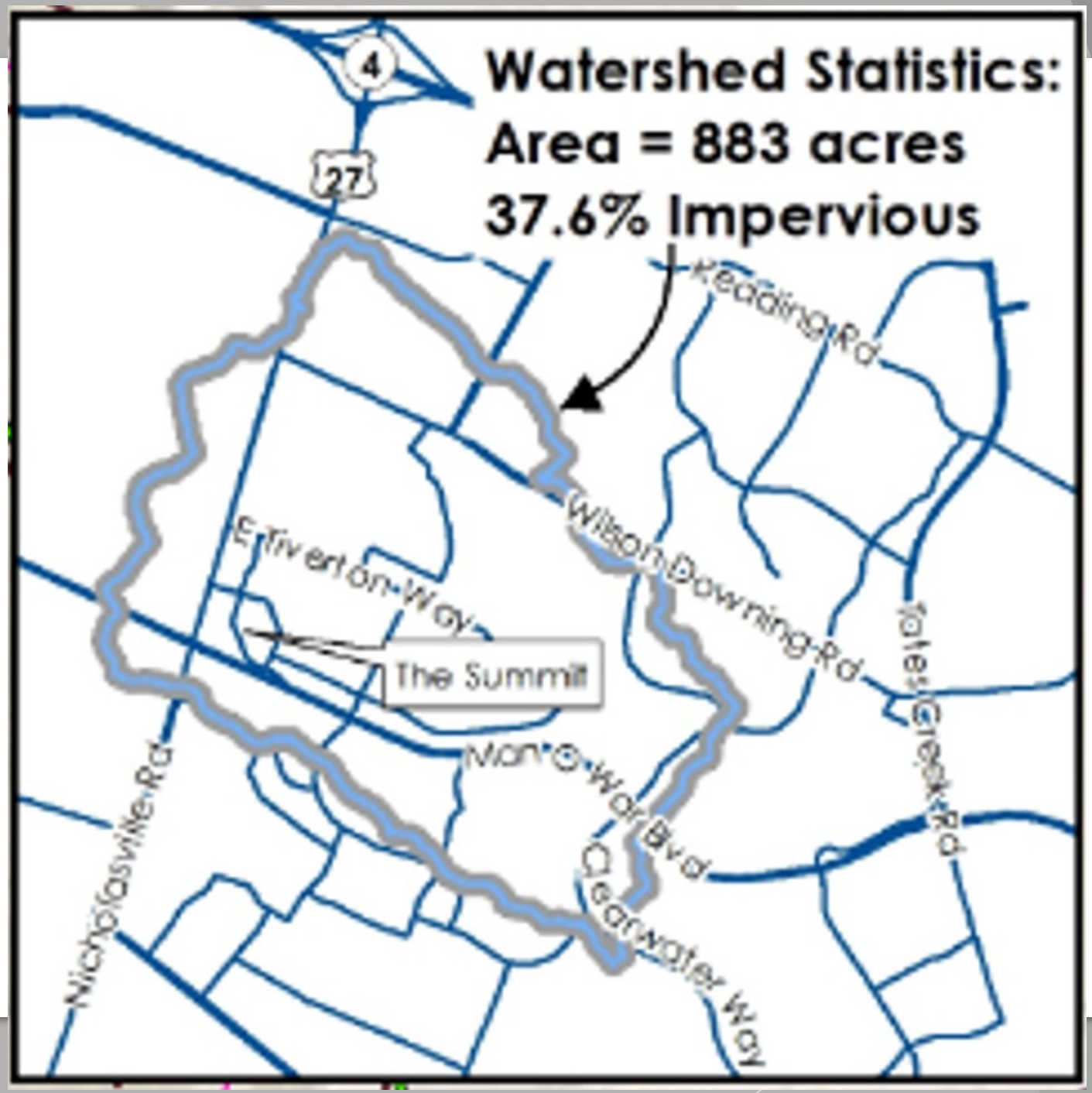
Summary of Current Situation

- There are two decorative ponds at the front of the main entrance of Waterford (Clearwater/Man O' War).
- For sake of discussion, we will reference the larger pond as Pond A going forward.
- Pond A drains over 800 acres of watershed starting at Nicholasville Road.
- Pond A is mostly full of silt and soil, likely from years of:
  - Natural as well as accelerated upstream stream channel and bank erosion
  - Storm sewer inputs of road runoff (gravel, sediment, etc.)
  - Vegetation (grass, leaves, sticks, etc.)
- At this time, there are no concerns with Pond B.


Watershed Statistics:
Area = 883 acres
37.6% Impervious
4
27
Reading Rd
Wilson Downing Rd
E Riverton Way
The Summit
Manor Wood Blvd
Nicholasville Rd
Clearwater Way
Tates Creek Rd

Options for HOA

- After thorough analysis and review of current pond situation and past feasibility study, it is our opinion that there are three options for Pond A.
  - Option #1 – Do nothing.
  - Option #2 – Dredge the Pond.
  - Option #3 – Construct Stream/Restore Pond to Natural Flow.

Option #1 – Do Nothing

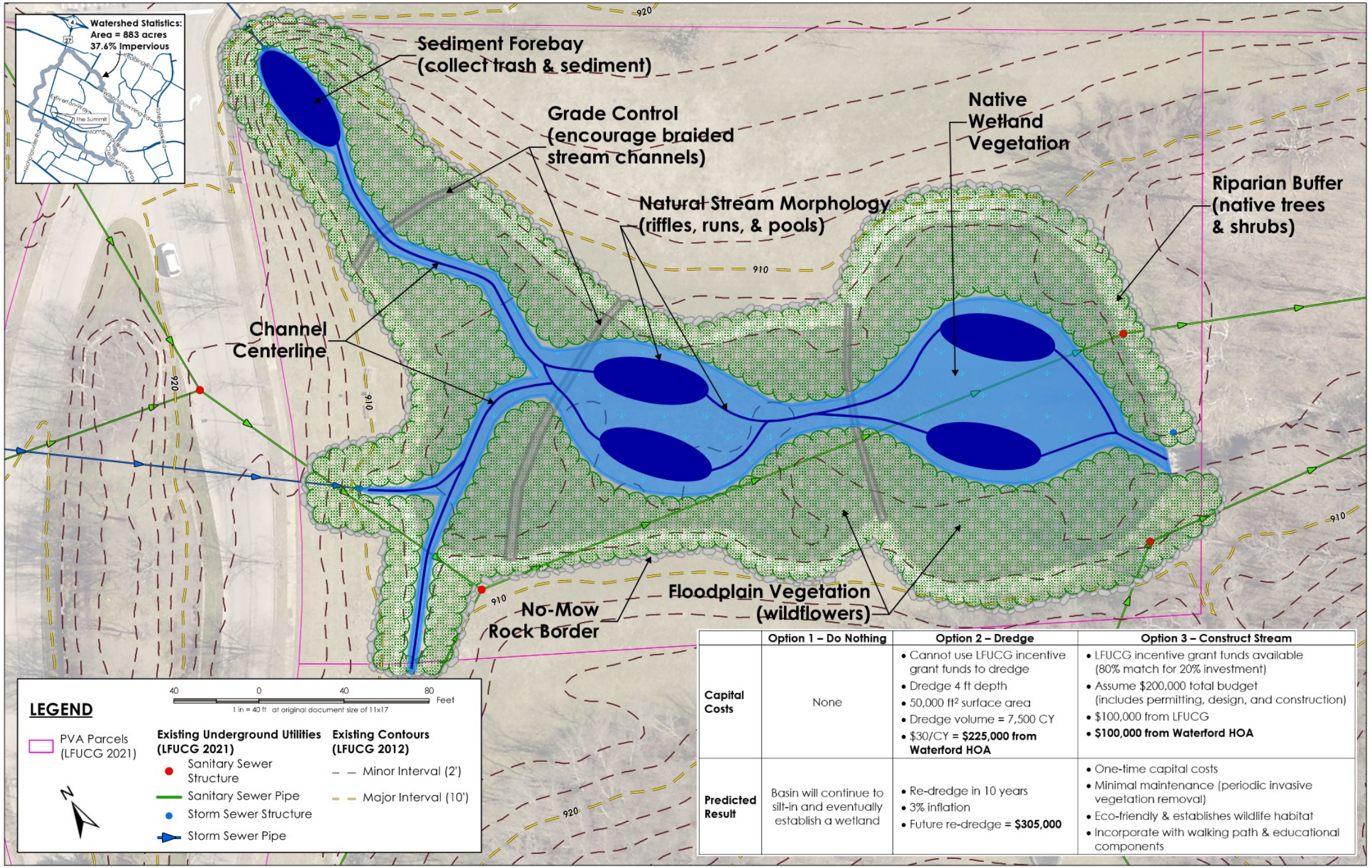
- Option #1: Leave **Pond A** in its existing state. Water level will continue to be shallow and basin will eventually silt-in and establish a wetland.
  - Pros:
    - Will cost the HOA **little** to no money.
    - **Low** maintenance.
  - Cons:
    - Unsightly (trash, debris, odor, etc.)
    - Water depth will not allow for fountain use.
    - Safety issue.

Option #2 – Dredge the Pond

- Option #2: **Pond A** would be dredged of existing material
  - Pros:
    - Pond will be returned to normal depth (3'-4'), temporarily.
    - Fountains can be restored for use.
    - Low maintenance (until next dredging).
    - Wildlife conducive.
  - Cons:
    - Very high cost to HOA (in excess of $200K).
    - Future cost to HOA to re-dredge ($300k)
    - Dredge solution would be **temporary**. It is expected the pond would need to be dredged again in 6-10 years.
    - Grant money unavailable for HOA; HOA would front **full cost for dredging**.
    - Upstream watershed, trash, nutrient rich material is uncontrollable for HOA (basin will continue to silt-in).
    - **Pond A** will be unsightly for short period during construction (equipment, mud, fencing, etc.)

Option #3 – Construct Stream/Restore Pond to Natural Flow

- **Option #3**: Existing **Pond A** and **Pond A** material would be repurposed into a natural stream like what would've existed before development of the neighborhood.
  - Pros:
    - Potential $100k **match** from LFUCG Stormwater Quality Projects Incentive Grant. Project could cost the HOA very little ($100k) in comparison to Option #2 – Dredge the Pond.
    - Minimal maintenance (periodic invasive vegetation removal, eliminate fountain O&M cost of $5k/year).
    - **Eco-friendly** and establishes wildlife habitat.
    - Family friendly (potential **learning environment**).
    - Potential option for **Trailhead** connecting to Veteran's Park.
  - Cons:
    - No large pond at front of neighborhood (Pond B would remain).
    - Fountains would not be reused (Would require **patience for first 2-3 years as vegetation grows in** and periodic maintenance.
    - **Pond A** will be unsightly for short period during construction (equipment, mud, fencing, etc.)



	Option 1 – Do Nothing	Option 2 – Dredge	Option 3 – Construct Stream
Capital Costs	None	• Cannot use LFUCG incentive grant funds to dredge • Dredge 4 ft depth • 50,000 ft² surface area • Dredge volume = 7,500 CY • $30/CY = **$225,000 from Waterford HOA**	• LFUCG incentive grant funds available (80% match for 20% investment) • Assume $200,000 total budget (includes permitting, design, and construction) • $100,000 from LFUCG • **$100,000 from Waterford HOA**
Predicted Result	Basin will continue to silt-in and eventually establish a wetland	• Re-dredge in 10 years • 3% inflation • Future re-dredge = **$305,000**	• One-time capital costs • Minimal maintenance (periodic invasive vegetation removal) • Eco-friendly & establishes wildlife habitat • Incorporate with walking path & educational components

University of Kentucky

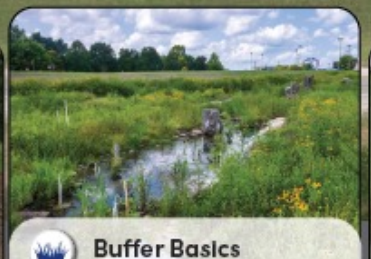
Alumni Drive Stream Restoration Project

Enhancing Education - Protecting Water Quality - Minimizing Maintenance

Streams are influenced by the land through which they flow. What happens in a stream's watershed affects its shape, water quality, and what lives in it. When a watershed is developed, the addition of impervious surfaces such as roads, buildings, and parking lots prevents stormwater from soaking into the ground. Instead, stormwater travels as runoff over the land where it can pick up pollutants. Streams that receive this runoff can have eroded streambanks, degraded water quality, and poor habitat quality. Stream restoration, as was done here, is a way of healing a stream. This project created rich hands-on learning opportunities for the campus and community while improving maintenance conditions by eliminating the need for mowing equipment to access wet areas.

Outdoor Learning

Outdoor learning spaces or classrooms are places where students can learn about the natural and human-created worlds while in an outdoor or natural setting. In these spaces, instructors can use engaging, hands-on curriculum to lead students through lessons and encourage exploration. While often utilized for natural and physical sciences and agricultural studies, outdoor learning spaces are useful for teaching all subjects or content areas including mathematics, social sciences, communication, and art and creativity. Outdoor learning spaces help students connect theory to application.



Buffer Basics

Riparian or streamside buffers are a great way to reduce the impacts of urbanization on streams. Buffers are transitional areas linking adjacent lands to aquatic environments like streams, rivers, ponds, and lakes. Healthy buffers are diverse with many types of plant communities that include trees, shrubs, and herbaceous species. The different vegetation types provide different benefits. Grasses are effective at filtering sediment from runoff while trees help improve aquatic habitat through water temperature regulation and introduction of leaves, twigs, and small logs that serve as food and shelter sources. Healthy buffers provide many ecosystem services such as nutrient cycling, water storage, and wildlife habitat.

Multiple Stream Types

Stream restoration is the re-establishment of the structure and function of a degraded stream as closely as possible to pre-disturbance conditions. Each stream restoration project has its own unique characteristics, but most share the same main components such as reconnecting the stream to its floodplain and using native vegetation to create a buffer zone around the stream. This project uses three different stream types, based on other projects in Kentucky, to show learners different design techniques without leaving campus. The uppermost portion of each stream type is denoted by a woodchip walking path that crosses the stream.

Trees as Infrastructure

Trees are a cost-effective means of reducing stormwater runoff. A tree's branches and leaves form its canopy which intercepts rainfall (hundreds to thousands of gallons annually depending on the tree). This captured rain evaporates to the atmosphere or falls to the ground. On the ground, it soaks into the soil or becomes runoff. Once in the soil, rainfall is available for uptake by the tree's root system where it is subsequently transpired back to the atmosphere. Trees also provide many other ecosystem services that benefit humans, including improvements in air quality, carbon sequestration, biodiversity, microclimate regulation, noise attenuation/reduction, human health, and property values. Trees were planted along the stream and in the median as part of this project.

Bioswale

Bioswales are often thought of as elongated rain gardens. These structures consist of shallow, wide, low-sloped channels, which are lined with vegetation and/or rock. The underlying soil is amended to encourage infiltration and promote plant growth. Rainfall from small storms is often absorbed completely while flow from larger storms is conveyed to surface waters or storm sewers. Bioswales are ideal for use alongside roadways or within parking medians, in lieu of pipes or drainage ditches, because they encourage infiltration by slowing down runoff and improve water quality by filtering out pollutants.

LEXINGTON

Funded in part by the LFUCG Water Quality Management Fee and the Stormwater Quality Projects Incentive Grant Program

To learn more about UK's Stormwater Program visit: https://www.uky.edu/env/stormwater

University Partners on this project included UK Grounds, the College of Agriculture Food and Environment, the UK Environmental Management Department, UK Sustainability, and Capital Projects Management.

Next Steps for HOA

- Feedback from Board and Owners
- Feedback from industry experts
- Pond Committee makes recommendation to Waterford HOA at February Board Meeting
- Regardless of recommendation, it is believed 2023 is the most likely timeframe for completion

Conceptual Cost Discussion

- Estimated Cost for Option #1 - >$5K per year (HOA Budget currently includes pond treatments & maintenance each year).
- Estimated Cost for Option #2 – **$225,000**
  - Future Re-dredge in 10 years = $**305,000**
- Estimated Cost for Option #3 - **$100,000** from **Waterford HOA**
  - $200k total budget; $100k Grant Matching from LFUCG