SEDIMENT TO SOLUTIONS

CHANNELING INNOVATION

MPA DMMP Innovative Reuse Program
December 3, 2018

Dredged Material Management

Harbor Channel Material - Where do we go next?

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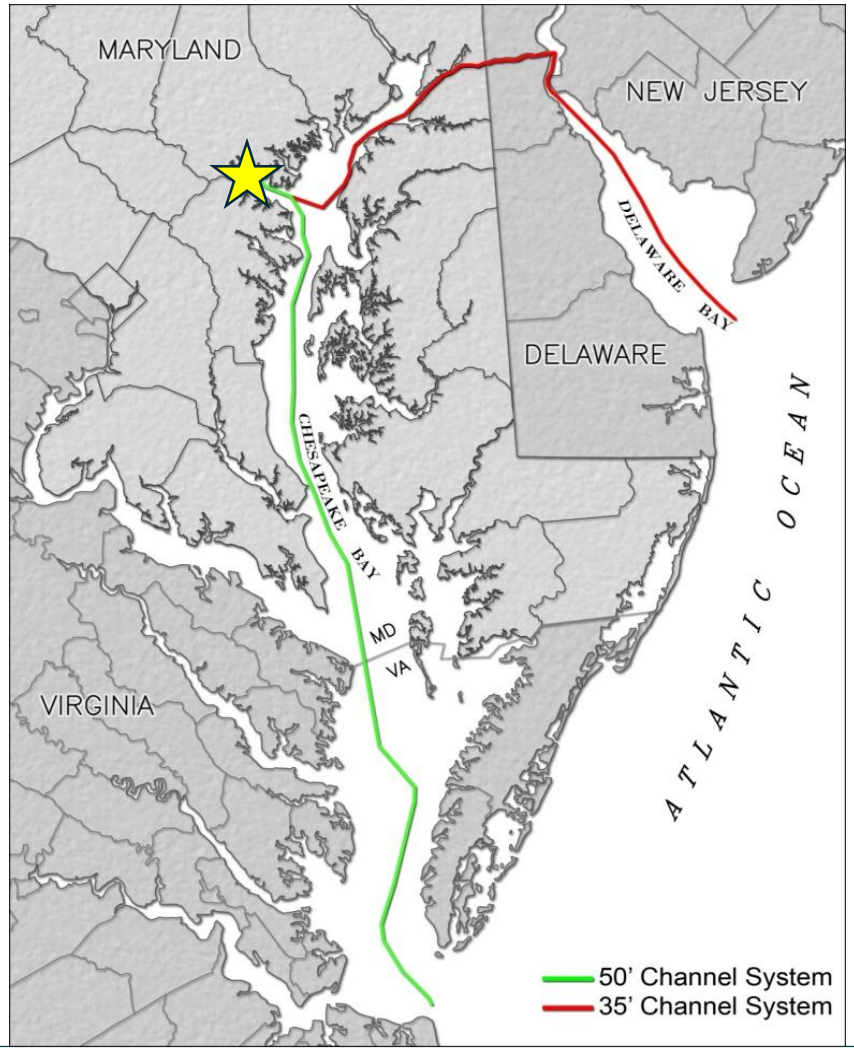

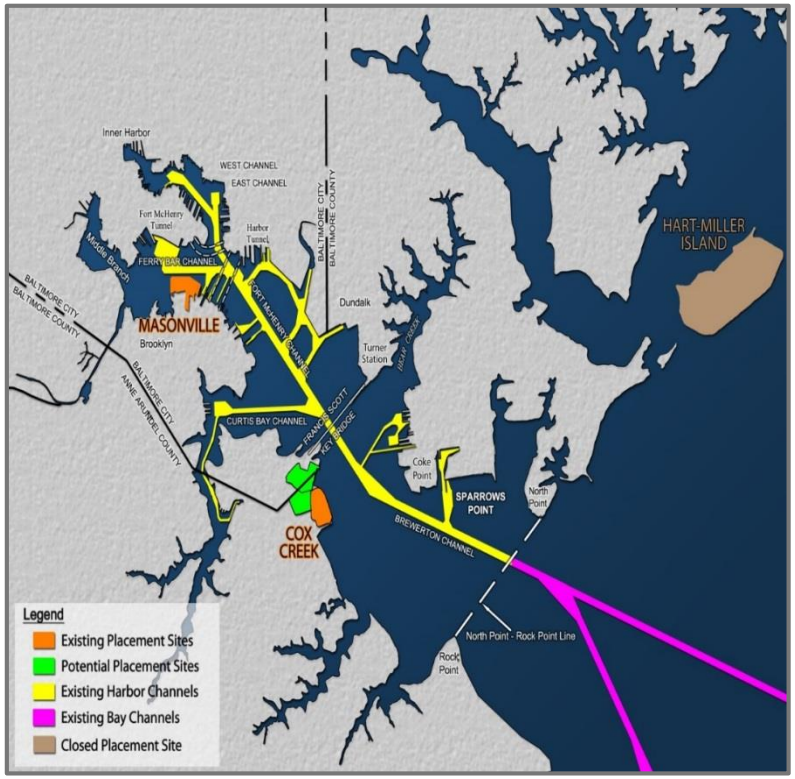

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND PORT ADMINISTRATION

PORT OF BALTIMORE 1706 Helen Delich Bentley

GreenPort of Baltimore

Dredging

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Port of Baltimore Shipping Channels Maintenance Dredging

- Port of Baltimore's shipping channel
  - Maintaining a 50'depth keeps channels safe and open and the Port competitive.
- Annual maintenance of the State's marine highway
  - 136 miles of dredged channels/yr
- 4.7mcy of material is dredged annually
  - Harbor channel material: 1mcy/yr
  - Bay channel material
  - C&D Canal approach channel material

New Solutions Needed

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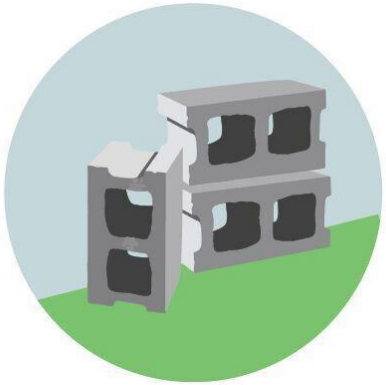
Innovative Reuse and Beneficial Use



Building Materials

Habitat Restoration

Manufactured Topsoil

Site Reclamation

MPA Long-Term Innovative Reuse Goal:
Recycle **500,000 cy/year** of Harbor Channel sediment

Innovative Reuse & Beneficial Use

Statutory Definitions:

Innovative Reuse:
"includes the use of dredged material in the development or manufacturing of commercial, industrial, horticultural, agricultural or other products."

Beneficial Use:
"Means any of the following uses of dredged material from the Chesapeake Bay and its tributary waters placed into waters or onto bottomland of the Chesapeake Bay or its tidal tributaries, **including Baltimore Harbor**:

(i) The restoration of underwater grasses;
(ii) The restoration of islands;
(iii) The stabilization of eroding shorelines;
(iv) The creation or restoration of wetlands; and
(v) The creation, restoration, or enhancement of fish or shellfish habitats."

Harbor Channel Maintenance Dredged Material WHAT'S IN IT?

- **Physical Characteristics**
  - Fine-grained Silts and Clays
  - Estuarine sediments (salinity ranges 1-15 ppt)
  - Initial moisture content: 70-80% water by weight before dewatering

- **Chemical Characteristics**
  - Metals – majority are not at levels of concern
  - Organics – infrequently detected
  - Bay & Harbor material contain Sulfides

Dredged Material Reuse Potential

The MDE Guidance Document guides prospective end users of dredged material through the various steps, permits or approvals necessary based on the proposed project. It covers the sampling requirements, environmental and public health standards and long-term management needs.

Establishes **4 categories** for management (including dredged material) of engineered fill or soil, including as a soil amendment:

- Category 1 – Residential, Unrestricted
- Category 2 – Non-Residential, Restricted Use
- Category 3 – Restricted Use, Cap Required
- Category 4 – Ineligible for Reuse

Innovative Reuse Opportunities

- Conducting Field Demonstrations/Small Scale projects
- Governor Hogan issued Waste Reduction/Resource Recovery Executive Order
- MPA Completing Studies: UMD Testing Topsoil & Fill Material Blends
- Partnering with Maryland State Highway Administration (SHA)

Demonstration Projects

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Currently evaluating projects using dried dredged material from Cox Creek DMCF for:

- **Alternative Daily Cover** (ADC) in partnership with Baltimore City
- **Engineered Fill** – on MPA property
- Small test **nursery** – growing grass in dredged material

Also exploring alternative sediment management opportunities at Hart Miller Island:

- **Design with Dredge pilot project** – in partnership with local landscape architecture firm, Mahan Rykiel.

Test Nursery at Cox Creek DMCF

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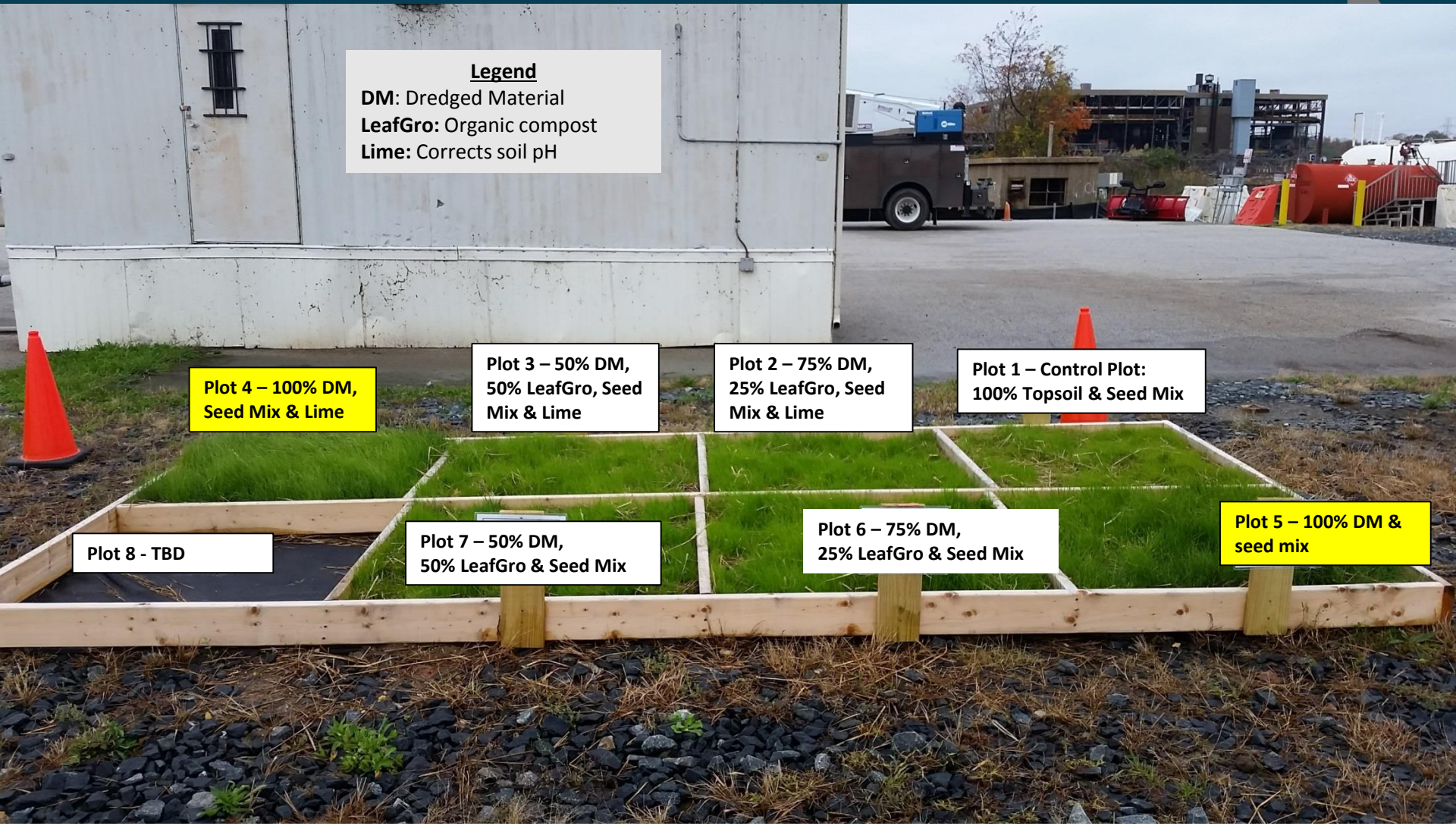


Governor's Executive Order

June 2017 - Governor Hogan issued Waste Reduction/Resource Recovery Executive Order → prompted the creation of Sustainable Materials Management Maryland (SM3)

University of MD Studies

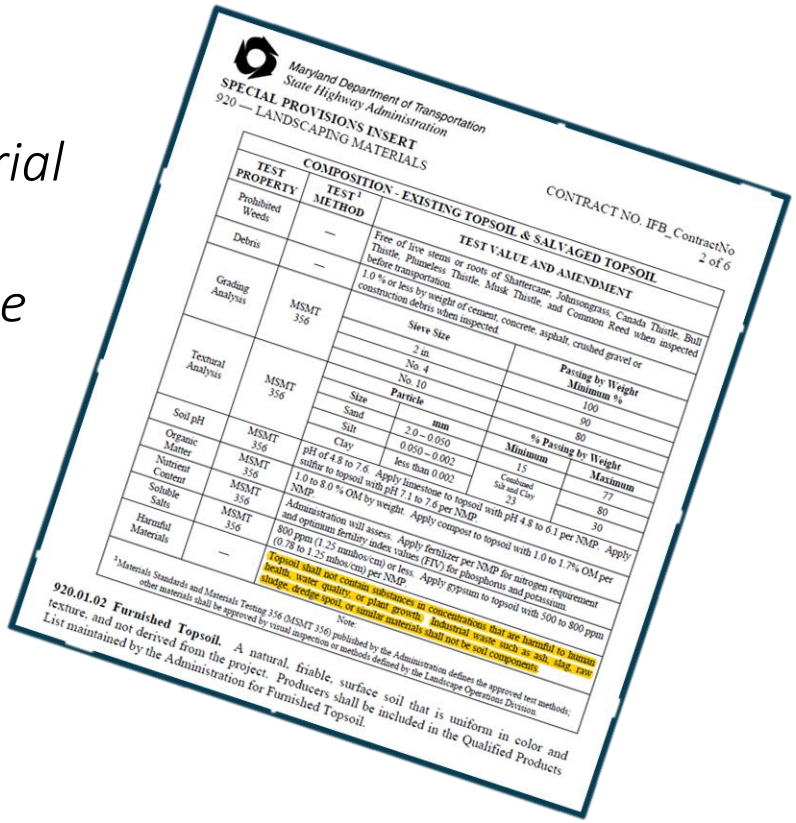
Topsoil Study: Aimed to develop a dredged material blend with properties that meet the MDOT SHA topsoil specifications, evaluate potential leaching characteristics, and determine the geotechnical stability of the blend.

Embankment Study: Explored the use of dredged material as potential highway embankment material. This study was conducted by amending the dredged material with quarry by-products. Geotechnical analysis was coupled with an environmental assessment to ensure satisfactory performance of the dredged material in structural fills.

Partnering with SHA

Current 920 Topsoil Spec - Harmful Materials :

"Topsoil shall not contain substances in concentrations that are harmful to human health, water quality, or plant growth. Industrial waste such as ash, slag, raw sludge, dredge spoil, or similar materials shall not be soil components."



Maryland Department of Transportation
State Highway Administration

SPECIAL PROVISIONS INSERT
920 — LANDSCAPING MATERIALS

CONTRACT NO. IFB_ContractNo
2 of 6

COMPOSITION - EXISTING TOPSOIL & SALVAGED TOPSOIL

TEST PROPERTY	TEST[1] METHOD	TEST VALUE AND AMENDMENT
Prohibited Weeds	—	Free of live stems or roots of Shattercane, Johnsongrass, Canada Thistle, Bull Thistle, Plumeless Thistle, Musk Thistle, and Common Reed when inspected before transportation.
Debris	—	1.0 % or less by weight of cement, concrete, asphalt, crushed gravel or construction debris when inspected.
Grading Analysis	MSMT 356	Sieve Size / Paving by Weight Minimum % Passing: 2 in. 100; No. 4 90; No. 10 80
Textural Analysis	MSMT 356	Particle Size: Sand 2.0 – 0.050 mm; Silt 0.050 – 0.002 mm; Clay less than 0.002 mm. % Passing by Weight: Minimum — Combined Silt and Clay 15; Maximum — Combined Silt and Clay 77
Soil pH	MSMT 356	pH of 4.8 to 7.6
Organic Matter	MSMT 356	Apply limestone to topsoil with pH 4.8 to 6.1 per NMP. Apply sulfur to topsoil with pH 7.1 to 7.6 per NMP.
Nutrient Content	MSMT 356	1.0 to 8.0 % OM by weight. Apply compost to topsoil with 1.0 to 1.7% OM per NMP.
Soluble Salts	MSMT 356	Administration will assess. Apply fertilizer per NMP for nitrogen requirement and optimum fertility index values (FIV) for phosphorus and potassium.
Harmful Materials	—	800 ppm (1.25 mmhos/cm) or less. Apply gypsum to topsoil with 500 to 800 ppm (0.78 to 1.25 mmhos/cm) per NMP.

Topsoil shall not contain substances in concentrations that are harmful to human health, water quality, or plant growth. Industrial waste such as ash, slag, raw sludge, dredge spoil, or similar materials shall not be soil components.

Note

[1]Materials Standards and Materials Testing 356 (MSMT 356) published by the Administration defines the approved test methods; other materials shall be approved by visual inspection or methods defined by the Landscape Operations Division.

920.01.02 Furnished Topsoil. A natural, friable, surface soil that is uniform in color and texture, and not derived from the project. Producers shall be included in the Qualified Products List maintained by the Administration for Furnished Topsoil.

SHA will be updating the 920 furnished topsoil specification to remove the words "dredge spoil" from the Harmful Materials provision.

Questions?

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