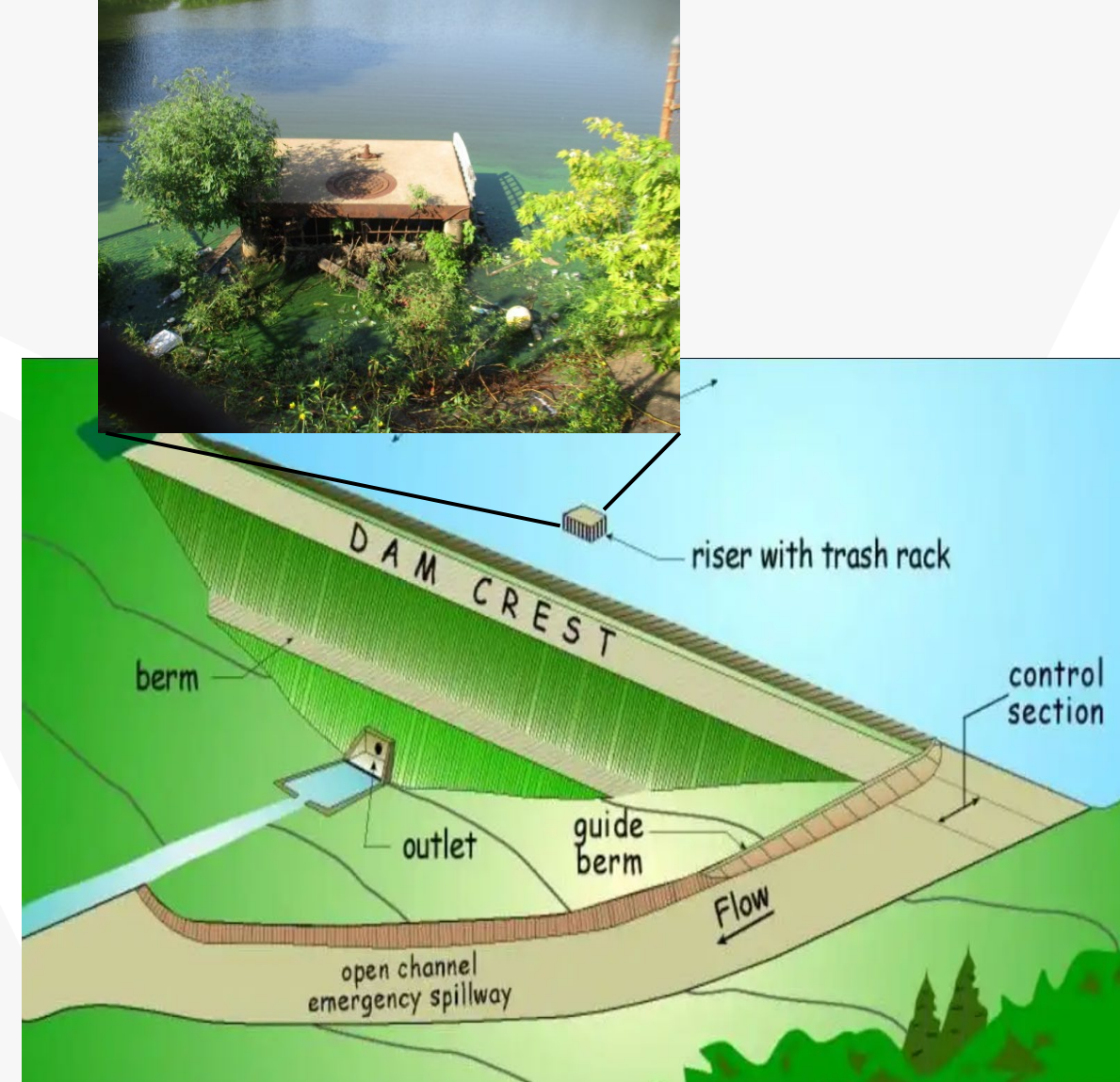
Willow Lake (2022)



Willow Lake Existing Conditions and Deficiencies

What happened to the emergency spillway channel at Willow Lake?

- Based on in-field assessed conditions, sediment and debris stemming from the contributing urban drainage area to the pond, entered the riser structure, partially blocked the flow capacity of the principal spillway pipe (PSP) which caused a rise in normal pool water surface elevation. Because of this, the emergency spillway was enacted consistently with flow which caused the extreme downstream erosion.



Willow Lake Dam Existing Conditions and Deficiencies

- 1.) Dam Overgrown with Vegetation
- 2.) Significant Erosion of Emergency Spillway Receiving Channel
- 3.) Significant Erosion of Principal Spillway Receiving Channel
- 4.) Toe of the dam is undercut and eroding
- 5.) Stormwater Outfall Re-alignment required to assist with dam toe stabilization

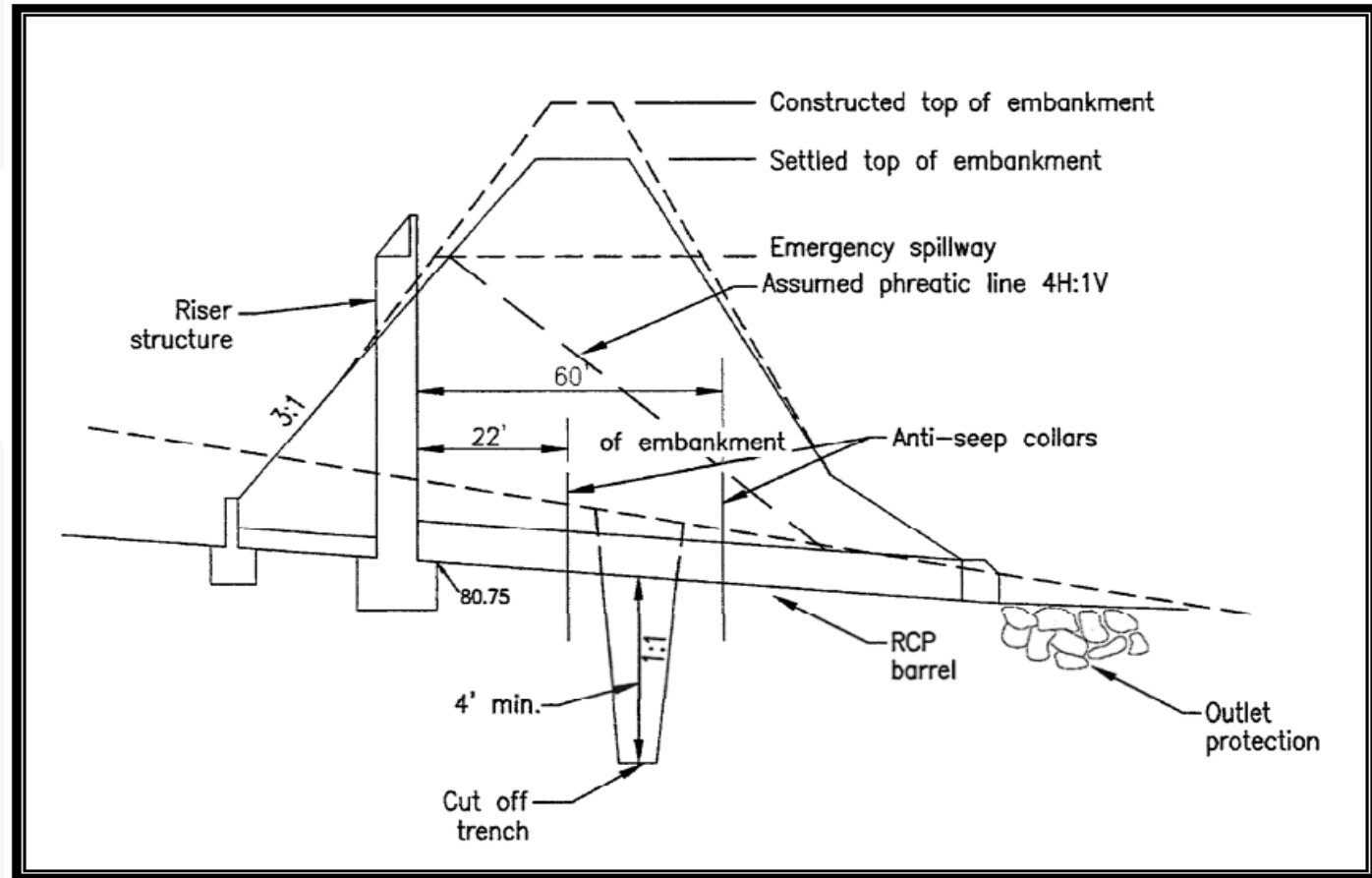


Figure A-3. Profile Along Centerline of Principal Spillway

Willow Lake Dam Existing Conditions



Virginia DCR Dam Safety: “Trees should never be allowed to grow on the embankment fill, at the outlet, plunge pool or spillway area, or within 25 feet beyond the abutment contacts and toe of fill. Any tree on a dam should be removed, its roots grubbed out and dense grass cover established in its place. Deviation from this standard must be based on a critical assessment by a professional engineer who specializes in dams.”

Dam significantly overgrown with vegetation.

Willow Lake Dam Existing Conditions



Significant erosion of the emergency spillway receiving channel.

Willow Lake Dam Existing Conditions



Significant erosion of the principal spillway receiving channel.

Willow Lake Dam Existing Conditions



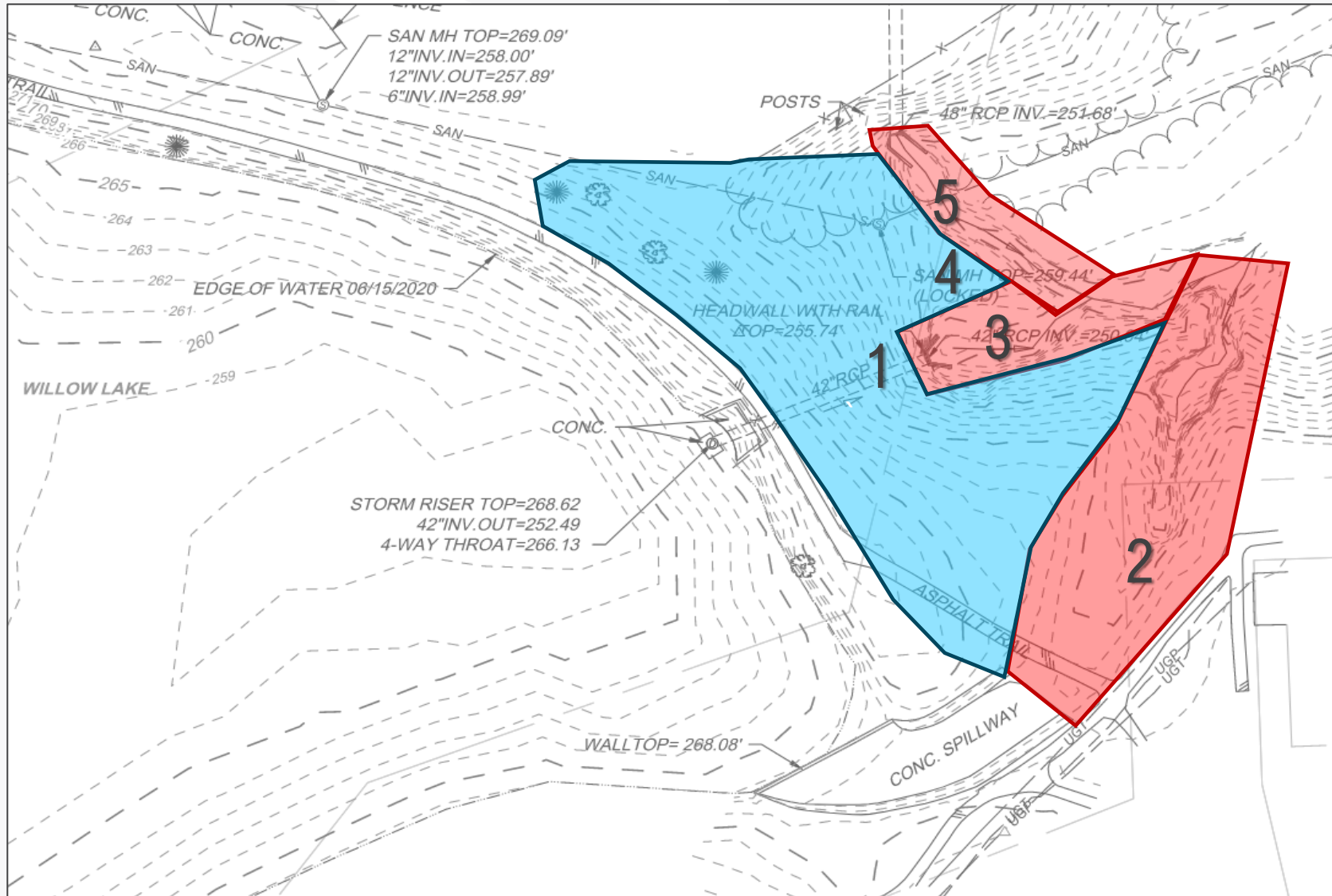
Toe of dam is undercut and eroding.

Willow Lake Dam Existing Conditions



Storm sewer realignment required to aid in erosion control.

Willow Lake Dam Existing Conditions Deficiencies Summary



The summary of existing conditions deficiencies for the Willow Lake Dam are as follows:

1 - Dam is overgrown with vegetation and is eroding near the principal spillway end wall structure.

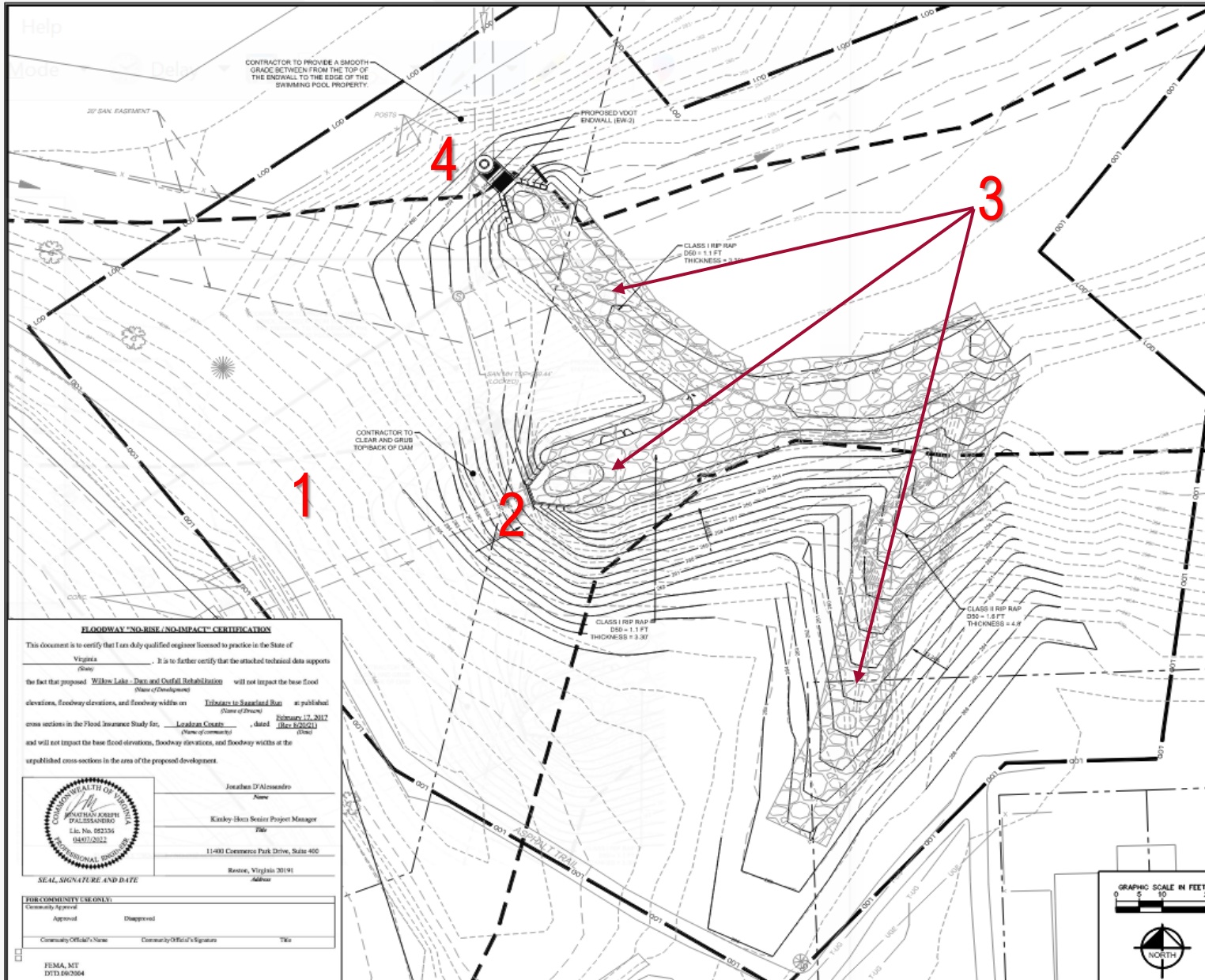
2 - Significant erosion of the emergency spillway receiving channel.

3 - Significant erosion of the principal spillway pipe receiving channel.

4 - Undercut toe of dam

5 - Storm sewer outfall aligned towards dam toe.

Willow Lake Dam and Outfall Rehabilitation Summary



As part of the dam and outfall rehabilitation the following construction activities will occur:

1 - Clearing, grubbing, and reseeding of all areas of the dam that are overgrown.

2 - Repair of erosion around the principal spillway pipe end wall structure.

3 - Regrading/repair and armoring of the emergency spillway receiving channel, principal spillway pipe receiving channel, and storm sewer outfall receiving channel.

4 - Extension and realignment of the storm sewer discharge point away from the toe of the dam.

- All receiving channels have been engineered, graded, and armored to accommodate design flows from their respective contributing discharge point.



Willow Lake Dam and Outfall Rehabilitation - Landscaping Plan

- This project proposes minimal tree and vegetation removal.
- A robust landscaping plan outlining heavy replanting of all impacted areas within the limits of disturbance has been developed and approved by the Loudoun County Department of Building and Development.

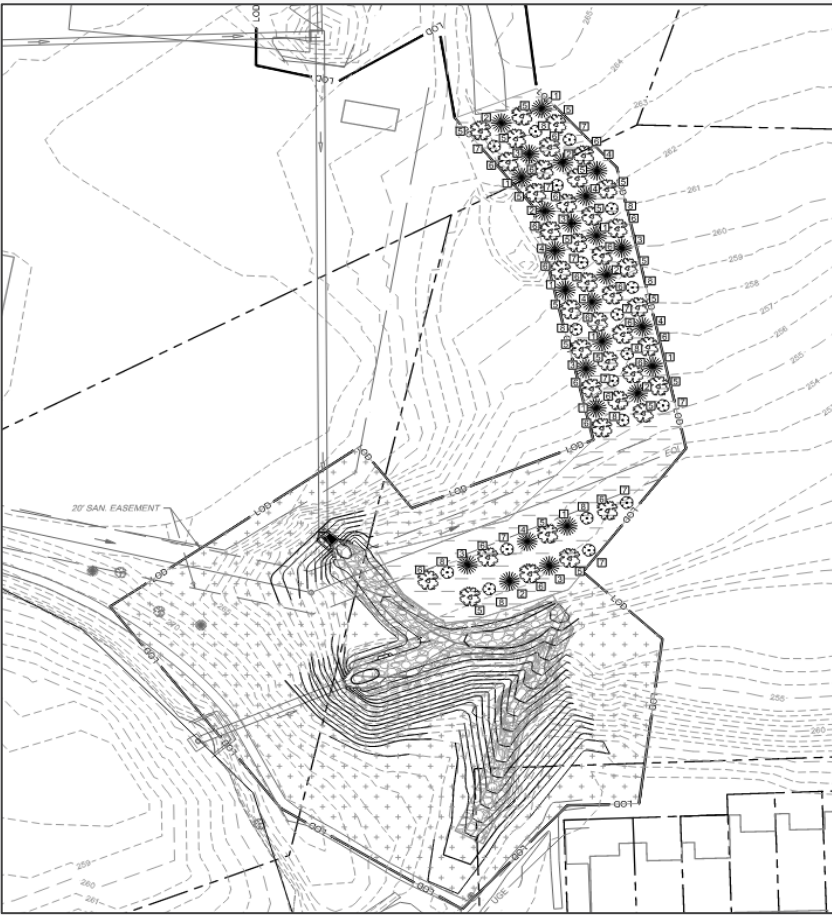


Figure 1. Willow Lake – Planting and Seeding Plan

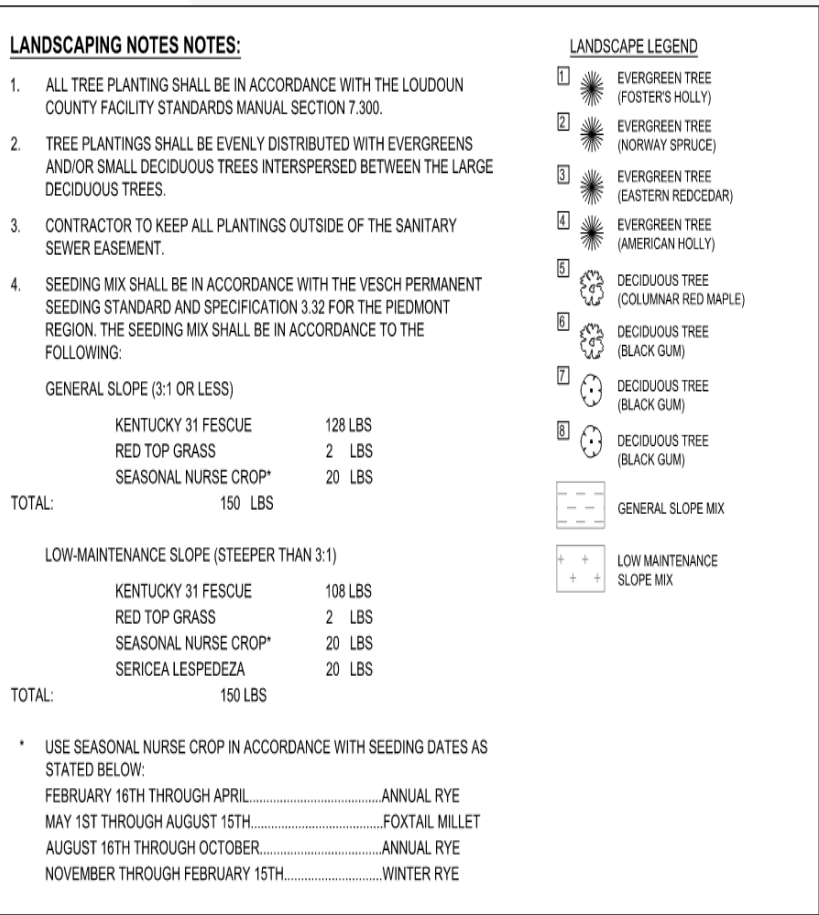


Figure 2. Willow Lake - Planting Notes and Legend

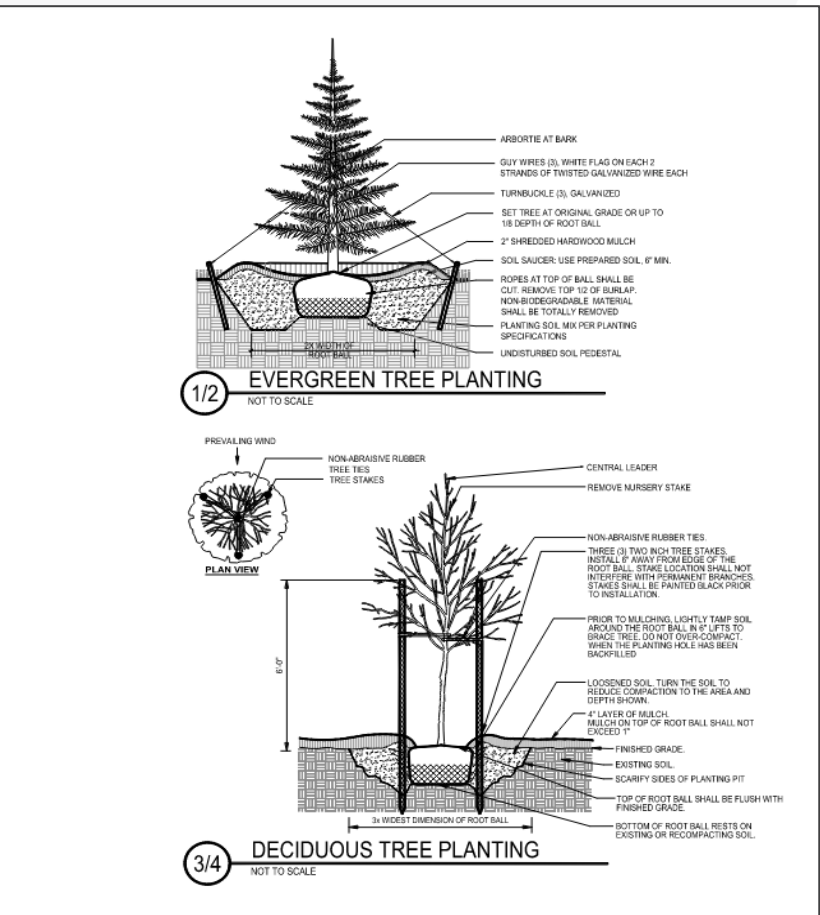
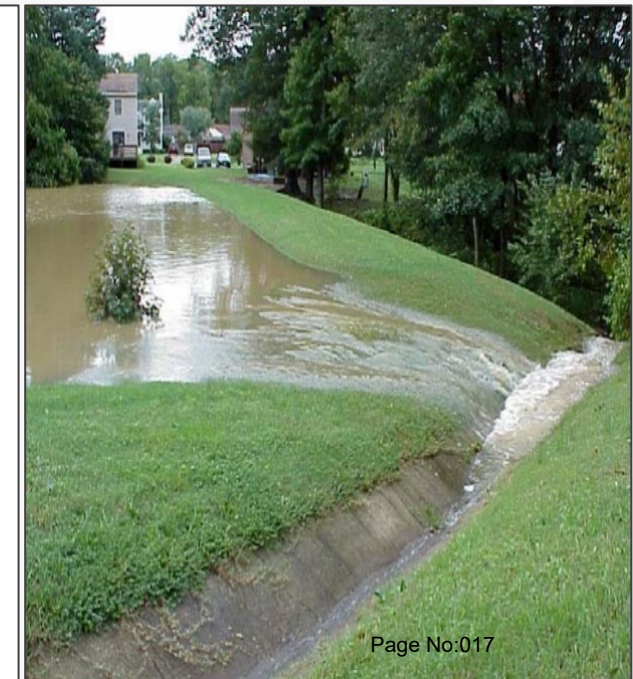
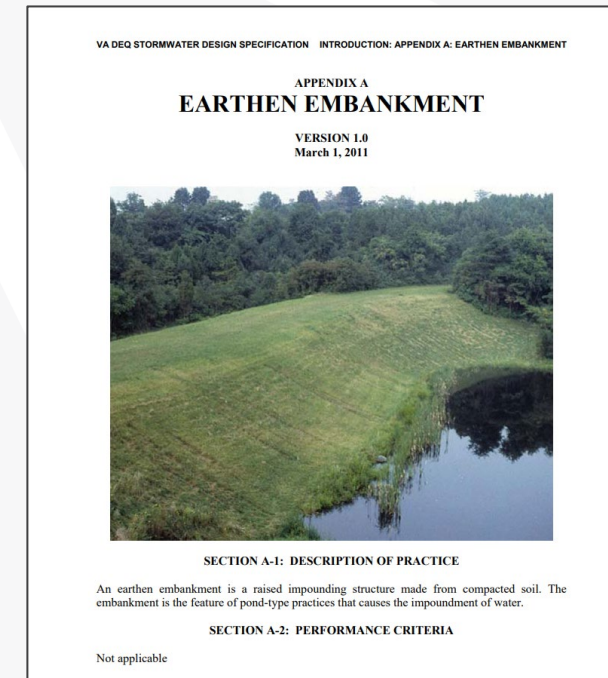
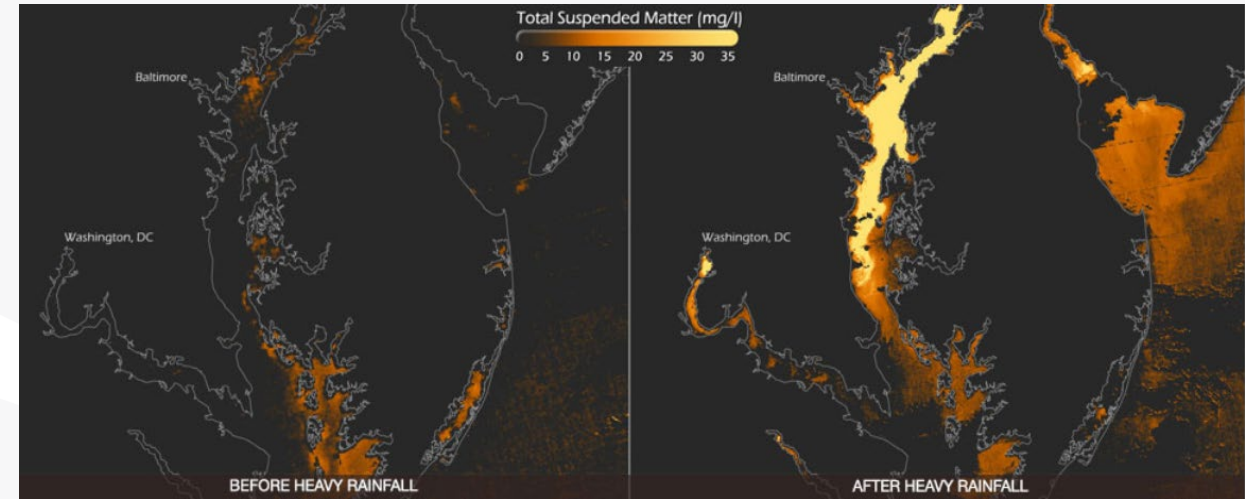


Figure 3. Willow Lake - Planting Details

Benefits of the Willow Lake Dam and Outfall Rehabilitation Project

- Removal of the vegetation on the dam and berm will allow for ease of maintenance.
- Repair of the spillway channels will prevent further erosion that is occurring downstream and will repair heavily incised channels that have been degrading for many years.
- The repairs will improve the existing dam infrastructure beyond the original design conditions.
- The repairs will decrease sediment contribution to the downstream receiving channels and will decrease pollutant transport that ultimately reaches the Chesapeake Bay.
- The project will secondarily provide Loudoun County with nutrient credits (Nitrogen, Phosphorous, Sediment) that will be applied to their Chesapeake Bay TMDL Reduction Goals.



Willow Lake Dam and Outfall Rehabilitation – Rendering



Willow Lake Dam and Outfall Rehabilitation - Project Summary

- The project will repair and upgrade the existing dam, receiving channels, and storm infrastructure within the project limits.
- The project will recreate a natural habitat downstream from the dam, as well as improve stream and receiving channel hydraulics.
- The restoration will provide significant TMDL Pollutant of Concern (POC) Credits for Nitrogen, Phosphorous, and Sediment for the County.
- Estimated construction start is late August / early September 2022.
- Estimated project duration 3 – 6 months.

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