SUMMARY OF THE DREDGED MATERIAL MANAGEMENT PROGRAM INNOVATIVE REUSE COMMITTEE MEETING February 27, 2024, 5:30 PM In-Person and Virtual Meeting

Attendees:

Anchor QEA: Billie-Jo Gauley*, Chris Overcash, Mark Reemts, Mindy Strevig*
Baltimore County Department of Environmental Protection & Sustainability: David Riter*
Baltimore Port Alliance: Rupert Denney
Biohabitats: Chris Streb
Chesapeake Bay Foundation (CBF): Doug Myers*, Gussie Maguire*
COMUS Sustainable Pozzolan Products (CSPP): Brad Hill, Dave Hendershot
Ecologix: Steve Pattison*
GEI Consultants: Nancy Straub
Harford Materials: Rick Nash*
Maryland Department of Natural Resources: Paul Petzrick, Chris Aadland
Maryland Environmental Service (MES): Dallas Henson*, Mackenzie Miller, Robert Natarian
Maryland Port Administration (MPA): Rachael Gilde, Holly Miller, Joseph Ross, Barbara Rowlett*, Darren Swift
Northeast Maryland Waste Disposal Authority (NMWDA): Andrew Kays*
Northgate Environmental Management (NGEM): Jacob Lacy*, Sam Merrill*
RK&K: Ed Tinney, Sari Rothrock
Remline: Danielle Lloyd,* Michelle Puszcz*
Rock Creek: Greg Sliviak, Ruth Sliviak
Stoney Beach Community: John Garofolo
Tradepoint Atlantic: Peter Haid
U.C. Berkeley Civil and Environmental Engineering: Paulo Monteiro*
United States Army Corps of Engineers (USACE): Graham McAllister*
University of Maryland Center for Environmental Science (UMCES): Lisa Wainger*
Unknown Affiliation: Ron Parks*

*Denotes attendees that participated virtually

1.0 Convene and Welcome **Sari Rothrock and Ed Tinney, RK&K**

Ms. Rothrock and Mr. Tinney welcomed attendees and called the meeting to order. Ms. Rothrock briefed participants on the agenda and housekeeping items and Mr. Tinney led introductions for both in-person and virtual attendees.

2.0 Innovative Reuse Program Updates **Darren Swift, Rachael Gilde, and Joe Ross, MPA**

Research and Development Projects
Mr. Swift provided an update on two of the Research and Development (R&D) projects. CSI Environmental (CSI-E) has a project studying the utilization of geotubes as a method to dewater the material before transporting the geotubes to the final location for shoreline stabilization and flood protection. The project is near completion and CSI will be providing a presentation at the May 2024 Innovative Reuse Committee (IRC) meeting.

The University of Maryland has a project studying vegetative earth berms in a laboratory setting that is scheduled to continue for two more years. Mr. Swift added that two new R&D proposals have been received and are currently under review.

New Website Materials
Ms. Gilde presented recent updates to the Dredged Material Management Program (DMMP) website (Maryland-dmmp.com). The purpose of the site enhancements is to provide easy access to public-friendly materials about DMMP topics. The "Committees" tab lists all the Committees within the DMMP and provides details on past and upcoming meetings. The "Innovative Solutions" tab organizes information about innovative reuse (IR), beneficial use (BU), and Confined Aquatic Disposal (CAD). Ms. Gilde also spoke briefly about the difference between the DMMP website and the IRBU Web Tool (https://gis.anchorqea.com/mdotmpa_irbu/), which is designed for stakeholders interested in obtaining dredged material for projects. The Web Tool has detailed information about past IR/BU projects including R&D projects, as well as a link to the Maryland Department of the Environment Confirmation of Suitability (COS) forms, which is used to track and approve uses of dredged material.

Ms. Gilde reminded meeting attendees that there will not be an update on CAD at this meeting, and that the Citizens Advisory Committee provides updates on that topic. Mr. Denney asked if the DMMP website was easily accessible and could be reached through the main MPA website. Ms. Gilde clarified that the Maryland-dmmp.com website is an existing website and that it can be accessed via the EcoPort tab on the main MPA website.

Sediment Technology and Reuse Facility
Mr. Ross presented an update on the Sediment Technology and Reuse (STAR) Facility remediation efforts and progress on the short-term goals related to the IR program. The STAR Facility is critical to advancing the IR program and implementing large scale capacity recovery to ensure MPA has a rolling 20-year plan for placement of dredged material from the Federal navigation channels.

Mr. Ross stated that when MPA purchased the property, the settlement included an Administrative Consent Order requiring the submission of Remedial Action Plans (RAPs) for each Operable Unit (OU) to MDE, and the remediation of the OUs will be phased over 10 years. This cost is shared with the previous property owner (Tronox). There are five OUs: Upland Area, Settling Basins, Batch Attack Lagoon, Waste Acid Neutralization Area, and a Groundwater Containment System. MPA has received approvals on the RAPs for almost all of the OUs, and the remaining RAPs will be submitted by the end of this year. The first OU available for development will be the Upland Area OU.

Mr. Ross proceeded to present the proposed short-term plan. The dewatering/geotube area will be located within the Upland OU close to the Cox Creek Dredged Material Containment Facility (DMCF) and the preliminary engineering investigation has begun. It is estimated to take at least a year to get the dewatering operation fully functional on the property. There are four proposed dewatered dredged material stockpile locations in the Upland OU, which will provide readily available material for IR projects. Mr. Ross stated that MPA has initiated a pilot project to study different geotube fabrics and polymers in an effort to understand and identify best practices and apply them on the STAR property.

Mr. Sliviak asked if the dredged material would be housed in the geotubes for six months and then staged in stockpiles for reuse. Mr. Ross stated that this would be a continuous process. Mr. Swift provided additional information based on the R&D project conducted by CSI which included drying IR material in geotubes. While CSI-Ewas onsite at the Cox Creek DMCF, two additional geotubes were established to allow MPA to study drying time. Based on this study, MPA determined that it will take approximately 60 days to dry the material. The addition of the polymer helps separate the water from the solids which accelerates the dewatering process. Mr. Ross noted that the geotubes in the initial study are much smaller than what would be used for full-scale dewatering.

Mr. Myers and Ms. Sliviak inquired about the disposition of the water draining from the geotubes and the associated testing throughout the process. Ms. Miller explained that water from the geotubes is drained back into the DMCF. During the CSI geotube R&D project, per MDE requirements, water was monitored, collected in frac tanks, and tested by an independent laboratory to analyze its properties. Once it was confirmed that polymers were not detected, the remaining water was permitted to enter the DMCF. As water in the DMCF is regulated under a MDE National Pollution Discharge Elimination System (NPDES) permit, all water within the DMCF must be tested and meet set standards in advance of discharge.

Mr. Denney asked if the geotubes are recyclable and Mr. Swift replied that they are not. Used geotubes are transported to landfills for disposal. Ms. Miller stated that MPA welcomes more questions about the DMCF, geotubes, and monitoring via email.

3.0 COMUS Sustainable Pozzolan Products, Dave Hendershot, Brad Hill

Mr. Swift introduced Mr. Brad Hill and Mr. Dave Hendershot from COMUS Sustainable Pozzolan Products (CSPP) and provided background on the working relationship between MPA and CSSP began. In 2023, CSPP requested samples of dredged material, which led to tours of the MPA facility, invitations to visit the CSPP facility and sharing information about DMMP IR initiatives.

Mr. Hendershot stated that CSPP was formed for the purpose of producing pozzolan powder for use in Pozzolan Portland Cement (PPC). Natural pozzolans are a class of material that contain at least 70 percent of three specific chemicals: silicon dioxide, aluminum oxide, and iron oxide. In their finely powdered form and in the presence of water, these chemicals react with calcium hydroxide to form compounds that improve concrete durability and performance. The use of pozzolan minerals has been used in structures for over 2,000 years. Pozzolan's impermeability encapsulates harmful chemicals within the end product.

CSPP's green concrete is made by using the environmentally friendly Hill Process. The Hill Process is the mechanical process of activating natural, sedimentary pozzolan materials for use as an admixture in PPC. Typically, a kiln is used to create cement: the inactive pozzolan material is fed into a kiln and heated to a molten state, which activates the pozzolan. The high heat of conventional cement manufacturing cement manufacturing is accountable for eight percent of the world's global emissions. The Hill Process does not use heat, unlike the typical PPC production, which means that greenhouse gases (GHG) could be reduced by using this process. The Hill Process is currently patent pending.

Mr. Hendershot proceeded to explain that dredged material can be used in green cement by replacing up to 40 percent of the clinker, the ball-like forms that develop in the kiln during cement manufacturing. Mr. Hendershot stated that green cement production would be scalable and could meet MPA's capacity needs. Legislation passed in 2023 requires all projects in Maryland that receive more than half of their budget from the state to use green cement rather than conventional options. This will fully take effect by July 2026. Similar legislation has been introduced at the Federal level.

After the presentation, Mr. Hendershot opened the floor to questions. Mr. Swift passed around a jar of pozzolan material for attendees to see.

Table 1: CSSP Q&A

Question	Answer
What type of fine particulates are created and how would they be confined? Are there any byproducts created during the production process?	The production process consumes every piece of dredged material that it is given. It is confined in bag houses which are like giant vacuum cleaner bags with very fine diameter holes used to catch the particles. The emergency storage for containment of the dust is monitored. In the event of failure, it can easily be shut down.
What are the potential recycling challenges at the end of life for this kind of material?	Because each particle is impervious to water, anything that is encapsulated remains inside and therefore creates a safe non-exchange of the material when in a landfill.
How much energy does the grinding process use compared to powering a kiln?	The amount is miniscule compared to what it takes to make cement traditionally. One ton of coal is needed to fire a kiln to make one ton of cement. Comparatively, a ball mill, uses approximately $5 of electricity for the same level of production.
Does the dried dredged material needed to be tested before adding to the clinker and ball mill?	The process can happen separately or simultaneously. Ideally, we would do it simultaneously for cost savings (there would be less handling, blending, and mixing). The future facility will be equipped to for both scenarios.
How dry does the dredged material need to be to enter the process?	To enter the mill, dredged material must have three percent or less moisture content. This is an ideal percentage. The mill creates additional heat through friction and will accomplish some drying in the mill.
What MDE Category of dredged material is needed for this process?	Category 2 dredged material has been deemed suitable and using Category 3 and 4 material has been explored and can be used.
How many plants that implement this process are currently in operation?	There are no plants using this process currently. However, CSPP is ready to build a plant now.
What is the annual throughput of dredged material needed for this operation?	CSPP would like to build a 2.5-million-ton annual throughput production cement plant but will start with a more modular approach to obtain political support before scaling up.
What is the shrinkage ratio and how does it compare to a regular process?	There is less shrinkage than experienced in a regular process.
Salt is often an issue when using dredged material for products. How has salt impacted the Hill Process?	Mr. Hill stated that there has not been much salt from the dredged material he has tested to date. He anticipated salt being a problem but has not encountered any issues because salt is almost non-existent in the material collected.
The Hill Process does not include drying of dredged material. When the material is taken from the containment facility it has a very high moisture content. There is concern that the energy to reach 3% is substantial.	Mr. Hill noted that drying has been investigated and it may be possible to use a kiln that is not fired by fossil fuels. There are hollow kilns that are equipped with an electrical jacket that heats electrically. The longer the residence time of the material in the device, the drier the material.
Will there be an American Society for Testing and Materials (ASTM) hurdle when developers begin a project? Would it require special certifications to use the product?	Mr. Hill stated an ASTM already exists and reminded attendees the Burj Khalifa was built using this material. He mentioned the US Army Corps of Engineers (USACE) and Federal Highway Administration (FHWA) have classified it as a 1P. 'P' stands for pozzolan. Mr. Hill explained that it is not a new product; instead, it is a new method for delivering the product.
Where is CSPP planning to put the cement plants?	CSPP would site its plant as close to the clay capture zones as possible. This would reduce transport through cities.
Could CSPP use more than the 40 percent target of dredged material in the clinker?	Mr. Hill noted there is as high as an 80% replacement on some projects, and it is not uncommon to be 60% to 70%.

4.0 Looking (202)4ward: Small Group Discussion

Attendees were divided into small groups to discuss participant preferences for IRC meeting topics and formats for the remainder of 2024. There were three small groups in the Cox Creek O&M Facility conference room and two groups in the virtual room. Each group was assigned a facilitator, who asked two questions:

Question #1: What type of topics do you want to hear about at IRC meetings this year?
Question #2: What type of format would you prefer for IRC Meetings in 2024?

The answers from each group are summarized in the table below.

Table 2: Small Group Engagement Discussion Summary

	Question #1: Topics	Question #2: Formats
Cox Creek Group 1	Product and project updates; amendments; discussion on how to overcome logistical and regulatory hurdles of BU	Field visits; networking events; fewer PowerPoint presentations
Cox Creek Group 2	Testing processes; report-out on research; outreach opportunities; use of byproduct materials like fly ash integrated with IR; IR/BU for Category 3 or 4 materials; coastal resiliency applications	Joint meetings with other committees; joining American Council of Engineering Companies or other local chapter meetings
Cox Creek Group 3	Lessons learned from other groups working to divert materials from waste streams; IR/BU applications for habitat restoration; community enhancement opportunities	Like Cox Creek venue, prefer in-person meetings with a hybrid option appreciated
Virtual Group 1	Opportunities for community outreach and case studies on community engagement; engagement with Environmental Justice communities around concerns	Hybrid meetings held in evenings; piggyback on existing community meetings for more effective outreach; offer STAR facility tours
Virtual Group 2	Federal funding for coastal resiliency efforts and applicability of IR/BU in habitat restoration; updates on the IR/BU strategy since 2020	Hybrid format preferred

5.0 Post-Meeting Question and Answer Session for CSPP

Following the small group discussions and report-out, attendees were invited to stay after the meeting to ask additional questions of the CSPP team. Ms. Straub asked how the polymers that are added to the geotubes would affect the pozzolan components when using that soil. Mr. Hill stated that, according to testing, it would not have any effect at all. Ms. Straub inquired whether CSPP had considered creating a controlled low-strength material strengthening process, which would reduce drying and allow for easier entry into the market. Mr. Hill stated they have an easier entry due to the Conference of Parties (COP) 26 pressures on the market, and that the Biden administration is supportive of the idea. Mr. Hill mentioned that the cement industry will be reluctant to change processes until the government pays for them to go greener.

Mr. Swift mentioned that MPA, University of Maryland and the Maryland State Highway Administration (SHA) received a Climate Challenge grant from the FHWA that focuses on paving materials, life cycle analysis, and environmental product declarations. SHA is currently working with local concrete producers on this effort. Legislation is being introduced to require that new state contracts are scored on Environmental Product Declarations (EPD), and there will be incentives for material producers to have low scores. Producers like CSPP will have a very low EPD, which would be favorable to the Maryland market and other states.

6.0 Adjourn