LOCKHEED MARTIN

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MRC Project Lead

Agenda

- Middle River Complex
  - Sediment Feasibility Study – proposed remedy
  - Short updates on:
    - Proposed Consent Agreement
    - Groundwater remedy underway
    - Surface water sampling results in Dark Head Cove
    - Soil remedy planning

Sediment Feasibility Study - Tonightôs Meeting

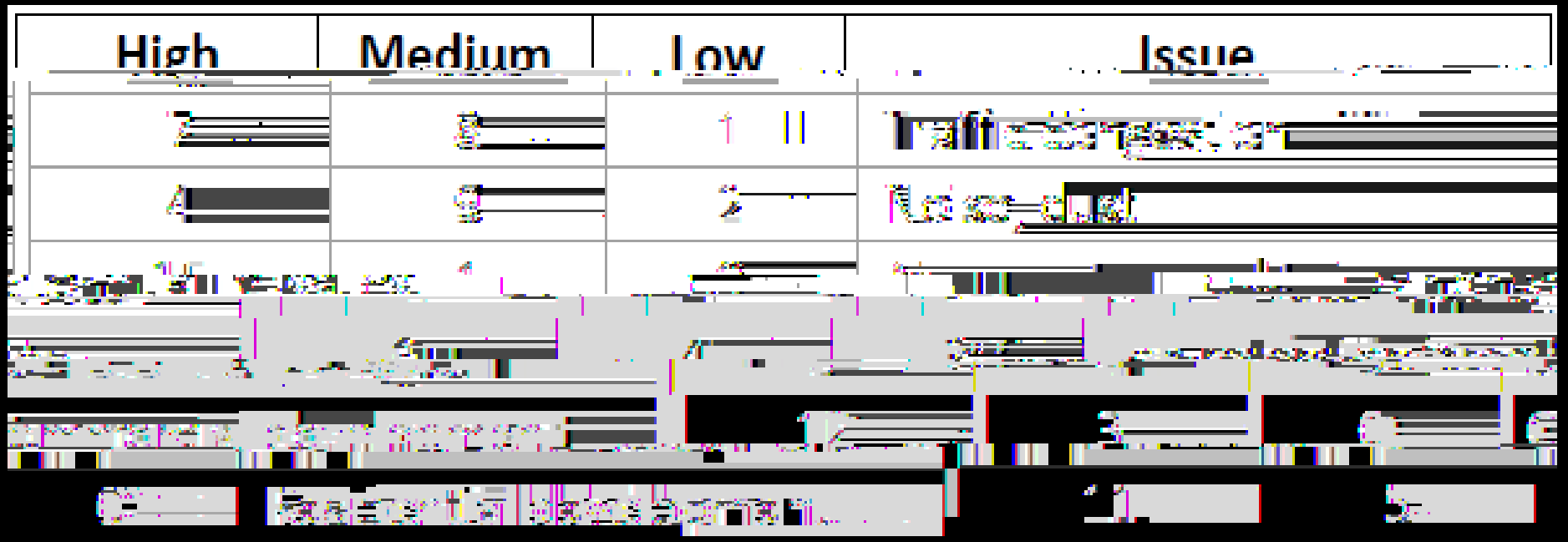
- Topics
  - Initial public engagement:
    - Citizens Guide Dec. 2011
    - Public Information Session January 18, 2012
  - Citizens' Working Group process (February, March, April 2012)
  - Remedy development & selection; Feasibility Study in review
  - Recommended remedy for sediments
  - Public and Regulators comment on the recommended remedy
  - Next Steps – projected schedule

Public Comment Period: Feb. 28 ï March 28, 2013

Middle River Complex (MRC) Setting

Values/Concerns and Working Group Feedback

- **H** for High level of concern
- **M** for Medium level of concern
- **L** for Low level of concern



Hydraulic & Sedimentation Analysis

1 cm
=~0.4ò

Surface Water & Sediment Quality

- Surface Water - No chemicals detected above water quality standards
- PCBs (Polychlorinated Biphenyls)
  - Are located in shallow sediments near the bulkhead
  - Represent human health and ecological risks
  - Are bioaccumulative (will build up in the food chain)
- PAHs (Polycyclic Aromatic Hydrocarbons)
  - Are located near the bulkhead and Martin State Airport
  - Are less of a risk driver than PCBs
- Metals (e.g., cadmium, copper, chromium)
  - Are present in Cow Pen Creek and Dark Head Cove
  - Are potentially toxic to benthic macroinvertebrates (i.e., worms)
  - Are more elevated in deep sediments

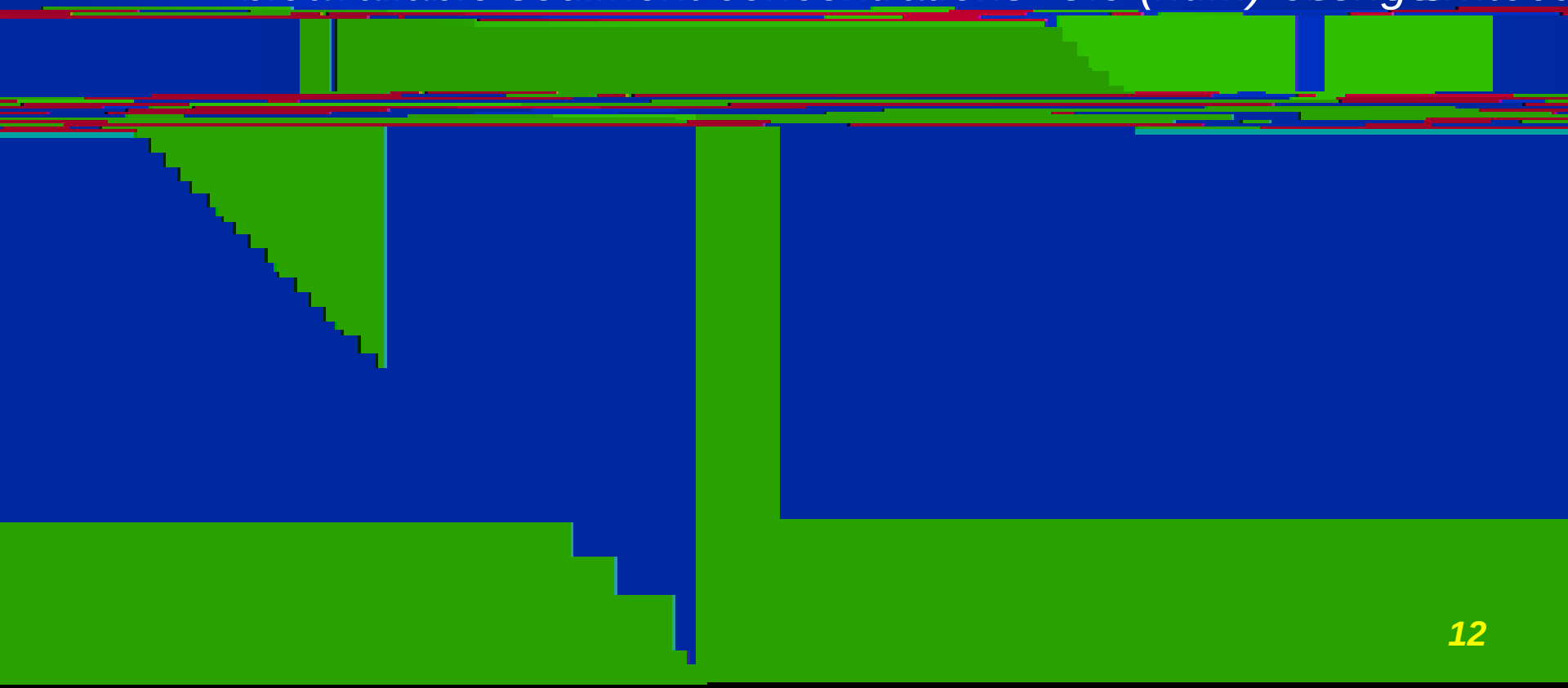
Risk Assessment Conclusions

- Human Health
  - No acute risks identified or anticipated
  - Some risks posed by fish consumption
  - Site fish tissue concentrations are similar to local area-wide conditions
- Ecological
  - No predicted impacts to fish, birds or mammals
  - Potential impacts to benthic macroinvertebrates (e.g., worms)

State fish consumption advisories listing specific species and waterways are in place now and are not expected to change as a result of this cleanup, as this is a regional issue.

Remedial Action Objectives (RAOs)

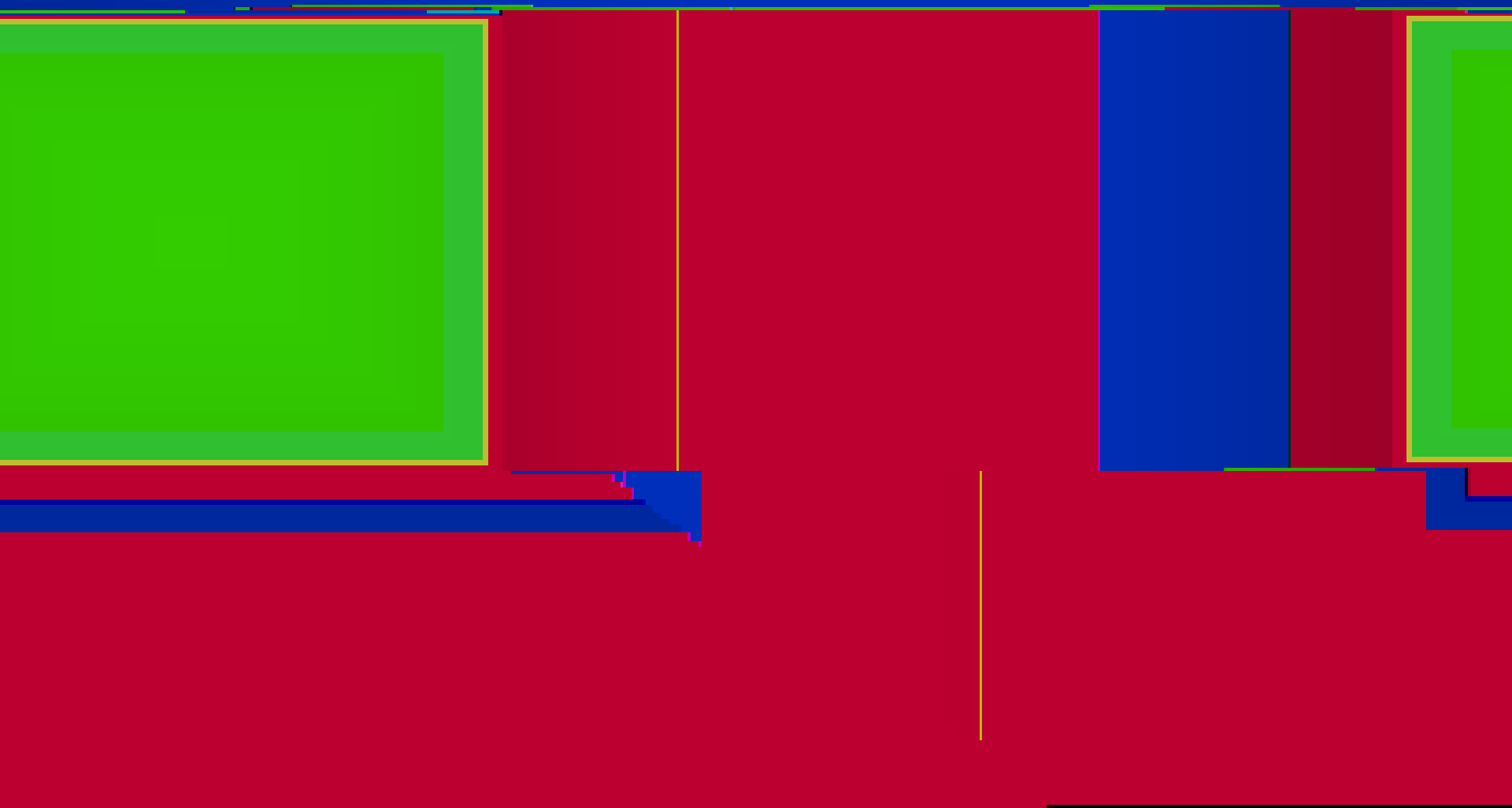
- *Reduce, to the extent practicable*:*
  - *RAO 1:* ***human health risks associated with the consumption of resident fish*** *- by reducing bioavailable sediment concentrations*



Site-Specific Considerations

- CowM¿ *f*

Cleanup Alternatives Comparison



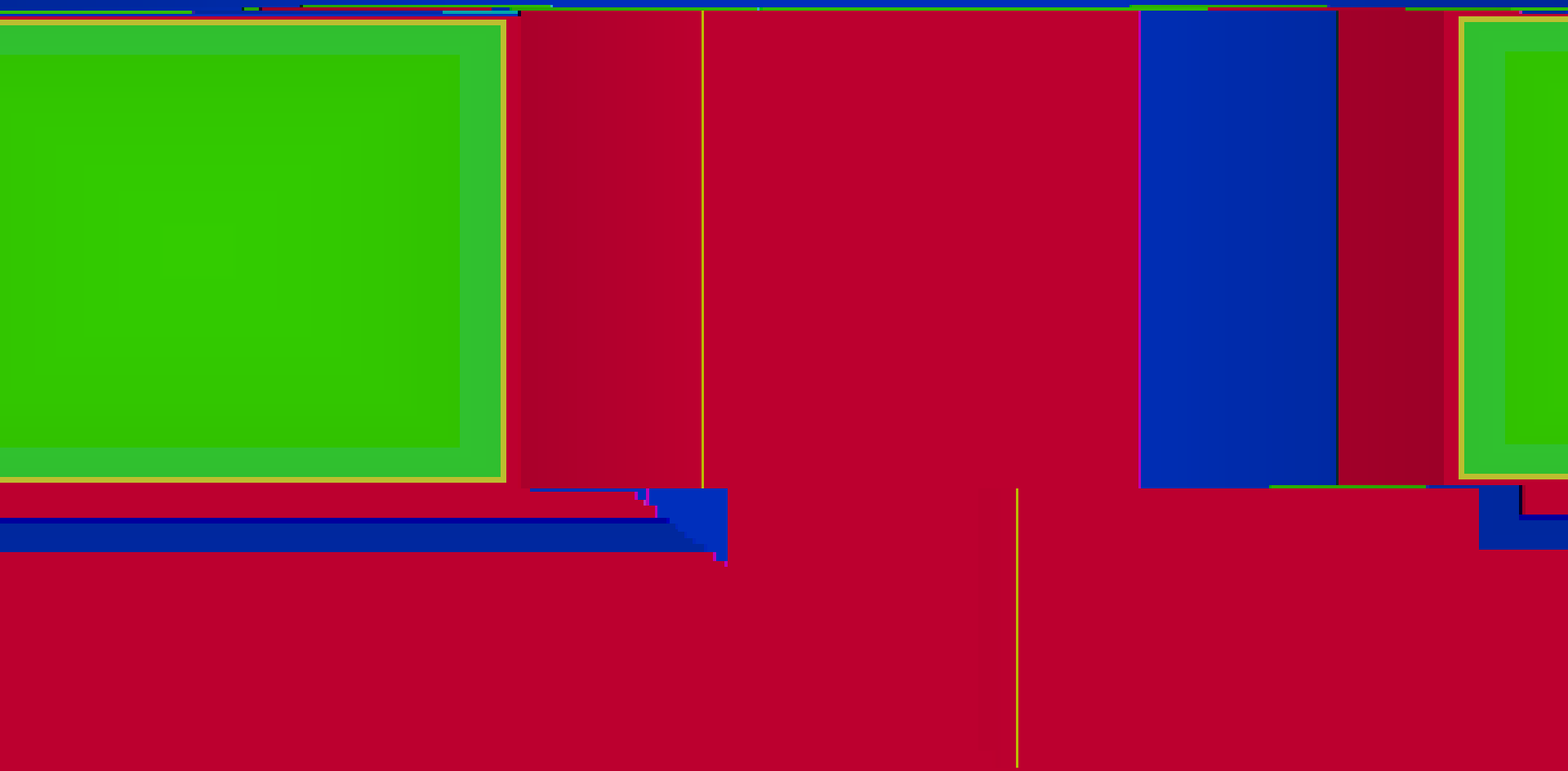
Removal by Excavation

Excavation of sediment from shore

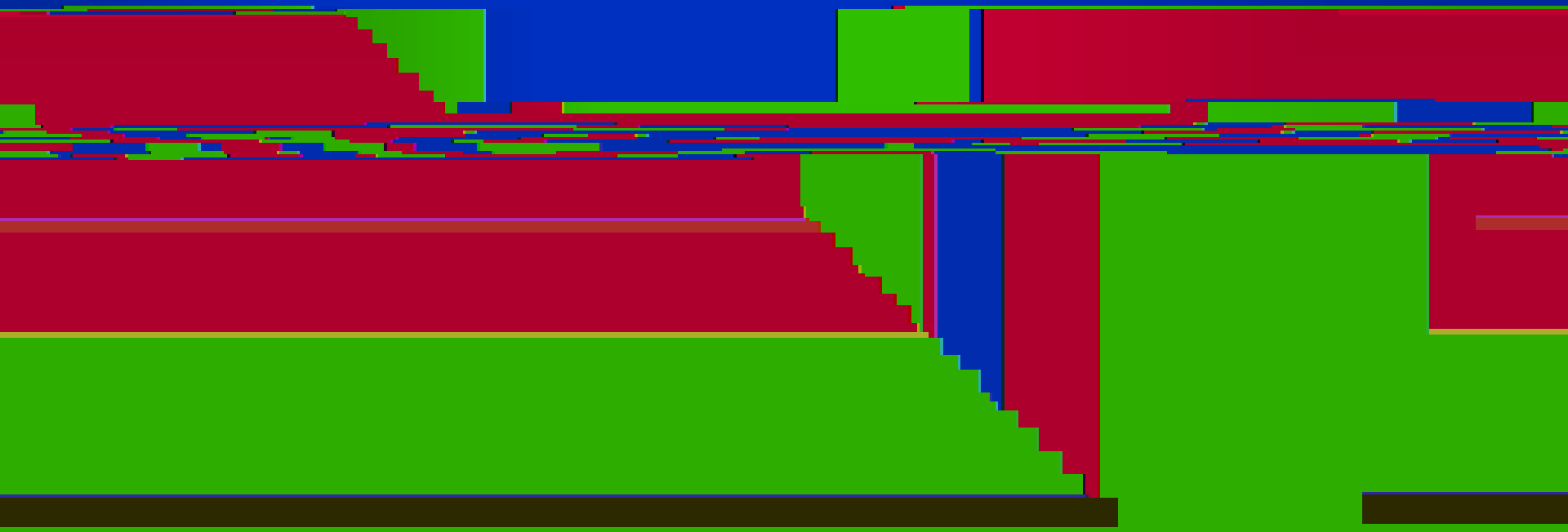
Removal by Excavation

Excavation of sediment in dry

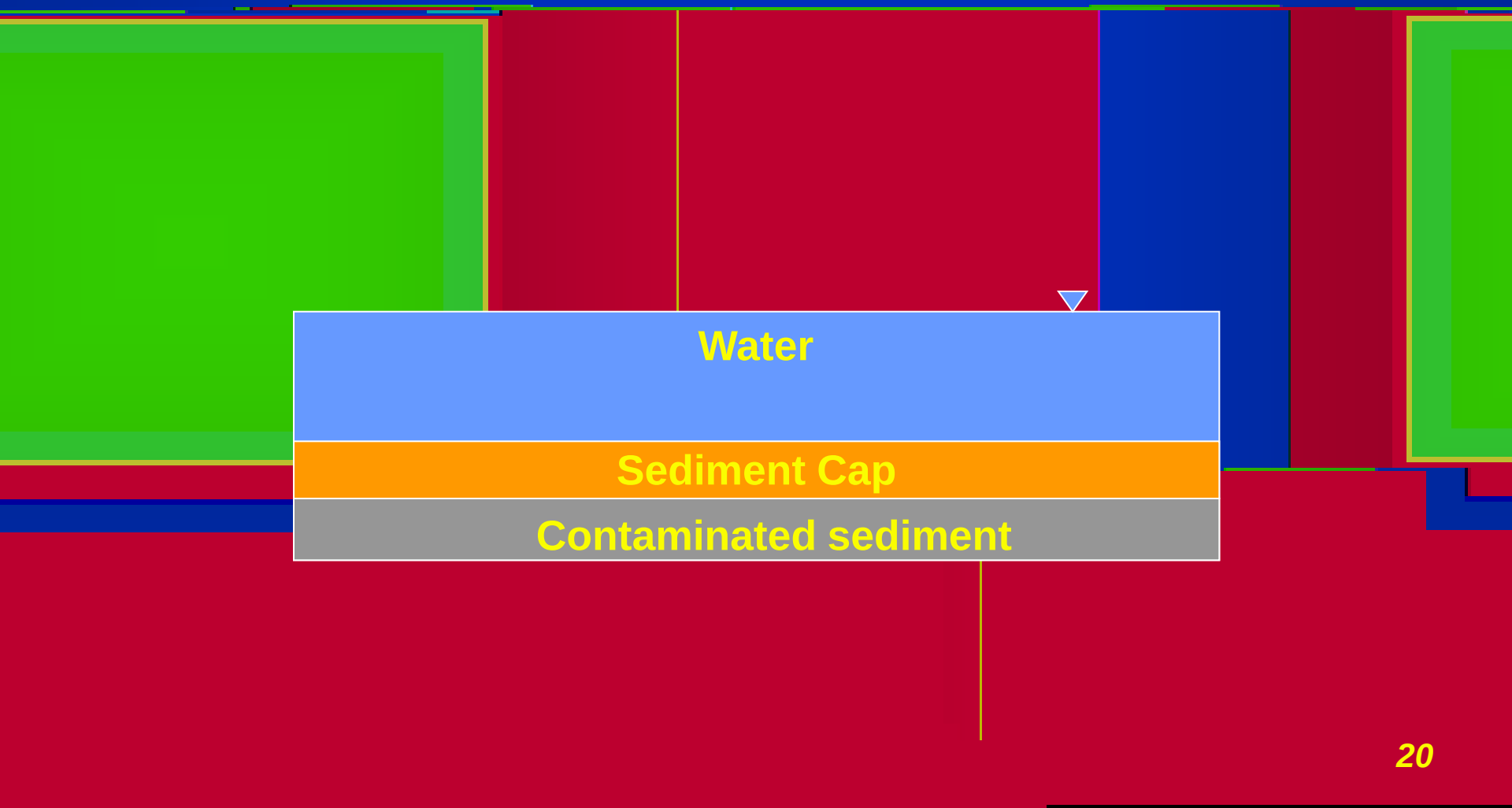
Mechanical Dredging



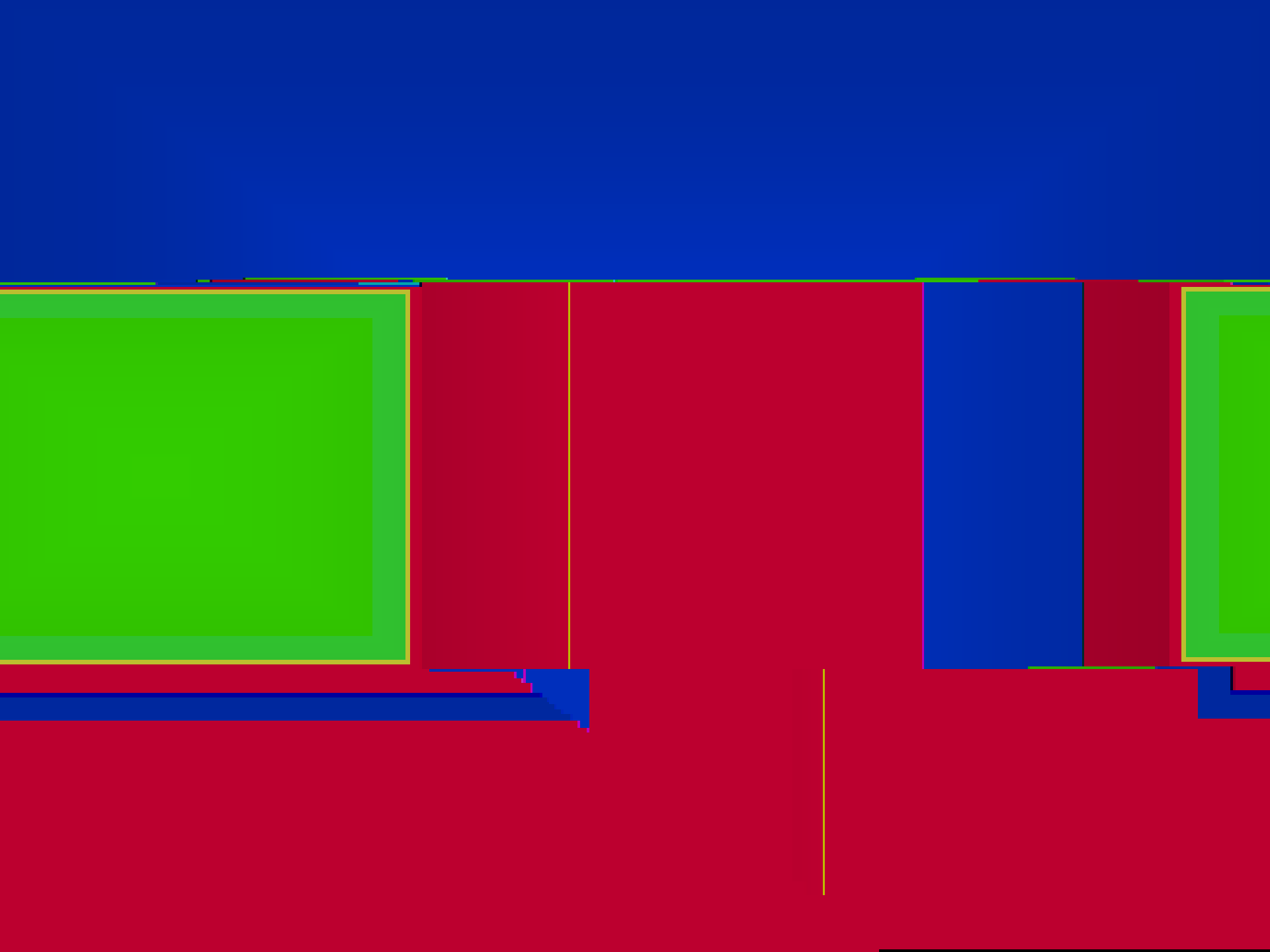
Hydraulic Dredging



Capping



Natural Recovery



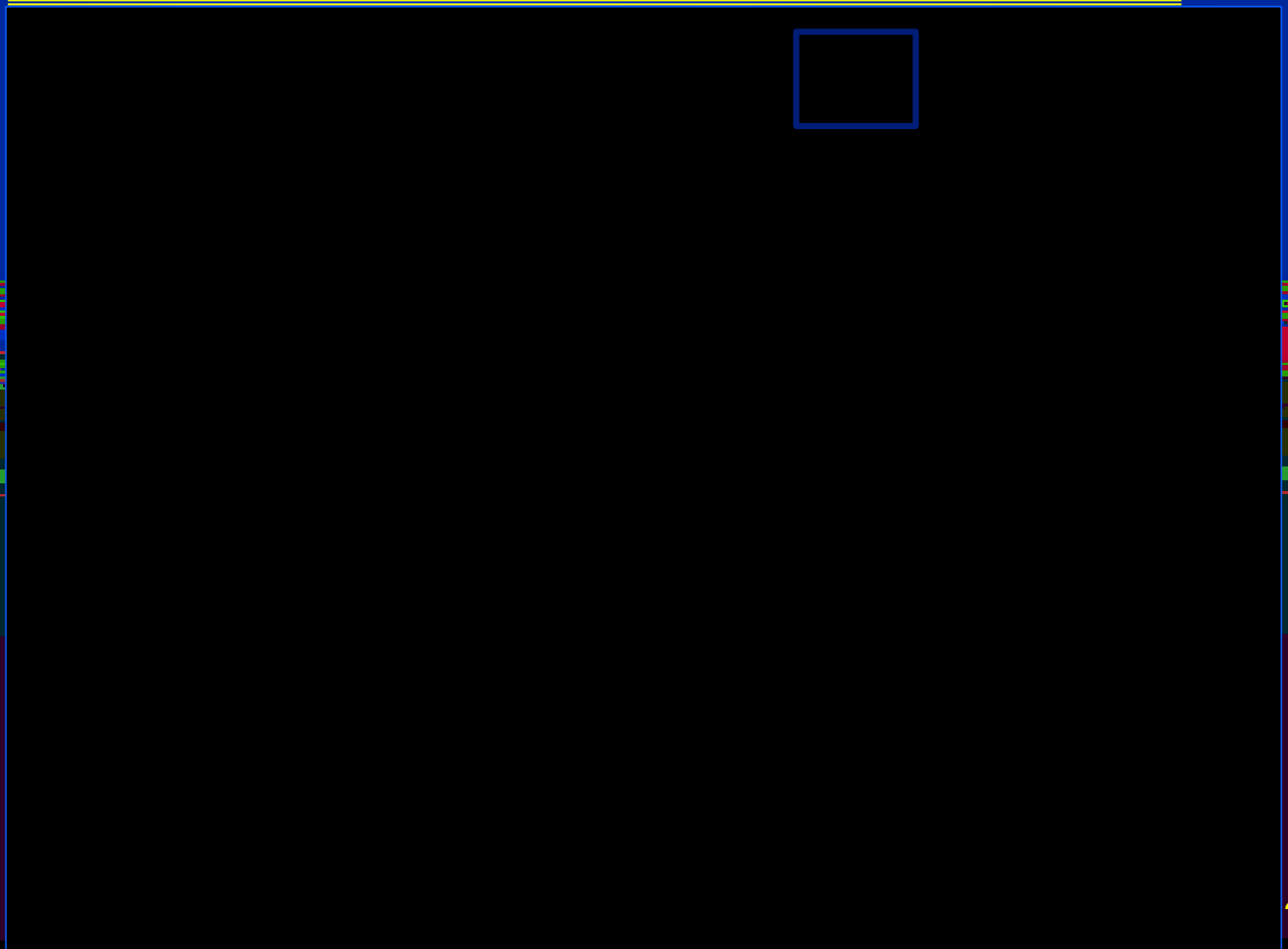
In situ Treatment Applications

Evaluation Criteria

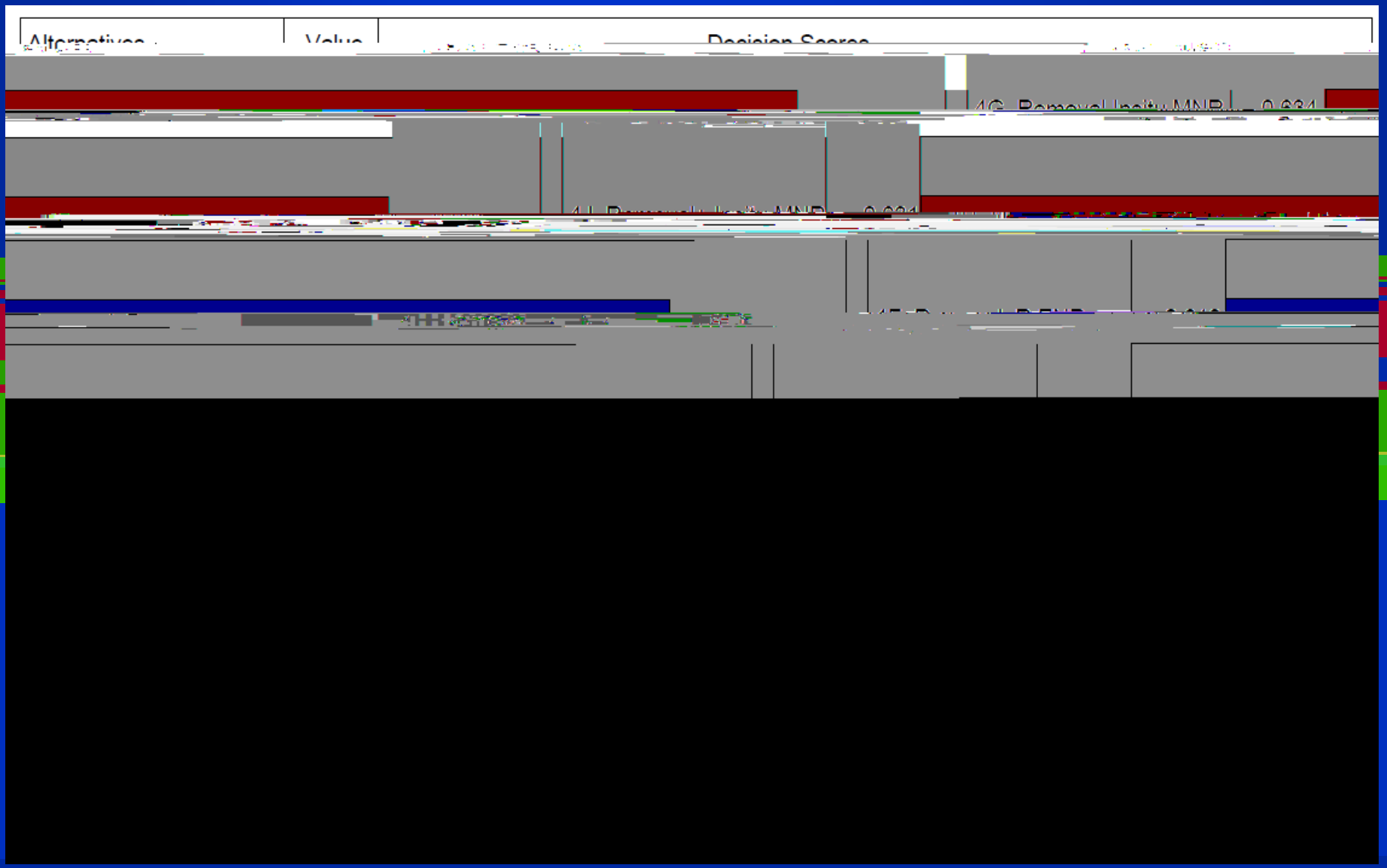
Based on EPA's Feasibility Study guidance

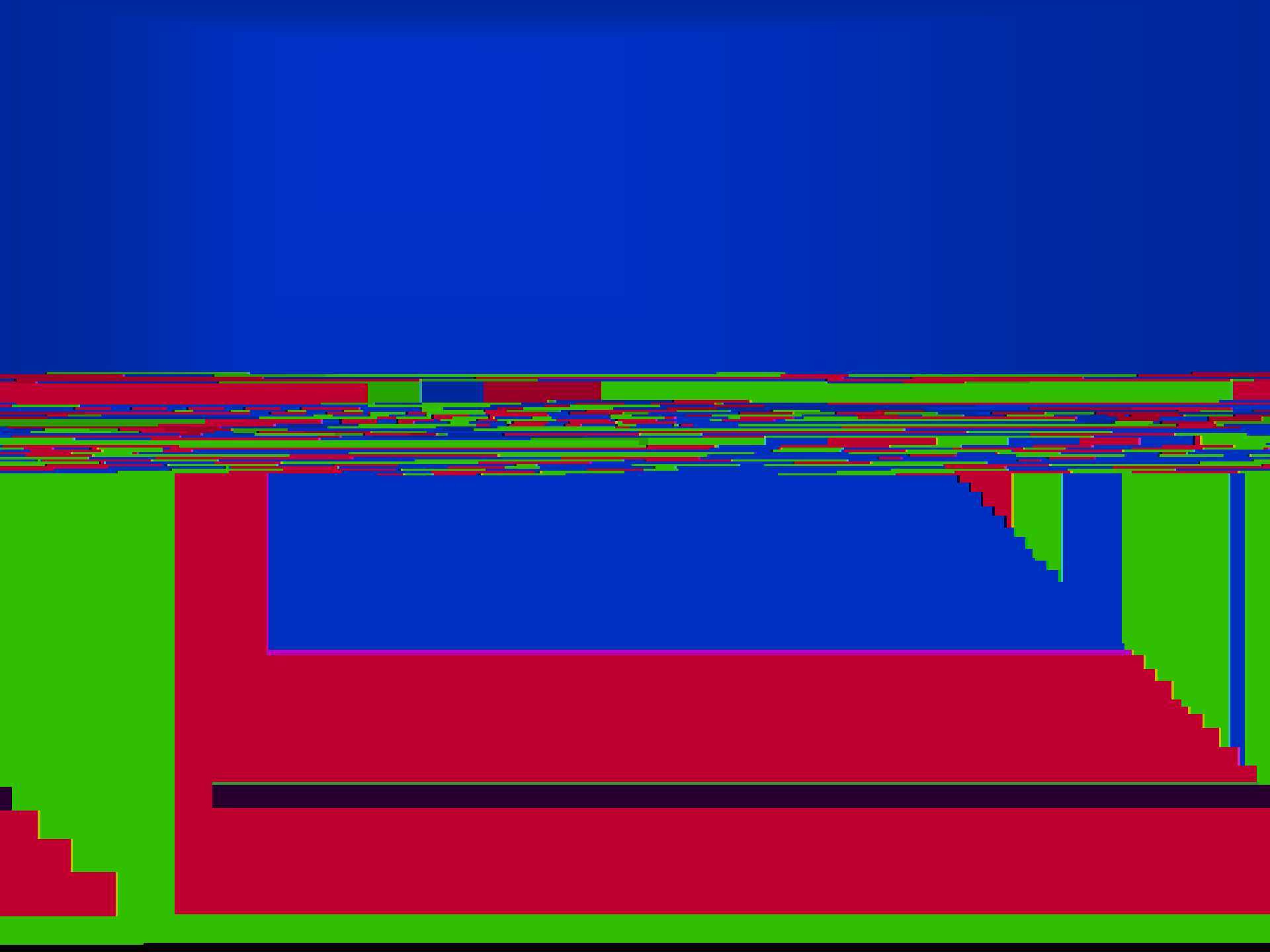
- Threshold Criteria
  - Protection of Human Health and the Environment
  - Compliance with Regulations
- Balancing Criteria
  - Long Term Effectiveness
  - Short Term Effectiveness (impacts)
  - Reduction in toxicity, mobility, volume through treatment
  - Implementability
  - Cost
- Modifying Criteria
  - Community Acceptance ⟵ **Ongoing Now**
  - Regulatory Acceptance ⟵ **Ongoing Now**

Qualitative Comparison



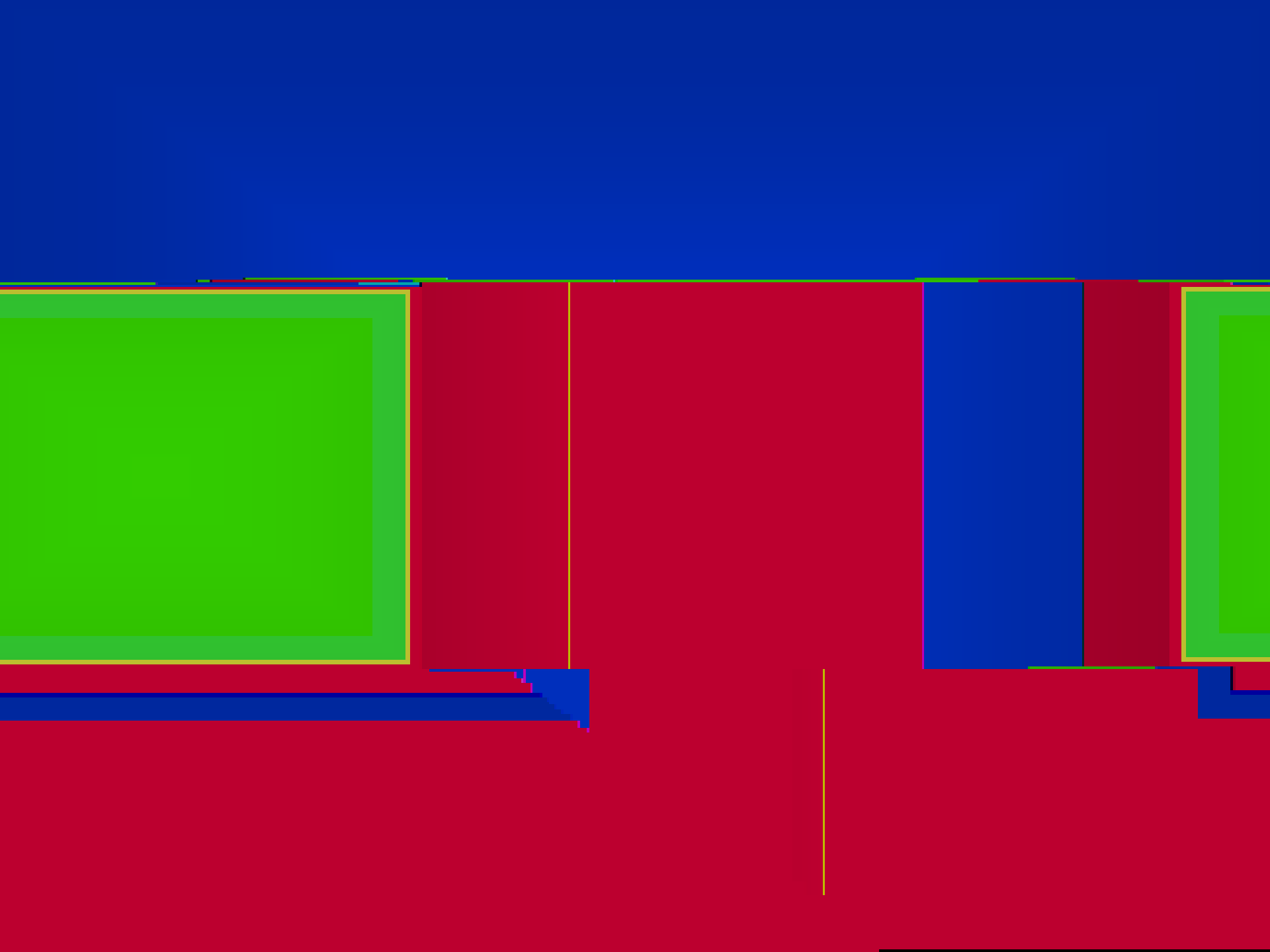
Quantitative Scoring of Alternatives





Areas of Potential Concern at the Sediment Surface

Recommended Remedial Alternative ï 4G Removal with *in Situ* Treatment & MNR



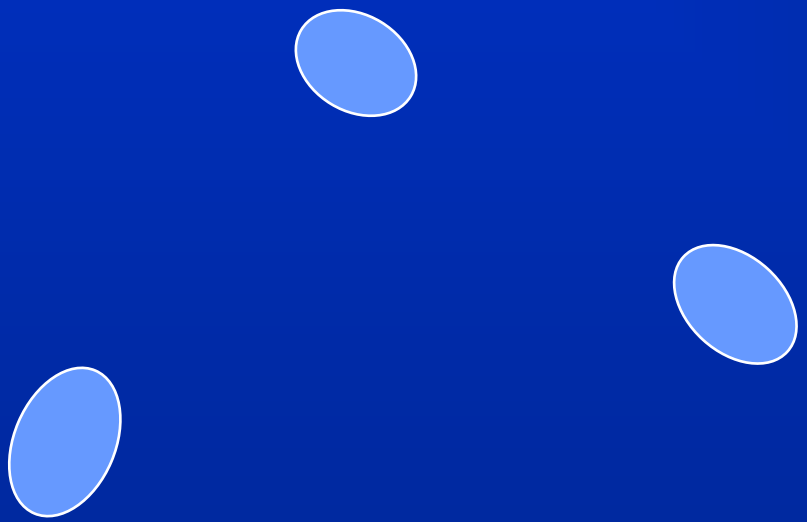
Next Steps

- Feasibility Study Document
  - Submitted to Maryland Department of the Environment and U.S. Environmental Protection Agency
  - Available at Essex Public Library and Lockheed Martin Website
- Public Information Session TONIGHT!!
  - Wilson Point Fire Hall – February 28th
- Public Comment Perio
  - Vebruary Fart # M

Agenda - Continued

- Middle River Complex
  - Short updates on:
    - Proposed Consent Agreement
    - Groundwater remedy underway
    - Surface water sampling results in Dark Head Cove
    - Soil remedy planning

Middle River Complex ï Groundwater Remedy Underway



Groundwater Remedy Permitting Overview

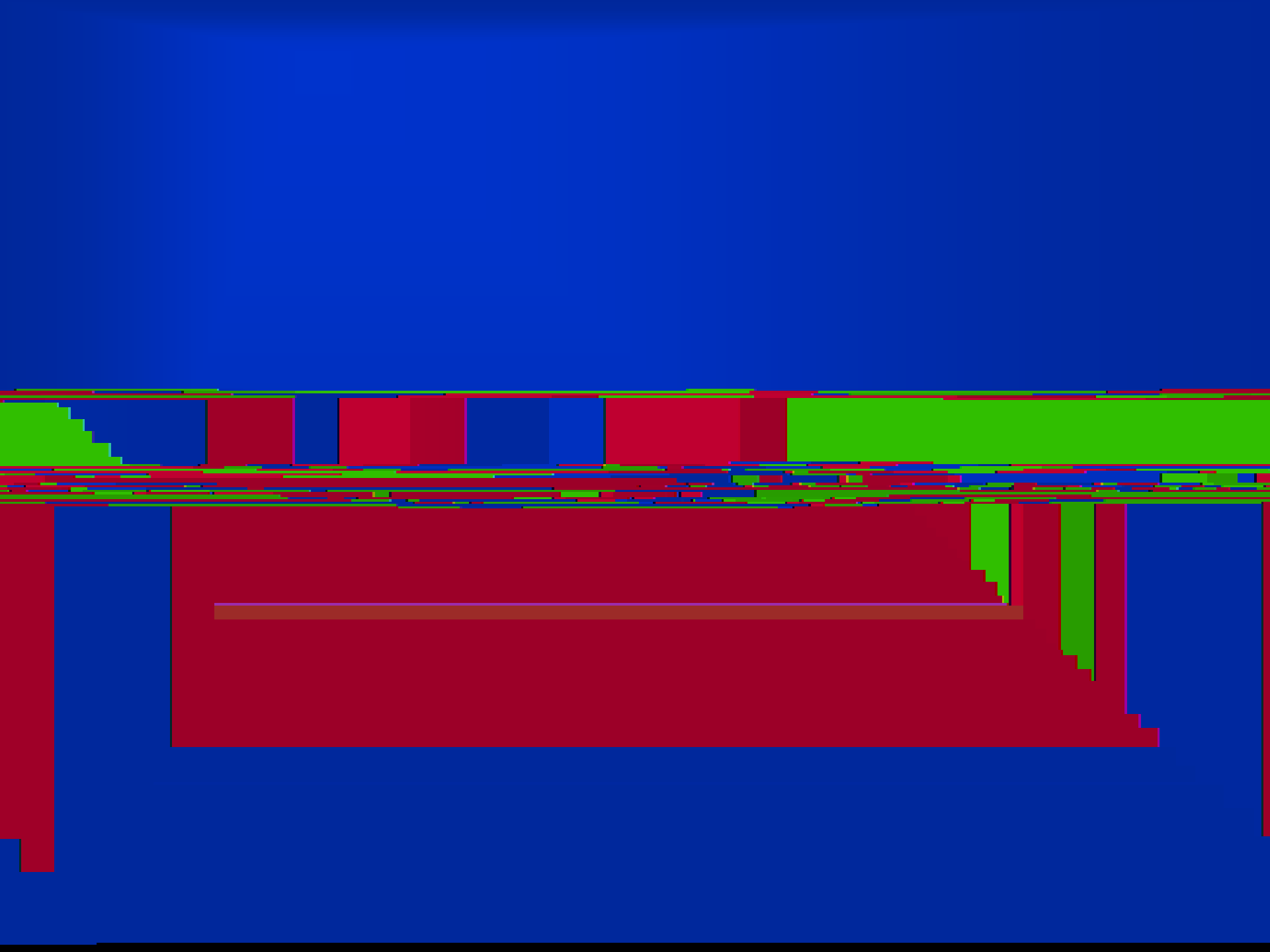
Numerous permits are underway

Permit	Status
US Army Corps of Engineers (USACE) & Maryland Department of the Environment (MDE) State Programmatic General Permit - Impacts to Waters of the US/State	Approval granted January 24, 2013
Maryland Historic Trust and Maryland Department of Natural Resources Project Review	Review completed ς Activities will have no effect on regulated resources
Baltimore County Soil Conservation District (SCD) Erosion and Sediment Control (E&S) Plan Approval	SCD in final review stage ς Expect approval by late Feb or early March 2013
Baltimore County Grading Plan Approval	County Soil Conservation District review in progress. Expect Approval in late Feb or Early March 2013
Baltimore County Stormwater Variance	Variance granted on January 7, 2013
MDE Notice of Intent (NOI) for coverage under the Construction Stormwater General Permit	Will be granted after Soil Conservation District Grading Plan approval and Inspection by County of installed Erosion and Sediment Control systems.

Groundwater Remedy Project Schedule

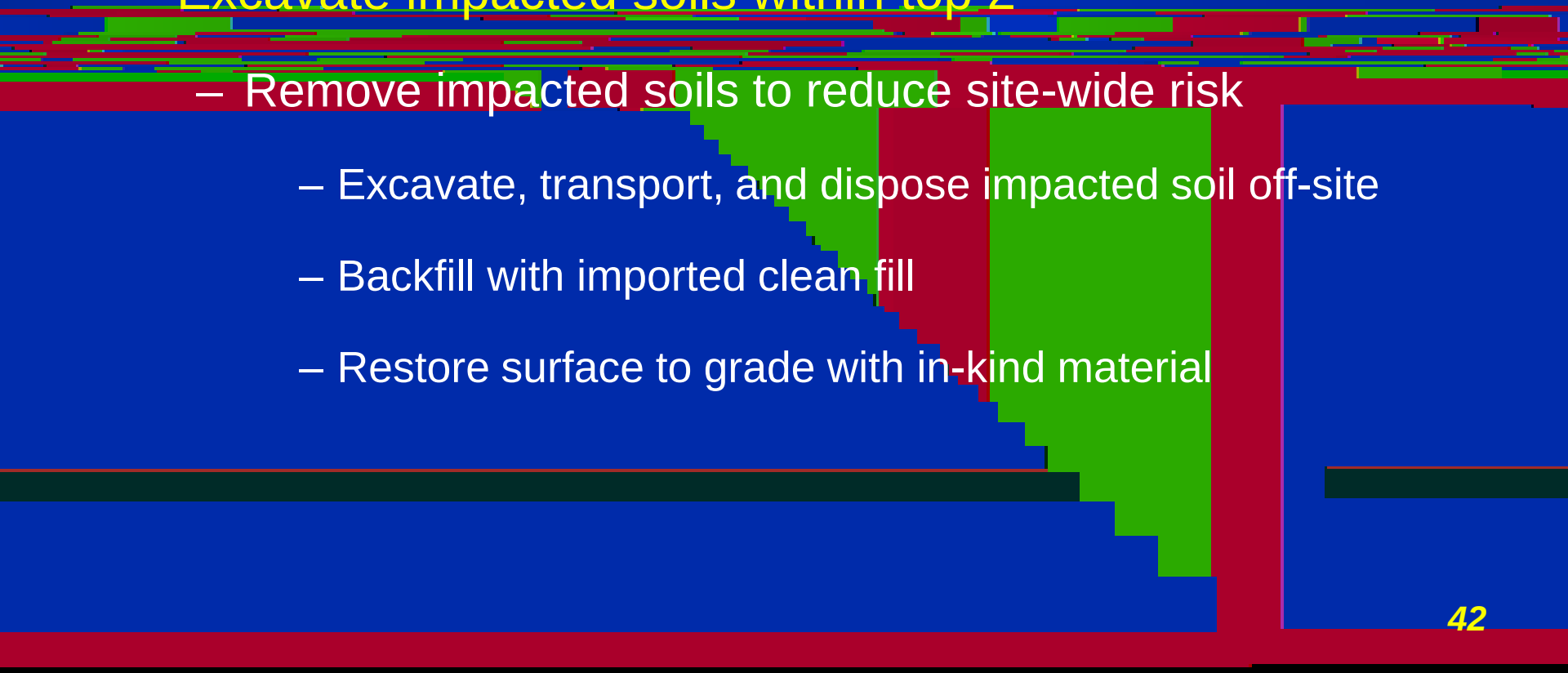
- Permitting – 2013
- Complete Design – early 2013
- Construction – site preparation begins in Spring 2013
  - Swale Relocation
  - Pre-remediation of soil
  - Groundwater system construction
- Tracer Injection Testing – Early 2014
- First Substrate Injection – Mid 2014

You May See These Activities



Proposed Soil Remedial Approach

- Industrial cleanup goal
  - Consistent with past and anticipated future land use
- Excavate impacted soils within top 2’
  - Remove impacted soils to reduce site-wide risk
    - Excavate, transport, and dispose impacted soil off-site
    - Backfill with imported clean fill
    - Restore surface to grade with in-kind material



Soil Remedy ï Estimated Removal Comparison

Cleanup Goal, Risk-Based (mg/kg)	Residential	Recreational	Commercial	Industrial
PAHs (BaPEq)	0.14	0.20	0.37	2.9
PCB (mg/kg)	1	--	--	10

PAH = polycyclic aromatic hydrocarbon

BaPEq = benzo(a)pyrene equivalent

PCB = polychlorinated biphenyl

*Assumes 18 tons per truckload

**Assumes round trips for removal and backfill

Soil Remedy Schedule

Task	Blocks D, F, G, H	Block E
Revise Response Action Plans	2013	2013
Design	2014	2014 - 2015
Remediation	2014 - 2015	2015 - 2016
Reporting and Approval	2016	2017

Thank you for your participation!