STORMWATER MANAGEMENT
LOUDOUN COUNTY, VIRGINIA

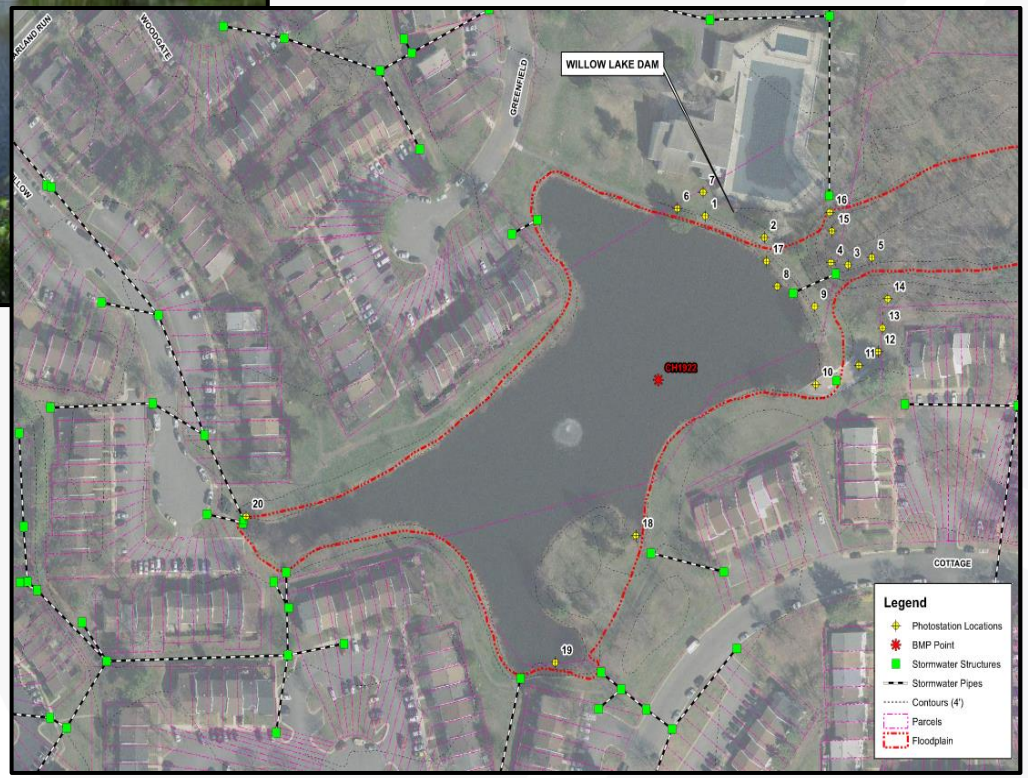
Kimley»Horn

Willow Lake Dredging and Pond Retrofit Project
Sugarland Run HOA Board Meeting
Wednesday, May 17th, 2023

Presentation Outline

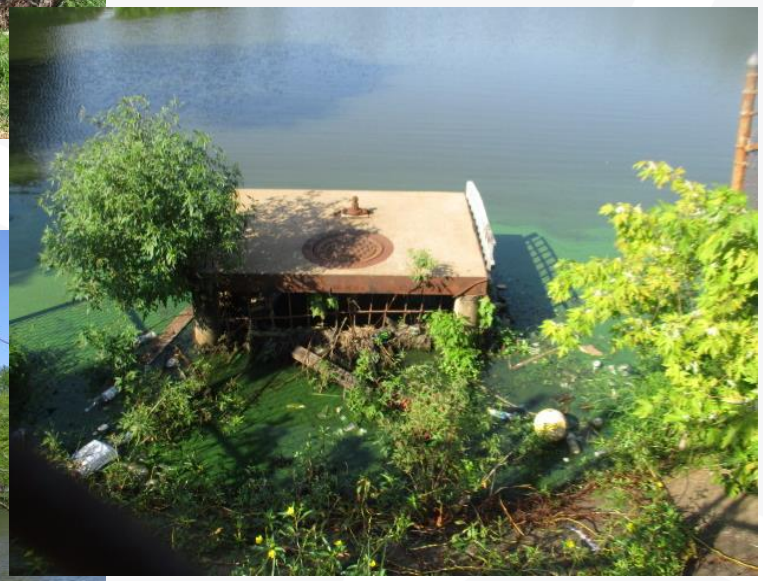
- Willow Lake Existing Conditions
- Benefits of Pond Maintenance and Retrofits
- Design Overview and Project Summary
- Questions

Willow Lake (2022)

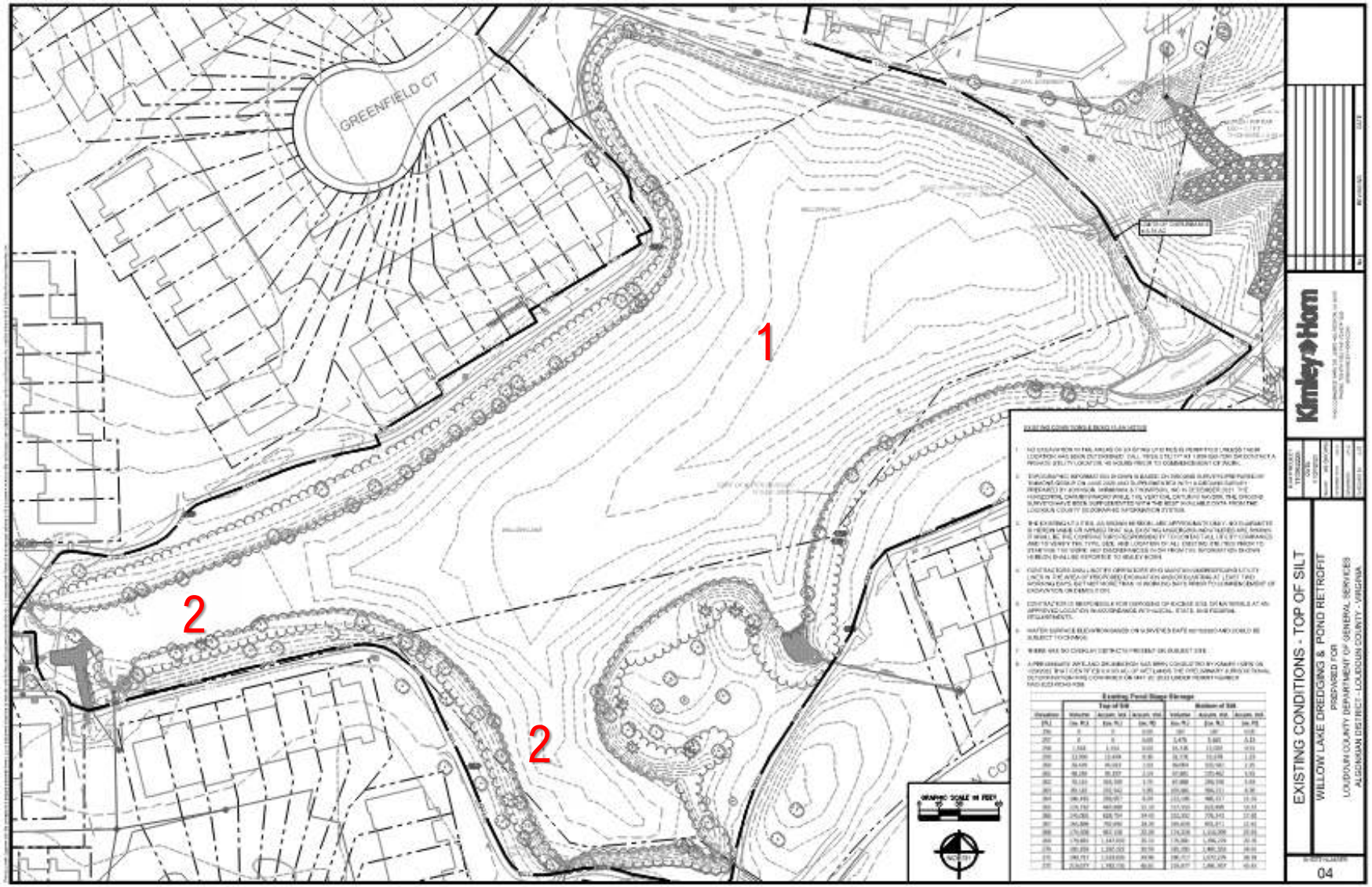


Willow Lake Dam Existing Conditions Summary

- Approximately 140 acres of urban, impervious land drain to Willow Lake.
- Runoff from the upstream contributing drainage area has transported sediment, trash, and debris to the pond through the upstream inflow locations.
- Willow Lake has never been dredged / excavated (to our knowledge).



Willow Lake Dam Existing Conditions Summary

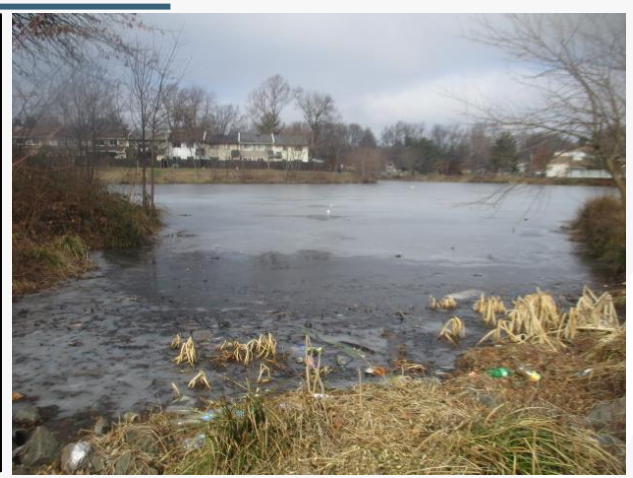


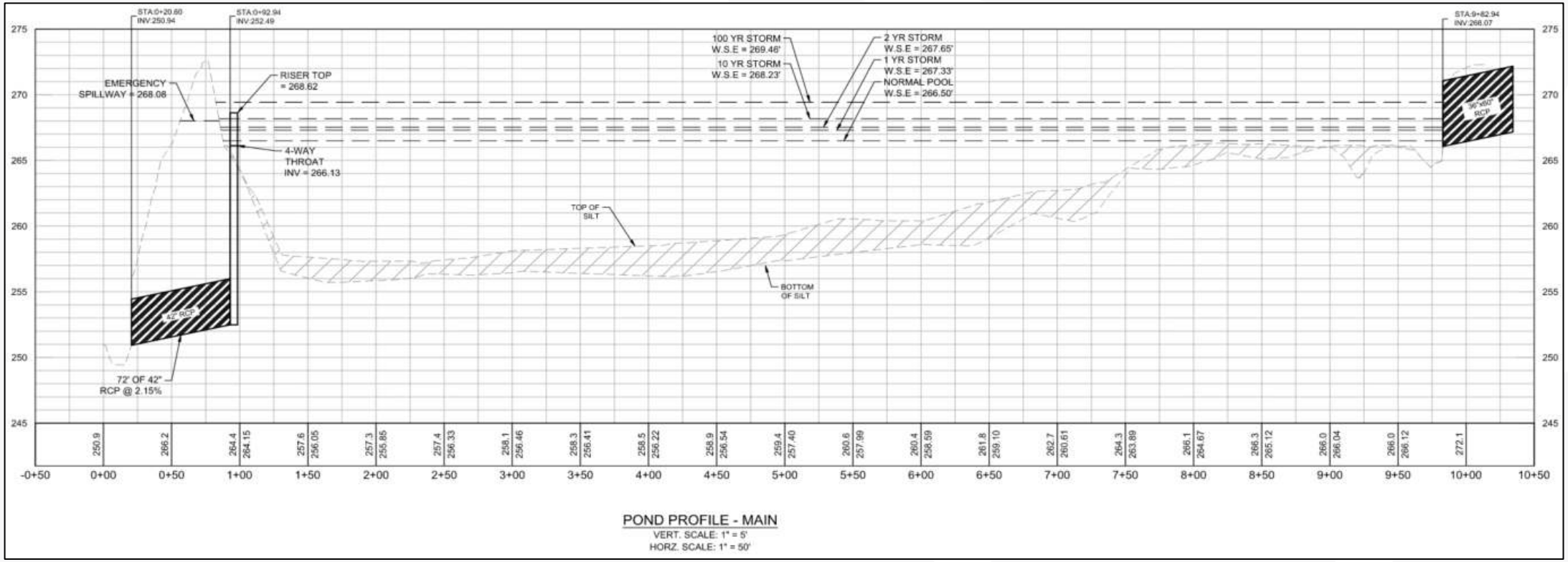
The summary of existing conditions deficiencies for Willow Lake are as follows:

1 - The existing pond has significant sediment accumulation throughout the facility.

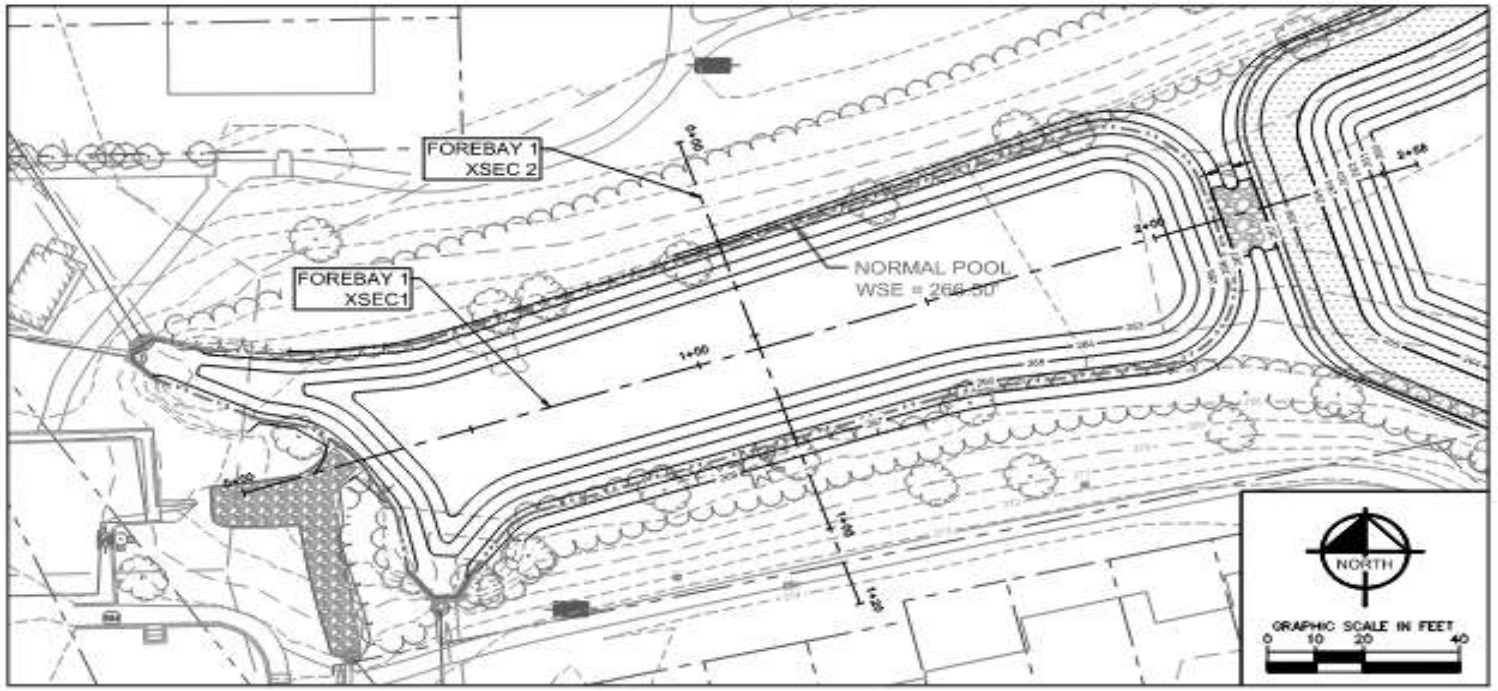
2 – Pond inflow areas show signs of excess sediment accumulation and erosion.

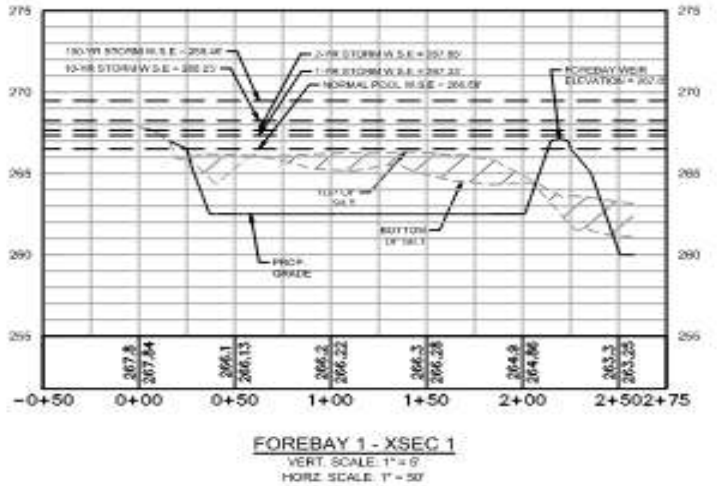
Willow Lake Existing Conditions – Sedimentation and Debris





Willow Lake Existing Conditions – Pond Inflow Area Deficiencies

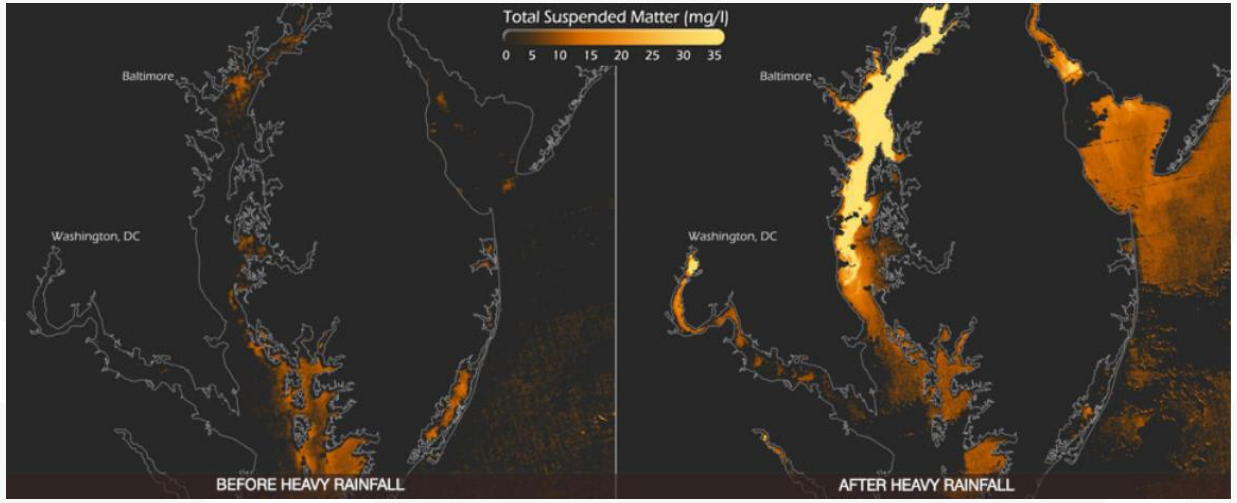


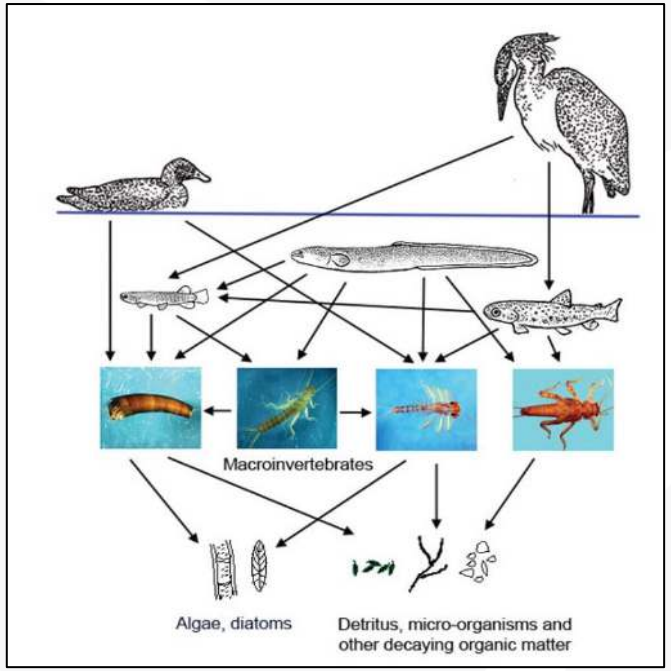


FOREBAY 1 - XSEC 1
VERT. SCALE: 1" = 5'
HORZ. SCALE: 1" = 50'

Benefits of the Willow Lake Retrofit Project

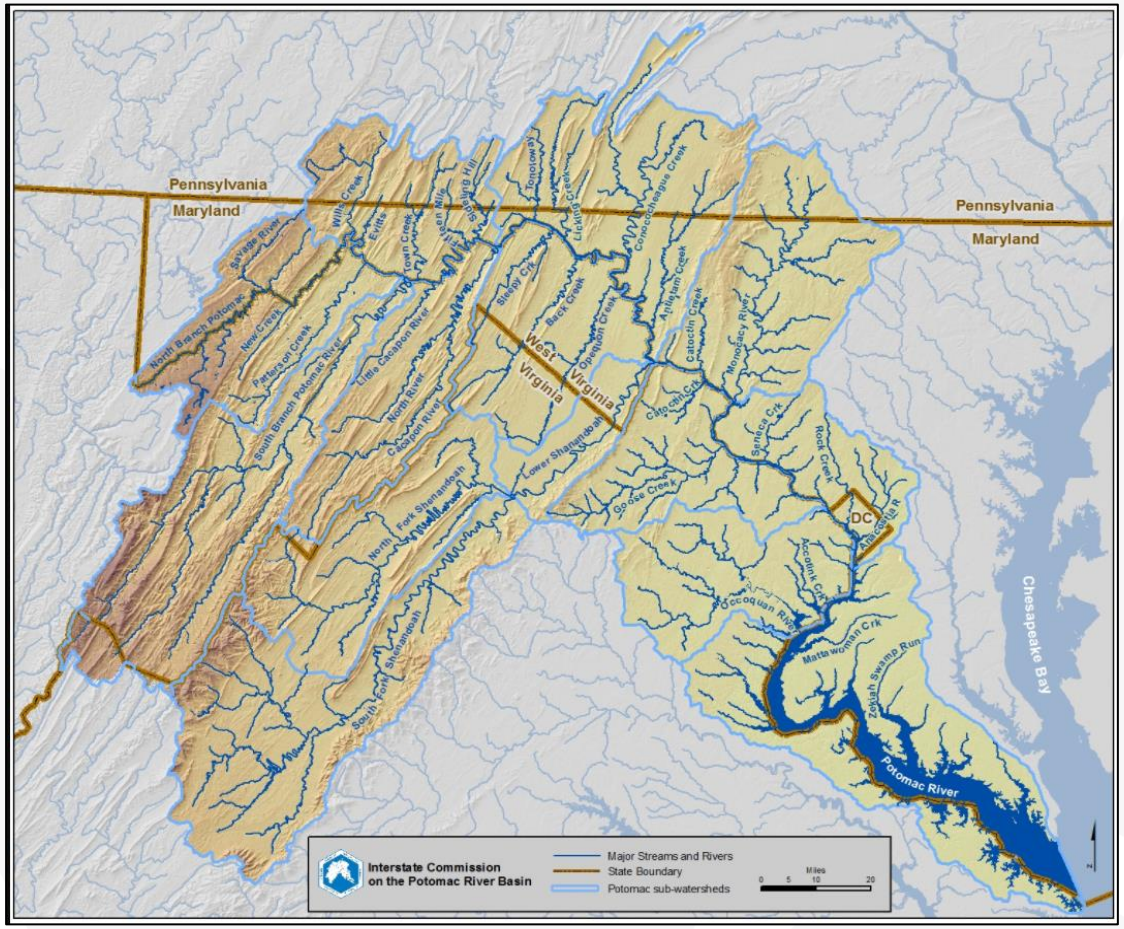
- Overall pond retrofit would increase aesthetics of a community centerpiece.
- Installation of Forebays would allow for ease of pond maintenance and would assist in limiting large debris from reaching the main pond / pond spillway structures.
- Proposed aquatic benching around the pond perimeter will provide food and shelter for fish, birds, small mammals, and other wildlife.
- Signage along the dam walking trail related to the pond enhancement would allow for a public education and outreach component.
- The County would be able to utilize the nutrient credits obtained from the enhancement to help satisfy Chesapeake Bay related requirements of their MS-4 (Stormwater) Permit.





Are other localities implementing Pond Retrofit Projects?

- Yes! There are pond retrofit projects occurring throughout Northern Virginia.
  - Fairfax County
  - City of Fairfax
  - Loudoun County
  - Prince William County
  - Stafford County
  - City of Fredericksburg
- Annually millions of dollars of Virginia DEQ Stormwater Local Assistance Fund (SLAF) Grant funding is awarded to pond retrofit projects.



Willow Lake Retrofit – Design Summary

- The proposed Willow Lake Retrofit will meet all design requirements outlined in the current Virginia DEQ design specifications for wet ponds.

Virginia Stormwater BMP Clearinghouse

BMPs | VRRM | MTD Evaluation | References & Tools | About | News

BMPs

Welcome to the Virginia Stormwater Best Management Practice Clearinghouse.

Best Management Practices (BMPs) found on this website are approved for post-construction use to meet the total phosphorus (TP) water quality requirements of Virginia Stormwater Management Program (VSMP) regulation.

[Note: To expand text boxes, click the heading or arrow button. To collapse them, click the heading or arrow button a second time.]

- BACKGROUND
- 2013 DRAFT DESIGN SPECIFICATIONS FOR PRACTICES 1-15
- 2011 DESIGN SPECIFICATIONS FOR PRACTICES 1-15
- OTHER APPROVED PRACTICES (16-17)

This website is jointly administered by the Virginia Department of Environmental Quality (DEQ) and the Virginia Water Resources Research Center (VWRRC). The DEQ has developed the content on this site to assist those who must comply with Virginia Stormwater Management Law and Regulations. The VWRRC manages this website as part of its efforts to disseminate new water resources information and facilitate the application and transfer of new technologies.

Join BMP Clearinghouse Listserv

To receive notices about BMP Clearinghouse news and stakeholder meetings, send your name and contact information to BMPClearinghouse@vt.edu. Please include "Join Stormwater BMP Clearinghouse Listserv" in the subject line.

For questions about stormwater management, contact:

Virginia Department of Environmental Quality
Water Permitting Division
1111 East Main Street, Suite 1400
Richmond, VA 23219
BMPClearinghouse@deq.virginia.gov

DEQ Virginia Department of Environmental Quality

For questions about this Website, contact:

Virginia Water Resources Research Center
Virginia Tech
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310 West Campus Dr.
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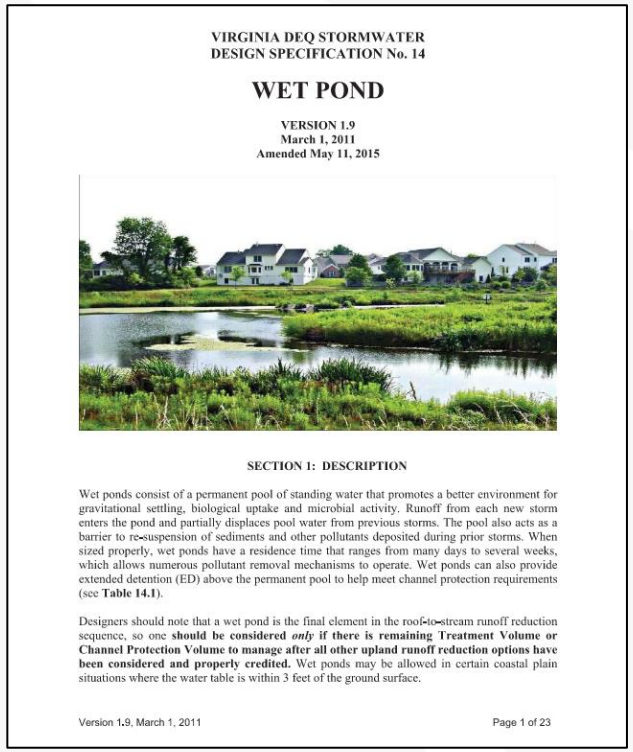
BMPClearinghouse@vt.edu



VIRGINIA DEQ STORMWATER DESIGN SPECIFICATION No. 14

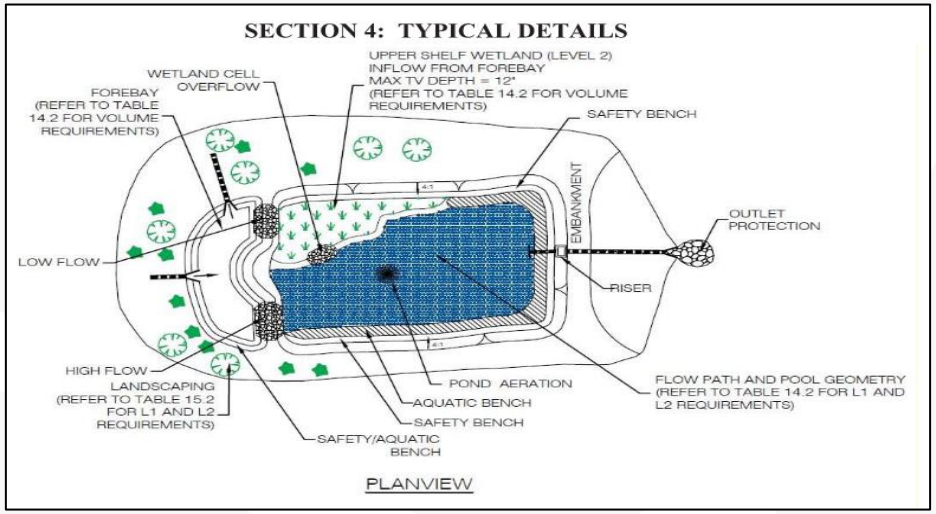
WET POND

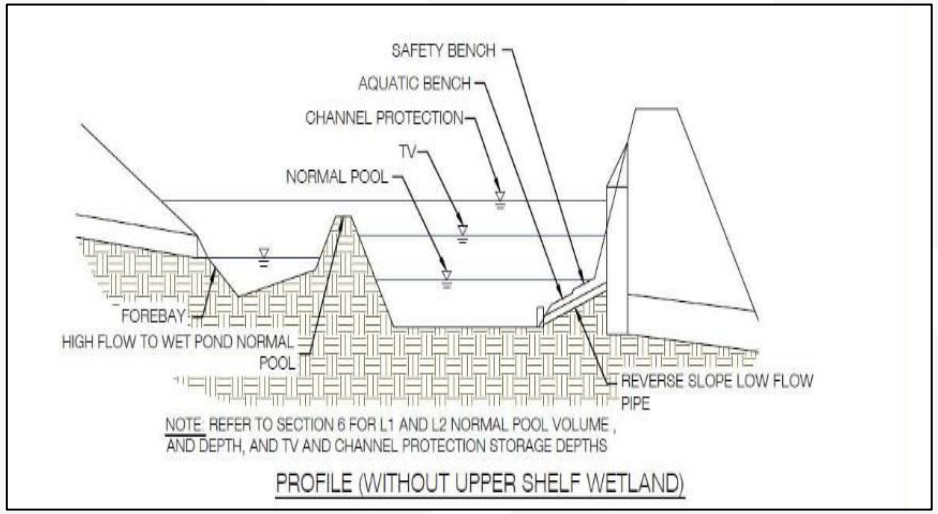
VERSION 1.9
March 1, 2011
Amended May 11, 2015

SECTION 1: DESCRIPTION

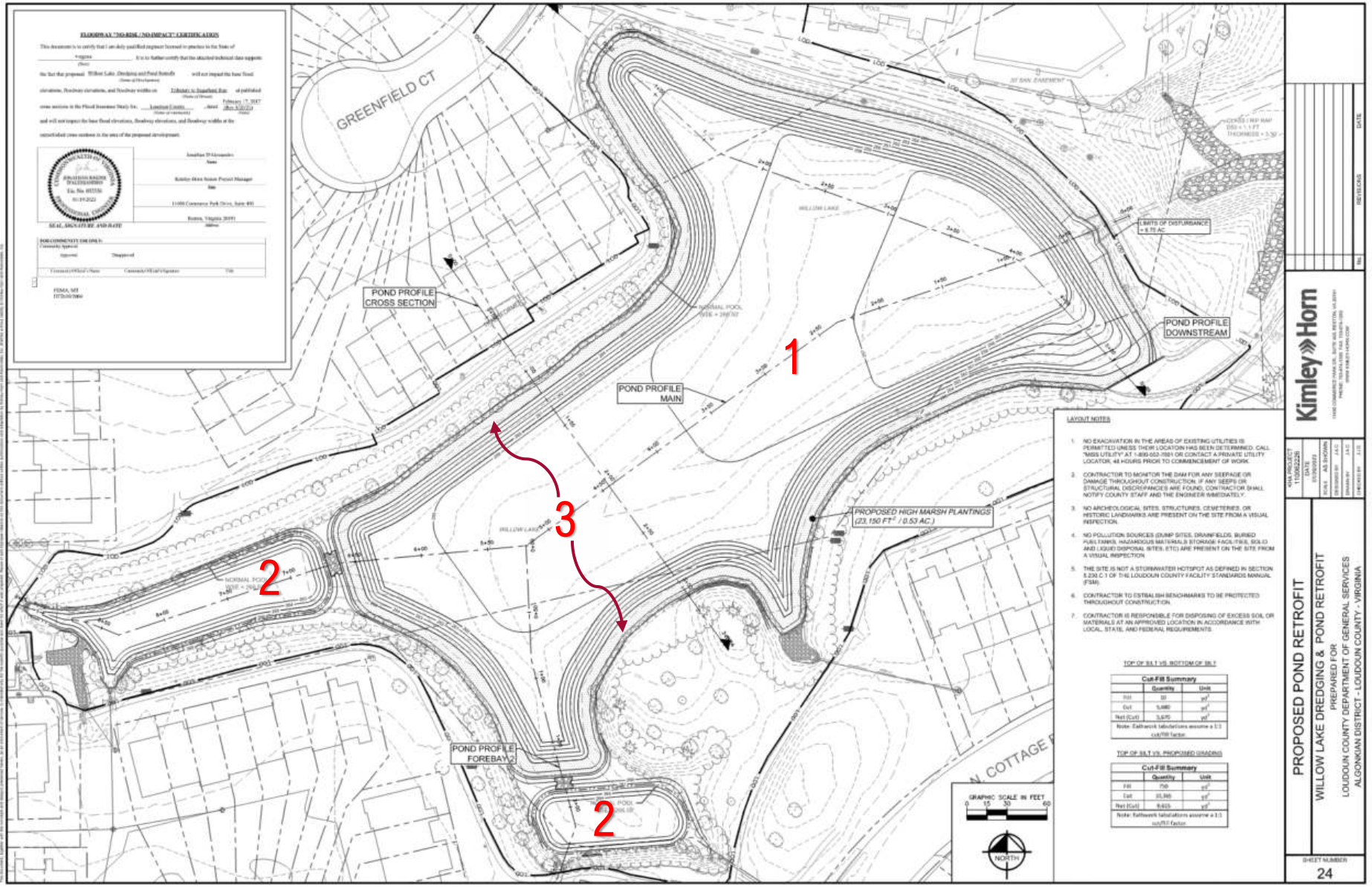
Wet ponds consist of a permanent pool of standing water that promotes a better environment for gravitational settling, biological uptake and microbial activity. Runoff from each new storm enters the pond and partially displaces pool water from previous storms. The pool also acts as a barrier to re-suspension of sediments and other pollutants deposited during prior storms. When sized properly, wet ponds have a residence time that ranges from many days to several weeks, which allows numerous pollutant removal mechanisms to operate. Wet ponds can also provide extended detention (ED) above the permanent pool to help meet channel protection requirements (see **Table 14.1**).

Designers should note that a wet pond is the final element in the roof-to-stream runoff reduction sequence, so one **should be considered *only* if there is remaining Treatment Volume or Channel Protection Volume to manage after all other upland runoff reduction options have been considered and properly credited.** Wet ponds may be allowed in certain coastal plain situations where the water table is within 3 feet of the ground surface.





Willow Lake Retrofit – Design Summary



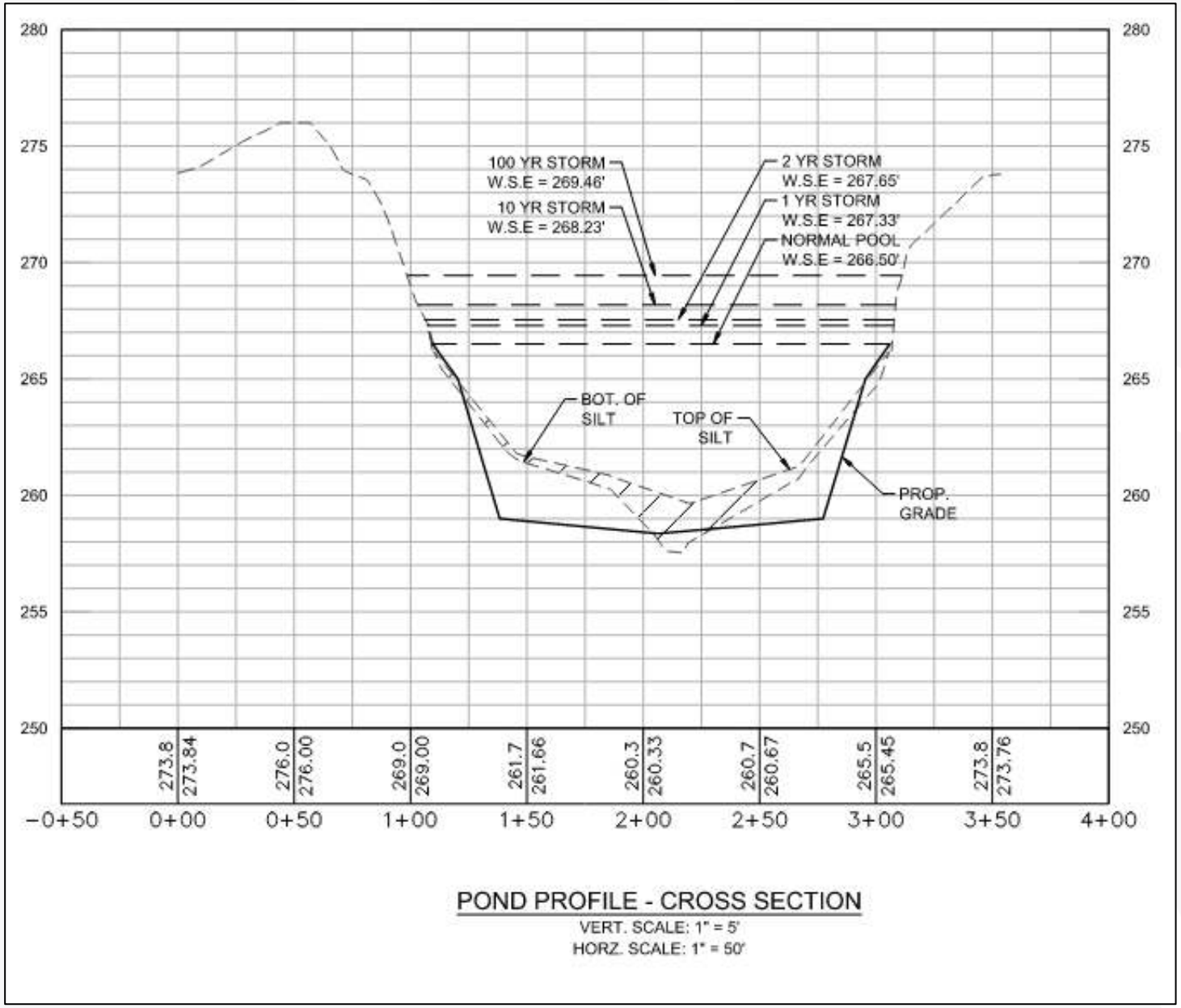
The proposed Willow Lake Retrofit Project includes the following:

1 - Removal of all legacy sediment and increase in pond treatment volume.

2 - Installation of a forebay at each pond inflow location.

3 – Installation of aquatic benching around the pond perimeter.

Willow Lake Retrofit – Design Summary - Excavation / Dredging



POND PROFILE - CROSS SECTION

VERT. SCALE: 1" = 5'

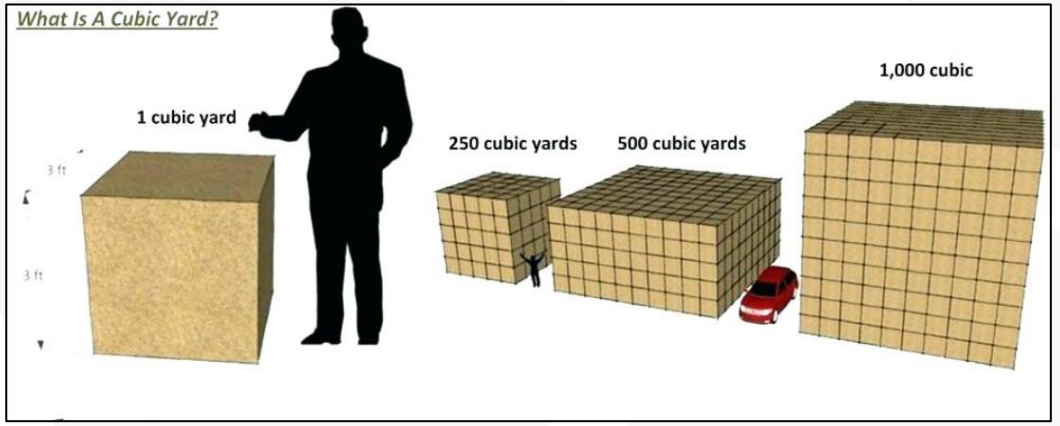
HORZ. SCALE: 1" = 50'

TOP OF SILT VS. BOTTOM OF SILT

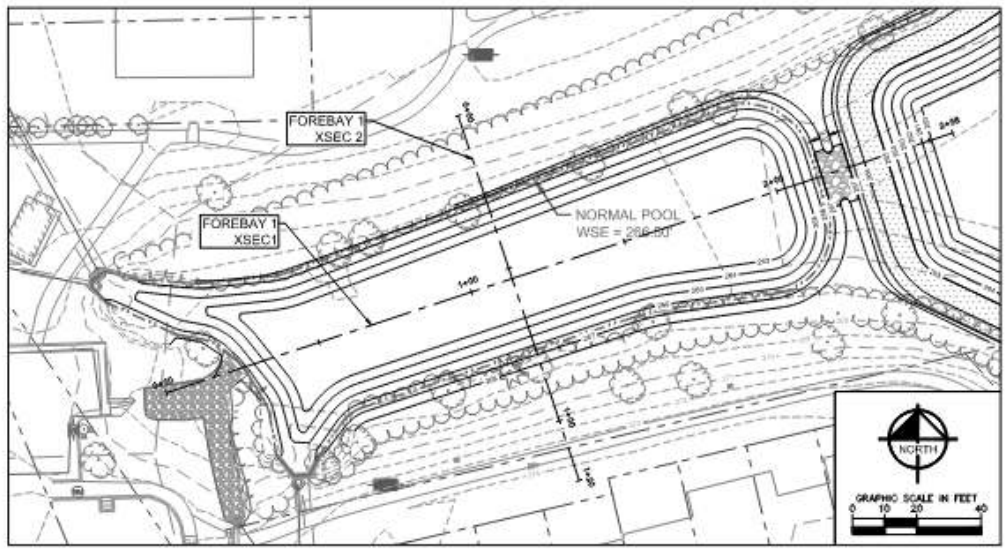
Cut-Fill Summary		
	Quantity	Unit
Fill	10	yd^3
Cut	5,680	yd^3
Net (Cut)	5,670	yd^3
Note: Eathwork tabulations assume a 1:1 cut/fill factor.		

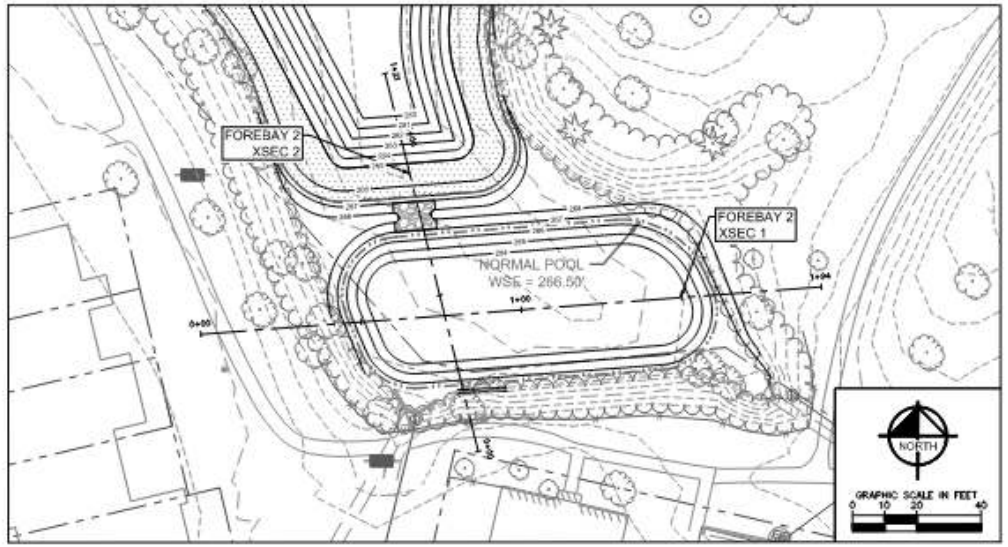
TOP OF SILT VS. PROPOSED GRADING

Cut-Fill Summary		
	Quantity	Unit
Fill	750	yd^3
Cut	10,365	yd^3
Net (Cut)	9,615	yd^3
Note: Eathwork tabulations assume a 1:1 cut/fill factor.		

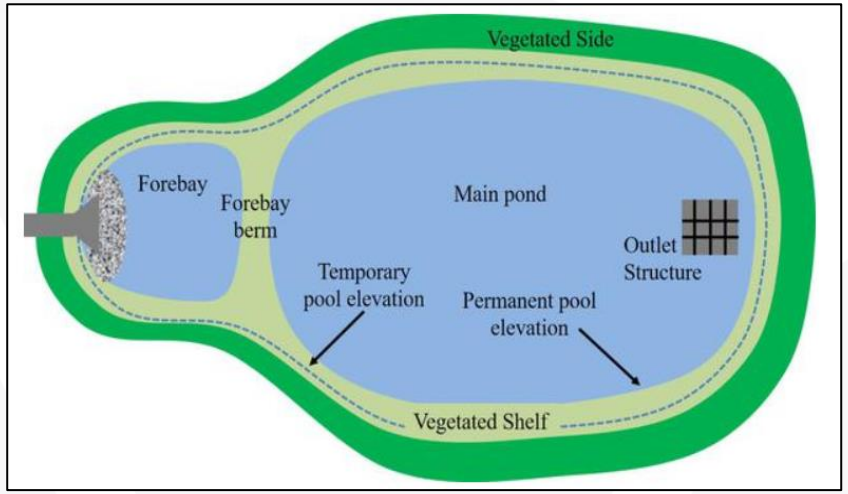


Willow Lake – Design Summary – Forebay





- Forebays provide a centralized location for sediment and debris accumulation and keeps most sediment from reaching the main pond area.
- Forebays allow for easier and more cost-effective pond maintenance.
- Routine maintenance will be easier to perform allowing for longer periods between required main pond dredging.



Examples of Forebays

Willow Lake Design Summary – Aquatic Benching

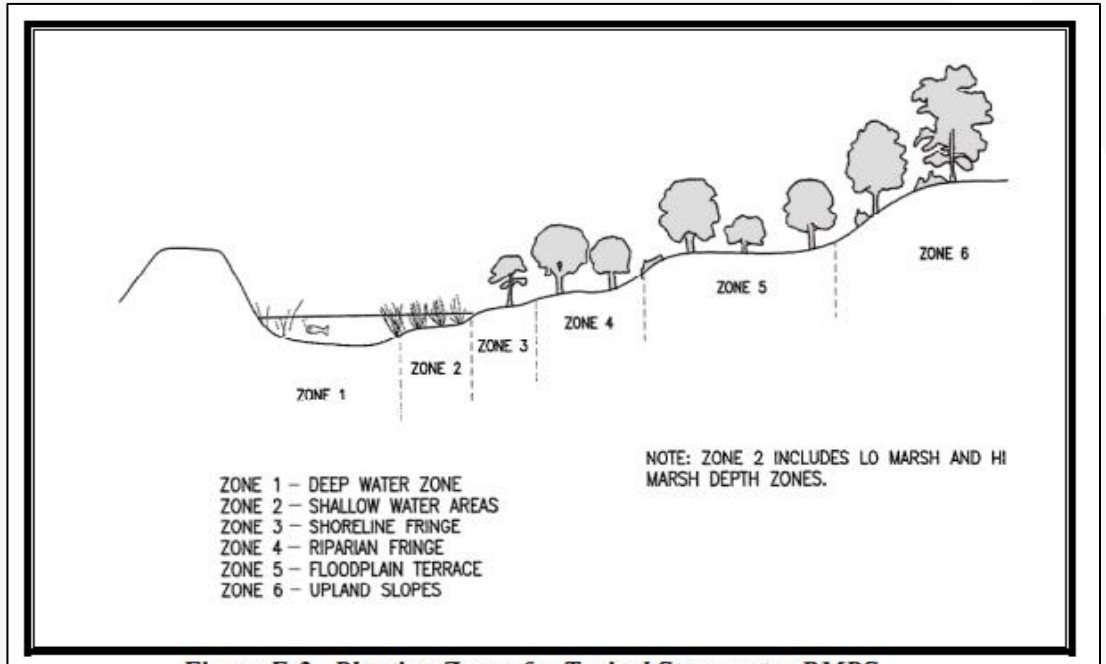


Figure E-2. Planting Zones for Typical Stormwater BMPS

- Aquatic Benching provides enhanced nutrient uptake.
- Reduces resuspension of sediment.
- Provides food and cover for wildlife.
- Provides habitat for predatory insects and serves as a check for mosquitos.
- Reduces shoreline erosion.
- Improves aesthetics.
- Provides an added safety/deterrent feature before water deepens.

Willow Lake Dredging and Retrofit– Conceptual Rendering

Willow Lake Dredging and Retrofit – Conceptual Rendering

Please note this is a graphical depiction of the potential retrofit. Design conditions may alter from what is shown on this graphical illustration.

Willow Lake Dredging and Retrofit - Project Summary

- The project would provide needed maintenance and upgrade Willow Lake.
- The project would include features to decrease major pond maintenance activities, thus saving future maintenance costs.
- The project would enhance a natural habitat within the community that, when paired with the existing pond trail system, would provide public education and community outreach opportunities which are requirements of the County's MS-4 Permit.
- The retrofit will provide significant TMDL Pollutant of Concern (POC) Credits for Nitrogen, Phosphorous, and Sediment for the County to apply to their Chesapeake Bay TMDL POC Reduction Goals.

Next Steps

- Receive community feedback
- Submit Willow Lake Retrofit design plan, and receive plan approval, from Loudoun County Department of Building and Development.
- Review final design with VA DEQ to finalize SLAF grant agreement and funding.
- Advertise for construction.
- Estimated construction start date late 2023 / early 2024.
- Estimated construction duration 9 – 14 months.

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Questions