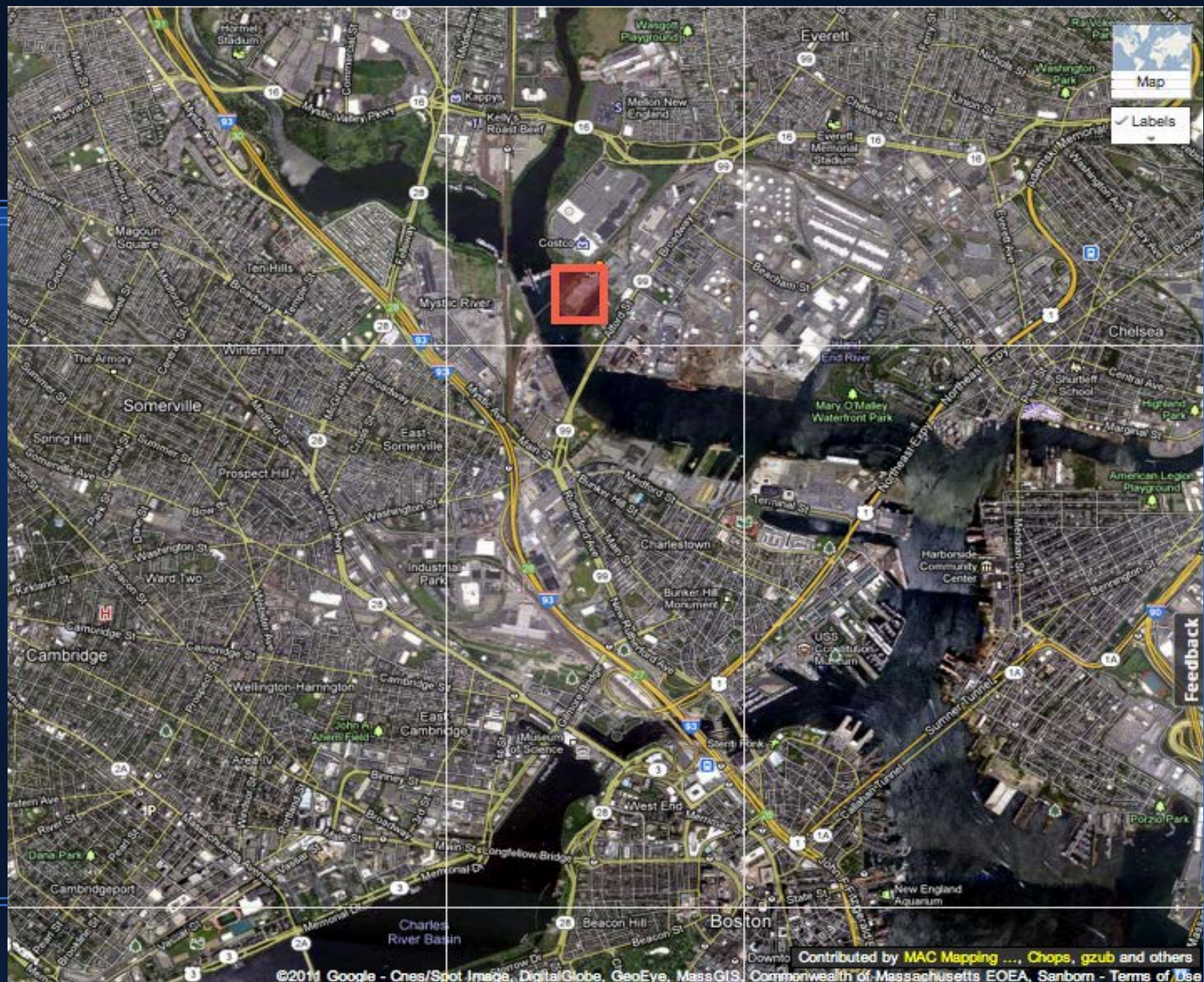


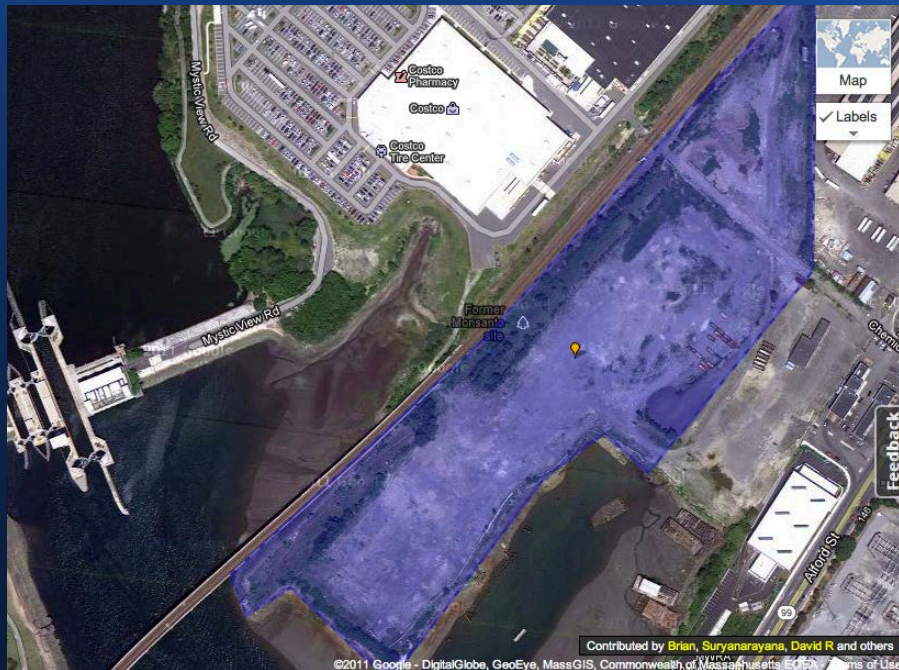
# Chemical Lane/ Alford St. / Monsanto Brownfield

Billy Castor  
Milo Stella  
EEOS 476  
Umass Boston  
Prof. Anamarija Frankic





# Site Boundary / Photo, 2011



# History of Use

- Cochran Chemical (late 1800's-1929)
  - Major chemical producer during WWI
  - Developed & produced first Hydraulic Acid
- Monsanto (1929-1983)
  - Produced: Plasticizer, Sulfuric Acid
  - Stored: Aluminum, Acids, Dyes

# Recent Ownership

- Boston Edison (1983-1995)
- O'Donnell Sand and Gravel (OSG) (1995 – 2001)
  - Tunnel Muck storage from Deer Island
- Mystic Landing LLC (2001-2009)
  - Modern Continental Construction as Proxy
  - Performed extensive testing
  - Received multiple regulatory extensions
- FBT Everett Realty LLC (2009-Present)

# Regulatory Context

- Site subject to Massachusetts Contingency Plan
  - Initial notice of release in 1995
  - Requires hiring LSP to conduct site assessment
- 6 Phase process from assessment through remediation
- Tier II Classification yet to be “officially” completed due to numerous extensions
- Notice of Noncompliance (NON) issued 2009

# LSP's and Findings

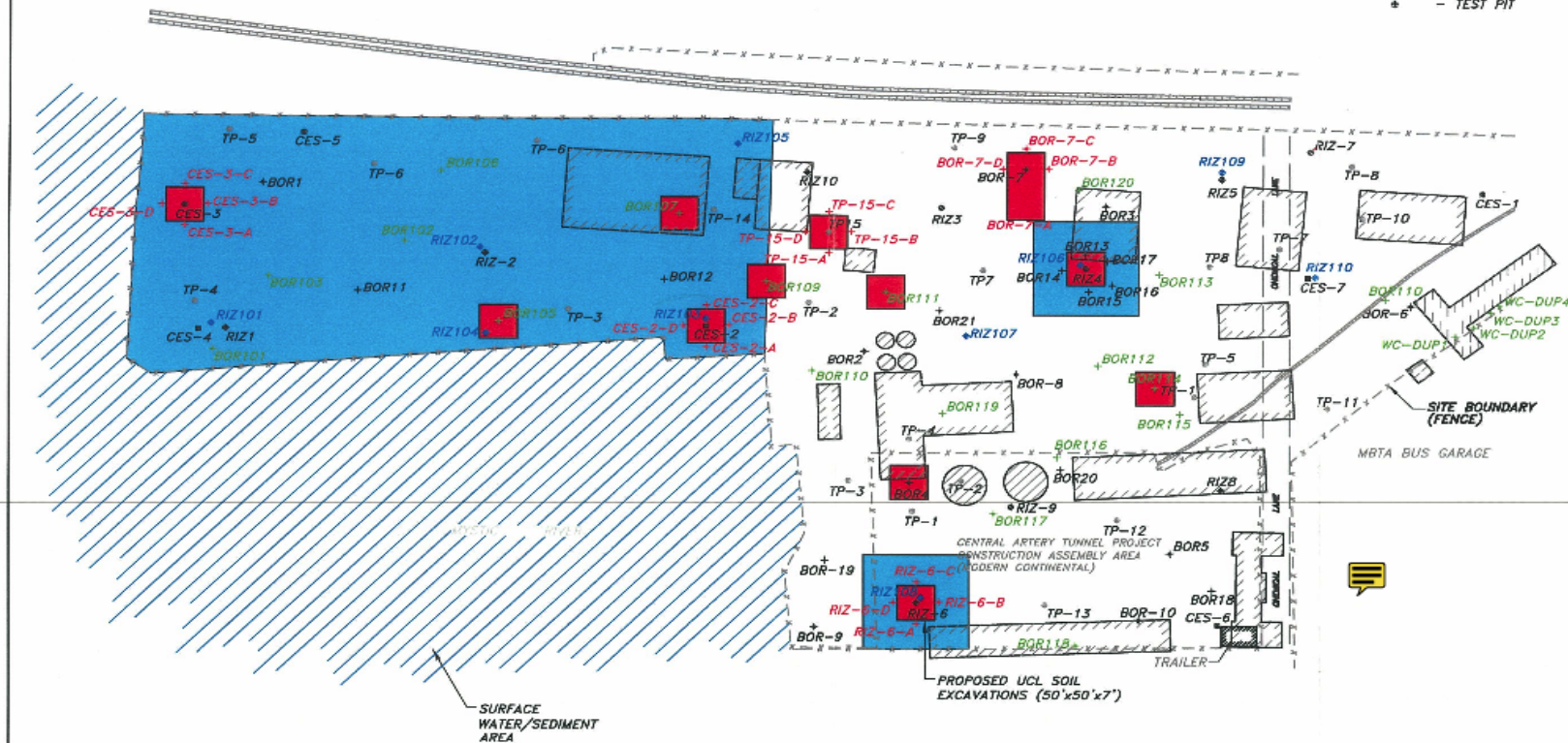
- CES
- Tetra Tech Rizzo / Rizzo Associates
  - Geo Tek
  - Williams Environmental Inc.
- Consistently measured elevated levels of Arsenic (As) and Lead (Pb) in Soils and Groundwater
- Repeatedly deemed of no immediate threat...  
Despite high levels of contaminants!



GATEWAY CENTER  
SHOPPING PLAZA  
(FORMER MONSANTO CHEMICAL PLANT)

**SAMPLING LOCATION KEY**

- BLACK - CES & RIZZO THROUGH 2001
- RED - BORINGS INSTALLED BY RIZZO, 2005
- GREEN - BORINGS INSTALLED BY RIZZO, 2006
- BLUE - WELLS INSTALLED BY RIZZO, 2006
- +
- ◆ - MONITORING WELL
- ⊕ - TEST PIT



- AREA OF METALS - IMPACTED GROUNDWATER
- DENOTES EXCEEDENCE OF MCP UCL

**RIZZO ASSOCIATES**  
A TETRA TECH COMPANY  
1000 WASHINGTON STREET  
FLOOR 1000  
BOSTON, MA 02111  
TEL: 617.552.1000  
WWW.RIZZO.COM

Project:  
Everett Staging Yard  
Chemical Lane  
Everett, Massachusetts

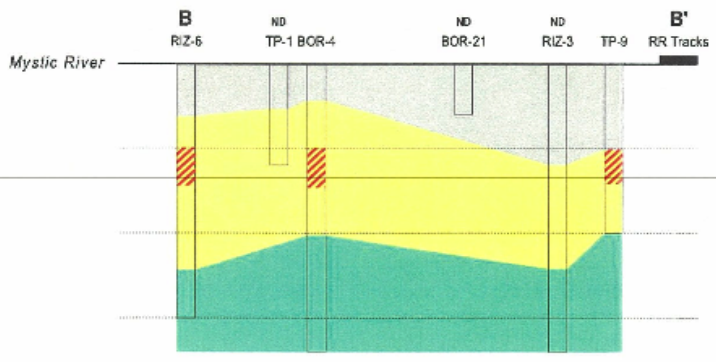
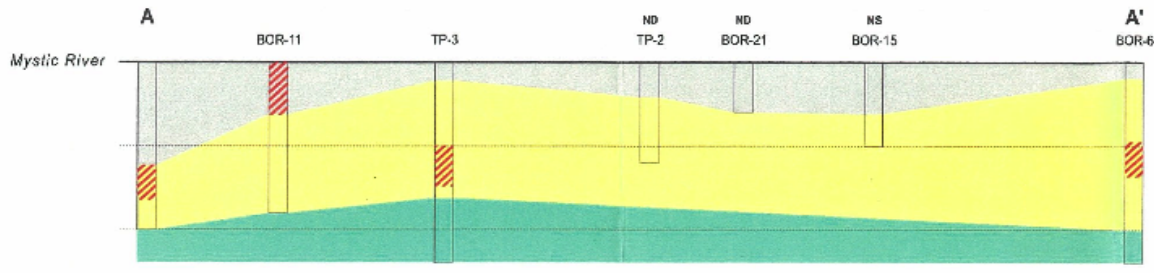
Scale:  
Site Plan with  
Sample Locations

Scale: 1" = 100'  
Graphic Scale: 0 50 100  
North Arrow

Sheet No. **2**

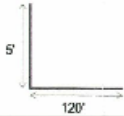
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**LEGEND**

- Tunnel Muck
- Fill
- Native Materials
- Contaminated Interval
- ND Not Detected
- NS Not Sampled



**Geologic Cross Sections A-A and B-B**

**RIZZO ASSOCIATES**

A TECHNICAL COMPANY

One River Street  
Everett, MA 01930  
603.633.1000  
www.rizzo.com

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Project:  
Everett Staging Yard  
Chemical Lane  
Everett, Massachusetts

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Drawing:  
Geologic Cross Sections  
A-A' and B-B  
with Contaminated Interval

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Not In Scale

Date:	1/14/05	Sheet:
Title:	5	Scale:

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# Observed Quantities of Arsenic and Lead

- 1995:

- Soil: As 33-1400;  
Pb 630-11,000  
mg/kg
- GW: As 1.03-7.85;  
Pb 0.05-1.2 mg/L

- 2001

- Soil: As 560; Pb  
20,000 mg/kg
- GW: As 12-50,500;  
Pb 13-1,420 ug/L

## 2005/2006:

Soil: As 1,200; Pb 10,600 mg/kg  
GW: As 22-29,800; Pb 104-893 ug/L

## 2007:

Soil: As 712; Pb 24,700 mg/kg  
GW: As 2-2.8; Pb 0.001-0.5 mg/L

# Environmental Risk may be much greater than LSP reports





# Remediation Strategies

- Sustainable solutions!
  - Prefer “In-Situ” methods
  - Passive vs Active systems
- Bio/Phyto-remediation may not be applicable
- Development of a remediation “toolbox” as there may not be a single fix
- As and Pb require differential treatment

**Table 1. Remediation Technologies Matrix for Metals in Soils and Ground-Water**

Remediation Technology	Metals Treated	Cost	Long-term Effectiveness/ Permanence	Commercial Availability	General Acceptance	Applicability to High Metals Concentrations	Applicability to Mixed Waste (metals & organics)	Toxicity Reduction	Mobility Reduction	Volume Reduction
Capping	1-3	+	«	+	+	«	+	«	+	«
Subsurface Barriers	1-3,5	+	«	+	+	«	+	«	+	«
Solidification/ Stabilization Ex situ	1-3,5	*	*	+	+	+	+	«	+	«
Solidification/ Stabilization In situ	1,2,4,6	+	*	+	+	+	+	«	+	«
Vitrification Ex situ	1-3,5	«	+	*	*	+	+	«	+	«
Vitrification In situ	1-3,7	«	+	*	*	+	+	«	+	«
Chemical Treatment	2	-	*	*	*	-	-	+	+	«
Permeable Treatment Walls	2	-	*	*	*	-	-	+	+	«
Biological Treatment	1-5	+	«	*	*	«	-	+	+	«
Physical Separation	1-6	*	+	+	+	+	«	«	«	+
Soil Washing	1-3,5-7	*	+	+	+	+	*	«	«	+
Pyrometallurgical Extraction	1-5,7	«	+	+	+	+	«	«	«	+
In situ Soil Flushing	1,2,7	+	«	+	+	+	+	«	«	+
Electrokinetic Treatment	1-6	*	+	+	+	+	-	«	«	+

1-Lead, 2-Chromium, 3-Arsenic, 4-Zinc, 5-Cadmium, 6-Copper, 7-Mercury  
 + Good, \* Average, « Marginal, - Inadequate Information

# Permeable Treatment Walls

- Use of a permeable subsurface wall containing a material-specific reactant
- Limestone for Pb, increases pH in highly acidic water and may effectively immobilize the Pb
- Can be used in conjunction with a slurry wall
- A quick improvement to prevent leaching to environmental receptors
- Can be employed during redevelopment activity



# Vision for Future Redevelopment



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