



Mike DeWine, Governor
Jon Husted, Lt. Governor
Laurie A. Stevenson, Director

November 4, 2020

Kathryn Golden, CPMSM, CFM
Storm Water Manager
City of Lorain Engineering Department
200 West Erie Avenue
Lorain, OH 44052

Re: Lorain Harbor GeoPool Pilot Study
Exemption
Approval
Beneficial Use
Lorain County
BENU023820

Dear Ms. Golden:

This letter is in response to the City of Lorain's proposal to conduct a pilot study to evaluate the potential beneficial use of soil blends created with dredged material dewatered in the GeoPool located on the City of Lorain's Black River Reclamation Site.

In 2019, through a Healthy Lake Erie grant administered by the Ohio Department of Natural Resources (ODNR) in consultation with the Ohio Environmental Protection Agency, the City of Lorain (City) began preparations for a pilot study to assess an innovative geotextile dewatering technology called a GeoPool for potential use in the design and construction of the Black River Dredged Material Reuse Facility. As part of that GeoPool Pilot Study, the GeoPool was filled in August 2020 with Lake Erie dredge as defined in Ohio Administrative Code (OAC) Rule 3745-599-02(L)(1). ODNR hydraulically dredged sediment from within the Lorain Harbor federal turning basin near Black River Mile 2.7 and delivered the dredge slurry into the GeoPool. Based on field measurements, the GeoPool contains approximately 4,500 cubic yards of dredged material.

Lorain Harbor sediment where the GeoPool dredged material was obtained was physically and chemically characterized previously by the United States Army Corps of Engineers (USACE) in 2013 and 2015. The material dredged for the GeoPool excluded deeper sediments within the federal turning basin that contain elevated concentrations of chemicals including polynuclear aromatic hydrocarbons. Both the USACE previous analytical results and recent preliminary chemical analytical results indicate that the GeoPool dredged material meet U.S. EPA residential soil screening levels and/or soil background levels contained in the July 2019 Ohio EPA *Evaluation of Background Metal Soil Concentrations in Lorain County*.

On October 2, 2020 the City provided Ohio EPA with a document titled *Black River Dredged Material Reuse Facility GeoPool Pilot Study Residual Solids Evaluation (RSE)*. This document includes a description of the City's proposal to conduct a pilot study to evaluate the potential beneficial use of soil blends created with dredged material excavated from within the GeoPool, which is included as Attachment 1 to this exemption. As part of this proposed pilot study, GeoPool dredged material will be transported to the City's adjoining Voluntary Action Program property located at 2601 East 28th Street in Lorain, Ohio (VAP Site). The VAP Site is fenced and is subject to a Covenant Not to Sue.

Specifically, the City proposes to land apply no more than 4,500 cubic yards of the dewatered GeoPool dredged material on the VAP Site in five test plots established and managed as described in Attachment 1. The GeoPool dredged material in four of the five test plots will be blended with material to create soil blends for agricultural soil, residential garden soil, structural soil, organic-rich feedstock, and a fifth test plot will include only GeoPool dredged material and be utilized as a control plot .

Ohio EPA has determined that the City's pilot study to evaluate the potential beneficial use of soil blends created with GeoPool dredged material as described in Attachment 1 is unlikely to adversely affect public health or safety or the environment as long as the following conditions are met:

1. Only dredged material that was placed into the GeoPool in August 2020 and is represented by the results of analytical testing performed by USACE in 2013 and 2015 may be used for this pilot study. No other dredged material may be brought to the VAP Site or placed into any of the test plots pursuant to this authorization. This authorization does not permit storage of GeoPool dredged material at any location.
2. All dredged material used for this pilot study shall be dewatered prior to creation of the soil blends at the VAP Site such that there are no free liquids as determined by Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) Test Method 9095B- Paint Filter Liquids Test, as amended through July 2016. The City shall ensure that Ohio EPA is notified not less than 48 hours prior to placement of the GeoPool dredged material onto the VAP Site.
3. Only compost product that meets the distribution requirements in OAC Rule 3745-560-420 may be combined with the GeoPool dredged material for this pilot study.

4. The blending of material, including but not limited to the blending of GeoPool dredged material with compost product, Portland cement, or tree stump chippings/shreddings, shall occur only at the VAP Site. Unless otherwise provided in a permit issued under Chapter 6111 of the Ohio Revised Code (ORC), the City shall ensure that sediment control practices are implemented to catch any solids in runoff or to divert runoff away from all property lines, functional storm water catch basins, drainage ways, railroad rights of way, post construction water quality features, and surface waters of the state.
5. The City shall ensure that all activities related to this pilot study, including but not limited to all land application and blending activities, are conducted in such a manner that dust and odors are controlled so as not to cause a nuisance or a health hazard.
6. This approval expires on December 31, 2021. On January 15 and July 15 of each year, lasting for the duration of the pilot project, and not later than 30 days after the pilot project ends, the City shall submit a Technical Memorandum that includes all of the following to Ohio EPA at Vanessa.SteigerwaldDick@epa.ohio.gov or some other address specified in writing by Ohio EPA:
 - a. The amount of dredged material used at each test plot in cubic yards;
 - b. The amount and nature of material blended with the GeoPool dredged material within each test plot; and
 - c. A detailed description of the City's current evaluation of the soil blends, using at a minimum the assessments, performance measurements, analyses, characterizations and other relevant criteria described in Attachment 1. This description shall at a minimum:
 - i. Explain the specific tests and comparisons conducted;
 - ii. Identify each standard, characteristic, and endpoint used in each test or comparison (including but not limited to the standards identified Attachment 1 for each test plot);
 - iii. Report the results of the tests and comparisons conducted;
 - iv. Identify any adjustments made to the test plots during implementation as provided in Attachment 1; and
 - v. The address of each site used as a comparison site for any test plot in this pilot study.
 - d. Time-stamped photographs documenting the pilot study results, including time-stamped photographs of the VAP Site and of any location used as a comparison site for this pilot study.

The City's use of dredged material from the Lorain Harbor GeoPool Pilot Study in order to evaluate the potential beneficial use of soil blends as described in Attachment 1 and in compliance with the conditions set forth above is unlikely to adversely impact the public health or safety or the environment. To the extent that the GeoPool dredged material is a solid waste, pursuant to ORC Section 3734.02(G) the City of Lorain is hereby exempted from the requirement to remit the state solid waste disposal fee set forth in ORC Section 3734.57(A) and from the requirements to obtain a permit and license before establishing a solid waste facility set forth in ORC Sections 3734.02(C), 3734.05(A)(1), and 3734.05(A)(2) and OAC Chapters 3745-27 and 3745-501.

Please note that this letter applies only to the City of Lorain's pilot program outlined above. Any future projects involving the use of dredged material may require a beneficial use permit.

The Director of Ohio EPA may revoke this authorization for any reason, including but not limited to the City's failure to comply with any of the conditions set forth herein or a determination by the Director that the activities performed pursuant to this authorization threaten or adversely affect public health or safety or the environment.

You are hereby notified that this action of the Director of Ohio EPA (Director) is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within thirty (30) days after notice of the Director's action. The appeal must be accompanied by a filing fee of \$70.00 made payable to "Treasurer, State of Ohio." The Commission, in its discretion, may reduce the fee if by affidavit it is demonstrated that payment of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal shall be filed with the Director within three (3) days of filing with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. An appeal may be filed with the Environmental Review Appeals Commission at the following address:

Environmental Review Appeals Commission
30 East Broad Street, 4th Floor
Columbus, Ohio 43215

If you have any questions concerning this letter, please contact Vanessa Steigerwald Dick of Ohio EPA, Northeast District Office, Division of Surface Water, at (330) 963-1219.

Sincerely,



Laurie A. Stevenson
Director
Ohio EPA

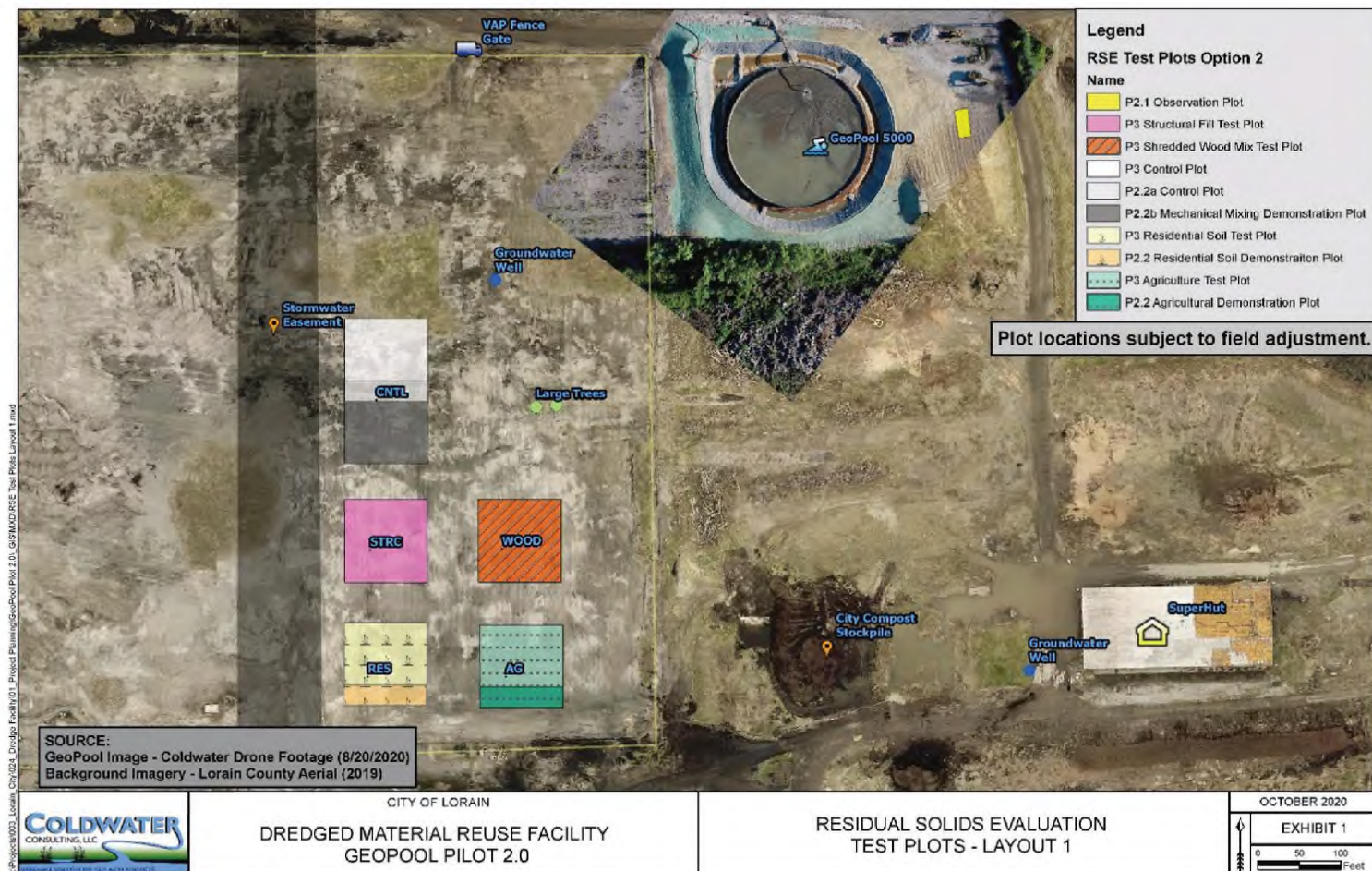
ec: Vlad Cica, Chief, DMWM
Harry Sarvis, Manager, DMWM
David Emerman, NEDO-DSW
Vanessa Steigerwald Dick, NEDO-DSW
Maera Flynn, DMWM
Robin M. Nichols, Legal
Kathryn Golden, City of Lorain (kathryn_golden@cityoflorain.org)
Corry Platt, Coldwater Consulting, LLC (ctplatt@coldwaterconsultants.com)

Attachment 1

Excerpts from the

***Black River Dredged Material Reuse Facility - GeoPool
Pilot Study Residual Solids Evaluation***

Figure 1 – Plot Locations – Phases 2.2 and 3



Phase 3 – Blended Beneficial Reuse Test Plots

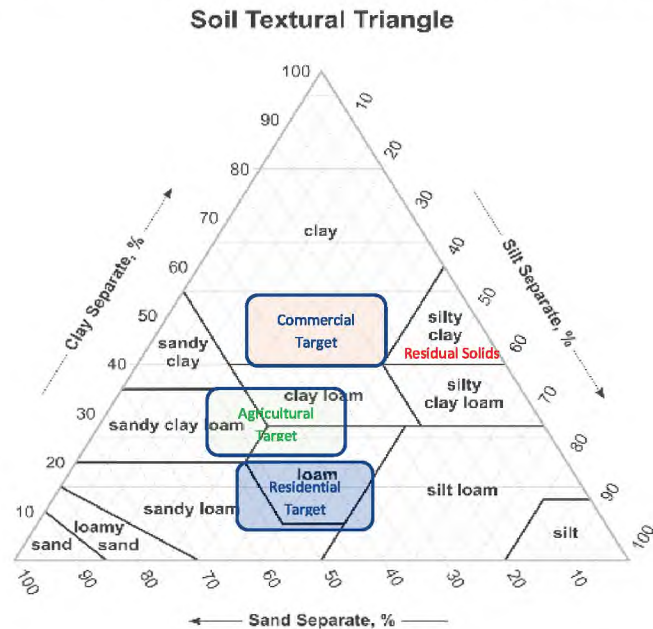
Dredged material is commonly fine particles and requires blending with other soils, aggregate, or organics to be a market-suitable product. Pre-dredge characterization indicated the Black River sediments as 93 percent silts and clays with 7 percent fine sands. During dredging, abundant organic debris (leaf matter) were encountered and entrained with the sediments in the delivered slurry. Commonly, dredged material containing abundant fines and organic debris are the most difficult to dewater. Handling and blending the Black River dredged material has applicability beyond Lorain as the lessons learned from these commonly difficult dredged materials broadens capability and suitability for other Ohio fine-grained sediments.

The residual solids will be excavated from within the GeoPool, transported to the adjoining City-owned Voluntary Action Program fenced lot (VAP Site), laid on the ground surface surrounded with a straw waddle perimeter, and blended using spread & till methods¹ with imported material to “create” the market-appropriate beneficial reuse products.

The intention of the blending is to modify the residual solids texture to create a soil product as shown on the soil triangle figure.

Five test plots (one is control) will be installed, sampled, and monitored overtime as described individually below.

The progress, analytical results, and data interpretation of each test plot will be summarized individually in a Technical Memorandum with tabulated data and representative photographs.



¹ Other common blending methods include mixing (pug) mills, mechanical mixing using excavator buckets, or excavator-mounted rotating blenders. The spread & till method was selected as it uses equipment commonly available in agriculture, soil blending facilities, and surface soil stabilization applications in Ohio.

Test Plot 1 – Agricultural Soil

The silty clay nature of the dredged material is typically unsuitable for agricultural soil; rather, a loamy soil is preferred. The predominant soil type for the regional agriculture users is a silt loam underlain by a clay loam (Mahoning soil type). A silt loam is generally 65% silt, 15% clay, and 20% sand. The residual solids have balanced amount of silt and clay which can not be separated to support creating a silt loam; rather, a general loam, a clay loam, and a sandy loam appear reasonable to create/simulate.

The preferred test plot for the agricultural soil as a loam to clay loam comprised of generally equal parts of sand, silt, and clay as shown in Table 2. The test plot size will be 100 ft wide by 100 ft long by 2 ft thick² and be installed as:

- Lift 1
 - 9 inches of dewatered dredged material (excavated at 60 percent moisture, ~300 cyds)
 - 3 inches of imported medium grained sand (trucked, ~100 cyds/150 tons)
 - Lime as required pending analytical results (trucked, estimated at 0.25 inch thick – 7.75 cyds/5.5 tons)
 - Disc to blend
- Lift 2 - Repeat of Lift 1.
- Rake surface and dig planting trench appropriate to selected crop seed³, install wooden stake at each end of the planting trench
- Sow selected crop seed in planting trench, cover seed by raking smooth

Soil Regions of Ohio



Figure 1 - Soil regions with area of interest circled

Item	Organic Matter %	% medium sand	% fine sand	% silt	% clay
Residual Solids	5	0	6	47	47
Ag Plot Soil	5	30	4	33	33
Adjustment	0 change	+30%	-33%	-30%	-30%
2 ft thick distribution		30% ~6 inches	70% ~18 inches		

The test plot will be visually assessed for seed germination, growth, and abundance initially on a weekly basis extending to monthly with stem counts, height, and other parameters of interest to stakeholders.

The test plot performance will be measured against regional and seasonal selected crop growth and abundance as measured by agricultural interests / cooperative extension.

² Plot dimensions may be adjusted pending target crop root depth.

³ Seasonally and regionally appropriate crop seed will be selected with input from stakeholders.

Test Plot 2 – Residential Garden Soil

The silty clay nature of the dredged material is typically unsuitable for residential garden soil; rather, an organic-rich loamy soil is preferred. The organic-rich loamy soil is generally one-third organic matter with the remaining two-thirds mineral soil as 50% sand, 25% silt, and 25% clay.

The preferred test plot for the residential garden soil as an organic-rich loamy soil created by blending organic matter (compost) with imported medium sand and residual solids as shown in Table 3

Table 3 – Residential Garden Test Plot Soil Creation					
Item	Organic Matter %	% medium sand	% fine sand	% silt	% clay
Residual Solids	5	0	6	47	47
Res Garden Plot Soil	One-third	50		25	25
Adjustment	+~8 inches	+~8 inches	No change		
	City-compost	imported	Residual Solids		
Blended distribution after amended	33%	33%	34%		

The test plot size will be 100 ft wide by 100 ft long by 2 ft thick and be installed as:

- Lift 1
 - 4 inches of dewatered dredged material (excavated at 80 percent moisture, ~125 cyds)
 - 4 inches of imported medium grained sand (trucked, ~125 cyds/185 tons)
 - 4 inches of City compost (~125 cyds, assumes includes onsite-generated wood chips, may require importing if City-available quantity insufficient)
 - Lime as required pending analytical results (trucked, estimated at 0.25 inch thick – 7.75 cyds/5.5 tons)
 - Disc to blend
- Lift 2
 - Repeat of Lift 1.
- Rake surface
- Broadcast Onsite Restoration Site seed mix consistent with manufacturer recommendations and cover with straw mat or equivalent as pertinent.

The test plot will be visually assessed for seed germination, growth, and abundance on a weekly basis extending to monthly with stem counts, height, and other parameters of interest to stakeholders.

The test plot performance will be measured against restoration plots under study at other locations within the same City-owned Reclamation Site against the restoration site's specification success criteria.

Test Plot 3 – Commercial Fill / Structural Soil

The silty clay nature of the dredged material is typically low-strength and generally not suitable as structural soil until amended with Portland cement. However, stabilized dredged material (dewatered residuals amended with Portland cement) have been found suitable as commercial site fill, brownfield cover or cap, embankment core and stabilization, landfill cover, and soil-cement subgrades.

The preferred test plot for the structural soil created by blending imported Portland cement and residual solids as shown in Table 4

Table 4 – Structural Soil Test Plot Soil Creation					
Item	Organic Matter %	% medium sand	% fine sand	% silt	% clay
Residual Solids	5	0	6	47	47
Structural Soil	minimal	15		45	45
Adjustment	No change	+10%		No change	
1 ft thick distribution	~0 inches	10%		90%	
		~1.25 inches		~12 inches	

The test plot size will be 100 ft wide by 100 ft long by 1 ft thick and be installed as:

- Lift 1
 - 12 inches of dewatered dredged material (excavated at 60-80 percent moisture, ~370 cyds)
 - 1.25 inches of imported Portland cement (trucked, ~38.5 cyds / 47 tons)
 - Disc to blend, Wait 24 hrs (initial curing), repeat disc to blend.
 - Compact to 96 +/-3 percent maximum dry density at optimum moisture, shape to drain.

The test plot will be divided into quadrants. Each quadrant will represent different curing and weather exposure durations based on number of elapsed days from completion of Lift 1 – 7, 14, 28 days. Bearing capacity will be field measured over the elapsed days using a Kessler Dynamic Cone Penetrometer (ASTM D6951). Aliquots of Lift 1 representing the curing duration (e.g., 7, 14, 28 days) will be collected or simulated using post-mixed, pre-compacted bulk sample in laboratory-cured samples for a total of up to 9 samples. Each sample will be analyzed for:

- Unconfined compressive strength (ASTM D2216)
- Standard Proctor (ASTM D698) – select samples
- Grain size (ASTM D6913) – select samples
- Atterberg Limits (ASTM 4318) – select samples
- Hydraulic Conductivity of Saturated Porous Materials using a Flexible Wall Permeameter – Falling Head (ASTM D5084) – select samples

The test plot performance / analyticals will be measured against geotechnical engineering standards, Ohio DOT standards, OEPA capping characteristics, and other pertinent endpoints agreed upon with the stakeholders.

Test Plot 4 – Organic-rich Feedstock

The silty clay nature of the dredged material typically hardens as it dries into a hardened clay-like base. Incorporating woody organic pieces (e.g., stump shavings, wood chips) into a clay-laden soil is the initial and primary step to a common multi-year improvement process of clay-laden soils. Blending equal parts of residual solids and onsite-available tree stump chippings/shreddings with subsequent conical stockpiling and monthly texture assessments forms the basis for the Organic-rich Feedstock test plot as shown in Table 5.

Table 5 – Organic-rich Feedstock Test Plot Soil Creation					
Item	Organic Matter %	% medium sand	% fine sand	% silt	% clay
Residual Solids	5	0	6	47	47
Wood waste	100	0	0	0	0
Adjustment	+50%	0%	-3%	-24%	-24%
2 ft thick distribution	50%	0%	50%		
	~12 inches	~0 inches	~12 inches		

The test plot size will be 100 ft wide by 100 ft long by 2 ft thick and be installed as:

- Lift 1
 - 6 inches of dewatered dredged material (excavated at 80 percent moisture, ~185 cyds)
 - 6 inches of City wood shavings (~185 cyds, assumes grinding of tree stump stockpile to generate)
 - Disc, doze, or excavator bucket rotations to blend
- Lift 2 - Repeat Lift 1.
- Doze or shape into conical stockpile

The test plot/stockpile will be assessed by visual-manual characterization (color, texture) on a monthly basis generally following ASTM D75 Sampling Aggregates – Sampling Stockpiles with Power Equipment. At quarterly intervals, a composite sample will be submitted for organic matter, soil pH, moisture content, and grain size distribution.

Test Plot 5 – Control

Observation of solely the Residual Solids is the focus of this test plot. Observation of surface hardening, cracking, clumping, and soil characteristics when exposed to weather conditions combined with the ability for comparative analysis against the other test plots are the purposes of this test plot.

The test plot size will be 100 ft wide by 100 ft long by 1ft thick and be installed as:

- Lift 1
 - 12 inches of dewatered dredged material (excavated at 80 percent moisture, ~370 cyds)
 - Shape to drain – may require 1.5 ft high berm to contain.

The test plot will be divided into quadrants. Each quadrant will be used at common times for collection of comparison samples (e.g., quarterly); thereby, limiting disturbance (e.g., compression, rutting, seepage holes).

Reporting

The observations, analytical results, and data interpretations will be summarized in Technical Memoranda with tabulated data and representative photographs as outlined in the individual phase descriptions.

END