

# Highlights of The Conceptual Design Report submitted by Mr. Andrew Knust, P.E



In 2020, the WFCa commissioned Bledsoe Riggert Cooper and James to create a report that would “improve pond aesthetics and maintainability, reduce the prevalence of algal blooms and other water quality issues, and control shoreline erosion.” The recommendation in this report were specifically aimed at the mainline Ponds 3 - 7 and provided a comparison between two options. Mr. Andrew Knust, P.E., presented the final Conceptual Design to the WFCa Board in the Spring of 2021.

**Conceptual Design Scenario #1: POND RENEWAL** would not change the fundamental dimensions of the WFCa pond system:

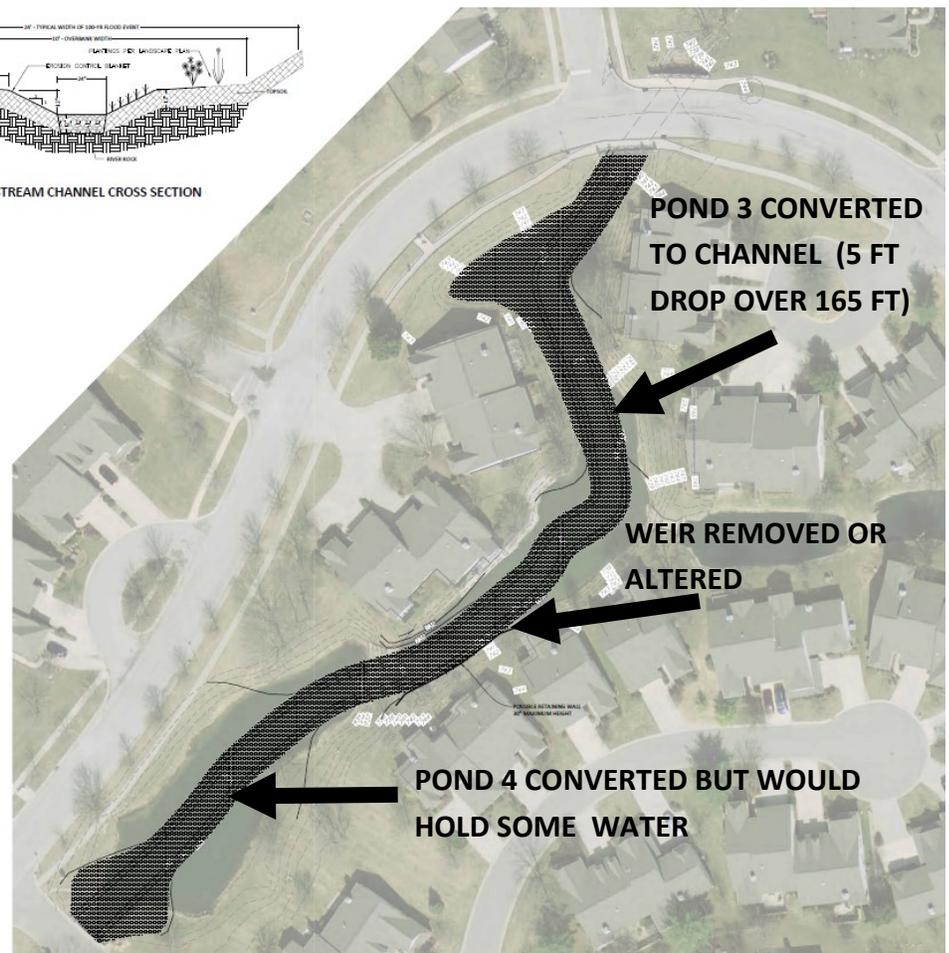
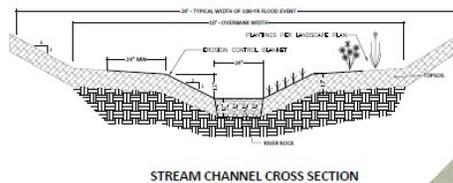
- Little, if any, IDEM/USACE permitting would be required.
- Deepening the ponds below the normal water level would have negligible impact on the overall detention storage volume within the system, so the peak flow performance at the outfall of Pond 7 would not change, and no modification to the outlet controls (*weirs*) should be required.
- However, there may still be some issues to address regarding access to construction areas, private property ownership, and WFCa common areas.
- Prior to proceeding with the work plan described, the depth of accumulated sediment should be measured in all the ponds. Accurate depth measurements will help to estimate the volume of material that needs to be removed from the ponds, significantly impacting the cost.
- The construction cost opinion for Scenario 1 assumes that all the ponds would be deepened and have a new liner installed.
- Specifically Ponds 3, 4, 5, 6, & 7:
  - Drain down and remove sediment by mechanical dredging.
  - Remove liner and excavate to beneath the pond liner, increasing depth by 2-5 feet.
  - Stabilize shorelines with geofabric-wrapped soil “shelves” stabilized with soil and plantings.
  - Install aeration fountains where electrical service is available.
  - Wherever Ponds are deepened and new liners installed, consider diffused aeration system in lieu of fountains.
  - Restore impacted access areas.
- Additional work at Pond 3:
  - Install sediment forebay at north end of Pond 3, lined with pond liner only.
  - Construct stabilized access area for annual maintenance by vactor truck.
  - Install valves and piping for alternate recirculation discharge location to Pond 3.
  - Inspect and reseal spillway structure (*weir*).
- Additional work at Pond 5: Evaluate well & pump system for continued use as supplemental water supply to Pond 5. Repair as needed.
- Additional work at Pond 6: Inspect and reseal spillway structure (*weir*).
- Additional Work at Pond 7:
  - Install new electrical service to Pond 7 recirculation pump.
  - Evaluate recirculation pump and repair or replace as needed.
  - Inspect and reseal spillway structure.

## Design Scenario 2 - STREAM CHANNEL:

Note that Pond 3 has been eliminated from the Conceptual Design model, replaced by an open channel to Pond 4. Even though Pond 4 will be redesigned to appear as a stream channel, it is still represented as a pond in the model because water would continue to pond up behind the culvert at Moss Creek Drive during large flood events, providing some storage of floodwaters in the former location of Pond 4. During smaller storm events, however, stream flow would be contained within the constructed stream channel with minimal overbank flow. (Note that possibly with the exception of drought, there will be some standing water in what is now considered to be pond #4.)

- The concrete spillway structure (*weir*) at the south end of Pond 3 would be removed and replaced with a 1.4' high grade control constructed with natural boulders
- A restored natural stream channel would be created through the existing locations of Pond 3 and Pond 4.
- Pond 5 would be dredged and reconstructed to serve as a sediment forebay, protecting Ponds 6 and 7 from excessive sedimentation.
- While it may be possible to continue stream channel construction through Ponds 5 and 6, the cost may be prohibitive.
  - The existing culvert structure between Pond 5 and 6 (*located under the bridge*) would need to be modified or replaced, and
  - the spillway connecting Pond 6 to Pond 7 would need to be reconstructed at a lower elevation to create enough vertical gradient for the water to flow from Pond 4 to Pond 7.
  - Potential conflict with existing utilities may result, requiring relocation and/or reconstruction.
  - **The recommendation of this study, therefore, is that Ponds 6 and 7 should remain as ponds.**

- Overall, it appears that the construction of a stream channel through Ponds 3 and 4 would have a relatively modest effect on peak flow performance and flood elevations in the WFCAs pond system. Further analysis and testing of design solutions would likely bring post-project peak flows and flood elevations within acceptable limits through minor modifications to existing culvert and outlet control structures (*weirs*).



# Winslow Farm Community Association Pond Improvement Simplified Overview

## Current Status

The WFCAs Ponds are numbered 1-7

- P1 is located closest to S Highland Ave.
- P7 is located closest to E. Winslow Rd.
- The arrows donate the major entry point for waterflow
- The double rectangles are bridges
- Single squares are weirs that serve as spillways
- Not shown: An inlet at the north end of P3 has already been filled in to allow for better waterflow.



## PROPOSED SCENARIO #1 POND REWAL



- Add sediment forebay north end of P3 to capture sediment
- Reinforce banks that have eroded in P3
- Dredge and deepen P3, install new liner
- Dredge & reline ponds 4-7, reinforce banks as needed
- Configuration remains as current

## PROPOSED SCENARIO #2: STREAM CHANNEL



- Pond 3/4: Reconfigure into a channel bed and install liner
- Remove weir between P3 & P4, replace with retaining walls
- Install sediment forebay in P5
- Dredge & reline ponds 5-7, reinforce banks as needed
- Install erosion control landscaping P3 and rain garden in P4.