Hookston Station Cleanup Plan

Community Meeting
August 10, 2006

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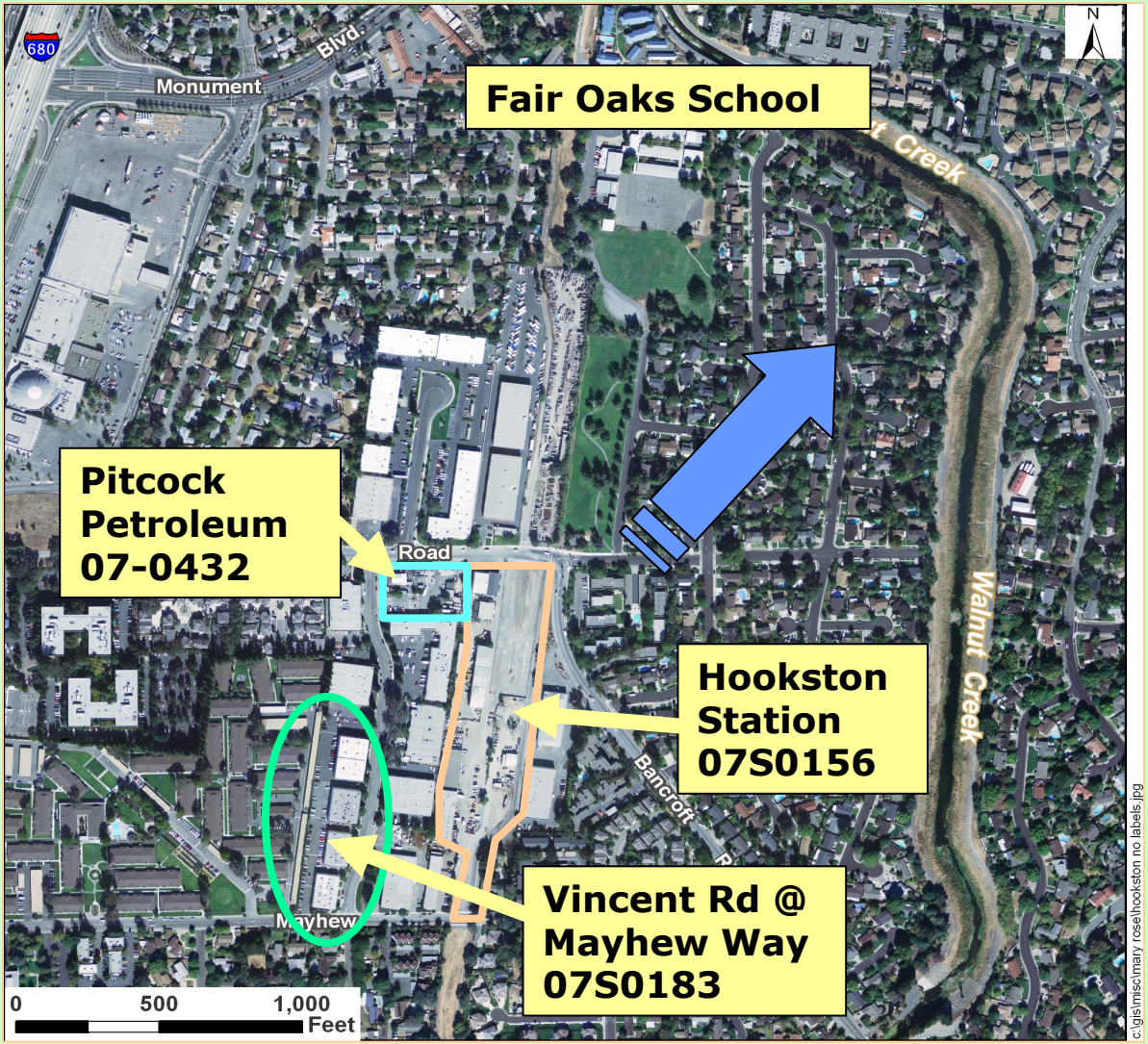
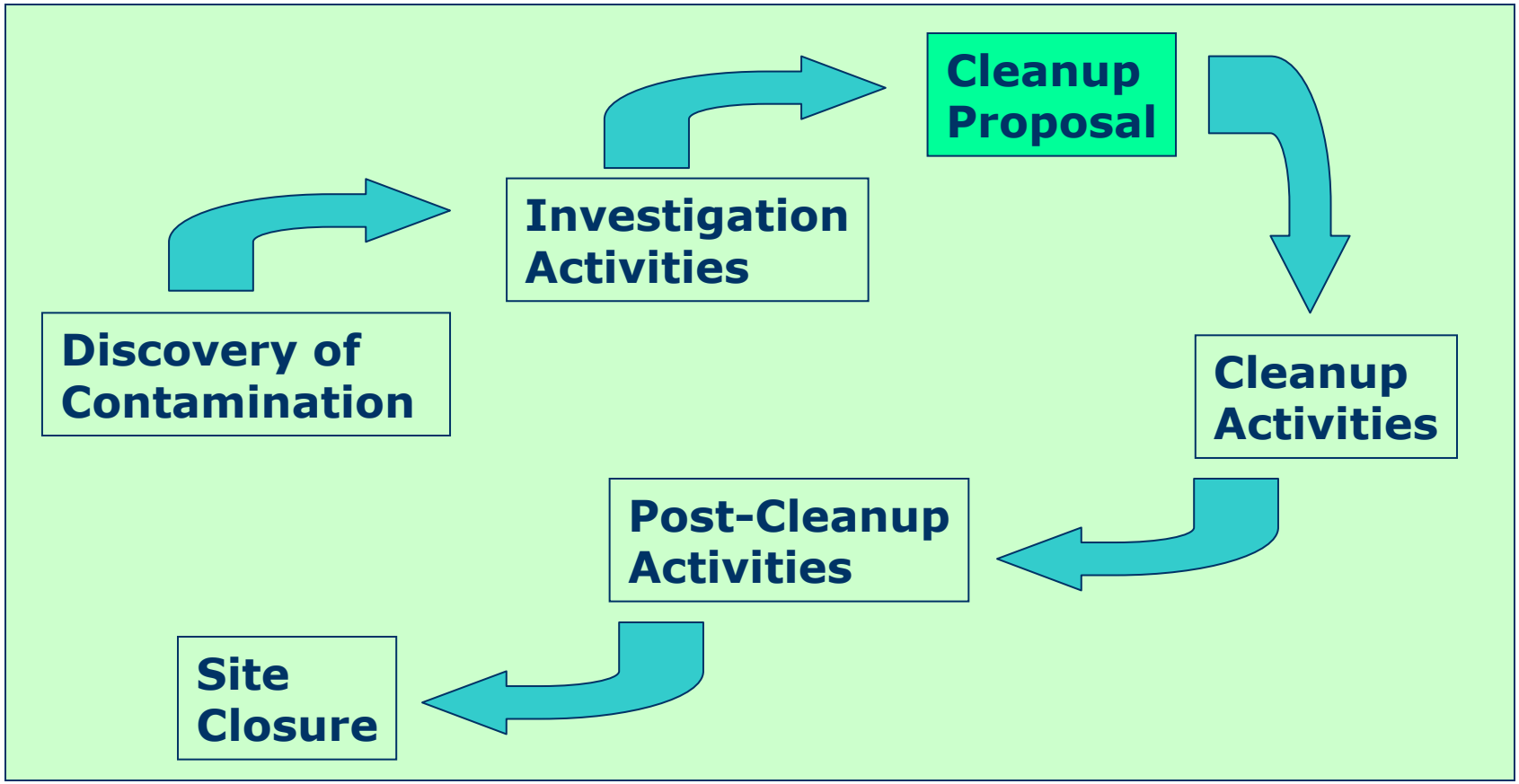
San Francisco Bay
Regional Water Quality Control Board

Vicinity Map



The Cleanup Process



The Process: Where are we?

- **Initiate Public Comment Period**
  - **August 1-September 1**
  - **Public meeting August 10**
- **Consider comments**
  - **Prepare responsiveness summary**
- **Approve Cleanup Plan**

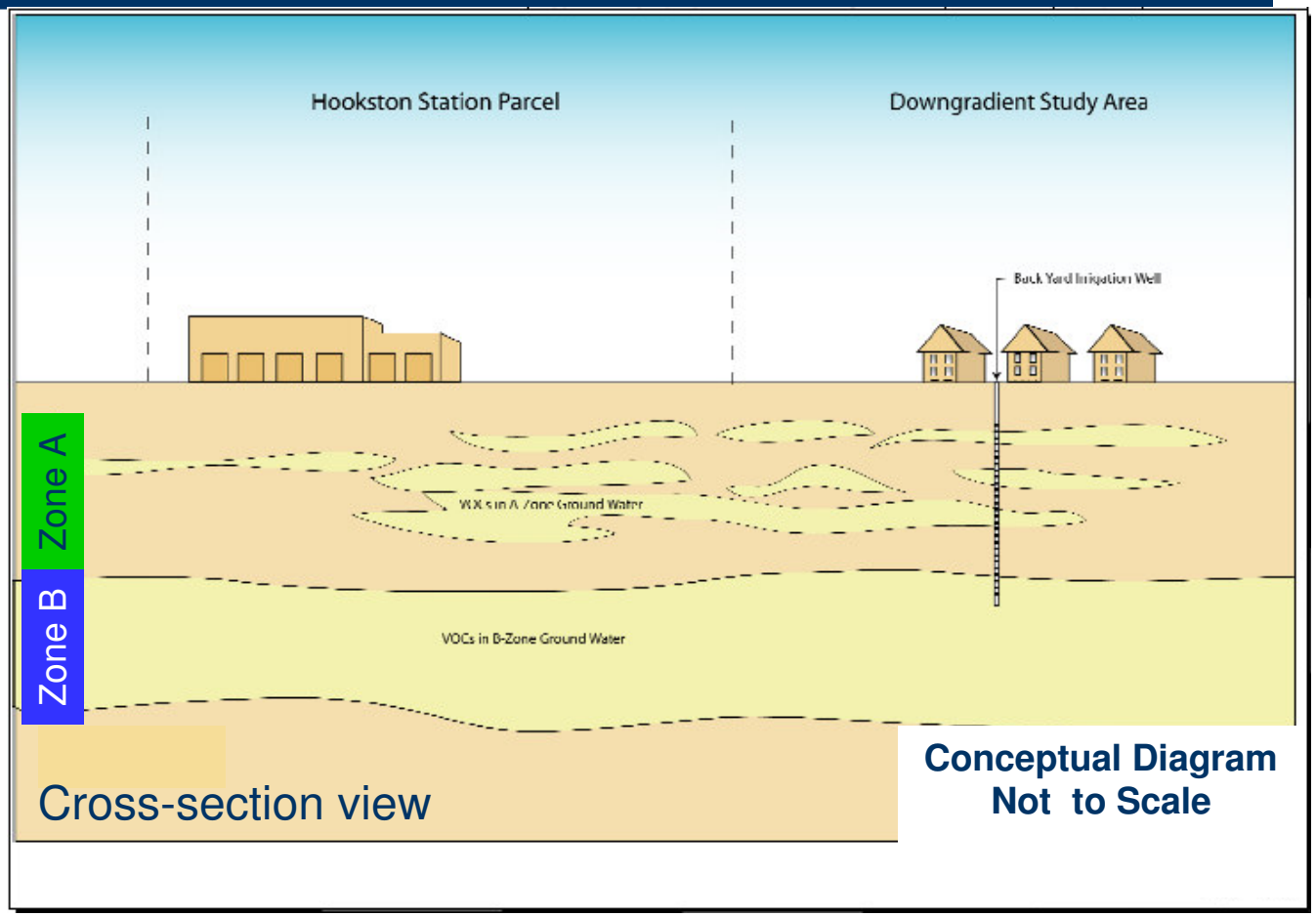
Community Involvement

- Review Feasibility Study/Cleanup Plan
- Learn about cleanup technologies (Community Working Group)
- Provide comments
  - Tonight
  - Written (letter or e-mail)
  - Deadline: September 1, 2006

Environmental Concerns Addressed in Cleanup Plan

- **From Baseline Risk Assessment**
  - **Onsite soil & groundwater**
  - **Offsite groundwater**
    - **Indoor air**
    - **Non-drinking water**
    - **Drinking water criteria (long-term)**

Conceptual Model



Cleanup Options Considered

1) No Action
2) Monitored Natural Attenuation
3) Enhanced Bioremediation and In-place Chemical Oxidation
4) Permeable Reactive Barrier and In-place Chemical Oxidation
5) Permeable Reactive Barrier
6) Pump and Treat

Elements Common to All Cleanup Options

Institutional Controls

- **Onsite**
  - **Deed restriction to prevent use of groundwater**
  - **Site management plan to control exposure to arsenic in subsurface soil**
- **Offsite**
  - **Control installation of new wells**

Common Elements (continued)

Exposure Prevention

- **Removal of private wells**
- **Annual indoor air monitoring over the core of the plume**
- **Vapor Intrusion Prevention Systems**
  - **Annual monitoring & inspection**

➢ **Recent Water Board directive concerning indoor air monitoring**

Common Elements (continued)

Operation and Maintenance

- **Groundwater & soil vapor monitoring**
- **Ensure optimal system performance**
- **Track rate of contaminant mass removal**

Criteria Used to Select Cleanup Technology

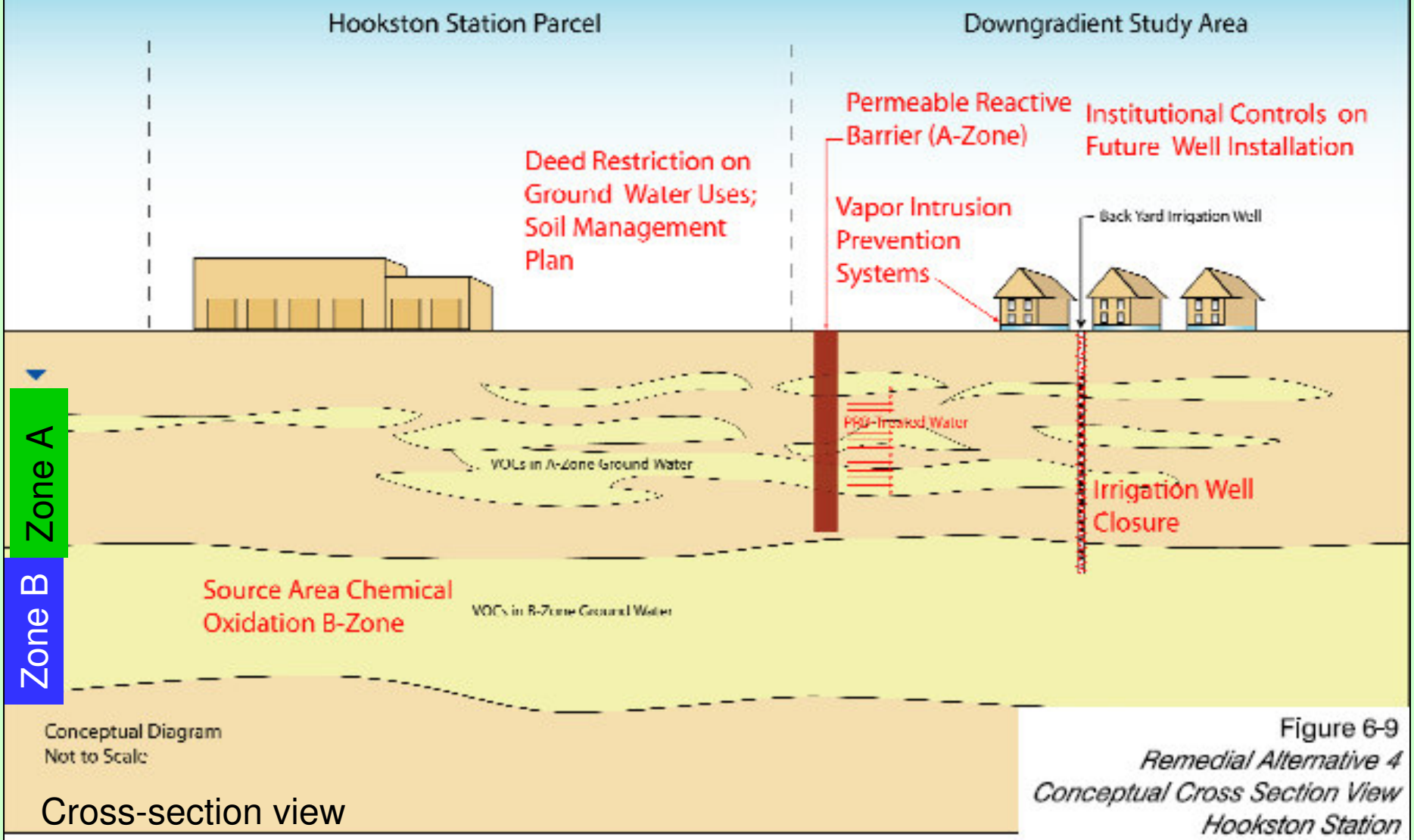
Based on several factors

- Overall protection of human health and the environment
- Compliance with applicable/appropriate standards
- Long-term effectiveness and permanence
- Reduction of toxicity, mobility or volume
- Short-term effectiveness
- Implementability
- Cost
- Community acceptance

Proposed Cleanup Option

- Zero-valent iron Permeable Reactive Barrier – Zone A
- Chemical Oxidation – Zone B
- Vapor intrusion prevention systems
- Removal of private wells
- Controls to prevent new well installation

Proposed Cleanup Option

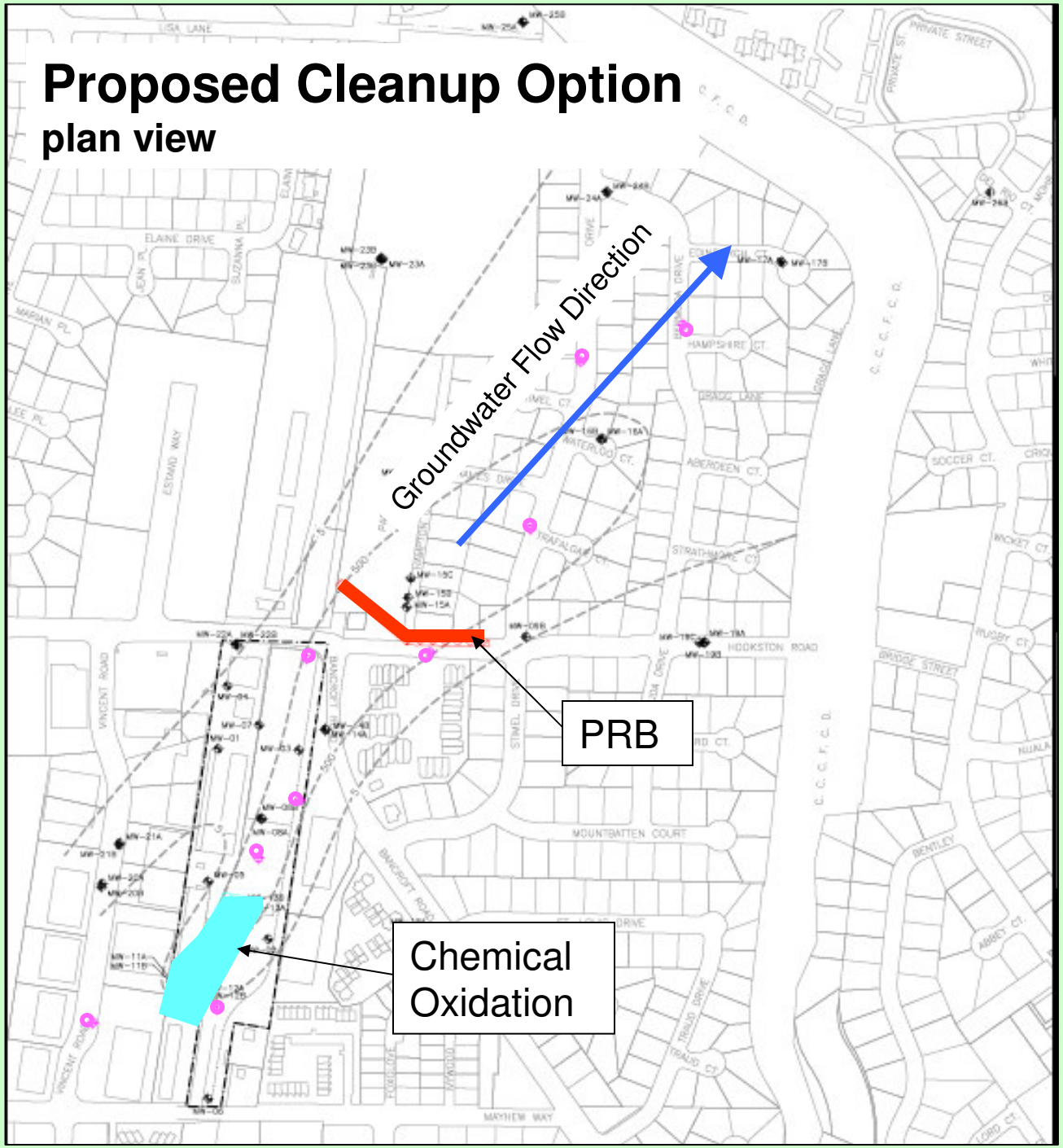


Cross-section view

Figure 6-9
Remedial Alternative 4
Conceptual Cross Section View
Hookston Station
Pleasant Hill, California
ERM 06/06

Proposed Cleanup Option

plan view

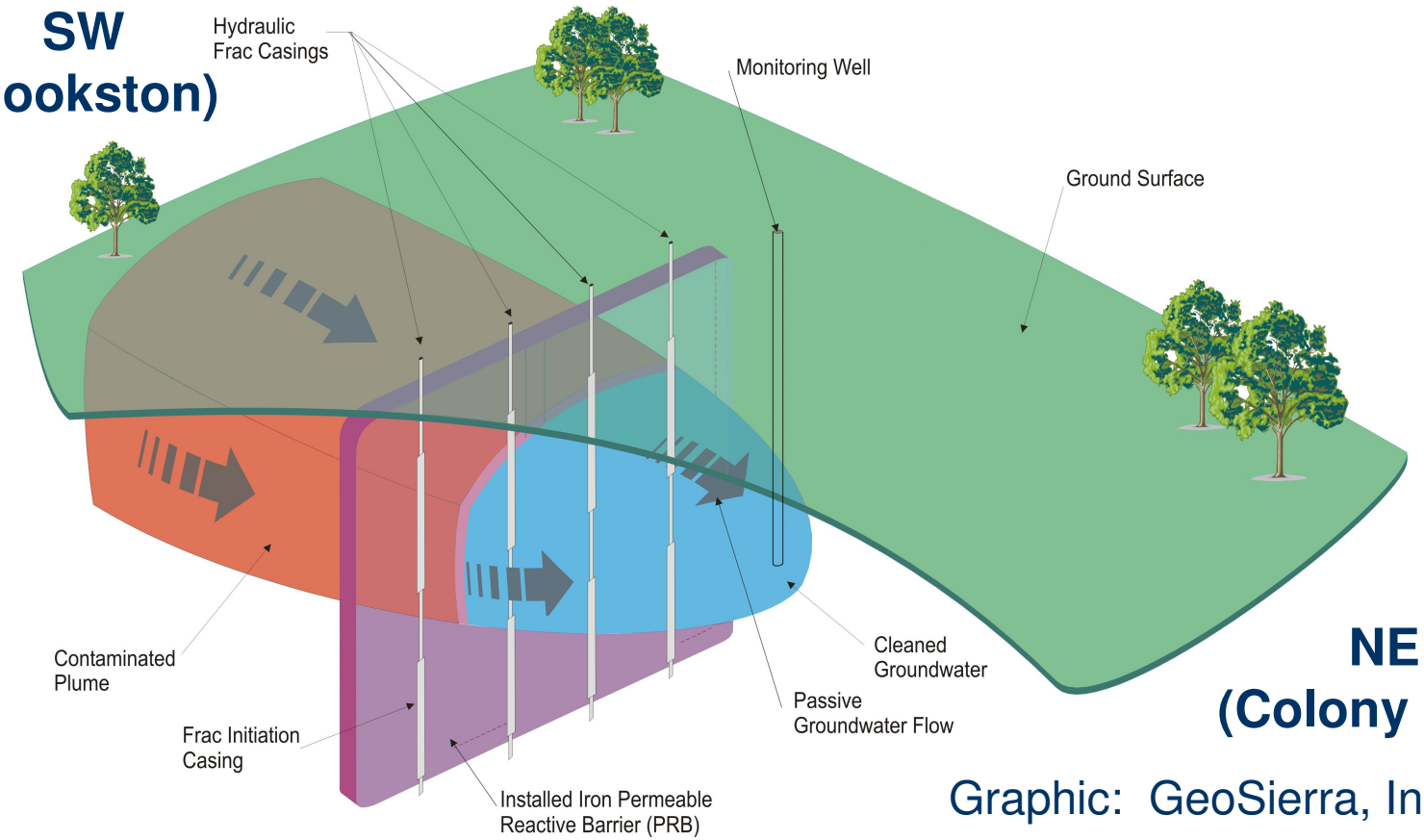


Permeable Reactive Barrier
Zone A

- ***Process:*** **Groundwater is directed through a chemical treatment zone ("zero-valent iron")**

- ***Required Equipment*****: Trench (300 ft long x 30 ft deep) & monitoring well network**

Permeable Reactive Barrier



Graphic: GeoSierra, Inc.

Chemical Oxidation
Zone B

- ***Process:*** **Strong chemical agents (oxidants) introduced into the subsurface to react with the contaminant of concern**
- ***Required Equipment*****: Extensive injection and monitoring well network**

Complete Cleanup Will Occur Over a 30-year Period

Remedy	Time Frame	Comment
Z-V Iron PRB (Zone A)	3-4 years	GW ≤ ESL for Risk to Indoor Air
	30+ years	GW ≤ MCL for Drinking Water
Chemical Oxidation (Zone B)	30+ years	GW ≤ MCL for Drinking Water
Vapor Intrusion Prevention Systems	3-4 years	Turn off when Zone A GW reaches ESL
Institutional Controls	30+ years	Remove when final cleanup goals achieved

Proposed Implementation Schedule

Activity	Time Frame (estimated)
VIPS Installation & Well Abandonment	Fall 2006
Hookston Station Site Soil Management Plan	Fall 2006
Pilot Test Workplan, Implementation, & Reporting	Fall 2006-Spring 2007
Final Remedial Design	Summer 2007
Permitting, Utility Clearance, Procurement	Summer-Fall 2007
Implementation	Fall 2007

Overview of Other Cleanup Options Considered

- No Action
- Monitored Natural Attenuation
- Bioremediation
- Pump & treat

No Action

- ***Process:*** **Natural processes degrade the contaminants**
- ***Required Equipment*****: None**
- ***Estimated Time to Complete Cleanup:*** **Unknown**

"No Action" is a baseline against which performance of other options is evaluated

Monitored Natural Attenuation

- ***Process:*** **Natural processes degrade the contaminants**
- ***Required Equipment*****: Extensive monitoring well network**
- ***Estimated Time to Complete Cleanup:*** **30++ years**

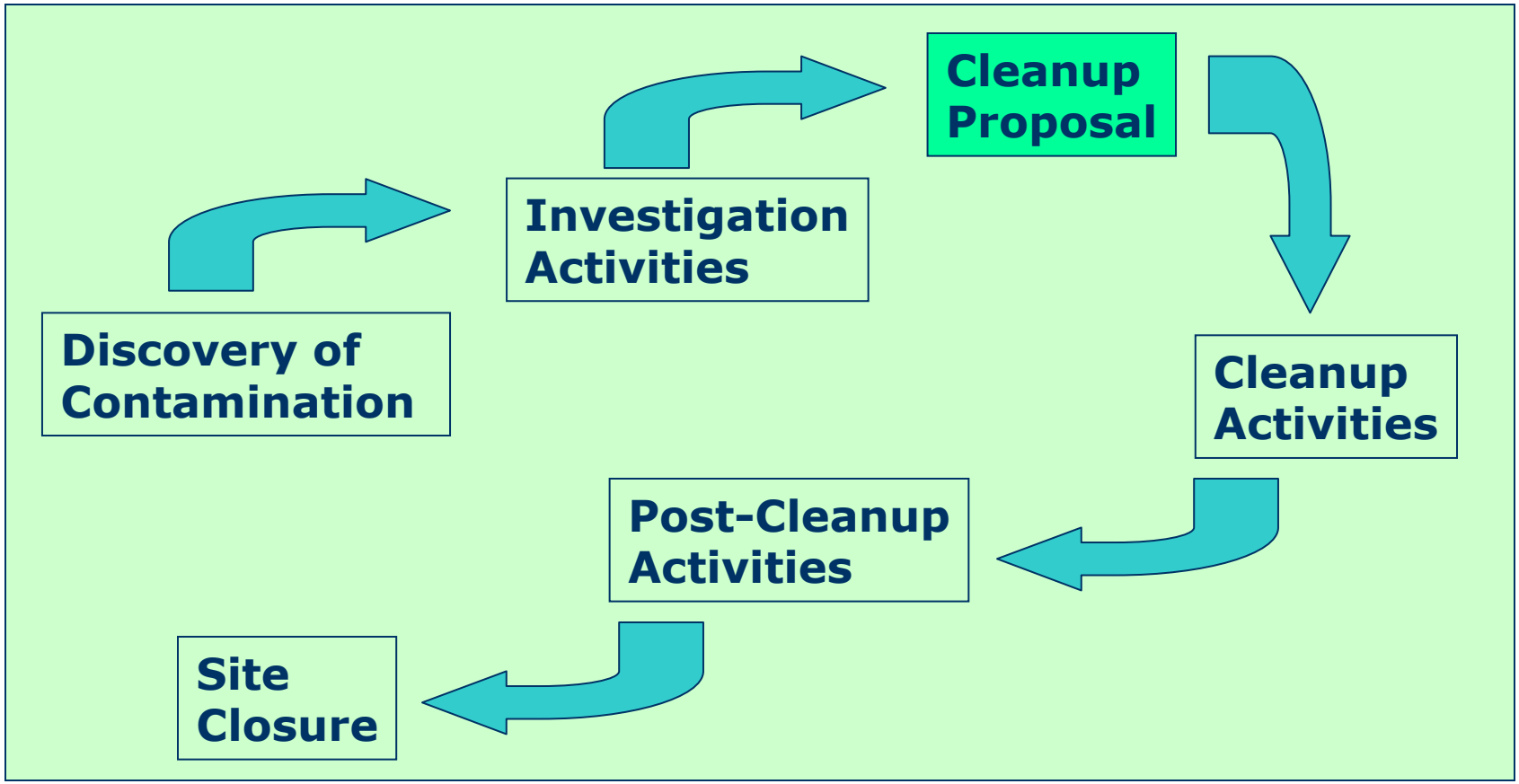
Bioremediation

- ***Process:*** **Stimulate microorganisms to grow and use the contaminants as food/energy source**
- ***Required Equipment*****: Extensive injection and monitoring well network**
- ***Estimated Time to Complete Cleanup: 30+ years***

Pump & Treat

- ***Process:*** **Conveys contaminated groundwater to the surface via extraction wells**
- ***Required Equipment:*** **Extensive extraction well network & piping; treatment system**
- ***Estimated Time to Complete Cleanup: 30+ years***

The Cleanup Process



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Next Steps

Task	Estimated Date
Receive and Consider Comments; Approve Cleanup Plan	October 1
Prepare Tentative Order for Final Site Cleanup Requirements (30-day comment period)	Fall 2006
Water Board Adopts Final SCR	Late Fall 2006 - Early Winter 2007
RPs Implement Pilot Testing & Interim Cleanup and Prepare Full-Scale Design	Fall 2006 - Fall 2007
RPs Implement Full-Scale Cleanup	Late 2007 - Early 2008

Questions?

- **Clarifying questions on the presentation**
- **Next: Comments on the proposed Cleanup Plan**