Preliminary Dredge Project Estimate V2

Huron Pointe- Archer Canal

Harrison Twp. 10/06/2025

Aquatic Hydraulic Dredging, LLC (AHD) has prepared this estimate using all available preliminary data, as well as visiting the site in person to determine the most accurate estimate for your project. The numbers in this estimate were based on dredging the full width of the canal to a max depth of 6.5ft at the center and tapering up near the shore over the entire length of the canal measuring approximately 4,400ft long. This depth is in reference to the water level observed during our onsite visit June 5th, 2025 and is based off an average removal depth of 2.5ft.

AHD has worked closely with another industry professional specializing in geotubes and polymer treatment in order to verify beyond a reasonable doubt that the previously proposed plan and geotube sites will not offer adequate storage capacity to complete this project, as well as investigated and ruled out the possibility of using any larger sites in the area. Of the 8 samples taken the average percent solids was 32%, with this data we cannot reasonably expect sediment volume to decrease as substantially as the previous plans suggest (See Dewatering Performance Trial). AHD instead proposes the following detailed plan for removing and dewatering dredged material using only Aune park in 2 stages.

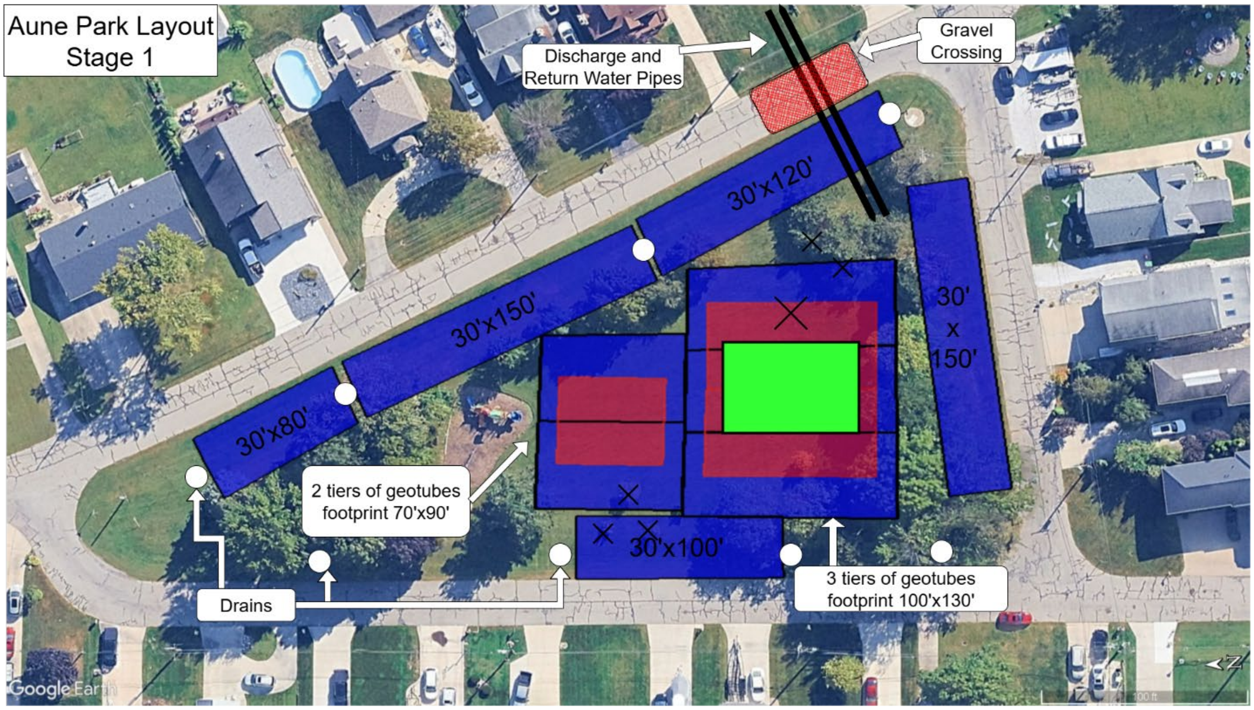
Timing

AHD expects that dredging could be complete by year end 2026 with the exception of final material haul off and site remediation. To complete this project within the expected timeframe AHD would have to start this project early spring 2026. This would mean all details, contracts, permits and permission must be in place prior to March 2026. We can begin mobilization March 2026 with dredging beginning mid-March 2026. This would result in Stage 1 dredging completion by Memorial Day (5/25/2026). Material Haul off for Stage 1 would be completed in the month of August with setup for Stage 2 Beginning immediately after. Stage 2 Dredging would begin approximately Labor Day (9/7/2026) and would be completed prior to year end. The entire canal being dredged will need to be closed until Memorial Day, then will re-open until Labor Day, from then the canal will be closed again until the end of the season. Material haul off and site remediation from Stage 2 would happen according to your preference in either late spring/summer 2027 or could wait until after Labor Day if preferred.


Site Map
Road Crossing
Pipe Route
Geotube Site
Google Earth

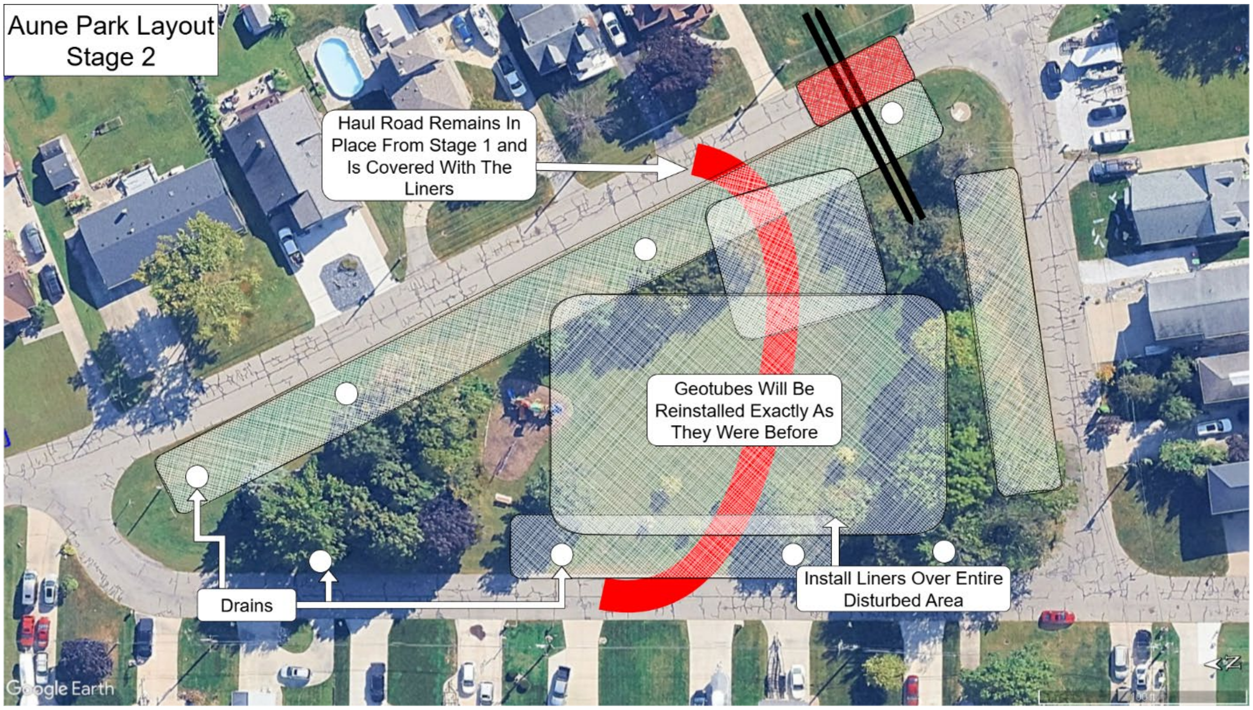
Stage 1 Site Prep and Haul Off

Using geotextile tube dewatering at Aune park will require the project to be completed in 2 stages due to the limited storage capacity of the site. In Stage 1 we would complete dredging for the northern ½ of the canal pumping all dredge material to Aune park. Site prep for Stage 1 will require that we remove a few trees as well as the hill near the southeast corner of the geotube site and install a liner to prevent erosion. We will also remove a few small trees at the northwest corner of the site. A liner 20'x120' tucked under the tubes and draped over strawbales and weighed down with sandbags will be used to divert water away from the playground. We would need to route (2) 8" pipes to/from the canal to the park to handle discharge from the dredge and return water. These pipes would cross over the road near the southeast corner of the park and would be covered with compactable gravel that can safely be driven over. Use of a return water pump has been included due to unknow flow capacity of the drains. The road crossing can be removed immediately after dredging is complete and while the sediment dries. Once the sediment is ready to be hauled, we will begin trucking it off while establishing a gravel haul road through the center of the geotube site.



Stage 2 Site Prep and Haul Off

After material haul off from Stage 1 the park will not have enough vegetation to prevent erosion. Rather than waiting to establish vegetation for Stage 2 AHD will immediately install poly liners over the entire laydown area to protect it from erosion and allow us to immediately begin Stage 2. For Stage 2 the haul road will be left in place and the road crossing reconstructed. In this Stage the remaining southern ½ of the canal will be dredged in the same manner as the first using new geotubes and the same layout. As soon as this stage of dredging is complete, we will again remove the road crossing. Material haul off from Stage 2 would happen according to your preference in either late spring/summer 2027 or could wait until after Labor Day if preferred. Upon completion of material haul off we will begin site remediation.



Site Remediation

Site remediation of Aune Park will include site cleanup, haul off and finish grading of all areas disturbed during the dewatering process. After an acceptable grade is met, AHD will reseed the entire geotube site with your choice of standard grass seed using straw, erosion control blankets and silt fence where necessary.

Pipe Route and Navigation

For this project the dredge pipe will be floated, clearly marked every 40ft and will severely limit navigation of the canal during the project. Between stages AHD will deconstruct all dredge equipment to whatever extent required to please all parties and allow for navigation, however during dredging, the canal will need to be closed. We must also have access to an open lot on the canal in order to stage equipment and assemble pipe. This lot will need to be relatively large, level, dry and open as well as have easy access to the canal without major concern for damaging docking equipment or seawalls. A natural shoreline or stone seawall would be preferred.

Project Cost

AHD estimates the “all in” dredging cost to dredge the canal as described using geotubes at Aune Park to be **$1,020,164.** This pricing is based on completing the project as described in this estimate with everything included. Stage 1 accounts for $494,832 of the total cost and Stage 2 accounts for $525,332 of the total project cost. The additional expense for Stage 2 is attributed to the requirement of a liner and site remediation and should not affect the even distribution of cost between all canal residents. The customer will be responsible for obtaining all permits and permissions required. It was also assumed that a gravel train will not exceed the load capacity of the bridge when hauling material off.

DEWATERING PERFORMANCE TRIAL
AQUATIC HYDRAULIC DREDGING
PORT HURON PROJECT

For:
Aquatic Hydraulic Dredging
Attn: James Schaedig
Email: ThatDredgeGuy@gmail.com
Cell: (989) 335-5043

By:
WaterSolve, LLC
5031 68th St., SE
Caledonia, MI 49316
www.gowatersolve.com
616-575-8693

June 11th, 2025

1. Scope of Work

WaterSolve, LLC was tasked to perform a geotextile tube dewatering performance trial and Cone Tests on sediment samples collected for Aquatic Hydraulic Dredging's "Port Huron Project". The objectives of these dewatering trials were to identify chemical conditioning program(s), identify polymer flocculant(s), and dosing rate(s) for a potential geotextile tube dewatering application. The objectives of subsequent Cone tests were to measure total solids of the flocculated, contained, and dewatered residual after passage through the geotextile tube fabric.

2. Materials & Methods

Eight five-gallon samples of sediment were received at WaterSolve's Laboratory (Caledonia, MI) in June 2025. Samples of residual were mixed, and 150-mL samples were placed in graduated, glass jars. Several polymers (emulsions) were "made-down" (200-mL) at a 0.5% concentration for this dewatering trial. Polymer (1 to 10-mL; 33.3 to 333-ppm) was added to a 150-mL sample with a plastic syringe and moderately tumbled five to seven times. Observations of water release rate, water clarity, and flocculent appearance were recorded on appropriate data sheets (Appendix A). Polymer(s) that flocculated and dewatered these residuals most effectively were re-evaluated with lower doses to isolate the most efficient dewatering and flocculating polymer(s). A Hach DR 2800 with a measurable limit of up to 750-mg/L suspended solids was used to measure Total Suspended Solids (TSS) after the sample was poured through the geotextile tube fabric.

Percent total solids (dry weight) of the sediment sample in-situ, sediment sample homogenized, and dewatering cake (captured on the geotextile tube fabric) of the sediment sample were measured (Appendix B).

3. Results

Chemical conditioning with Solve 164 was determined to flocculate and dewater the residual most effectively compared to the other chemical conditioning programs (Appendix A). Water release volume and flocculent appearance were good to excellent when a 5-mL (167-ppm, 1.9-Ibs/dry ton) dose of Solve 164 was added to 150-mL of sediment sample.

The sediment samples in-situ measured at 32.2-percent solids on average. The sediment samples homogenized measured at 17.6-percent solids on average. After passing 1,000-mL of conditioned (167-ppm of Solve 164) sediment samples through the geotextile tube fabric, percent solids increased to 35.6-percent after sixty minutes. From this 1,000-mL sample, 340-mL and 650-mL of water was released in one minute and sixty minutes, respectively, after passage through the fabric. Total suspended solids (TSS) measurements were taken on the filtrate after passage through the geotextile tube fabric. The TSS of the filtrate measured 157-mg/L.

4. Recommendations

We recommend an application of Solve 164 (167-ppm, 1.9-lbs/dry ton) for dewatering residuals in a geotextile tube application to pass a paint filter test for subsequent disposal. The dose may vary based on the solids concentration in the pumped line. Additional evaluation is recommended for determining optimal inline percent solids thresholds for geotextile tube performance including filtrate release and solids consolidation over time.

Solve 164 is required to be made-down at 0.5-percent with a polymer make-down unit or aged in batch/feed tanks prior to injection into the residual line. Moderate to high mixing energy is required between the polymer introduction points and the geotextile tube containers (e.g., two to three bends in the discharge line and/or inline static mixers).

Expected time to being able to pass a Paint Filter Test is unpredictable in a geotextile tube container from these bench-scale experiments. An onsite, laboratory hanging bag or geotextile tube dewatering trial (GTDT) may be used and is recommended if the timeline for achieving project goals of dry weight solids and geotextile tube filtrate characteristics is in question for this application. Additional dewatering evaluations over time are recommended if project objectives for consolidation are greater than passing a Paint Filter Test.

Please note, while a composite sample may give us an indication of an average treatment scenario, it does not indicate pockets of concern for treatment effectiveness or areas that may require a higher or lower dose of chemistry, or contain higher in situ solids, since the areas of concern may be masked by factors of dilution from other areas.

Due to potential variability of the material, daily on-site testing and chemical conditioning verification are recommended during pumping operations.

WaterSolve LLC does not make any implied warranty of any kind. Customer is solely responsible for determining the means and methods of the Product(s) use and whether or not Product(s) is suitable or desirable for Customer's intended uses. Customer agrees not to make any claim against WaterSolve LLC based upon, or arising out of or relating to any advice or any technical information given to the Customer by WaterSolve LLC for information purposes only and shall indemnify and hold WaterSolve LLC harmless from any and all claims asserted by any third party arising out of or related to the Customer's use of WaterSolve LLC's Product(s). Any technical information if given by WaterSolve LLC to the Customer is without any consideration and use of such information by Customer be at consumer's own risk and shall not relieve the Customer from ultimate liability to ensure Product(s) are used properly per Project and Product(s) specifications.

WaterSolve LLC

Appendix A - Dewatering Trial

Page _____ of _____

WaterSolve, LLC

Clearly thinking about your water treatment!

DEWATERING PERFORMANCE TRIAL

Date: 6/9/25
Analyst: Nick I, Kristen L

Customer: AHD - Port Huron
Location:
Equipment in Service: Sample 4

1=Best *6=Worst*

Polymer make-down concentration = .5 %
Dilution of test sample = Ø

Jar Number	Polymer Name	Polymer Dosage (mL)	Sample Size (mL)	Water Rel. Rate (1 - 6)	Water Clarity (1 - 6)	Floc Appearance (1 - 6)	Comments
1	137	1	150 mL		6	6	
2		2			6	6	
3		4			5	5	
4		8			3	3	
5		10			1-2	1-2	
6	2230C	5			2-3	1	
7	7118/2230C	1/3			3	3	
8		1/4			1-2	2	
9	216B	9			1-2	1-2	- Overdosed
10							
11	153	5			~~8~~ 6	6	
12	162				6	6	
13	164				5-6	3	OK! → ~~[illegible]~~ Recommended
14	804				6	6	
15	803				6	6	
16	2210A				6	6	
17	9220				4	3-4	OK!
18	9350				6	6	
19	163				3	3-4	
20							
21	4126/164	2/2			6	6	
22	4296/164	2/3			4	4-5	
23	4116/164	2/2			6	6	
24	4161/164	2/3			3-4	4	
25	164	4			3-4	4	
26	164	6			3-4	3-4	
27							
28							

Cone Test / RDT: _____mL sample conditioned with ________mL of _________ poured thru Geotextile Fabric.
Filtrate Quality: TSS-___________ mg/L Turbidity-___________ NTU Filtrate collected@ 1min:______60min:______

WaterSolve LLC

Page _____ of ______

WaterSolve LLC

WaterSolve, LLC

Clearly thinking about your water treatment!

DEWATERING PERFORMANCE TRIAL

Date: 6/19/25
Analyst: Kristine L, Nick I

Customer: AHD - Port Huron
Location:
Equipment in Service: Sample 1, 2, 3, 5, 6

1=Best *6=Worst*

	Jar Number	Polymer Name	Polymer Dosage (mL)	Sample Size (mL)	Water Rel. Rate (1 - 6)	Water Clarity (1 - 6)	Floc Appearance (1 - 6)	Comments
		Polymer make-down concentration = 0.5 % Dilution of test sample = 0						
Sple #1	1	164	5	150 mL	~~3~~	3-4	3	
	2							
#2	3	164	5	150 mL		3-4	3	
	4							
#3	5	164	5	150mL		4	2-3	
	6							
#5	7	164	5	150		3-4	3	
	8							
#6	9	164	5	150		3-4	3	
	10							
#7	11	164	3.5 mL	150		3/4	3	
	12							
#8	13	164	5	150		3	3	
	14	164	3	150		3	2-3	
	15							
mix	16	164	3			3-4	3	
	17		4			3-4	2-3	→ Best, Recomend
	18		5			3-4	2-3	
	19							
	20							
	21							
	22							
	23							
	24							
	25							
	26							
	27							
	28							

Cone Test / RDT: 1000 mL sample conditioned with 26.7 mL of 164 poured thru Geotextile Fabric.

Filtrate Quality: TSS- 157 mg/L Turbidity-________ NTU Filtrate collected@ 1min: 340 60min: 650

WaterSolve LLC

Appendix B - Percent Solids

Total Solids Determination
Percent Dry Weight

Customer Name/Application Aquatic Hydrolavic Dredging - Port Huron

Date 6/9/25 Technician Nick I Oven Temperature 105°C

Sample ID 1 - Archer Bridge Dish Number 77 Dilution in-Situ

Dish (dry) = 47.931 g Dish, Sample (wet) = 163.339 g Dish, Sample (dry) = 89.414 g

Dish, sample (wet) – Dish (dry) = 115.408 (A) Dish, sample (dry) – Dish (dry) = 41.483 (B)

Total Solids B ÷ A x 100 = 35.9 % Dry Weight Solids

Sample ID 2 - Next to tiny boat house Dish Number 42 Dilution in-Situ

Dish (dry) = 46.939 g Dish, Sample (wet) = 192.115 g Dish, Sample (dry) = 98.229 g

Dish, sample (wet) – Dish (dry) = 145.176 (A) Dish, sample (dry) – Dish (dry) = 51.29 (B)

Total Solids B ÷ A x 100 = 35.3 % Dry Weight Solids

Sample ID 3 - 6.5' Dish Number 45 Dilution in-situ

Dish (dry) = 49.287 g Dish, Sample (wet) = 161.553 g Dish, Sample (dry) = 86.042 g

Dish, sample (wet) – Dish (dry) = 112.226 (A) Dish, sample (dry) – Dish (dry) = 36.755 (B)

Total Solids B ÷ A x 100 = 32.7 % Dry Weight Solids

Sample ID 4 - 6.5' Dish Number 3 Dilution in-Situ

Dish (dry) = 48.658 g Dish, Sample (wet) = 140.177 g Dish, Sample (dry) = 72.882 g

Dish, sample (wet) – Dish (dry) = 91.519 (A) Dish, sample (dry) – Dish (dry) = 24.224 (B)

Total Solids B ÷ A x 100 = 26.5 % Dry Weight Solids

WaterSolve LLC

Total Solids Determination
Percent Dry Weight

Customer Name/Application AHD - Port Huron

Date 6/9/25 Technician Nick I Oven Temperature 105 °C

Sample ID 5 - 6.5' Dish Number 47 Dilution in-situ

Dish (dry) = 49.341 g Dish, Sample (wet) = 128.413 g Dish, Sample (dry) = 82.479 g

Dish, sample (wet) – Dish (dry) = 79.072 (A) Dish, sample (dry) – Dish (dry) = 33.138 **(B)**

Total Solids B ÷ A x 100 = 41.9 % Dry Weight Solids

Sample ID 6 Dish Number 1 Dilution in-situ

Dish (dry) = 48.480 g Dish, Sample (wet) = 114.421 g Dish, Sample (dry) = 65.109 g

Dish, sample (wet) – Dish (dry) = 65.941 (A) Dish, sample (dry) – Dish (dry) = 16.629 **(B)**

Total Solids B ÷ A x 100 = 25.2 % Dry Weight Solids

Sample ID 7 Dish Number 22 Dilution in-situ

Dish (dry) = 50.170 g Dish, Sample (wet) = 125.667 g Dish, Sample (dry) = 71.287 g

Dish, sample (wet) – Dish (dry) = 75.497 (A) Dish, sample (dry) – Dish (dry) = 21.117 **(B)**

Total Solids B ÷ A x 100 = 28.0 % Dry Weight Solids

Sample ID 8 - light material Dish Number 20 Dilution in-situ

Dish (dry) = 50.820 g Dish, Sample (wet) = 168.839 g Dish, Sample (dry) = 88.254 g

Dish, sample (wet) – Dish (dry) = 118.019 (A) Dish, sample (dry) – Dish (dry) = 37.434 **(B)**

Total Solids B ÷ A x 100 = 31.7 % Dry Weight Solids

WaterSolve LLC

Total Solids Determination
Percent Dry Weight

Customer Name/Application AHD - Port Huron

Date 6/9/25 Technician Nick T, Kristine L Oven Temperature 105°C

Sample ID 4 - 6.5' Dish Number 23 Dilution homogenized

Dish (dry) = 47.701 g Dish, Sample (wet) = 101.184 g Dish, Sample (dry) = 57.234 g

Dish, sample (wet) – Dish (dry) = 53.483 **(A)** Dish, sample (dry) – Dish (dry) = 9.533 **(B)**

Total Solids B ÷ A x 100 = 17.8 % Dry Weight Solids

Sample ID 3 Dish Number 48 Dilution homogenized

Dish (dry) = 48.416 g Dish, Sample (wet) = 102.544 g Dish, Sample (dry) = 58.268 g

Dish, sample (wet) – Dish (dry) = 54.128 **(A)** Dish, sample (dry) – Dish (dry) = 9.852 **(B)**

Total Solids B ÷ A x 100 = 18.2 % Dry Weight Solids

Sample ID 2 Dish Number 49 Dilution homogenized

Dish (dry) = 47.170 g Dish, Sample (wet) = 100.032 g Dish, Sample (dry) = 55.829 g

Dish, sample (wet) – Dish (dry) = 52.862 **(A)** Dish, sample (dry) – Dish (dry) = 8.659 **(B)**

Total Solids B ÷ A x 100 = 16.4 % Dry Weight Solids

Sample ID ~~4~~ 1 - Archer Bridge Dish Number 53 Dilution homogenized

Dish (dry) = 46.864 g Dish, Sample (wet) = 99.194 g Dish, Sample (dry) = 56.331 g

Dish, sample (wet) – Dish (dry) = 52.33 **(A)** Dish, sample (dry) – Dish (dry) = 9.467 **(B)**

Total Solids B ÷ A x 100 = 18.1 % Dry Weight Solids

WaterSolve LLC

Total Solids Determination
Percent Dry Weight

Customer Name/Application Aquatic Hydrolaulic Dredging - Port Huron

Date 6/9/25 Technician Nick T, Kristine L Oven Temperature 105°C

Sample ID 5 Dish Number 5 Dilution homogenized

Dish (dry) = 47.878 g Dish, Sample (wet) = 109.442 g Dish, Sample (dry) = 58.977 g

Dish, sample (wet) – Dish (dry) = 61.564 (A) Dish, sample (dry) – Dish (dry) = 11.099 (B)

Total Solids B ÷ A x 100 = 18.0 % Dry Weight Solids

Sample ID 6 Dish Number 6 Dilution homogenized

Dish (dry) = 49.124 g Dish, Sample (wet) = 108.073 g Dish, Sample (dry) = 59.931 g

Dish, sample (wet) – Dish (dry) = 58.949 (A) Dish, sample (dry) – Dish (dry) = 10.807 (B)

Total Solids B ÷ A x 100 = 18.3 % Dry Weight Solids

Sample ID 7 Dish Number 17 Dilution homogenized

Dish (dry) = 43.657 g Dish, Sample (wet) = 117.945 g Dish, Sample (dry) = 57.617 g

Dish, sample (wet) – Dish (dry) = 74.288 (A) Dish, sample (dry) – Dish (dry) = 13.96 (B)

Total Solids B ÷ A x 100 = 18.8 % Dry Weight Solids

Sample ID 8- light material Dish Number 43 Dilution homogenized

Dish (dry) = 45.749 g Dish, Sample (wet) = 129.861 g Dish, Sample (dry) = 58.362 g

Dish, sample (wet) – Dish (dry) = 84.112 (A) Dish, sample (dry) – Dish (dry) = 12.613 (B)

Total Solids B ÷ A x 100 = 15.0 % Dry Weight Solids

WaterSolve LLC

Total Solids Determination
Percent Dry Weight

Customer Name/Application Aquatic Hydrolavic Dredging - Port Huron

Date 6/10/25 Technician Kristine L, Nick I Oven Temperature 105°C

Sample ID Cake #1 Dish Number 4 Dilution ____

Dish (dry) = 48.579 g Dish, Sample (wet) = 99.443 g Dish, Sample (dry) = 66.715 g

Dish, sample (wet) – Dish (dry) = 50.864 (A) Dish, sample (dry) – Dish (dry) = 18.136 (B)

Total Solids B ÷ A x 100 = 35.6 % Dry Weight Solids

Sample ID ____ Dish Number ____ Dilution ____

Dish (dry) = ____ g Dish, Sample (wet) = ____ g Dish, Sample (dry) = ____ g

Dish, sample (wet) – Dish (dry) = ____ (A) Dish, sample (dry) – Dish (dry) = ____ (B)

Total Solids B ÷ A x 100 = ____ % Dry Weight Solids

Sample ID ____ Dish Number ____ Dilution ____

Dish (dry) = ____ g Dish, Sample (wet) = ____ g Dish, Sample (dry) = ____ g

Dish, sample (wet) – Dish (dry) = ____ (A) Dish, sample (dry) – Dish (dry) = ____ (B)

Total Solids B ÷ A x 100 = ____ % Dry Weight Solids

Sample ID ____ Dish Number ____ Dilution ____

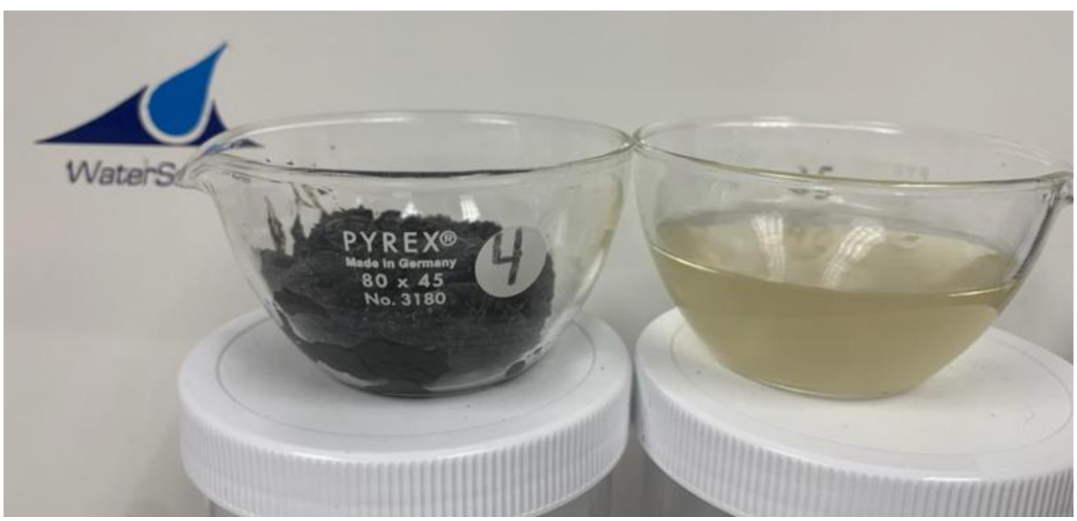
Dish (dry) = ____ g Dish, Sample (wet) = ____ g Dish, Sample (dry) = ____ g

Dish, sample (wet) – Dish (dry) = ____ (A) Dish, sample (dry) – Dish (dry) = ____ (B)

Total Solids B ÷ A x 100 = ____ % Dry Weight Solids

Appendix C – Photographs

One hundred fifty milliliters of unconditioned sediment sample (top), One hundred fifty milliliters of sediment sample conditioned with Solve 164 (bottom).



One thousand milliliters of sediment sample conditioned with Solve 164 was poured through geotextile tube fabric, the dewatered cake (left) and captured filtrate (right) are displayed above.

WaterSolve LLC

Appendix D - Chain of Custody

SDS - Available upon request.