

Callahan Mine Superfund Site



Public Information Meeting
For Proposed Cleanup Plan
July 9, 2009



1:24,000 scale digital topographic map
obtained from Maine Office of GIS at
<http://apollo.gis.state.me.us/catalog>



Prepared/Date: BRP 06/04/09 Checked/Date: SWR 06/04/09

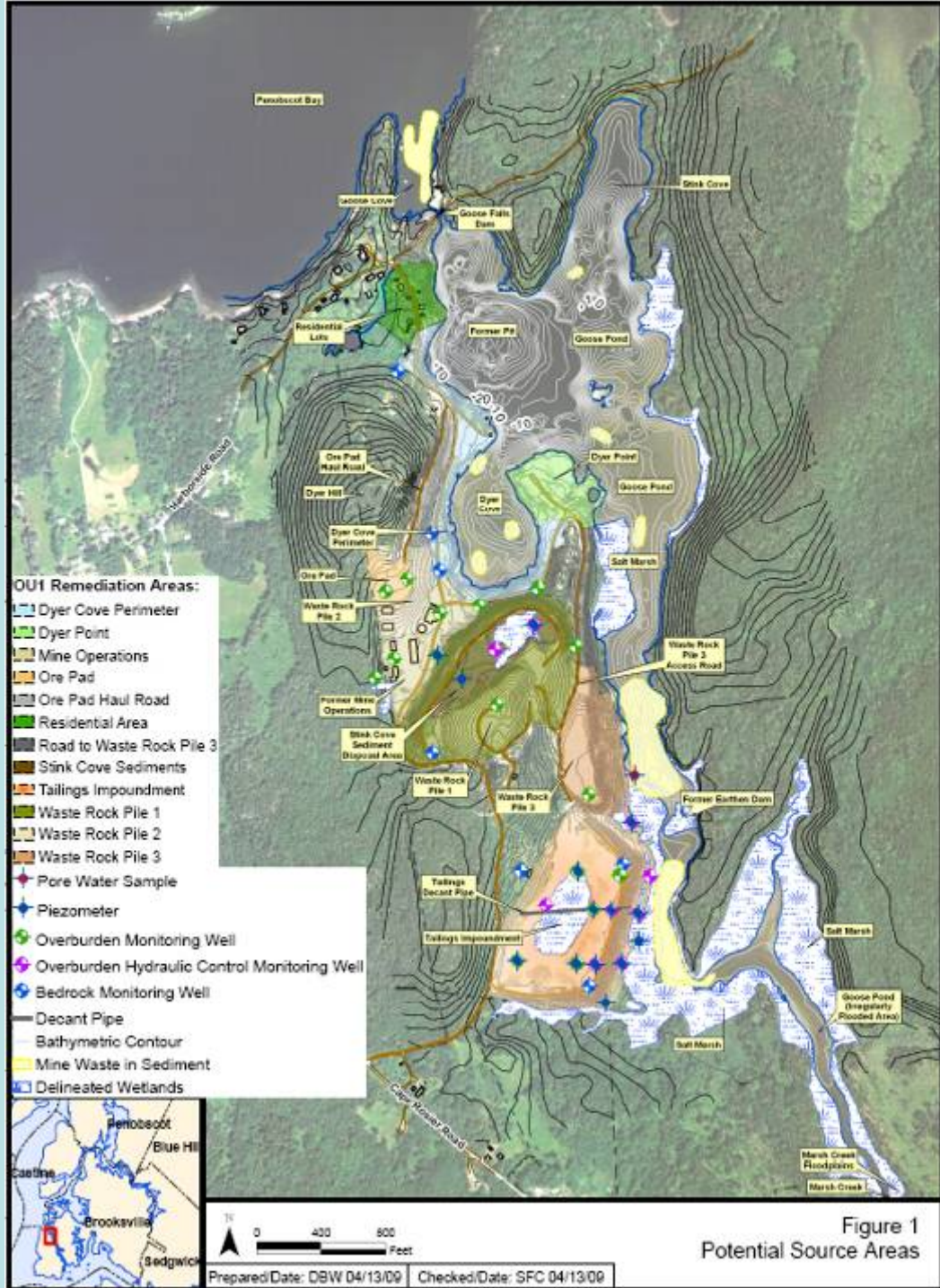
Callahan Mine Superfund Site
Brooksville, Maine
MACTEC, Inc.

Figure 1
Site and Study Areas



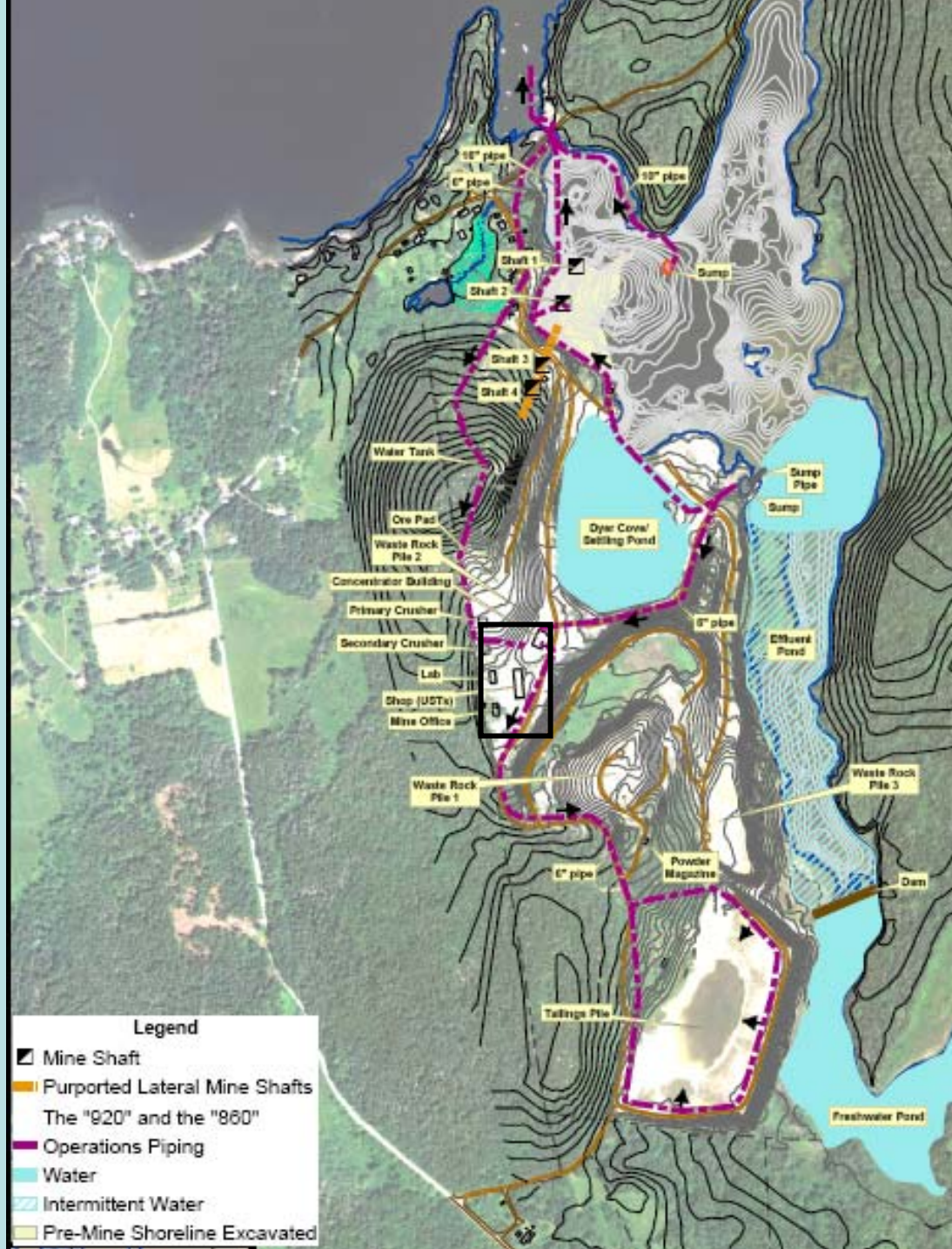
RI Summary

- Focus Areas
 - Soil/waste material
 - Residential properties and access roads
 - Forested areas surrounding waste areas (Halo - 550 acre study area)
 - Waste piles and former operational areas
 - 75 acres
 - Sediments and Surface water
 - Goose Pond (75 acres)
 - Dyer Cove (8 acres)
 - South Goose Pond mine waste area (10 acres)
 - Goose Pond remainder (57 acres)
 - Salt Marsh (23 acres)
 - Salt marsh with mine waste (7 acres)
 - Goose Cove (4 acres)
 - Cove area with mine waste (1.5 acres)
 - Cove area without mine waste (2.5 acres)
 - Groundwater
 - Off-site Residential wells
 - On-site monitoring wells

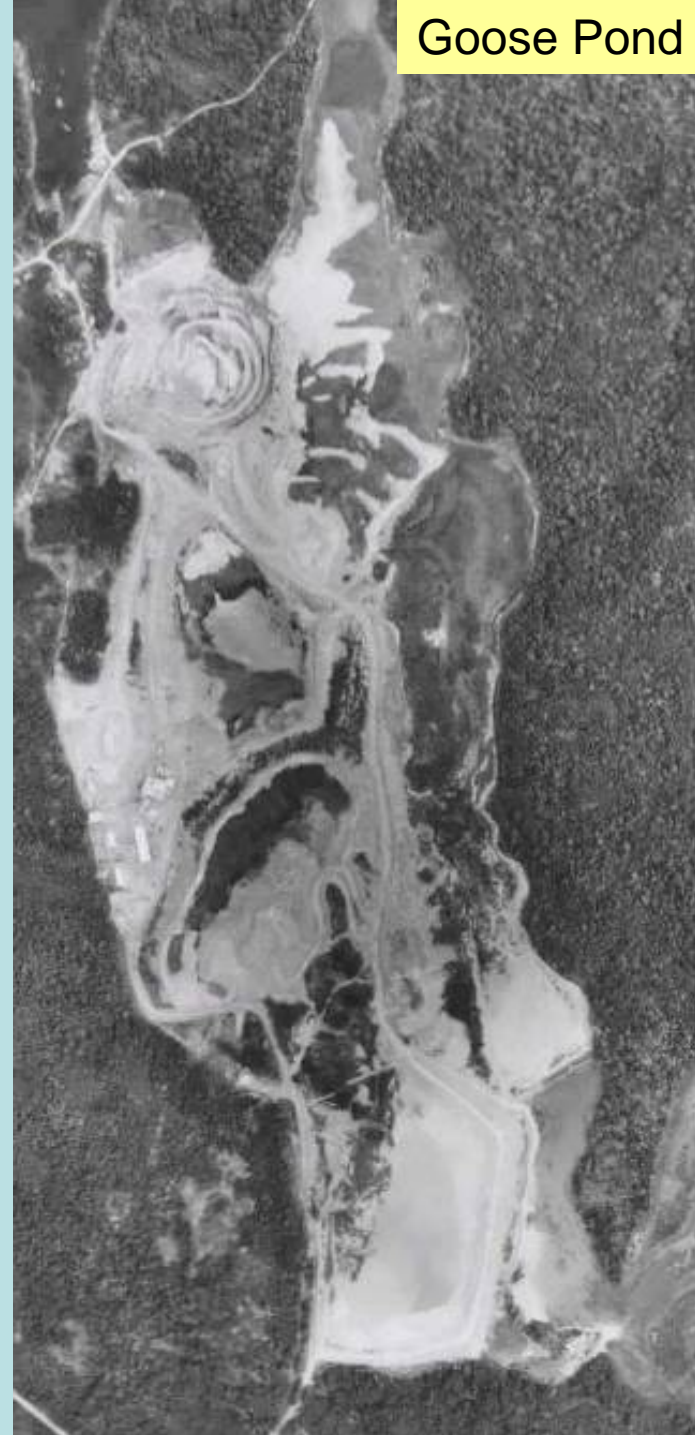


Historic Operational Areas and Waste Disposal

- Highest levels of contamination are associated with former operational features or waste disposal areas:
 - Operational features
 - Ore Pad
 - Mine Facilities
 - Settling Pond
 - Discharge effluent area
 - Waste Disposal
 - Waste Rock Piles
 - Tailings Pile
 - Access Roads



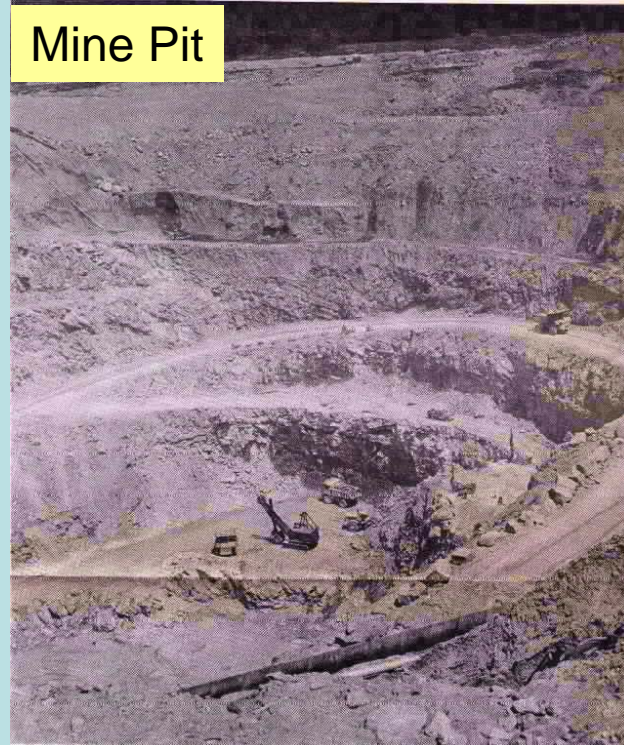
Goose Pond 1971



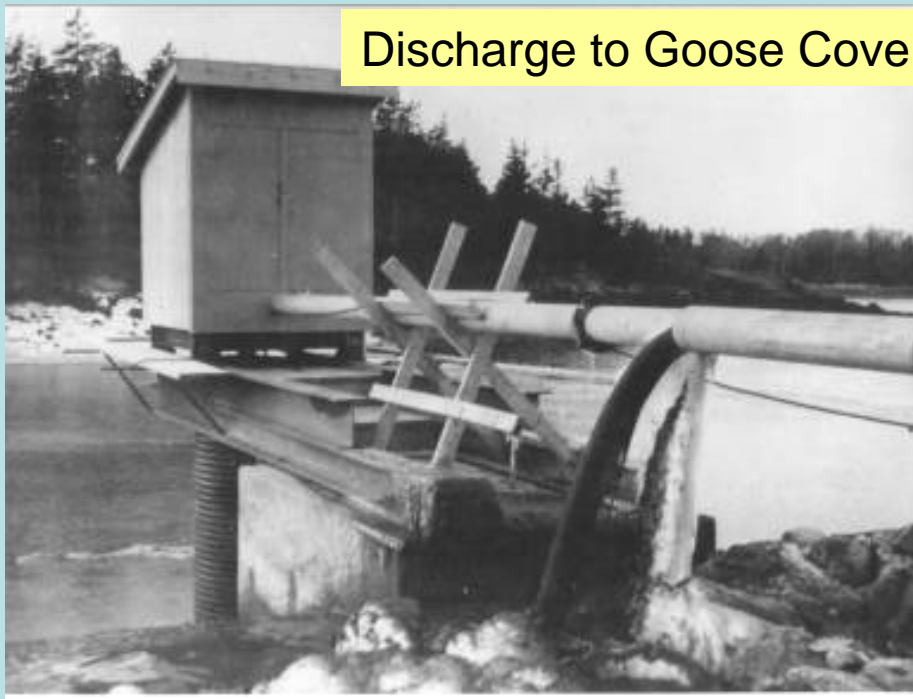
Mine Pit



Mine Pit



Discharge to Goose Cove



Tailings Impoundment

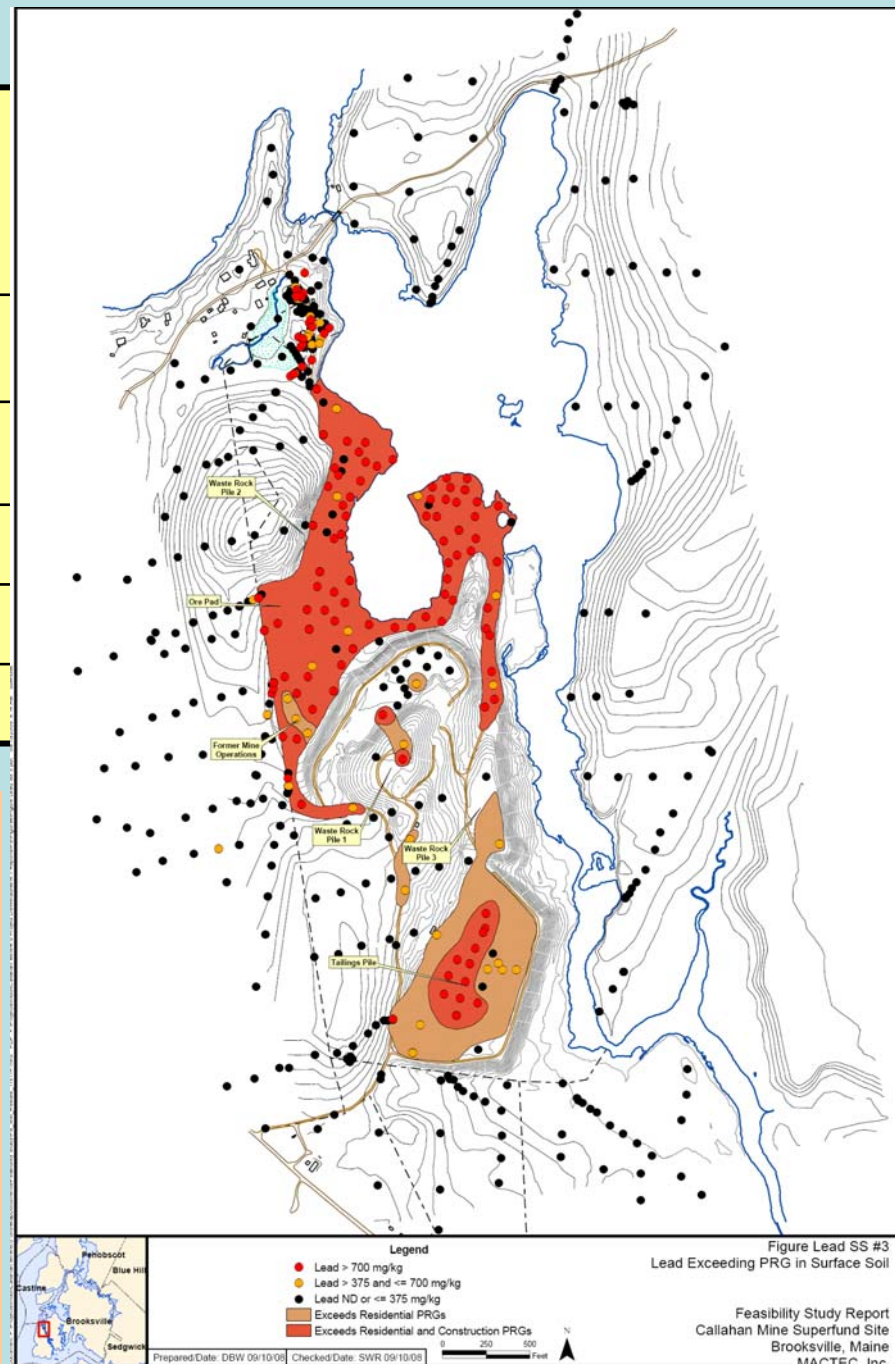


RI Soil and Waste Material Summary

Source Area	Halo Areas 95% UCL of mean (mg/kg)	Source Areas 95% UCL of mean (mg/kg)	Acceptable level for human contact (mg/kg)	Acceptable level for ecological health (mg/kg)
PCBs	Not detected	655	1	1
Arsenic	12	65	14* (background)	20
Copper	108	4,046	650	536
Lead	79	1,520	375	1,240
Zinc	260	12,501		792

Conclusions (RI, HHRA, and BERA):

- Arsenic, copper, lead, and zinc were detected at concentrations higher than surrounding areas.
- PCB were detected in former operations area at levels are unsafe for human contact.
- Lead and arsenic would be unsafe for residential level contact but acceptable for occasional visits.
- Area outside source areas (Halo area) does not contain contaminants above levels of concern.
- Waste material is a source of groundwater, sediment, and surface water contamination.



SS-7191
SS-7192

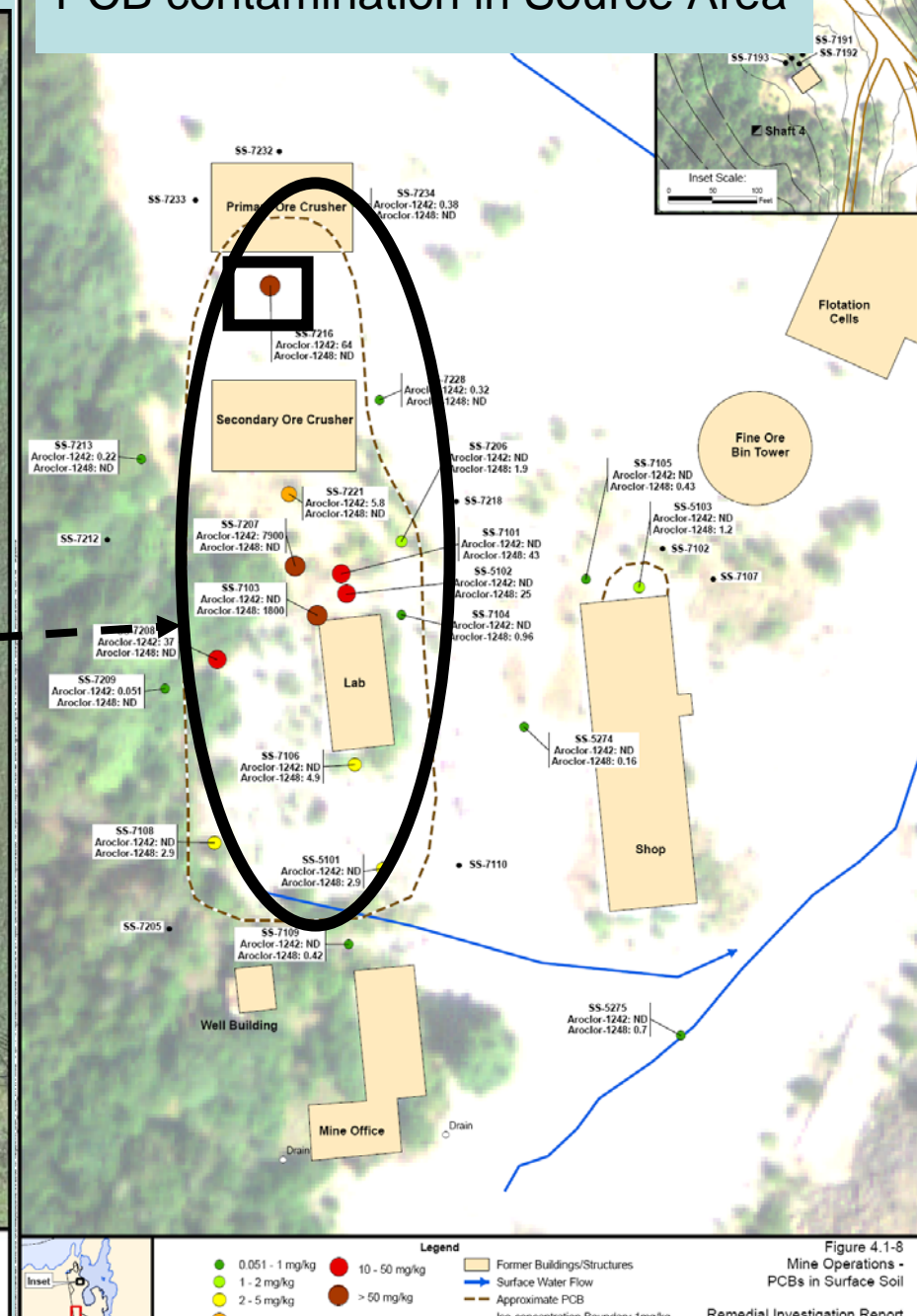


Figure 4.1-8

Legend

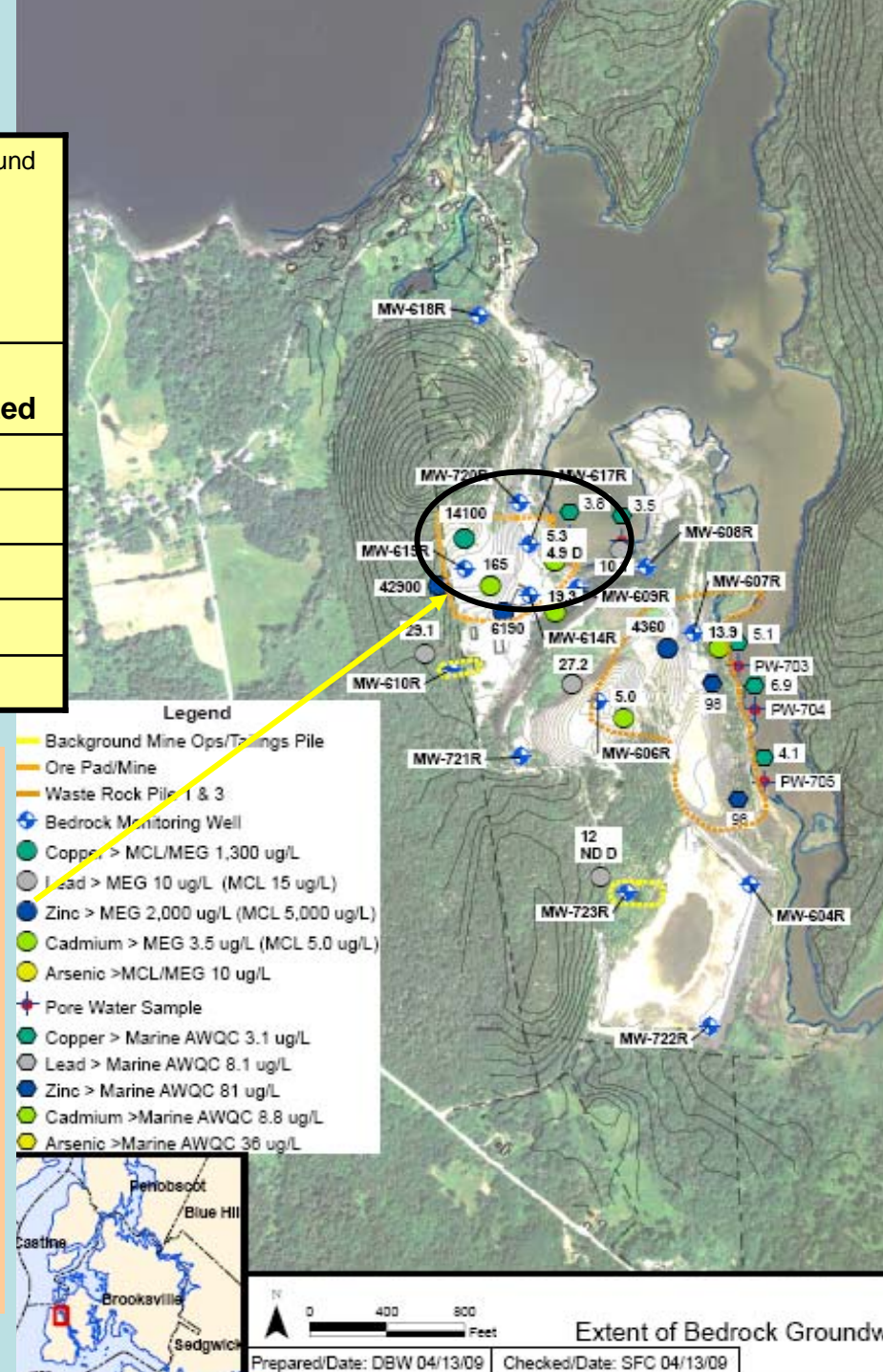
- 0.051 - 1 mg/kg
- 1 - 2 mg/kg
- 10 - 50 mg/kg
- Former Buildings/Structures
- Surface Water Flow
- Mine Operations - PCBs in Surface Soil

RI Groundwater Summary

	Site bedrock groundwater (ug/l)	EPA safe drinking water level (MCL) or risk advisory (ug/l)	Maine Maximum Exposure Guideline (MEG) (ug/l)	Background (ug/l)
Arsenic	5	10	10	Not detected
Cadmium	165	5	3.5	3
Copper	14,100	1,300	1,300	84
Lead	13	15	10	
Manganese	9,750	300	500	74
Zinc	42,900		2,000	717

Conclusions (RI and HHRA):

- Bedrock groundwater has been impacted by leaching from mine waste rock.
- Most significant contamination is in the vicinity of the former Ore Pad.
- Groundwater discharges to Goose Pond.
- Groundwater above EPA and Maine criteria is unsuitable for use as a water supply.



Ore Pad



Ore Pad



800
Feet

Extent of Bedrock Groundw

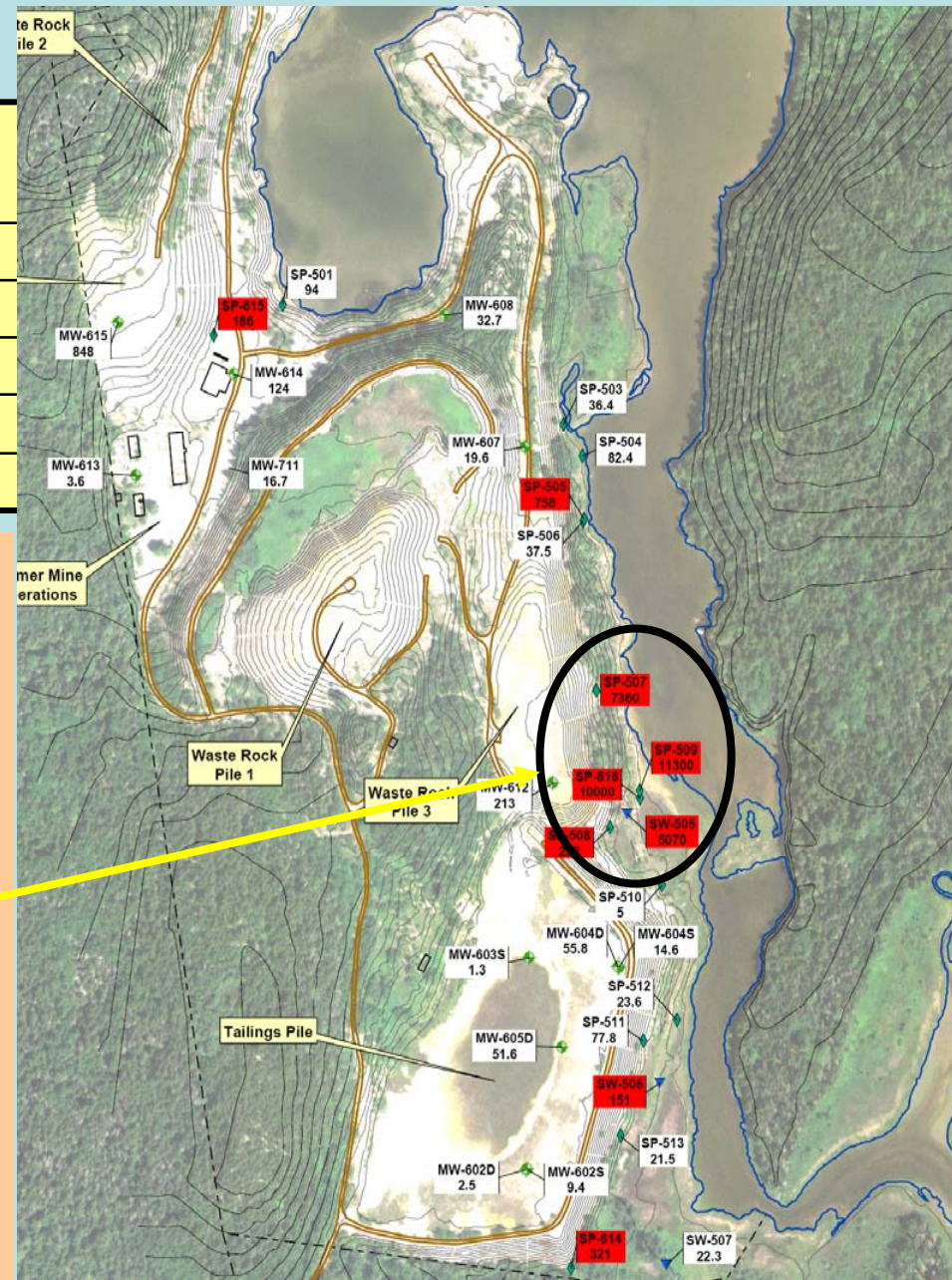
W 04/13/09 Checked/Date: SFC 04/13/09

RI Surface water Summary

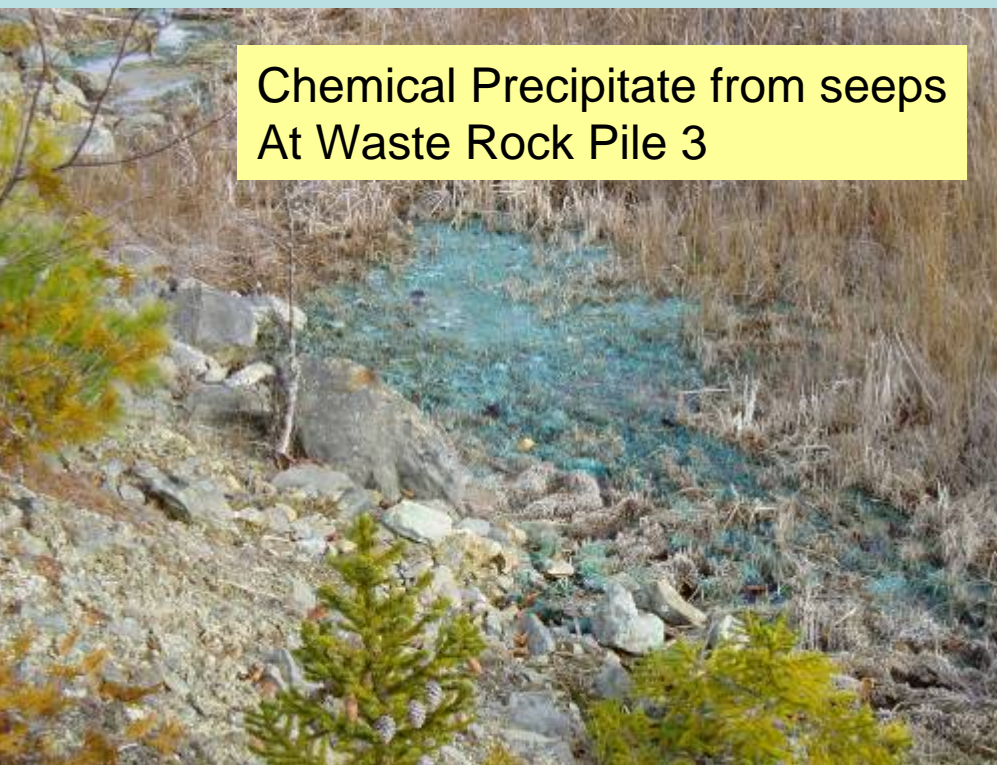
	Surface water – Goose Pond (ug/l)	Surface water – seeps (ug/l)	Ecological water quality criteria (ug/l)
Cadmium	3	854	9
Copper	59	11,300	3
Lead	5	178	8
Manganese	200	8,050	
Zinc	524	172,000	81

Conclusions (RI, HHRA and BERA):

- No human health threat was identified from exposure to surface water.
- Concentrations of copper and zinc were detected in Goose Pond above water quality criteria. This could cause an adverse impact on aquatic organisms.
- Concentrations of cadmium, copper and zinc in the seeps from the waste rock piles (WRP- 3) and tailings pile were two orders of magnitude above acceptable criteria.
- Significant dilution occurs as the seeps mix with Goose Pond, therefore Goose Pond surface water concentrations will vary with tides.



Chemical Precipitate from seeps
At Waste Rock Pile 3



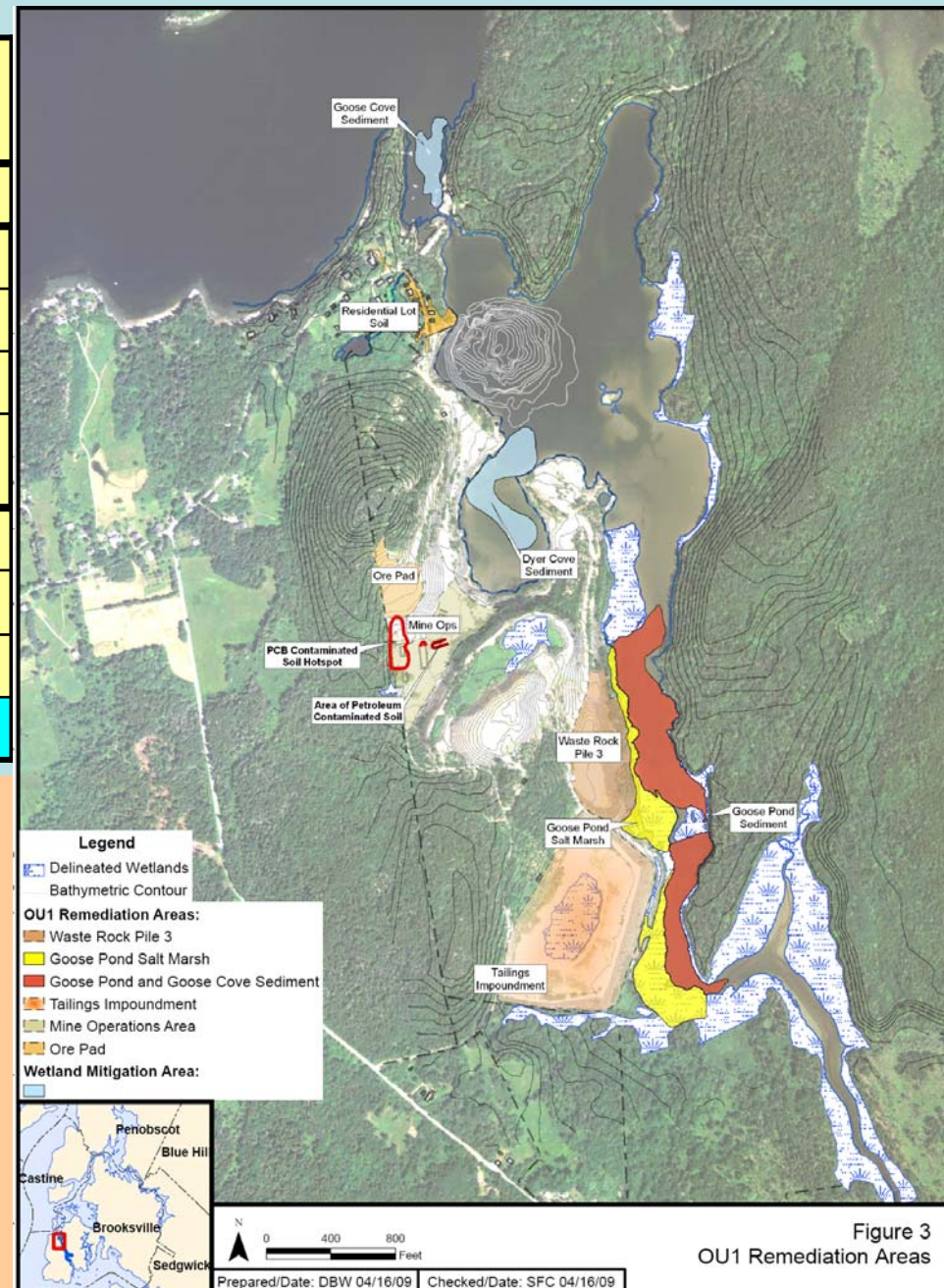
Waste Rock Pile 3

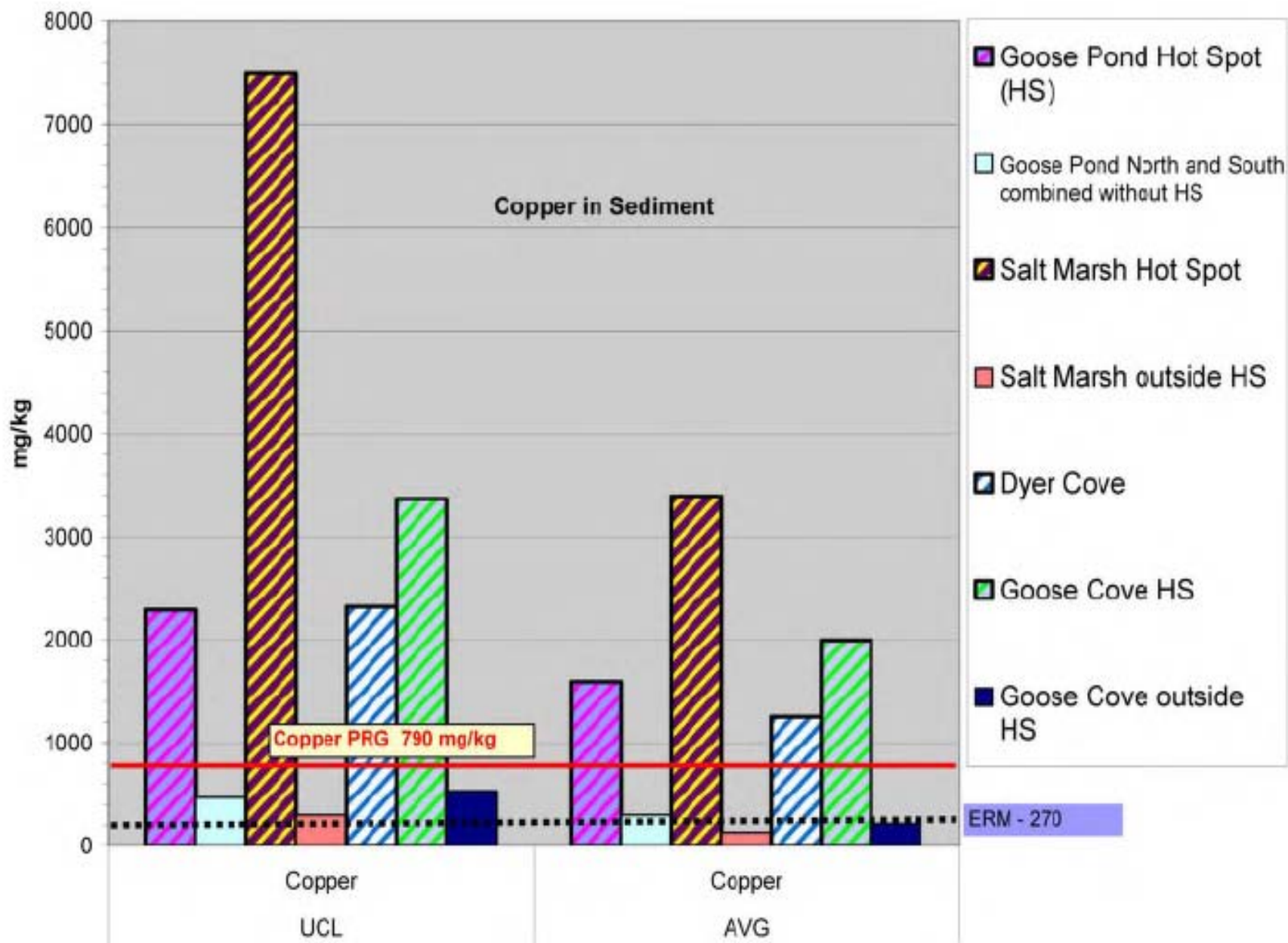


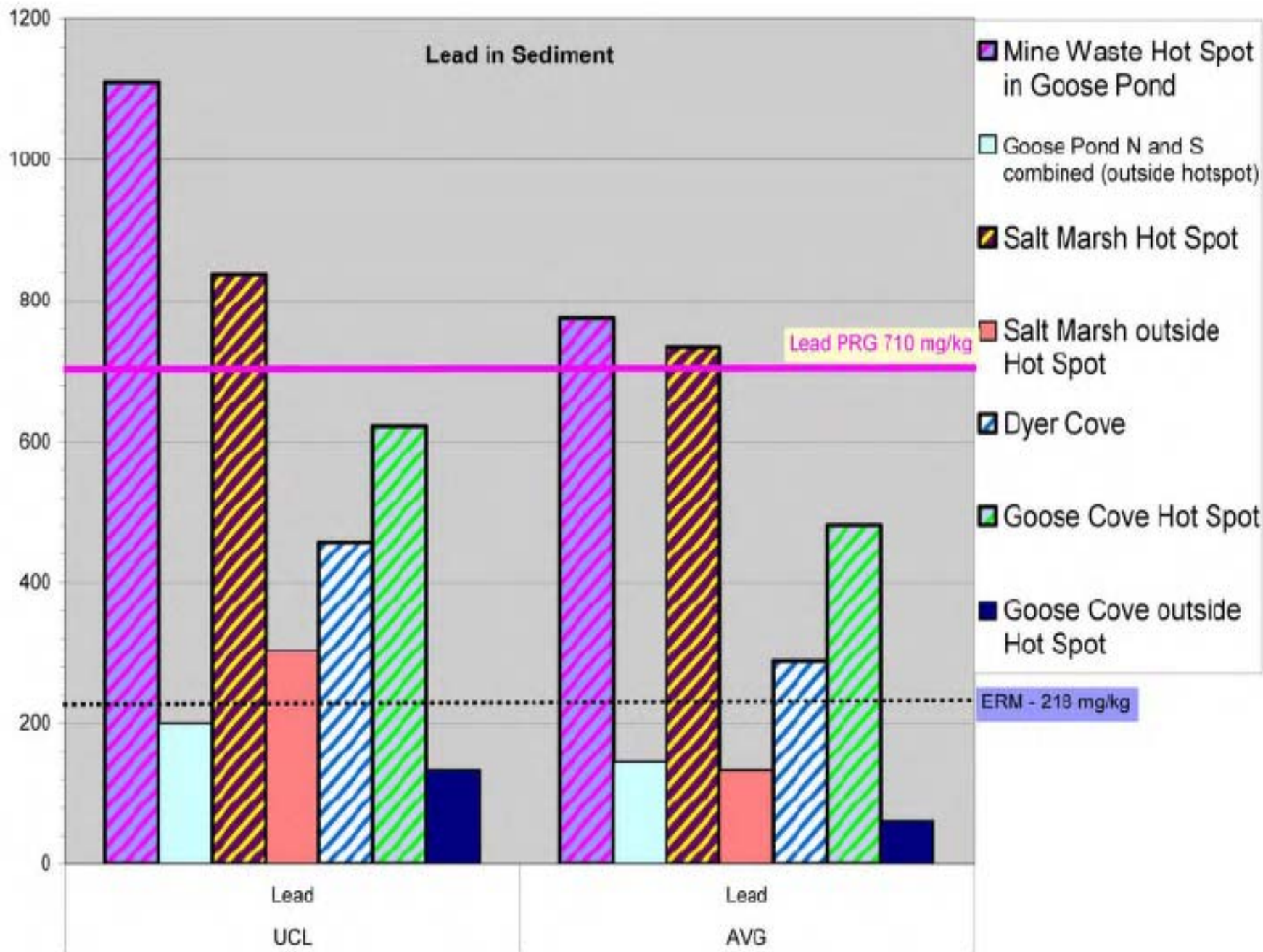
RI Sediment Results

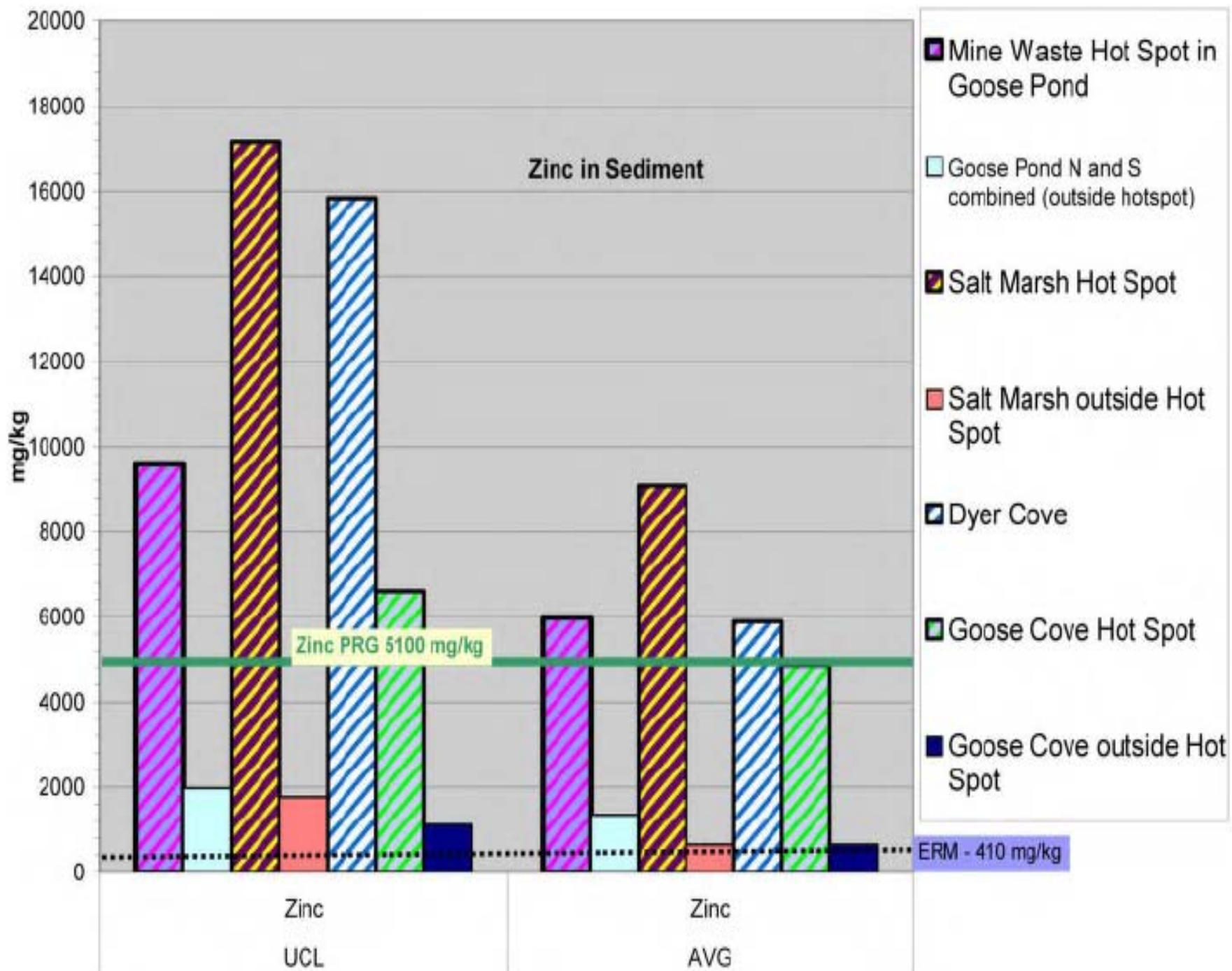
All concentrations are the estimated 95% upper confidence limit of the mean in milligrams per kilogram	Copper (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)
Site specific cleanup threshold	790	710	5,100
Goose Pond Hot Spot (red)	2,228	1,110	9,801
Salt Marsh Hot Spot (yellow)	7,498	837	17,161
Dyer Cove (light blue)	2,316	457	15,635
Goose Cove Hot Spot (light blue)	3,370	622	6,607
Remainder of Goose Pond	464	200	1,979
Remainder of Salt Marsh	296	303	1,773
Remainder of Goose Cove	523	133	1,111
Background	23	32	368

- All sediment areas contain contaminants above background.
- Concentrations of copper, lead, and zinc were found to be among the highest along the entire Gulf of Maine (Cape Cod, MA to New Brunswick, Canada).
- Worst copper, lead, and zinc sediment contamination is limited to four “hot spot” areas associated with either mine pit dewatering activities (Dyer Cove, Goose Cove) or discharge from the tailings pile (Salt Marsh and southern Goose Pond).



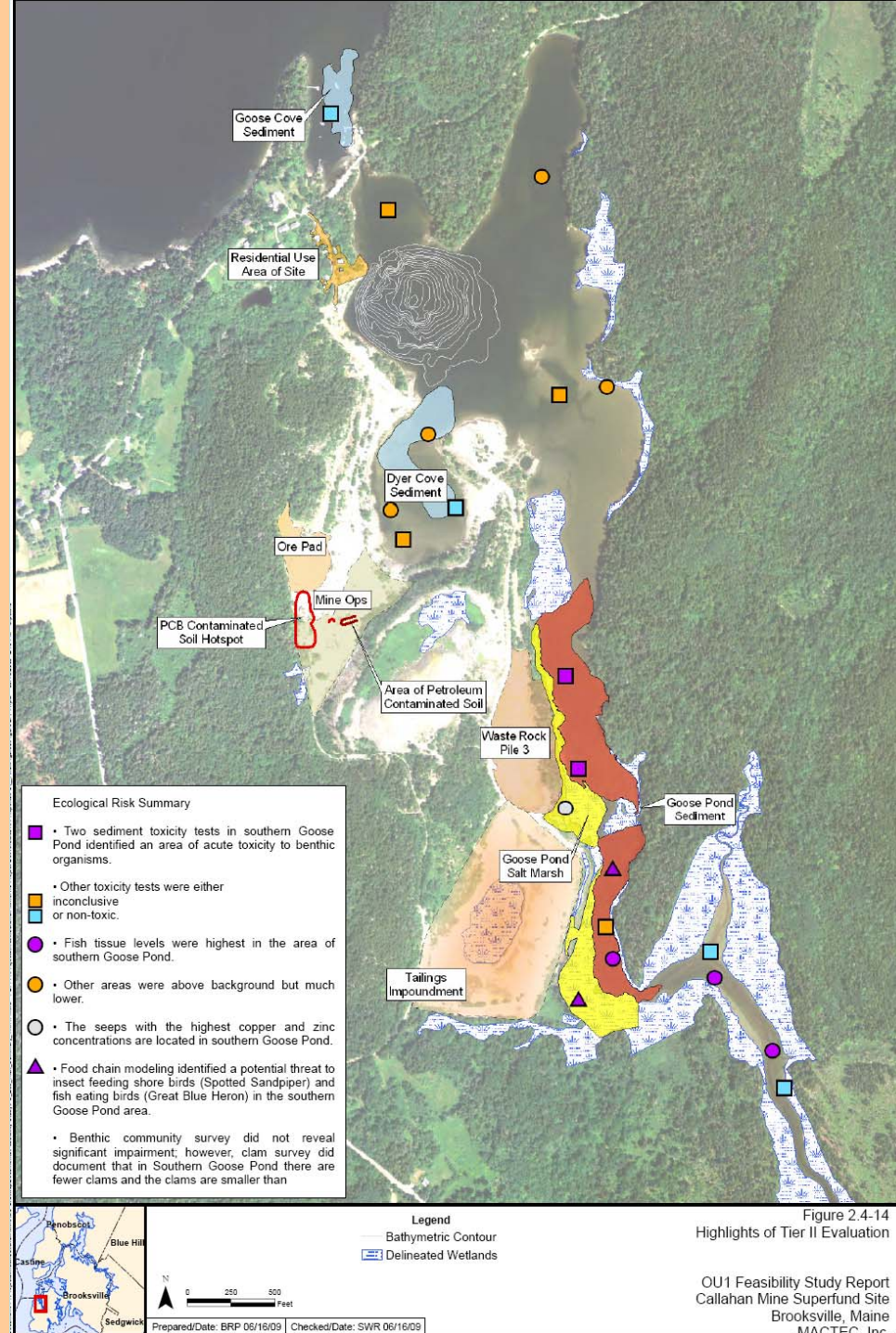






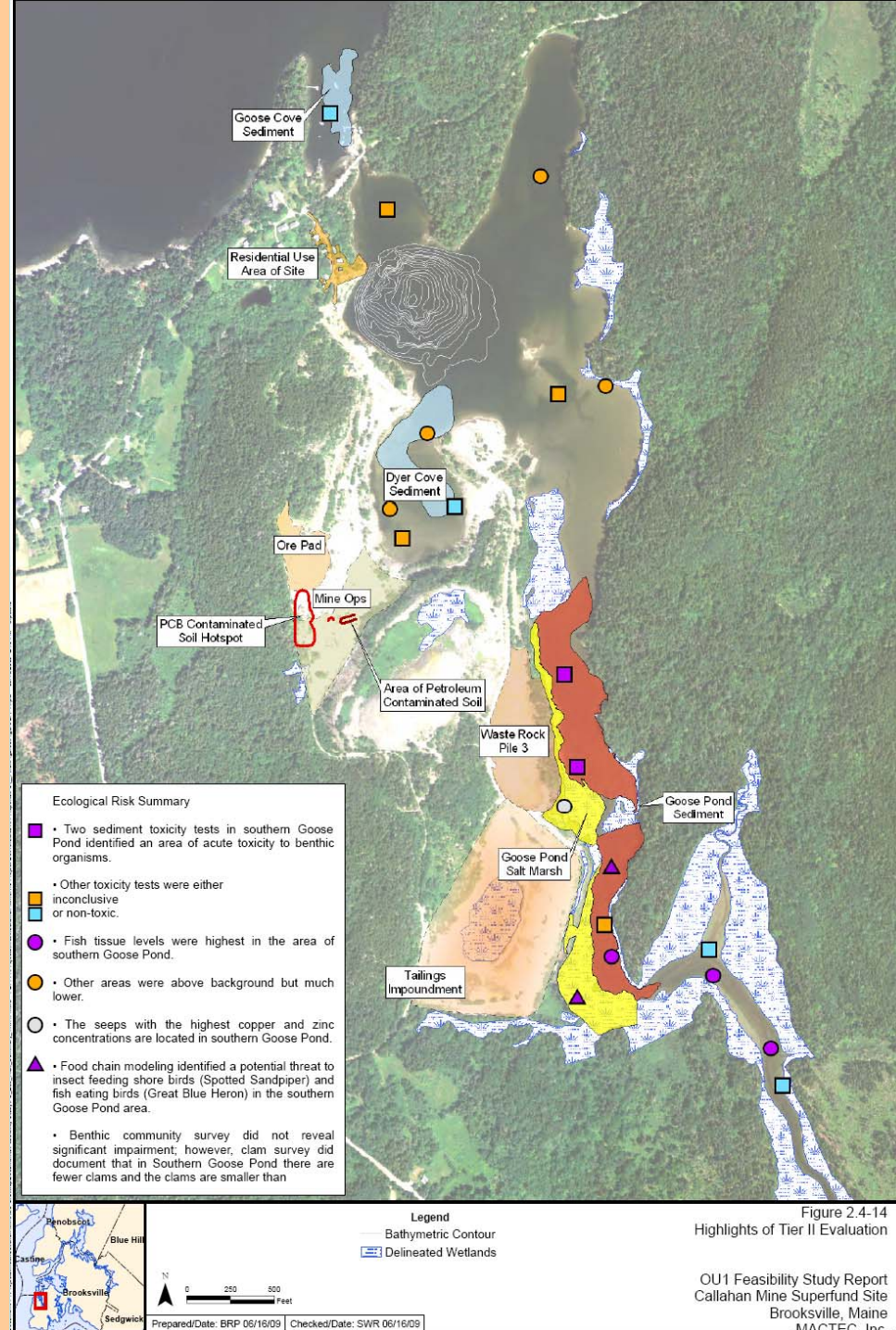
Why is EPA Proposing a Cleanup Action for OU1 Action

- Current residential use area contains mine waste/soil with lead and arsenic above levels acceptable for long-term exposure.
- PCBs in Mine Operations area are above levels acceptable for human contact.
- Ore Pad is the most significant source of groundwater contamination.
- Ore Pad and Mine Operations Area contribute to surface water contamination.
- Tailings Impoundment dam does not meet acceptable stability criteria.



Why is EPA Proposing a Cleanup Action for OU1 Action

- Seeps from Waste Rock Pile #3 and Tailings Impoundment contain concentrations of copper and zinc well above levels considered acceptable for aquatic biota.
- The sediments in southern Goose Pond contain mine waste and very high levels of copper, lead, zinc. The area represents a threat to the biota of Goose Pond due to:
 - Acute toxicity demonstrated in toxicity testing at two of three locations in this area;
 - Food chain modeling that identified a potential threat to insect feeding shore birds (Spotted Sandpiper) and fish eating birds (Great Blue Heron) in this area; and
 - Elevated levels of copper, lead, and zinc in the tissue of clams and fish in this area.



Feasibility Study

Remedial Action Objectives

OU1 Remedial Action Objectives:

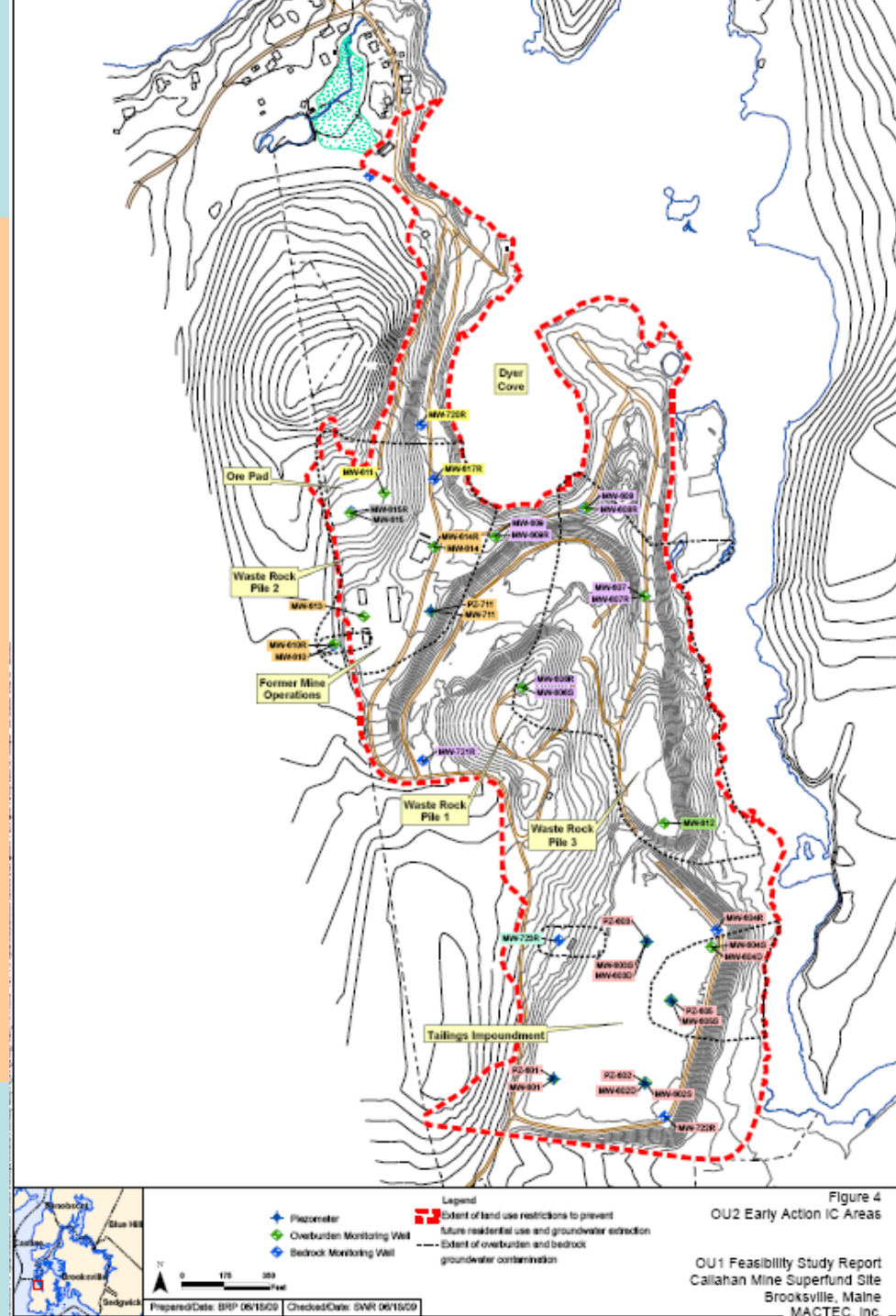
- Prevent contact now and in the future with soil or waste containing PCBs above the residential and recreational cleanup levels.
- Prevent contact now and in the future with soil or waste containing lead or arsenic above the residential cleanup levels in the residential use area of the Site.
- Prevent exposure of biota to sediment, including the sediment/soil in the salt marsh, with concentrations of copper, lead, or zinc that may represent a threat to insectivorous and piscivorous birds, fish, and other aquatic organisms.
- Minimize impacts from waste rock and tailings within the OU1 area on groundwater, surface water, and sediment.
- Stabilize the Tailings Dam to achieve acceptable stability criteria.
- Comply with the federal and state regulations that apply to the cleanup action.

Feasibility Study

Remedial Action Objectives

OU 2 Early Action Remedial Action Objectives:

- Prevent future residential use of the former Callahan Mine property portion of the Site due to the presence of lead and arsenic above levels acceptable for long-term residential exposure.
- Prevent future use of the groundwater within the former Callahan Mine property portion of the Site due to the presence of arsenic, cadmium, copper, lead, manganese, and zinc above federal or state drinking water or groundwater criteria.

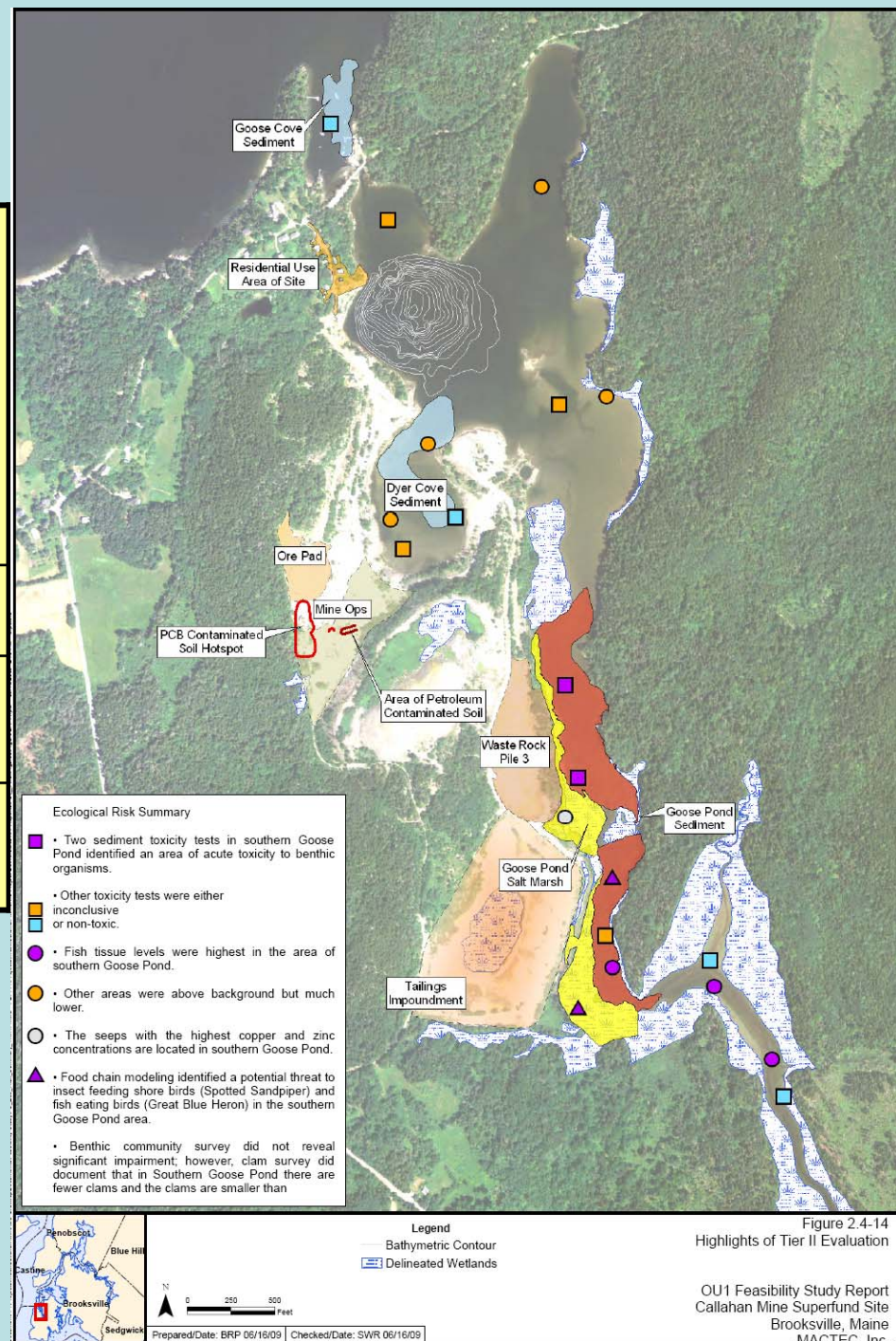


Proposed Plan

Human Health Cleanup Level

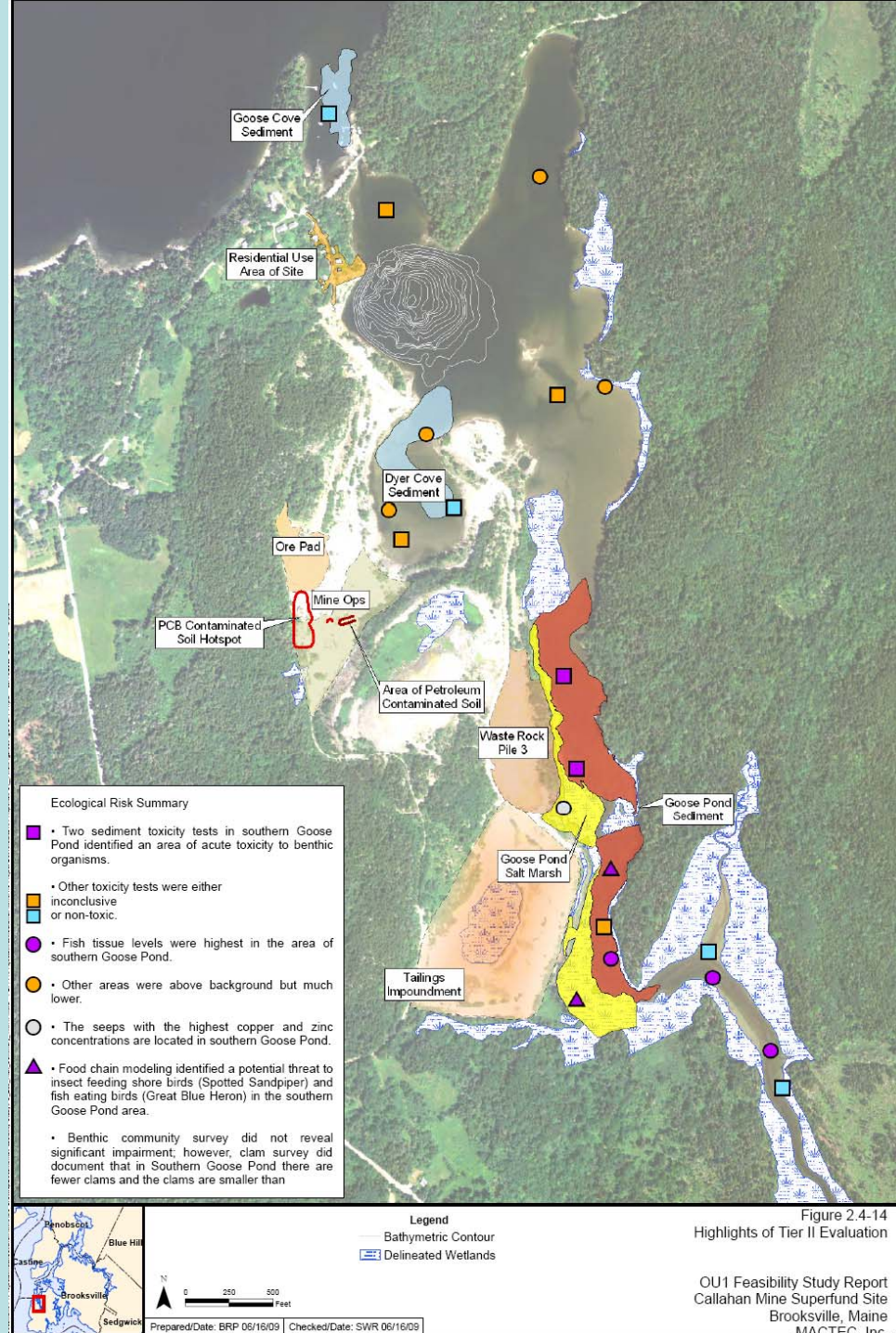
(Preliminary Remediation Goals - PRGs)

	Cleanup level assuming future residential use of Site (150 days per year) (mg/kg)	Cleanup level assuming future recreational use of Site (52 days per year) (mg/kg)	Basis
PCBs	1	1	Risk based level and TSCA
Lead	375	700	Maine Safe Lead Level and risk based
Arsenic	14	30	Background level and risk based



Proposed Plan Eco Cleanup Levels

Eco Wetland soil/ sediment PRGs	Cleanup level safe for ecological receptors Mg/kg	Basis
Copper	790	Food chain modeling to protect birds
Lead	710	Food chain modeling to protect birds
Zinc	5,100	Benthic community impacts



Feasibility Study Screening Process

Waste	Cleanup approaches retained for consideration	Notes	Cleanup approaches rejected for consideration	Notes
PCBs	Off-site disposal	Small volume is well suited for permanent removal from Site and disposal at appropriate facility	On-site disposal in cap or placement in mine pit (CAD cell)	Would require area with PCBs to be designated a toxic waste area and would leave PCBs on-site
Tailings	Cap in place	Effective and would comply with ARARs	Off-site disposal or placement in mine pit (CAD cell)	Quantity of material too high to re-locate, some material would be difficult to move
Lead and arsenic soil/waste and other source material	Cap on site or subaqueous disposal in mine pile (CAD cell)	Both are effective and would comply with ARARs	Off-site disposal	Quantity of material too high to re-locate off-site due to traffic, road and cost issues.

Feasibility Study Screening Process

Waste	Cleanup approaches retained for consideration	Notes	Cleanup approaches rejected for consideration	Notes
Sediments	Dredge and subaqueous disposal in mine pit (CAD cell)	Effective and would comply with ARARs	In-situ capping or Monitored Natural Recovery	In-situ capping would not be effective due to site hydrology. Natural recovery would require hundreds of years.
Seeps	Passive wetland treatment for horizontal drain	Good for reducing contaminant levels, best with consistent flow and concentration.	Passive wetland treatment of all discharge from Tailings Impoundment, WRP-3, or both	Large area needed for passive wetland treatment, effectiveness uncertain, maintenance costs may be high, implementability concerns regarding size.

Basic Components of Alternatives	CMS1 – No Action	<u>Alternative CMS2 –</u> Capping of Tailings Impoundment; Off-Site Disposal of PCB and Petroleum Contaminated Soil; Subaqueous Disposal of Source Area Material (from the Ore Pad, Mine Operations Area, and WRP-3), Residential Use Area Soil, and Sediment in a Confined Aquatic Disposal (CAD) cell in the Former Mine Pit	<u>Alternative CMS3 –</u> Capping of Tailings Impoundment; Off-Site Disposal of PCB and Petroleum Contaminated Soil; Capping of Source Area Material (from the Ore Pad, Mine Operations Area, WRP-3), and Residential Use Area Soil; and Subaqueous disposal of Sediment in a Confined Aquatic Disposal (CAD) cell in the Former Mine Pit
Waste Rock Pile 3	No action	Excavation and subaqueous disposal in confined aquatic disposal (CAD) in mine pit	Excavate and cap on site near WRP1
Ore Pad	No action	Excavation and subaqueous disposal in confined aquatic disposal (CAD) in mine pit	Excavate and cap on site near WRP1
Mine Operations Area –PCBs and Petroleum waste	No action	Excavate and dispose off site	Excavate and dispose off site
Mine Operations Area – other	No action	Excavation and subaqueous disposal in confined aquatic disposal (CAD) in mine pit	Excavate and cap on site near WRP1
Residential soil with arsenic and lead	No action	Excavation and subaqueous disposal in confined aquatic disposal (CAD) in mine pit or use for fill at Tailings Impoundment	Excavate and cap on site near WRP1 or use for fill at Tailings Impoundment

Basic Components of Alternatives	CMS1 – No Action	<u>Alternative CMS2 –</u> Capping of Tailings Impoundment; Off-Site Disposal of PCB and Petroleum Contaminated Soil; Subaqueous Disposal of Source Area Material (from the Ore Pad, Mine Operations Area, and WRP-3), Residential Use Area Soil, and Sediment in a Confined Aquatic Disposal (CAD) cell in the Former Mine Pit	<u>Alternative CMS3 –</u> Capping of Tailings Impoundment; Off-Site Disposal of PCB and Petroleum Contaminated Soil; Capping of Source Area Material (from the Ore Pad, Mine Operations Area, WRP-3), and Residential Use Area Soil; and Subaqueous disposal of Sediment in a Confined Aquatic Disposal (CAD) cell in the Former Mine Pit
Tailing Impoundment	No action	Low permeability cover system and surface drainage controls and stability improvements. Horizontal drain with passive wetland treatment system.	Low permeability cover system and surface drainage controls and stability improvements. Horizontal drain with passive wetland treatment system.
Sediments in southern Goose Pond and Salt Marsh	No action	Excavation and subaqueous disposal in confined aquatic disposal (CAD) in mine pit	Excavation and subaqueous disposal in confined aquatic disposal (CAD) in mine pit
Cost	Five Year Reviews	\$22.8	\$25.5

Alternative CMS3

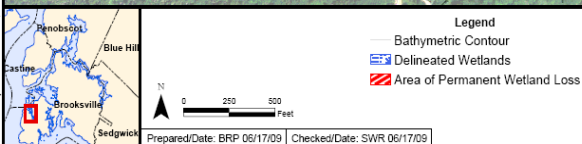
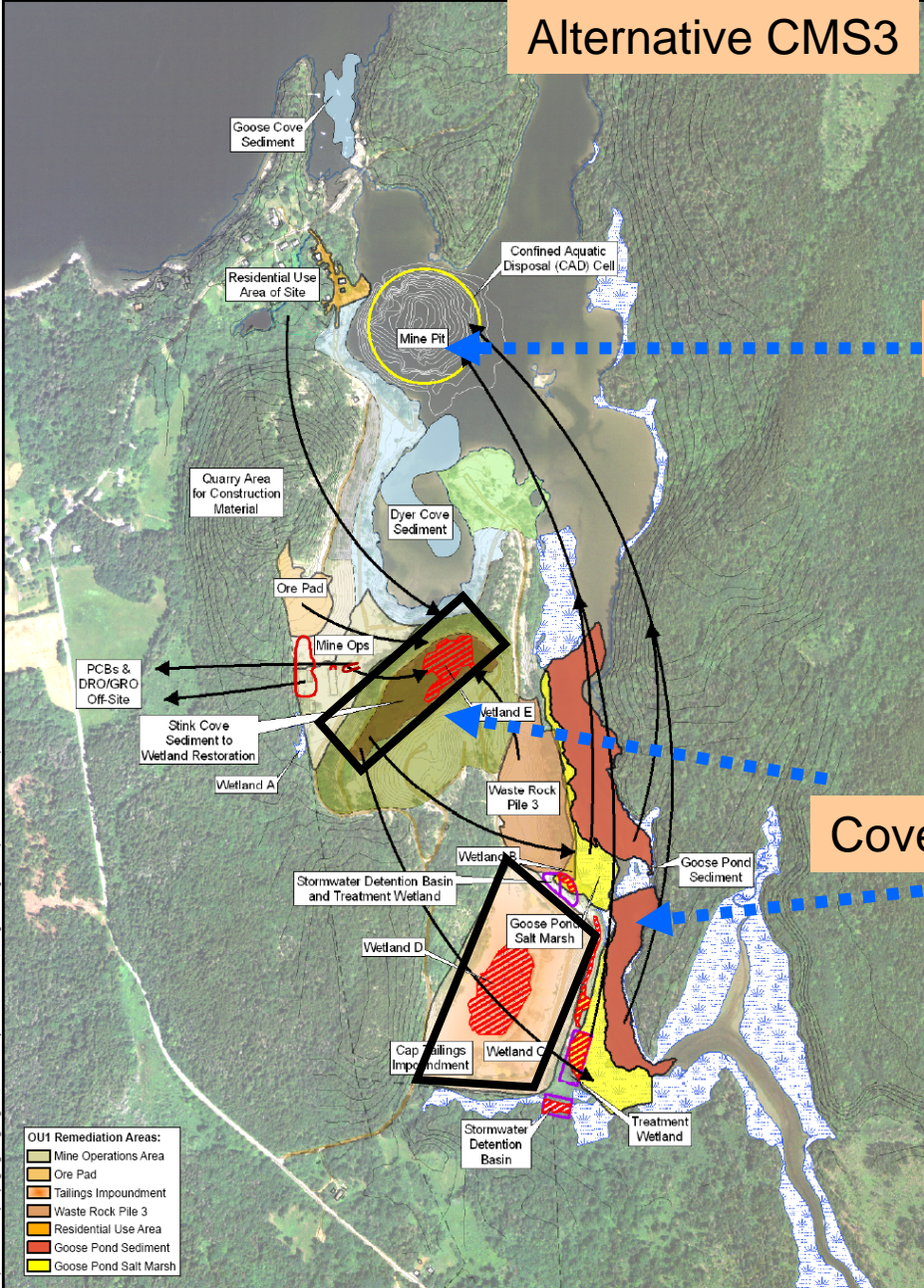


Figure 6
Alternative CMS3
Proposed Remedy Map
Callahan Mine Superfund Site
Brooksville, Maine
MACTEC, Inc.

Alternative CMS2

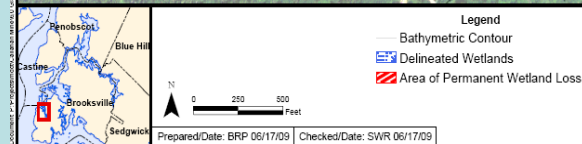
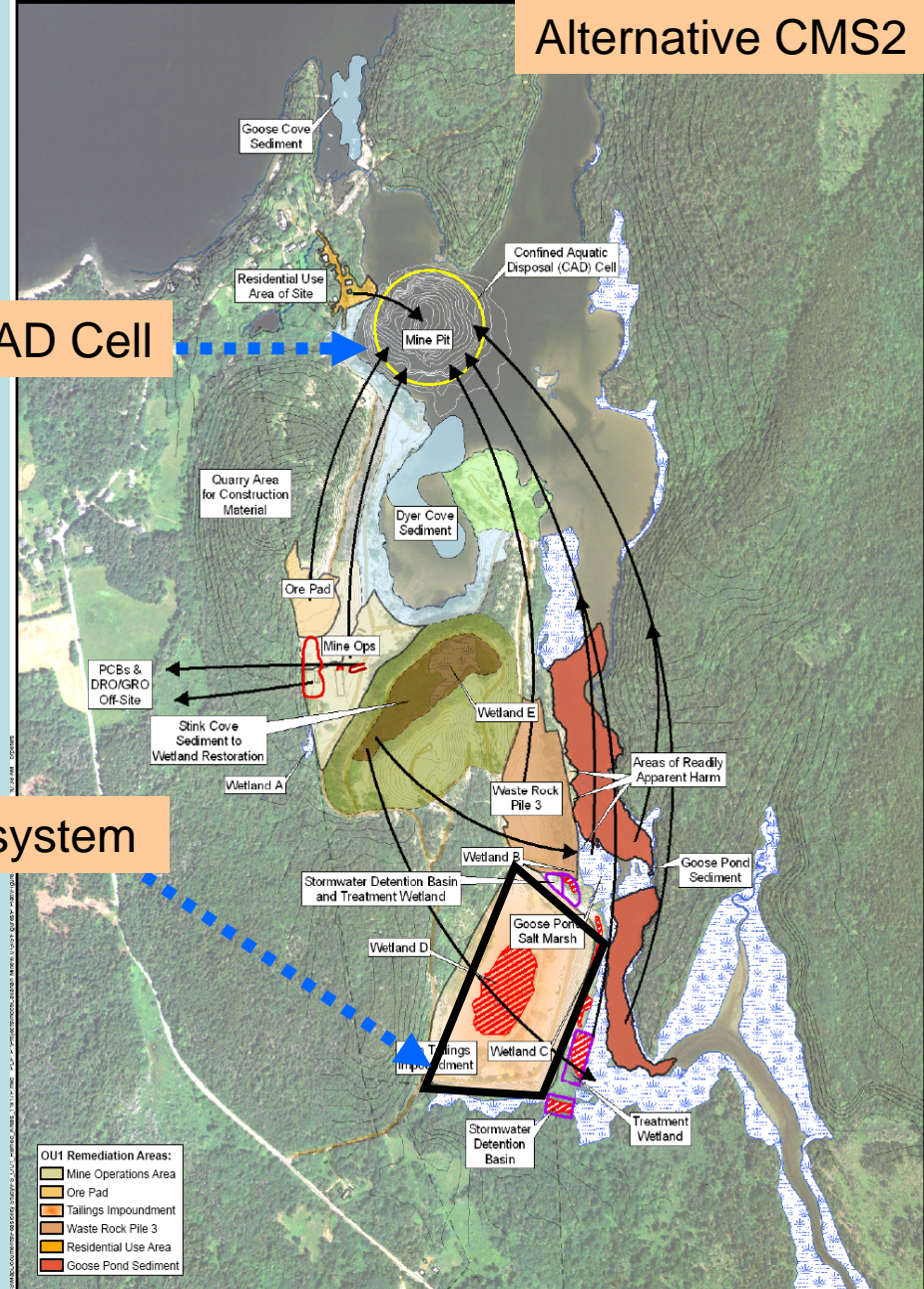
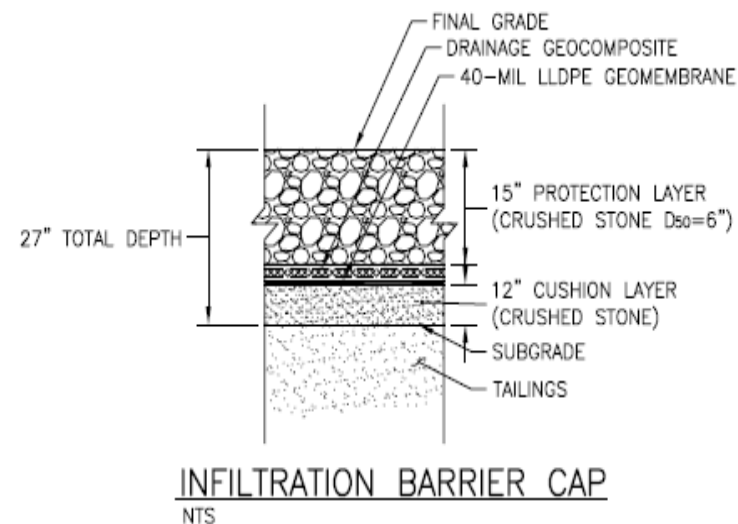
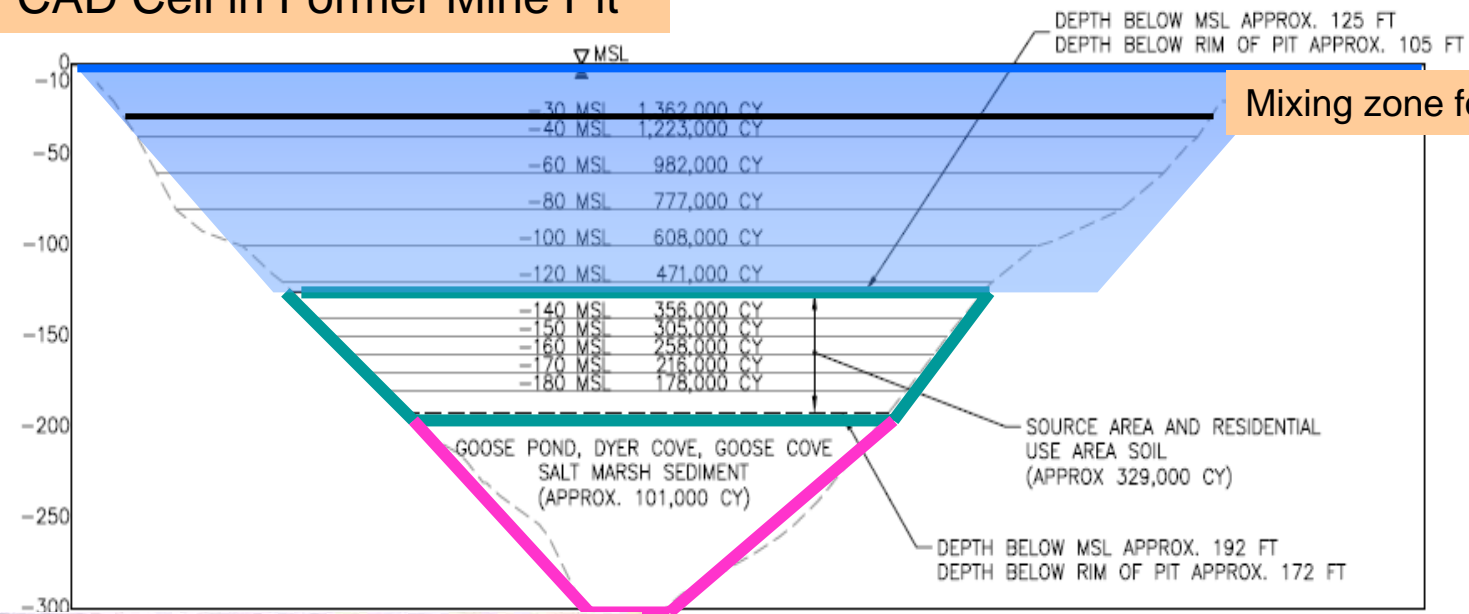


Figure 5
Alternative CMS2
Proposed Remedy Map
Callahan Mine Superfund Site
Brooksville, Maine
MACTEC, Inc.

CAD Cell

Cover system

CAD Cell in Former Mine Pit



Prepared/Date: MRS 06/04/09
Checked/Date: SWR 06/04/09

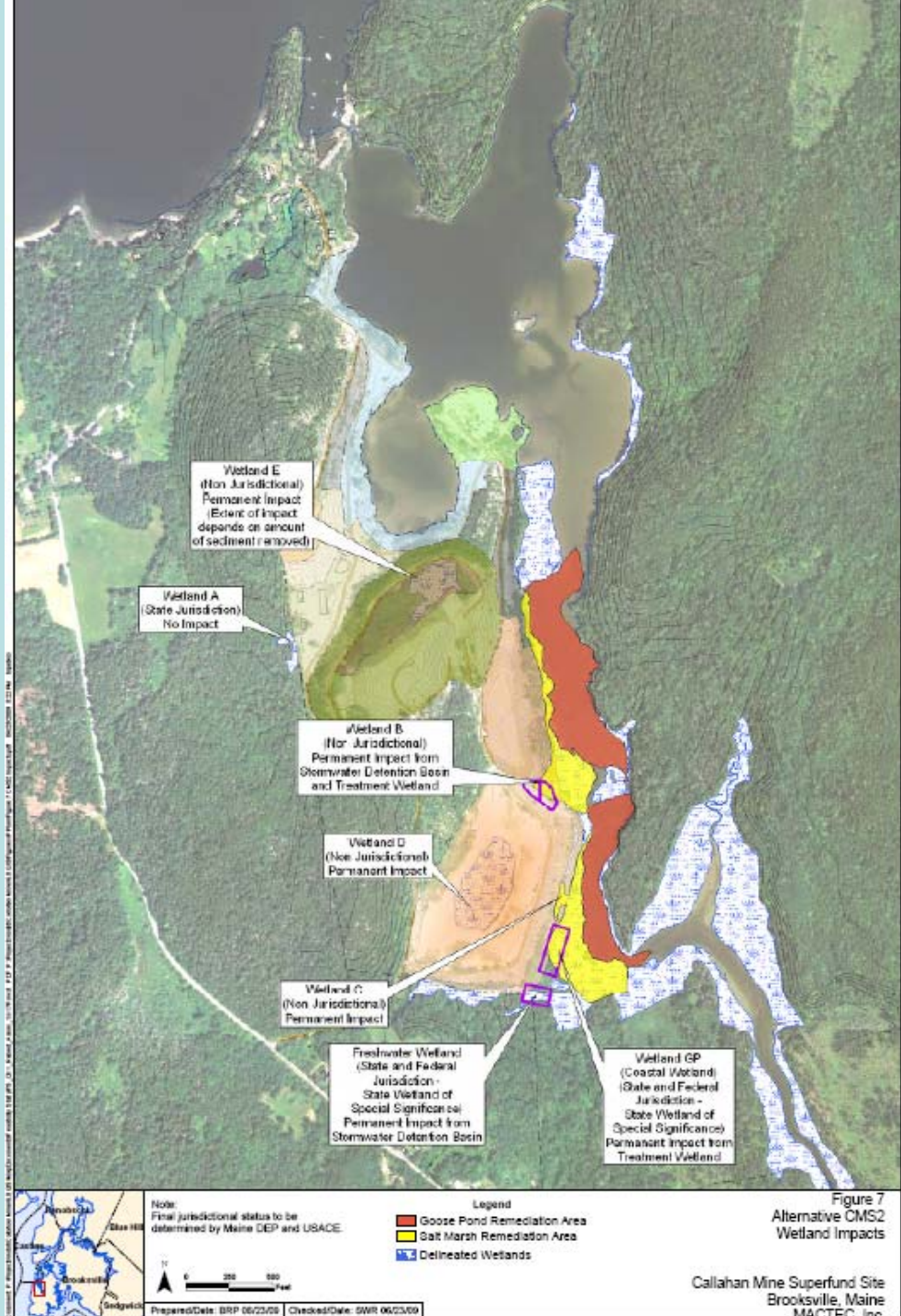
CALLAHAN MINE SUPERFUND SITE
BROOKSVILLE, MAINE

MACTEC

CAD CELL AND TAILINGS IMPOUNDMENT
COVER SYSTEM
OU1 FEASIBILITY STUDY REPORT
Project 3612-06-2047.30
Figure 8

Potential Wetland Impacts

- **Wetland A:**
 - No anticipated impacts.
- **Wetlands B and C:**
 - Short term impacts that occur during dredging and excavation will be mitigated by restoration of these areas;
 - Some permanent loss of wetlands will occur for areas required for use in the cover system drainage controls (sediment basin) and for the passive treatment wetland;
 - Wetland mitigation will be included in design and remediation to address the partial loss in Wetlands B and C.
- **Wetlands D and E:**
 - Permanent loss of entire wetland.
 - Mitigation may be required for wetland.

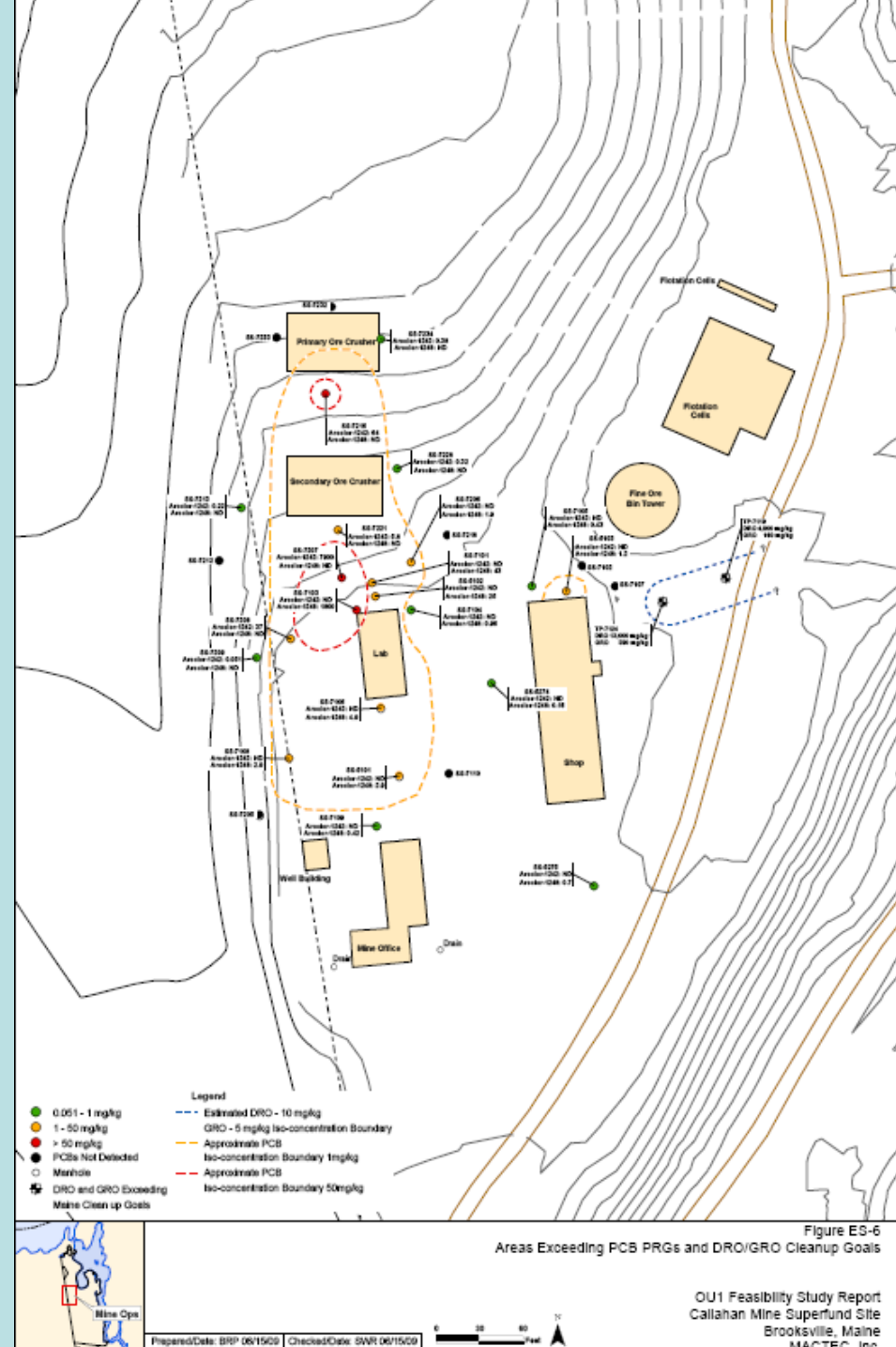


Public Notice of Potential Wetland Impacts

EPA has evaluated the requirements of the applicable regulations, including Section 404 of the Clean Water Act and **identified the proposed cleanup actions as the least damaging practicable alternative** to protect federally regulated wetland and aquatic resources from exposure to contaminated sediments and contaminated surface water.

As required by federal Executive Order 11990, entitled “Protection of Wetlands,” public comment is sought regarding the wetland impacts.

- **Public Notice of Determination that the PCB Cleanup Level is Protective of Human Health**
- EPA has made a finding under the Toxic Substances Control Act (TSCA) PCB Regulations at 40 CFR Part 761, that the cleanup level established for PCBs at this Site will be protective of human health and the environment.
- PCB proposed cleanup level of 1 ppm (mg/kg) will meet the unrestricted use standard under TSCA and Site specific risk assessment.



Nine Criteria Evaluation

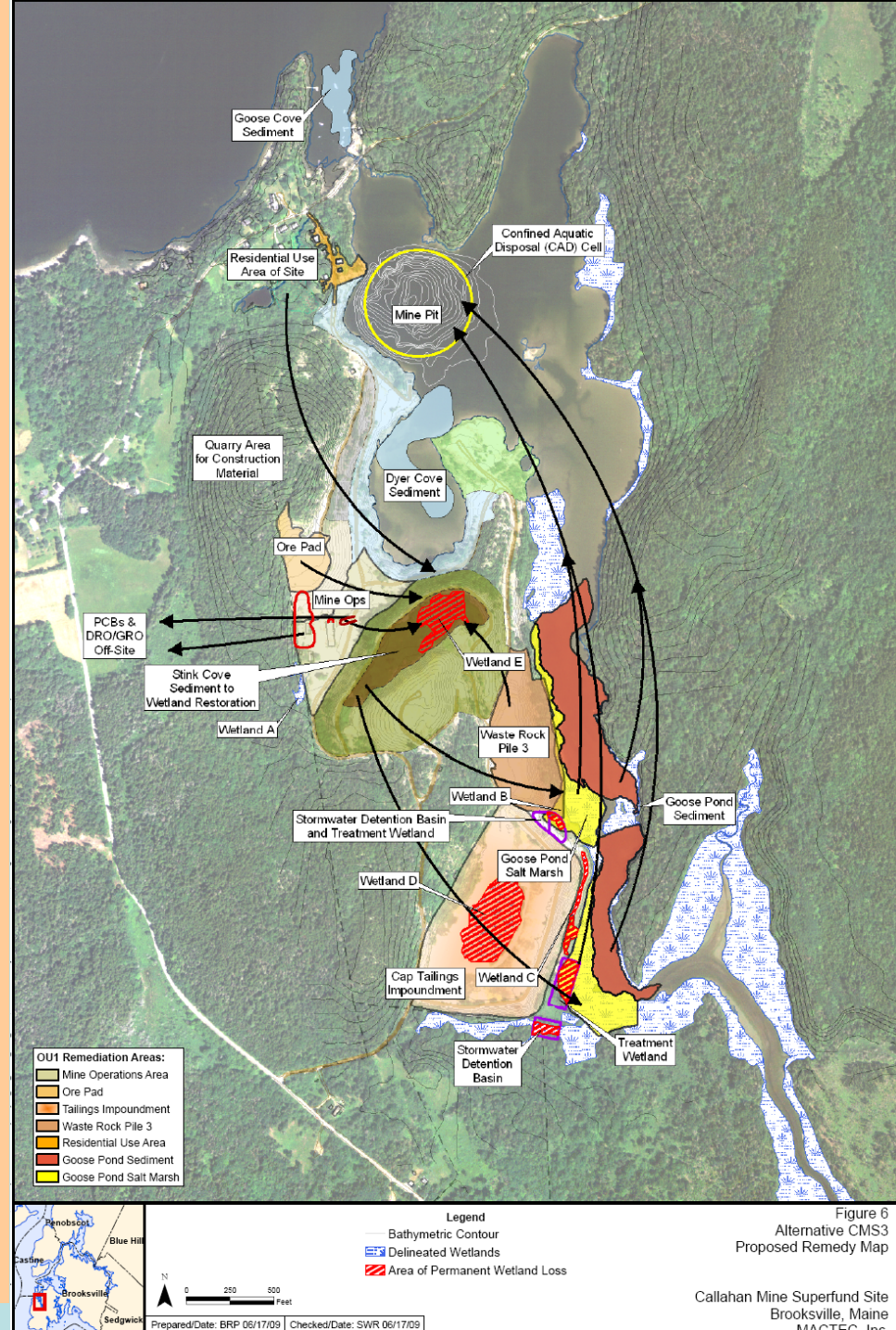
Threshold Criteria	CMS1	CMS2	CMS3
Protection of Human Health	No	Yes	Yes
Protection of Environment	No	Yes	Yes
Full compliance with applicable or relevant and appropriate requirements	No	Yes	Yes
Achieves threshold criteria and then subject to balancing criteria	No	Yes	Yes

Nine Criteria Evaluation

Balancing Criteria	CMS1	CMS2	CMS3
Long-Term Effectiveness and permanence	X	Best – Equal for Tailings Impoundment. Disposal at depth in mine pit offers the most effective long-term approach for mine waste and sediment.	Good, but reliance on cap maintenance for waste rock close is less protective than mine pit disposal
Short-Term effectiveness, including short term impacts and time period to achieve cleanup	X	Immediately after cleanup Equal	Immediately after cleanup Equal
Reduction in Toxicity, Volume, or Mobility through Treatment	X	Only as a result of wetland treatment system.	Only as a result of wetland treatment system.
Implementability	X	equal	equal
Cost (millions)	\$0.019	\$22.8 (best - lowest)	\$25.5
Alternative with that best balanced the criteria		*	

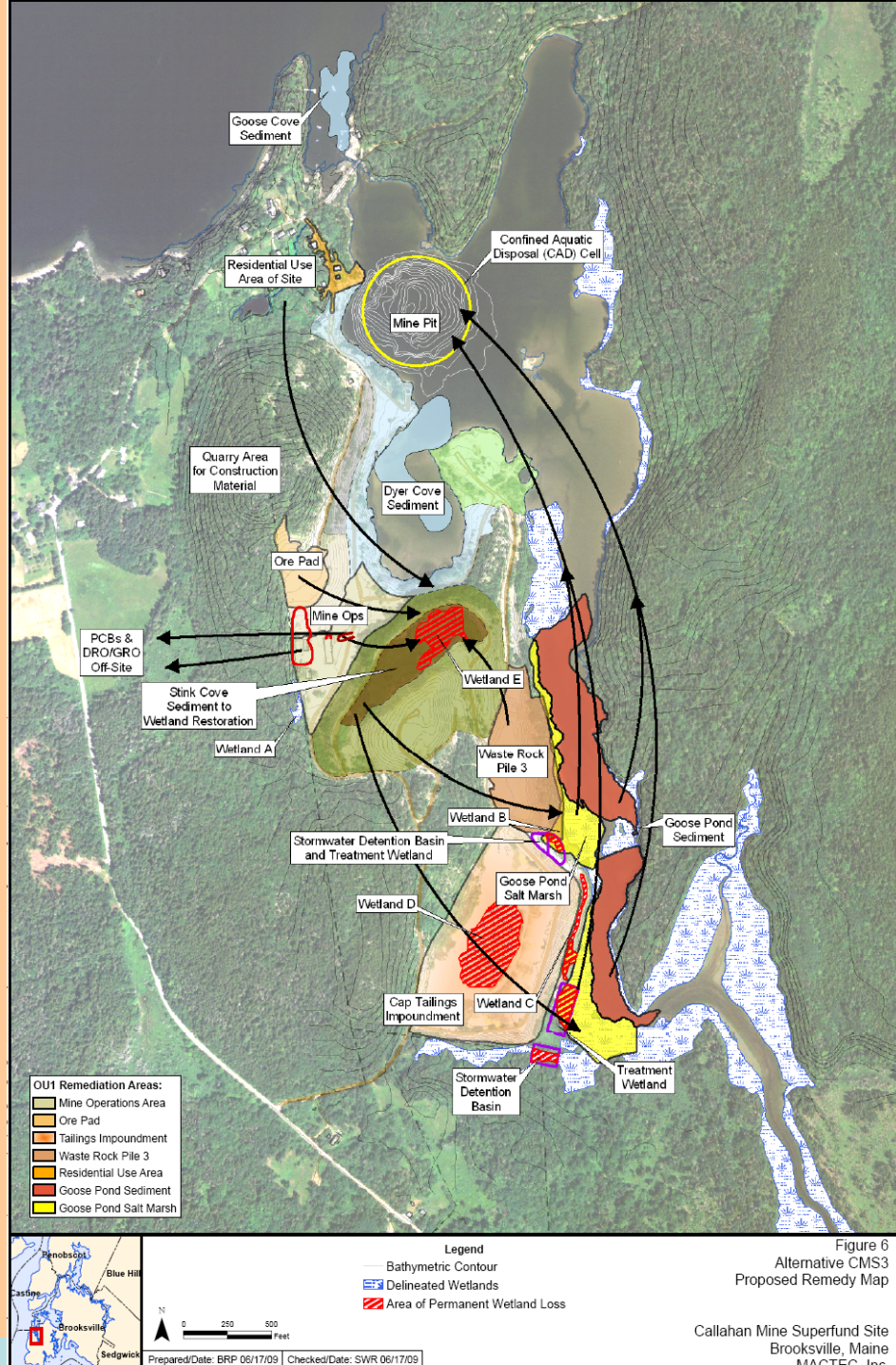
Proposed Cleanup Action CMS2

- Tailings impoundment cover system, stability measures, and horizontal drain:
 - Eliminate material transport
 - Prevent seeps
 - Comply with Mine Rules
 - Achieve stability criteria
- PCB Hot Spot removal:
 - Prevent any human contact
- Residential yard cleanup for lead and arsenic:
 - Prevent long-term human contact
- Waste Rock Area 3 removal and subaqueous disposal in CAD cell:
 - Eliminate source of seeps and material transport
 - Comply with Mine Rules



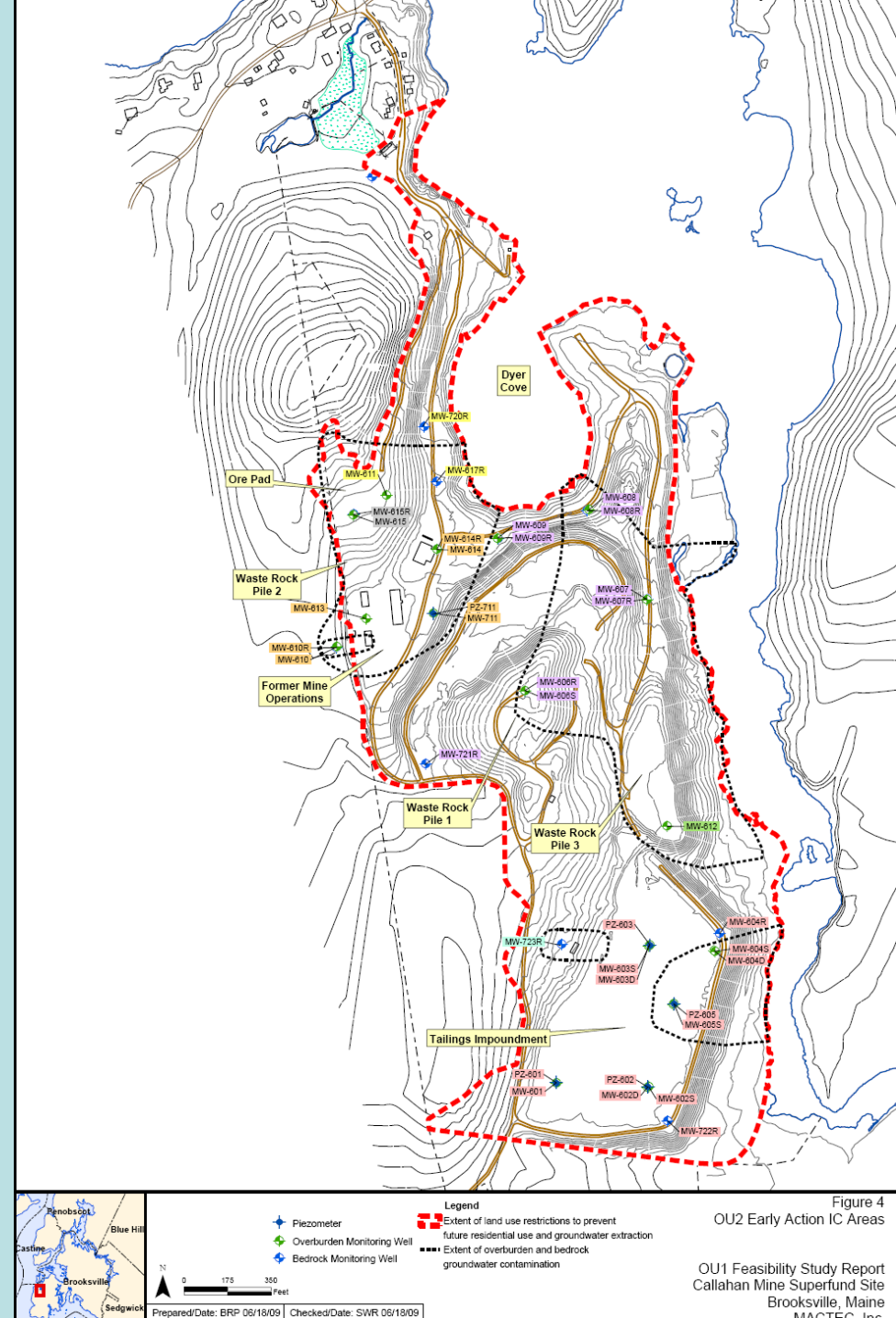
Proposed Cleanup Action CMS2

- Southern Goose Pond and Salt Marsh Sediment removal and subaqueous disposal in CAD cell:
 - Eliminate sediment that are a source of ecological impacts
 - Comply with Clean Water Act and Mine Rules
- Ore Pad/Mine Ops Area waste removal and subaqueous disposal in CAD cell:
 - Remove source of groundwater contamination
 - Remove source of seeps
- Land-use restrictions to protect cover system, prevent disturbance of CAD cell
- Long term monitoring, maintenance, and five-year reviews
- Estimated Cost: Present Value is \$22.8 million.
- Dyer Cove and Goose Cove under consideration for mine waste removal as part of wetlands restoration.



OU2 Proposed Early Cleanup

- OU2 Early Cleanup
 - Land use restrictions within area designated in red to:
 - Prevent future residential;
 - Prevent installation of water supply wells; and
 - Prevent ingestion of groundwater



Feasibility Study Community Input

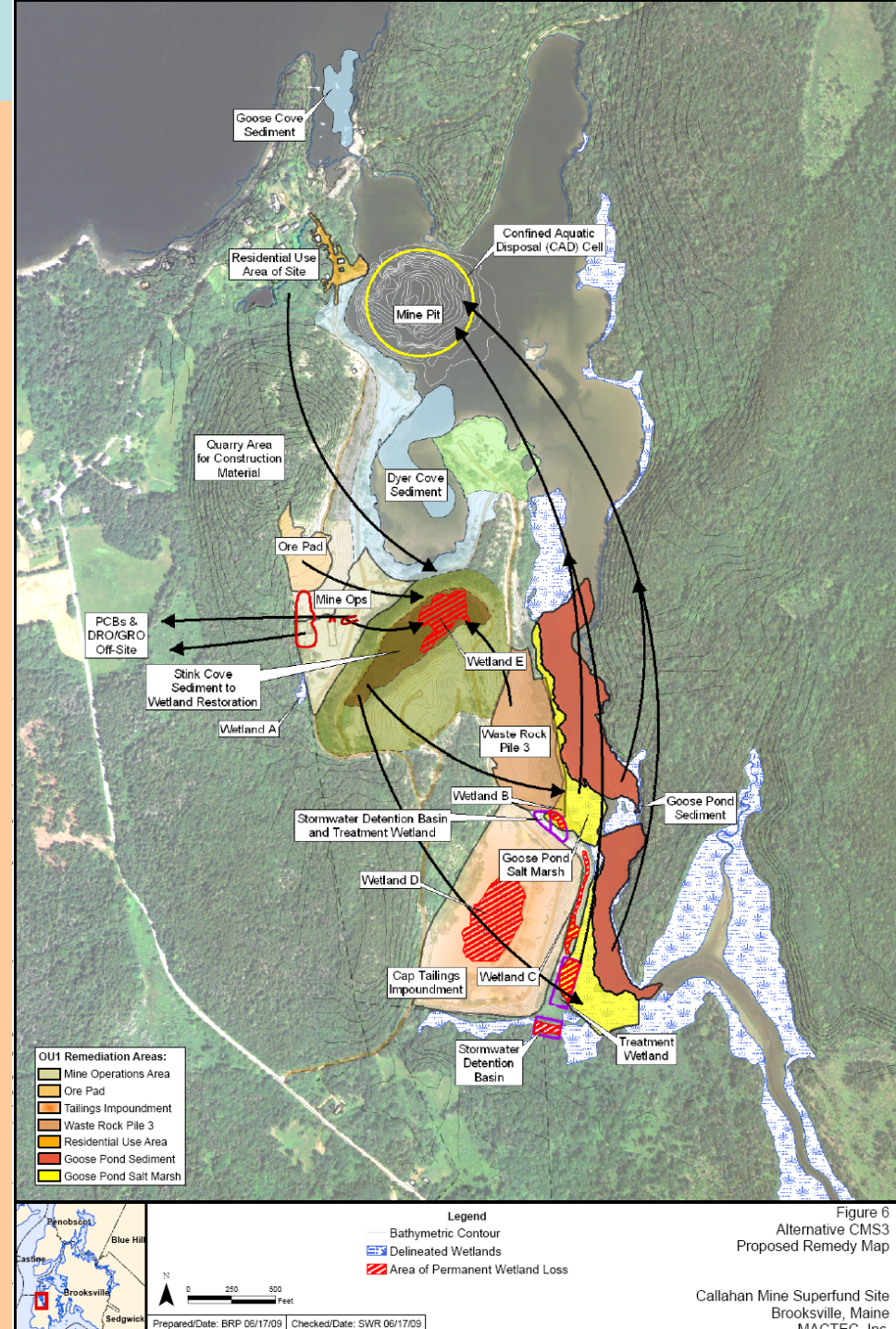
Community input was factored into development of FS:

Roads and traffic:

- Alternatives with high road impact and traffic loads were eliminated during screening of alternatives.
- On-site sources of materials were fully evaluated, including use of stink cove material stored on WRP-1 and the development of an on-site source of capping material (stone).
- Alternative design for cover system was developed to significantly reduce soil quantities.

Cost and Scope of Cleanup:

- OU 1 targets the areas of current human health risk and the major source of ecological impacts.
- Only about 10 acres of the 75 acre Goose Pond are targeted for cleanup.
- OU 2 early action will prevent future residential land use and consumption of groundwater from waste areas.



Feasibility Study Community Input

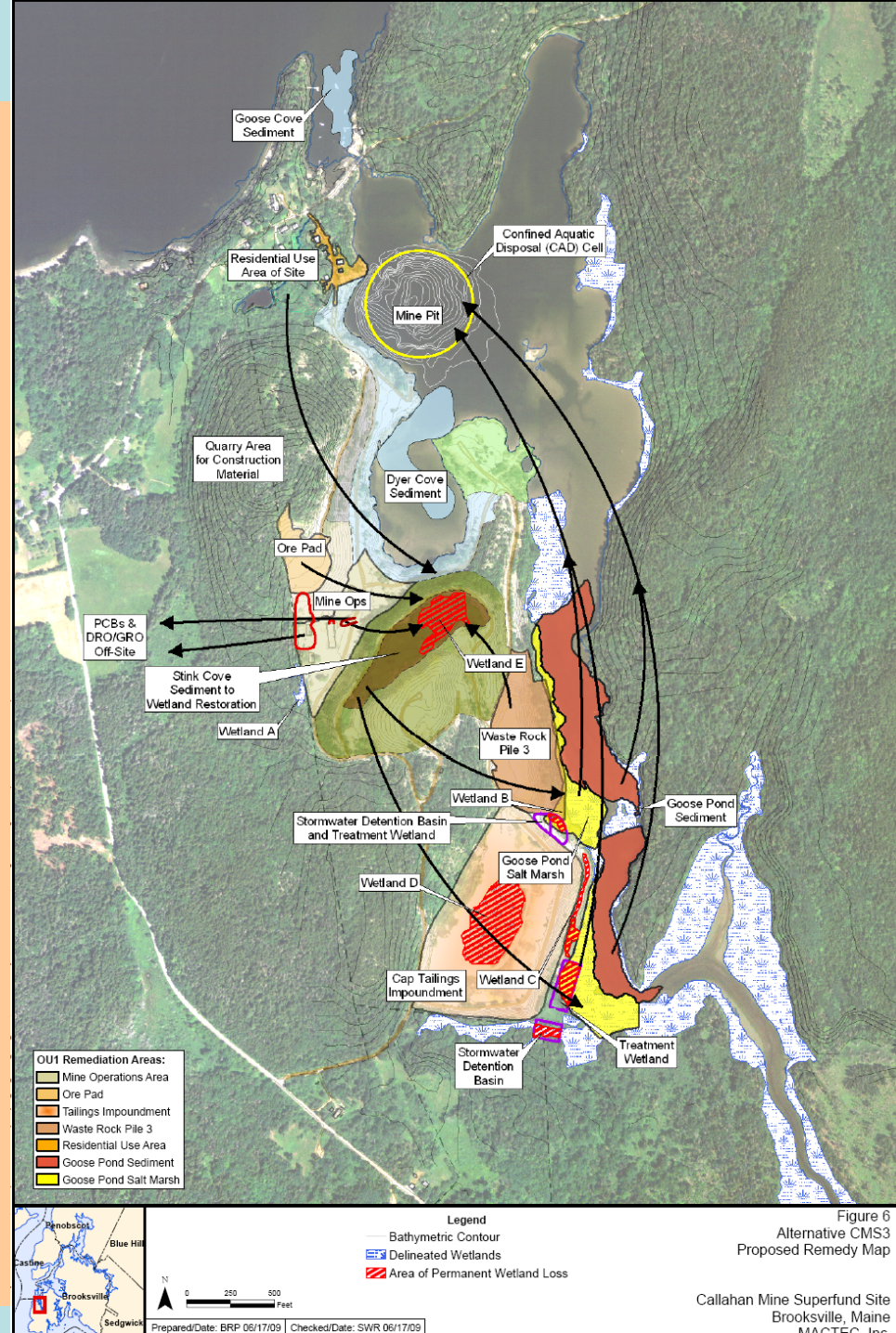
Community input was factored into development of FS:

Goose Cove:

- Cleanup and restoration of Goose Cove is included as a possible mitigation activity.

Site use:

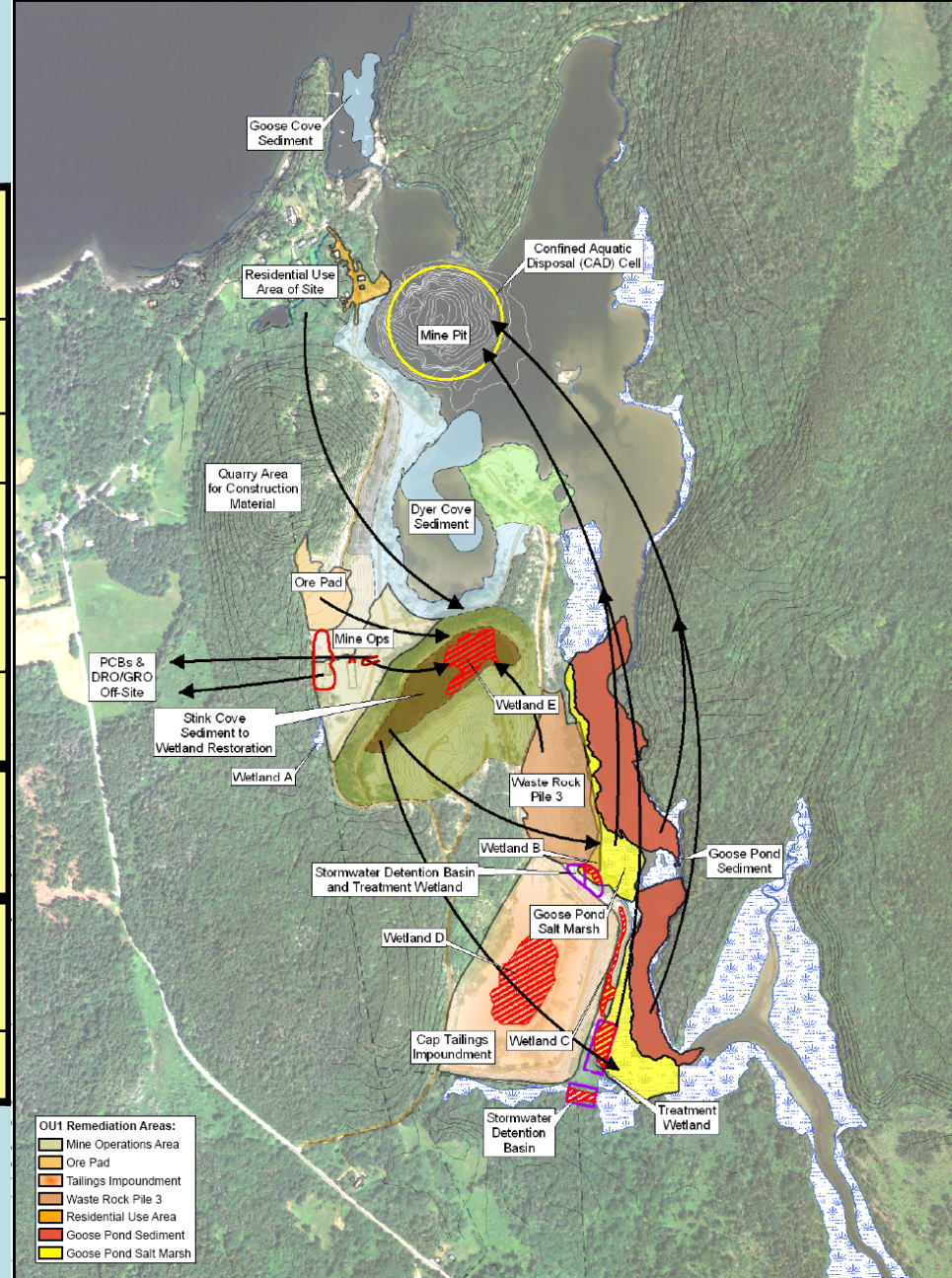
- WRP-1 and associated vista will remain.
- The former Callahan Mine property portion of the Site use will be restricted to prevent residential development.



Feasibility Study Truck Traffic

	Estimated truck loads to implement cleanup
General mobilization and equipment deliveries	184
Tailings Impoundment Cover System	52
Off-site transport of PCB contaminated soil	344
Off-site transport of Petroleum contaminated soil	116
Residential lot restoration (after lead and arsenic removal)	428
Estimated truck traffic for cover system, PCB and Petroleum waste removal, and site restoration	1124
Organic material for wetland treatment system (design will evaluate use of on-site material)	904
Fuel truck visits (1-2 daily trips)	

Notes: Other transportation vehicles (barges) will also be considered. Daily truck loads will be quite variable.



Next Steps

- **Modifying Criteria**
 - **State Acceptance**
 - State of Maine DEP supports CMS2 as the preferred cleanup alternative.
 - **Community Acceptance**
 - Based on input during public comment period.

Next Steps

- Public Hearing August 6, 2009.
- 30 day comment period
 - July 10, 2009 - August 10, 2009
 - Please comment
- Cleanup decision and Response to Comments by end of September 2009.

After Cleanup Decision

- Design OU 1 Cleanup (Duration: 1-2 years)
 - State of Maine would pay 10% if cleanup is implemented by EPA
- Begin OU1 Cleanup and OU2 Early Action (Duration: 2-4 years)
- Complete OU 2 RI/FS
 - Determine long-term approach to address contaminated groundwater and soil.
 - Determine whether additional cleanup actions are necessary to achieve surface water criteria.

Information Repositories

- Remedial Investigation, Human Health Risk Assessment, Baseline Ecological Risk Assessment, Feasibility Study, and Proposed Plan are all available as part of the Callahan Mine Site Administrative Record at:
 - EPA Record Center
 - Brooksville Town Office
- Site reports are also available at the following locations:
 - Maine DEP
 - Marine Environmental Research Institute (MERI)

Information and Contacts:

- Internet users may access current site information at: <http://www.epa.gov/superfund/sites/npl/me.htm#statelist>

Site information can also be found at:

Brooksville Free Public Library

1 Town House Road

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End of Presentation