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February 22, 2018

Mr. Brandon Herbert
Strand Associates, Inc
910 West Wingra Dr
Madison, WI 53715

Subject: Final Report Review for LPL164117

Dear Mr. Herbert:

I have been asked by you to review the final report for the Millpond and Channel Study grant, grant number LPL164117. I've given some preliminary feedback to you by phone, but this is a complete response, which is being sent to you as the Authorized Representative.

Some of the deliverables agreed upon on in the grant award have not been met. The grant award is a contract outlining the project terms and conditions, along with deliverables. The state is required to ensure that state funds are being used in a fiscally sound manner. This letter provides some relevant background information to this review followed by some options for you and the City of Lake Mills, the grant sponsor, to close out this grant.

Background

Lake Management Planning Grants provide financial assistance for the collection, analysis, and communication of information needed to conduct studies and develop or update management plans to protect and restore lakes and their watersheds.

The City's initial draft grant application was met with interest by myself and others. We met at my office on 11/18/16 for a scoping discussion so I could help them modify the scope to better compete for a grant award. At that meeting, Mr. Wilke from the City stated they would like to look at the feasibility of dredging the millpond as an effort to alleviate problems with odor, vegetation, and sedimentation, and that the request for dredging came from one person. He also noted that he wanted to see if any part of the millpond was indeed in need of dredging and that he was not pushing that as a personal agenda or solution.

The following was provided as feedback during this meeting:

- The millpond is a designated Sensitive Area, so dredging considerations must be evaluated carefully; there may be a specific navigational need in the channel. Our Water Regulation and Zoning staff are trained to promote optimal public rights in public waters, and these rights sometimes are conflicting.
- Fish surveys have found multiple sensitive and threatened/endangered fish species in the area, and that dredging would have an impact on those species.
- It was suggested to broaden the scope to more than just a dredging feasibility which alone would have been unlikely to qualify for an award; the problem statement needs to be very clear and the scope should look at the problems themselves (i.e. odor, excessive plants, sedimentation, habitat quality) rather than just assuming the solution was dredging. These grants are intended to protect and improve lakes. You stated you'd be happy with a grant focused on a study rather than the dredge focus, and having a

comprehensive study would provide a good reference for future management, even if dredging did not become a necessity.
- The importance of partner support. Strong partnerships improve the likelihood of grant approval, and of project success. Assistance and support from the Joint Rock Lake Committee (JRLC) and from Jefferson County LWCD were offered.

The final grant application was received on time. Here are some excerpts from the final Mill Pond and Channel Study grant application (emphasis added for deliverables which have not been adequately addressed):

- Concluding the Problem Statement: The City is proposing to study the Mill Pond and Channel *to gather baseline data for the physical and ecological characteristics of these areas* as well as address known areas of shoreline degradation and potential storm water treatment.
- In C.1. Goal: Produce base line data on the physical *and ecological* characteristics of the Mill Pond and Channel and *evaluate the impacts and feasibility of sediment dredging*, natural shoreline restoration, and storm water treatment.
- In C.1. Job Objective: *Evaluate the impacts and/or benefits of sediment removal on habitat, odor, downstream nutrient loading, and lake access*
- Under 1.d. activity: Sediment Removal Analysis: *Evaluate whether sediment removal is possible, will increase lake access, will impact ecological quality, or will reduce nutrient loading, and/or odor issues downstream of the Mill Pond.*
- Under D. Role of project in Planning/management of Waterbody: This project will…*assess the habitat* in the mill pond and feasibility and/or benefits of sediment removal…
- Under F. Plan for Sharing Results: *The results will be shared with the JRLC at one of their meetings if the Committee desires. The Jefferson County LWCD will also be invited to attend the Public Works Board, City Council, and/or the JRLC meetings as well.*

Despite unspecified methods and deliverables in the application which resulted in a low score, the grant was ranked high enough to qualify for an award of $25,000, which is 67% of the project cost estimate. Here are the comments, which were all discussed during our scoping meeting on 11/18/16, that I provided on the incoming grant checklist for the ranking staff to consider: *The entire millpond is a designated Sensitive Area, and is home to numerous NHI listed species. Protection of this habitat is considered by department to be important. Dredging in this area may ease navigational challenges posed by growth of aquatic plants, but could also compromise health of the habitat for the listed species. All of these perspectives should receive fair and thorough consideration. The channel between the millpond and the lake is also shallow, though it is navigable for appropriate sized boats. The bridge over the channel is also a limiting factor for boat size, in addition to the fact that local children can't seem to resist throwing sizeable rocks into the channel. Solutions for these problems can also be explored via this proposal. I support an award for this proposal provided it ranks high enough.*

Comments on Final Report

Some of the report activities were satisfactorily completed and summarized in the report, including sediment quality analysis, depth mapping, planned cross-sections, and stormwater outfall modeling and prioritization. However, the activities excerpted in the bullet point above in italic font have not been satisfactorily completed.

Additional specific comments are:

- Pages 5 and 6 of the final report, under the heading “Impacts and Benefits of Sediment Removal” does not complete an assessment of habitat in the mill pond. This text contains many assumptions and hypothetical statements that may have no applicability to this millpond and channel setting. Without data or verification, even the mention of some subjects could lead readers to assume the issues are applicable. For example, algae blooms and low dissolved oxygen are mentioned repeatedly, but there was no sampling or documentation about whether these conditions ever exist in the millpond. Blanket statements like “aquatic fauna may also benefit from the dredging” may in a small number of instances be true (e.g.,

maybe deeper water would provide habitat for some sportfish), but may be incorrect in other cases (deeper water probably would be detrimental to the habitat needed by sensitive fish species currently found there). The suggestion that there could be fish kills in the millpond could lead to public concern about fish kills, but in fact, fish kills haven't been documented in the millpond.

- The report states that noxious odors are from hydrogen sulfide produced in the sediment. I didn't see any investigation in the report to determine if those odors are from the stormwater outfalls, from the large marsh adjacent to and south of the millpond, or from the sediments in the millpond, or whether dredging a channel in the millpond would do anything to help that problem, and whether or not it would be reasonable to expect.
- If water temperature in the millpond is creating problems, what are they, and is there reason to believe that dredging the channel and a navigational path would change the water temperature, given flow rate and tree canopy cover?
- If the water in the millpond were to be dredged deeper, what kind of plant community in the dredged channel would be expected, and what about the other areas of the mill pond if there is a lot of boat traffic?
- Will the water clarity improve, stay the same or get worse?
- What impact would dredging and the predicted increase in boat size and numbers have on the sensitive species that live in the millpond?
- How long would the channel and millpond navigational path be expected to remain before filling in by redistribution of sediments, especially if boat size and numbers in the millpond increase?
- My overarching concern with the text throughout the report is the assumption that dredging only had benefits, is the only solution to the problems that are mentioned, and that the problems are severe enough to warrant dredging. This grant was to be a preliminary and comprehensive study, not just focused on engineering aspects of dredging. There should be some balance brought to the assumption that dredging will be the outcome of this study, with an equal exploration of the detrimental impacts of dredging, and how changed habitat and use could affect sensitive species.
- Results, when they are ready, should also be offered to be presented to a meeting of the JRLC, per the grant agreement. They are a well-organized group with a lot to offer, and along with Jefferson County LWCD, are knowledgeable and resourceful partners in questions about management of Rock Lake, and the millpond.

Options

The issues with this grant report have been evaluated by the department and in order to complete this grant, you'll need to follow through with one of the options listed here, both of which are attached to partial reimbursement of the contract award:

1. Partial reimbursement - 75% of the $25,000 reimbursement if a) the department accepts the report with no changes, provided a copy of this letter is attached to the report explaining our concerns, and b) the report is offered to be presented at a meeting of the JRLC; or
2. Partial reimbursement - 85% of the $25,000 reimbursement if a) you modify the language in an effort to remove the assumption that dredging is a given; b) pages 5 & 6 are modified to clarify any statements that are hypothetical, versus factual information that's applicable to and supported by monitoring at this location; c) indicate a need for future studies to address the list of issues (in the excerpts above); and d) offer to present the final report at a meeting of the JRLC.

Option 1a is standard practice with grants where the deliverables are not fully complete and there is a partial reimbursement. You may ask why additional monitoring and analysis couldn't be completed for a full reimbursement. This is not an option because as you know, the current grant has already received an extension, and is due to be completed June 30, 2018. Work required to do a complete analysis would have to continue past June 30 (e.g. monitoring algae and dissolved oxygen in the millpond). The City would of course have the option of requesting another grant during the next cycle to work on the unfinished issues. Ecological evaluation of this

millpond would require monitoring of some habitat features such as water quality, different biota, and others. I'd be happy to work with you, the City and other partners on refining a monitoring plan and methodology to addressing these issues if the City is interested in moving forward. Also, I'm sure the JRLC would be able to help brainstorm other questions to answer if the project looks like it should move forward to the next level of consideration.

Please let me know if you prefer option 1 or 2, and feel free to give me a call if you'd like to meet to discuss further clarification about this letter. I'm happy to talk with you about it any time.

Sincerely,

Susan Graham

Susan Graham, Lakes Management Coordinator
608-275-3329

e-cc. Jim Klosiewski, DNR, Acting Field Operations Supervisor
Greg Searle, DNR, Field Operations Director
Sandy Chancellor, DNR Environmental Grants Specialist
Ali Mikulyuk, DNR, Lakes Team Leader

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January 9, 2018

Mr. Steve Wilke, City Manager
City of Lake Mills
200 D Water Street
Lake Mills, WI 53551

Re: Mill Pond and Channel Dredging Feasibility Study

Dear Steve,

We have completed sediment sampling and the initial management and planning efforts for the Mill Pond and channel. The assessment included collection and analysis of sediment samples, an initial dredging feasibility study, a stormwater treatment device assessment, and a shoreland erosion assessment. This project is partially funded by a Wisconsin Department of Natural Resources (WDNR) Large Scale Lake Management Planning Grant.

Sediment Collection and Analysis

On May 11, 2017, a sediment sampling plan was submitted to WDNR for review. Following discussion, the following sampling plan was recommended by WDNR in an e-mail dated May 19, 2017:

1. Collection of a grab sediment sample and a grab parent material sample at one location in Mill Pond.

2. Collection of a grab sediment sample and a grab parent material sample at one location in the channel between Rock Lake and Mill Pond.

3. Analysis of the samples for: total metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc), polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), total organic carbon (TOC), oil and grease, total phosphorus, nitrate and nitrite, ammonia, total kjeldahl nitrogen (TKN), grain size by hydrometer, and moisture content.

On August 9, 2017, samples were collected from Mill Pond (Mill Pond Sediment) and the channel (Channel Sediment). Figure 1 shows the sampling locations. No parent material could be recovered and only a sediment sample from Mill Pond and a sediment sample from the channel were retrieved. Numerous attempts were made, but parent material would not stay in the 4-foot core sampler. The depth of sediment and the type of parent material (believed to be sand and gravel) prevented collection of parent material.

The sediment sample analytical results are summarized in a data table and the laboratory report provided in Attachment A. The table compares the analytical results to the Consensus-Based Sediment Quality Guidelines (CBSQG) from the WDNR Interim Guidance dated December 2003. Results are compared to the Threshold Effect Concentration (TEC), Midpoint Effect Concentration (MEC), and Probable Effect Concentration (PEC) as provided in the CBSQG. The lower TEC is the concentration at which toxicity to benthic-dwelling organisms is unlikely, and the PEC is the concentration at which toxicity to benthic-dwelling organisms is probable. The MEC is the concentration midway between the TEC and the PEC concentrations. Reported dry weight results are provided as well as the results normalized

to 1 percent TOC for comparison to the TEC, MEC, and PEC as recommended in the CBSQG. The table also compares the results to Wisconsin Administrative Code (WAC) NR720 Industrial Site and Non-Industrial Site Direct Contact standards. These standards represent levels of contamination that would be considered a direct-contact risk at a site with and industrial land use or a site with a non-industrial land use.

The analytical results show that no concentrations of PAHs, PCBs, or metals exceed the TECs, MECs, or PECs. This means no contaminants were detected at levels harmful to benthic-dwelling organisms. In the Mill Pond's Sediment sample, the concentration of one PAH compound (benzo(a)pyrene) slightly exceeded the NR720 non-industrial site direct contact standard. This would preclude disposal/reuse of dredged material at a residential site, but would likely not precluded other off-site disposal/reuse options that might be available in the area, including land application at an approved land application site or placement at any other fill site or disposal site that complies with the performance standards specified in NR 504.04(4). The material could also be disposed in a licensed landfill. No other concentrations of PAHs, PCBs, or metals exceed NR720 direct contact standards and no additional sediment sampling is recommended.

Dredging Feasibility Study

An analysis was conducted for the channel and Mill Pond. Sediment depths in the channel generally range from 0.5 foot to 2 feet. Sediment depths in the pond generally range from 0.5 foot to 4 feet. The analysis included conceptual plan and profile sheets and cross sections showing removal of all sediment, removal of sediment to elevation 824.03, and removal of sediment to elevation 825.03. The plan and profile and cross section sheets are included as Attachment B. An opinion of probable construction cost (OPCC), a listing of required permits and grant opportunities, and an implementation plan were included with the analysis.

Four scenarios for dredging were analyzed: Scenario 1–Removing all sediment in the channel and pond; Scenario 2–Removing sediment to elevation 824.03; Scenario 3–Removing all sediment to elevation 825.03; and Scenario 4–Removing all sediment in a 50-foot wide channel from Mill Pond's boat landing to the Ferry Drive bridge/culvert. Removing all sediment from the channel and pond would improve stormwater retention by maximizing storage capacities and would remove nutrient-rich sediments that could potentially be washed downstream into Rock Creek. Removing sediment to elevation 824.03 would allow 4 feet of water depth at the Rock Lake minimum water level elevation (828.03) during the summer season (May 2 to September 15), and removing sediment to elevation 825.03 would allow 3 feet of water depth during the summer season. To achieve these elevations, the channel requires parent material removal at some of the cross sections. As can be seen in the cross sections, the entire channel has a maximum depth of less than 3 feet (measured from the Rock Lake summer minimum elevation of 828.03). The pond appears to consistently have maximum depths between 3 feet to 4 feet (measured from the Rock Lake summer minimum elevation of 828.03) within the central portion of the pond. Near shore areas, however, show less than 3 feet of depth. The dam located at the eastern end of Mill Pond was rehabilitated in 2016 and controls these water levels. The operation and management of the dam and required seasonal water levels are included in a memo titled *Policy Letter #4-19, Dam Management*, dated September 11, 2007. A topographic survey of the top of sediment and the top of parent material was completed. This survey data was used to compute approximate quantities of sediment removal for each scenario, which is summarized in Table 1. When this project moves forward to a design phase in the future, a denser survey consisting of cross sections at every 25 feet across Mill Pond would be needed to refine the sediment quantities. Hydraulic dredging of Mill Pond would require dewatering in geotextile

bags. These bags could be located along Veterans Drive south of the fire station, which is generally unused and drains back to wetland south of Mill Pond.

Channel (Sta. 10+75 to 13+50)		
Scenario	**Sediment Removed (CY)**	**Parent Material Removed (CY)**
Removal of All Sediment	762	0
Removal of Sediment to Elev. 825.03	441	50
Removal of Sediment to Elev. 824.03	691	76
Mill Pond (Sta. 13+50 to 23+50)		
Scenario	**Sediment Removed (CY)**	**Parent Material Removed (CY)**
Removal of All Sediment	17,793	0
Removal of Sediment to Elev. 825.03	2,588	0
Removal of Sediment to Elev. 824.03	6,657	96
Total (Channel and Mill Pond)		
Scenario	**Sediment Removed (CY)**	**Parent Material Removed (CY)**
Removal of All Sediment	18,555	0
Removal of Sediment to Elev. 825.03	3,029	50
Removal of Sediment to Elev. 824.03	7,347	172
Mill Pond 50-Foot Wide Channel		
Scenario	**Sediment Removed (CY)**	**Parent Material Removed (CY)**
Removal of All Sediment	1,807	0
Removal of Sediment to Elev. 825.03	36	6
Removal of Sediment to Elev. 824.03	549	44
Total (Channel and Mill Pond 50-Foot Wide Channel)		
Scenario	**Sediment Removed (CY)**	**Parent Material Removed (CY)**
Removal of All Sediment	2,569	0
Removal of Sediment to Elev. 825.03	477	55
Removal of Sediment to Elev. 824.03	1,239	120

Note: CY=cubic yards

Table 1 Sediment Removal Summary

An OPCC in first quarter 2019 dollars was computed for each scenario.

The dredged sediment should not require disposal in a licensed landfill and should be suitable for land application, potentially on a farm field or some other site needing fill. The Dredged Material Exemptions in NR 500.08(3) should apply to the dredged materials and beneficial reuse at a location meeting the NR 504.04(4) performance standards may be an option rather than disposal of the material in a licensed landfill. Beneficial reuse and landfill disposal options will be evaluated in more detail when the Chapter 30 permit is submitted.

Tables 2A through 2E summarize the OPCCs assuming off-site beneficial reuse and landfill disposal for the channel and Mill Pond, respectively. If an acceptable on-site reuse location is identified, sediment disposal costs would be significantly reduced. The detailed OPCCs are included as Attachment C and

include costs for applicable shoreline/streambank restoration and applicable fish habitat improvements. Note, the OPCCs do not include design and construction observation costs.

Channel (Mechanical Dredging)		
	Total Cost	
Scenario	**Beneficial Reuse**	**Landfill Disposal**
Remove Sediment to El. 825.03*	$213,500	$248,800
Remove all Sediment	$224,900	$279,800
Remove Sediment to El. 824.03*	$225,100	$280,200

Note: The OPCCs do not include design and construction observation costs.
*These scenarios include parent material removal.

Table 2A Channel OPCC Summary

Mill Pond (Hydraulic Dredging)		
	Total Cost	
Scenario	**Beneficial Reuse**	**Landfill Disposal**
Remove Sediment to El. 825.03	$483,100	$816,900
Remove Sediment to El. 824.03*	$978,500	$1,829,300
Remove all Sediment	$1,712,500	$3,954,500

*These scenarios include parent material removal.

Table 2B Mill Pond OPCC Summary

Channel and Mill Pond Combined		
	Total Cost	
Scenario	**Beneficial Reuse**	**Landfill Disposal**
Remove Sediment to El. 825.03	$696,600	$1,065,700
Remove Sediment to El. 824.03	$1,203,600	$2,109,500
Remove all Sediment	$1,937,400	$4,234,300

Table 2C Channel and Mill Pond Combined OPCC Summary

Mill Pond 50-Foot Channel (Hydraulic Dredging)		
	Total Cost	
Scenario	**Beneficial Reuse**	**Landfill Disposal**
Remove Sediment to El. 825.03*	$94,400	$100,000
Remove Sediment to El. 824.03*	$190,200	$268,400
Remove all Sediment	$379,900	$614,100

*These scenarios include parent material removal.

Table 2D Mill Pond 50-Foot Channel OPCC Summary

Channel and Mill Pond 50-Foot Channel		
	Total Cost	
Scenario	**Beneficial Reuse**	**Landfill Disposal**
Remove Sediment to El. 825.03*	$307,900	$348,800
Remove Sediment to El. 824.03*	$415,300	$548,600
Remove all Sediment	$604,800	$893,900

*These scenarios include parent material removal.

Table 2E Channel and Mill Pond 50-Foot Channel Combined OPCC Summary

Impacts and Benefits of Sediment Removal

There are several beneficial impacts anticipated with dredging Mill Pond and the channel: reduced nutrient loading within the pond and downstream water ways, improved wildlife habitat, and better access to the pond via Rock Lake. As the CT Laboratories Analytical Report shows, Mill Pond's sediment is laden with nutrients such as phosphorus and nitrogen. These nutrients can cause algae blooms, which deplete oxygen levels and can lead to fish kills. Algae blooms can also lead to unpleasant odors. The channel sediment and pond sediment phosphorus concentrations are 164 milligrams per kilogram (mg/kg) and 386 mg/kg, respectively. During storm events or high winds, turbulence within the pond can re-suspend these pollutants. They can also be re-suspended by aquatic life such as carp. Pollutant resuspension increases nutrient concentrations in the pond and the downstream Rock Creek and Crawfish River, mitigating effects upstream and within the City of Lake Mills (City) to reduce pollutant loadings. There could also be hydrogen sulfide within the sediment. Hydrogen sulfide produces the "rotten egg" smell complained about within the City. Within the sediment, this compound is the result of bacteria reducing iron and manganese. Like phosphorus, it can be released into the water and the surrounding air by the sediment during high turbulence in the pond and channel. Dredging the pond and channel of the sediment will therefore reduce the risk of resuspension of algae-inducing nutrients, decrease phosphorus concentrations, and decrease hydrogen sulfide releases.

Aquatic fauna may also benefit from the dredging. The bathymetric survey completed for this project shows that the channel and Mill Pond have water depths generally less than 3 feet and between 3 and 4 feet, respectively. Likewise, the channel and Mill Pond have sediments between 0.5 foot and 2 feet and between 0.5 foot to 4 feet, respectively. These shallow depths can harm fauna in several ways. When depths are shallow, sunlight has increased intensity on the bottom, allowing for greater plant growth. This plant growth can crowd aquatic fauna habitats. The sunlight intensity can also increase the water temperature, putting stress on fauna. Dredging the pond to a greater depth will help to mitigate these issues by decreasing sunlight intensity at the hard bottom, lowering temperatures in the channel, and providing an enhanced habitat for fauna. Additionally, increasing the depth will also provide more habitat for fish during the winter months.

Dredging Mill Pond may also increase dissolved oxygen concentrations in the water, particularly in the winter, encouraging aquatic fauna to use Mill Pond as a year-round habitat. Decaying organic matter, such as dead aquatic plant growth, causes a biological oxygen demand (BOD) due to aerobic bacteria requiring oxygen to consume the decaying plant and other organic matter. This BOD can cause dissolved oxygen concentrations in the water to fall below levels that can sustain aquatic fauna. This is particularly a concern during winter when ice prevents oxygen exchange at the water's surface and very little plant photosynthesis is occurring to deposit oxygen into the water below the ice. Dredging the existing Mill Pond sediments would remove the organic sediment and its associated BOD. Removing the sediment would also remove phosphorus from the aquatic system. One pound of phosphorus in the water can produce 500 pounds of algae. In the winter, this algae dies and decays in the sediment, increasing the BOD in the system. Removing Mill Pond's sediment would stop or greatly reduce the cycle of algal and plant life growth and decay that reduces dissolved oxygen concentrations in Mill Pond.

Figure 1.1 Ferry Drive Existing Culvert

Dredging Mill Pond and the channel will also improve access for boats, particularly in the channel where sediment is visible above the water line in some areas. The City has received several complaints from residents trying to pass through the channel and under South Ferry Drive from Rock Lake. The dredging will allow for improved access including for larger watercraft if the South Ferry Drive bridge is improved in the future. However, dredging beneath the existing bridge/culvert would pose as a challenge due to culvert's low vertical clearance (See Figure 1.1). The lack of space beneath the bridge/culvert would prevent dredging equipment from working under the bridge and as a result, would decrease the efficiency and amount of sediment removed. It is recommended the culvert be replaced with future Ferry Drive bridge improvements to allow dredging to occur beneath the bridge. Channels could also be dredged laterally to the individual homeowners alongside Mill Pond. Turbulence created by homeowners' watercraft in Mill Pond can re-suspend sediment, causing problems discussed above. These lateral channels would reduce the re-suspension and allow for easier dock access. At the October 17, 2017 progress meeting, City staff expressed interest in dredging a channel from the boat landing to the Ferry Drive existing culvert.

Removal of Mill Pond and Channel sediments may also be subject to additional evaluation during permit review as Mill Pond is classified as a "Critical Habitat Area" for Rock Lake by WDNR. Critical Habitat Areas are defined as areas of a water body that are "most important to the overall health of the aquatic plants and animals" in that water body. These areas contain public rights features such as critical fish and wildlife habitat and/or physical features of lakes and streams the ensure protection of water quality. A Critical Habitat Area designation does not preclude dredging and as described in the Impacts and Benefits of Sediment Removal section, we believe sediment removal will generally improve aquatic habitat in Mill Pond.

To provide additional fish habitat in the pond, coarse woody debris and boulders could be installed near fishing access points if not interfering with watercraft navigation.

Stormwater Treatment Device Assessment

The stormwater treatment device assessment was completed using the modeling program, WinSLAMM v. 10.2. Drainage basins to five outfalls were delineated and modeled with a Suntree Nutrient Baffle Box (SNBB) unit. The unit size was chosen based off the peak flow rate (from WinSLAMM) that enters the device with the goal to remove 80 percent total suspended solids for the 110-micron particle size. Figure 2 shows the outfall drainage basins and proposed locations for stormwater treatment devices. Table 3 provides a summary of the pollutant loading each basin experiences in the baseline and proposed conditions, along with the recommended pretreatment device size. Basin 1 is recommended as the priority basin to receive a SNBB pretreatment unit due to the larger amounts of pollutants being reduced.

Basin	Basin Area (ac)	Baseline TSS Load (lbs)	TSS Load with Prop. Unit (lbs)	Total Load Reduct. (lbs)	TSS Load Reduct. (%)	Baseline TP Load (lbs)	TP Load with Prop Unit (lbs)	Total TP Load Reduct. (lbs)	TP Load Reduct. (%)	Peak Flow Entering Unit- From Win SLAMM (cfs)	Prelim. Unit Size
1	1.56	601	494	107	17.9%	1.54	1.32	0.22	14.3%	2.14	NSBB-3-6
2	0.74	310	255	55	17.7%	0.68	0.58	0.10	14.9%	1.00	NSBB-2-4
3	1.65	245	200	45	18.4%	0.82	0.71	0.11	13.6%	0.76	NSBB-2-4
4	0.38	103	80	24	22.8%	0.28	0.23	0.05	18.2%	0.47	NSBB-2-4
5	0.72	201	164	37	18.6%	0.66	0.56	0.09	14.0%	0.76	NSBB-2-4

*Modeling does not include street sweeping or catch basin sumps in the watershed.

Table 3 Modeling Summary

Other methods of treatment may also be considered, including a "snout" and/or a SAFL Baffle in inlets or manholes upstream of Mill Pond.

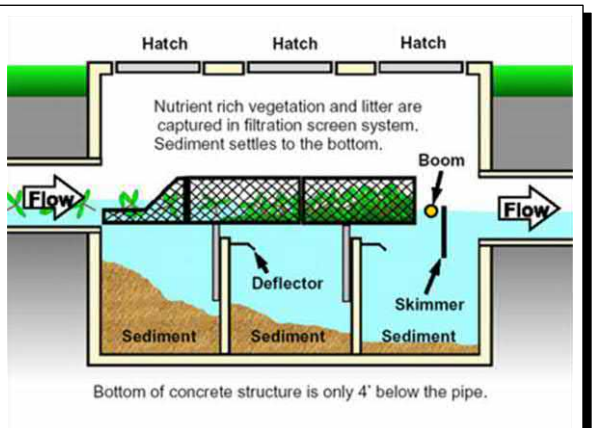


Figure 1 Suntree NSBB Unit

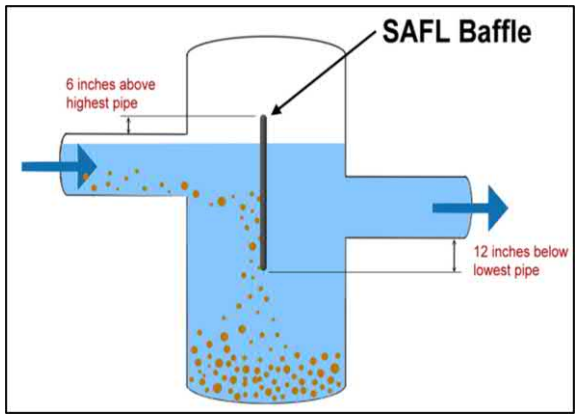


Figure 2 SAFL Baffle

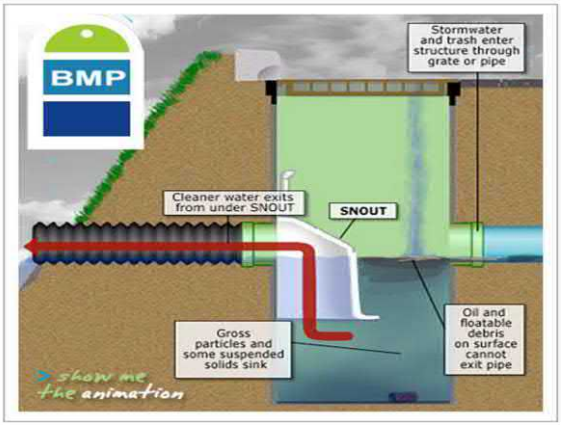


Figure 3 Snout BMP

Figure 4 SAFL Baffle and Snout BMP

The estimated opinion of probable construction costs (in 1st quarter 2019 dollars) for a NSBB stormwater treatment device, a Snout, and a SAFL Baffle are provided in Table 4.

Item	Total Cost
NSBB 2-4	$42,500
NSBB 3-6	$46,800
SAFL Baffle with Existing Structure	$5,682
SAFL Baffle with New Structure	$8,000
Snout with Existing Structure	$2,000

*All costs include unit cost, delivery, and installation.

Table 4 BMP Opinion of Probable Construction Costs

Shoreland Erosion Assessment

A field investigation was completed on August 9, 2017 to assess the streambank erosion along the channel and Mill Pond. Figures 3.01 and 3.02 show the locations of erosion, categorized by severity level: 2 (Slight), 2.5, and 3 (Moderate). Table 5 provides a summary of the existing streambank erosion. Figures 4.01 and 4.02 show the locations of stabilization and restoration categorized by types: Augmentative Riprap Restoration (add riprap to existing riprap), Boulder Revetment Restoration, Coir Fiber Roll, Vegetated Boulder Revetment, and specific structural repairs. Table 6 provides a summary of the proposed shoreline stabilization and restoration measures.

Erosion Severity	Length of Erosion (feet)
2 (Slight)	166
2.5	128
3 (Moderate)	42
Total	336
Structural Failures	**Length (feet)**
Deteriorating Concrete Wall	66
Grand Total	**402**

Table 5 Shoreland Erosion Summary

Treatment	Channel Length of Treatment (feet)	Mill Pond Length of Treatment (feet)
Boulder Revetment Restoration	134	-
Augmentative Riprap Restoration	11	-
Coir Fiber Roll Restoration	92	11
Vegetated Boulder Revetment	76	78
Grand Total	**313**	**89**

Table 6 Shoreland Stabilization and Restoration Summary

The existing arch pedestrian bridge located over the channel near Rock Lake has failing structural components and could be a safety hazard. Adjacent to this arch bridge is an overlook area that has a failing concrete foundation. A potential solution to these failing structures is to remove and relocate the existing arch bridge to Bartel's Beach Park. The arch bridge could be refurbished and serve as a decorative feature for the park. The existing pedestrian crossing over the channel would be maintained at the Ferry Drive bridge. The arch bridge and overlook areas at the channel would be restored with vegetated boulder revetment treatment.

Public Access Assessment

The channel and Mill Pond currently have four fishing piers and one boat launch (with two piers) in Mill Pond. Both channel shorelines provide complete or intermittent fishing access. The addition of new fishing piers and canoe/kayak launches was considered. The deteriorating concrete wall near the fire station could be repaired and used as a fishing access location. No additional formal fishing access points appear necessary. The existing boat landing provides adequate access for small (more discussion below) watercraft in Mill Pond and to Rock Lake. However, a canoe/kayak launch is recommended southeast of the Bartel's Beach parking lot alongside the existing fishing pier.

Watercraft access to Rock Lake from Mill Pond's boat landing is heavily restricted to small water craft because of the low height or clearance of the Ferry Drive bridge over the channel to the lake. This restriction to only smaller and low height water craft under the bridge significantly reduces the benefit of dredging the channel. The type of water craft capable of passing under the bridge typically also have a minimal draft, allowing them to utilize shallower waters than medium or larger size water craft. Removing all sediment to elevation 825.03 to provide 3 feet of water depth in the channel would have minimal benefits as water craft requiring 3 feet of depth typically could not fit under the Ferry Drive bridge.

Dredging and Ferry Drive Bridge Replacement Economic Impact Assessment

The Channel and Mill Pond could provide an important economic corridor from the Rock Lake community to the restaurants and other businesses in downtown Lake Mills. Rock Lake has hundreds of homes surrounding it and also a robust transient boater population because of its proximity to population centers, good public access, good fishing, and high water quality. Despite the economic asset of a popular, high quality lake, there is currently no public boating or boat parking facilities anywhere near the downtown hub of restaurants and businesses.

Dredging the channel and Mill Pond, coupled with replacement of the Ferry Drive bridge for higher water clearance and a public boat docking facility could provide a boating season economic boom for downtown businesses. In addition to the existing high quality downtown restaurants and shops, one new

brewery, one distillery, and a Tyranena Brewing downtown location are planned in the next year or two for the downtown area. These businesses will provide additional attraction to the downtown area for boaters on Rock Lake. Imagine a warm summer Saturday with boats streaming in and out of Mill Pond. Families and boats full of happy lake users docking at a public pier near the Dam and American Legion to walk into the downtown on a sidewalk network, a mere 200 feet away, for lunch, dinner, or shopping. Plenty of City or other business-owned shoreline in Mill Pond exists where a transient boat docking pier could be placed. This situation would require City investment in channel dredging, Ferry Drive bridge replacement, and a public transient boat docking facility. Bridge replacement information and costs, as well as downtown access public boat docking ideas, have been provided in Attachment D. A conservative potential economic impact to the downtown area is shown in Table 7.

Downtown Economic Impact	
Boating Season (Memorial Day to Labor Day)	15 weeks
Boats per Week (Average 5 per day, higher on weekends)	35
Average People per Boat	3
Average Dollars Spent Downtown per Person	$15
Economic Gain to Downtown during Boating Season	$23,625
Total Economic Gain (additional 20% outside of typical boating season)	**$28,350**

Table 7 Rock Lake to Mill Pond Economic Impact to Downtown

Recommendations, Funding Opportunities, and Schedule

Sampling results found no significant contamination in the sediment and no additional sediment sampling is recommended at this time.

Proposed improvements will require an engineering and permitting effort. Construction drawings and specifications will be required to convey project design information to WDNR for review approval and issuance of permits. The following is a list of anticipated required permits for dredging, streambank restoration, and the installation of stormwater pretreatment devices.

Anticipated Required Permits (depends on size, nature, and complexity of the project):

- Wisconsin Department of Natural Resources Chapter 30 Permit
- Wisconsin Department of Natural Resources Dredging/Dewatering-Related Permits
- Wisconsin Department of Natural Resources Notice of Intent (NOI) Permit
- U.S. Army Corps of Engineers General Permit
- Environmental Analysis and Decision on the Need for an Environmental Impact Statement

Potential funding opportunities for the above-mentioned projects are shown in Table 8.

Grant Funding Opportunities	**Dredge**	**Channel Markers**	**Streambank Restoration**	**Stormwater Treatment Units/BMPs**
DNR UNPS Construction Grant			X	X
Lake Management Planning Grant	X			
Recreational Boating Facilities Grant	X	X		

Table 8 Funding Opportunities

Table 9 summarizes an implementation plan and schedule for dredging the entire channel and Mill Pond. The overall schedule allows for dredging to be completed in mid- to late-summer 2019, as funding is available. The Recreational Boating Facilities Grant provides funding for dredging channels (up to a 50-foot width) for recreational boating, dredging to provide safe water depths in basins, aids to navigation, and the construction of facilities such as navigational aids, ramps, and boarding docks needed to gain water access. Should funding availability change the schedule below, the City should remain aware of the grant application deadlines and modify the schedule accordingly.

Channel Dredging Implementation Plan	
Activity	**Anticipated Date**
Submit 2018 Lake Management Planning Grant	December 10, 2018
Design–Begin Preliminary and Final Engineering including Surveying, Preliminary and Final Drawings, Specifications, Permit Meeting with Regulatory Agencies, and Bidding (Channel Only)	February 15, 2019
Submit 2019 Recreational Boating Facilities Grant Application	June 1, 2019
Submit Required Permits	October 2019
Public Information Meeting	November 2019
Advertisement for Bids No. 1	February 2020
Advertisement for Bids No. 2	February 2020
Issue Addendum (5 days prior to bid opening)	February 2020
Bid Opening	March 2020
Begin Construction	June 2020
End Construction (Substantial Completion)	November 2020
Mill Pond Dredging and Implementation Plan	
Design and Construction as Funds Become Available	

Table 9 Dredging Implementation Plan

An implementation plan and schedule for the design and construction of one stormwater pretreatment device and streambank restoration along the channel is shown in Table 10. It is anticipated that a streambank restoration project could be designed and constructed every other year when the WDNR Urban Nonpoint Source and Stormwater (UNPS) Construction Grant is available. Should funding availability change the schedule below, the City should remain aware of the grant application deadlines and modify the schedule accordingly.

Mill Pond and Channel Stormwater Treatment Device and Streambank Restoration Implementation Plan	
Activity	**Anticipated Date**
Submit 2018 WDNR UNPS Construction Grant Application	April 15, 2018
Design Project 2–Streambank Restoration and Stormwater Pretreatment Device	January 2019
Submit Required Permits	January2019
Advertise for Bids	February 2019
Bid Opening	March 2019
Begin Construction	June 2019
End Construction (Substantial Completion)	November 2019
Mill Pond Stormwater Pretreatment Device and Streambank Restoration Implementation Plan	
Design and Construction as Funds Become Available	

Table 10 Stormwater Treatment Device and Streambank Restoration Implementation Plan

If you have any comments or questions regarding the preliminary planning and investigation results, please contact us.

Sincerely,

STRAND ASSOCIATES, INC.®

Jon H. Lindert, P.E. Luke T. Hellermann, P.G. Brandon W. Herbert, P.E.

Enclosures

Copy: Jim Amrhein, Wisconsin Department of Natural Resources
Susan Graham, Wisconsin Department of Natural Resources
Sandy Chancellor, Wisconsin Department of Natural Resources
Steve Wilke, City of Lake Mills
Brandon Herbert, Strand Associates, Inc.®

Legend

- Sediment Sampling Location
- Rock Lake Outlet
- Storm Sewer
- Parcels

2-Foot Contours

- Inter
- Index

S-1

S-2

Mill Pond

Channel

Rock Lake

Ferry Dr

Veterans Ln

N

W E

S

0 40 80 160 Feet

SEDIMENT SAMPLE LOCATIONS

MILL POND AND CHANNEL DREDGING FEASIBILITY STUDY

CITY OF LAKE MILLS

JEFFERSON COUNTY, WISCONSIN

STRAND ASSOCIATES®

FIGURE 1
1060.055

Path: S:\MAD\1000--1099\1060\055\Data\GIS\Figures\Figure 1 - Sediment Sampling Locations 11x17.mxd User: christyr Date: 9/25/2017 Time: 8:12:43 AM

Path: S:\MAD\1000--1099\1060\055\Data\GIS\Figures\SW Device Locations 11x17.mxd

User: chrisly

Date: 9/5/2017

Time: 11:42:01 AM

STORMWATER TREATMENT DEVICE ASSESSMENT

MILL POND AND CHANNEL DREDGING FEASIBILITY STUDY
CITY OF LAKE MILLS
JEFFERSON COUNTY, WISCONSIN

FIGURE 2
1060.055

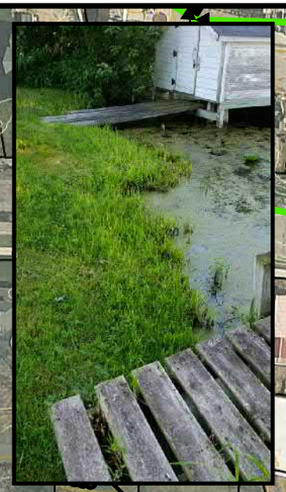
STRAND ASSOCIATES®

Legend

Severity Level

- 2 (94 LF)
- 2.5 (123 LF)
- 3 (35 LF)
- Rock Lake Outlet
- Storm Sewer

(Every 50 feet in Mill Pond.
Every 25 feet in channel.)



W Lake St

Church St

Water St

Veterans Lane

Mill Pond

Channel

Ferry Dr

N
W E
S

0 50 100 200 Feet

MILL POND SHORELINE EROSION ASSESSMENT

THE MILL POND AND CHANNEL DREDGING FEASIBILITY STUDY

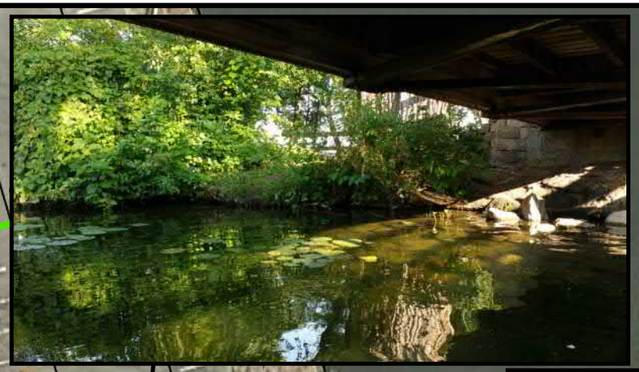
CITY OF LAKE MILLS

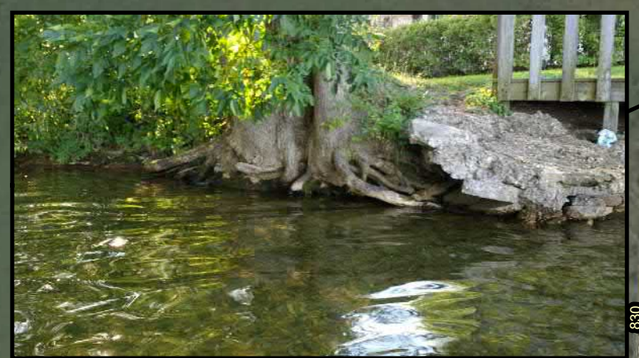
JEFFERSON COUNTY, WISCONSIN

STRAND ASSOCIATES®

FIGURE 3.01
1060.055

Path: S:\MAD\1000--1099\1060\055\Data\GIS\Figures\Figure 3.01-Streambank Erosion Assessment 11x17.mxd User: christyr Date: 9/25/2017 Time: 8:11:20 AM





Rock Lake

Mill Pond

Channel

830

832

828

28

Legend

Severity Level

- 2 (57 LF)
- 2.5 (115 LF)
- 3 (35 LF)
- Storm Sewer
- Parcels

2-Foot Contours

- Inter
- Index

N
W E
S

0 20 40 80 Feet

CHANNEL SHORELINE EROSION ASSESSMENT

MILL POND AND CHANNEL DREDGING FEASIBILITY STUDY

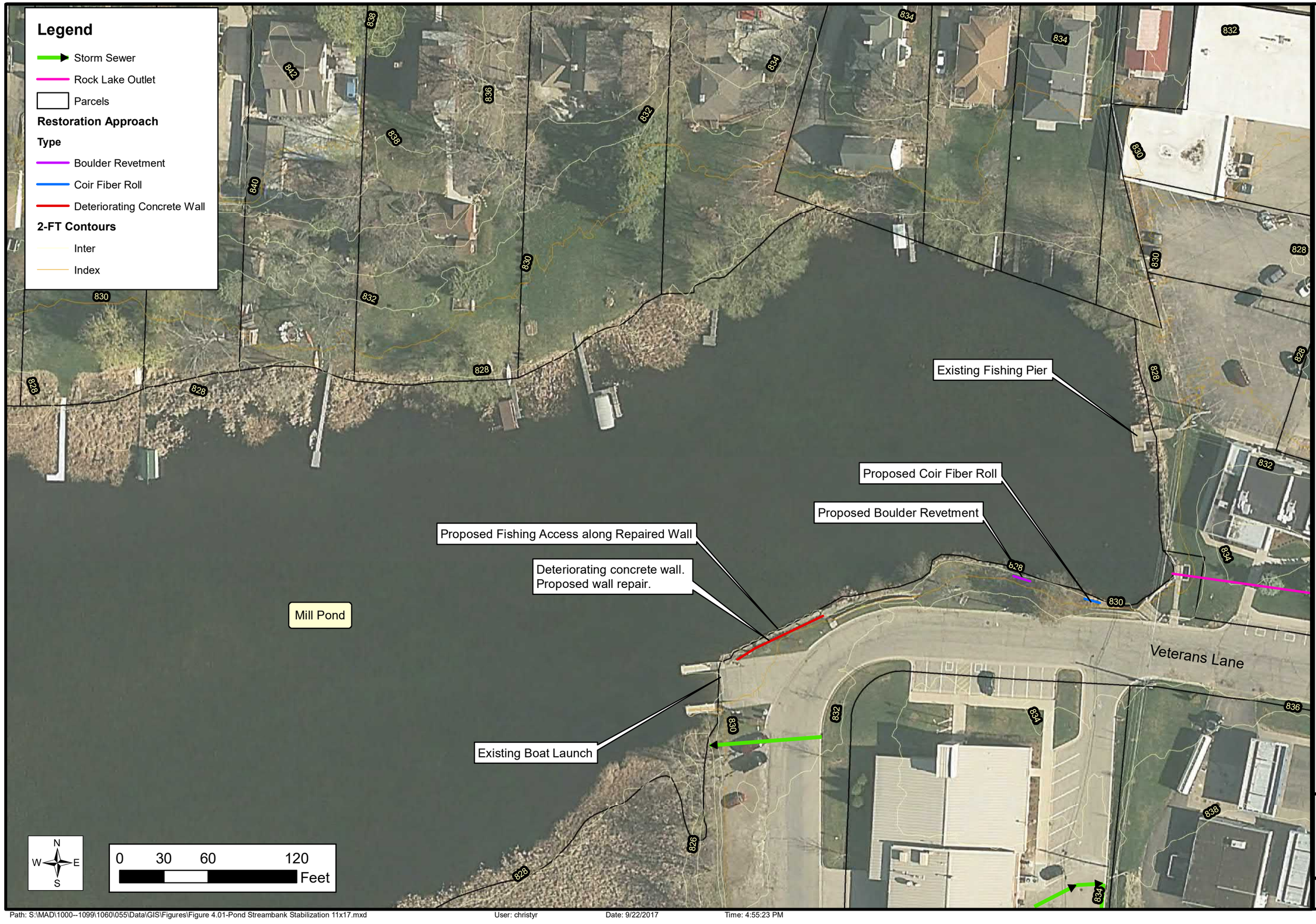
CITY OF LAKE MILLS

JEFFERSON COUNTY, WISCONSIN

STRAND ASSOCIATES®

FIGURE 3.02
1060.055

Path: S:\MAD\1000--1099\1060\055\Data\GIS\Figures\Figure 3.02-Channel Streambank Erosion Assessment 8.5x11.mxd User: christyr Date: 9/25/2017 Time: 8:07:33 AM



MILL POND SHORELINE STABILIZATION

THE MILL POND AND CHANNEL DREDGING FEASIBILITY STUDY

CITY OF LAKE MILLS

JEFFERSON COUNTY, WISCONSIN

STRAND ASSOCIATES®

FIGURE 4.01
1060.055

Path: S:\MAD\1000--1099\1060\055\Data\GIS\Figures\Figure 4.01-Pond Streambank Stabilization 11x17.mxd User: christyr Date: 9/22/2017 Time: 4:55:23 PM

Legend

- Storm Sewer
- Parcels

Restoration Approach

Type

- Augmentative Riprap
- Boulder Revetment
- Deteriorating Concrete Foundation

2-FT Contours

- Inter
- Index

Mill Pond

Proposed canoe/kayak launch

Existing fishing pier

Existing fishing pier and overlook

Rock Lake

Existing intermittent fising access along shoreline.

Existing fishing pier and overlook

Channel

Deteriorating concrete foundation for overlook. Proposed new pier supports.

Existing fising access along entire shoreline.

Deteriorating concrete retaining wall. Proposed retaining wall repair.

828 830 832

N W E S

0 15 30 60 Feet

CHANNEL STREAMBANK STABILIZATION

MILL POND AND CHANNEL DREDGING FEASIBILITY STUDY
CITY OF LAKE MILLS
JEFFERSON COUNTY, WISCONSIN

STRAND ASSOCIATES®

FIGURE 4.02
1060.055

Path: S:\MAD\1000--1099\1060\055\Data\GIS\Figures\Figure 4.02-Channel Streambank Restoration 11x17.mxd User: christyr Date: 9/22/2017 Time: 4:52:36 PM

ATTACHMENT A

Mill Pond and Channel Sediment Samples
1060.055

						GRAB SAMPLES - August 9, 2017			
						Mill Pond Sediment		Channel Sediment	
						TOC mg/kg	TOC %	TOC mg/kg	TOC %
						114000	11.4	48200	4.82
Contaminant	Industrial Site DC	Non-Industrial Site DC	CBSQG TEC	CBSQG MEC	CBSQG PEC	Dry Weight Concentration	Concentration Normalized to 1% TOC	Dry Weight Concentration	Concentration Normalized to 1% TOC
PAHs (ug/kg)									
1-Methylnaphthalene	72,700	17,600	--	--	--	15.5	1.36	0.572	0.1
2-Methylnaphthalene	3,010,000	239,000	20.2	111	201	34.3	3.01	0.923	*0.19*
Acenaphthene	45,200,000	3,590,000	6.7	48	89	26.1	2.29	1.42	0.29
Acenaphthylene	--	--	5.9	67	128	50.1	4.39	5.23	1.09
Anthracene	100,000,000	17,900,000	57.2	451	845	97.6	8.56	12	2.49
Benzo(a)anthracene	20,800	1,140	108	579	1050	234	20.53	74.1	15.4
Benzo(a)pyrene	2,110	115	150	800	1450	218	19.12	74.4	15.44
Benzo(b)fluoranthene	21,100	1,115	240	6820	13400	417	36.58	113	23
Benzo(g,h,i)perylene	--	--	170	1685	3200	142	12.46	53.2	0
Benzo(k)fluoranthene	211,000	11,500	240	6820	13400	129	11.32	32.8	6.80
Chrysene	2,110,000	115,000	166	728	1290	295	25.88	74.6	15.48
Dibenzo(a,h)anthracene	2,110	115	33	84	135	38.8	3.40	13.3	2.76
Fluoranthene	30,100,000	2,390,000	423	1327	2230	572	50.18	150	31.1
Fluorene	30,100,000	2,390,000	77.4	307	536	54.7	4.80	3.6	0.75
Indeno(1,2,3-cd)pyrene	21,100	1,115	200	1700	3200	139	12.19	51.1	10.60
Naphthalene	24,100	5,520	176	369	561	41.4	3.63	0.998	0.21
Phenanthrene	--	--	204	687	1170	585	51.3	49.8	10.33
Pyrene	22,600,000	1,790,000	195	858	1520	525	46.05	115	23.86
Total PAHs (ug/kg)	--	--	1610	12205	22800	3614.50	317.06	826.04	171.38
Total PCBs (mg/kg)	0.967	0.234	0.06	0.368	0.676	0	0	0	0
Solids (%)	--	--	--	--	--	33	NA	72.9	NA
Moisture (%)	--	--	--	--	--	67	NA	27.1	NA
Particle Size (Hydrometer)	--	--	--	--	--	SM (33.7% fines)	NA	SP (3.3% fines)	NA
Inorganic Results (mg/kg)									
Ammonia Nitrogen	--	--	--	--	--	84.8	NA	79.5	NA
Phosphorus	--	--	--	--	--	386	NA	164	NA
Kjeldahl Nitrogen	--	--	--	--	--	6460	NA	811	NA
Nitrate Nitrogen	--	--	--	--	--	<1.2	NA	<0.54	NA
Nitrite Nitrogen	--	--	--	--	--	<4.6	NA	<2	NA
Total Organic Carbon	--	--	--	--	--	114000	NA	48200	NA
Oil and Grease	--	--	--	--	--	2940	NA	892	NA
Metals (mg/kg)									
Arsenic	3	0.677	9.8	21.4	33	<0.54	0	<0.24	0
Cadmium	985	71.1	0.99	3	5	0.6	0.05	<0.017	0
Total Chromium	--	--	43	76.5	110	7.4	0.65	2	0.4
Copper	46,700	3,130	32	91	150	14.3	1.25	1.8	0.37
Lead	800	400	36	83	130	66	5.79	4.6	0.95
Nickel	22,500	1,550	23	36	49	6.4	0.56	1.2	*0.25*
Selenium	5,840	391	--	--	--	<1.3	0	<0.59	0
Zinc	100,000	23,500	120	290	460	89.7	7.87	11	2.28
Mercury	3.13	3.13	0.18	0.64	1.1	0.058	0.01	0.0064	0.00

CBSQG - Consensus-Based Sediment Quality Guidelines, Interim Guidance, Publication WT-732 2003.
PEC - Probable Effect Concentration
TEC - Threshold Effect Concentration
MEC - Midpoint Effect Concentration
-- - No Standard for this compound
mg/kg - milligrams per kilogram
ug/kg - micrograms per kilogram
NA - Not Applicable
Italics - Exceeds TEC
Bold - Exceeds MEC
Highlighted - Exceeds PEC
Highlighted - Exceeds NR720 Industrial Site Direct Contact Level
Boxed Value - Exceeds NR720 Non-Industrial Site Direct Contact Level
PAH - polycyclic aromatic hydrocarbon
PCB - polychlorinated biphenyl
TOC - Total Organic Carbon
SM - silty sand
SP - poorly graded sand

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ANALYTICAL REPORT

STRAND ASSOCIATES
LUKE HELLERMAN
910 W WINGRA DR
MADISON, WI 53715

Project Name: LAKE MILLS MILL POND
Project Phase:
Contract #: 2418
Project #: 1060-701
Folder #: 129767
Purchase Order #:

Arrival Temperature: See COC
Report Date: 09/05/2017
Date Received: 08/11/2017
Reprint Date: 09/05/2017

CT LAB Sample#: 904518 Sample Description: CHANNEL SEDIMENT License #:10049051 Sampled: 08/09/2017 1030

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**72.9**	%	0.1	0.1	1			08/14/2017 09:20	JAS	EPA 8000C
Ammonia Nitrogen	**79.5**	mg/kg	8.8	29	5	M	08/14/2017 09:30	08/14/2017 12:03	MER	SM 4500-NH3H
Phosphorus	**164**	mg/kg	49	160	1	M	08/16/2017 12:00	08/18/2017 14:04	MER	EPA 365.4
Nitrogen Kjeldahl	**811**	mg/kg	54	180	1		08/16/2017 12:00	08/18/2017 10:55	MER	EPA 351.2
Nitrate Nitrogen	<0.54	mg/kg	0.54	1.9	1		08/16/2017 13:00	08/16/2017 13:38	DGS	EPA 9056A
Nitrite Nitrogen	<2.0	mg/kg	2.0	6.9	1	M	08/16/2017 13:00	08/16/2017 13:38	DGS	EPA 9056A
Percent Moisture	**27.1**	%	0.1	0.1	1			08/14/2017 09:20	JAS	ASTM D2974-87
Total Organic Carbon	**48200**	mg/kg	49	170	1	Y		08/23/2017 16:45	AGK	L-Kahn/9060A
Oil and Grease	**892**	mg/kg	200	650	1		08/17/2017 10:30	08/24/2017 10:10	JLH	EPA 9071B
Metals Results										
Arsenic	<0.24	mg/kg	0.24	0.87	1		08/21/2017 12:25	08/22/2017 22:18	MDS	EPA 6010C
Cadmium	<0.017	mg/kg	0.017	0.057	1		08/21/2017 12:25	08/22/2017 22:18	MDS	EPA 6010C
Chromium	**2.0**	mg/kg	0.51	1.7	1		08/21/2017 12:25	08/22/2017 22:18	MDS	EPA 6010C
Copper	**1.8**	mg/kg	0.098	0.32	1		08/21/2017 12:25	08/22/2017 22:18	MDS	EPA 6010C
Lead	**4.6**	mg/kg	0.10	0.35	1		08/21/2017 12:25	08/22/2017 22:18	MDS	EPA 6010C

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 904518 Sample Description: CHANNEL SEDIMENT License #:10049051 Sampled: 08/09/2017 1030

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Nickel	**1.2**	mg/kg	0.10	0.35	1		08/21/2017 12:25	08/22/2017 22:18	MDS	EPA 6010C
Selenium	<0.59	mg/kg	0.59	2.0	1		08/21/2017 12:25	08/22/2017 22:18	MDS	EPA 6010C
Zinc	**11.0**	mg/kg	0.13	0.42	1		08/21/2017 12:25	08/22/2017 22:18	MDS	EPA 6010C
Mercury	**0.0064**	mg/kg	0.000090	0.00031	1	M,Y	08/23/2017 08:03	08/24/2017 16:35	MDS	EPA 7471B
Organic Results										
Aroclor-1016	<0.0055	mg/kg	0.0055	0.019	1		08/15/2017 09:30	08/21/2017 17:01	AJZ	EPA 8082A
Aroclor-1221	<0.0096	mg/kg	0.0096	0.034	1		08/15/2017 09:30	08/21/2017 17:01	AJZ	EPA 8082A
Aroclor-1232	<0.0096	mg/kg	0.0096	0.030	1		08/15/2017 09:30	08/21/2017 17:01	AJZ	EPA 8082A
Aroclor-1242	<0.0082	mg/kg	0.0082	0.026	1		08/15/2017 09:30	08/21/2017 17:01	AJZ	EPA 8082A
Aroclor-1248	<0.0069	mg/kg	0.0069	0.023	1		08/15/2017 09:30	08/21/2017 17:01	AJZ	EPA 8082A
Aroclor-1254	<0.0069	mg/kg	0.0069	0.022	1		08/15/2017 09:30	08/21/2017 17:01	AJZ	EPA 8082A
Aroclor-1260	<0.0041	mg/kg	0.0041	0.011	1		08/15/2017 09:30	08/21/2017 17:01	AJZ	EPA 8082A
1-Methylnaphthalene	**0.572**	ug/kg	0.55 *	2.8	1		08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
2-Methylnaphthalene	**0.923**	ug/kg	0.43 *	2.8	1		08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
Acenaphthene	**1.42**	ug/kg	0.40 *	2.8	1		08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
Acenaphthylene	**5.23**	ug/kg	0.36	2.8	1		08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
Anthracene	**12.0**	ug/kg	0.55	2.8	1	B	08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
Benzo(a)anthracene	**74.1**	ug/kg	0.69	2.8	1		08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
Benzo(a)pyrene	**74.4**	ug/kg	0.55	2.8	1		08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
Benzo(b)fluoranthene	**113**	ug/kg	0.69	2.8	1		08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
Benzo(g,h,i)perylene	**53.2**	ug/kg	0.83	2.8	1		08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
Benzo(k)fluoranthene	**32.8**	ug/kg	1.2	3.9	1		08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
Chrysene	**74.6**	ug/kg	0.83	2.8	1		08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
Dibenzo(a,h)anthracene	**13.3**	ug/kg	0.83	2.9	1	B	08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 904518 Sample Description: CHANNEL SEDIMENT License #:10049051 Sampled: 08/09/2017 1030

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Fluoranthene	**150**	ug/kg	0.55	2.8	1		08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
Fluorene	**3.60**	ug/kg	0.37	2.8	1		08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
Indeno(1,2,3-cd)pyrene	**51.1**	ug/kg	0.69	2.8	1		08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
Naphthalene	**0.998**	ug/kg	0.41 *	2.8	1		08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
Phenanthrene	**49.8**	ug/kg	0.41	2.8	1		08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
Pyrene	**115**	ug/kg	0.55	2.8	1		08/15/2017 09:30	08/22/2017 14:47	JJY	EPA 8270D-SIM
Sub Lab Results										
Hydrometer	**attached**		N/A	N/A	1			08/29/2017 00:00	SUB	

CT LAB Sample#: 904520 Sample Description: MILLPOND SEDIMENT License #:10049050 Sampled: 08/09/2017 1130

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**33.0**	%	0.1	0.1	1			08/14/2017 09:20	JAS	EPA 8000C
Ammonia Nitrogen	**84.8**	mg/kg	7.9	26	2		08/14/2017 09:30	08/14/2017 12:11	MER	SM 4500-NH3H
Phosphorus	**386**	mg/kg	100	350	1		08/16/2017 12:00	08/18/2017 14:16	MER	EPA 365.4
Nitrogen Kjeldahl	**6460**	mg/kg	230	760	2		08/16/2017 12:00	08/18/2017 11:20	MER	EPA 351.2
Nitrate Nitrogen	<1.2	mg/kg	1.2	4.3	1		08/16/2017 13:00	08/16/2017 14:53	DGS	EPA 9056A
Nitrite Nitrogen	<4.6	mg/kg	4.6	15	1		08/16/2017 13:00	08/16/2017 14:53	DGS	EPA 9056A
Percent Moisture	**67.0**	%	0.1	0.1	1			08/14/2017 09:20	JAS	ASTM D2974-87
Total Organic Carbon	**114000**	mg/kg	110	370	1			08/23/2017 17:13	AGK	L-Kahn/9060A
Oil and Grease	**2940**	mg/kg	430	1400	1		08/17/2017 10:30	08/24/2017 10:10	JLH	EPA 9071B
Metals Results										
Arsenic	<0.54	mg/kg	0.54	1.9	1		08/21/2017 12:25	08/22/2017 22:44	MDS	EPA 6010C

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 904520 Sample Description: MILLPOND SEDIMENT License #:10049050 Sampled: 08/09/2017 1130

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Cadmium	**0.60**	mg/kg	0.038	0.13	1		08/21/2017 12:25	08/22/2017 22:44	MDS	EPA 6010C
Chromium	**7.4**	mg/kg	1.1	3.7	1		08/21/2017 12:25	08/22/2017 22:44	MDS	EPA 6010C
Copper	**14.3**	mg/kg	0.22	0.71	1		08/21/2017 12:25	08/22/2017 22:44	MDS	EPA 6010C
Lead	**66.0**	mg/kg	0.23	0.78	1		08/21/2017 12:25	08/22/2017 22:44	MDS	EPA 6010C
Nickel	**6.4**	mg/kg	0.23	0.78	1		08/21/2017 12:25	08/22/2017 22:44	MDS	EPA 6010C
Selenium	<1.3	mg/kg	1.3	4.3	1		08/21/2017 12:25	08/22/2017 22:44	MDS	EPA 6010C
Zinc	**89.7**	mg/kg	0.28	0.94	1		08/21/2017 12:25	08/22/2017 22:44	MDS	EPA 6010C
Mercury	**0.058**	mg/kg	0.00019	0.00065	1		08/23/2017 08:03	08/24/2017 16:46	MDS	EPA 7471B
Organic Results										
Aroclor-1016	<0.012	mg/kg	0.012	0.042	1		08/15/2017 09:30	08/21/2017 17:23	AJZ	EPA 8082A
Aroclor-1221	<0.021	mg/kg	0.021	0.075	1		08/15/2017 09:30	08/21/2017 17:23	AJZ	EPA 8082A
Aroclor-1232	<0.021	mg/kg	0.021	0.066	1		08/15/2017 09:30	08/21/2017 17:23	AJZ	EPA 8082A
Aroclor-1242	<0.018	mg/kg	0.018	0.057	1		08/15/2017 09:30	08/21/2017 17:23	AJZ	EPA 8082A
Aroclor-1248	<0.015	mg/kg	0.015	0.051	1		08/15/2017 09:30	08/21/2017 17:23	AJZ	EPA 8082A
Aroclor-1254	<0.015	mg/kg	0.015	0.048	1		08/15/2017 09:30	08/21/2017 17:23	AJZ	EPA 8082A
Aroclor-1260	<0.0091	mg/kg	0.0091	0.024	1		08/15/2017 09:30	08/21/2017 17:23	AJZ	EPA 8082A
1-Methylnaphthalene	**15.5**	ug/kg	1.2	6.0	1		08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM
2-Methylnaphthalene	**34.3**	ug/kg	0.93	6.0	1		08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM
Acenaphthene	**26.1**	ug/kg	0.87	6.0	1		08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM
Acenaphthylene	**50.1**	ug/kg	0.78	6.0	1		08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM
Anthracene	**97.6**	ug/kg	1.2	6.0	1		08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM
Benzo(a)anthracene	**234**	ug/kg	1.5	6.0	1		08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM
Benzo(a)pyrene	**218**	ug/kg	1.2	6.0	1		08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM
Benzo(b)fluoranthene	**417**	ug/kg	1.5	6.0	1		08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 904520 Sample Description: MILLPOND SEDIMENT License #:10049050 Sampled: 08/09/2017 1130

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Benzo(g,h,i)perylene	**142**	ug/kg	1.8	6.0	1		08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM
Benzo(k)fluoranthene	**129**	ug/kg	2.7	8.4	1		08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM
Chrysene	**295**	ug/kg	1.8	6.0	1		08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM
Dibenzo(a,h)anthracene	**38.8**	ug/kg	1.8	6.3	1	B	08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM
Fluoranthene	**572**	ug/kg	1.2	6.0	1	Y	08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM
Fluorene	**54.7**	ug/kg	0.81	6.0	1		08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM
Indeno(1,2,3-cd)pyrene	**139**	ug/kg	1.5	6.0	1		08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM
Naphthalene	**41.4**	ug/kg	0.90	6.0	1		08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM
Phenanthrene	**585**	ug/kg	0.90	6.0	1	M	08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM
Pyrene	**525**	ug/kg	1.2	6.0	1		08/15/2017 09:30	08/22/2017 15:09	JJY	EPA 8270D-SIM

Sub Lab Results

Hydrometer	**attached**		N/A	N/A	1			08/29/2017 00:00	SUB	

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

Notes: * Indicates a value in between the LOD (limit of detection) and the LOQ (limit of quantitation). All LOD/LOQs are adjusted to reflect dilution and also any differences in the sample weight / volume as compared to standard amounts.

All samples were received intact and properly preserved unless otherwise noted. The results reported relate only to the samples tested. This report shall not be reproduced, except in full, without written approval of this laboratory. The Chain of Custody is attached.

Submitted by: Eric T. Korthals
Project Manager
608-356-2760

QC Qualifiers

Code	Description
B	Analyte detected in the associated Method Blank.
C	Toxicity present in BOD sample.
D	Diluted Out.
E	Safe, No Total Coliform detected.
F	Unsafe, Total Coliform detected, no E. Coli detected.
G	Unsafe, Total Coliform detected and E. Coli detected.
H	Holding time exceeded.
I	BOD incubator temperature was outside acceptance limits during test period.
J	Estimated value.
L	Significant peaks were detected outside the chromatographic window.
M	Matrix spike and/or Matrix Spike Duplicate recovery outside acceptance limits.
N	Insufficient BOD oxygen depletion.
O	Complete BOD oxygen depletion.
P	Concentration of analyte differs more than 40% between primary and confirmation analysis.
Q	Laboratory Control Sample outside acceptance limits.
R	See Narrative at end of report.
S	Surrogate standard recovery outside acceptance limits due to apparent matrix effects.
T	Sample received with improper preservation or temperature.
U	Analyte concentration was below detection limit.
V	Raised Quantitation or Reporting Limit due to limited sample amount or dilution for matrix background interference.
W	Sample amount received was below program minimum.
X	Analyte exceeded calibration range.
Y	Replicate/Duplicate precision outside acceptance limits.
Z	Specified calibration criteria was not met.

Current CT Laboratories Certifications

Wisconsin (WDNR) Chemistry ID# 157066030
Wisconsin (DATCP) Bacteriology ID# 105-289
Louisiana NELAP (primary) ID# ACC20160002
Illinois NELAP Lab ID# 200073
Kansas NELAP Lab ID# E-10368
Virginia NELAP Lab ID# 460203
Maryland Lab ID# WI00061
ISO/IEC 17025-2005 A2LA Cert # 3806.01
DoD-ELAP A2LA 3806.01
GA EPD Stipulation ID ACC20160002
Pennsylvania NELAP Lab ID# 68-04201, # 008

WWW.MI-TECH.US
715.359.9400
Mi-Tech Services, Inc.
5707 Schofield Avenue
PO Box 107
Weston, WI 54476

ANALYTICAL REPORT

CT Laboratories
Attn: Mr. Eric Korthals
1230 Lange Court
Baraboo, WI 53913
ekorthals@ctlaboratories.com

PROJECT NAME:	**Lake Mills Mill Pond**		
REPORT DATE:	August 23, 2017	CT LABS PO #	129767 MITECH
ANALYSIS:	HYDROMETER	MI-TECH #	10726
METHOD:	ASTM D422	DATE RECEIVED:	08/14/2017

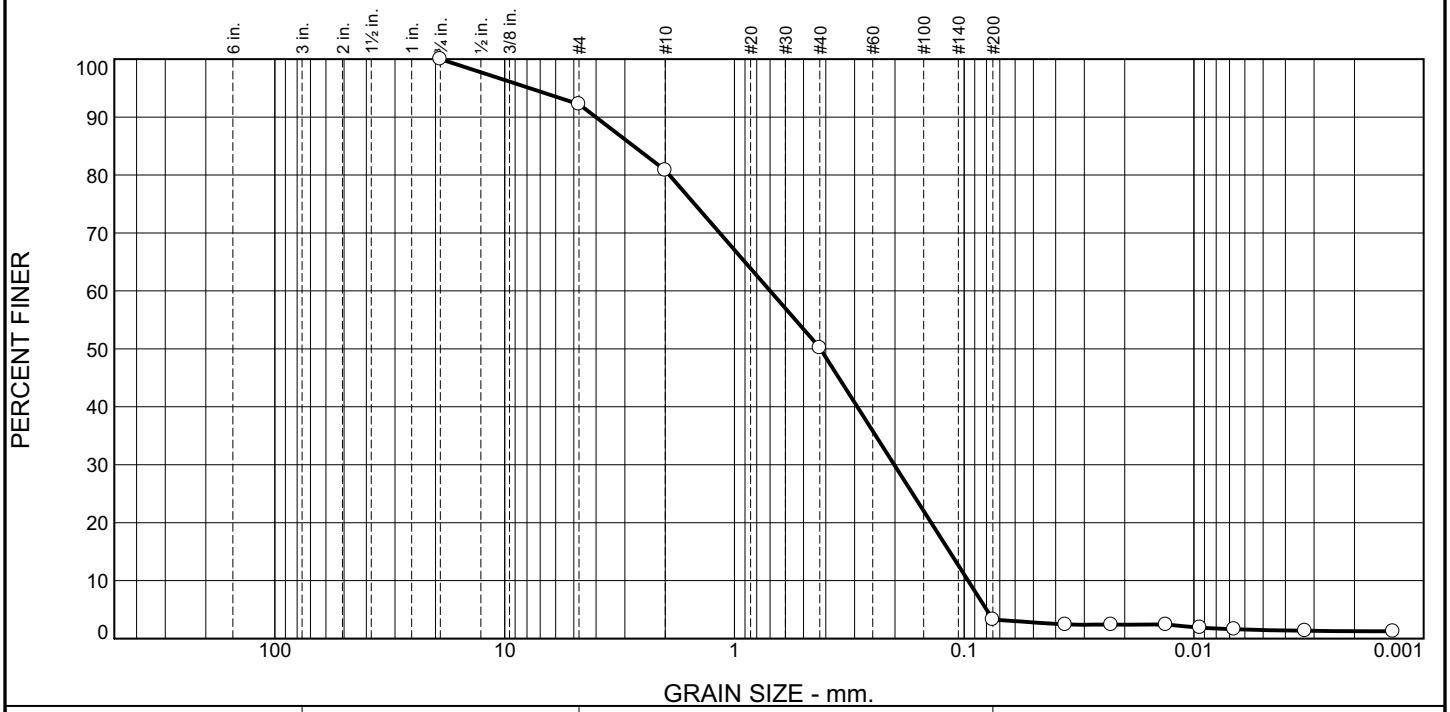
Dear Mr. Korthals:

Analytical results for the above referenced project are enclosed. Thank you for your business.

Sincerely,
Mi-Tech Services, Inc.

David Buckner, PE
Environmental Engineer

Particle Size Distribution Report - Hydrometer Method



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.8	11.4	30.6	46.9	1.8	1.5

Test Results (ASTM D 422-63 & ASTM D 2217)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75	100.0		
#4	92.2		
#10	80.8		
#40	50.2		
#200	3.3		
0.0362 mm.	2.4		
0.0229 mm.	2.4		
0.0132 mm.	2.4		
0.0094 mm.	1.9		
0.0067 mm.	1.6		
0.0033 mm.	1.3		
0.0014 mm.	1.2		

* (no specification provided)

Client Sample Description

Channel Sediment

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=**

Classification

USCS (D 2487)= SP **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 4.0114 D_{85}= 2.7465 D_{60}= 0.6988
D_{50}= 0.4225 D_{30}= 0.2016 D_{15}= 0.1157
D_{10}= 0.0962 C_u= 7.27 C_c= 0.60

Remarks

Date Received: 8-14-17 **Date Tested:** 8-21-17

Tested By: DWB

Checked By: SMF

Title: ENVIRO DIRECTOR

Sample Number: 904518 **Date Sampled:** 8-9-17

Mi-Tech Services, Inc.

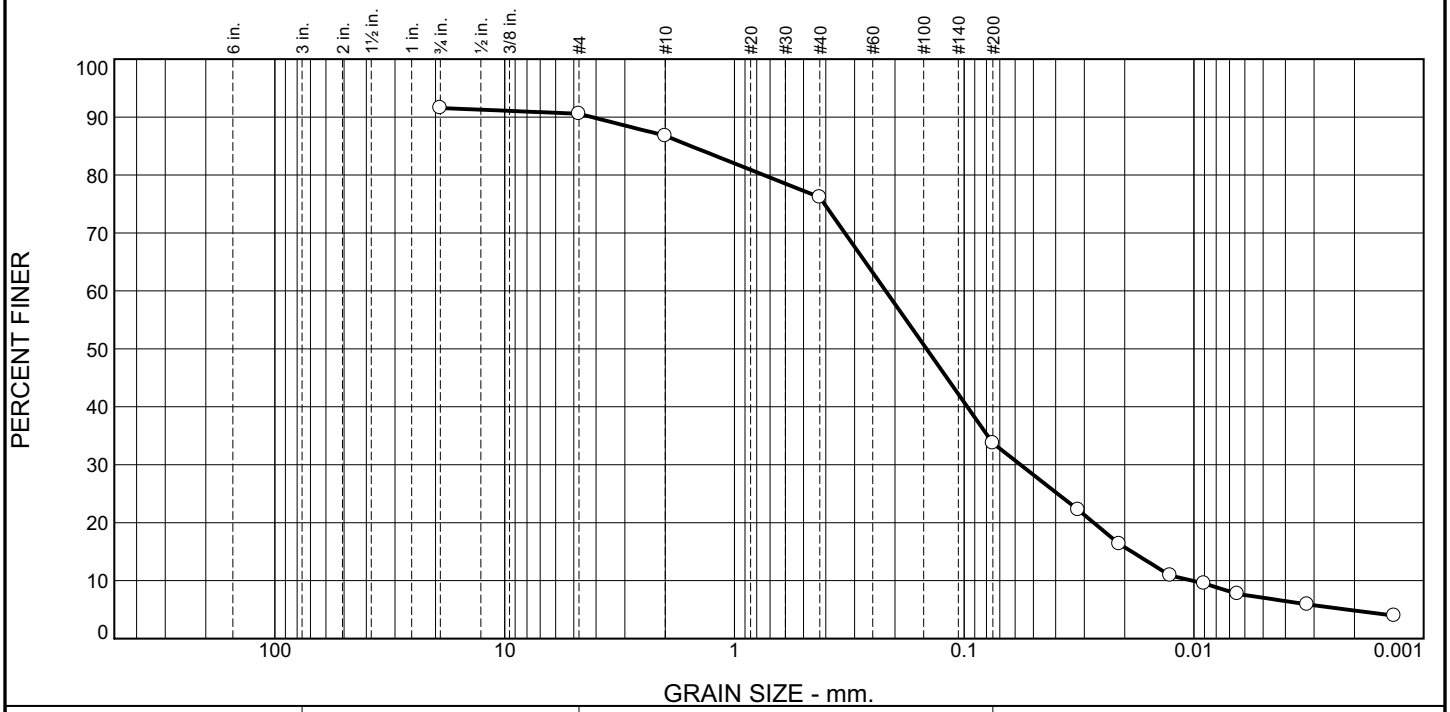
Weston, WI

Client: CT Laboratories

Project: Lake Mills Mill Pond
PO #129767

Project No: 10726 **Figure** 1

Particle Size Distribution Report - Hydrometer Method



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		1.0	3.8	10.6	42.5	26.7	7.0

Test Results (ASTM D 422-63 & ASTM D 2217)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75	91.6		
#4	90.6		
#10	86.8		
#40	76.2		
#200	33.7		
0.0319 mm.	22.2		
0.0211 mm.	16.3		
0.0127 mm.	10.9		
0.0090 mm.	9.5		
0.0065 mm.	7.7		
0.0032 mm.	5.9		
0.0013 mm.	3.9		

* (no specification provided)

Client Sample Description

Mill Pond Sediment

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 4.1720 D_{85}= 1.5460 D_{60}= 0.2196
D_{50}= 0.1459 D_{30}= 0.0569 D_{15}= 0.0187
D_{10}= 0.0102 C_u= 21.55 C_c= 1.45

Remarks

Date Received: 8-14-17 **Date Tested:** 8-21-17

Tested By: DWB

Checked By: SMF

Title: ENVIRO DIRECTOR

Sample Number: 904520 **Date Sampled:** 8-9-17

Mi-Tech Services, Inc.

Weston, WI

Client: CT Laboratories

Project: Lake Mills Mill Pond
PO #129767

Project No: 10726 **Figure** 2

Rev. 02/2017

CHAIN OF CUSTODY

Page _____ of _____

Company: Strand Associates, Inc.

Project Contact: Luke Hellermann

Telephone: 608-251-4843

Project Name: Lake Mills Mill Pond

Project #: 1060-701

Location: Lake Mills, WI

Sampled By: Steve Small

1230 Lange Court, Baraboo, WI 53913
08-356-2760 Fax 608-356-2766
www.ctlaboratories.com

Folder #: 129767

Company: STRAND ASSOCIATES

Project: LAKE MILLS MILL PON

Logged By: BNA PM: ET

im:
RCRA SDWA NPDES
/aste Other _____

Report To: Luke Hellermann
EMAIL: Luke.Hellermann@Strand.com
Company: Strand Associates
Address: 910 W. Wingra Dr. Madison, WI 53715

Invoice To:*
EMAIL: SAME
Company:
Address:

*Party listed is responsible for payment of invoice as per CT Laboratories' terms and conditions

Client Special Instructions
Total Metals: As, Cd, Cr, Cu, Pb, Hg, Ni, Se, and Zn.

Matrix:
GW – groundwater SW - surface water WW - wastewater DW - drinking water
S - soil/sediment SL - sludge A - air M - misc/waste

ANALYSES REQUESTED

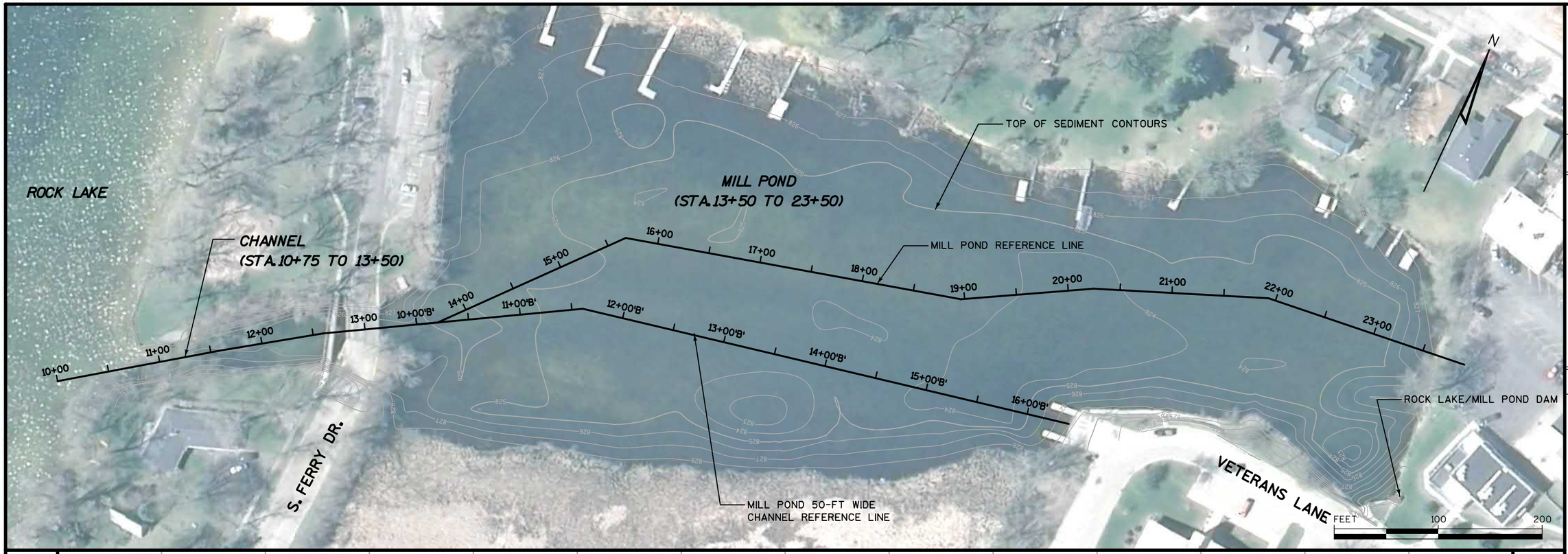
Collection Date	Collection Time	Matrix	Grab/ Comp	Sample #	Sample ID Description	Filtered? Y/N	Tot Organic Carbon	PCBs	PAHs	Total Metals	Oil & Grease	Total Phosphorus	Nitrate+Nitrite	Ammonia	TKN	Grain Size (Hydrometer)	Moisture Content				Total # Containers	Designated MS/MSD	CT Lab ID # (Lab use only)
							Fill in Spaces with Bottles per Test																	
8-9-17	10:30	S	G		Channel Sediment	N	X	X	X	X	X	X	X	X	X	X	X					3		904518
8-9-17	11:30	S	G		Mill Pond Sediment	N	X	X	X	X	X	X	X	X	X	X	X					3		904520

Turnaround Time
Normal RUSH*
Date Needed: _____
Rush analysis requires prior CT Laboratories' approval
Surcharges:
24 hr 200%
2-3 days 100%
4-9 days 50%

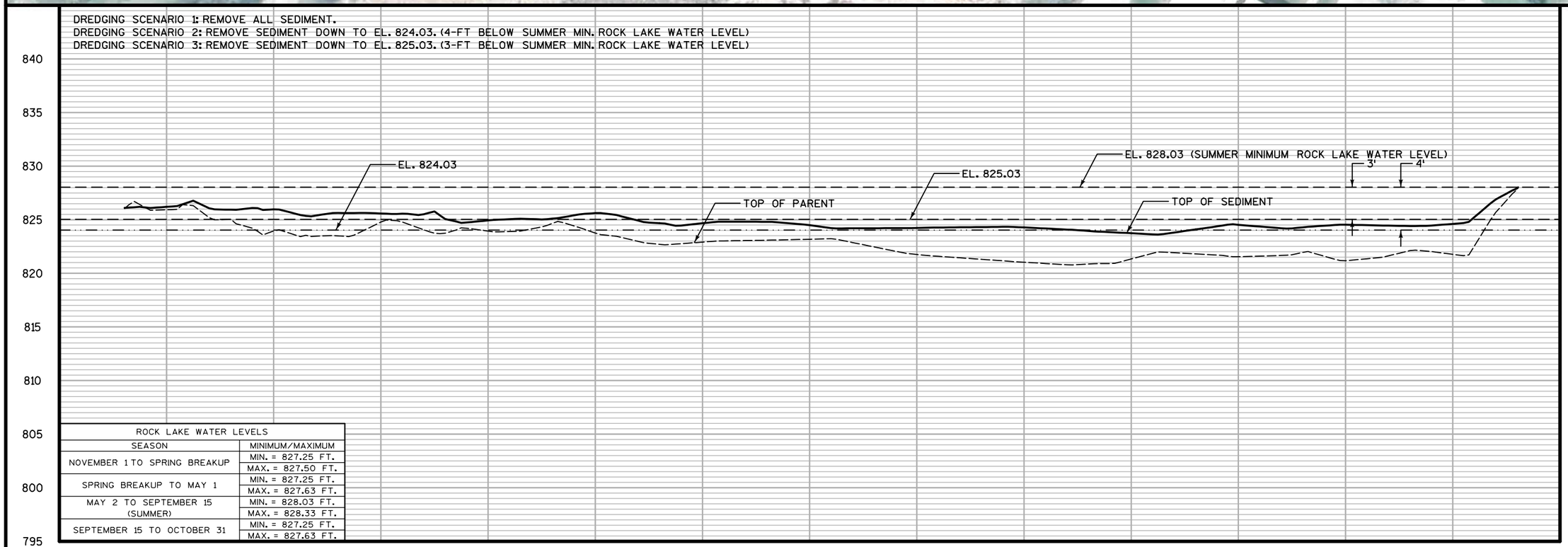
Relinquished By:	Date/Time	Received By:	Date/Time
	8/10/17 12:00pm		
Received by:	Date/Time	Received for Laboratory by:	Date/Time
			8-11-17 1331

Lab Use Only
Ice Present (Yes) No
Temp 2.8 IR Gun 14
Cooler # 5961

ATTACHMENT B



DREDGING SCENARIO 1: REMOVE ALL SEDIMENT.
DREDGING SCENARIO 2: REMOVE SEDIMENT DOWN TO EL. 824.03. (4-FT BELOW SUMMER MIN. ROCK LAKE WATER LEVEL)
DREDGING SCENARIO 3: REMOVE SEDIMENT DOWN TO EL. 825.03. (3-FT BELOW SUMMER MIN. ROCK LAKE WATER LEVEL)



ROCK LAKE WATER LEVELS	
SEASON	MINIMUM/MAXIMUM
NOVEMBER 1 TO SPRING BREAKUP	MIN. = 827.25 FT.
	MAX. = 827.50 FT.
SPRING BREAKUP TO MAY 1	MIN. = 827.25 FT.
	MAX. = 827.63 FT.
MAY 2 TO SEPTEMBER 15 (SUMMER)	MIN. = 828.03 FT.
	MAX. = 828.33 FT.
SEPTEMBER 15 TO OCTOBER 31	MIN. = 827.25 FT.
	MAX. = 827.63 FT.

DATE:
REVISIONS
NO.

PLAN AND PROFILE
MILL POND AND CHANNEL
MILL POND AND CHANNEL DREDGING FEASIBILITY STUDY
CITY OF LAKE MILLS
JEFFERSON COUNTY, WISCONSIN

JOB NO.
1060.055
PROJECT MGR.
JHL

STRAND ASSOCIATES®

SHEET
1

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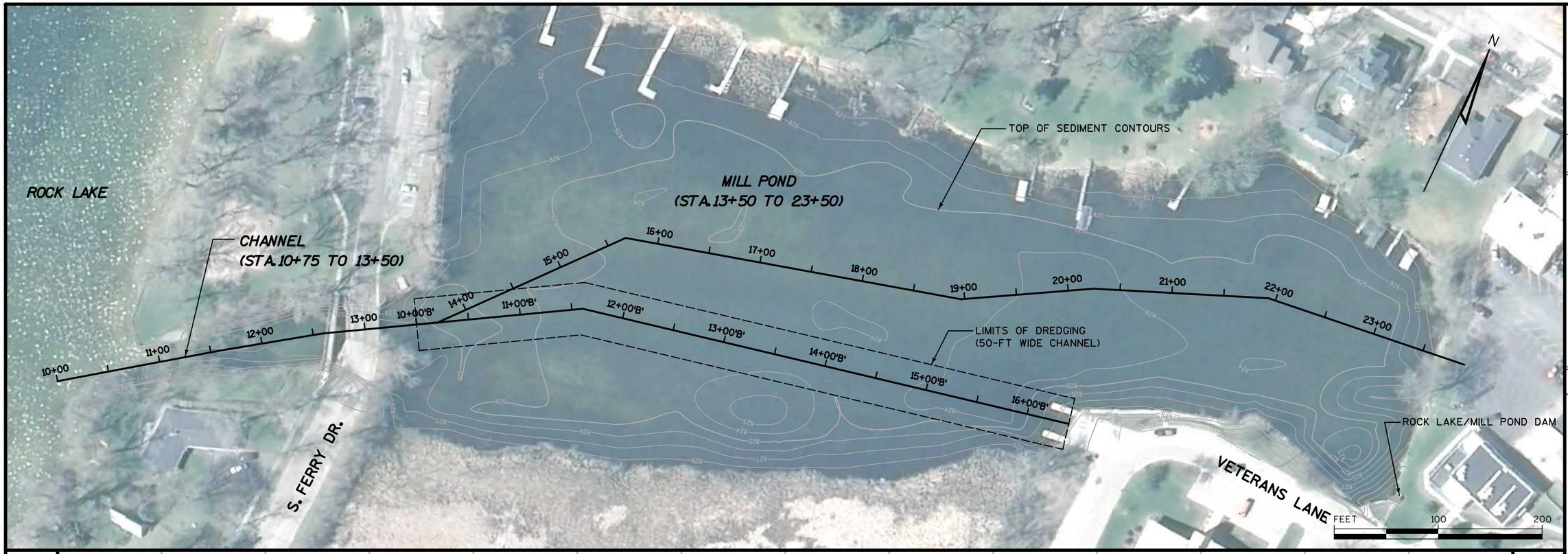
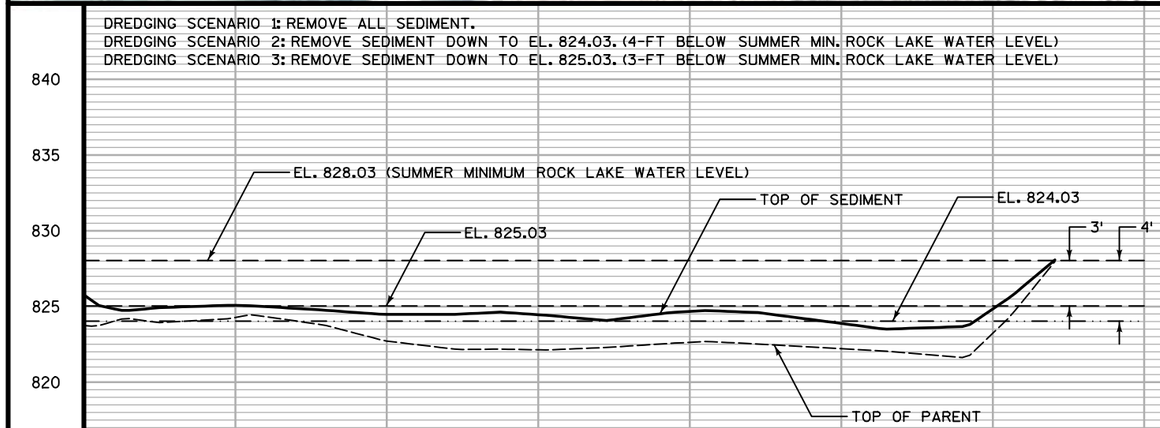


DREDGING SCENARIO 1: REMOVE ALL SEDIMENT.
DREDGING SCENARIO 2: REMOVE SEDIMENT DOWN TO EL. 824.03. (4-FT BELOW SUMMER MIN. ROCK LAKE WATER LEVEL)
DREDGING SCENARIO 3: REMOVE SEDIMENT DOWN TO EL. 825.03. (3-FT BELOW SUMMER MIN. ROCK LAKE WATER LEVEL)



ROCK LAKE WATER LEVELS	
SEASON	MINIMUM/MAXIMUM
NOVEMBER 1 TO SPRING BREAKUP	MIN. = 827.25 FT.
	MAX. = 827.50 FT.
SPRING BREAKUP TO MAY 1	MIN. = 827.25 FT.
	MAX. = 827.63 FT.
MAY 2 TO SEPTEMBER 15 (SUMMER)	MIN. = 828.03 FT.
	MAX. = 828.33 FT.
SEPTEMBER 15 TO OCTOBER 31	MIN. = 827.25 FT.
	MAX. = 827.63 FT.

840 835 830 825 820 815 810 805 800 795

10+00'B' 11+00'B' 12+00'B' 13+00'B' 14+00'B' 15+00'B' 16+00'B' 17+00'B' 18+00'B' 19+00'B' 20+00'B' 21+00'B' 22+00'B' 23+00'B'

DATE:
REVISIONS
NO.

PLAN AND PROFILE
MILL POND (50-FT WIDE CHANNEL)
MILL POND AND CHANNEL DREDGING FEASIBILITY STUDY
CITY OF LAKE MILLS
JEFFERSON COUNTY, WISCONSIN

JOB NO. 1060.055
PROJECT MGR. JHL

STRAND ASSOCIATES®

SHEET 1A

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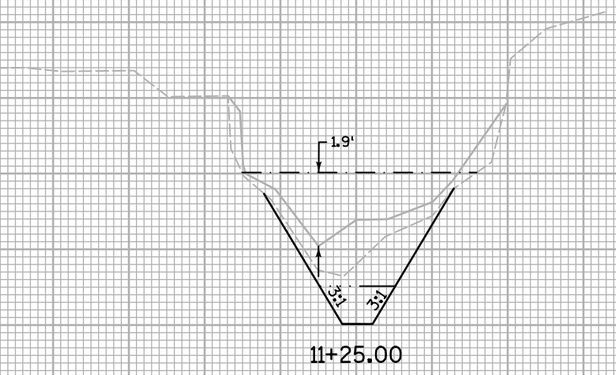
NOTE: AUGUST 9, 2017
AVERAGE WSEL=827.93



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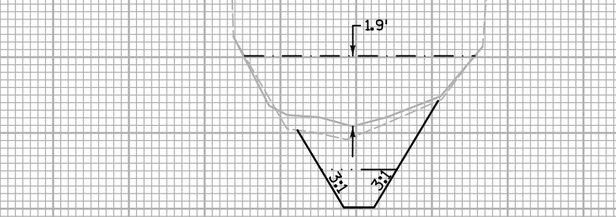

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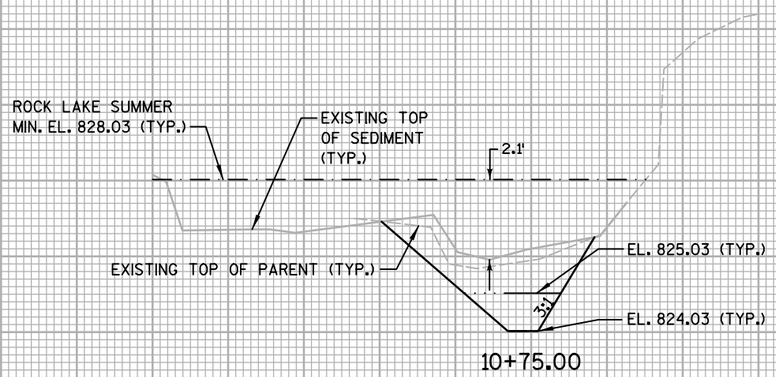

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DATE:

REVISIONS

NO.

CROSS SECTION
MILL POND AND CHANNEL
MILL POND AND CHANNEL DREDGING FEASIBILITY STUDY
CITY OF LAKE MILLS
JEFFERSON COUNTY, WISCONSIN

JOB NO.
1060.055

PROJECT MGR.
JHL

STRAND ASSOCIATES®

SHEET
2

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NOTE: AUGUST 9, 2017
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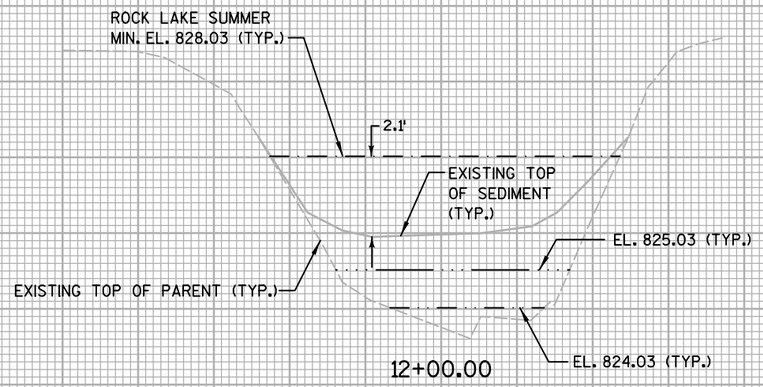

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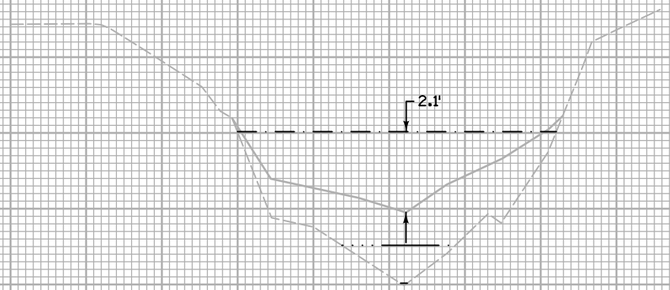

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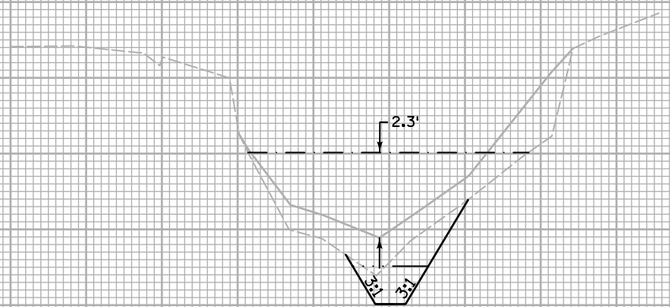

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CROSS SECTION
MILL POND AND CHANNEL
MILL POND AND CHANNEL DREDGING FEASIBILITY STUDY
CITY OF LAKE MILLS
JEFFERSON COUNTY, WISCONSIN

JOB NO.
1060.055

PROJECT MGR.
JHL

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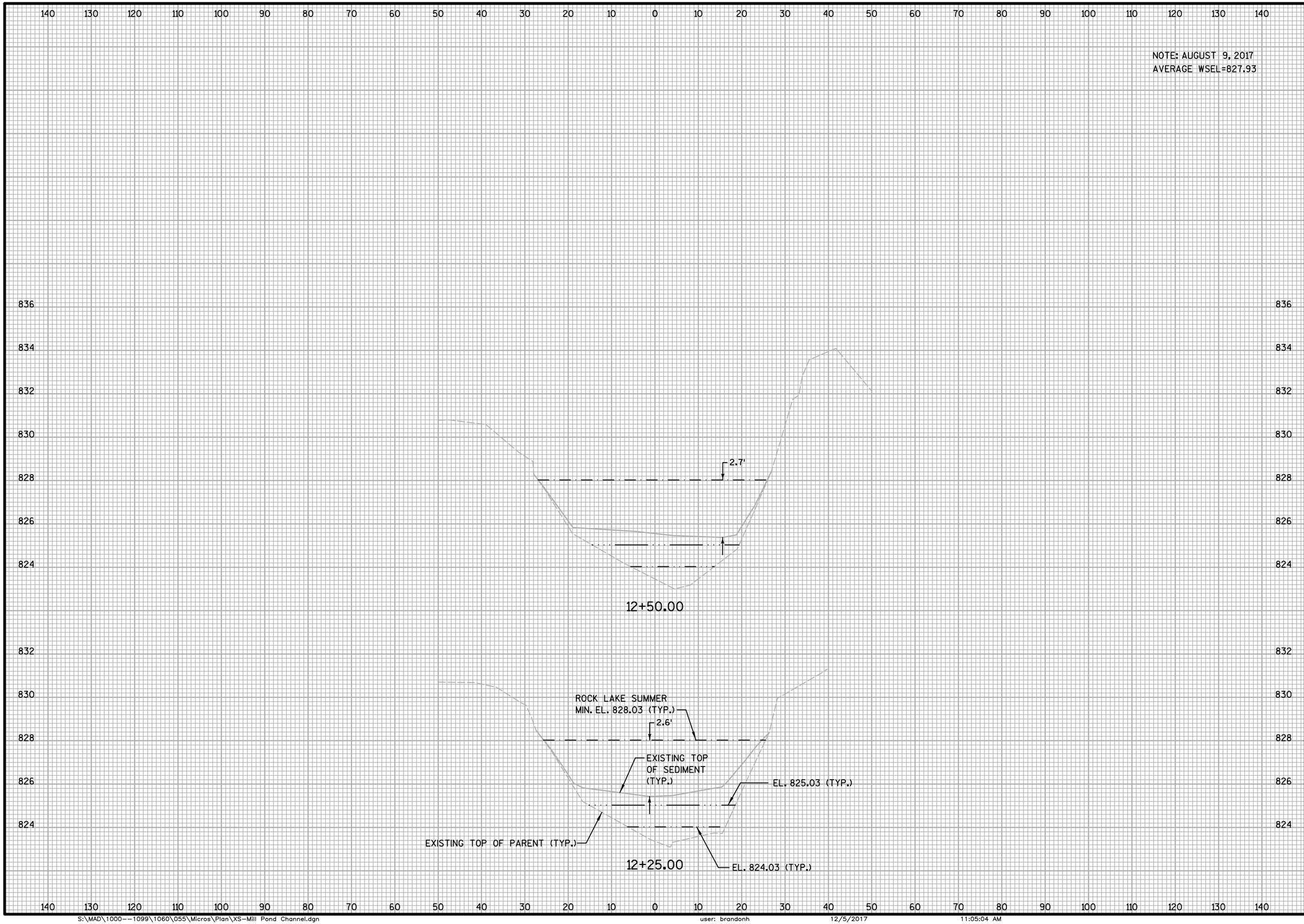

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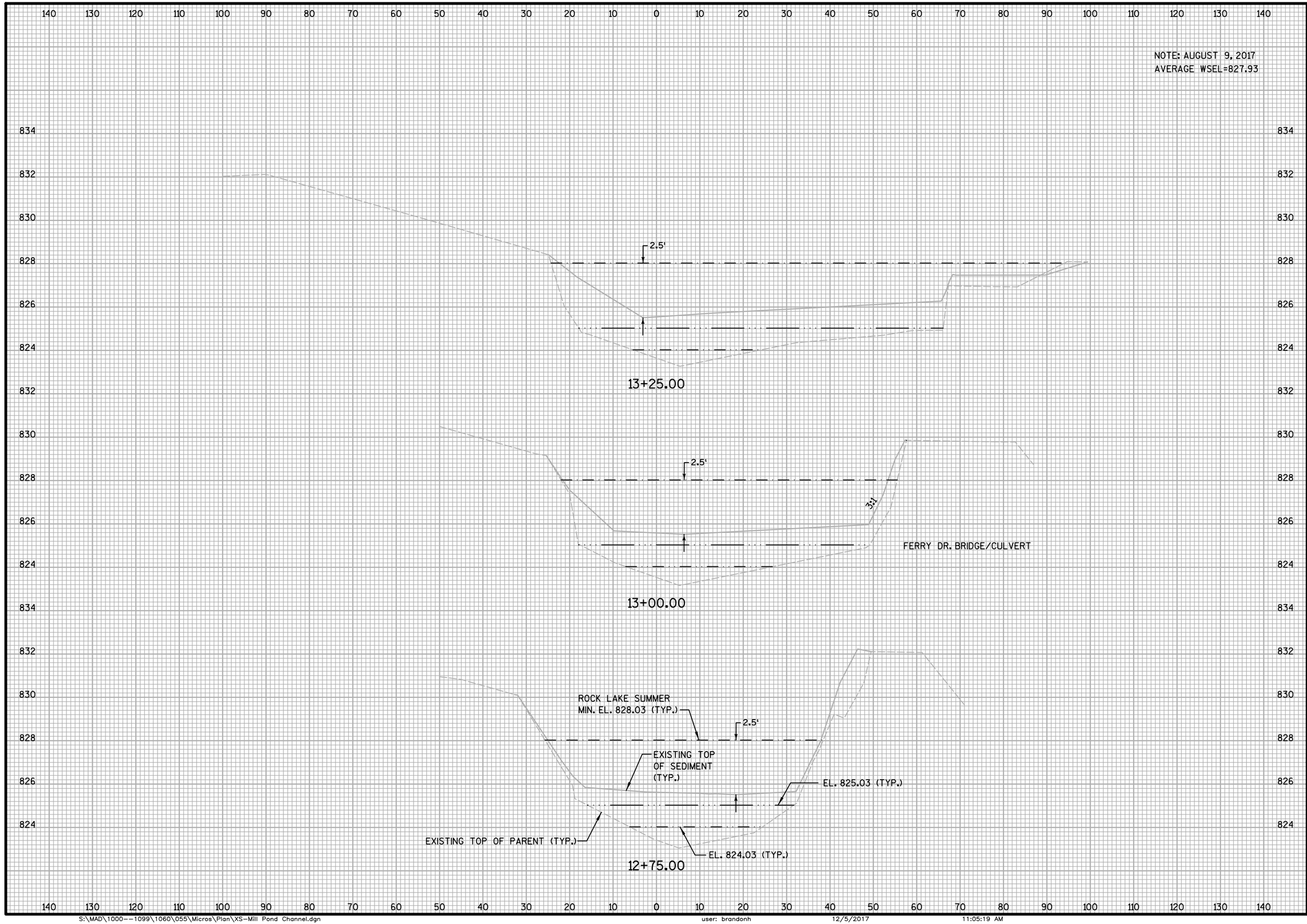

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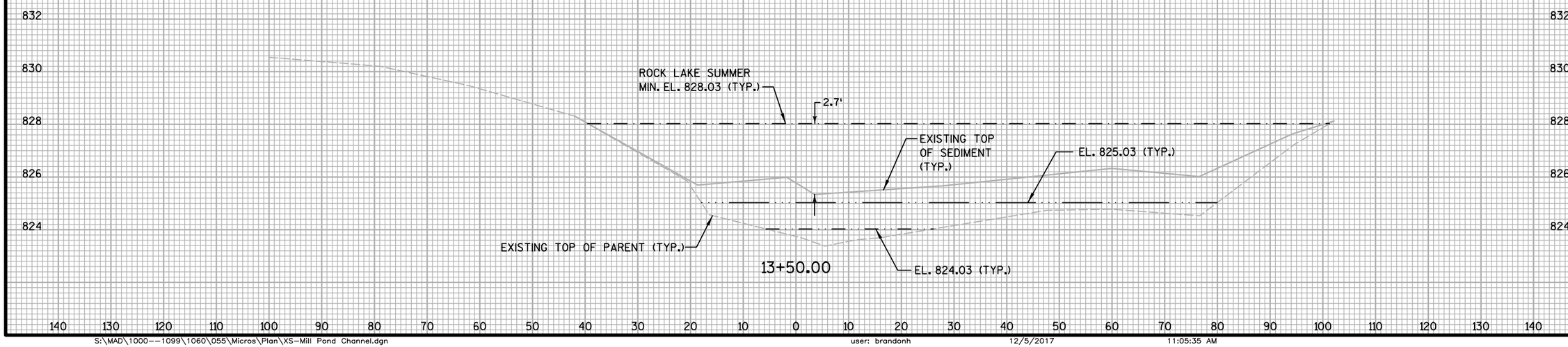

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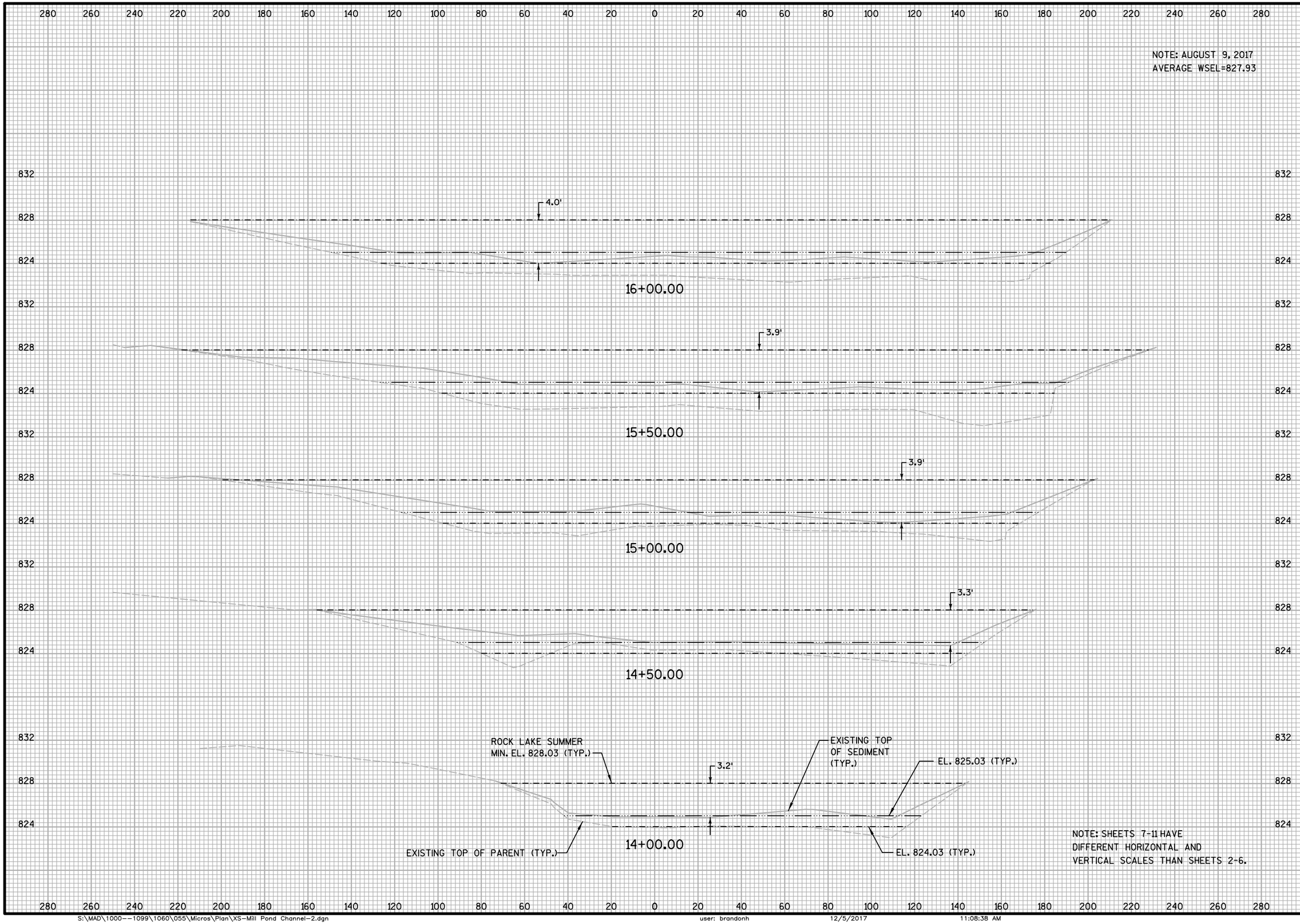

NOTE: SHEETS 7-11 HAVE
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NOTE: AUGUST 9, 2017
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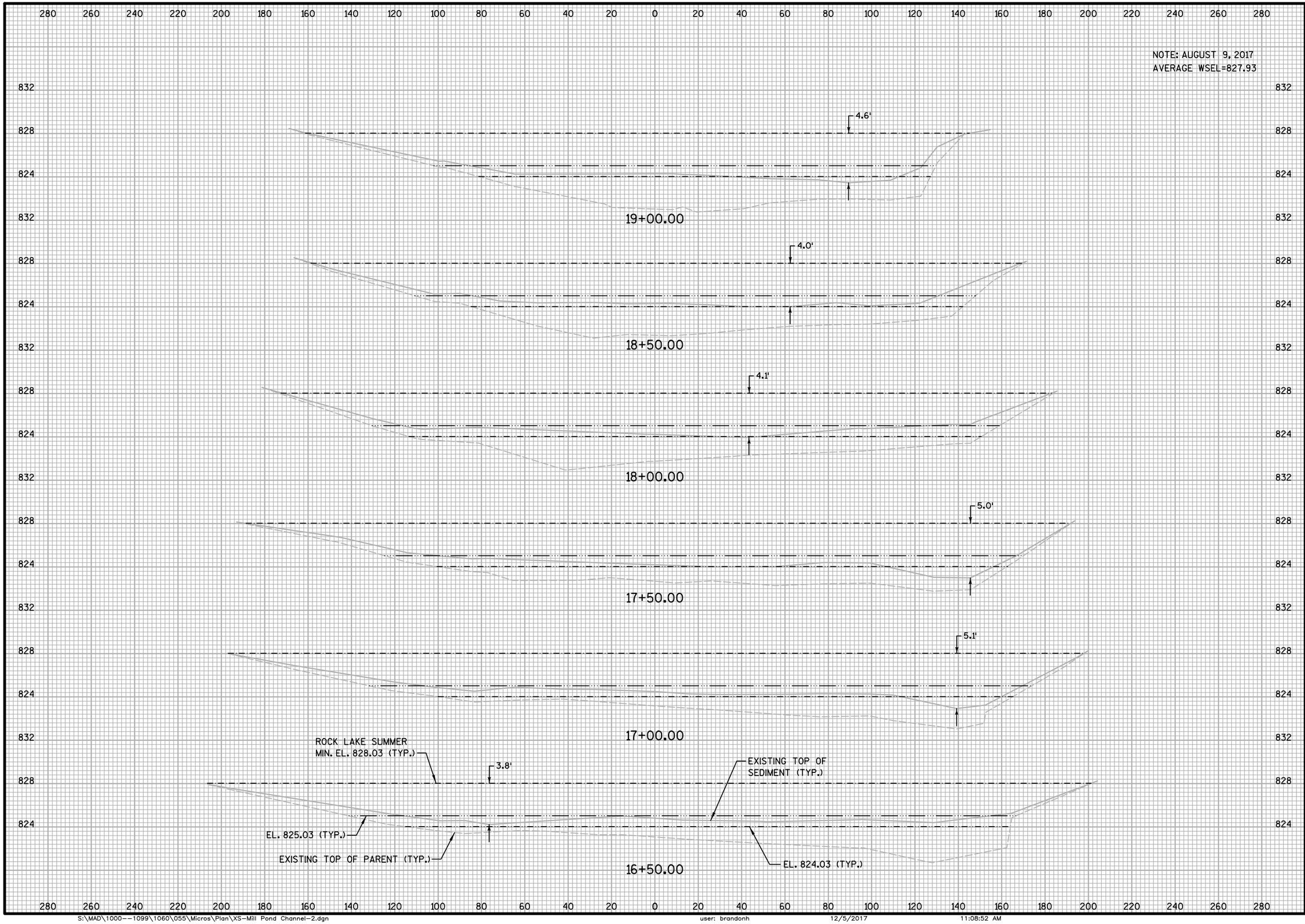

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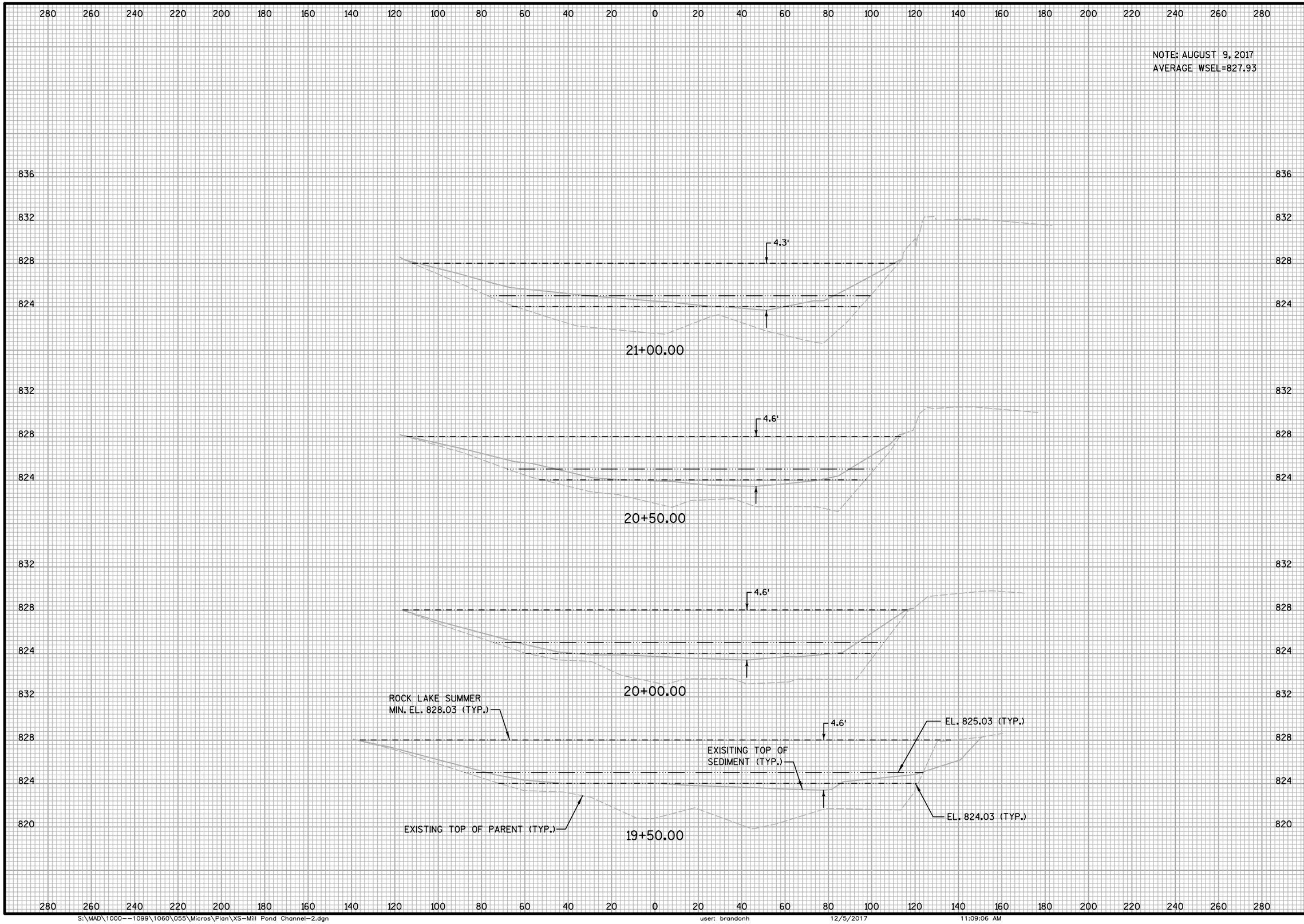

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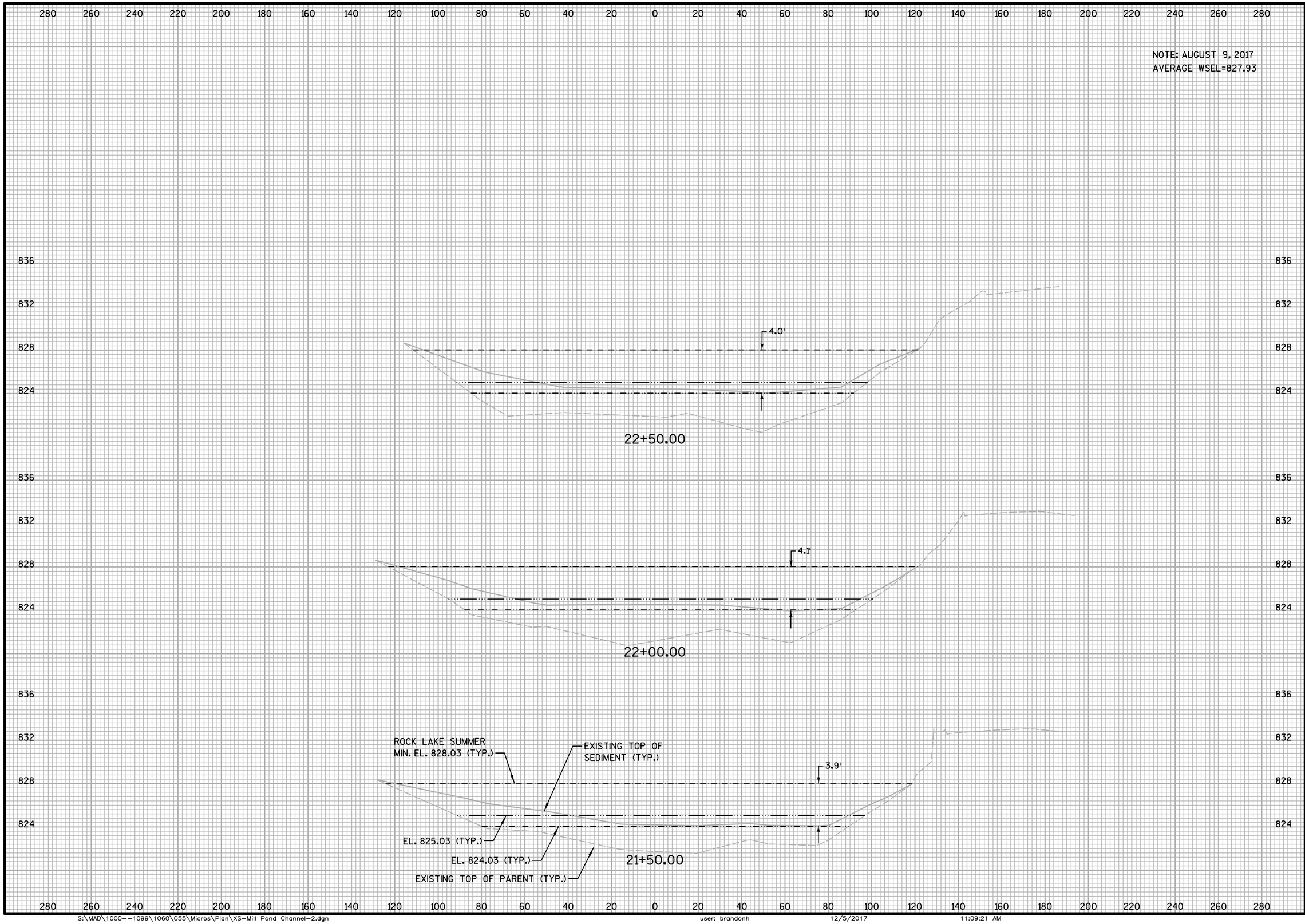

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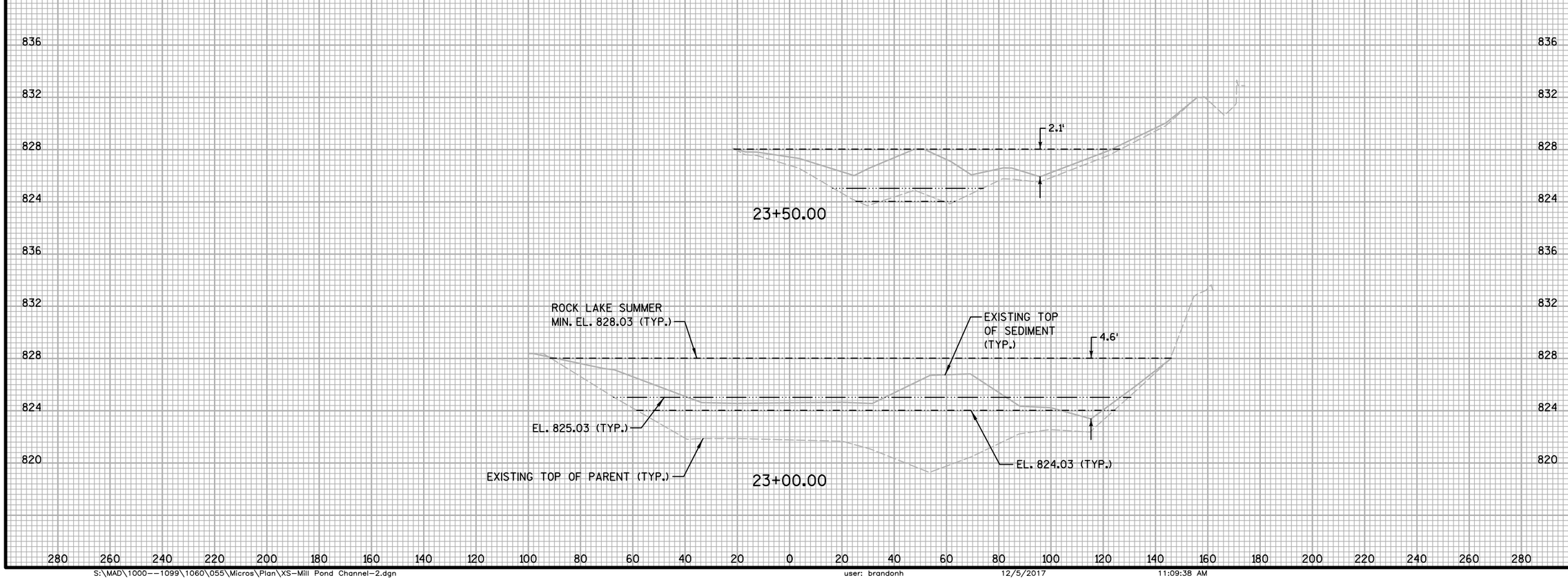

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ATTACHMENT C

Mill Pond and Channel Dredging Feasibility Study

Remove All Sediment - Channel

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

ITEM NO.	DESCRIPTION	Quantity	Units	Unit Price	Total
1	Mobilization	1	LS	$21,500.00	$21,500
2	Clearing and Grubbing	1	LS	$1,500.00	$1,500
3	Traffic Control	1	LS	$8,000.00	$8,000
4	Stone Tracking Pad	1	EA	$2,900.00	$2,900
5	Turbidity Barrier	160	LF	$40.00	$6,400
6	Dust Control	1	LS	$2,500.00	$2,500
7	Sediment Excavation and Off-Site Disposal (Beneficial Reuse) - Mechanical Dredging	762	CY	$35.00	$26,674
8	Sediment Excavation and Off-Site Disposal (Landfill Disposal) - Mechanical Dredging	762	CY	$95.00	$72,400
9	Medium Rip Rap (Assumes 2-25'x15' Access Area Restoration)	85	SY	$75.00	$6,375
10	Turf Restoration-Topsoil, Seed, and Fertilizer (Assumes 25' Wide Along Side of Channel)	1,214	SY	$5.25	$6,374
11	Turf Restoration-Class I, Urban Type B Erosion Control Revegetative Mat	1,214	SY	$3.75	$4,553
12	Coffer Dam on Both Ends (Aqua Dam)	1	LS	$15,000.00	$15,000
13	Coarse Woody Debris	3	EA	$1,400.00	$4,200
14	Boulders	9	EA	$375.00	$3,375
15	Streambank Restoration-Boulder Revement	134	LF	$170.00	$22,780
16	Streambank Restoration-Vegetated Boulder Revement	68	LF	$180.00	$12,240
17	Streambank Restoration-Coir Fiber Roll	92	LF	$75.00	$6,900
18	Streambank Restoration-Augmentative Rip Rap	13	SY	$70.00	$933
19	Concrete Fixes (Assumed)	1	LS	$25,000.00	$25,000
20	Canoe/Kayak Launch	1	EA	$2,700.00	$2,700
21	Remove Existing Fishing Pier and Overlook	1	LS	$2,500.00	$2,500
22	Relocate Existing Arch Bridge	1	LS	$5,000.00	$5,000
				Beneficial Reuse Cost (per Item 7)	
				Subtotal	$187,403
				20% Construction Contingency	$37,481
				SITE GRAND TOTAL	**$224,900**
				Landfill Disposal Cost (per Item 8)	
				Subtotal	$233,129
				20% Construction Contingency	$46,626
				SITE GRAND TOTAL	**$279,800**

Mill Pond and Channel Dredging Feasibility Study

Remove All Sediment - Mill Pond

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

ITEM NO.	DESCRIPTION	Quantity	Units	Unit Price	Total
1	Mobilization	1	LS	$21,500.00	$21,500
2	Clearing and Grubbing	1	LS	$1,500.00	$1,500
3	Traffic Control	1	LS	$8,000.00	$8,000
4	Stone Tracking Pad	1	EA	$2,900.00	$2,900
5	Turbidity Barrier	160	LF	$40.00	$6,400
6	Dust Control	1	LS	$2,500.00	$2,500
7	Sediment Excavation and Off-Site Disposal (Beneficial Reuse) - Hydraulic Dredging	17,793	CY	$75.00	$1,334,493
8	Sediment Excavation and Off-Site Disposal (Landfill Disposal) - Hydraulic Dredging	17,793	CY	$180.00	$3,202,783
9	Medium Rip Rap (Assumes 2-25'x15' Access Area Restoration)	85	SY	$75.00	$6,375
10	Turf Restoration-Topsoil, Seed, and Fertilizer (Assumes 25' Wide Along Restoration Limits)	245	SY	$5.25	$1,286
11	Turf Restoration-Class I, Urban Type B Erosion Control Revegetative Mat	245	SY	$3.75	$919
12	Coarse Woody Debris	2	EA	$1,400.00	$2,800
13	Boulders	6	EA	$375.00	$2,250
14	Streambank Restoration-Boulder Revement	12	LF	$170.00	$2,040
15	Streambank Restoration-Vegetated Boulder Revement	74	LF	$180.00	$13,320
16	Streambank Restoration-Coir Fiber Roll	11	LF	$75.00	$825
		1	LS	$20,000.00	$20,000
				Beneficial Reuse Cost (per Item 7)	
				Subtotal	$1,427,108
				20% Construction Contingency	$285,422
				SITE GRAND TOTAL	**$1,712,500**
				Landfill Disposal Cost (per Item 8)	
				Subtotal	$3,295,398
				20% Construction Contingency	$659,080
				SITE GRAND TOTAL	**$3,954,500**

Mill Pond and Channel Dredging Feasibility Study

Remove Sediment to Elevation 824.03 - Channel

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

ITEM NO.	DESCRIPTION	Quantity	Units	Unit Price	Total
1	Mobilization	1	LS	$21,500.00	$21,500
2	Clearing and Grubbing	1	LS	$1,500.00	$1,500
3	Traffic Control	1	LS	$8,000.00	$8,000
4	Stone Tracking Pad	1	EA	$2,900.00	$2,900
5	Turbidity Barrier	160	LF	$40.00	$6,400
6	Dust Control	1	LS	$2,500.00	$2,500
7	Sediment Excavation and Off-Site Disposal (Beneficial Reuse) - Mechanical Dredging	691	CY	$35.00	$24,168
8	Parent Material Excavation and Off-Site Disposal (Beneficial Reuse) - Mechanical Dredging	76	CY	$35.00	$2,657
9	Sediment Excavation and Off-Site Disposal (Landfill Disposal) - Mechanical Dredging	691	CY	$95.00	$65,598
10	Parent Material Excavation and Off-Site Disposal (Landfill Disposal) - Mechanical Dredging	76	CY	$95.00	$7,211
11	Medium Rip Rap (Assumes 2-25'x15' Access Area Restoration)	85	SY	$75.00	$6,375
12	Turf Restoration-Topsoil, Seed, and Fertilizer (Assumes 25' Wide Along Side of Channel)	1,214	SY	$5.25	$6,374
13	Turf Restoration-Class I, Urban Type B Erosion Control Revegetative Mat	1,214	SY	$3.75	$4,553
14	Coffer Dam on Both Ends (Aqua Dam)	1	LS	$15,000.00	$15,000
15	Coarse Woody Debris	3	EA	$1,400.00	$4,200
16	Boulders	9	EA	$375.00	$3,375
17	Streambank Restoration-Boulder Revement	134	LF	$170.00	$22,780
18	Streambank Restoration-Vegetated Boulder Revement	68	LF	$180.00	$12,240
19	Streambank Restoration-Coir Fiber Roll	92	LF	$75.00	$6,900
20	Streambank Restoration-Augmentative Rip Rap	13	SY	$70.00	$933
21	Concrete Fixes (Assumed)	1	LS	$25,000.00	$25,000
22	Canoe/Kayak Launch	1	EA	$2,700.00	$2,700
23	Remove Existing Fishing Pier and Overlook	1	LS	$2,500.00	$2,500
24	Relocate Existing Arch Bridge	1	LS	$5,000.00	$5,000
				Beneficial Reuse Cost (per Items 7 & 8)	
				Subtotal	$187,553
				20% Construction Contingency	$37,511
				SITE GRAND TOTAL	**$225,100**
				Landfill Disposal Cost (per Items 9 & 10)	
				Subtotal	$233,537
				20% Construction Contingency	$46,707
				SITE GRAND TOTAL	**$280,200**

Mill Pond and Channel Dredging Feasibility Study

Remove Sediment to Elevation 824.03 - Mill Pond

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

ITEM NO.	DESCRIPTION	Quantity	Units	Unit Price	Total
1	Mobilization	1	LS	$21,500.00	$21,500
2	Clearing and Grubbing	1	LS	$1,500.00	$1,500
3	Traffic Control	1	LS	$8,000.00	$8,000
4	Stone Tracking Pad	1	EA	$2,900.00	$2,900
5	Turbidity Barrier	160	LF	$40.00	$6,400
6	Dust Control	1	LS	$2,500.00	$2,500
7	Sediment Excavation and Off-Site Disposal (Beneficial Reuse) - Hydraulic Dredging	6,657	CY	$110.00	$732,226
8	Parent Material Excavation and Off-Site Disposal (Beneficial Reuse) - Hydraulic Dredging	96	CY	$110.00	$10,560
9	Sediment Excavation and Off-Site Disposal (Landfill Disposal) - Hydraulic Dredging	6,657	CY	$215.00	$1,431,169
10	Parent Material Excavation and Off-Site Disposal (Landfill Disposal) - Hydraulic Dredging	96	CY	$215.00	$20,640
11	Medium Rip Rap (Assumes 2-25'x15' Access Area Restoration)	85	SY	$75.00	$6,375
12	Turf Restoration-Topsoil, Seed, and Fertilizer (Assumes 25' Wide Along Restoration Limits)	245	SY	$5.25	$1,286
13	Turf Restoration-Class I, Urban Type B Erosion Control Revegetative Mat	245	SY	$3.75	$919
14	Coarse Woody Debris	2	EA	$1,400.00	$2,800
15	Boulders	6	EA	$375.00	$2,250
16	Streambank Restoration-Boulder Revement	12	LF	$170.00	$2,040
17	Streambank Restoration-Vegetated Boulder Revement	74	LF	$180.00	$13,320
18	Streambank Restoration-Coir Fiber Roll	11	LF	$75.00	$825
				Beneficial Reuse Cost (per Items 7 & 8)	
				Subtotal	$815,401
				20% Construction Contingency	$163,080
				SITE GRAND TOTAL	**$978,500**
				Landfill Disposal Cost (per Items 9 & 10)	
				Subtotal	$1,524,424
				20% Construction Contingency	$304,885
				SITE GRAND TOTAL	**$1,829,300**

Mill Pond and Channel Dredging Feasibility Study

Remove Sediment to Elevation 825.03 - Channel

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

ITEM NO.	DESCRIPTION	Quantity	Units	Unit Price	Total
1	Mobilization	1	LS	$21,500.00	$21,500
2	Clearing and Grubbing	1	LS	$1,500.00	$1,500
3	Traffic Control	1	LS	$8,000.00	$8,000
4	Stone Tracking Pad	1	EA	$2,900.00	$2,900
5	Turbidity Barrier	160	LF	$40.00	$6,400
6	Dust Control	1	LS	$2,500.00	$2,500
7	Sediment Excavation and Off-Site Disposal (Beneficial Reuse) - Mechanical Dredging	441	CY	$35.00	$15,442
8	Parent Material Excavation and Off-Site Disposal (Beneficial Reuse) - Mechanical Dredging	50	CY	$35.00	$1,733
9	Sediment Excavation and Off-Site Disposal (Landfill Disposal) - Mechanical Dredging	441	CY	$95.00	$41,914
10	Parent Material Excavation and Off-Site Disposal (Landfill Disposal) - Mechanical Dredging	50	CY	$95.00	$4,703
11	Medium Rip Rap (Assumes 2-25'x15' Access Area Restoration)	85	SY	$75.00	$6,375
12	Turf Restoration-Topsoil, Seed, and Fertilizer (Assumes 25' Wide Along Side of Channel)	1,214	SY	$5.25	$6,374
13	Turf Restoration-Class I, Urban Type B Erosion Control Revegetative Mat	1,214	SY	$3.75	$4,553
14	Coffer Dam on Both Ends (Aqua Dam)	1	LS	$15,000.00	$15,000
15	Coarse Woody Debris	3	EA	$1,400.00	$4,200
16	Boulders	9	EA	$375.00	$3,375
17	Streambank Restoration-Boulder Revement	134	LF	$170.00	$22,780
18	Streambank Restoration-Vegetated Boulder Revement	68	LF	$180.00	$12,240
19	Streambank Restoration-Coir Fiber Roll	92	LF	$75.00	$6,900
20	Streambank Restoration-Augmentative Rip Rap	13	SY	$70.00	$933
21	Concrete Fixes (Assumed)	1	LS	$25,000.00	$25,000
22	Canoe/Kayak Launch	1	EA	$2,700.00	$2,700
23	Remove Existing Fishing Pier and Overlook	1	LS	$2,500.00	$2,500
24	Relocate Existing Arch Bridge	1	LS	$5,000.00	$5,000
				Beneficial Reuse Cost (per Items 7 & 8)	
				Subtotal	$177,904
				20% Construction Contingency	$35,581
				SITE GRAND TOTAL	**$213,500**
				Landfill Disposal Cost (per Items 9 & 10)	
				Subtotal	$207,346
				20% Construction Contingency	$41,469
				SITE GRAND TOTAL	**$248,800**

Mill Pond and Channel Dredging Feasibility Study

Remove Sediment to Elevation 825.03 - Mill Pond

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

ITEM NO.	DESCRIPTION	Quantity	Units	Unit Price	Total
1	Mobilization	1	LS	$21,500.00	$21,500
2	Clearing and Grubbing	1	LS	$1,500.00	$1,500
3	Traffic Control	1	LS	$8,000.00	$8,000
4	Stone Tracking Pad	1	EA	$2,900.00	$2,900
5	Turbidity Barrier	160	LF	$40.00	$6,400
6	Dust Control	1	LS	$2,500.00	$2,500
7	Sediment Excavation and Off-Site Disposal (Beneficial Reuse) - Hydraulic Dredging	2,588	CY	$127.50	$329,945
8	Sediment Excavation and Off-Site Disposal (Landfill Disposal) - Hydraulic Dredging	2,588	CY	$235.00	$608,133
9	Medium Rip Rap (Assumes 2-25'x15' Access Area Restoration)	85	SY	$75.00	$6,375
10	Turf Restoration-Topsoil, Seed, and Fertilizer (Assumes 25' Wide Along Restoration Limits)	245	SY	$5.25	$1,286
11	Turf Restoration-Class I, Urban Type B Erosion Control Revegetative Mat	245	SY	$3.75	$919
12	Coarse Woody Debris	2	EA	$1,400.00	$2,800
13	Boulders	6	EA	$375.00	$2,250
14	Streambank Restoration-Boulder Revement	12	LF	$170.00	$2,040
15	Streambank Restoration-Vegetated Boulder Revement	74	LF	$180.00	$13,320
16	Streambank Restoration-Coir Fiber Roll	11	LF	$75.00	$825
				Beneficial Reuse Cost (per Item 7)	
				Subtotal	$402,560
				20% Construction Contingency	$80,512
				SITE GRAND TOTAL	**$483,100**
				Landfill Disposal Cost (per Item 8)	
				Subtotal	$680,748
				20% Construction Contingency	$136,150
				SITE GRAND TOTAL	**$816,900**

Mill Pond and Channel Dredging Feasibility Study

Remove All Sediment - 50-Ft Channel in Mill Pond

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

ITEM NO.	DESCRIPTION	Quantity	Units	Unit Price	Total
1	Mobilization	1	LS	$21,500.00	$21,500
2	Clearing and Grubbing	1	LS	$1,500.00	$1,500
3	Traffic Control	1	LS	$8,000.00	$8,000
4	Stone Tracking Pad	1	EA	$2,900.00	$2,900
5	Turbidity Barrier	160	LF	$40.00	$6,400
6	Dust Control	1	LS	$2,500.00	$2,500
7	Sediment Excavation and Off-Site Disposal (Beneficial Reuse) - Hydraulic Dredging	1,807	CY	$135.00	$243,986
8	Sediment Excavation and Off-Site Disposal (Landfill Disposal) - Hydraulic Dredging	1,807	CY	$243.00	$439,174
9	Medium Rip Rap (Assumes 2-25'x15' Access Area Restoration)	85	SY	$75.00	$6,375
10	Turf Restoration-Topsoil, Seed, and Fertilizer (Assumes 25' Wide Along Restoration Limits)	245	SY	$5.25	$1,286
11	Turf Restoration-Class I, Urban Type B Erosion Control Revegetative Mat	245	SY	$3.75	$919
12	Coarse Woody Debris	2	EA	$1,400.00	$2,800
13	Boulders	6	EA	$375.00	$2,250
14	Streambank Restoration-Boulder Revement	12	LF	$170.00	$2,040
15	Streambank Restoration-Vegetated Boulder Revement	74	LF	$180.00	$13,320
16	Streambank Restoration-Coir Fiber Roll	11	LF	$75.00	$825
				Beneficial Reuse Cost (per Item 7)	
				Subtotal	$316,601
				20% Construction Contingency	$63,320
				SITE GRAND TOTAL	**$379,900**
				Landfill Disposal Cost (per Item 8)	
				Subtotal	$511,789
				20% Construction Contingency	$102,358
				SITE GRAND TOTAL	**$614,100**

Mill Pond and Channel Dredging Feasibility Study

Remove Sediment to Elevation 824.03 - 50-Ft Channel in Mill Pond

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

ITEM NO.	DESCRIPTION	Quantity	Units	Unit Price	Total
1	Mobilization	1	LS	$21,500.00	$21,500
2	Clearing and Grubbing	1	LS	$1,500.00	$1,500
3	Traffic Control	1	LS	$8,000.00	$8,000
4	Stone Tracking Pad	1	EA	$2,900.00	$2,900
5	Turbidity Barrier	160	LF	$40.00	$6,400
6	Dust Control	1	LS	$2,500.00	$2,500
7	Sediment Excavation and Off-Site Disposal (Beneficial Reuse) - Hydraulic Dredging	549	CY	$145.00	$79,576
8	Parent Material Excavation and Off-Site Disposal (Beneficial Reuse) - Hydraulic Dredging	44	CY	$145.00	$6,337
9	Sediment Excavation and Off-Site Disposal (Landfill Disposal) - Hydraulic Dredging	549	CY	$255.00	$139,944
10	Parent Material Excavation and Off-Site Disposal (Landfill Disposal) Hydraulic Dredging	44	CY	$255.00	$11,144
11	Medium Rip Rap (Assumes 2-25'x15' Access Area Restoration)	85	SY	$75.00	$6,375
12	Turf Restoration-Topsoil, Seed, and Fertilizer (Assumes 25' Wide Along Restoration Limits)	245	SY	$5.25	$1,286
13	Turf Restoration-Class I, Urban Type B Erosion Control Revegetative Mat	245	SY	$3.75	$919
14	Coarse Woody Debris	2	EA	$1,400.00	$2,800
15	Boulders	6	EA	$375.00	$2,250
16	Streambank Restoration-Boulder Revement	12	LF	$170.00	$2,040
17	Streambank Restoration-Vegetated Boulder Revement	74	LF	$180.00	$13,320
18	Streambank Restoration-Coir Fiber Roll	11	LF	$75.00	$825
				Beneficial Reuse Cost (per Items 7 & 8)	
				Subtotal	$158,528
				20% Construction Contingency	$31,706
				SITE GRAND TOTAL	**$190,200**
				Landfill Disposal Cost (per Items 9 & 10)	
				Subtotal	$223,703
				20% Construction Contingency	$44,741
				SITE GRAND TOTAL	**$268,400**

Mill Pond and Channel Dredging Feasibility Study

Remove Sediment to Elevation 825.03 - 50-Ft Channel in Mill Pond

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

ITEM NO.	DESCRIPTION	Quantity	Units	Unit Price	Total
1	Mobilization	1	LS	$21,500.00	$21,500
2	Clearing and Grubbing	1	LS	$1,500.00	$1,500
3	Traffic Control	1	LS	$8,000.00	$8,000
4	Stone Tracking Pad	1	EA	$2,900.00	$2,900
5	Turbidity Barrier	160	LF	$40.00	$6,400
6	Dust Control	1	LS	$2,500.00	$2,500
7	Sediment Excavation and Off-Site Disposal (Beneficial Reuse) - Hydraulic Dredging	36	CY	$145.00	$5,235
8	Parent Material Excavation and Off-Site Disposal (Beneficial Reuse) - Hydraulic Dredging	6	CY	$145.00	$856
9	Sediment Excavation and Off-Site Disposal (Landfill Disposal) - Hydraulic Dredging	36	CY	$255.00	$9,206
10	Parent Material Excavation and Off-Site Disposal (Beneficial Reuse) - Hydraulic Dredging	6	CY	$255.00	$1,505
11	Medium Rip Rap (Assumes 2-25'x15' Access Area Restoration)	85	SY	$75.00	$6,375
12	Turf Restoration-Topsoil, Seed, and Fertilizer (Assumes 25' Wide Along Restoration Limits)	245	SY	$5.25	$1,286
13	Turf Restoration-Class I, Urban Type B Erosion Control Revegetative Mat	245	SY	$3.75	$919
14	Coarse Woody Debris	2	EA	$1,400.00	$2,800
15	Boulders	6	EA	$375.00	$2,250
16	Streambank Restoration-Boulder Revement	12	LF	$170.00	$2,040
17	Streambank Restoration-Vegetated Boulder Revement	74	LF	$180.00	$13,320
18	Streambank Restoration-Coir Fiber Roll	11	LF	$75.00	$825
				Beneficial Reuse Cost (per Items 7 & 8)	
				Subtotal	$78,705
				20% Construction Contingency	$15,741
				SITE GRAND TOTAL	**$94,400**
				Landfill Disposal Cost (per Items 9 & 10)	
				Subtotal	$83,325
				20% Construction Contingency	$16,665
				SITE GRAND TOTAL	**$100,000**

ATTACHMENT D

CHANNEL

EXISTING PEDESTRIAN BRIDGE WOULD NEED TO BE RAISED AS WELL

67'

PI 11+90.95

12+00

FERRY DRIVE

+50

110'

+50

11+00

+50

85'

EXISTING STORM SEWER

SS

SS

13+00

SS

SS

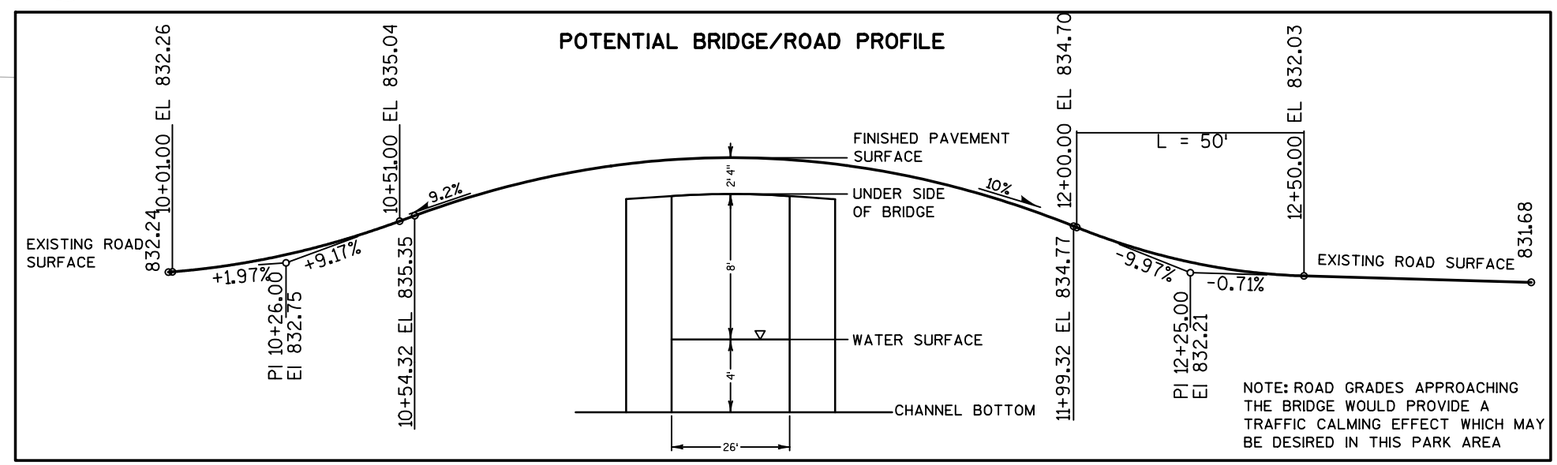
GUY

MILL POND

N

0 FEET 25 50

POTENTIAL BRIDGE/ROAD PROFILE



MILL POND BRIDGE EXHIBIT

DOWNTOWN ECONOMIC STIMULUS IDEA

CITY OF LAKE MILLS

JEFFERSON COUNTY, WISCONSIN

STRAND ASSOCIATES®

FIGURE 1

MILL POND DOCK EXHIBIT

DOWNTOWN ECONOMIC STIMULUS IDEA

CITY OF LAKE MILLS

JEFFERSON COUNTY, WISCONSIN

OPTION B: 7-8 BOATS,
MODULAR EXPANSION POSSIBLE

OPTION A: 6-8 BOATS,
MODULAR EXPANSION POSSIBLE

MILL POND

AMERICAN LEGION
PROPERTY LINE

NEW SIDEWALK

CONNECTION TO
EXISTING SIDEWALK

AMERICAN LEGION

EXISTING SIDEWALK
ON AMERICAN LEGION PROPERTY

MAIN STREET/STH 89

20'

18.8'

4'

NEW SIDEWALK

32.9'

33'

32'

VETERANS LANE

32'

37.2'

29.1'

21.3'

CONNECTION TO
EXISTING SIDEWALK

N

0 FEET 50 100

STRAND ASSOCIATES®

FIGURE
2

S:\MAD\1000--1099\1060\701\MICROS\Mill Pond City Dock\Mill Pond City Dock Exhibit.dgn user: brandonh 1/8/2018 9:56:53 AM

Ferry Drive Bridge Replacement and Public Boat Dock Opinion of Probable Construction Cost

DOCK

OPTION A

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Floating Dock (6-8 parking spots)	515	SF	$ 35.00	$ 18,025.00
2	Clearing and Grubbing	1	LS	$ 5,000.00	$ 5,000.00
3	4-IN Concrete Sidewalk	750	SF	$ 7.00	$ 5,250.00
4	Railing	100	LF	$ 10.00	$ 1,000.00
5	Bridge Sidewalk over Fish Hatchery Intake	1	LS	$ 2,000.00	$ 2,000.00
6	Sawcut Asphalt	150	LF	$ 3.00	$ 450.00
7	Remove and Replace 24-IN Curb and Gutter	150	LF	$ 30.00	$ 4,500.00
8	Asphalt Patch	50	SY	$ 25.00	$ 1,250.00
9	Engineering	1	LS	$ 5,621.25	$ 5,621.25
				Total	**$ 43,100.00**

OPTION B

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Floating Dock (6-8 parking spots)	515	SF	$ 35.00	$ 18,025.00
2	Clearing and Grubbing	1	LS	$ 1,500.00	$ 1,500.00
3	4-IN Concrete Sidewalk	520	SF	$ 7.00	$ 3,640.00
4	Engineering	1	LS	$ 3,474.75	$ 3,474.75
				Total	**$ 26,600.00**

BRIDGE

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Contech Bridge (8' Vertical Boat Clearance)	1	LS	$ 130,000.00	$ 130,000.00
2	Contech Bridge Installation	1	LS	$ 100,000.00	$ 100,000.00
3	Remove and Replace 30-IN Curb and Gutter	375	LF	$ 35.00	$ 13,125.00
4	4-IN Asphalt Pavement	670	SY	$ 20.00	$ 13,400.00
5	Remove and Replace Concrete Sidewalk	475	SF	$ 8.00	$ 3,800.00
6	Raise Pedestrian Bridge	1	LS	$ 40,000.00	$ 40,000.00
7	Erosion Control	1	LS	$ 5,000.00	$ 5,000.00
8	Traffic Control	1	LS	$ 2,000.00	$ 2,000.00
9	Engineering	1	LS	$ 19,331.25	$ 19,331.25
				Total	**$ 326,656.25**

Note: A floating dock system was used for this cost estimate. The City may wish to install a more permanent dock for less annual maintenance. A permanent dock would change dock costs.

Option A and Bridge Improvements	**$ 369,756.25**
Option B and Bridge Improvements	**$ 353,256.25**