Project Authorization Increase for Arkema Manufacturing Area

Port of Tacoma

People. Partnership. Performance.

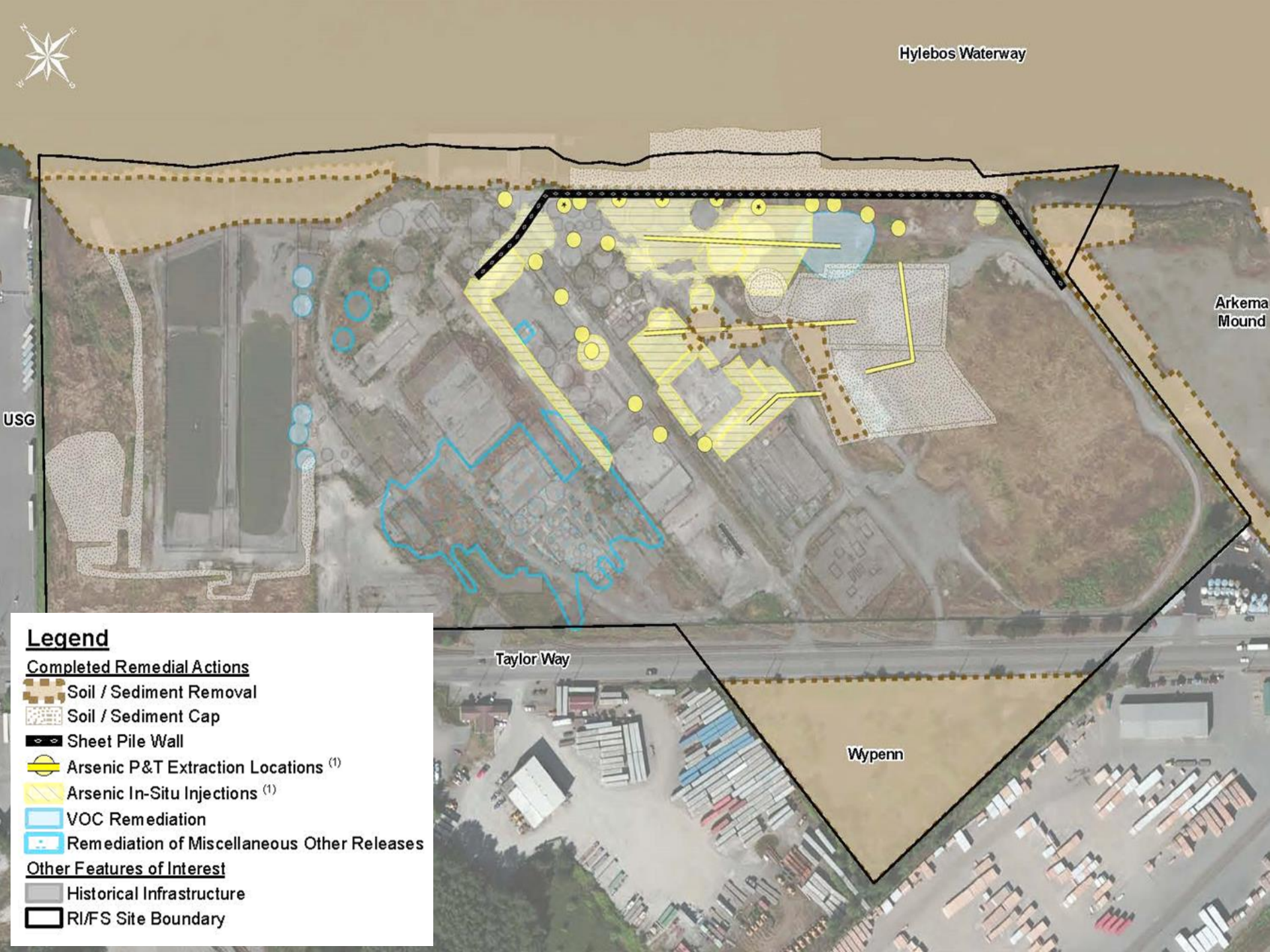
Project Authorization Increase
Arkema Manufacturing Area

Request project authorization increase in the amount $2,323,053, for a total authorized amount of $5,763,794, for the Arkema Manufacturing Area, Master Identification No. 096201.


HYLEBOS WATERWAY
Manufacturing
2901 Taylor Way
Log Yard
3009 Taylor Way
Wypenn
2920 Taylor Way
2006


Taylor Way
Cell Room
Chlorine Bldg
Caustic Bldg
Salt Pad
Hylebos Waterway
1940

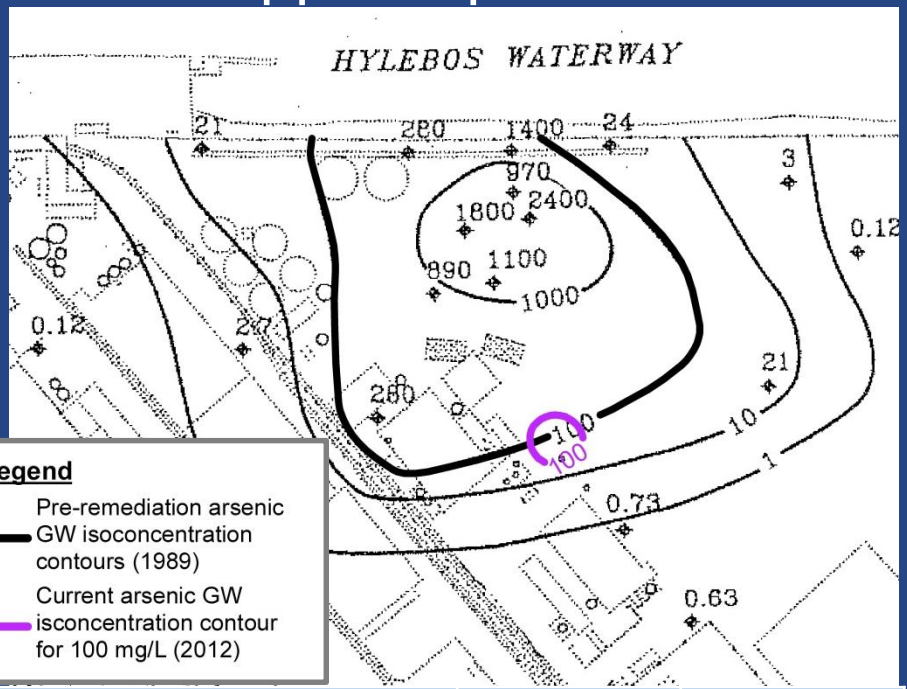

Hylebos Waterway
Storage&Shop Bldg
Former Penite Bldg
Caustic Bldg
Asbestos Pond
Cell Renewal Room
Fuel Oil Tanks
Shop
Transformers
Caustic Tanks
Chlorate Pond
Taylor Lake
Cell Room
Warehouse
Acid Plant
Transformers
Stripper Bldg
Staff Bldg
Chlorine Bldg
Office
Rectifier Bldg
Sodium Chlorate Tanks
Cell Room Pond
Sodium Chlorate Bldg
Taylor Way
1990


Hylebos Waterway
Arkema Mound
USG
Taylor Way
Wypenn
Legend
Completed Remedial Actions
Soil / Sediment Removal
Soil / Sediment Cap
Sheet Pile Wall
Arsenic P&T Extraction Locations (1)
Arsenic In-Situ Injections (1)
VOC Remediation
Remediation of Miscellaneous Other Releases
Other Features of Interest
Historical Infrastructure
RI/FS Site Boundary

Background
Arkema Manufacturing Area

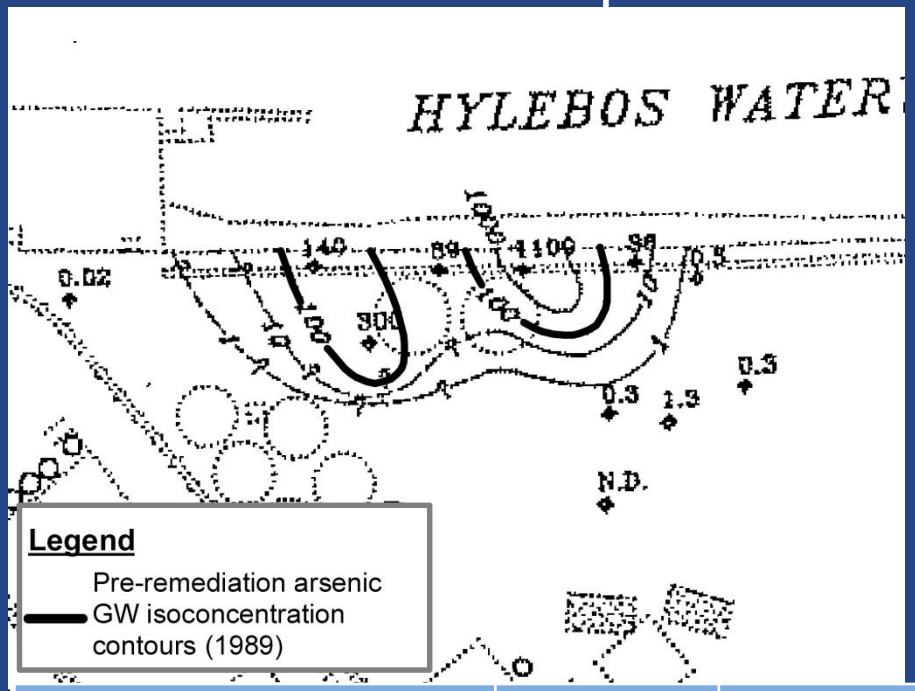
Remedy has Reduced Source Strength

Upper Aquifer



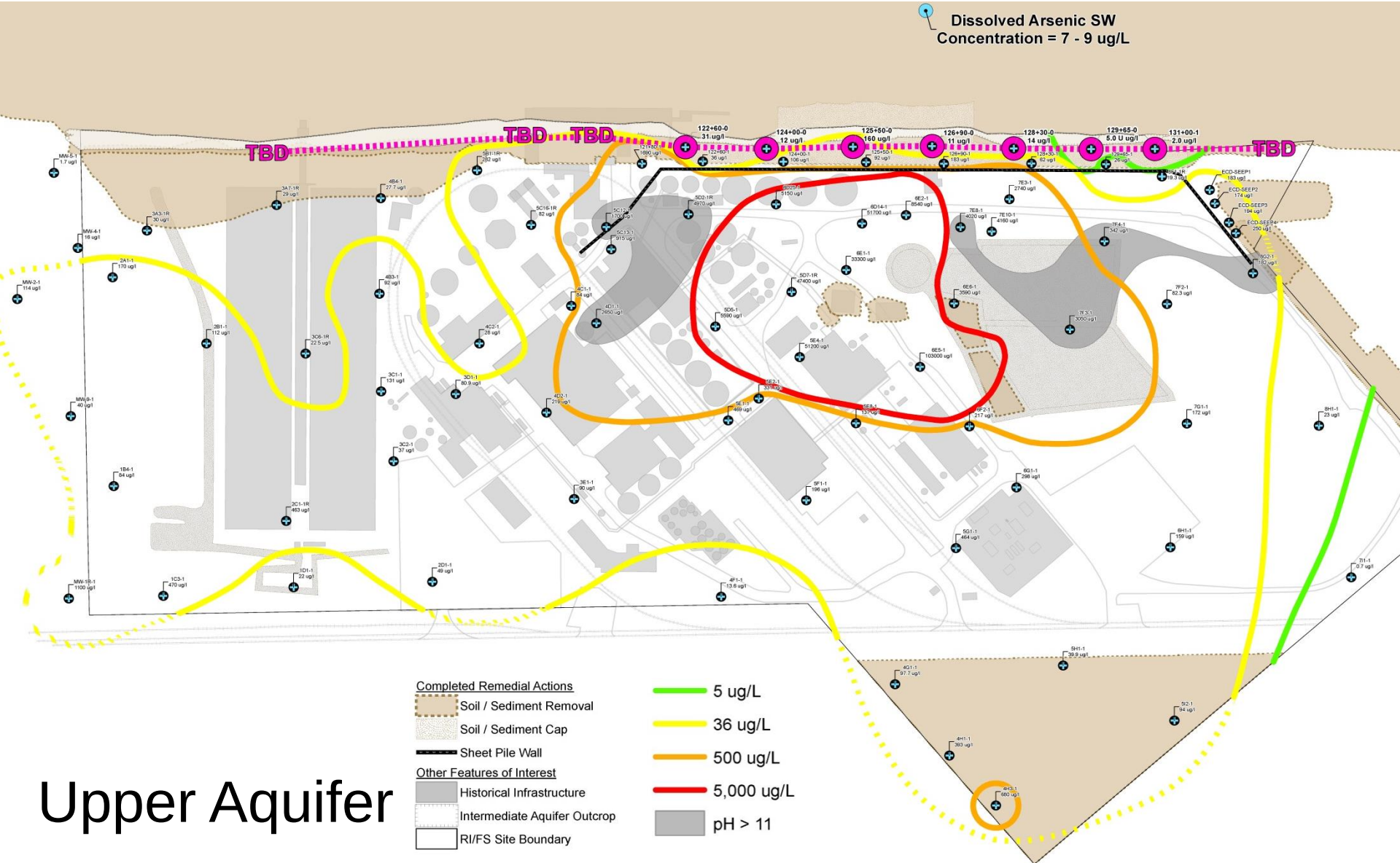
Comparison Item	1989	2012
Max Conc (mg/L)	2,400	103
100 mg/L Area (acres)	3.4	0.07

Intermediate Aquifer



Comparison Item	1989	2012
Max Conc (mg/L)	1,100	96
100 mg/L Area (acres)	0.3	0

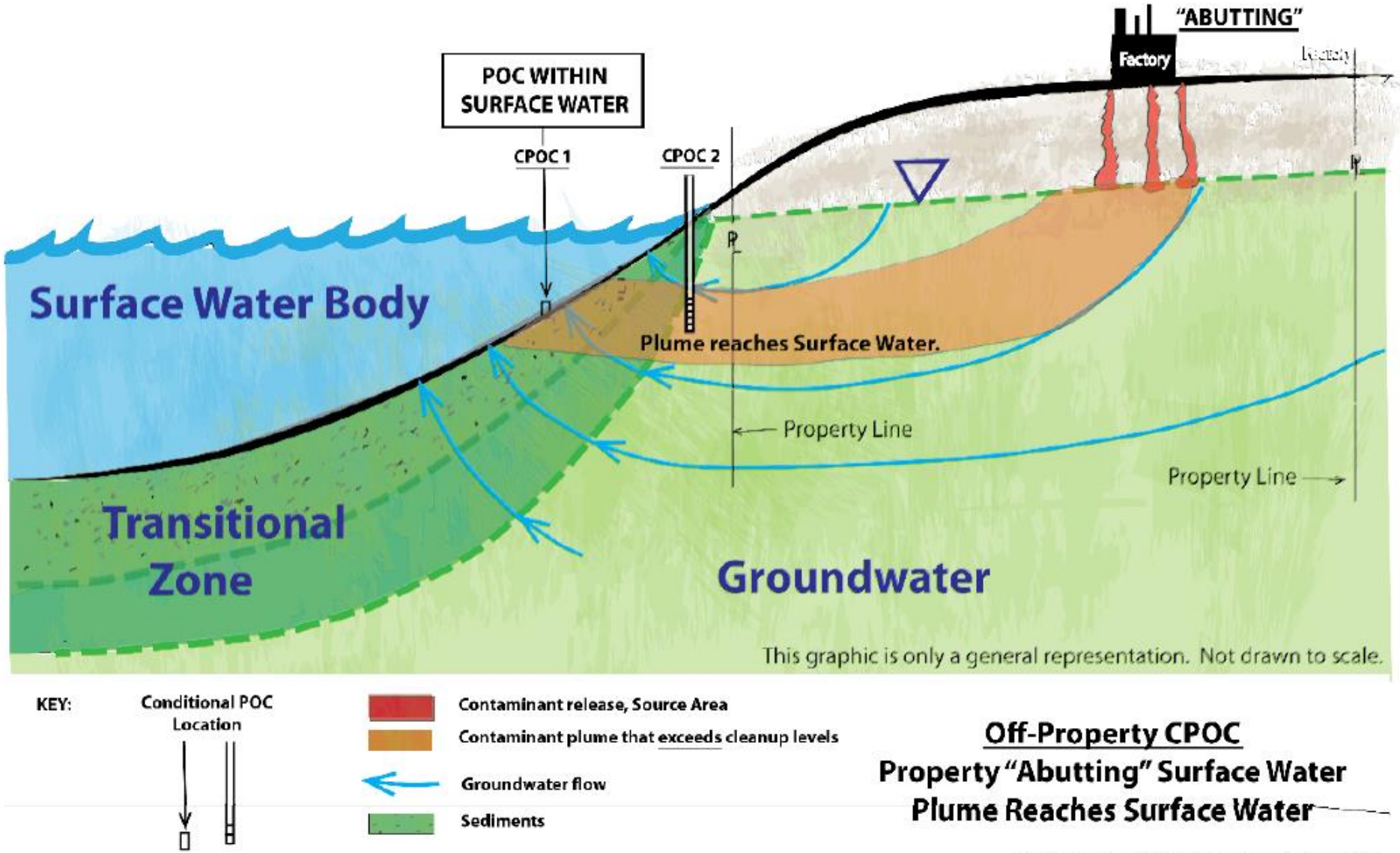
Background
Arkema Manufacturing Area



Upper Aquifer

Background
Arkema Manufacturing Area

Port of Tacoma



(HF 2016-1217: FS rev15_Artboard 2) **Figure 4a**

Project Description
Arkema Manufacturing Area

- Negotiation of an Agreed Order (Complete)
- Data Compilation Report (Complete)
- Remedial Investigation (RI) (Complete), Feasibility Study (FS) and Draft Cleanup Plan (DCAP)
- Cost Estimate to implement DCAP
- Potential Interim Actions
- Ecology Oversight Costs
- Legal Support
- Port Staff
- Contingency

Project Description
Arkema Manufacturing Area

Port of Tacoma

Key FS Data Gaps

1. Groundwater geochemistry is retarding arsenic transport, but more data and modeling is required to predict long-term behavior of the plume (plume stability)
2. The cause of a single groundwater seep with elevated arsenic along the bank of the Hylebos Waterway is not well understood (elevated UA seep)
3. The integrity of the existing sheet pile wall is unknown (wall integrity)
4. Is the wall necessary over the long-term (wall effectiveness)
5. Is targeted soil dig & haul a beneficial or feasible action (targeted dig & haul feasibility)
6. Concentrations at few compliance points are unknown (PPOC network)
7. Is nickel in UA seeps due to Site release (nickel in seeps)
8. Concentrations in nearshore Hylebos SW are unknown (SW data)

Source of Funds
Arkema Manufacturing Area

- The estimated cost to complete work under the current Ecology order (RI/FS/CAP) is $7,730,229.
- Additional Commission Authorization will most likely be required after the data gap workplan is implemented to fulfill requirements of the Ecology order.
- The estimated budget for this element of the project is $2,323,053.
- The 2017-2021 Capital Improvement Plan allocates $4,150,000 for this project.
- MTCA grant funding of $3.1M offset approximately 50% of implementation costs of the current Ecology order.

Financial Summary
Arkema Manufacturing Area

Port of Tacoma

Project Cost Summary			
Item	**Budget Estimate**	**Cost to Date**	**Remaining Cost**
Prior Environmental Work			
May 2007 through March 2011 Investigation, Historical Data Review and Documentation, Groundwater Sampling, Further Investigation Planning	$1,191,896	$1,191,896	$0
Funding Authorization for Agreed Order DE 5668 (RI/FS and DCAP)			
Consultant(s)	$2,846,587	$1,522,298	$1,324,289
Port Staff	$350,637	$270,637	$80,000
Purchase Orders	$262,552	$31,731	$230,821
Legal Support	$170,000	$127,870	$42,130
Ecology Oversight	$270,000	$202,267	$67,733
Contingency (40%)	$672,122	$0	$672,122
Agreed Order TOTAL	**$4,571,898**	**$2,154,804**	**$2,417,094**
Sub-total Prior Environmental Work + Agreed Order TOTAL	$5,763,794	$3,346,700	$2,417,094
Grant Reimbursements	$3,115,807	-$1,566,443	$1,549,364
Prior Environmental Work + Agreed Order TOTAL minus Grant Reimbursements	**$2,647,987**	**$1,780,256**	**$867,730**
Future Authorization Requests			
Complete Agreed Order DE 5668 (FS and DCAP)	$1,966,435	$0	$1,966,435
Interim and/or Final Cleanup Actions, Long Term Monitoring	$11,000,000-$119,000,000 (estimate)	$0	$11,000,000 - $119,000,000 (estimate)
Future Authorization Requests TOTAL	$12,966,435-$120,966,435 (estimate)	**$0**	$12,966,435 - $120,966,435 (estimate)
PROJECT TOTAL	**$18,730,229-$126,730,229 (estimate)**	**$3,346,700**	**$15,383,529-$123,383,529 (estimate)**

Project Schedule
Arkema Manufacturing Area

Activity	Timeframe
Implement Data Gap Workplan	3Q17 through 2Q18
Submit Arsenic Stability Report	November 1, 2018
Add'l Commission Authorization	December 21, 2018
Submit Feasibility Study	November 1, 2019

Conclusion
Arkema Manufacturing Area

Request project authorization increase in the amount $2,323,053, for a total authorized amount of $5,763,794, for the Arkema Manufacturing Area, Master Identification No. 096201.

Backup Slides

Background
Land Purchase

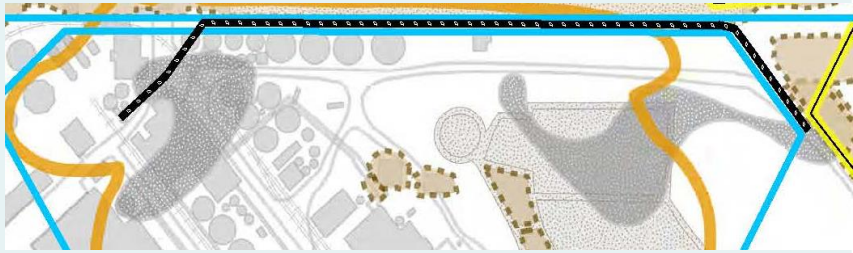
• **2006 Appraisal**		$27,390,000
• Port – Arkema Agreement		
Deductions		
Mound Allowance	$1,700,000	
Remaining Cleanup**	$3,000,000	
Subtotal	$4,700,000	
• **Net purchase price**		$22,690,000

** Port pre-purchase estimate for future cleanup costs: $20.4M to $28.7M

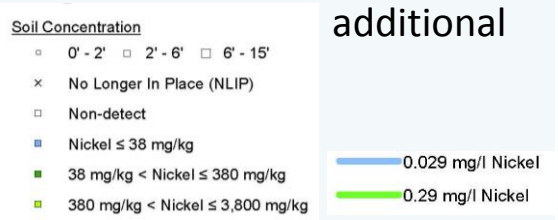
Project Description
Arkema Manufacturing Area

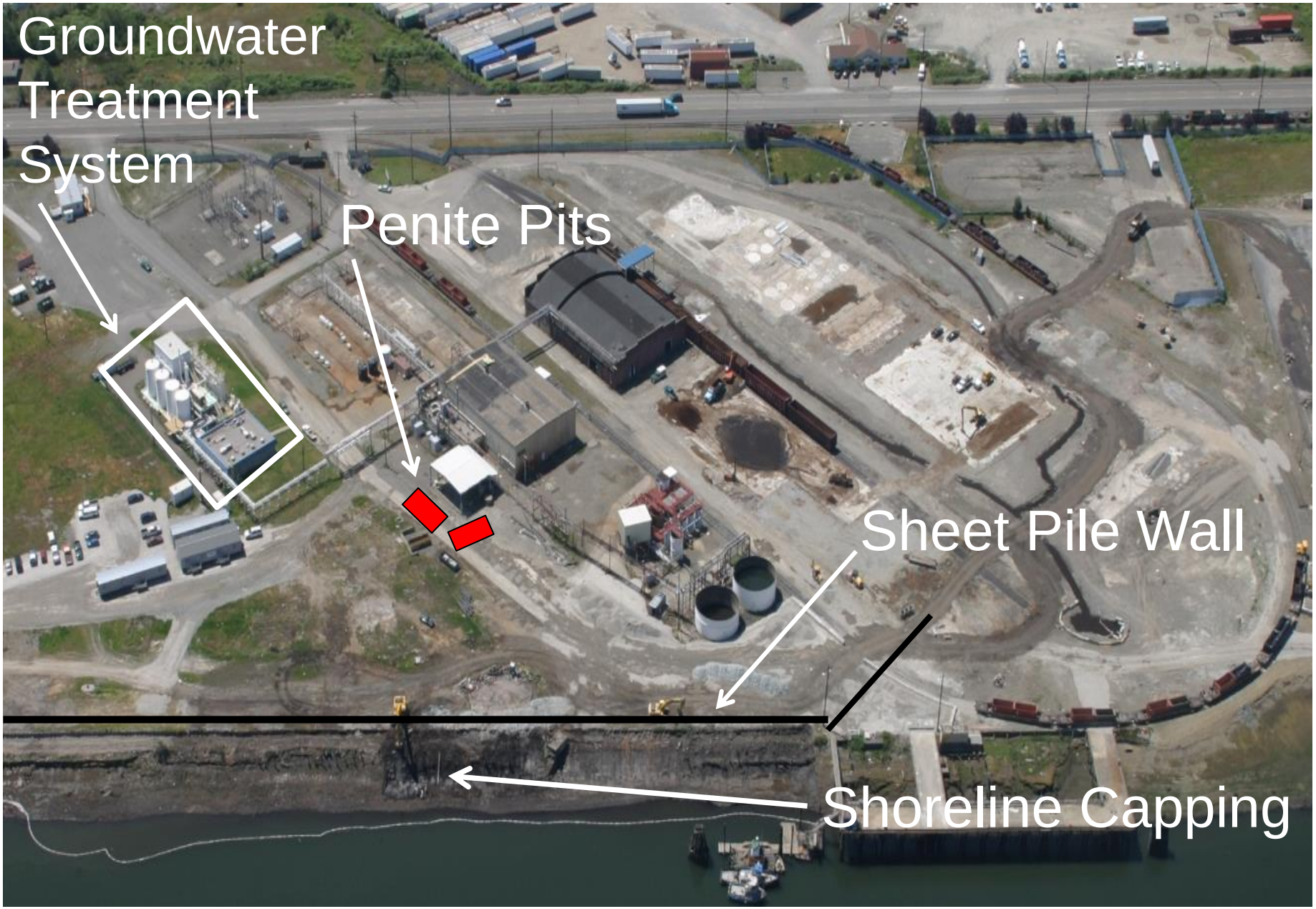
FS Data Gap	Issue Summary	Overview of Proposed FS Investigation Activities
1. Plume stability	The type and degree of remediation for SW protection will depend in large part on whether the plume is stable	• Conduct an extensive GW sampling event in 2017 &2018 • Evaluate multiple lines of evidence and prepare report • Conduct recurring GW sampling after report approved
2. Elevated UA seep	Influences the nature of the preferred remedy for SW protection near the shoreline and potentially in the source area	• Evaluate existing and new paired soil and GW concentrations inside vs. outside the wall for arsenic and geochemical indicators • Results of plume stability and wall integrity evaluations
3. Wall integrity	The current and anticipated future integrity of the wall affects the role of the existing wall in the preferred remedy and evaluations of other FS data gaps	• Evaluate multiple lines of evidence as necessary • Mine existing data (e.g., photos, tidal SWLs, pump tests) • Visual observations and wall thickness in test pits • Other tests (e.g., corrosion, tracer, pump) as necessary
4. Wall effective-ness	Affects evaluation of competing technologies (e.g., wall, different containment design, treatment with PRB or funnel & gate, increased attenuation with marine water mixing, etc)	• Results of above evaluations • Evaluate pre-wall vs. post-wall arsenic concentrations • Evaluate geochemical indicators inside vs. outside wall • Re-evaluate GW modeling results as necessary

Project Description
Arkema Manufacturing Area

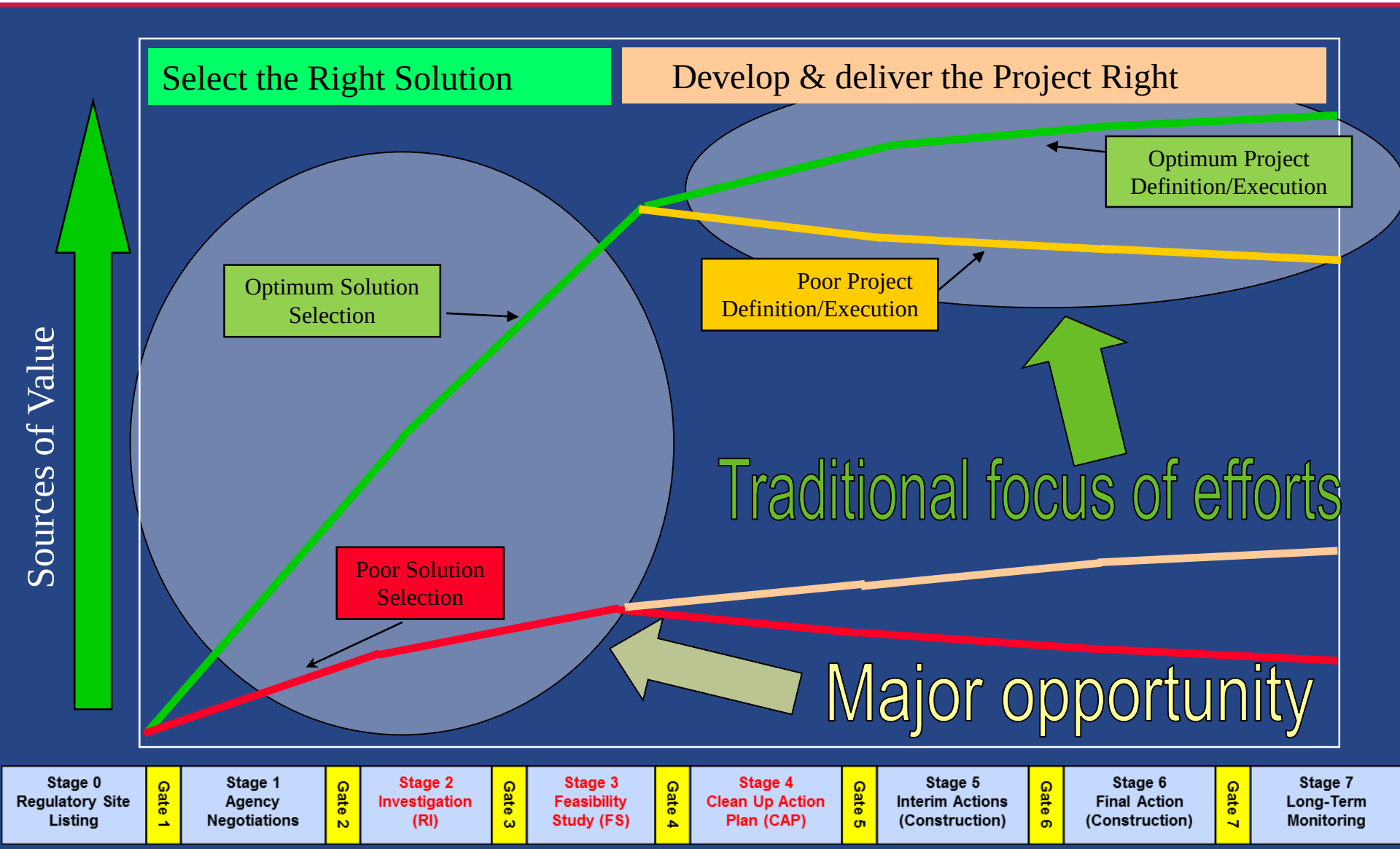
FS Data Gap	Issue Summary	Overview of Proposed FS Investigation Activities
5. Targeted dig & haul feasibility	Cannot evaluate feasibility of targeted dig & haul proximate to Penite Pits due to low data density (e.g., 1st Aquitard)	• Collect soil samples to increase vertical and horizontal data density by Penite Pits 
	Cannot evaluate feasibility of targeted dig & haul for potential localized soil pH sources due to low data density	• Collect soil pH samples to increase data density in areas with elevated GW pH
	Feasibility of targeted dig & haul depends on how much excavated soil would be haz waste	• Also analyze soil for TCLP metals
	Feasibility of targeted dig & haul depends on whether haz soil can be adequately treated on-site to facilitate non-haz disposal	• Conduct bench tests for ex-situ stabilization as part of FS data gap investigation • Conduct ex-situ stabilization pilot if necessary
	Feasibility of targeted dig & haul depends on ability to excavate relatively deep (e.g., likely into 1st Aquitard)	• Evaluate excavation depth & dewatering feasibility during ex-situ stabilization pilot test (if conducted)

Project Description
Arkema Manufacturing Area

FS Data Gap	Issue Summary	Overview of Proposed FS Investigation Activities
6. PPOC network	Need to refine arsenic concentrations at PPOC locations near sides of sheet pile wall, and confirm copper and mercury compliance at PPOC	 • Will also collect passive samples at select PPOC locations
7. Nickel in seeps	Although existing info indicates nickel is not due to additional	• Install and sample a co-located UA Seep Sampler (or similar) that is not constructed with stainless steel  
8. SW data	Need SW data to evaluate ongoing protectiveness of HH&E, Hylebos background concentrations, and SW	• Collect nearshore Hylebos SW samples along Site shoreline • Collect SW samples at one or more non-Site locations


Groundwater Treatment System
Penite Pits
Sheet Pile Wall
Shoreline Capping

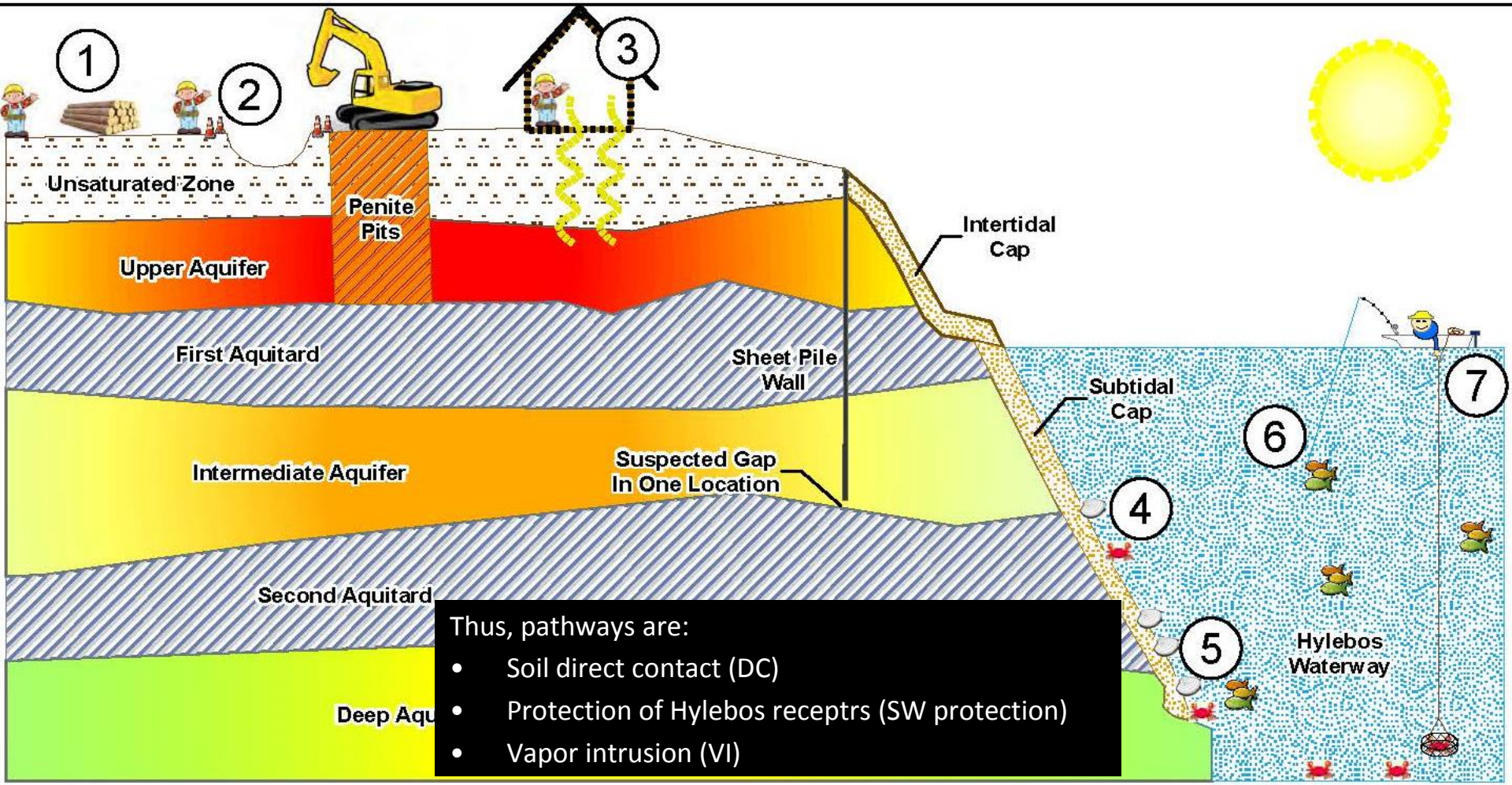
Create value by selecting an optimum solution



Background
Arkema Manufacturing Area

Item	Cost	Comments/Notes
Arkema environmental studies	$11M	• Does not include 2006 to 2008 costs • Costs not adjusted to current dollars
Arkema primary remediation	$15M	• Assumed to include soil removals, P&T, and sheet pile wall • Costs not adjusted to current dollars
Arkema P&T O&M	$14.3M	• $1.3M/year for 11 years • Costs not adjusted to current dollars
Arkema in-situ stabilization RD/RA	$3M	• Assumed based on "several million" in Arkema 2006 letter • Costs not adjusted to current dollars
Arkema sediment cap	$2.6M	• Assumed to be separate from HHCG sediment remedy RD/RA • Costs not adjusted to current dollars
HHCG sediment remedy RD/RA	$29.8M	• Assumed to be 50% split of $59.6M in 2011 CB/NT RACR • Costs not adjusted to current dollars
Port RI and associated tasks	$2.4M	• Actual Port costs for 2007 to May 2013 • Costs not adjusted to current dollars
Port FS and associated tasks	$2M	• includes anticipated FS data gap investigation, treatability studies, etc • Estimated future costs
Minimum commitment for long-term monitoring under existing remedy	$1.6M	• Minimum estimated future costs assume groundwater sampling at $100K/year for 30 years at 5% NPV • Sediment sampling associated with CB/NT remedy not included
Minimum commitment for long-term management under existing remedy	$1M	• Minimum estimated future costs for land use inspections, sediment cap inspections, and sediment cap repair/replacement as necessary
Total	**$83M**	Total of previous costs + minimum committed costs

Conceptual Site Exposure Model (CSEM)



Thus, pathways are:

- Soil direct contact (DC)
- Protection of Hylebos receptrs (SW protection)
- Vapor intrusion (VI)

1. Incidental ingestion, dermal contact, and inhalation of particulates from surface soil by on-site workers and trespassers.
2. Incidental ingestion, dermal contact, and inhalation of particulates from subsurface soil by utility workers.
3. Inhalation of indoor air vapors by on-site workers if occupied building was constructed without vapor instrusion mitigation systems in the few isolated areas that have VOC impacts.
4. Ingestion and dermal contact with surface water and sediment by aquatic organisms.
5. Consumption of seafood by aquatic organisms.
6. Consumption of seafood by recreators and subsistence fishers.
7. Incidental ingestion and dermal contact with surface water and sediment by recreators and subsistence fishers.

Nickel in Seep Samplers Due to Stainless Steel?