Morris Cove as a Confined Aquatic Disposal (CAD) Cell

Bridgeport Maintenance Dredging Project Public Meeting

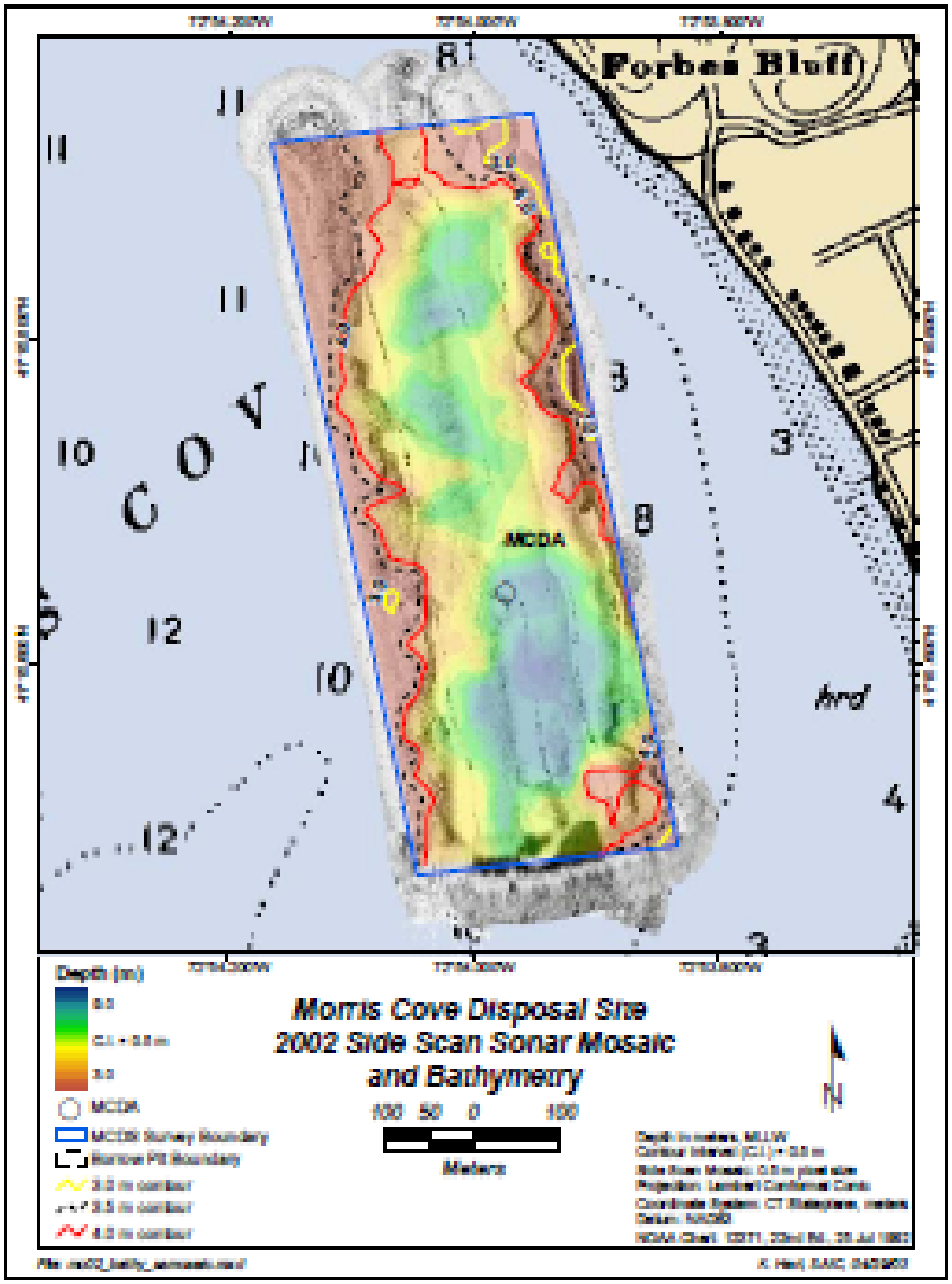
25 October 2010

Thomas J. Fredette, PhD

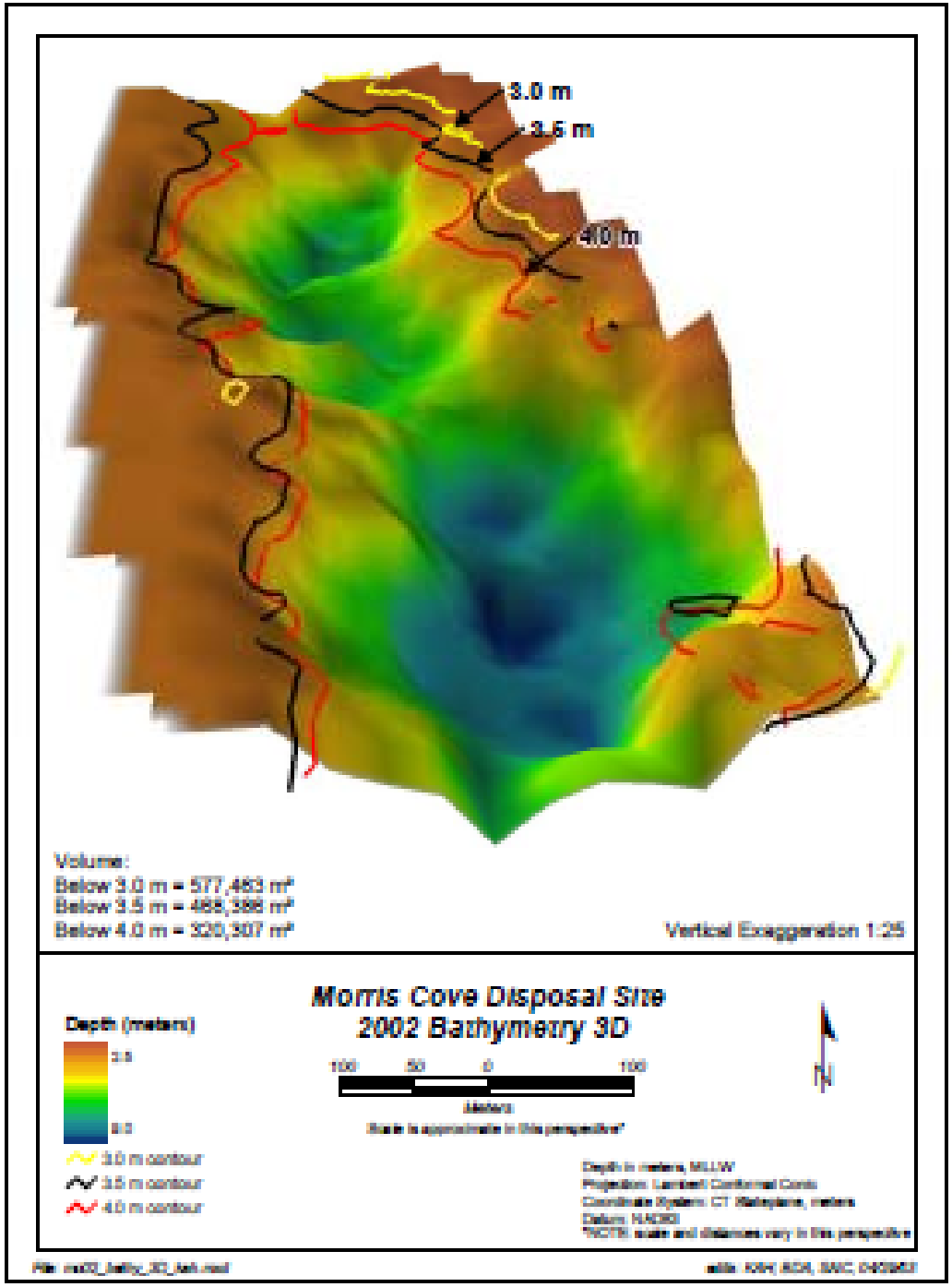
USACE Army Engineer Research Lab

Vicksburg, MS

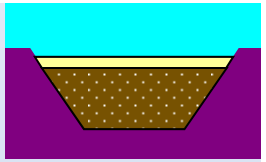
- Sediment used for I-95 construction
- About 650 x 2450 ft
- About 30 ft deep
- 610,000 cubic yard capacity



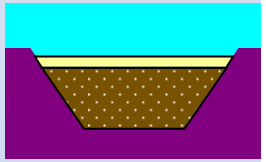
3-D view of Morris Cove with vertical exaggeration



New England CAD Alternative Experience

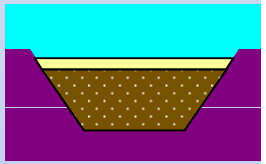


Confined Aquatic Disposal Cells



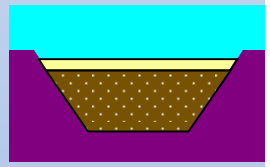
1981 – Norwalk Harbor, ~ 2,500 cu m

1989 – New Bedford Harbor Pilot



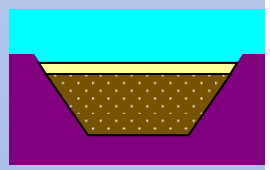
1997-2000 – Boston Harbor, 1,200,000 cu m

1998 – Hyannis Harbor, 57,000 cu m



2003-? - Providence Harbor, 900,000 cu m

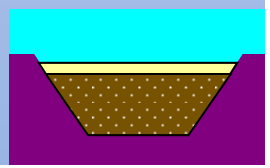
2006 - Norwalk Harbor, 27,000 cu m



2005-? – New Bedford Harbor - TBD

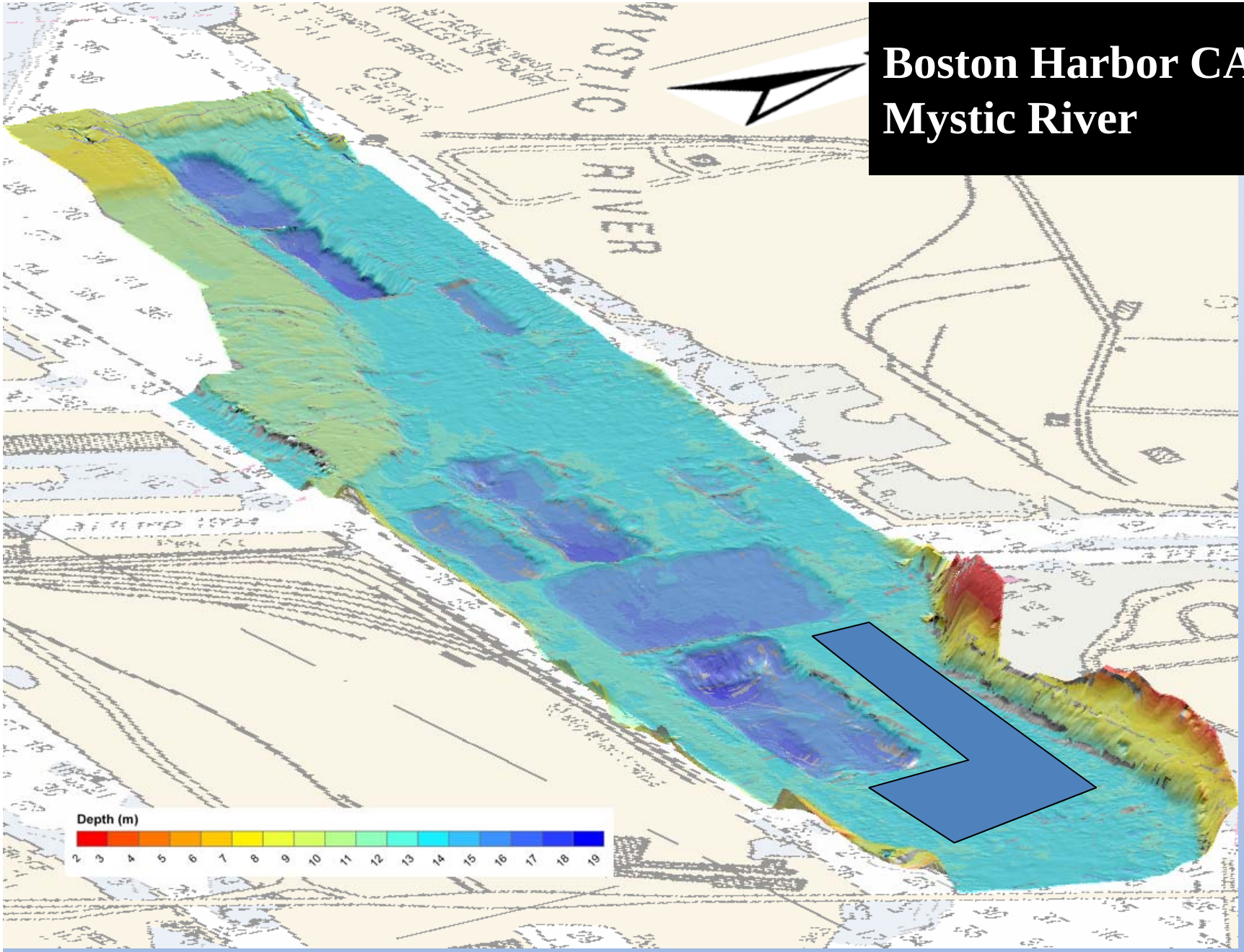
2006 - New London Harbor, 117,000 cu m

2008-2010 – Boston Harbor

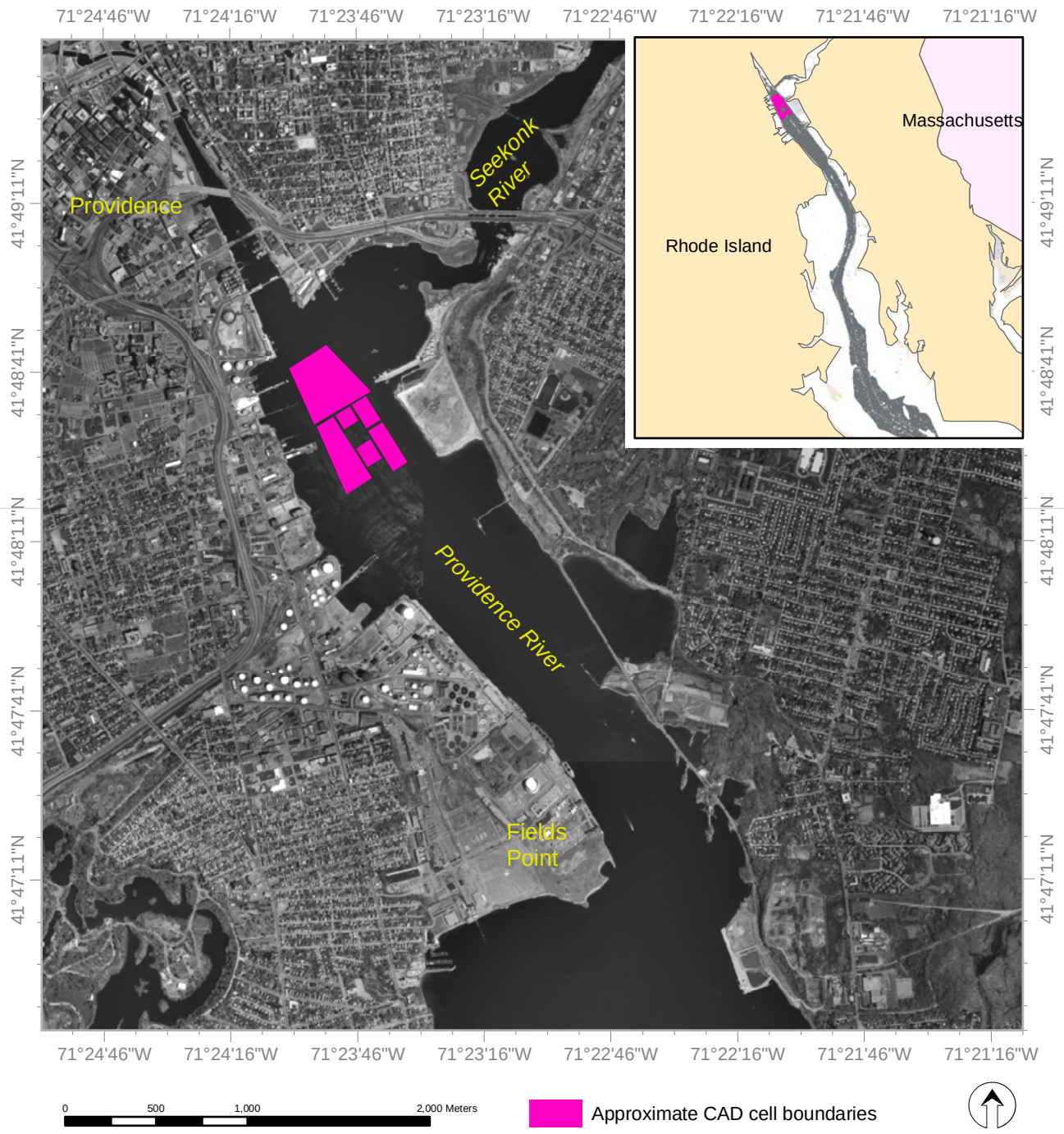


2010 – New London Harbor

Boston Harbor CADs
Mystic River



Providence CADs



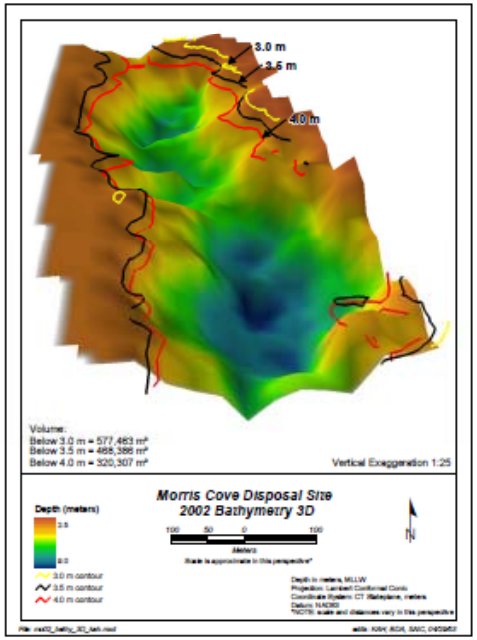
Morris Cove Borrow Pit Filling

Potential Benefits	Public Concerns
Increase Oyster Habitat	Potential Health Impacts from Contaminated Sediments
Decrease Potential Anoxic Zone	Potential for Contaminated Water Infiltrating Residential Basements
Improve Benthic Habitat	Loss of Sediments During Filling of Pit
Provide Cost Effective Sediment Placement Alternative	

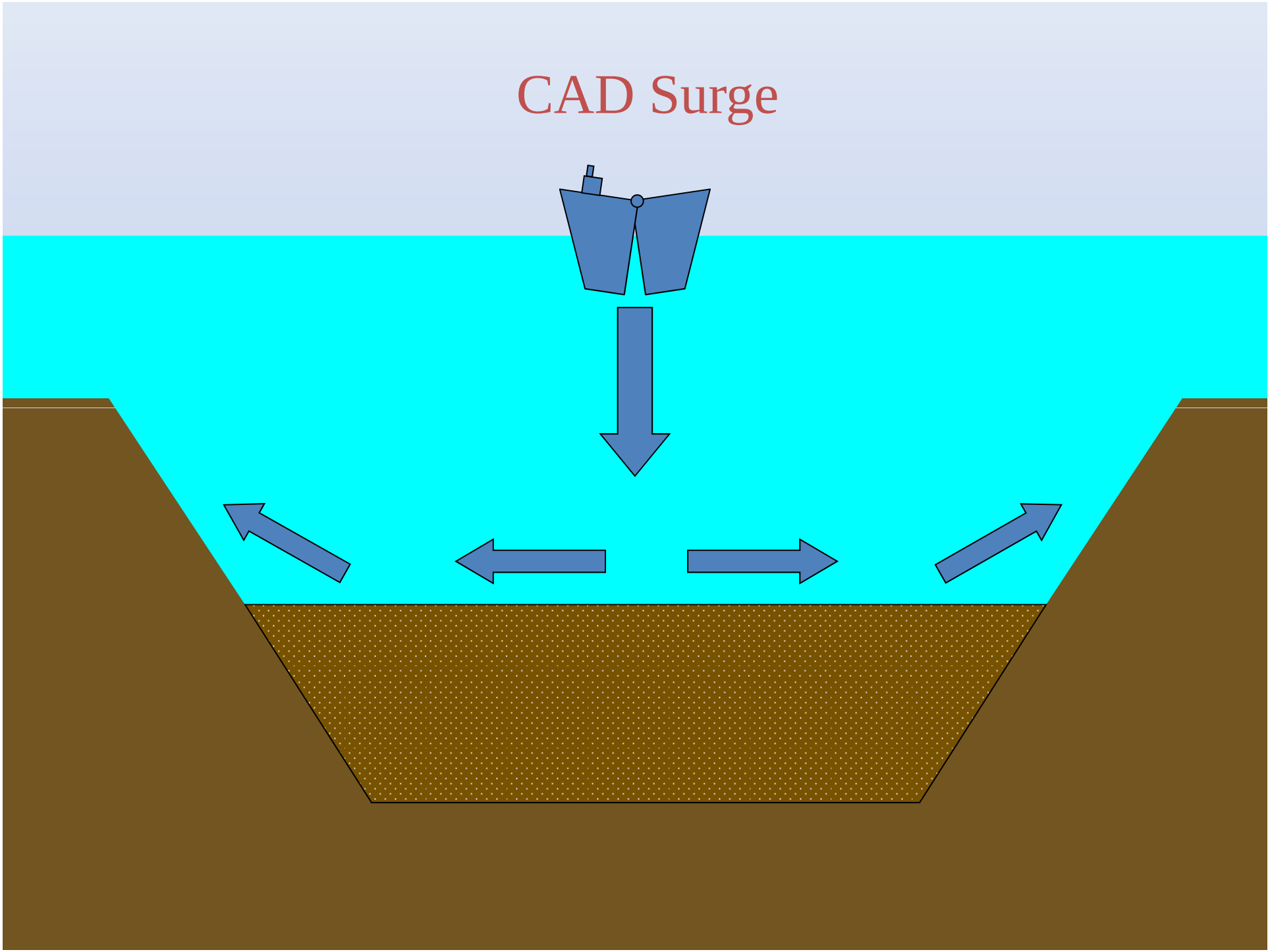
Morris Cove Borrow Pit Filling

Loss of sediments during filling of pit concern

- Sediment & water plume denser than surrounding water
- Friction with water & bottom slow spread
- Steep side slopes limit spread

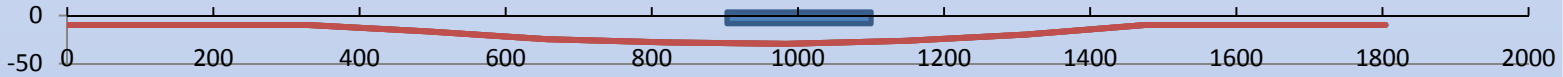


CAD Surge



Morris Cove Borrow Pit Profile & 70’ x 200’ barge – no vertical exaggeration - All scales in feet

Front View



Side View

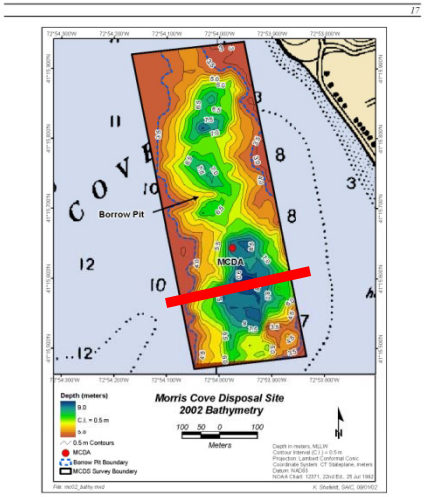


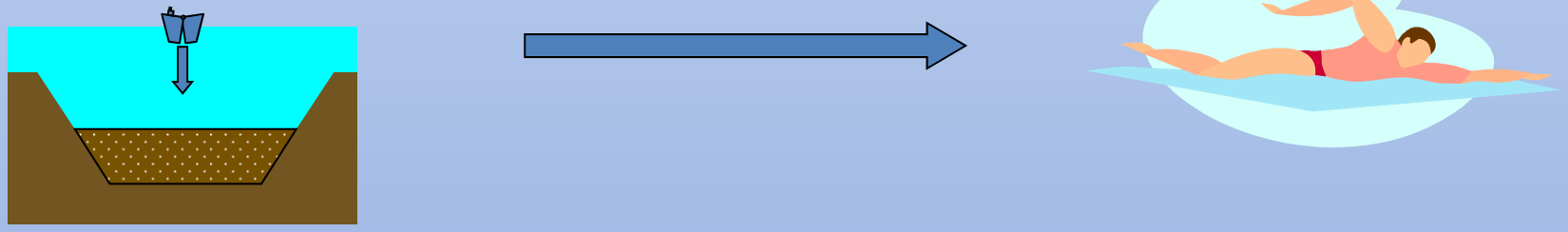
Figure 3-1. Bathymetric chart of the seafloor within the 0.24 km² survey area established over Morris Cove, 0.5 m contour interval. The blue dotted line designates the borrow pit boundary based on the 3.5 m bathymetric contour.

Monitoring Cruise at the Morris Cove Borrow Pit May 2002

Morris Cove Borrow Pit Filling

Potential Health Impacts from Contaminated Sediments Concern

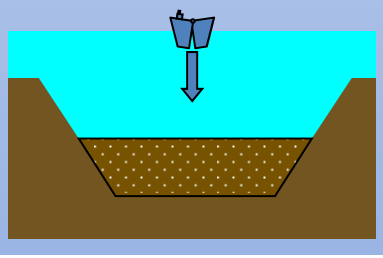
- Potential pathway – Sediment loss to water column → Transport in water →Swimmers
- Prime risk assessment factors: Exposure duration and exposure concentration



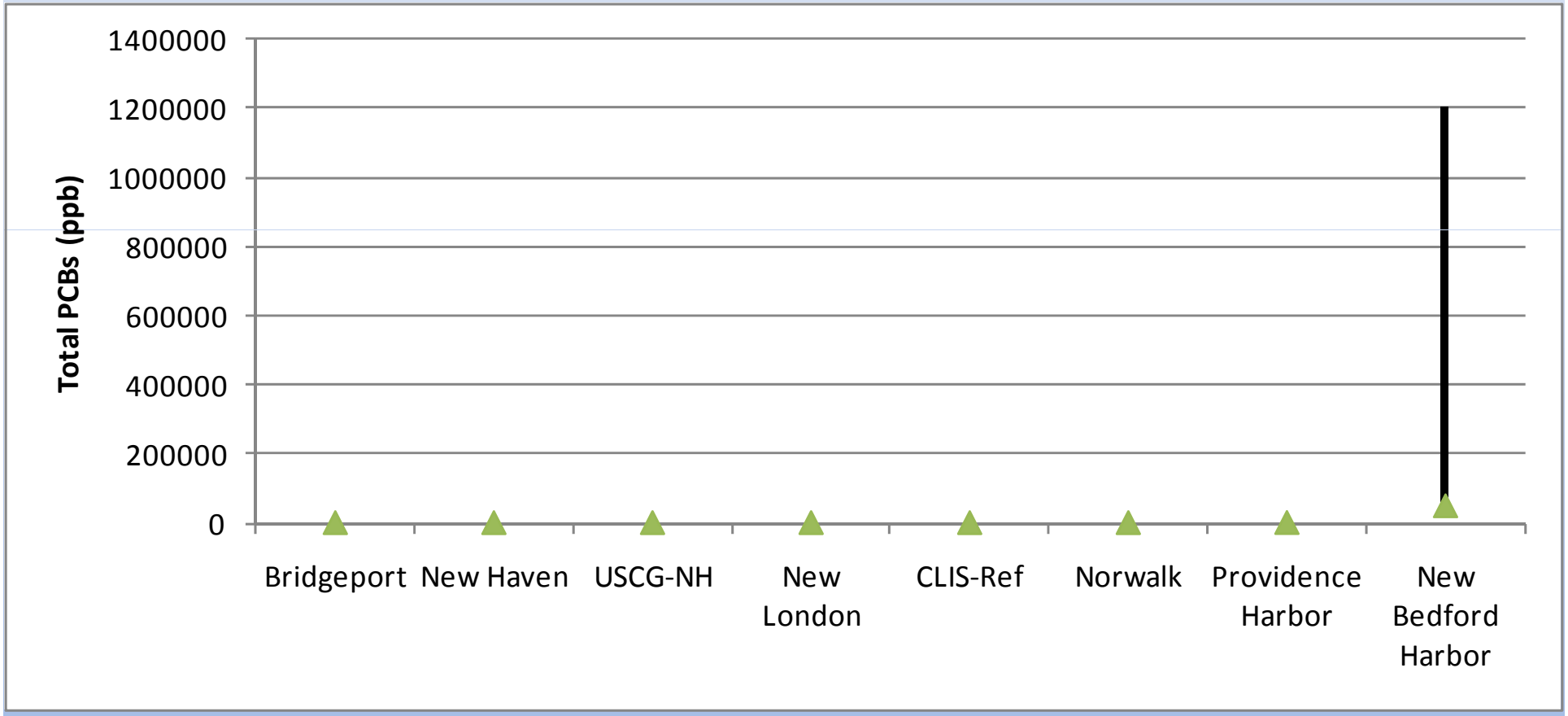
Morris Cove Borrow Pit Filling

Exposure duration and exposure

- Exposures limited to time spent in water
- Concentrations limited by loss from sediment and dilution
  - Contaminants largely remain on sediment
  - Extremely large dilution volumes relative to expected volume of release
  - Transport direction? Season?
  - Low release, dilution, & transport very short-term



Comparison of tPCBs in Select Harbors



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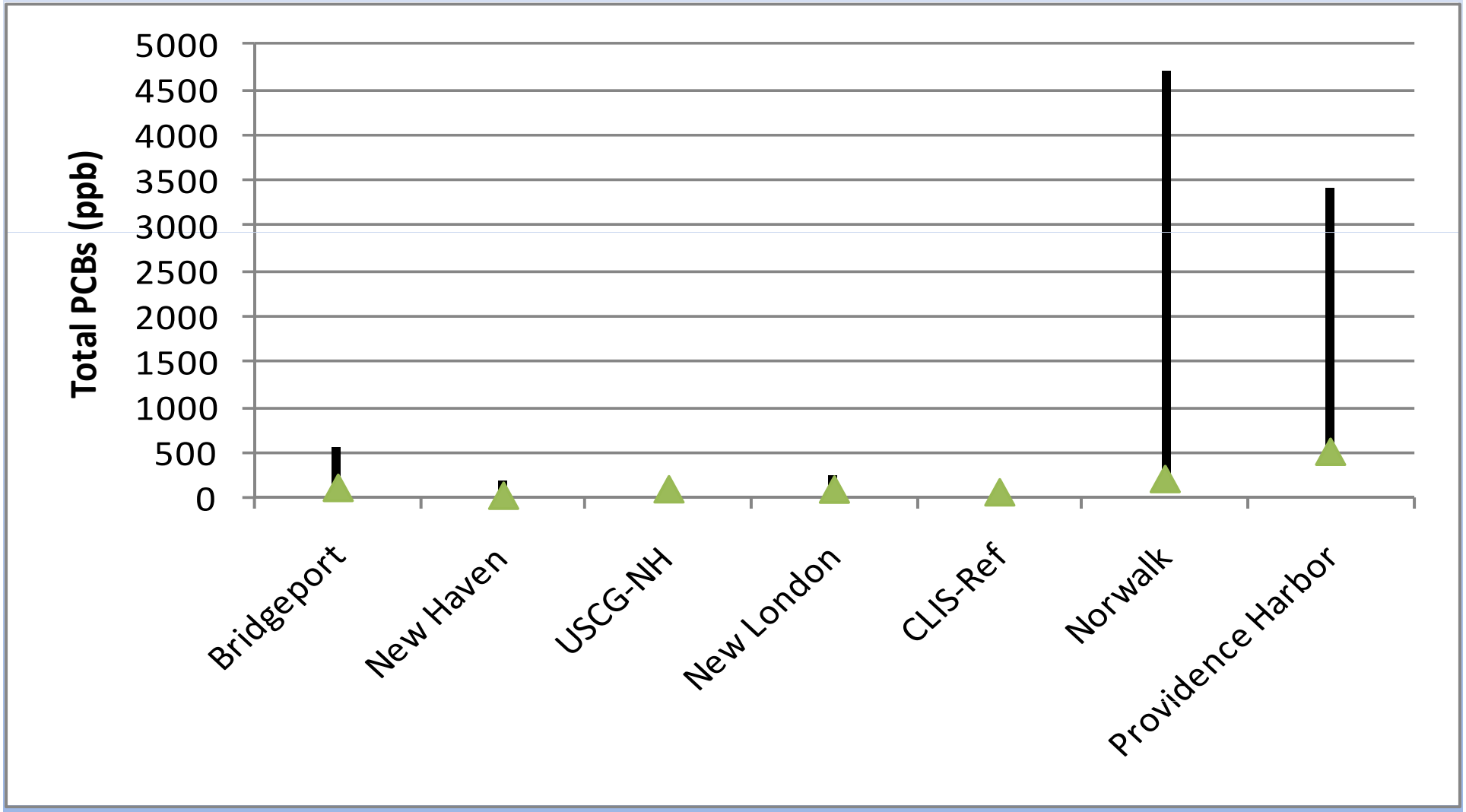

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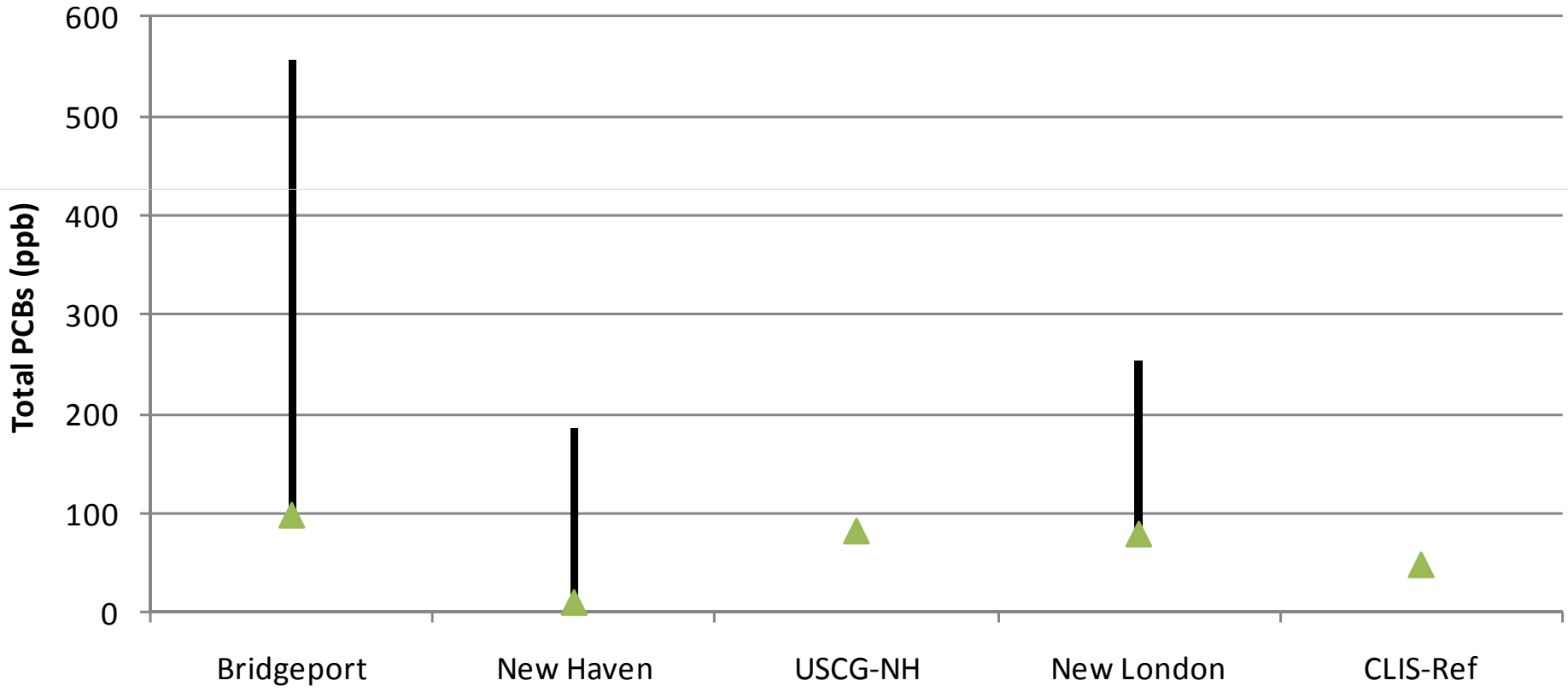
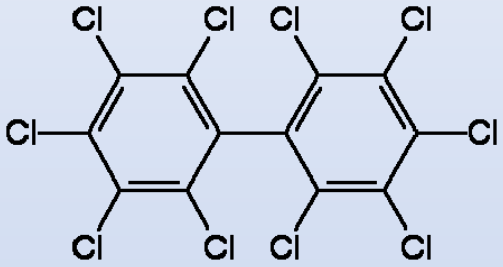


PCB Solubility



- "all PCBs are lipophilic and poorly soluble in water" - http://www.chem.unep.ch/pops/pops inc/proceedings/bangkok/FIEDLER1.html
- "Owing to their low solubility's in water, PCBs are often associated with the solid fraction (*e.g.*, particulate matter, sediments)" - http://www.env.gov.bc.ca/wat/wq/BCguidelines/pcbs/pcbs-02.htm

New Bedford Harbor CAD Study

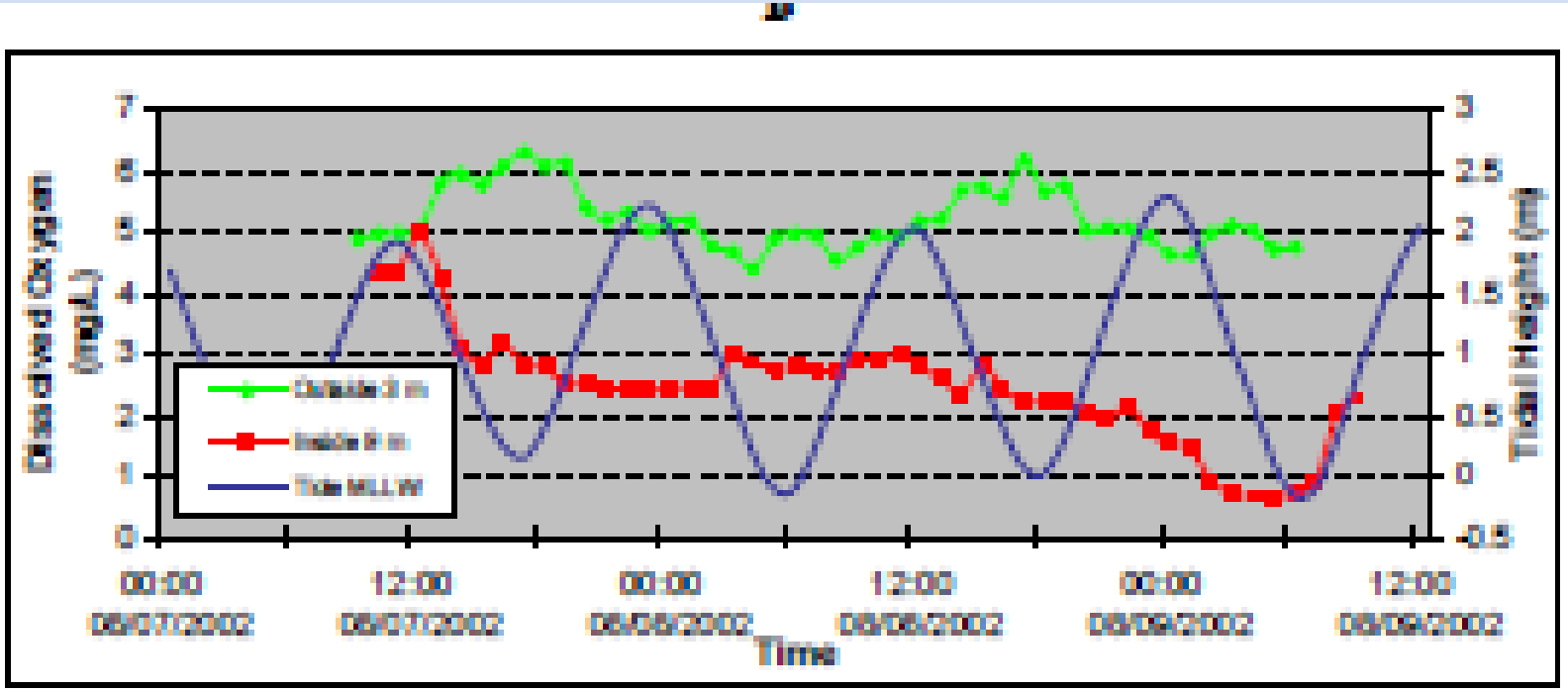
- "…contaminant breakthrough of the cap at a concentration of 0.01% of the pore water contaminant concentration (e.g., 0.01% of 7 ppb PCB or 0.0007 ppb PCB) will take more than 1800 years as predicted by the USACE RECOVERY model. With burial promoted by the dredged material settlement, the transport of contaminants through the cap and burial material will take tens of thousands of years."

P.R. Schroeder, C.E. Ruiz, T.J. Fredette, and E. Hayter. 2010. Assessment of Contaminant Loss and Sizing for Proposed Lower Harbor Confined Aquatic Disposal (CAD) Cell New Bedford Harbor Superfund Site Massachusetts

Morris Cove Borrow Pit Filling

- Decrease Potential Anoxic Zone
  - Existing data show some periods of low oxygen in the borrow pit, but other data clearly show considerable periods of good water quality
  - The depth, stratification, and subsequent stagnation do have strong potential to lead to anoxic conditions

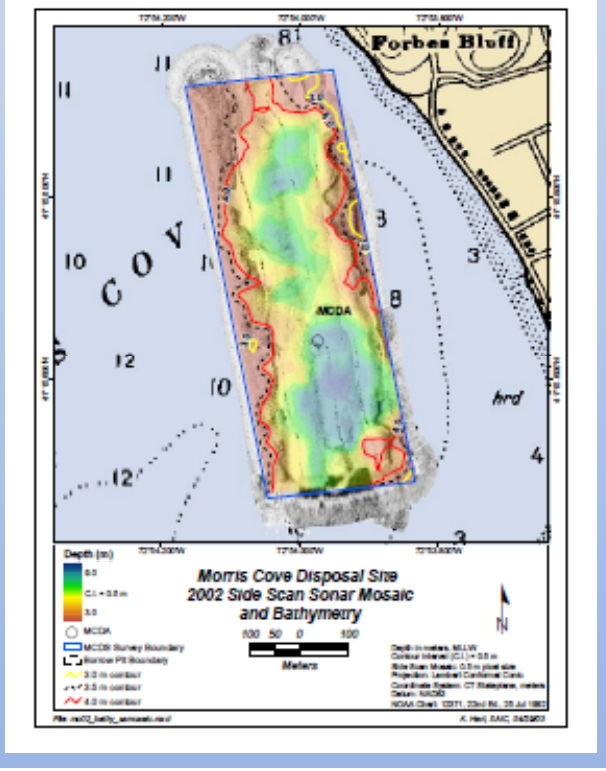
Dissolved Oxygen
NMFS August 2002



- Green – outside
- Red – inside
- Blue - tide

Morris Cove Borrow Pit Filling

- Increase Oyster Habitat
  - Once appropriate depths are achieved the likelihood of increasing oyster habitat is high
  - Potential increase is 22 acres



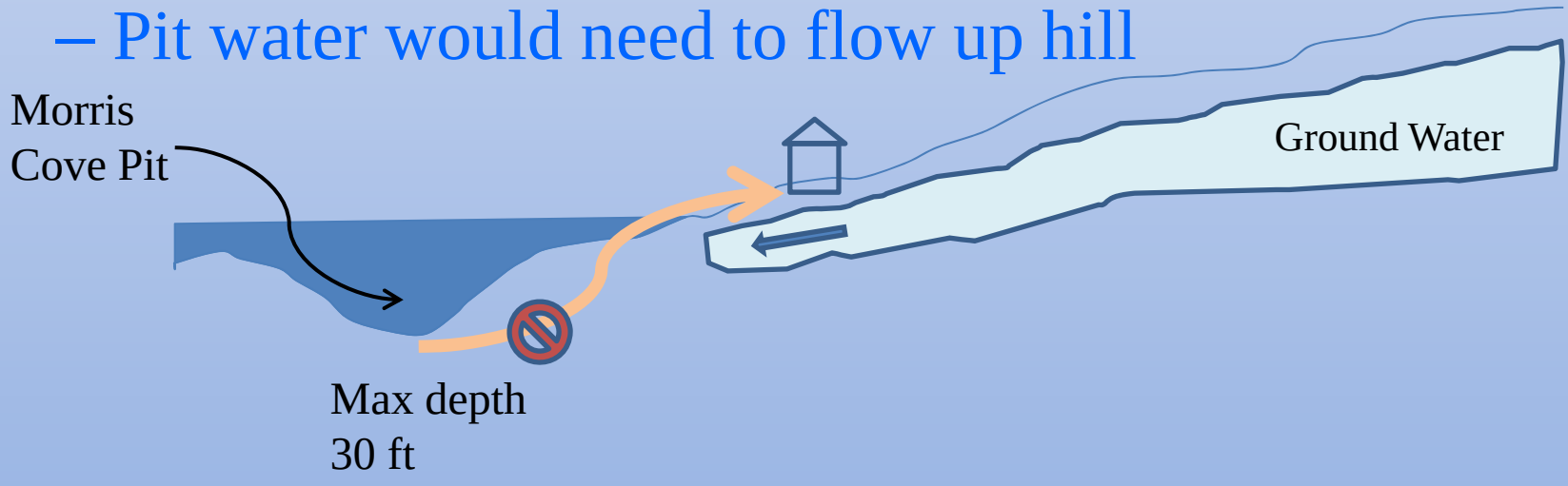
Morris Cove Borrow Pit Filling

- Improve Benthic Habitat
  - Data show that benthic communities are less populated in the pit than reference locations outside the pit
  - Returning the area to depths similar to the surrounding bottom has very strong potential to improve habitat quality

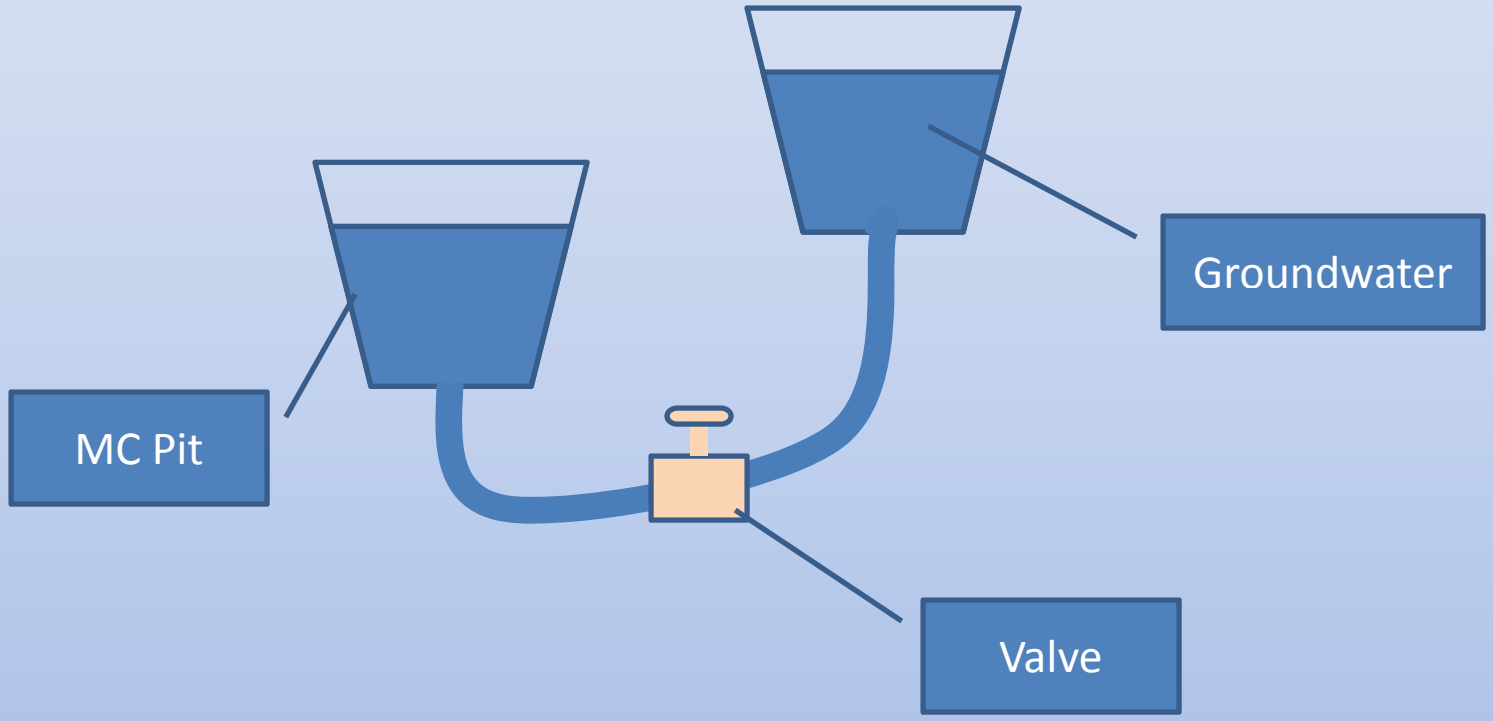
Morris Cove Borrow Pit Filling

Contaminated water infiltrating residential basements concern

- Bottom of pit much lower than basements
- Hydraulic gradient will push water from land to cove
- Pit water would need to flow up hill



Basic Principle



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