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Strand Associates, Inc.®

Bioswale to Wet Detention Basin Conversion Stoughton, WI

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MAMSWaP – August 4, 2020

Presentation Outline

- Project background and location
- Grant process and funding
- Design
- Permits
- Construction
- Questions

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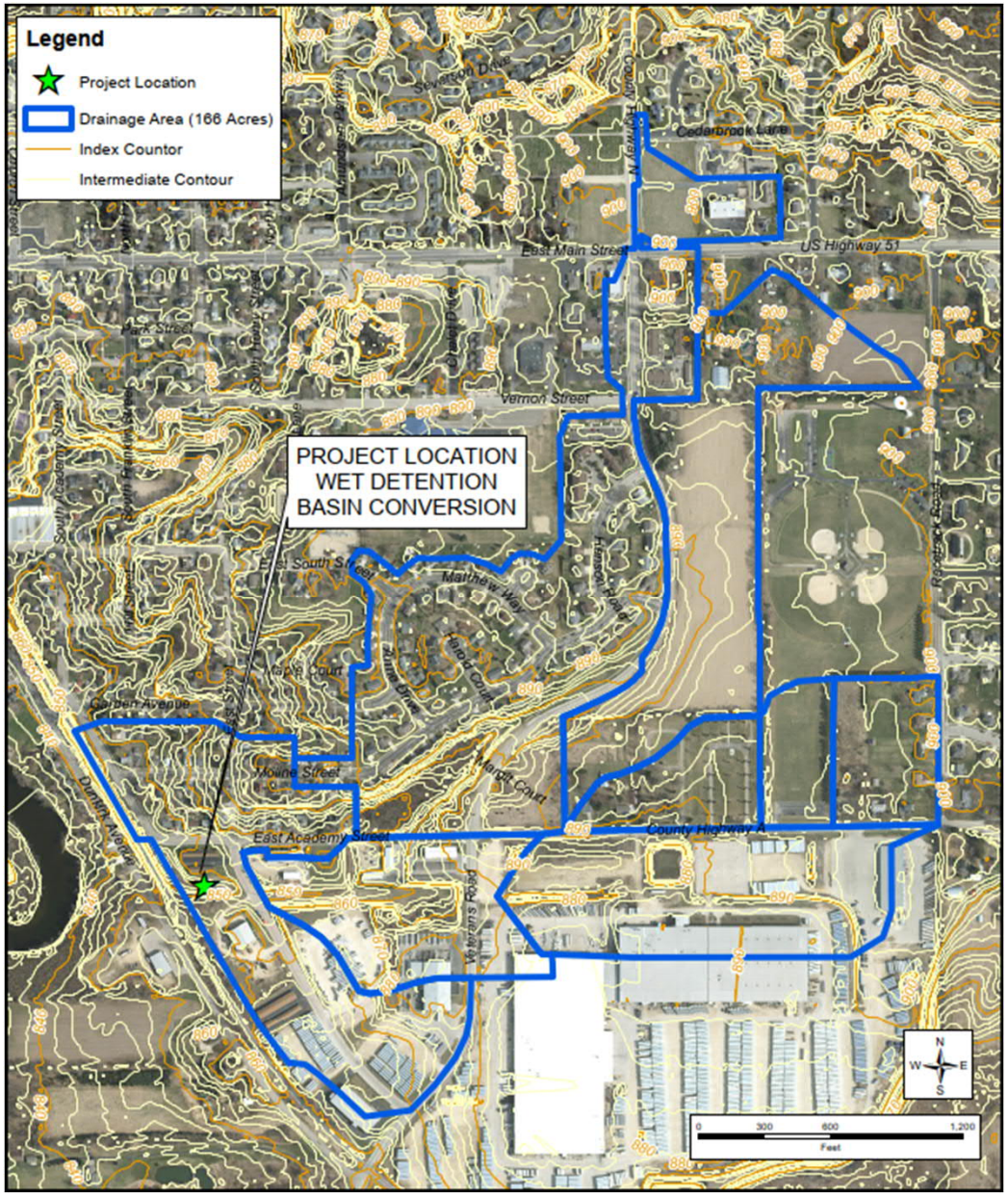
Project Background

- 2018 Stormwater Quality Management Plan
  - Retrofit bioswale to wet detention basin
  - Increase TSS/P reduction
  - Drainage Area = 166 acres
  - Within Reach 68 of the Rock River Basin TMDL in the Yahara River Watershed

- Project Location
  - Southwest of Academy St./East St. intersection.



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Grant Process and Funding

- **WDNR UNPS Construction Grant**
  - Total Grant = $135,000 (35.5% of Construction and Engineering - $380,000)
  - Grant Technical Submittal
  - Final Report
  - Reimbursement Request
- **Dane County Urban Water Quality Grant**
  - Total Grant = $100,000 (26.3% of Construction and Engineering Costs)
  - As-built Documentation
  - Operation and Maintenance Plan
- **Local Funding**
  - $145,000 (38% of Construction and Engineering Costs)

DANE COUNTY LAND & WATER RESOURCES DEPARTMENT

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WISCONSIN DEPT. OF NATURAL RESOURCES

Data Collection

- **Survey**
  - Cross sections along existing bioswale every 25 feet.
  - Top and bottom of sediment shots within bioswale footprint
- **Sediment Sampling**
  - 8 sediment samples at 4 locations
  - Submitted 2 composite sediment and 2 composite parent material samples to CT Laboratories.
  - Tested for parameters listed in NR 528 (total N, P, K, As, Cd, Cu, Cr, Pb, Ni, Zn)
- **Geotechnical (CGC Inc.)**
  - 3 soil borings
  - Global Stability Analysis
  - Suitability of native material to be used for proposed clay liner

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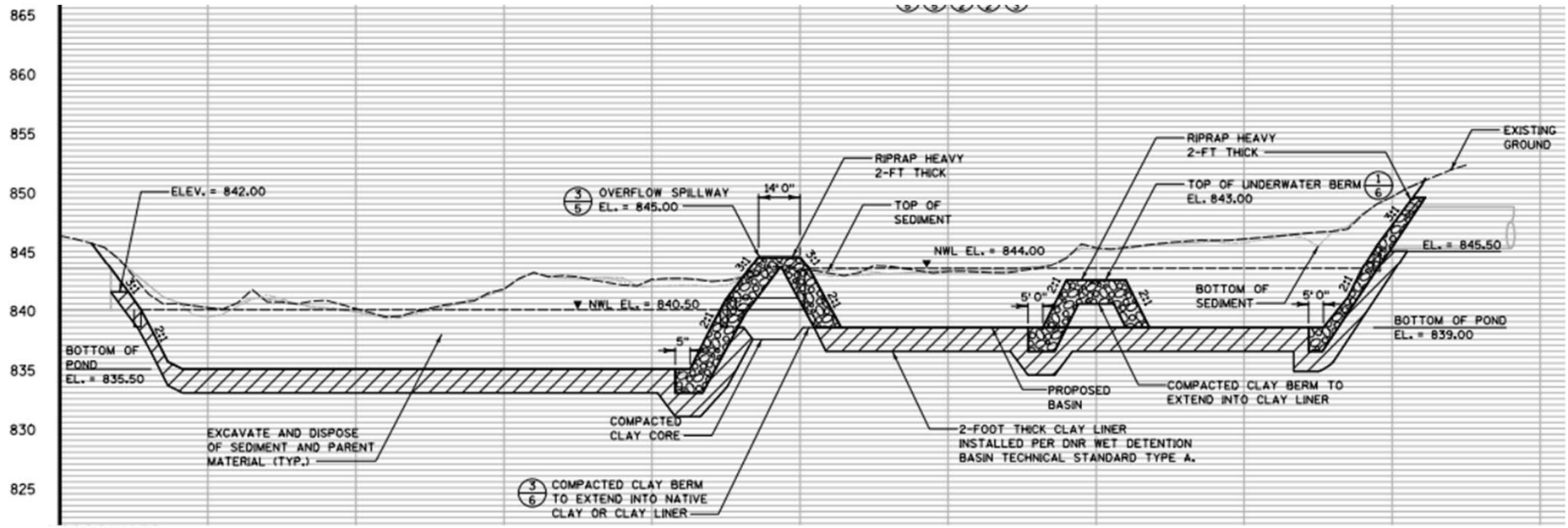
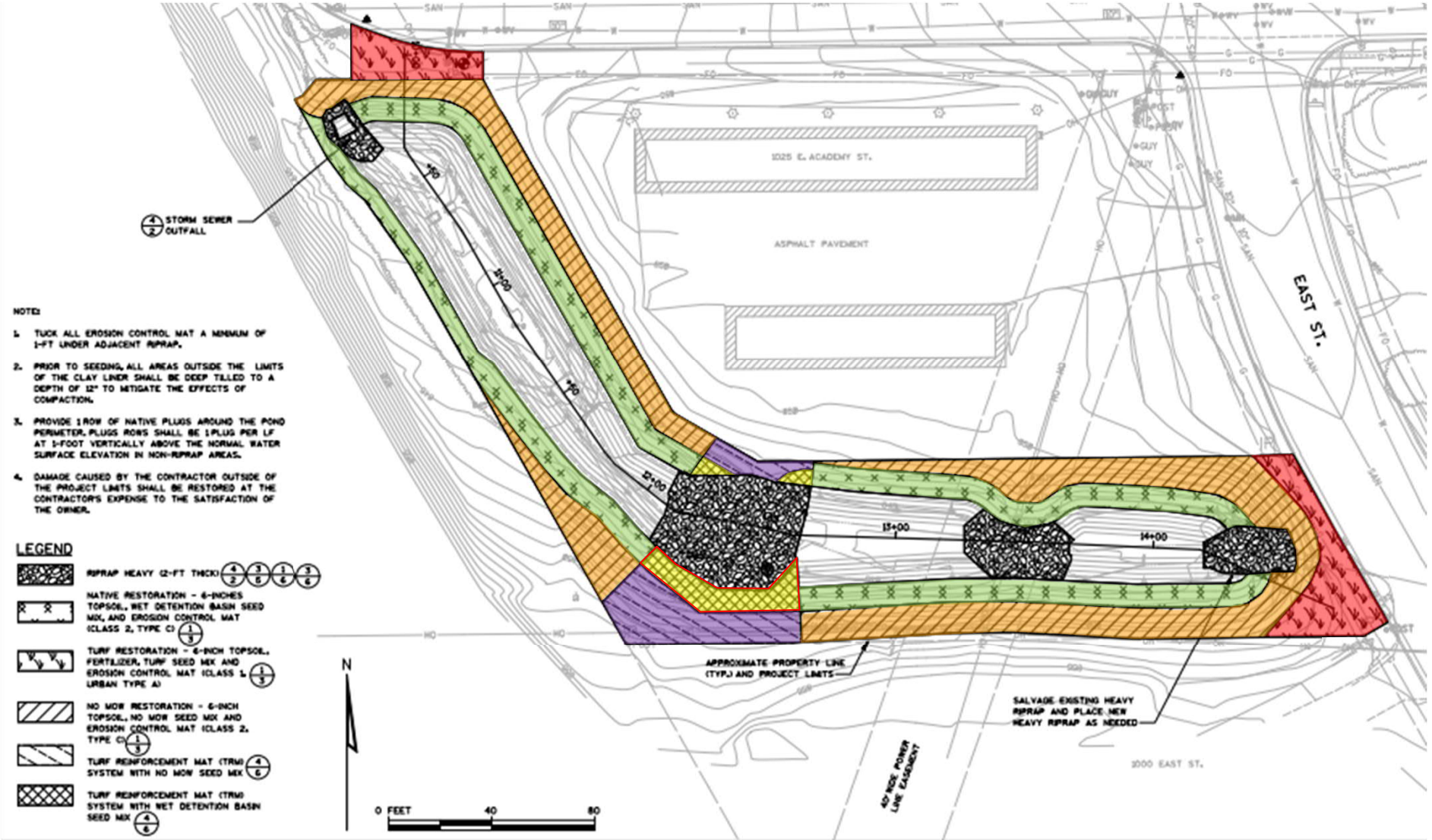
Design Features

- Two wet detention basin cells separated by an overflow spillway with compacted clay berm.
- Normal water level is at approximate existing ground surface (US NWL = 844; DS NWL = 840.5)
- 5-feet of sediment storage in each cell
- Underwater berm on upstream cell to create forebay and avoid utility guy wires.
- Overflow structure to control flow from the upstream to downstream cells during a rain event.
- 2-foot thick clay liner extends 1.5’ vertically above NWL for each cell.
- Salvaged existing basin inlet apron endwall. Removed outlet pipe gate and added an apron endwall with new pipe gate.



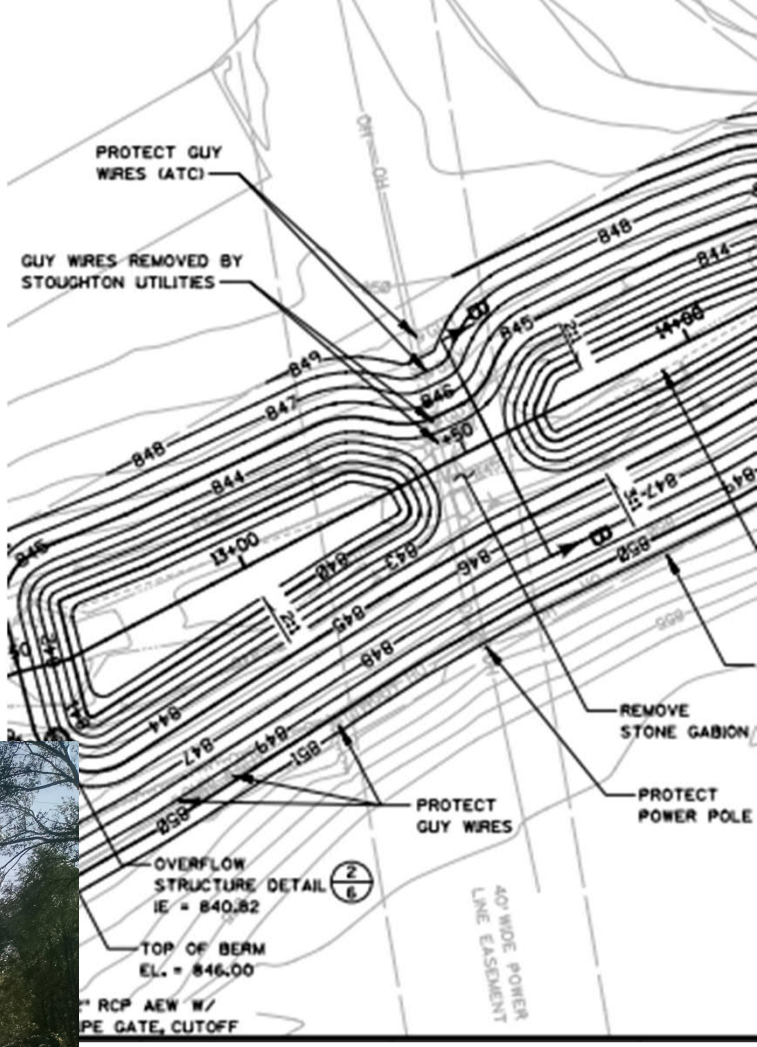
Restoration

- Heavy riprap
- Native plant plugs
- Native restoration
- No Mow Restoration
- TRM System
- Turf Restoration



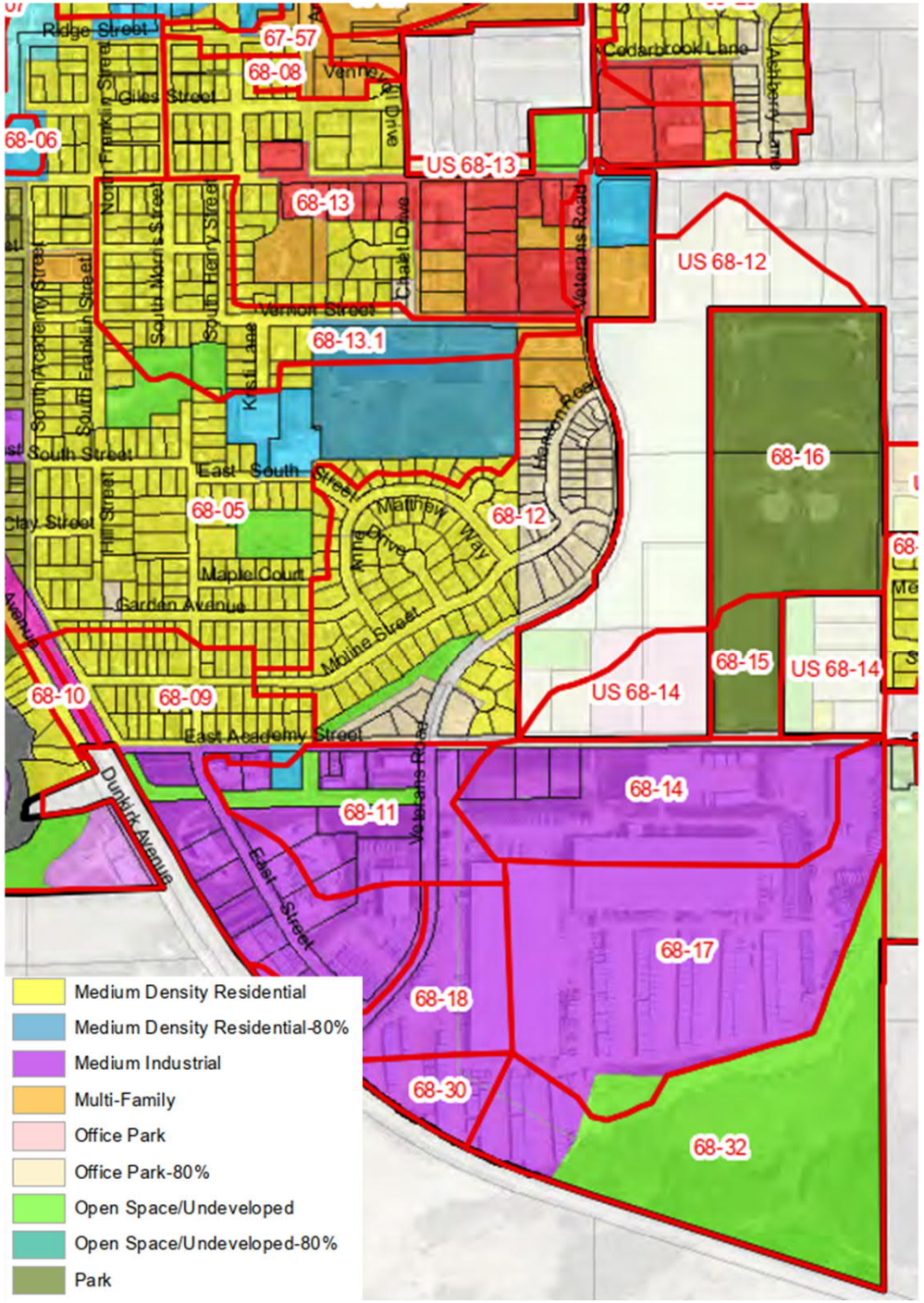
Utilities

- 40’ wide ATC and Stoughton Utilities easement with guy wires that would conflict with proposed grading.
- Stoughton Utilities relocated guy wires. High cost for ATC relocation.
- Modified grading to avoid ATC guy wires.



Water Quality Modeling

- Updated existing WinSLAMM model from 2018 SWQMP with the proposed detention basin design
- Proposed wet detention basin removes an additional 7,500 lbs/yr of TSS and 3 lbs/yr of P compared to existing bioswale



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Hydrologic/Hydraulic Modeling

- Created a HydroCAD model for existing and proposed conditions to determine impacts of the WSEL for the 1-, 2-, 10-, and 100-year storm events.
- NOAA Atlas 14 rainfall depths with MSE4 rainfall distribution
- Proposed high water elevations are less than existing conditions

Watershed	Drainage Area	1-Year		2-Year		10-Year		100-Year	
	(ac)	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Water Surface Elevation in Feet (Downstream Cell)	166	843.17	842.98	843.55	843.38	845.85	845.73	848.04	847.88
Flow Rate into Pond (cfs)	166	47.4	47.4	61.5	61.5	136.0	136.0	279.8	279.8
Flow Rate out of Pond (cfs)	166	42.61	37.4	53.8	49.5	111.0	109.8	365.3	347.74

Note: cfs = cubic feet per second

Table 2 Proposed High-Water Elevations and Flows Into and Out of Pond

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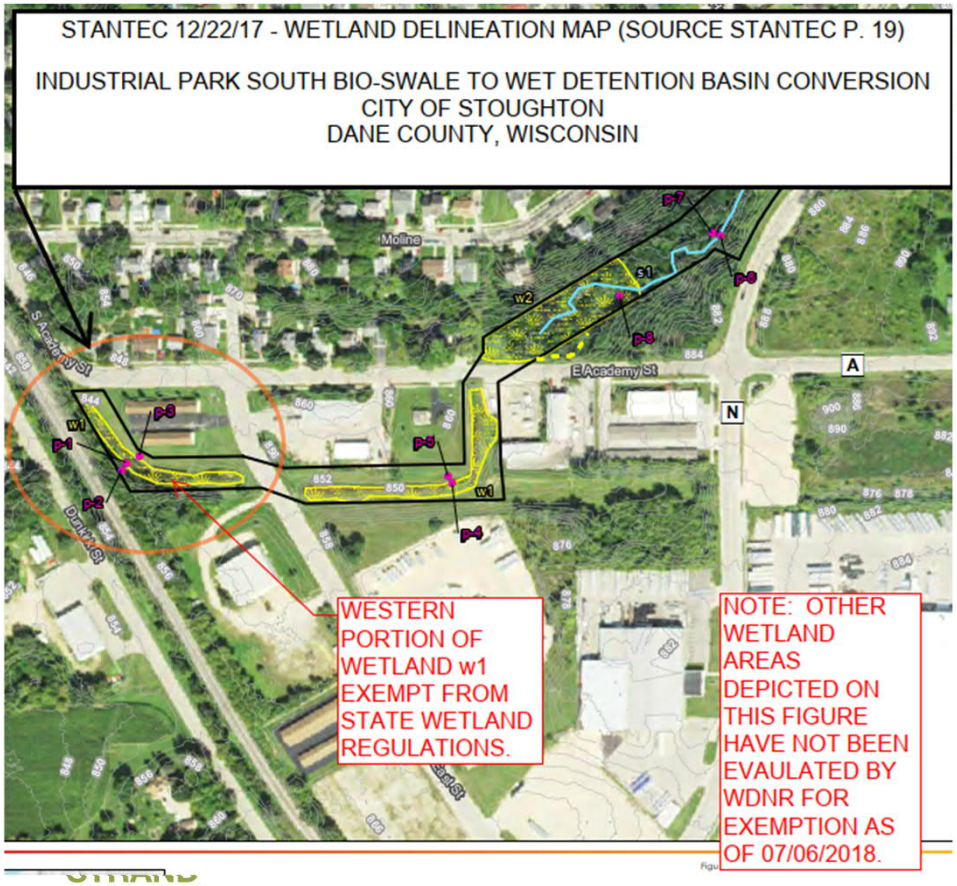
Permits

- **WDNR Chapter 30 Permit**
- **Dane County Erosion Control Permit**
- **Artificial Wetland Exemption**
- **Railroad Right-of-Way Permit Exemption**



STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

GENERAL PERMIT - Pond-stormwater
GP-SC-2019-13-03608

Rodney Scheel on behalf of the City of Stoughton, is hereby granted under Section 30.19(3r), Wisconsin Statutes, a permit to construct a stormwater pond near the Yahara River, in the City of Stoughton, Dane County, also described as being in the NW1/4 of the SW1/4 of Section 09, Township 05 North, Range 11 East, subject to the following conditions:

PERMIT

1. You must notify Weston Matthews at phone (715) 460-4089 or email weston.matthews@wisconsin.gov before starting construction and again not more than 5 days after the project is complete.
2. You must complete the project as described on or before 10/24/2022. If you will not complete the project by this date, there is no opportunity for an extension and you must apply for a new permit.
3. This permit does not authorize any work other than what you specifically describe in your application and plans, and as modified by the conditions of this permit. If you wish to alter the project or permit conditions, you must first obtain written approval of the Department.
4. Before you start your project, you must first obtain any permit or approval that may be required for your project by local zoning ordinances and by the U.S. Army Corps of Engineers. You are responsible for contacting these local and federal authorities to determine if they require permits or approvals for your project. These local and federal authorities are responsible for determining if your project complies with their requirements.
5. Upon reasonable notice, you shall allow access to your project site during reasonable hours to any Department employee who is investigating the project's construction, operation, maintenance or permit compliance.
6. The Department may modify or revoke this permit for good cause, including if the project is not completed according to the terms of the permit or if the Department determines the activity is detrimental to the public interest.
7. You must post a copy of this permit at a conspicuous location on the project site, visible from the waterway, for at least five days pri at least five days after construction. You must als approved plan available at the project site at all tim
8. Your acceptance of this permit and efforts to begi you have read, understood and agreed to follow al

DANE COUNTY LAND & WATER RESOURCES DEPARTMENT

Jeremy Balousek, P.E., Division Manager
Joe Parisi, Dane County Executive

Land Conservation • Office of Lakes & Watersheds • Parks • Water Resource Engineering

DATE: April 8, 2020

TO: Rodney Scheel
City of Stoughton

FROM: Elliott Mergen
Conservation Engineer

RE: Bioswale to Wet Detention Basin – Erosion Control Permit # 2019710
Erosion Control Plan Review

The erosion control plan for Bioswale to Wet Detention Basin has been reviewed and meets the requirements of the City of Stoughton's erosion control ordinance. The plan includes the following requirements:

1. The site may only be accessed using a stone tracking pad. The pad must be a minimum of 50' long x 24' wide x 12" deep and be constructed of 3-inch clear stone. The tracking pad shall be maintained in a condition that prevents the tracking of material onto public roads. In the event material is tracked onto the street, site access shall be restricted, tracked material will be removed and tracking controls shall be restored before site access resumes.
2. Stormwater inlets will be protected with framed inlet protection.
3. Rock riprap, ditch checks and erosion control matting will be installed at the locations shown on the plan.
4. The contractor shall install additional erosion control measures as requested in writing by the project superintendent or the City of Stoughton within 24 hours of notification.
5. The plan includes a construction schedule as follows:

   Grading is scheduled to begin April 13, 2020.

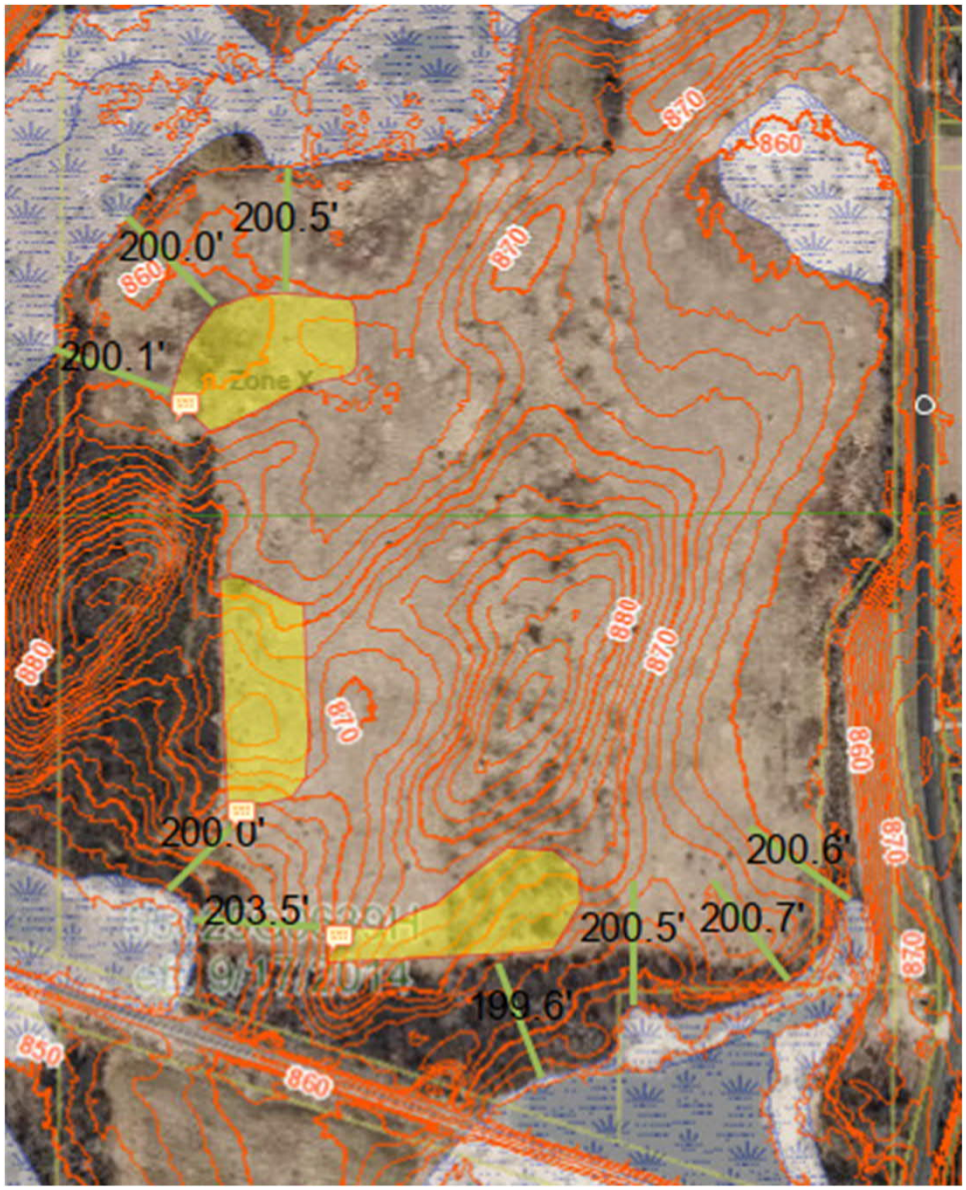
   All disturbed lands shall be restored as noted in the plan by June 12, 2020.

Any proposed changes to the erosion control plan must be submitted and approved prior to implementation.

Cc: Michael Stacey – City of Stoughton, Justin Gutoski – Strand and Associates

Sediment Disposal Site

- All excavated material was taken to City's compost site at 1101 Collins Road.
- Locational Criteria
  - 3' separation from bedrock or groundwater
  - 1,200' from public water supply well
  - 250' from private water supply well
  - 200' from lake, wetland, pond, or any navigable waterway
  - 250' from residence
- Material spread on south end of site as it can't be reused.
- Pile was approximately 45,0000 ft^2 and 2.5' tall (4,000 yd^3).
- Erosion control measures included silt fence and temporary seeding.



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Construction

- **Schedule**
  - Bid Opening: November 26, 2019
  - Preconstruction Meeting: April 6, 2020
  - Construction Start Date: April 29, 2020
  - Contract Substantial & Final Completion Date: June 15, 2020
  - Construction End Date: June 26, 2020
  - Final Walkthrough: July 10, 2020
- **Construction Team**
  - Strand: Part-time RPR Services; Construction Management
  - CGC Inc.: Geotechnical Engineer
  - Speedway Sand & Gravel: Prime Contractor
  - Field & Stream Restorations: Restoration Subcontractor

SPEEDWAY
Sand & Gravel, Inc.

CGC, Inc.

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Construction

- Construction Challenges
  - High ground water
  - Frequent rain events

- Key Takeaways
  - Seek synergistic opportunities for dredged spoils and have a sediment management plan.
  - Ensure that the Contractor has a sufficient flow management/dewatering plan.
  - Communicate with the Owner/Client on restoration techniques and maintenance responsibilities

- Project Cost
  - Awarded Contract Bid = $265,000
  - Final Project Cost = $281,300

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KOMATSU

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Questions

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