Air Force Real Property Agency

Integrity - Service - Excellence

Kelly Restoration Advisory Board

April 10, 2012

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Port San Antonio
Main Board Room
907 Billy Mitchell Blvd.
San Antonio, TX 78226
6:30 - 8:30 p.m.

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Welcome and Overview

- 6:30 – 6:35 Welcome and Overview
- 6:35 – 6:45 RAB Membership
- 6:45 – 6:50 Administrative Items
- 6:50 – 7:10 Environmental Update Introduction
- 7:10 – 7:45 Performance-Based Remediation Contract
- 7:45 – 8:15 RAB Adjournment Process
- 8:15 – 8:20 Public Comment Period
- 8:20 – 8:25 Suggested Agenda Items for next RAB
- 8:25 – 8:30 B171 Announcement
- 8:30 Adjournment

RAB Membership

Ms. Beverly Abbott
Community Co-Chair

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Kelly RAB Membership

- **Introduce New Member: Ivan Jaime**
- **Member Roll Call**

Administrative Items

Mr. Jose Martinez
Facilitator

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Administrative Items

- **Review previous action items and status**
- **10/11/11 transcript acknowledgement**

Environmental Update Introduction

Mr. Paul Carroll
BRAC Environmental Coordinator

Performance Based Remediation Contractor

Mr. Praveen Srivastav
Susan Watson, Shaw E&I
Shaw Group

Headquarters U.S. Air Force

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Semiannual Compliance Plan Report June through December 2011

Shaw E&I
Prepared for AFRPA
April 10, 2012

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Hazardous Waste Permit/ Compliance Plan Details

- Texas Commission on Environmental Quality (TCEQ) Hazardous Waste Permit No. 50310 (renewed April 2009)
  - Divides the permitted areas into 5 geographic Zones
  - Establishes monitoring at 15 waste management units and Leon Creek
  - Establishes the contaminants of concern (COCs) and Groundwater Protection Standards (GWPSs) for cleanup
  - Establishes groundwater well network to be sampled annually (all units)/semiannually (Resource Conservation and Recovery Act [RCRA] units)
  - Establishes Leon Creek locations to be sampled semiannually

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Hazardous Waste Permit/ Compliance Plan Details

- Corrective Actions have been implemented at 28 locations
  - Recovery Systems
  - Permeable Reactive Barriers (PRBs)
  - Slurry Walls
  - High Density Polyethylene Barriers
  - Injections
  - Soil Venting Systems (SVE)
  - Electrical Resistive Heating (ERH)
- To accelerate time to cleanup, several of these actions will be optimized or enhanced over the next five years
- Permit renewal required in 2019

Zone and Permit Unit Map

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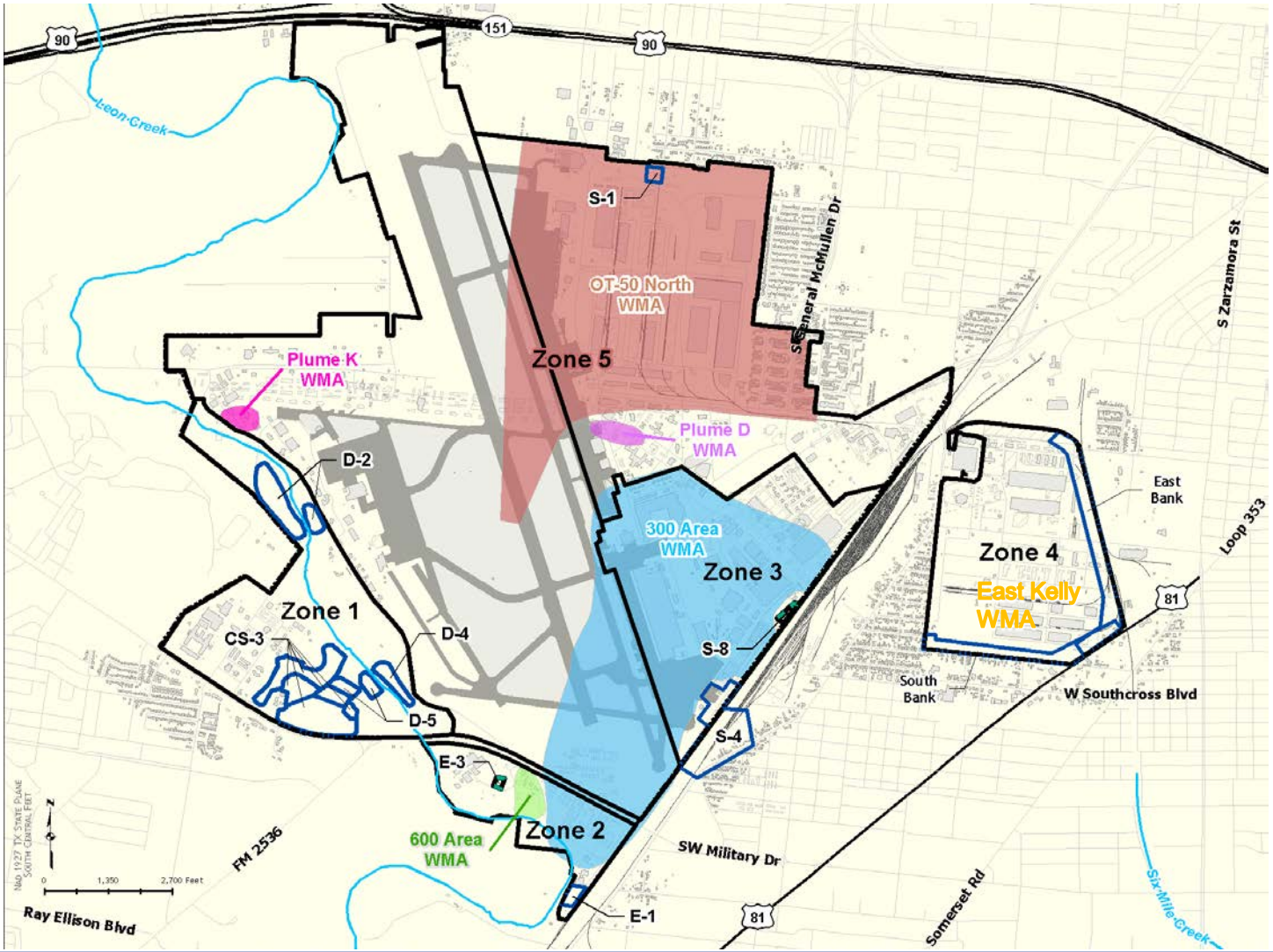

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2011 Groundwater Data Summary

- The 2011 plumes were compared with the 2010 plumes based on the annual sampling results.
- Annual results: July – December 2011 and July – December 2010
- Selected “largest” contamination area or plume footprint for comparison

  For example: Zone 3 – tetrachloroethene (PCE)/trichloroethene (TCE) plumes show extent of the contamination above the cleanup level. Other chemicals were above their cleanup levels (i.e. 1,2-dichlorethene (DCE), vinyl chloride, and arsenic), but are within this plume boundary.

- Overall conclusions
  - Plume areas remained the same
  - Corrective Actions are effective
  - Plans to optimize current actions will be effective in reducing time to reach cleanup levels

Zone 1 Groundwater

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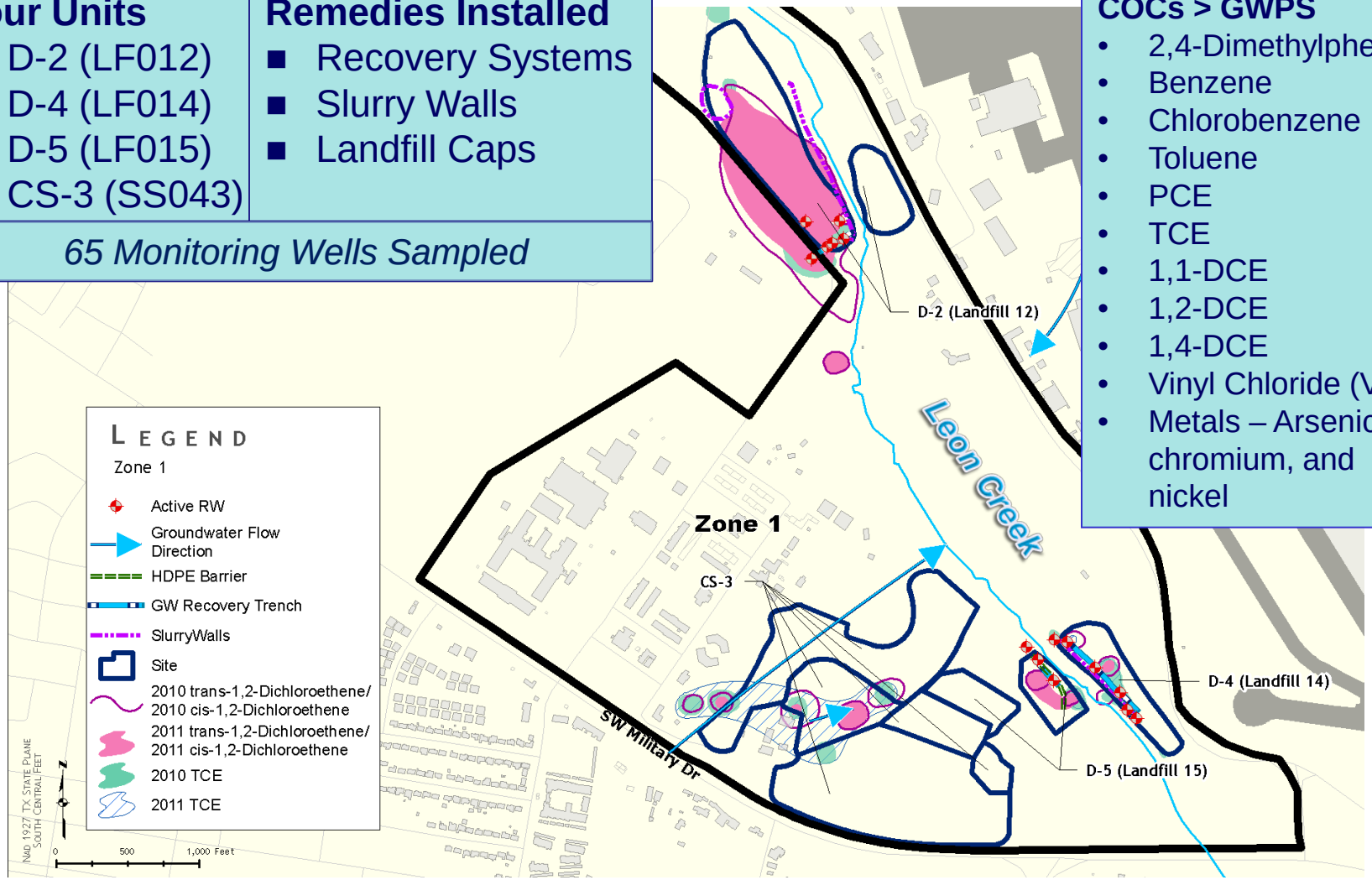
Four Units
- D-2 (LF012)
- D-4 (LF014)
- D-5 (LF015)
- CS-3 (SS043)

Remedies Installed
- Recovery Systems
- Slurry Walls
- Landfill Caps

65 Monitoring Wells Sampled

COCs > GWPS
- 2,4-Dimethylphenol
- Benzene
- Chlorobenzene
- Toluene
- PCE
- TCE
- 1,1-DCE
- 1,2-DCE
- 1,4-DCE
- Vinyl Chloride (VC)
- Metals – Arsenic, chromium, and nickel



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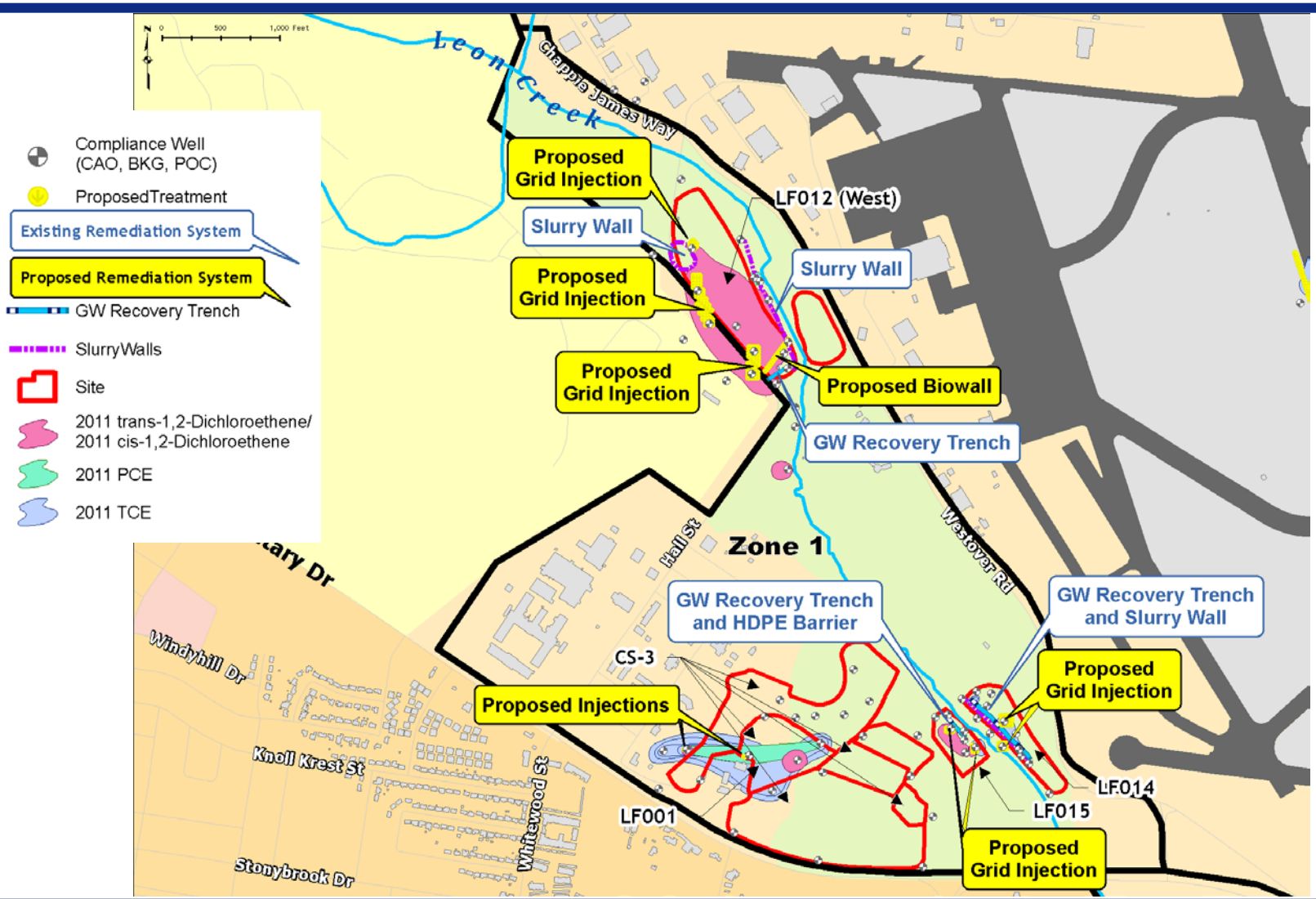
Zone 1 Proposed Remediation



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Zone 1 Conclusions/Plans

July-December 2011

D-2 (Landfill12)

- Current Remedy – Slurry Wall (Barrier)/Recovery System
- Effective at capturing plume and mitigating flow of contaminants to Leon Creek and residual plume areas outside the barrier are stable

D-4 (Landfill 14)

- Current Remedy – Hydrogen Release Compound Injections/Recovery System/Slurry Wall
- Effective at treating/capturing plume; stable plume outside barrier

D-5 (Landfill 15)

- Current Remedy – Recovery Trench and high density polyethylene (HDPE) Barrier System
- Effective at capturing plume and residual plume areas outside barrier are stable

Zone 1 Conclusions/Plans

July-December 2011

CS-3 (Combined Site SS043)

- Current Remedy– Capping of areas and monitored natural attenuation
- Plumes have limited ability to move due to low permeability of the formation and is effective at keeping plume stable

- Plans for in situ enhanced bioremediation (ISEB) at all these areas to reduce cleanup time and reduce potential for contaminants to reach Leon Creek

Zone 2 Groundwater

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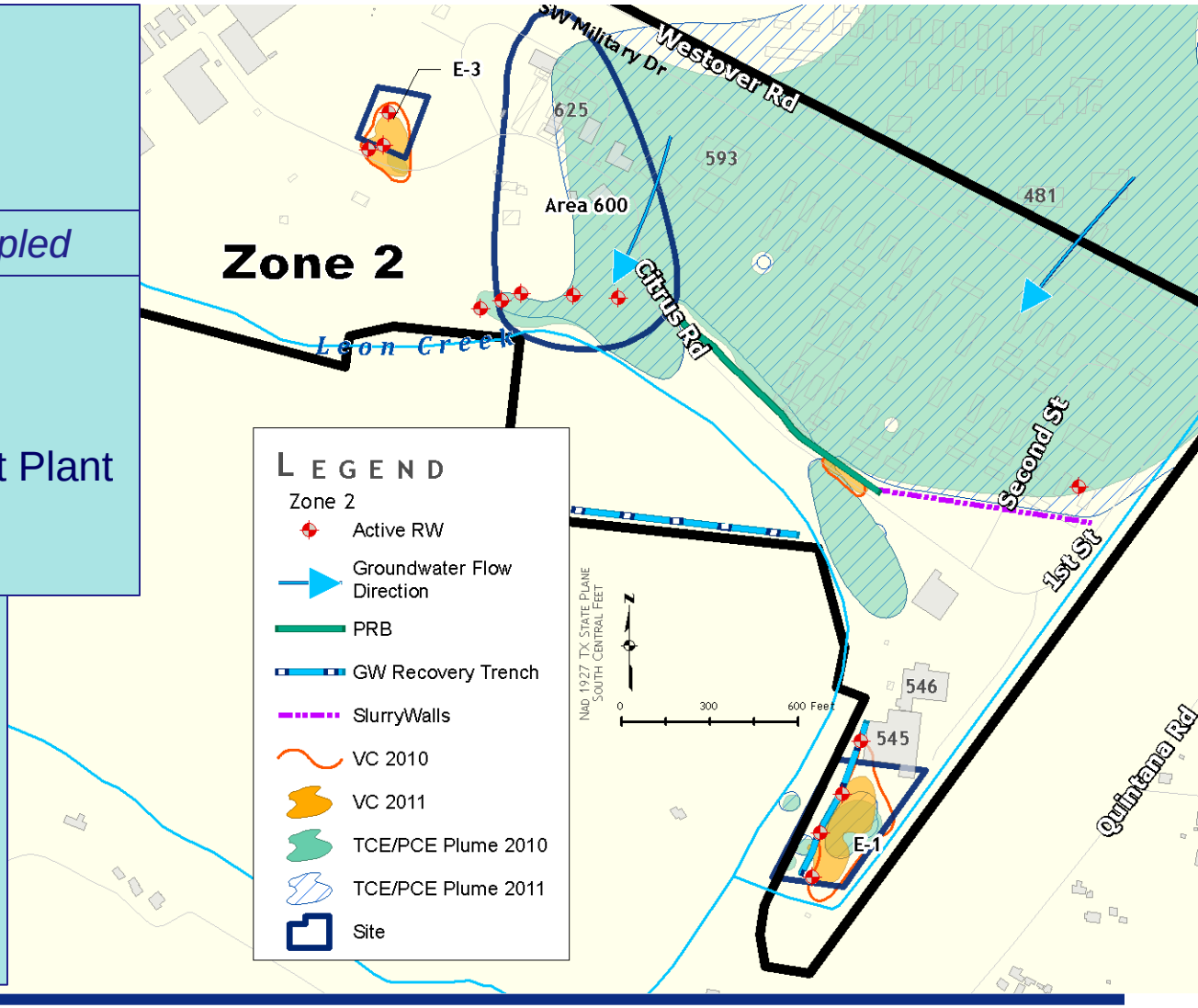
Three Units
- 600 Area
- E-1
- RCRA Site E-3

58 Monitoring Wells Sampled

Remedies Installed
- Recovery Systems
- Soil Vapor Extraction
- Groundwater Treatment Plant
- Slurry Wall/Permeable Reactive Barrier

COCs > GWPS
- 1,4-Dichlorobenzene
- Benzene
- Chlorobenzene
- 1,2-Dichloroethane (DCA)
- PCE/TCE/1,2-DCE
- Vinyl Chloride
- Arsenic
- Chromium



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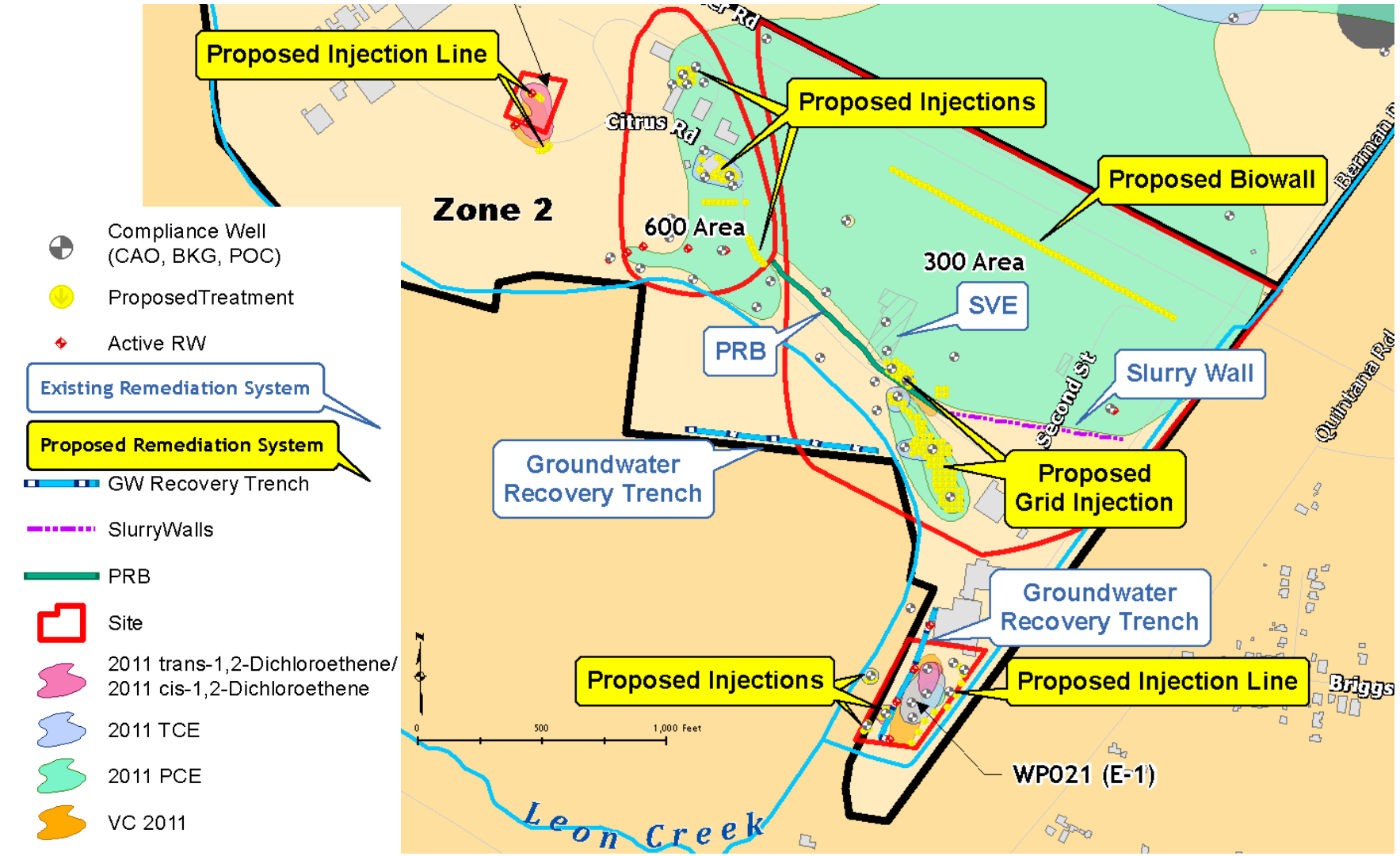
Zone 2 Proposed Remediation



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Zone 2 Conclusions/Plans

July-December 2011

600 Area

- Current remedy – Recovery System/Injections 2004, 2006, & 2008
- Groundwater treatment system located at north end of the area
- Effective at capturing plume
- Planned in situ enhanced bioremediation (ISEB) to shorten time to reach cleanup levels

E-1

- Current remedy – Recovery System
- Effective at capturing plume
- Planned ISEB to shorten time to reach cleanup levels and clean up plume areas near Leon Creek

RCRA Site E-3

- Current remedy – Recovery System
- Past soil venting and excavation removed soil source area
- Effective at capturing plume
- Planned ISEB to shorten time to reach cleanup levels

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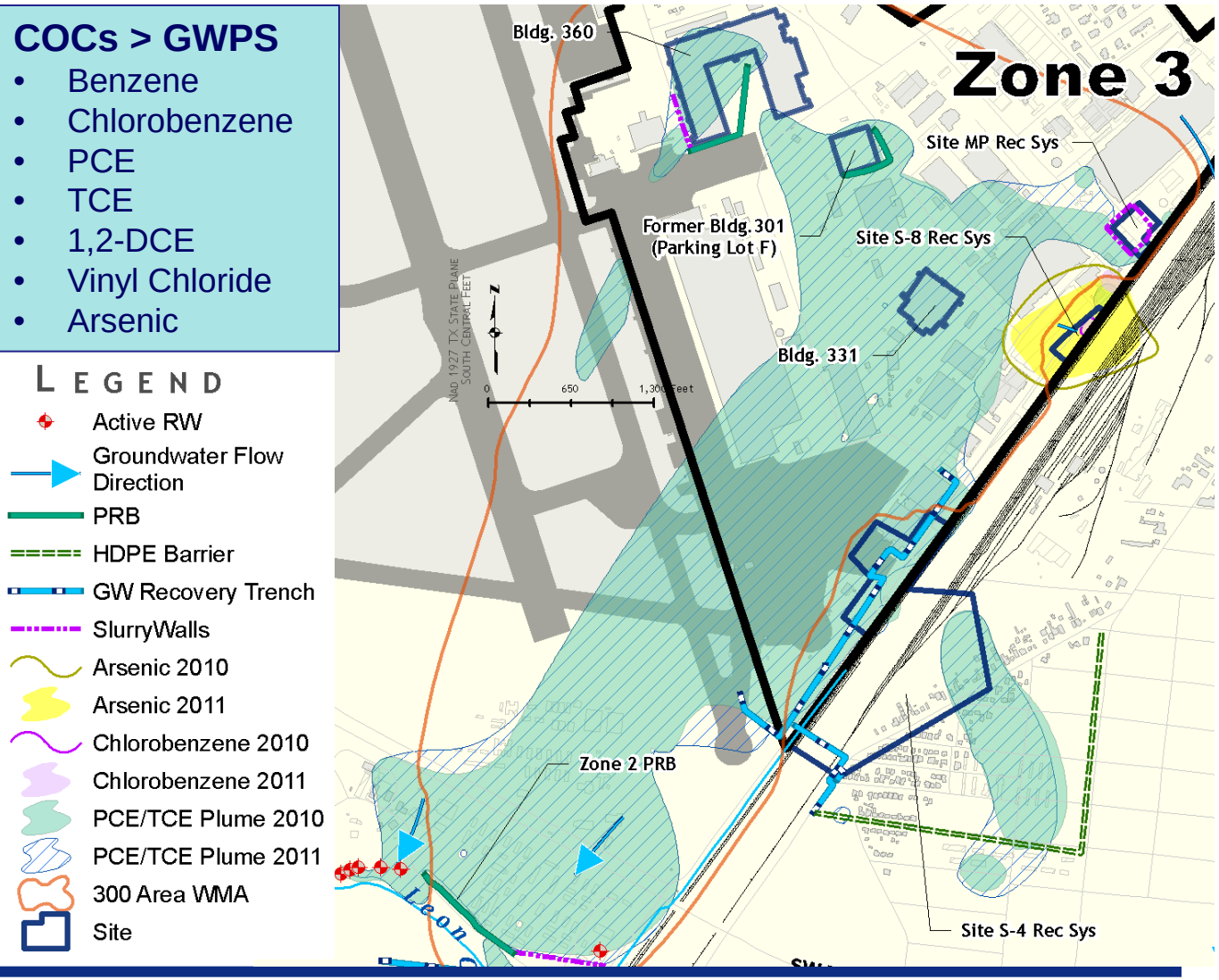
Zone 3 Groundwater

Three Units
- 300 Area
- RCRA Site S-8
- Site S-4

109 Monitoring Wells Sampled

Remedies Installed
- Permeable Reactive Barrier
- High Density Polyethylene Barrier
- Slurry Wall
- Recovery System
- Injections
- Soil Vapor Recovery
- Electrical Resistive Heating

COCs > GWPS
- Benzene
- Chlorobenzene
- PCE
- TCE
- 1,2-DCE
- Vinyl Chloride
- Arsenic



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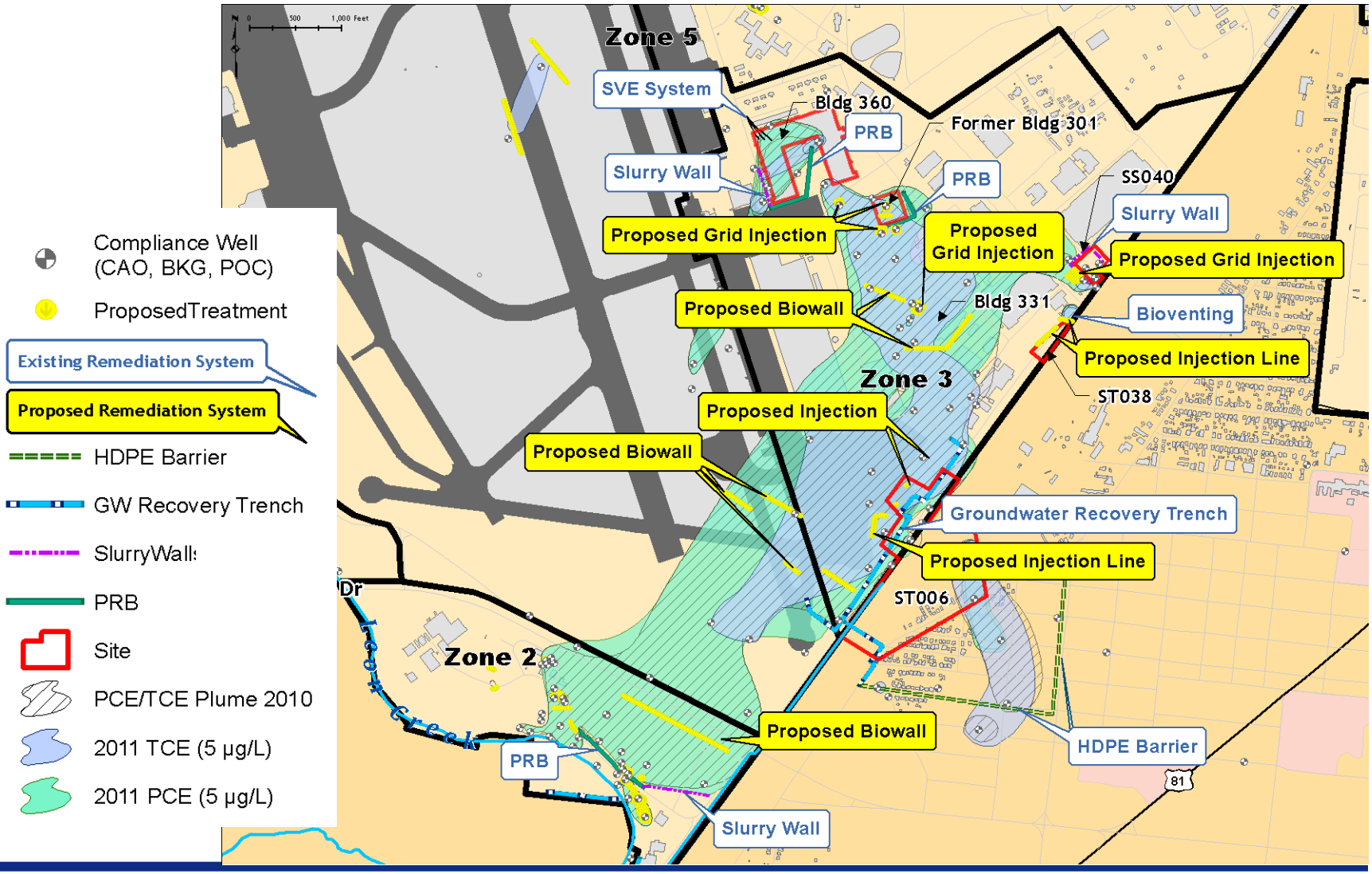
Zone 3 Proposed Remediation



Zone 3 Conclusions/Plans

July-December 2011

300 Area Waste Management Area (WMA) Sites

General

- Current remedies are site specific and do not address large overall plume
- Plans for in situ enhanced bioremediation (ISEB) biowalls to reduce the overall plume size faster
- PCE/TCE 2010 will be used as a baseline for comparison

Site MP

- Current remedy – Slurry Wall 1999/Recovery System
- Soil source material was excavated and in situ treatment in 2010
- Second in situ treatment applied (2012) inside slurry wall
- Effective at capturing plume
- Plans for ISEB in grid pattern to reduce area of high concentration outside slurry wall

Zone 3 Conclusions/Plans

July-December 2011

300 Area WMA

Building 360

- Current remedy – Permeable Reactive Barrier (PRB) & Surry Wall 2003/Soil Vapor Extraction 2008/ Injections 2005 & 2008
- Effective at treating plume
- Maintain and operate current system

Building 301

- Current remedy – PRB 2003/Electrical Resistive Heating 2008-2009
- Contaminants maybe bypassing PRB on the southwest side
- Plans for ISEB to address the bypass area and reduce remaining high concentration areas

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Zone 3 Conclusions/Plans

July-December 2011

300 Area WMA continued

Building 331 (300 Area WMA)

- Current remedy – Vegetable oil injection 2006 and 2009
- Concentrations were increasing prior to the 2009 reinjection
- Concentrations are now reducing after the 2009 injections
- Plans for ISEB grid injections in high concentration areas to continue contaminant reductions

Zone 2 Permeable Reactive Barrier

- Current remedy – PRB & Slurry Wall 2004/Recovery system
- Effective at mitigating plume migration to the south towards Leon Creek

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Zone 3 Conclusions/Plans

July-December 2011

Site S-4

- Current remedy – Recovery System
- Effective at capturing plume
- Plans for ISEB in conjunction with recovery system

RCRA Site S-8

- Current remedy – Recovery System/Soil Vapor Extraction & Bioventing – optimized 2010
- Effective at capturing/treating plume
- Plans for aerobic ISEB to address chlorobenzene plume

Zone 4 Groundwater

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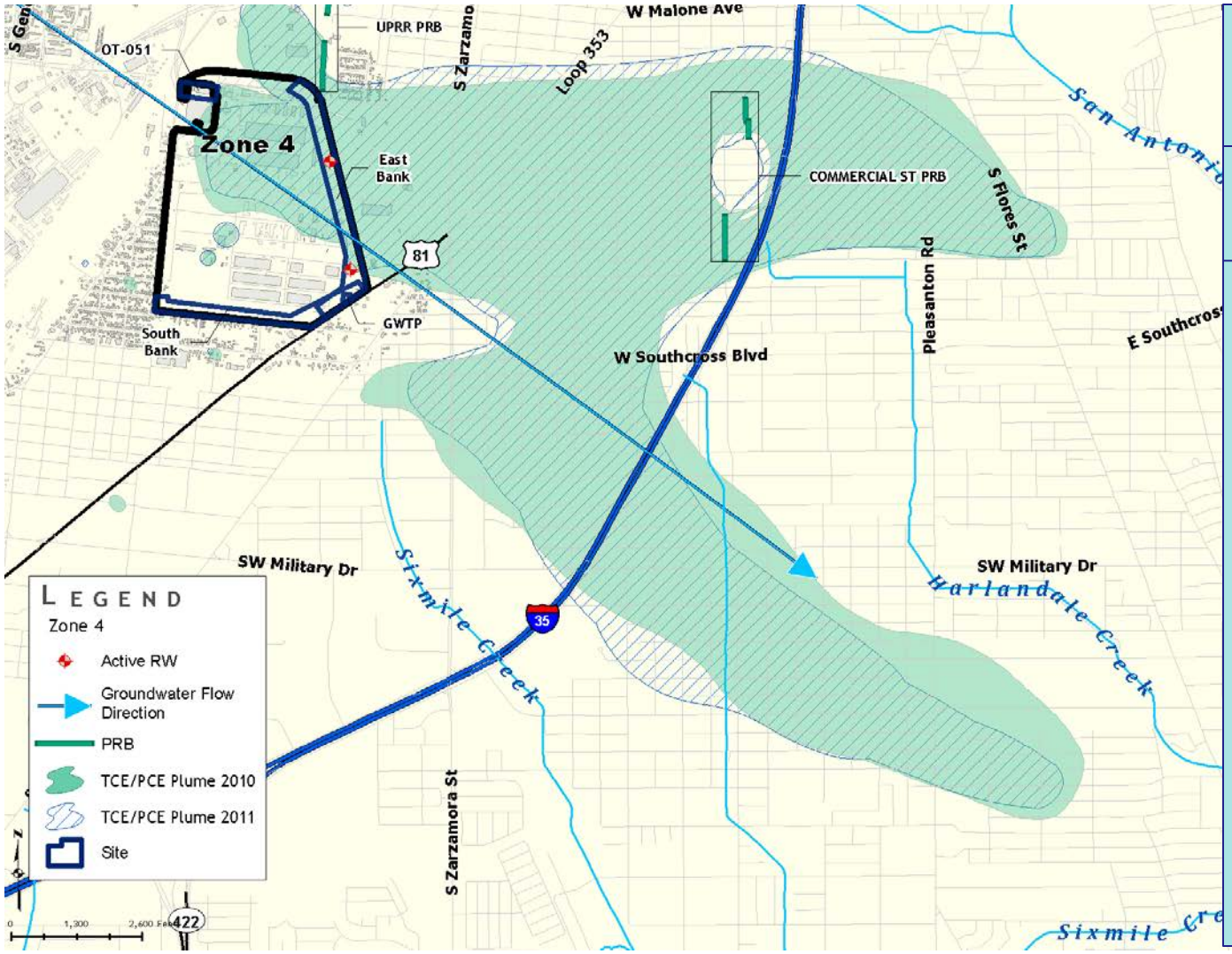

One Unit

- East Kelly WMA

110 Monitoring Wells Sampled

COCs > GWPS

- PCE
- TCE
- 1,2-DCE
- Vinyl Chloride

Remedies Installed

- Permeable Reactive Barriers
- Recovery Systems
- Groundwater Treatment Plant

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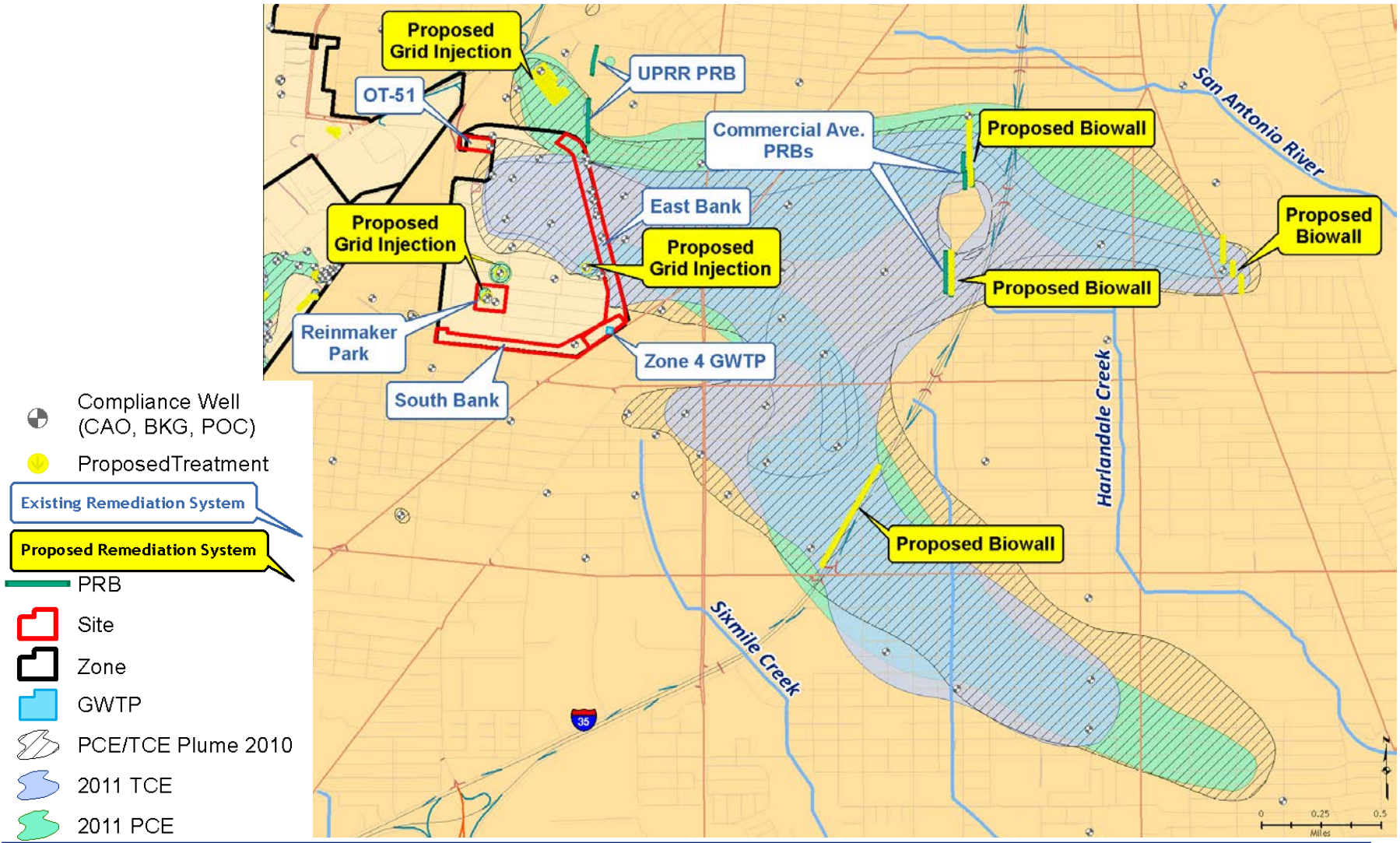
Zone 4 Proposed Remediation



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Zone 4 Conclusions/Plans

July-December 2011

Site OT-051

- Current Remedy - Vegetable Oil Injections October 2002
- Natural degradation is occurring
- No plans for additional work

East and South Bank

- Current Remedy – Recovery system and Groundwater Treatment Plant
- Effective at capturing plume
- Plans for in situ enhanced bioremediation (ISEB) in isolated areas of high PCE/TCE concentrations
- Plans for ISEB biowall to be installed on southern arm of plume beyond south bank

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Zone 4 Conclusions/Plans

July-December 2011

Union Pacific Railroad (UPRR) PRB

- Current Remedy – Permeable Reactive Barrier (PRB)
- Effective at treating plume
- Plans for ISEB in plume area to reduce concentration faster

Commercial Street PRB

- Current Remedy - PRB
- Effective at treating plume, plume may be flowing over a portion of the wall
- Plan to install an ISEB biowall which will enhance the existing PRB and extend the length of the wall across the plume width
- Plan to install ISEB biowall at the eastern tip of the plume to treat any plume migration

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Zone 5 Groundwater

Four Units

- OT-50 North WMA
- Plume D
- Plume K
- Site S-1 WMA

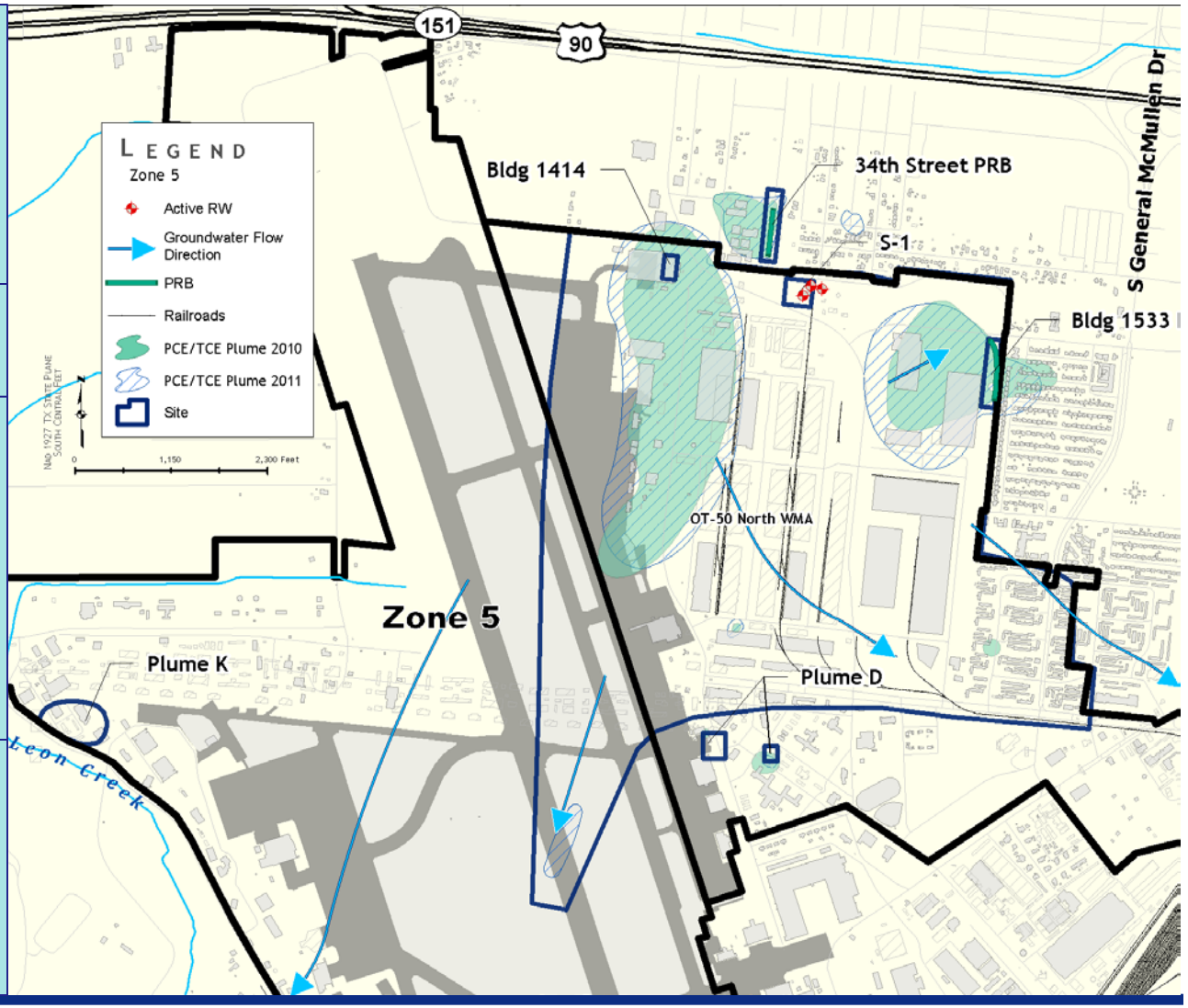
95 Monitoring Wells Sampled

COCs > GWPS

- Benzene
- Chlorobenzene
- PCE
- TCE
- 1,2-DCE
- Vinyl Chloride

Remedies Installed

- SVE
- PRBs
- Recovery System
- GWTP



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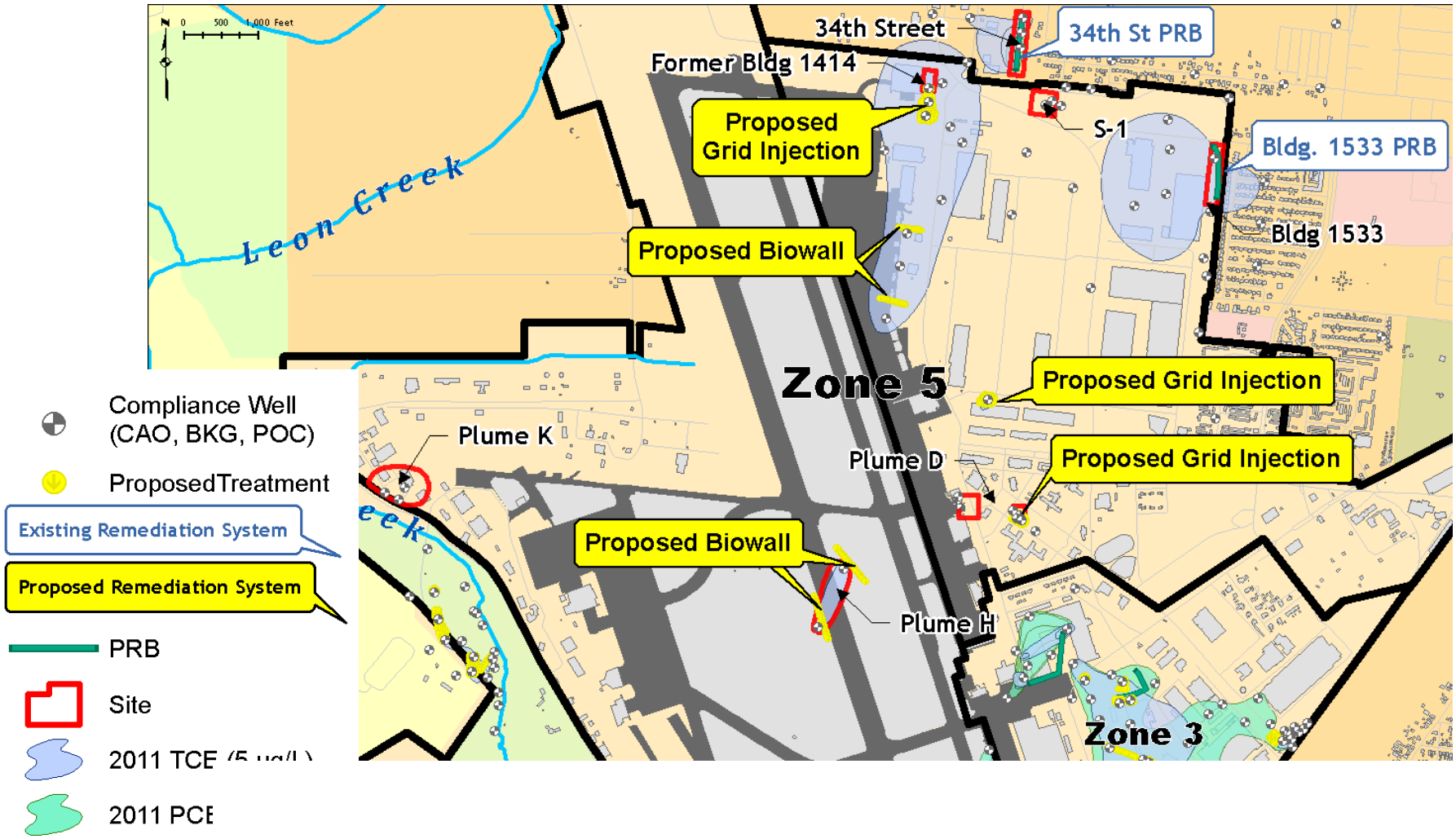
Zone 5 Proposed Remediation



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Zone 5 Conclusions

July-December 2011

OT-50 North WMA

Building 1533 Permeable Reactive Barrier (PRB)

- Current Remedy – PRB, Vegetable Oil Injections 2008
- Dechlorination of volatile organic compounds (VOCs) continuing

Building 1414

- Current Remedy – PRB, Hydrogen Release Compound (HRC) injections 2002, Vegetable Oil Injections 2006
- Dechlorination of VOCs continuing
- Plans to accelerate dechlorination with ISEB

34th Street PRB

- Current Remedy – PRB
- Effective at treating plume
- High concentration area upgradient of PRB will be investigated to design remedy to enhance PRB operations

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Zone 5 Conclusions

July-December 2011

Plume D

- Current Remedy – hydrogen release compound (HRC) injections 2002/2003 and 2008
- Dechlorination of VOCs continuing
- Plan for ISEB to accelerate time to reach cleanup levels

Plumes H and K (Lackland AFB – aka as OT-50)

- Current Remedy – monitored natural attenuation is effective
- Plan for ISEB at Plume H to shorten cleanup time

Site S-1

- Current Remedy – Soil Vapor Extraction, Recovery System/Groundwater Treatment Plant (GWTP), Electrical Resistive Heating (ERH) completed in 2011
- Recovery System/GWTP was not in operation during ERH
- Will evaluate results of ERH operations

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Leon Creek Sampling Program

- 59 Stations (6 upstream, 50 down stream, & 3 reference stations)
- Monitor twice per year for surface water and sediment at in-stream, seep, and outfall locations for the following:
  - Flow and water level measurements for hydrologic budget determination
  - Metals
  - Cyanide
  - Semivolatile organic compounds (including PAHs)
  - Polychlorinated biphenyls (PCBs)
  - Volatile organic compounds
- Also evaluate annually:
  - Toxicity to aquatic life (bioassessment)
  - Fish tissue

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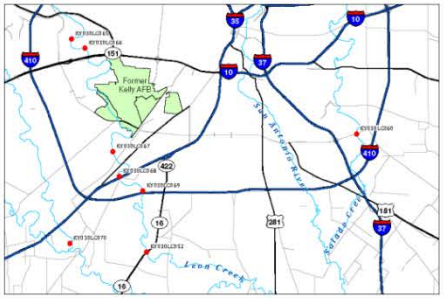
Leon Creek Monitoring
Stations



Off Base In-Stream Sampling Locations - Not to Scale

LEGEND

- Zone Boundary
- In-Stream Sampling Station
- Outfall Sampling Station
- Seep Sampling Station
- GWTP = Groundwater Treatment Plant

GLOSSARY TERMS:

SD = Sediment Sample
SW = Surface Water Sample
SF = Stream Flow Cross-Section
ELEV = Stream Elevation

N

0 1,000 2,000
Feet

FIGURE 4-1
Leon Creek Sampling Stations
Former Kelly AFB, San Antonio, Texas

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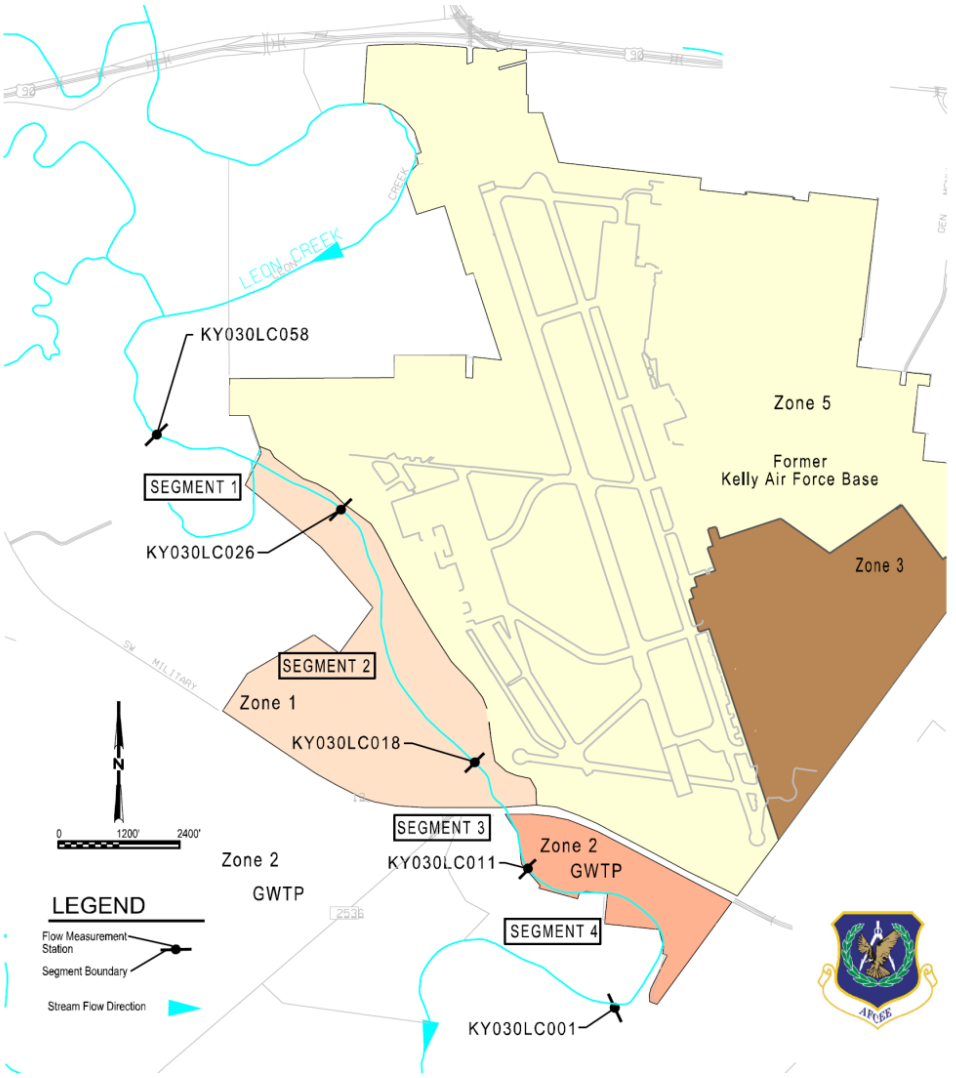
Leon Creek Monitoring

July 2011 Surface Water Elevation/Flow

- Surface water elevations were collected at 23 stations (including 3 seeps and 3 outfalls)
- Hydrologic budget for July 2011 indicates:
  - All segments (1, 2, 3, and 4) showed net water loss assumed to be due to drought-like conditions encountered in 2011.



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Leon Creek Monitoring
July 2011 Surface Water Sampling

Sampling

- Surface water samples were collected from 38 stations: 29 in-stream locations, three seeps, three outfalls, and three reference stations.

Results

Surface water results compared against Texas Water Quality Standards – acute and chronic aquatic life criteria and human health criteria

- Surface water met compliance standards for all aquatic life criteria and human health criteria *except*:
  - Tetrachloroethene (PCE) and thallium exceeded the human health criteria at one seep location near the Zone 2 GWTP.
  - Selenium exceeded the chronic aquatic life criteria at one seep location near the Golf Course
  - Fewer locations than last year with exceedances

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Leon Creek Monitoring
July 2011 Sediment Sampling

Sampling

- Sediment samples were collected from 27 stations: 23 Leon Creek stations, outfall KY030OF002, and 3 reference stations

Results

- Texas Surface Water Quality Standard sediment screening benchmarks were exceeded from in-stream locations for 13 sediment contaminants including semivolatile organic compounds (SVOCs), pesticides, metals, and PCB. Not all contaminants were detected at each location.
- Fewer PAHs than last time likely due to drought conditions and less runoff from parking lots.
- Pesticides, PCBs, and metals continue to persist in sediment at elevated levels along and downstream of the former base.
- Trend graphs are used to evaluate the changes along the sampling locations as well as evaluate current versus past concentrations

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Leon Creek Monitoring
July 2011 Bioassessment

- **Bioassessment Evaluation:** A biological survey of fish and microinvertebrates at 11 stations.

  Results: All Leon Creek stations partially supporting aquatic life use designations – except 1 which is fully supporting
- **Chronic Toxicity Testing** - water fleas and flathead minnows at 11 stations

  Results: No toxicity issues
- **Fish Tissue Sampling:** 9 fish species were collected from 11 stations

  Results:
  - 3 organics detected; none exceeded screening levels for fish tissue
  - Fish are minimally impacted by Kelly AFB and upstream conditions

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Acronyms

BKG	Background well – listed in permit
CAO	corrective action observation well – listed in permit
COCs	contaminants of concern
DCA	dichloroethane
DCE	dichloroethene
ERH	electrical resistive heating
GW	groundwater
GWPSs	Groundwater Protection Standards
GWTP	groundwater treatment plant
HDPE	high density polyethylene
HRC	Hydrogen release compound
ISEB	in situ enhanced bioremediation
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PCE	tetrachloroethene
POC	point of compliance well – listed in permit
PRB	permeable reactive barrier
RCRA	Resource Conservation and Recovery Act
RW	recovery well
SVE	soil vapor extraction
SVOCs	semivolatile organic compounds
TCE	trichloroethene
TCEQ	Texas Commission on Environmental Quality
VC	vinyl chloride
VOCs	Volatile organic compounds
WMA	Waste Management Area

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In Situ Enhanced Bioremediation Methodology

Shaw E&I
Prepared for AFRPA
April 10, 2012

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What is In-situ Enhanced Bioremediation (ISEB)?

- Process whereby conditions are enhanced to encourage microorganisms to degrade contaminants (Make the microbes comfortable so they can do their job).
  - Air - oxygen, sulfate
  - Food Source - lactate, vegetable oil, molasses
  - Nutrients - nitrogen, phosphorus
  - Vitamins - B-12
  - Microbes

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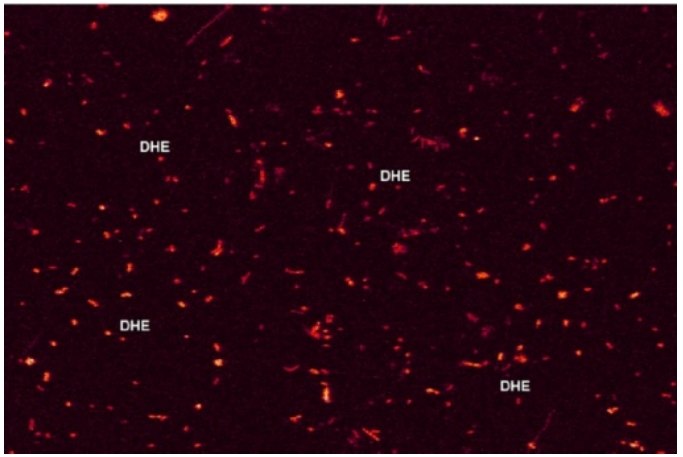
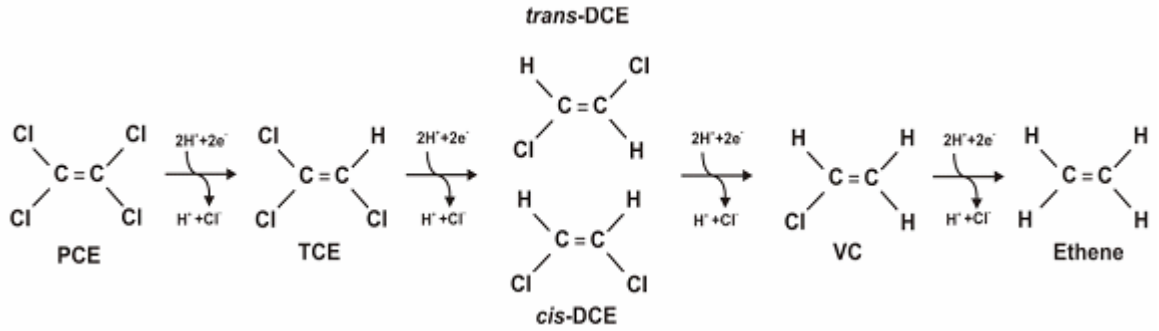
Anaerobic Biological Contaminant Degradation

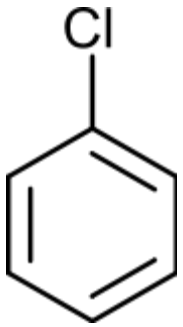
- Anaerobic - No oxygen
- Biological - Microbes
- Microbes “breathe” chlorinated ethenes
  - Tetrachloroethene (PCE)
  - Trichloroethene(TCE)
- Who can do it? *Dehalococcoides ethenogenes (DHC-SDC-9™) or microb*



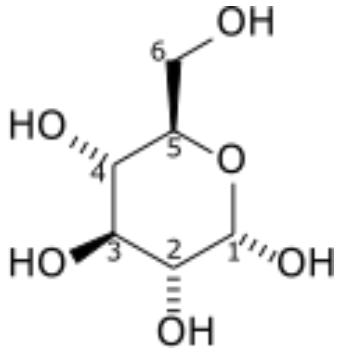


Aerobic Biological Contaminant Degradation

- Aerobic – Requires Oxygen
- Biological - Microbes
- Eats Chlorobenzene
- Who can do it? Many indigenous microbes including *Pseudomonas* and *Rhodococcus* strains (ENV-477).
- How they do it – Metabolism, a food source



Chlorobenzene



Sugar

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What we will do for the Microbes?

Air

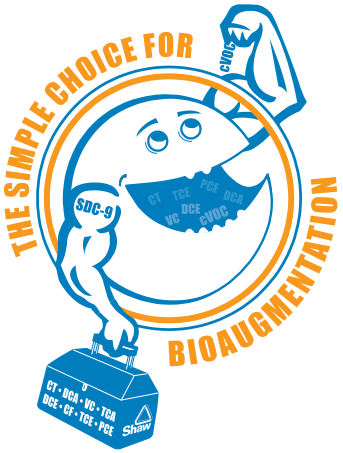
+

Food

+

Nutrients and Vitamins

=



Happy Microbes

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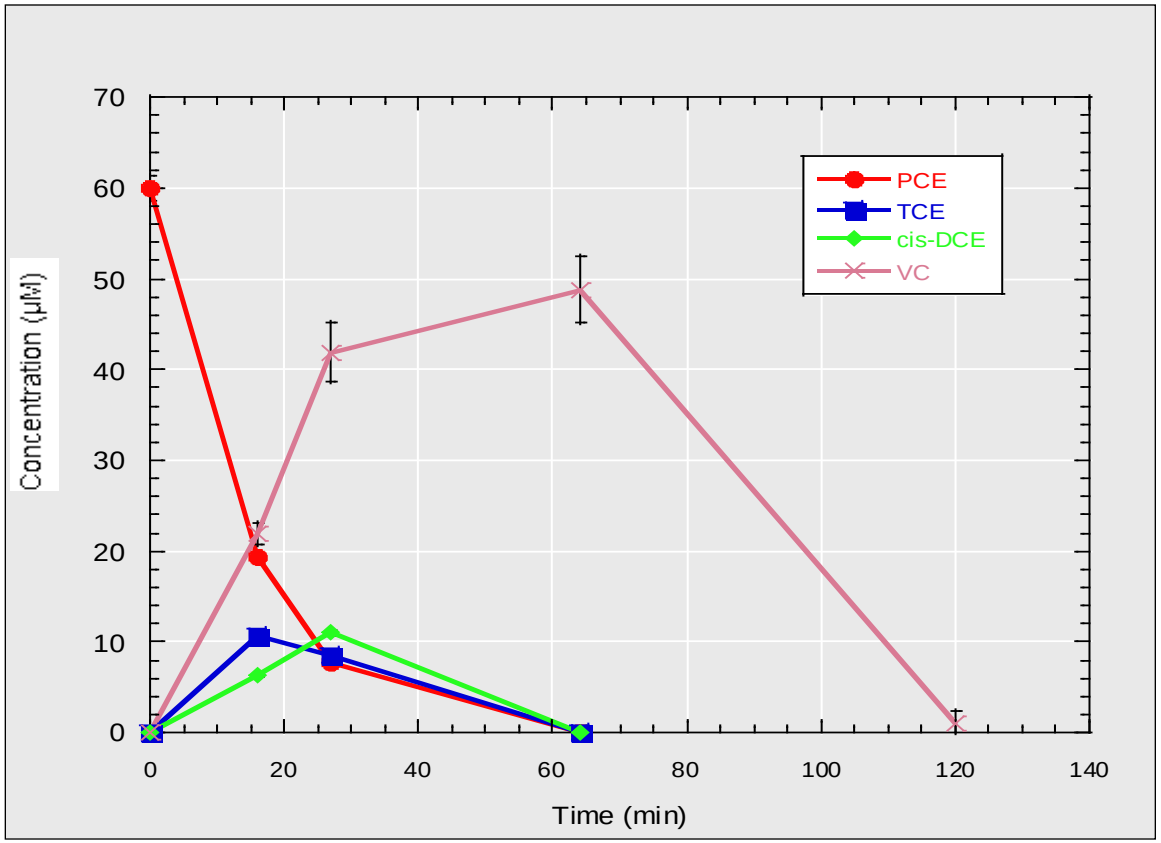
What the Microbes will do for us!



Clean-up the Contaminants

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Food - Carbon Amendments

- Emulsified Vegetable Oil
- Sodium Lactate
- Chlorobenzene

275 Gallon Totes of Emulsified Vegetable Oil

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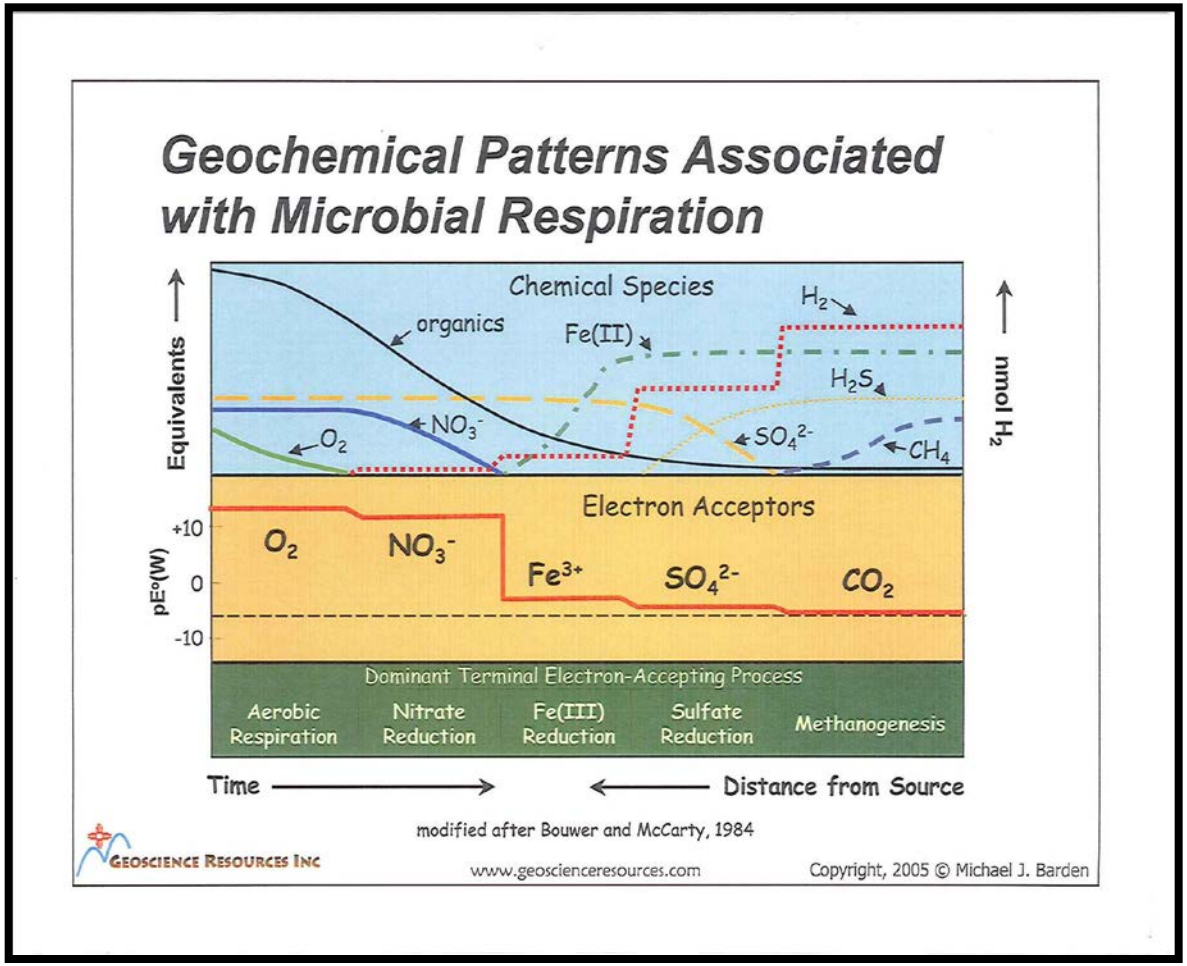
Air - Respiratory Substrates

- Oxygen
- Nitrate
- Ferric Iron
- Sulfate
- Chlorinated ethenes
- Carbon Dioxide



Nutrients and Vitamins

Accelerite:

- Nitrogen (ammonia)
- Phosphorus
- B-12

55 Gallon drums of Accelerite – Microbes' Nutrients and Vitamins

Microbes

- Adding additional microbes known to completely breakdown contaminants.
- Why?
  - To ensure the correct microbes are present
  - Increase the number of microbes
  - Decrease the amount of time to reduce the target compounds. SDC-9™ and ENV-477
- How?
  - Grow a large amount of the microbes
  - Add microbes to the treatment area

Laboratory Growth

5 Gallon Keg

Subsurface Injection Tools

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Injection Rods and Rigs

Injection Tool

Injection

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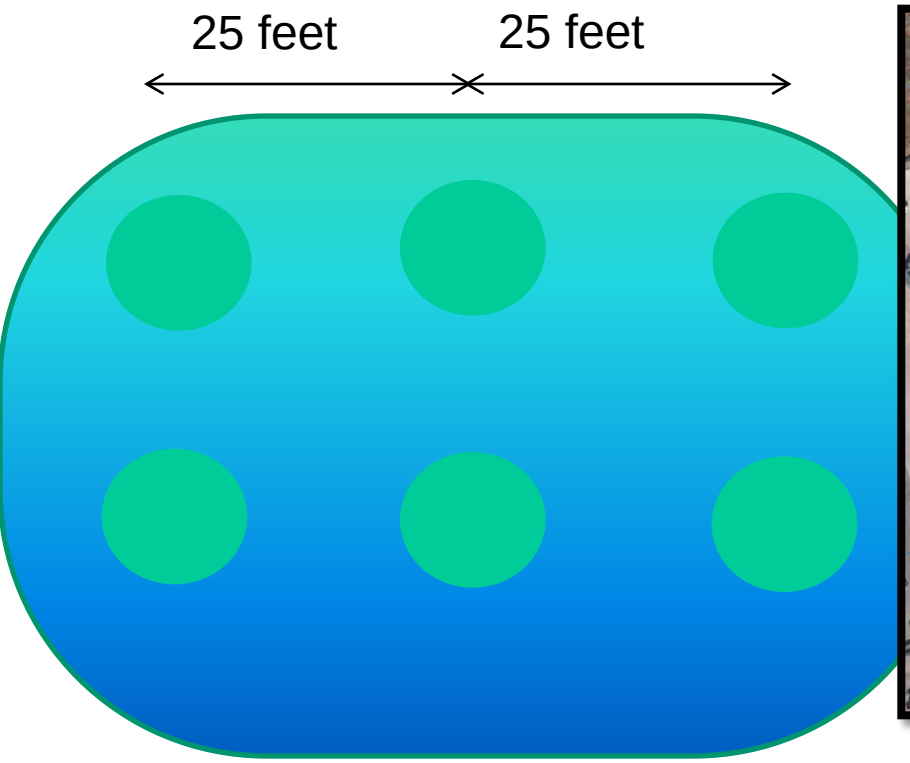
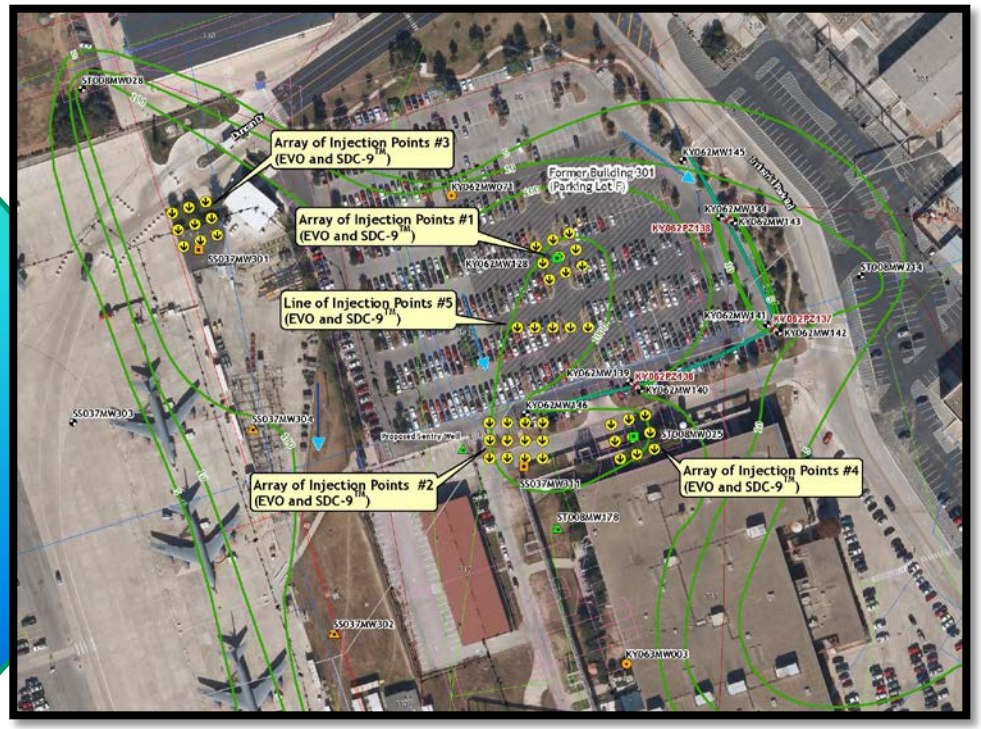
Injection Patterns- Grid Array





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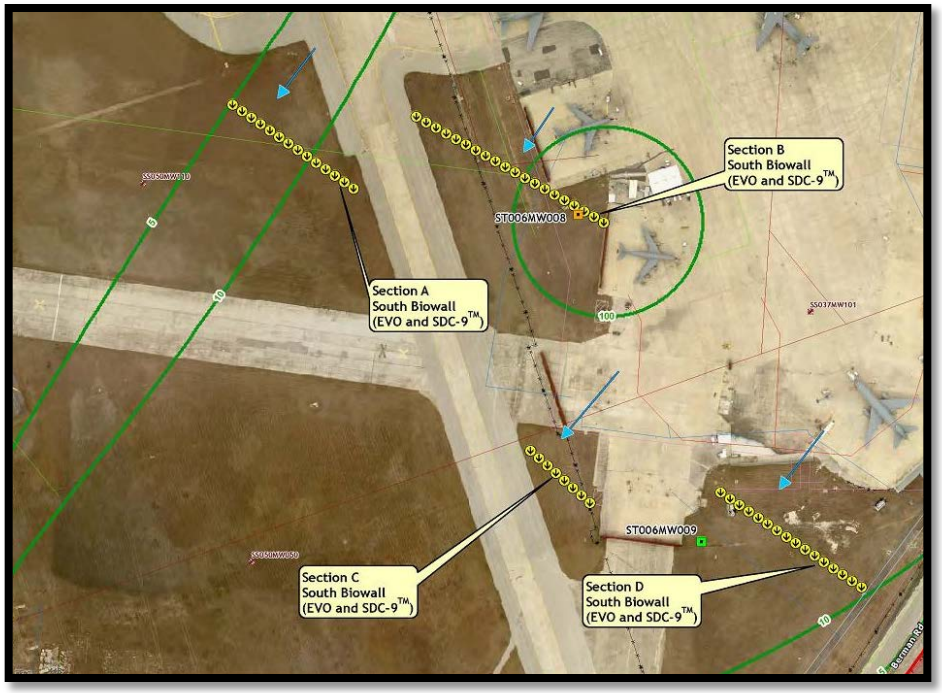
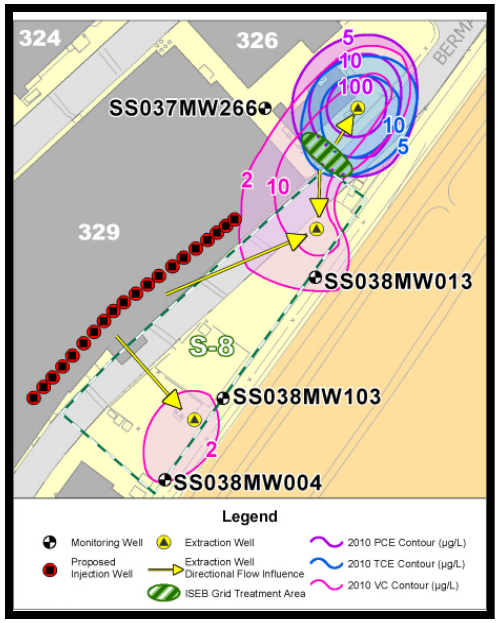
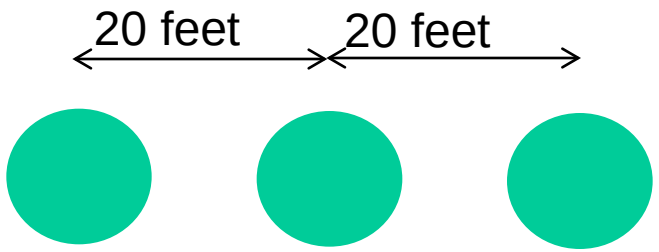
Injection Patterns – Biowall (Anaerobic)



Injection Patterns – Biowall (Aerobic)





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Field work
Step 1- Amendment Preparation

Mixing

Filling Water Pillows

Anaerobic Water

Adding Microbes

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Field work
Step 2- Amendment Injection

Pump to Injection Trailer

Pump to Injection Rod

Inject into Subsurface

Bioremediation

Bioremediation Summary

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- **Step 1**
  - Air
  - Food
  - Vitamins
  - Microbes

- **Step 2**
  - Inject Amendments into the Target zone

In-situ Groundwater Remediation

RAB Adjournment Process

Mrs. Linda Geissinger
AFRPA Public Affairs Officer
Western Region

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RAB Adjournment

- **Adjourn a RAB if:**
  - **Lack of community interest**
  - **All major cleanup decisions are made**
  - **“Response complete” at all sites**
  - **All remedies are in place**
  - **Achieved RAB goals**
  - **Land transferred to a non-DoD entity**
  - **No longer sufficient and sustained community interest**

- **Regulation 32 CFR, Part 202**
  May 2006

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Process for Adjourning the RAB

Public Notice Announcing Consideration of Adjournment and Opportunity for Public Comment

↓

30-day Public Comment Period

↓

Compile Comments

↓

Prepare Responsiveness Summary

↓

If a final decision is made to adjourn the RAB, the following actions will be taken

→ Finalize Adjournment Report

↓

Notification Letter Regarding Adjournment to Mailing List

↓

Update Administrative Record and place documents in the Information Repository

Public Comment Period

Mr. Jose Martinez
Facilitator

Suggested Agenda Items for next RAB Meeting

Mr. Paul Carroll
BRAC Environmental Coordinator

Building 171 Announcement

Mr. Jose Martinez
Facilitator

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For More Information

- **Contact AFRPA Public Affairs:**
  - **Public Information Line: 210-925-0956**
  - **Fax: 210-395-9527**
  - **Email: afrpa.pa@us.af.mil**

- **Documents are available electronically or on hard copy:**
  - **Administrative Record Site: https://afrpaar.lackland.af.mil/ar/docsearch.aspx**

  - **San Antonio Central Library**
  - **Government Documents Section (6th Floor)**
  - **600 North Soledad, San Antonio, TX 78205**

Meeting Adjournment