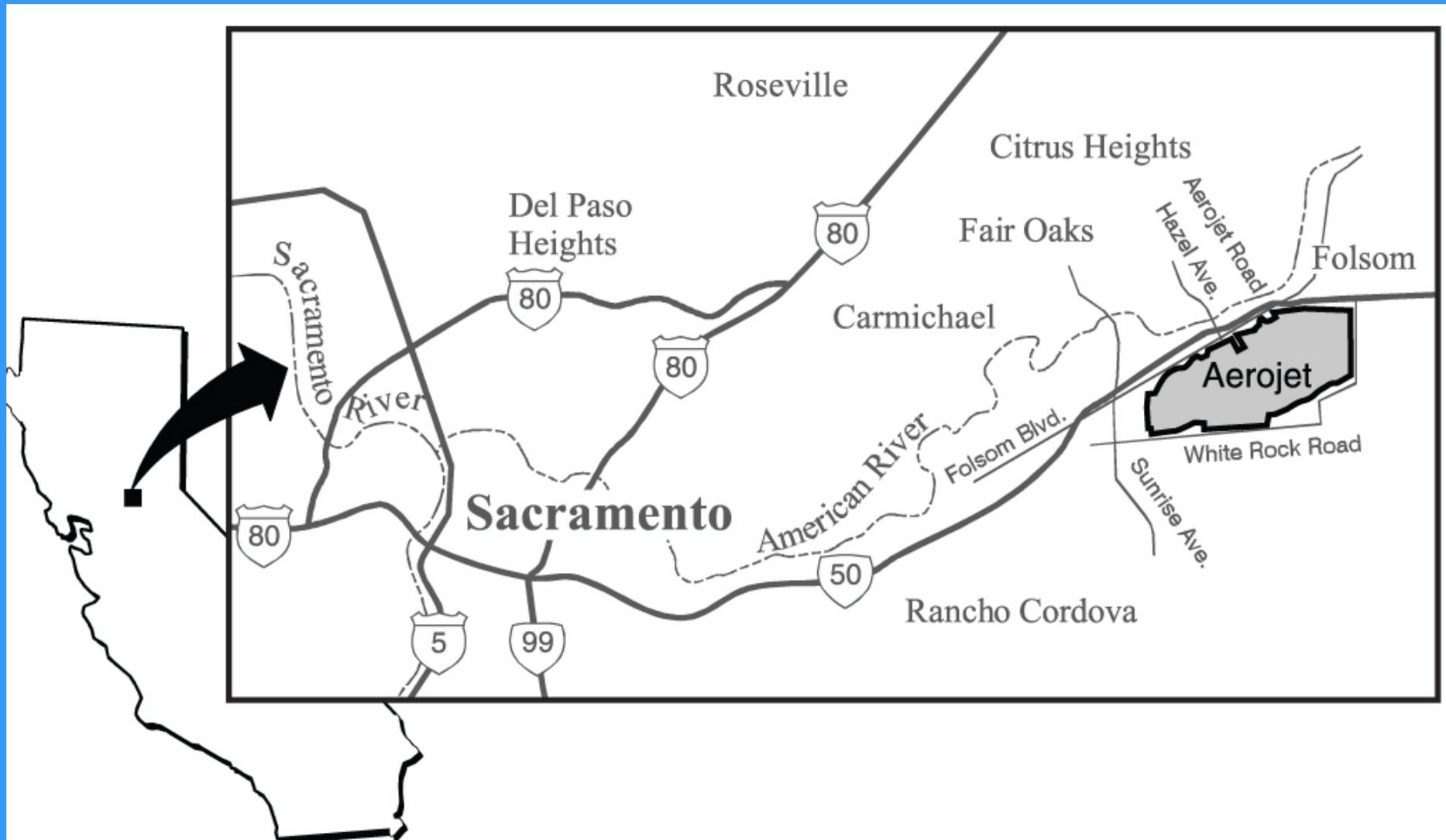


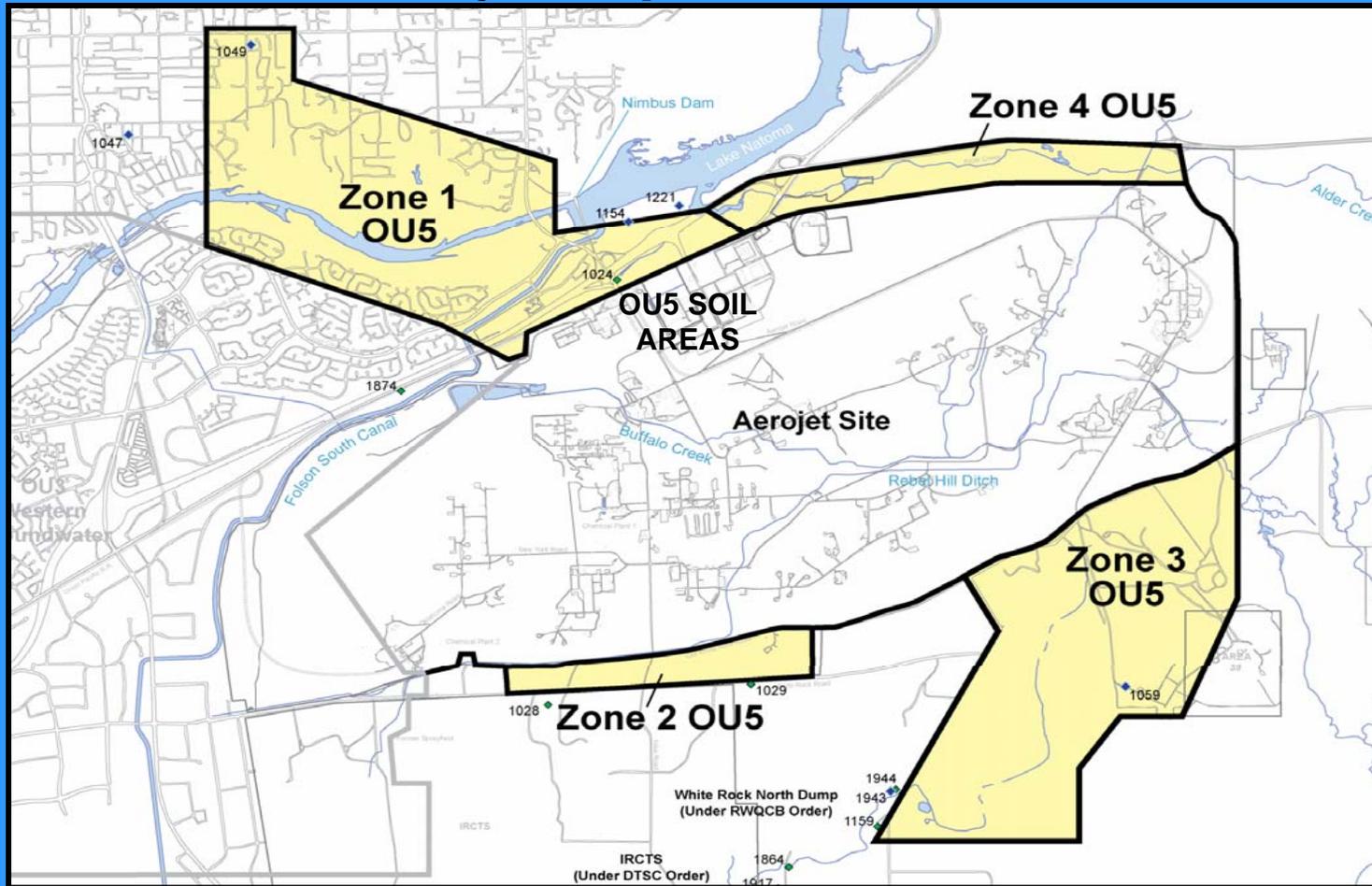
Aerojet General Superfund Site, Rancho Cordova, California



Aerojet General Site Location



Aerojet Superfund Site



Proposed Plan
Perimeter Groundwater
Operable Unit OU-5

Presentation Outline

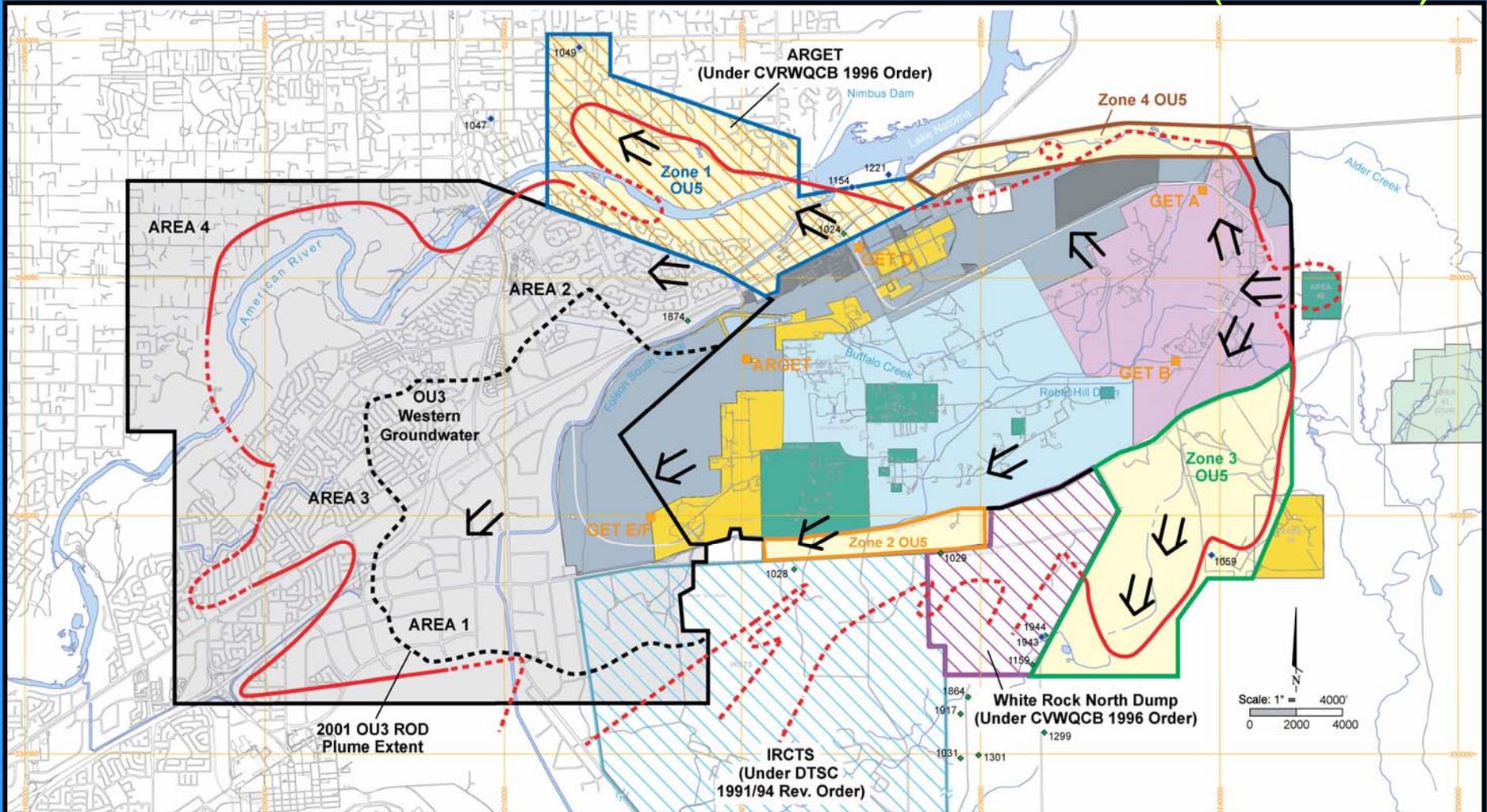
Aerojet Site, Operable Units and General Approach Groundwater

- The Problem and Objectives, Risks and Rules
- Cleanup Alternatives
- Soil Vapor

Soil

- The Problem and Objectives, Risks and Rules
- Cleanup Alternatives

Aerojet Site Operable Units, Groundwater Flow (black arrows) and Extent of Groundwater Contamination (red line)



- | | | | | | | | |
|---|------------------|---|---------------|---|-------------|---|-------------|
|  | OU3-Western |  | OU5-Perimeter |  | OU7-Island |  | OU9-Central |
|  | OU4-Cavitt Ranch |  | OU6-Boundary |  | OU8-Eastern | | |

Groundwater Remedial Goals

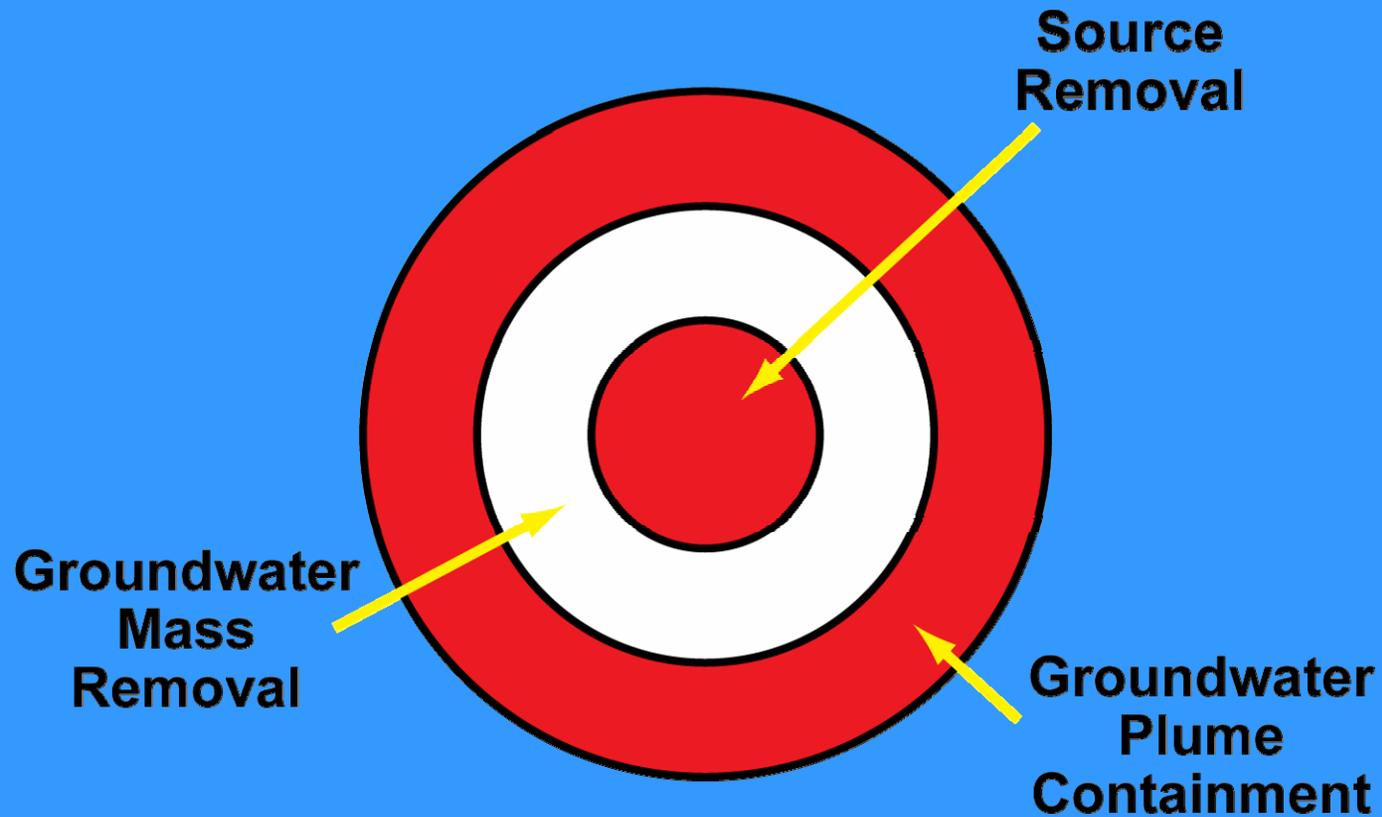
Protect Public Drinking Water Supply
Immediately

Contain Current Contaminant Plume

Minimize Off-Site Migration of Chemicals to
Protect Beneficial Uses (Source Control)

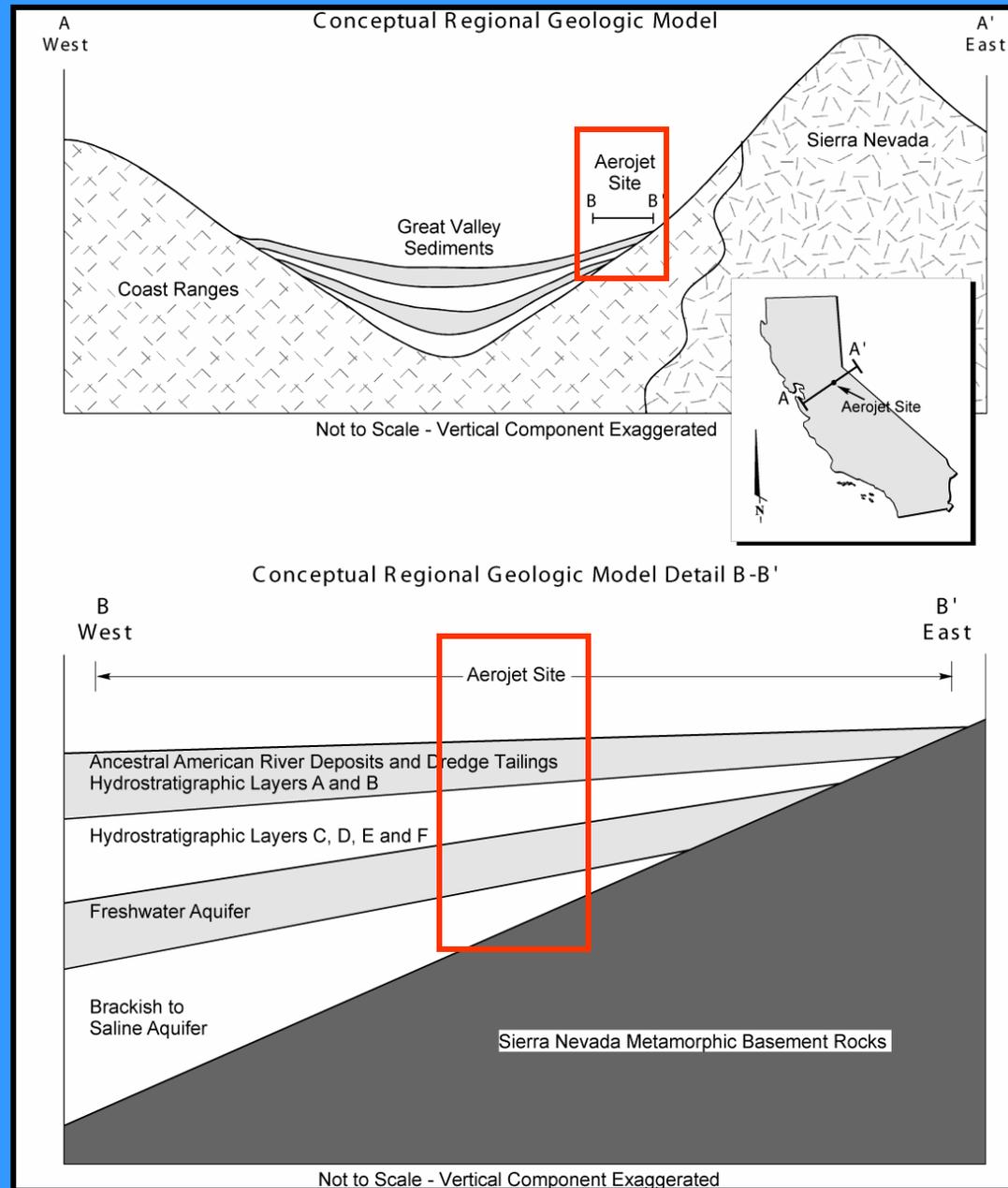
Restore Groundwater between Source Areas
and Outer Extent of Contamination

Groundwater Remedial Target



Regional Site Conceptual Groundwater Model

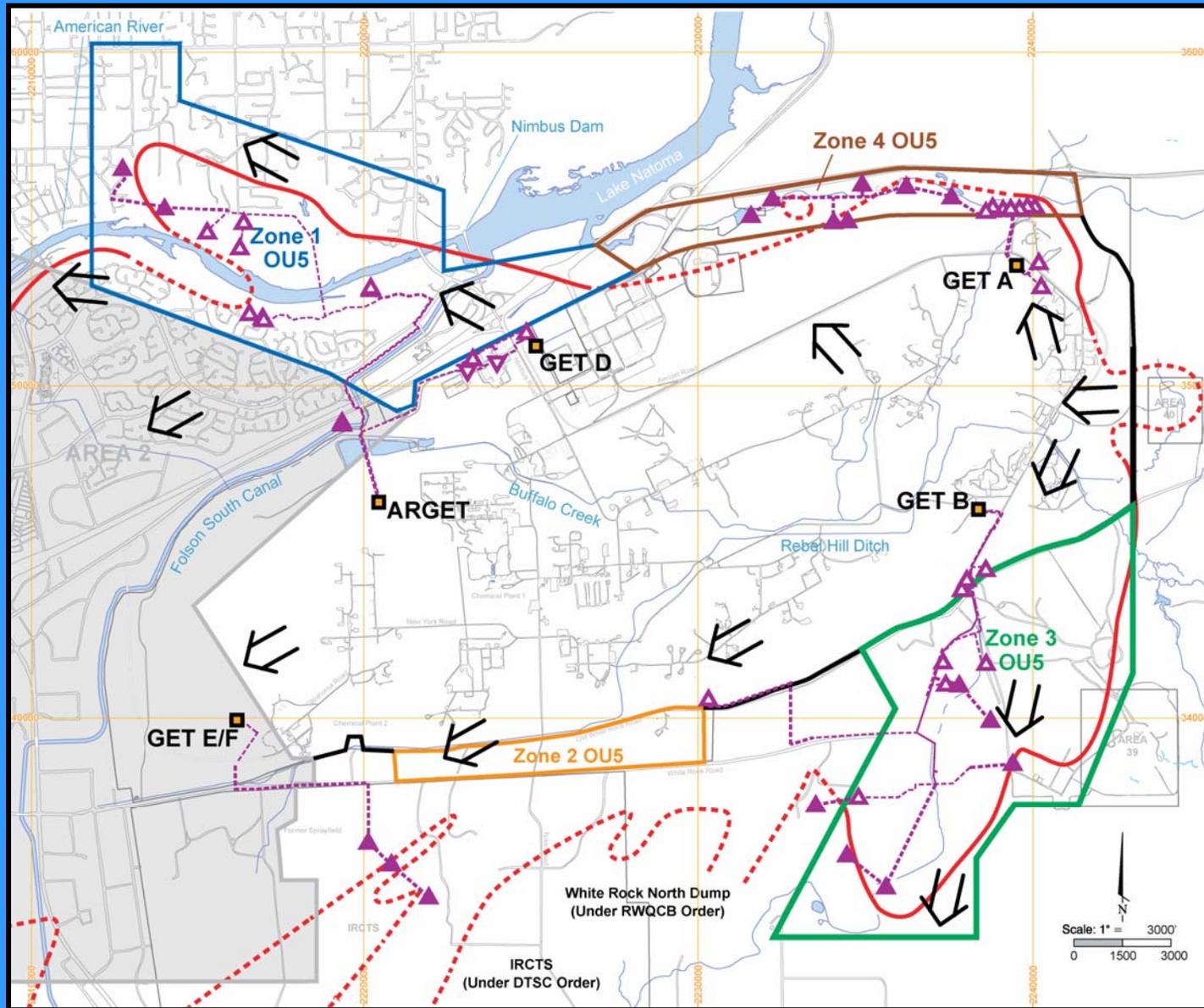
Multiple Layers of water-bearing sand and gravel with layers of water-resisting material such as silt and clay.



Groundwater Chemicals of Potential Concern

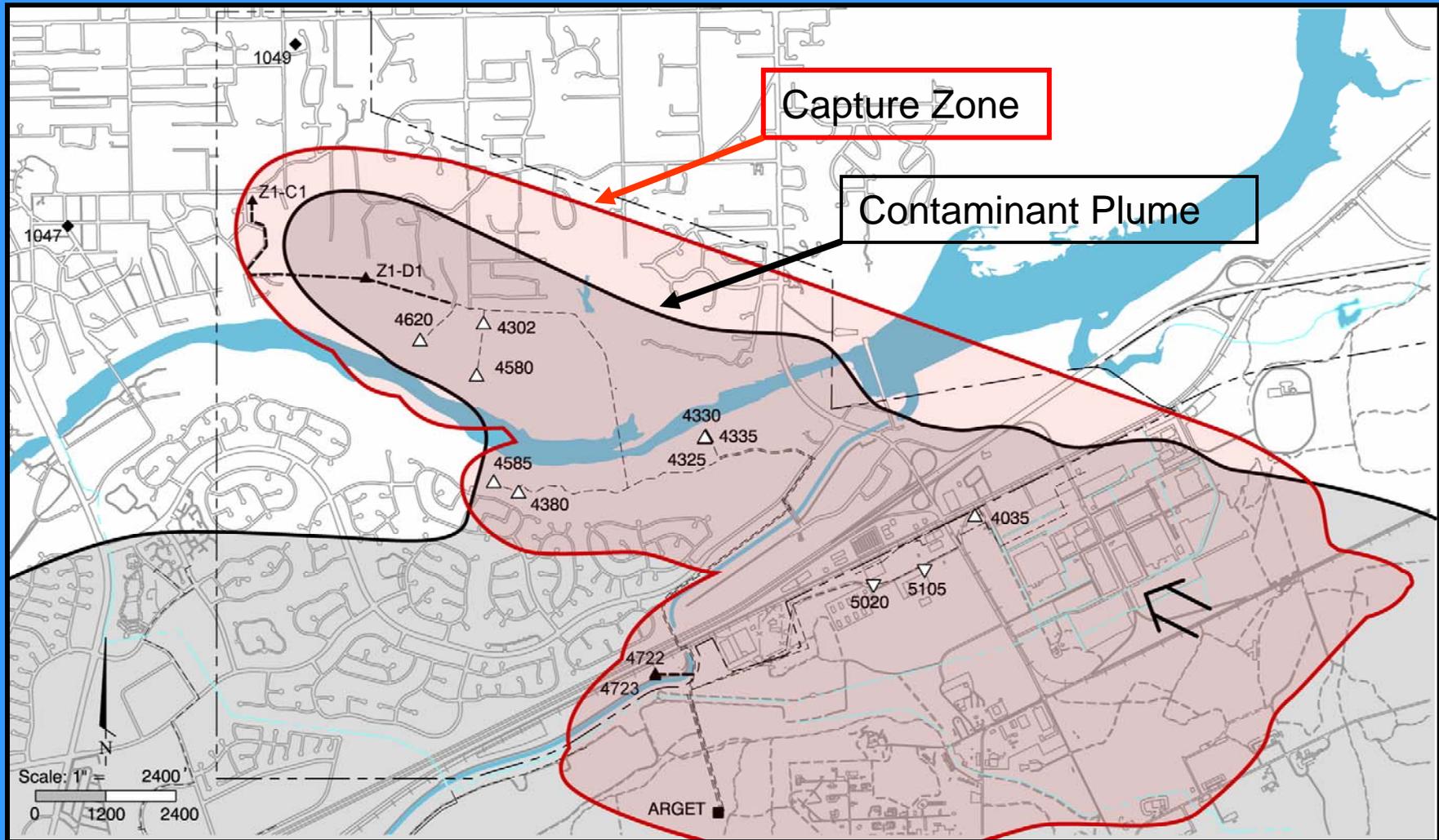
Chemicals of Potential Concern	Containment and Cleanup Level (micrograms per liter or ppb)	
Non-Metal Anion		
Perchlorate	6	CA Drinking Water Standard (MCL)
SVOCs		
N-Nitrosodimethylamine (NDMA)	0.003	CA Public Health Goal ★
VOCs		
Trichloroethylene (TCE)	5	Federal MCL
1,1,2,2-Tetrachloroethane	1	CA MCL
1,1,2-Trichloroethane	5	Federal MCL
1,1-Dichloroethylene	6	CA MCL
1,2-Dichloroethane	0.5	CA MCL
1,2-Dichloroethene cis	6	CA MCL
1,2-Dichloroethene trans	10	CA MCL
1,4-Dioxane	3	Federal Public Health Advisory ★
Bromodichloromethane	80	Federal MCL
Carbon tetrachloride	0.5	CA MCL
Chloroform	80	Federal MCL
Dibromochloromethane	80	Federal MCL
Methylene chloride	5	Federal MCL
Tetrachloroethylene	5	Federal MCL
Vinyl chloride	0.5	CA MCL

Preferred Groundwater Remedy



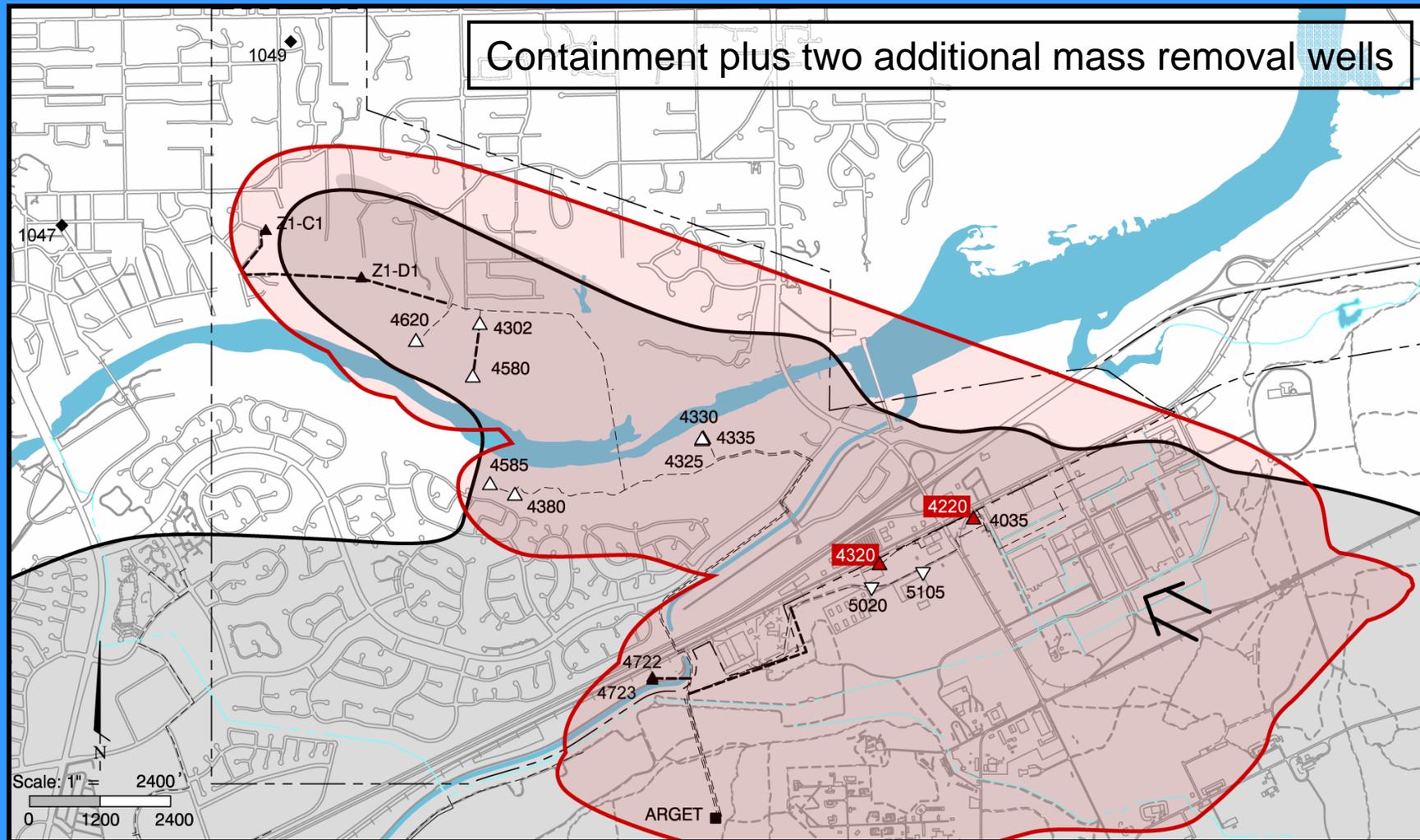
Groundwater Containment Alone

Example in the Fair Oaks-Gold River Area (Zone 1)



-  Composite Capture Zone for All Layers
-  Maximum Extent of COCs for All Layers in Zone 1 (TCE Controls)

Groundwater Containment and Additional Mass Removal Example in the Fair Oaks-Gold River Area (Zone 1)



-  Composite Capture Zone for All Layers
-  Maximum Extent of COCs for All Layers in Zone 1 (TCE Controls)

Groundwater Remedy Estimated Costs and Time

Alternative	Alternative Description	Cost (30-Year Net Present Value)	Years for Completion
Z1-1	No Action	\$1.9M	NA
Z1-2	Groundwater Containment	\$13.4M	151
Z1-3	<i>Groundwater Containment with Mass Removal</i>	<i>\$19.8M</i>	<i>124</i>
Z2-1	No Action	\$0.5M	NA
Z2-2	Ground water Containment	\$11.2M	232
Z2-3	<i>Ground water Containment with Mass Removal</i>	<i>\$12.8M</i>	<i>131</i>
Z3-1	No Action	\$2.0M	NA
Z3-2	Ground water Containment	\$18.3M	327
Z3-3	<i>Ground water Containment with Mass Removal</i>	<i>\$24.0M</i>	<i>263</i>
Z4-1	No Action	\$0.7M	NA
Z4-2	Ground water Containment	\$7.5M	347
Z4-3	<i>Ground water Containment with Mass Removal</i>	<i>\$7.8M</i>	<i>208</i>

* Preferred alternatives are highlighted.

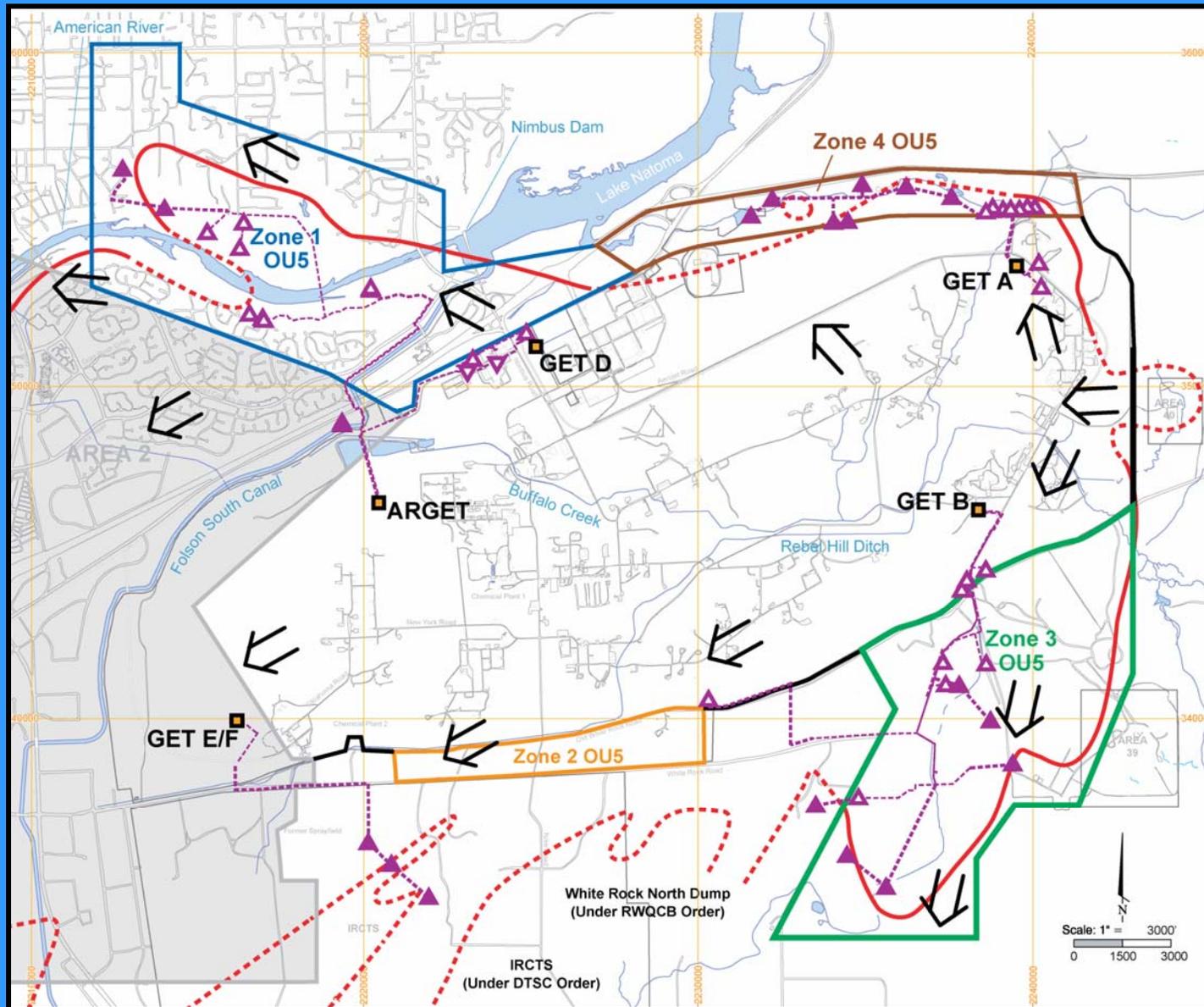
Groundwater Alternatives Evaluation

Evaluation Criteria	No Action (monitor)	Groundwater Containment	Groundwater Containment with Mass Removal (Preferred)
Overall Protectiveness			
Compliance with State & Federal Requirements			
Long-term Effectiveness			
Implementability	NA		
Short-term Effectiveness	NA		
Reduction of Toxicity, Mobility or Volume by Treatment			
Estimated Project Cost	\$5.1 M	\$56.8 M	\$61.3 M
State Agency Acceptance	CA Department of Toxic Substance Control & CA Central Valley Regional Water Quality Control Board concurred with EPA's highlighted preferred alternative, with the exception that the RWQCB State prefers a lower TCE and chloroform containment level based on final and draft Public Health Goals.		
Community Acceptance	Community acceptance of the preferred alternative will be evaluated after the public comment period.		

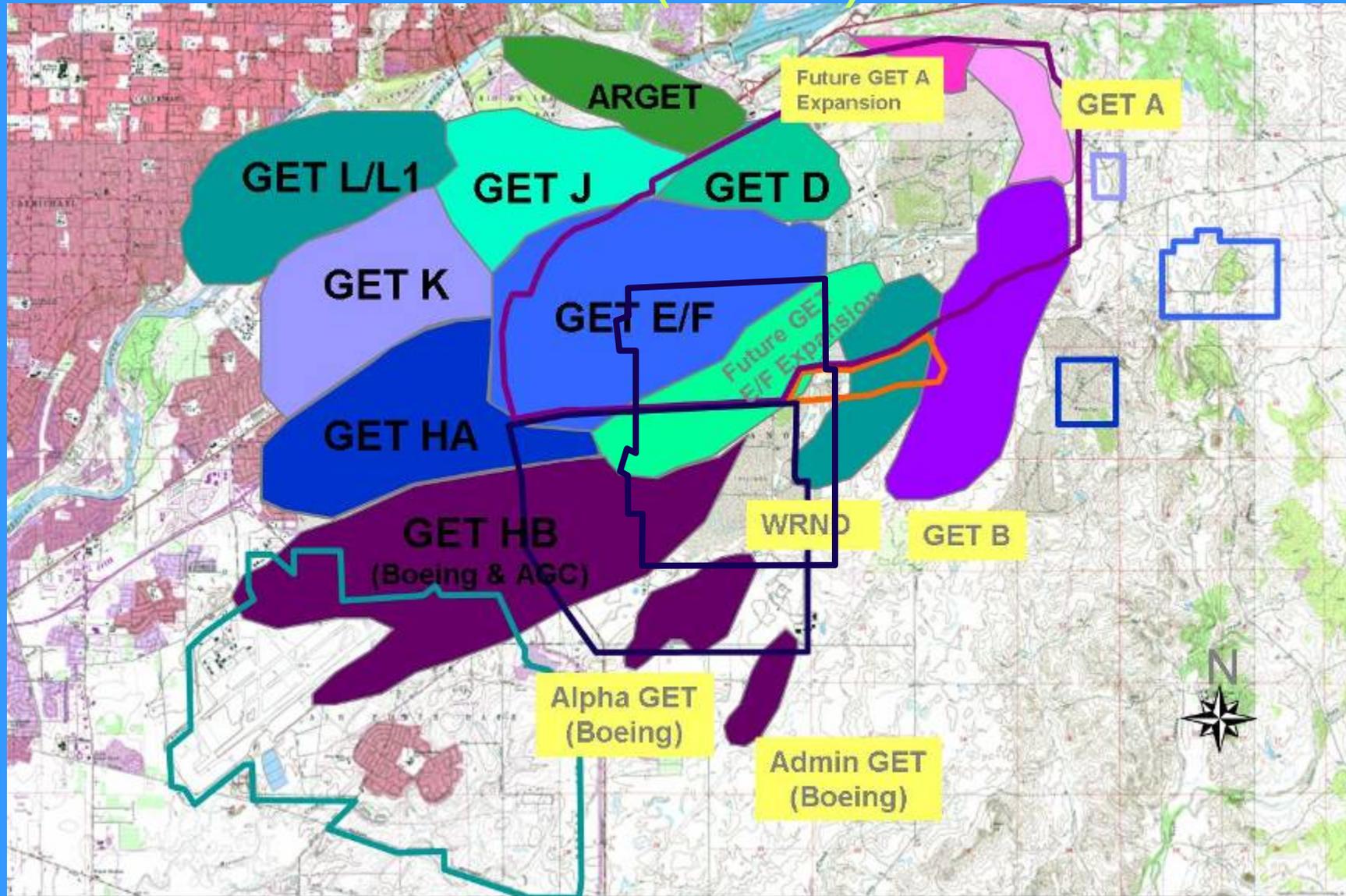
 = Does not meet criterion
  = Partially meets criterion
  = Meets criterion

Preferred Groundwater Remedy Components

- 1) Pumping to Capture
- 2) Treating
- 3) Discharge or Reuse



Aerojet Groundwater Extraction Treatment (GET) Areas

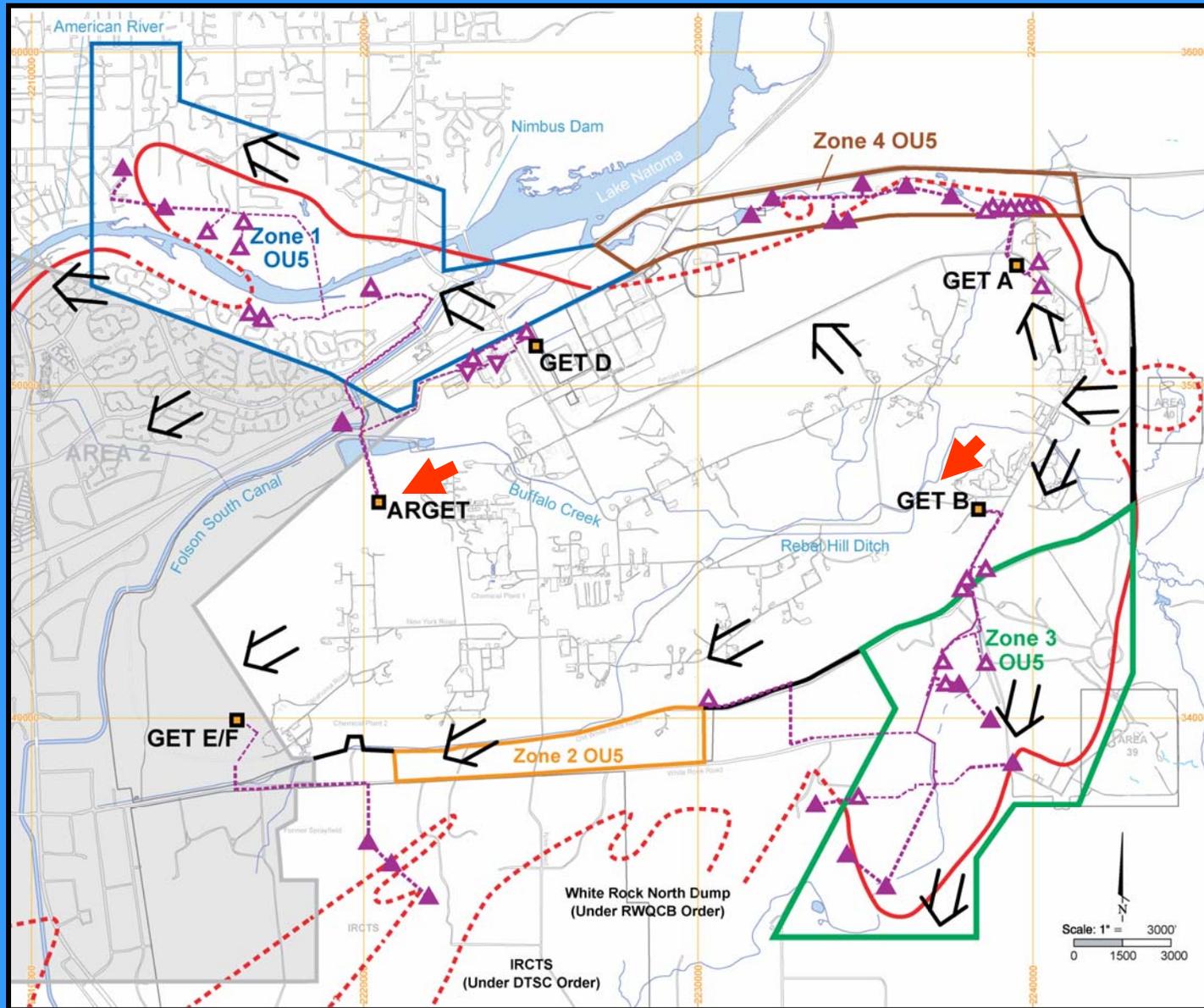


American
River
Groundwater
Extraction
and
Treatment
System

ARGET



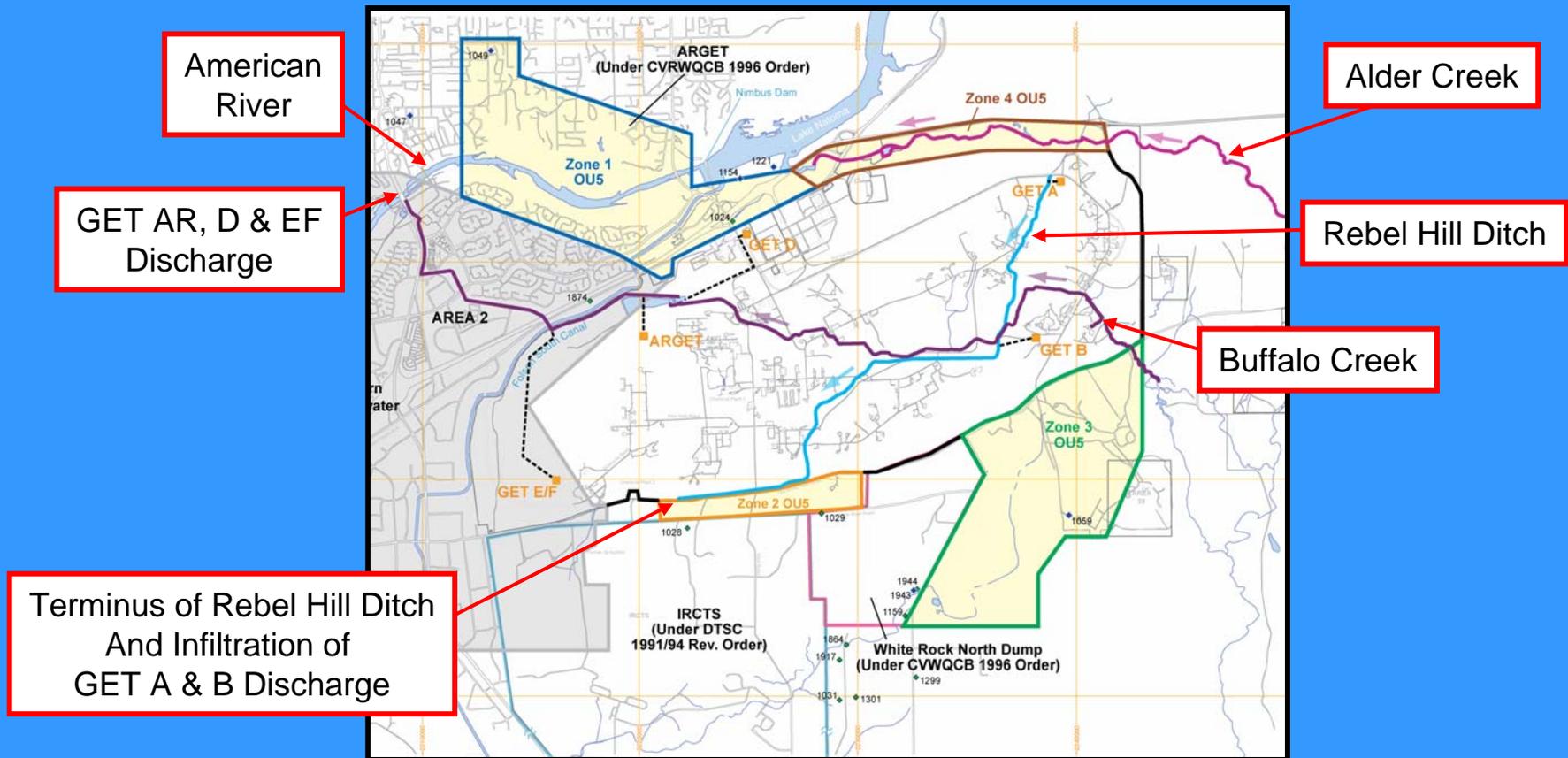
Preferred Remedy for All Zones





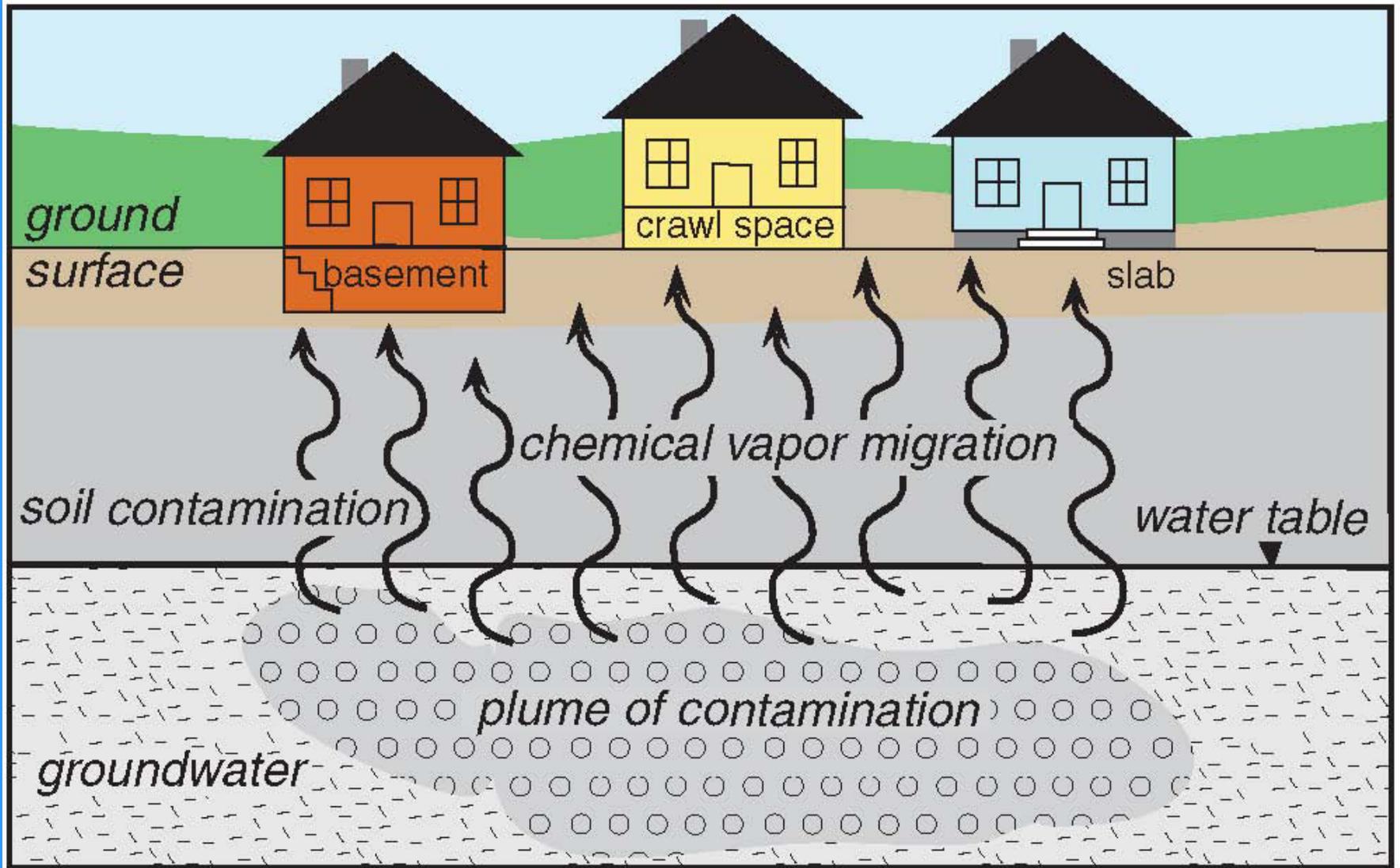
GET B

Current Groundwater Discharge

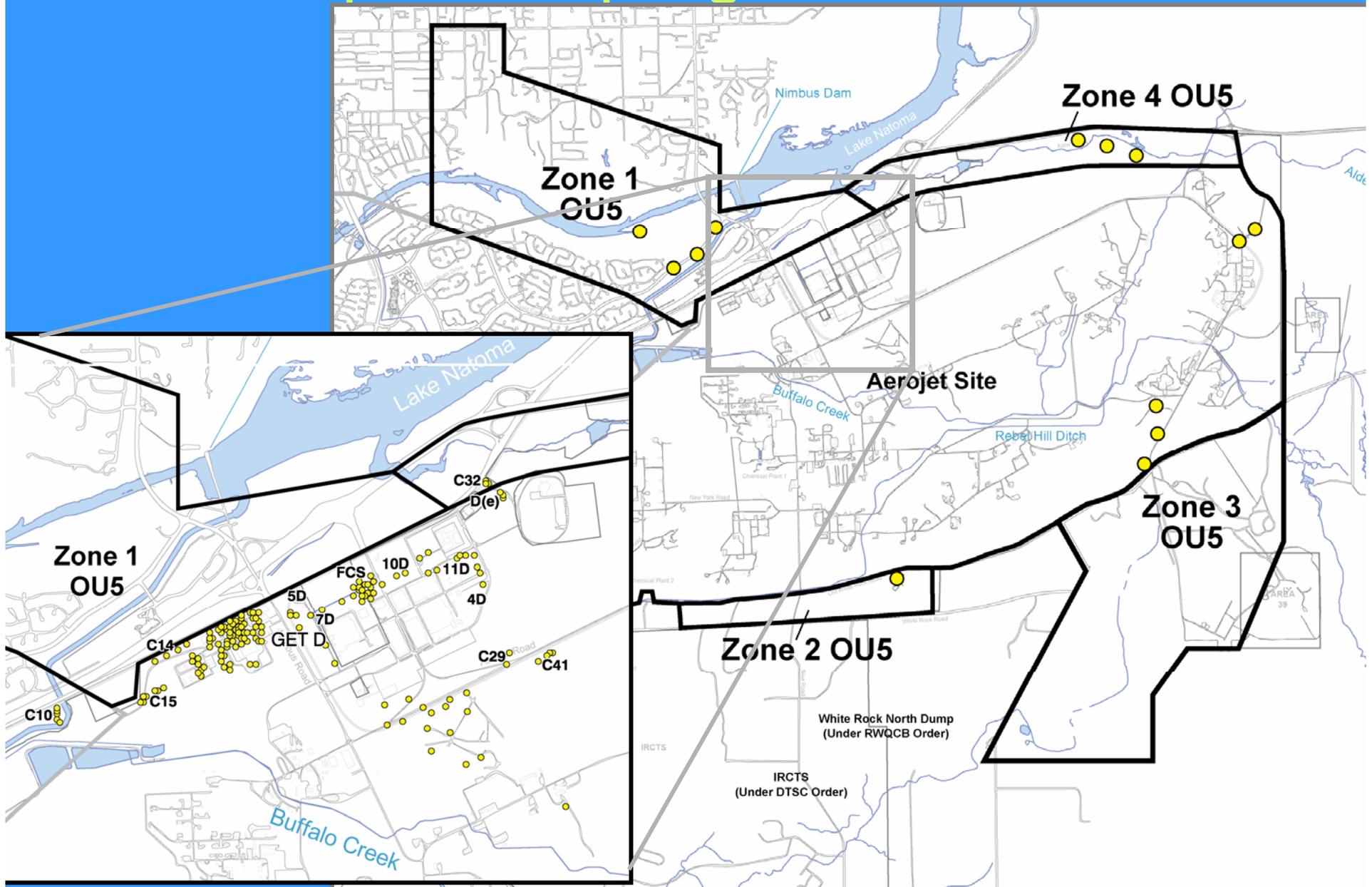


Treatment Levels for Surface Discharge
Must Meet State Discharge Limits

Vapor Intrusion from Groundwater



Soil Vapor Sampling ~300 Locations



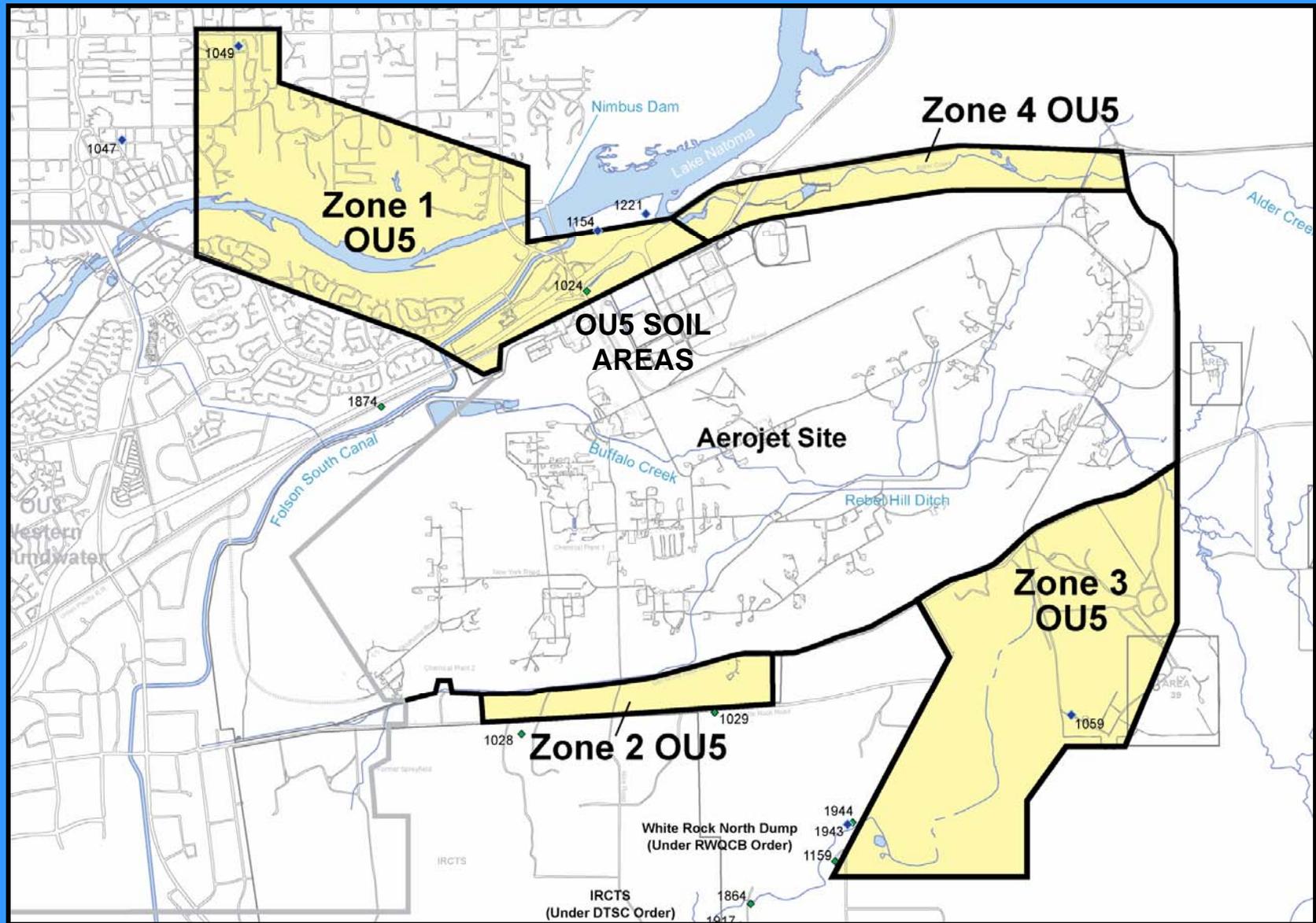
Soil Area Remedial Goals

Prevent Movement of Contaminants to Groundwater

Prevent Exposure of Volatile Chemicals to Protective Levels for Residential or Commercial Use

Eliminate Exposure of Pollutants in Soil that Pose a Risk for Present and Future Users

OU5 Proposed Plans for Lands

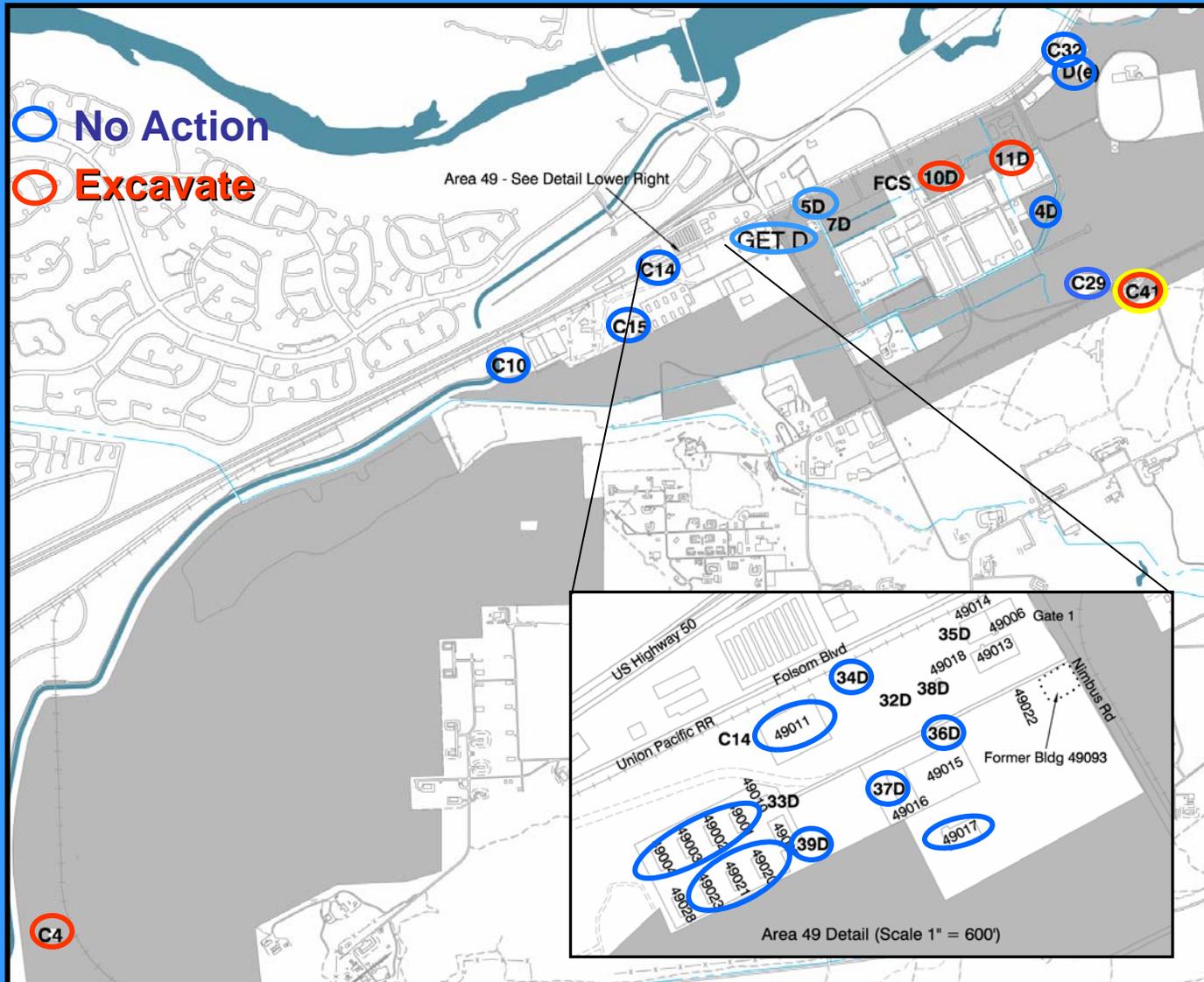


Soil Contaminants and Cleanup Levels

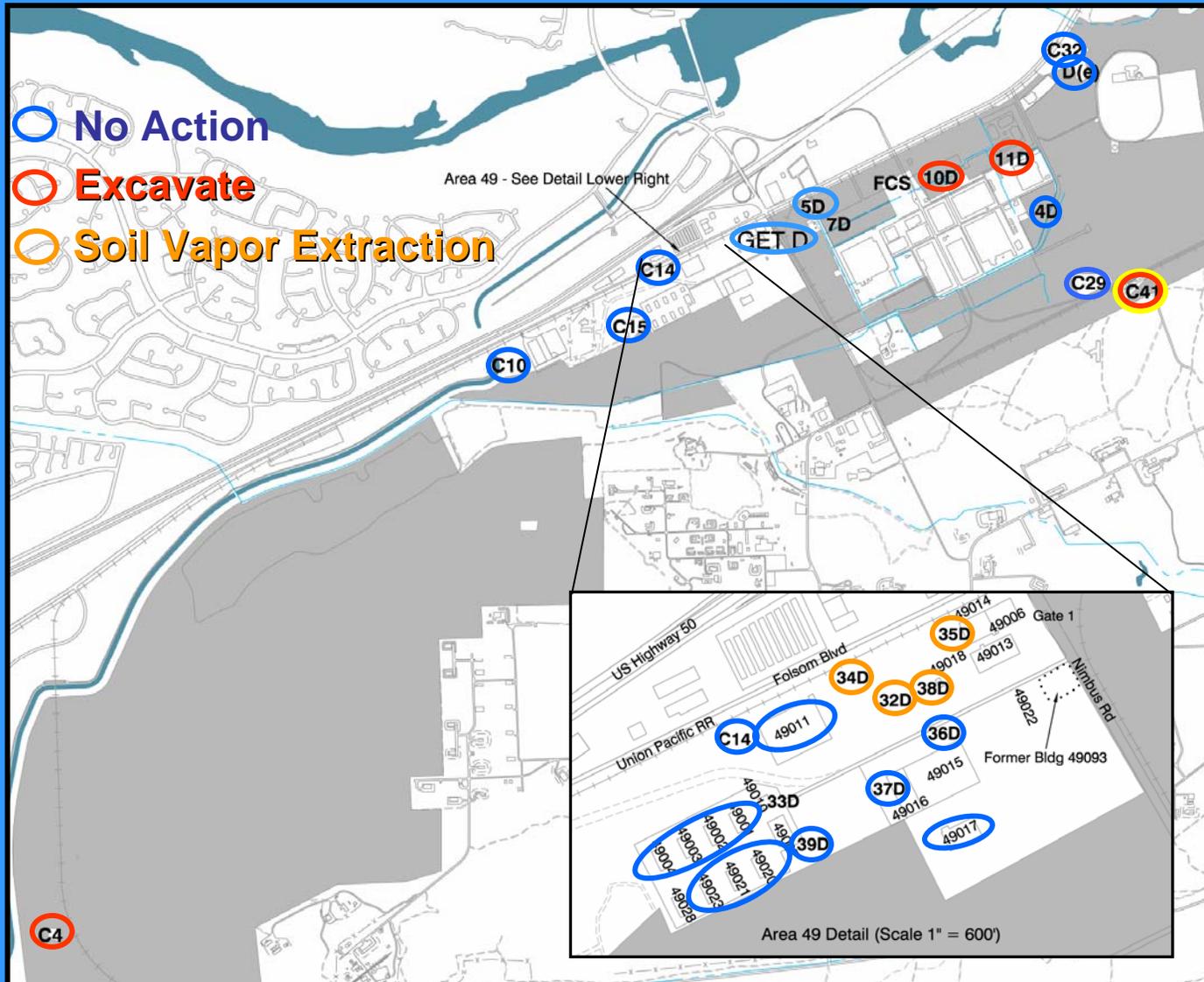
Chemical	Unrestricted Use Level (Residential Use)		Restricted Use (Commercial Use)	
	Soil concentration mg/kg soil	Risk basis	Soil concentration mg/kg soil	Risk basis
2,3,7,8-TCDD (Dioxin)	3.9E-06	Cancer	1.6E-05	Cancer
Antimony	31	Non-cancer	120	Non-cancer (construction worker)
Bis(2-Ethylhexyl)phthalate	35	Cancer	123	Cancer
Cadmium	48	Cancer (construction worker)	48	Cancer (construction worker)
Diethyl phthalate	49,000	Non-cancer	186,000	Non-cancer (construction worker)
Di-n-butyl phthalate	6,110	Non-cancer	23,280	Non-cancer (construction worker)
Hexavalent chromium	1.4	Cancer (construction worker)	1.4	Cancer (construction worker)
Lead	127	Non-cancer	531	Non-cancer (construction worker)
Mercury	23.5	Non-cancer	84	Non-cancer (construction worker)
Perchlorate*	55	Non-cancer	210	Non-cancer (construction worker)
PCB-1254	0.09	Cancer	0.3	Cancer
PCB-1260	0.09	Cancer	0.3	Cancer
Silver	390	Non-cancer	1,500	Non-cancer (construction worker)
Zinc	23,400	Non-cancer	90,000	Non-cancer (construction worker)

*Perchlorate cleanup goal for protection of groundwater quality is 0.6 mg/kg soil.

OU5 RI/FS Soil Sites



OU5 RI/FS Soil Sites



Soil Alternatives Evaluation

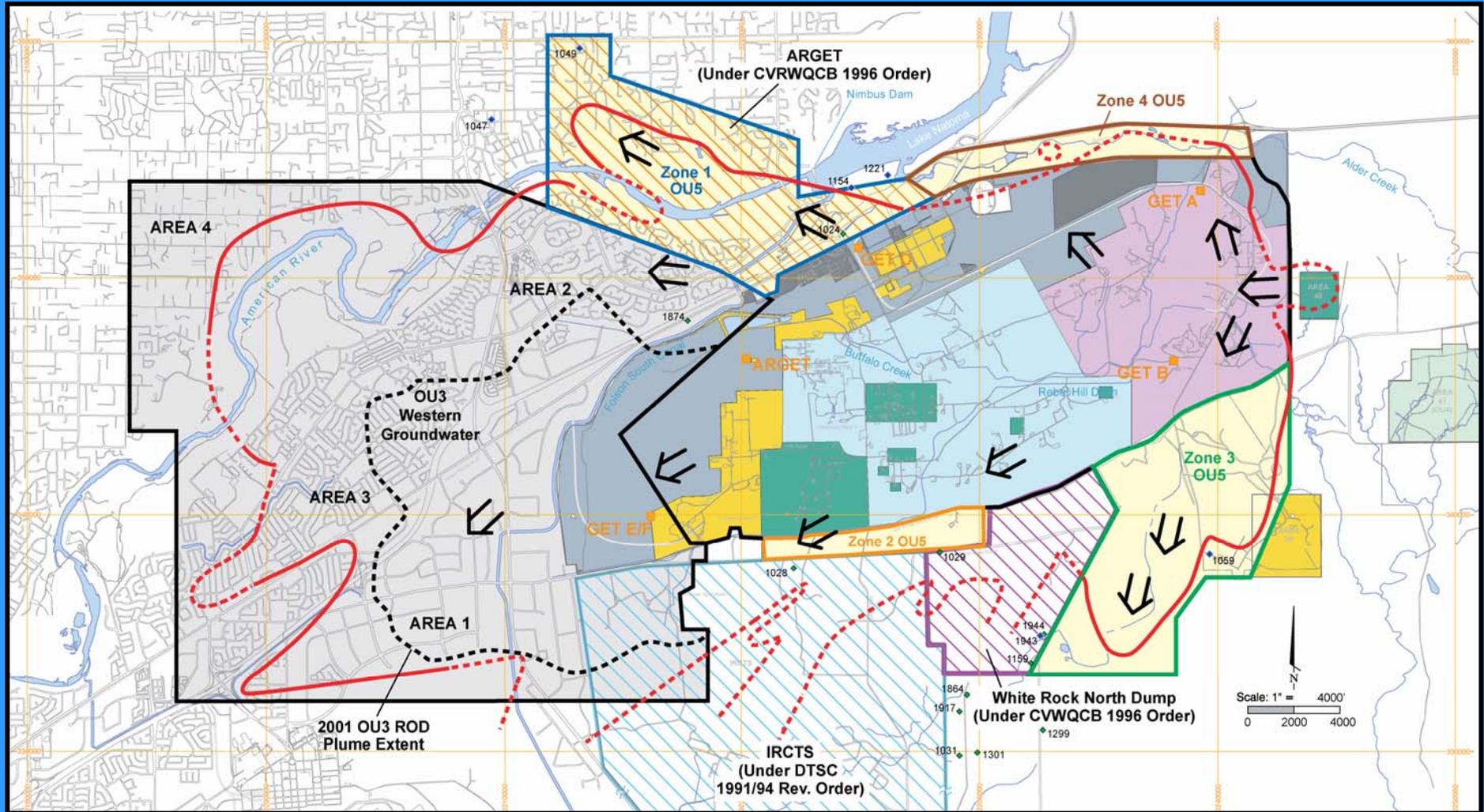
Evaluation Criteria	Areas 7D, 33D and FCS		Areas C4, C41, 10D and 11D		Areas 32D, 34D, 35D and 38D		
	No Action (monitor)	Vapor Mitigation and Deed Restriction (Preferred)	No Action (monitor)	Excavate & Landfill, Treat and/or Recycle (Preferred)	No Action (monitor)	Capping and Deed Restriction	Capping & Soil Vapor Extraction (Preferred)
Overall Protectiveness							
Compliance with State & Federal Requirements							
Long-term Effectiveness							
Implementability	NA		NA		NA		
Short-term Effectiveness	NA		NA		NA		
Reduction of Toxicity, Mobility or Volume by Treatment							
Estimated Project Cost	\$0	\$28,000	\$0	\$631,000	\$0	\$366,000	\$1,039,000
State Agency Acceptance	CA Department of Toxic Substance Control & CA Central Valley Regional Water Quality Control Board concurred with EPA's highlighted preferred alternative, with the exception that the RWQCB prefers a lower cleanup goal for hexavalent chromium based on a draft California Public Health Goal.						
Community Acceptance	Community acceptance of the preferred alternative will be evaluated after the public comment period.						

= Does not meet criterion

= Partially meets criterion

= Meets criterion

Remedy Integration Plan



- | | | | | | | | |
|---|------------------|---|---------------|---|-------------|---|-------------|
|  | OU3-Western |  | OU5-Perimeter |  | OU7-Island |  | OU9-Central |
|  | OU4-Cavitt Ranch |  | OU6-Boundary |  | OU8-Eastern | | |

HOW TO COMMENT

- By request, EPA extended the comment period to October 1, 2009
- Send comments no later than this date to:
 - Kevin Mayer, SFD-7-2
 - U.S. EPA Region 9
 - 75 Hawthorne Street
 - San Francisco, CA 94105
 - Fax: (415) 947-3528
 - Email: mayer.kevin@epa.gov

OU5 Proposed Plan

Aerojet Superfund Site

