Air Force Civil Engineer Center

FORMER
WILLIAMS AIR FORCE BASE

Site ST012
Former Liquid Fuels Storage Area
Remedial Action

BCT Meeting
24 August 2016

Battle Ready…Built Right!

Williams AFB
BRAC Cleanup Team Meeting

Time	Agenda Item	Est. Time
8:30-8:40	**Welcome and Agenda Review**	10 min
8:40-10:30	**ST012 Update** • Summary of Site Activities (last 30 days) • Evaluation of EBR Baseline Data • Response to EPA and ADEQ Comments	110 min
10:30-10:45	**Break**	15 min
10:45-12:00	**ST012 Update con't**	75 min
12:00-12:30	**Lunch provided**	30 min
12:30-1:30	**ST012 Update con't**	60 min
1:30-2:15	**LF004 and FT002 Update**	45 min
2:15-2:30	**SS017 Update**	15 min
2:30-2:45	**Break**	15 min
2:45-3:00	**Five Year Review**	15 min
3:00-3:15	**ST035 Update**	15 min
3:15-3:30	**2016 Meeting/Conference Call Schedule** **Deliverable Status Review**	15 min
3:30-3:45	**BCT General Update** **Stakeholder Items**	15 min
3:45-4:00	**Action Items**	15 min
4:00	**BCT Meeting Adjourn**	

ST012 Update

- Introduction
- Site Activities Update (last 30 days)
- Evaluation of Phase 1 Data
- Path Forward
- Response to EPA and ADEQ Comments

ST012 Introduction

- Update since June BCT Meeting
  - 28 June 2016 – EPA/ADEQ joint letter requesting halt to all activities related to decommissioning the SEE system and procuring for and constructing the EBR system
  - 1 July 2016 – AF letter acknowledging suspension of SEE decommissioning and EBR construction
  - 11 and 20 July 2016 – Two meetings between AF, EPA, ADEQ managers (Phil, Angeles, Tina)
  - 28 July 2016 – EPA/ADEQ Invokes Informal Dispute
  - 17 August 2016 – ADEQ comments on ST012 OMM Reports
- Characterization and containment are priorities

ST012 Status

- Temporary halt for SEE decommissioning and EBR construction
- Enhancement and optimization of deep SVE
- Ongoing
  - SVE
  - LNAPL monitoring and removal
  - Water level and temperature monitoring
- Phase 1 Characterization completed

Phase 1 Post-Steam Investigation

- **Evaluation of Phase 1 Results**
  - **Bottom Line**
    - An additional round of borings and wells is recommended for LNAPL or dissolved phase characterization
    - Actions are recommended to achieve active containment capability
- **The Air Force is committed to remedy performance and achieving remedy objectives**
- **Activities for Phase 2 Post-Steam Investigation and Containment Construction can start immediately**

ED_005025_00005105-00006

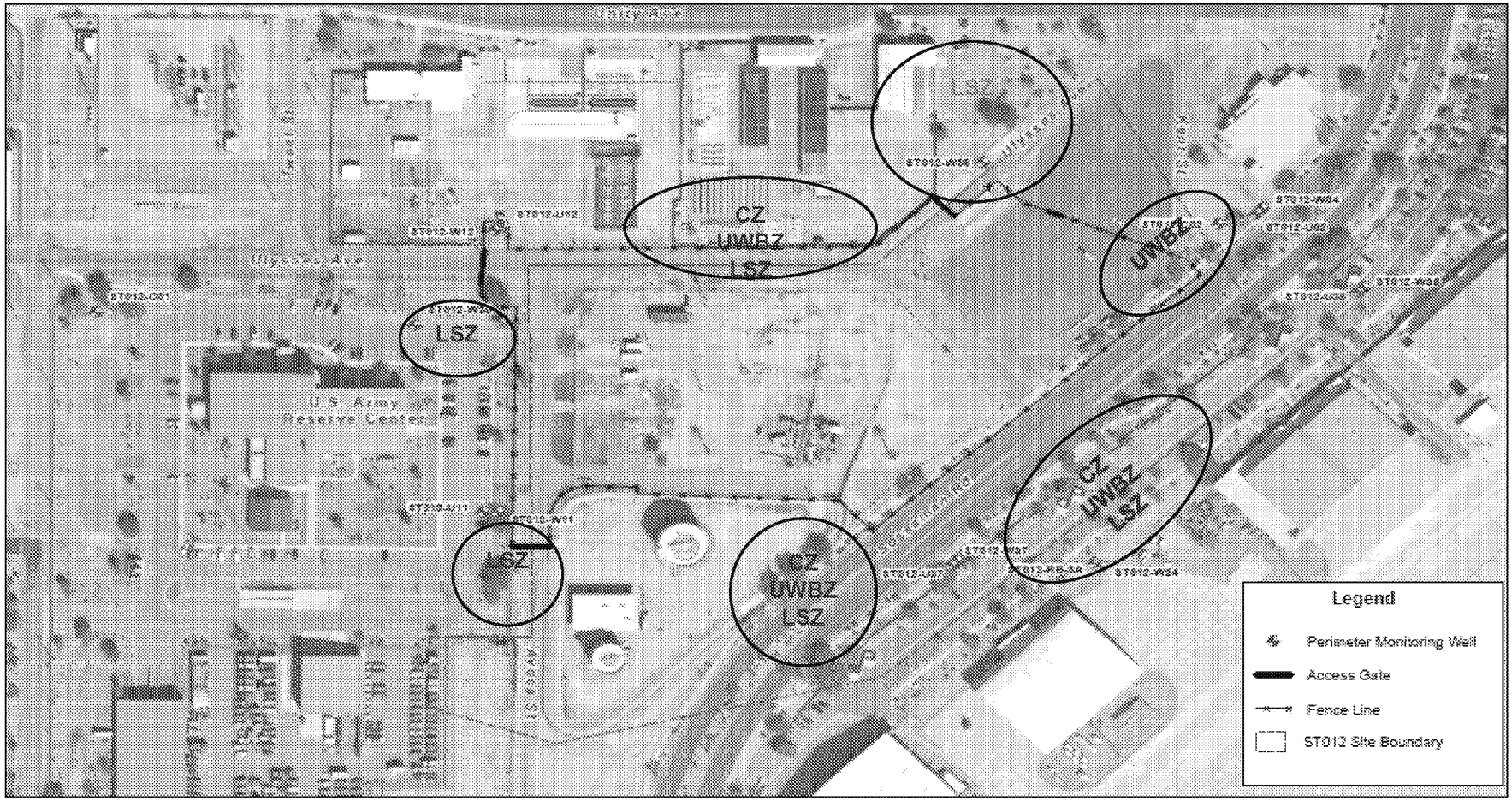
ST012 Update

- PBR objectives are designed to achieve ROD objectives
- AF Oversight and Management
  - All deliverables and responses to comments are reviewed, approved and issued by the AF
  - AF reviews and provides input to all presentation materials
  - Reviews and input on PBR approaches to achieve ROD objectives are a consistent and integrated component
- AF is the ROD signatory and heavily involved in primary, secondary and operational documents
- Presentations are performed based on project and technical responsibilities. AF manages the overall program.
- Direct discussion between regulatory and AF BCT members is encouraged at any and all times, including throughout the BCT meetings.

ST012
Additional Characterization

- **Summary of Additional Characterization**
  - Focused on areas of past ADEQ/EPA concern
  - Updated LNAPL interpretations with recent Phase 1 data
  - Phase 2 Additional Characterization consists of
    - 10 additional LNAPL characterization borings
    - 13 additional groundwater monitoring wells
    - Some locations may be combined
  - Construct extraction and treatment capability for active containment

Site ST012 EPA/ADEQ Concerns for LNAPL and Groundwater (Benzene) Characterization



Red – LNAPL and dissolved phase

Green – dissolved phase

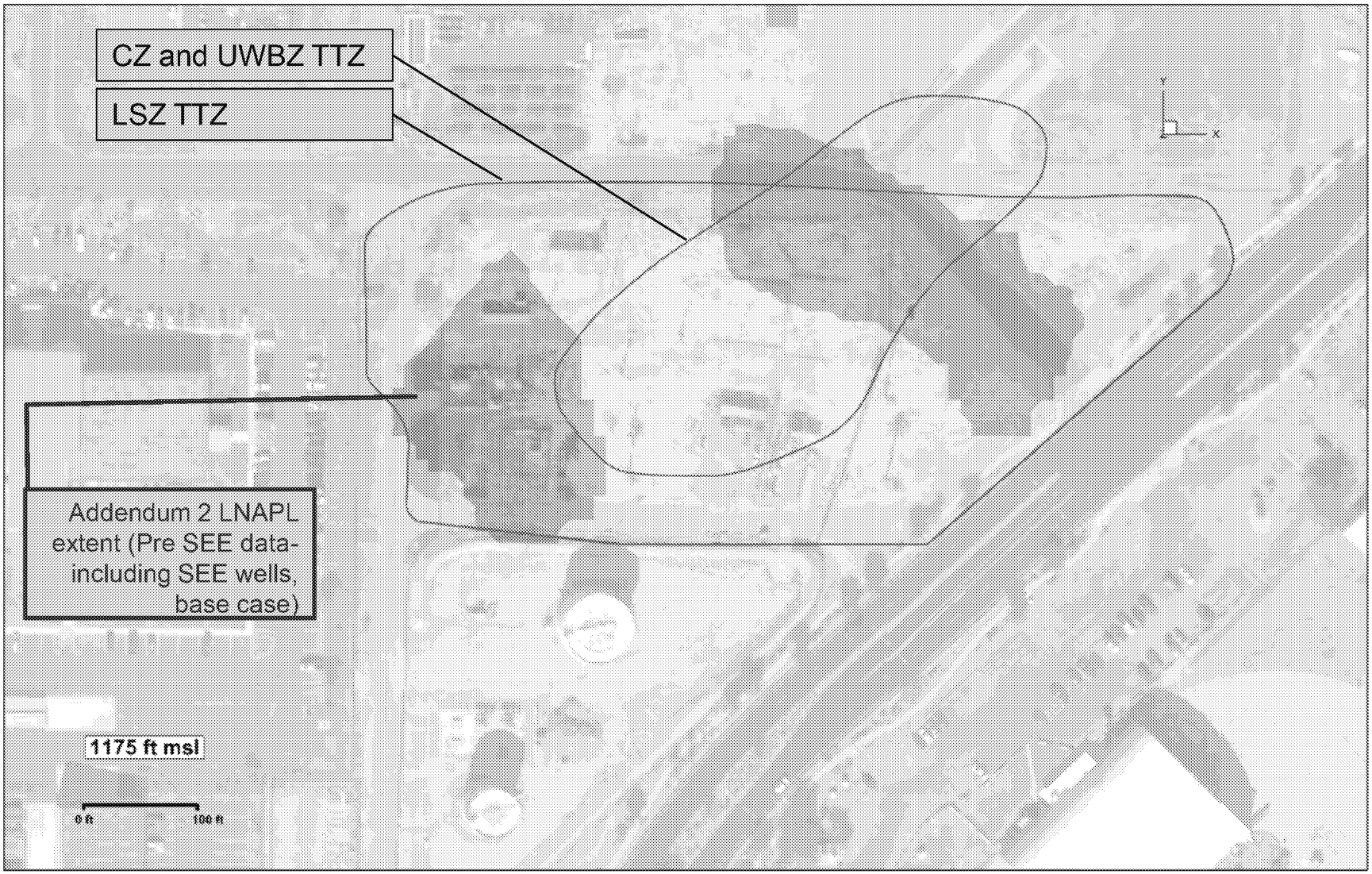
Blue – LNAPL

Area of EPA/ADEQ comment

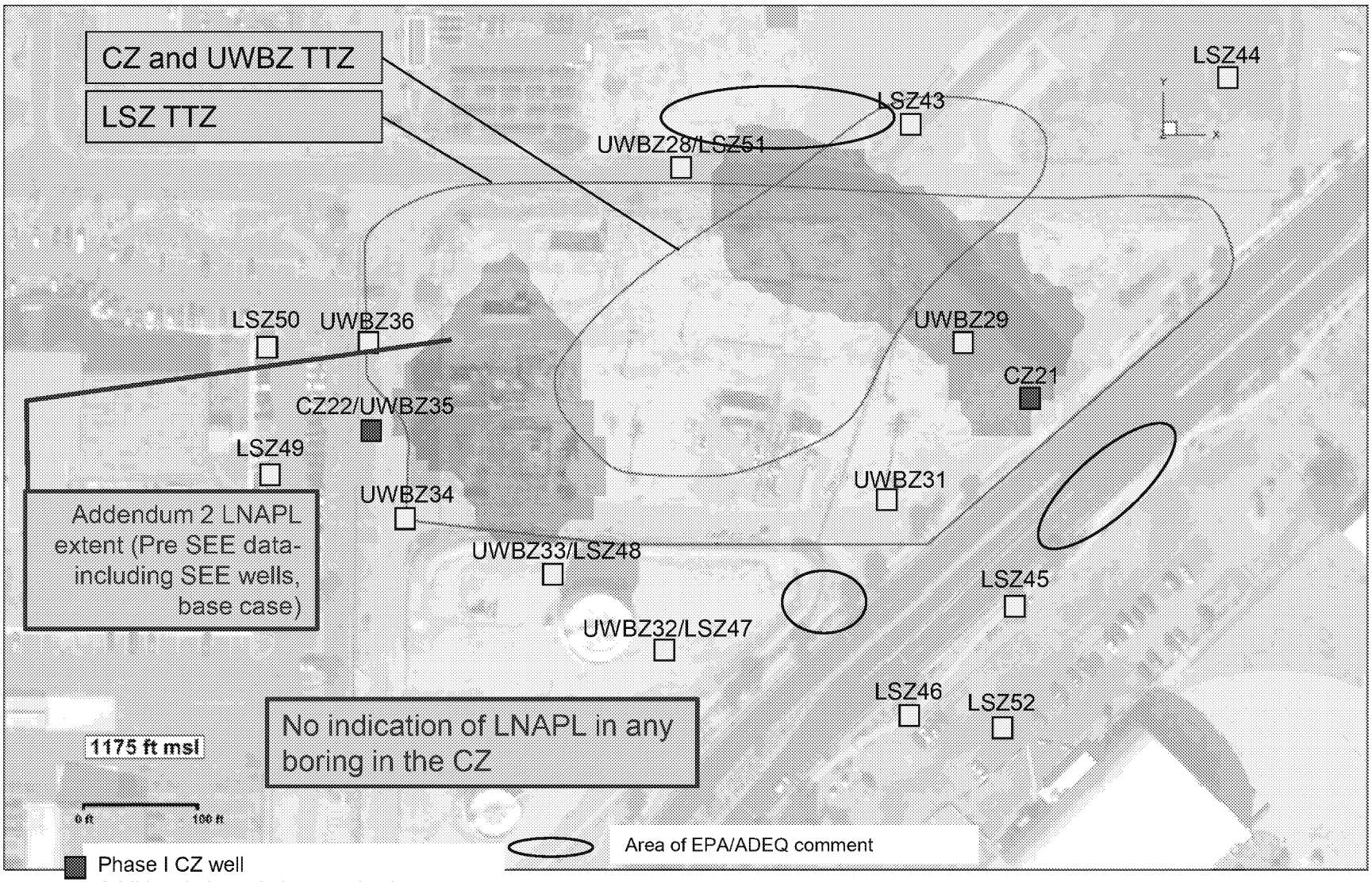
Site ST012 Additional Characterization

- Review of LNAPL Delineation
  - Historical logs/interpretations
  - Update with
    - New well dye test kit results (supported by analytical)
    - LNAPL observations in wells (through 8/5/16)
    - LNAPL removed (through 8/5/16)

Evaluation of CZ LNAPL Characterization Based on Pre SEE Data

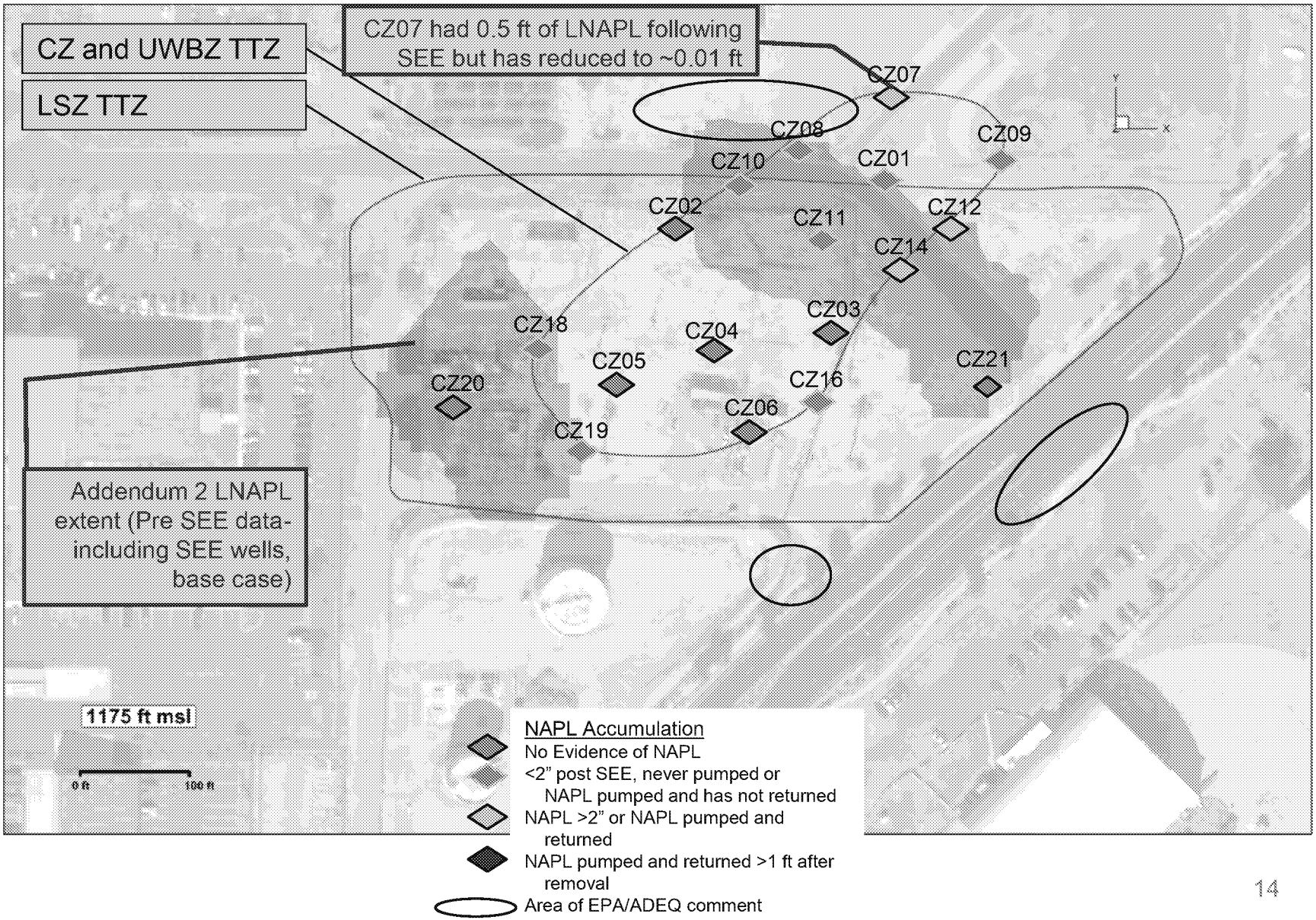


Evaluation of CZ LNAPL Characterization LNAPL Indications/Dye Test

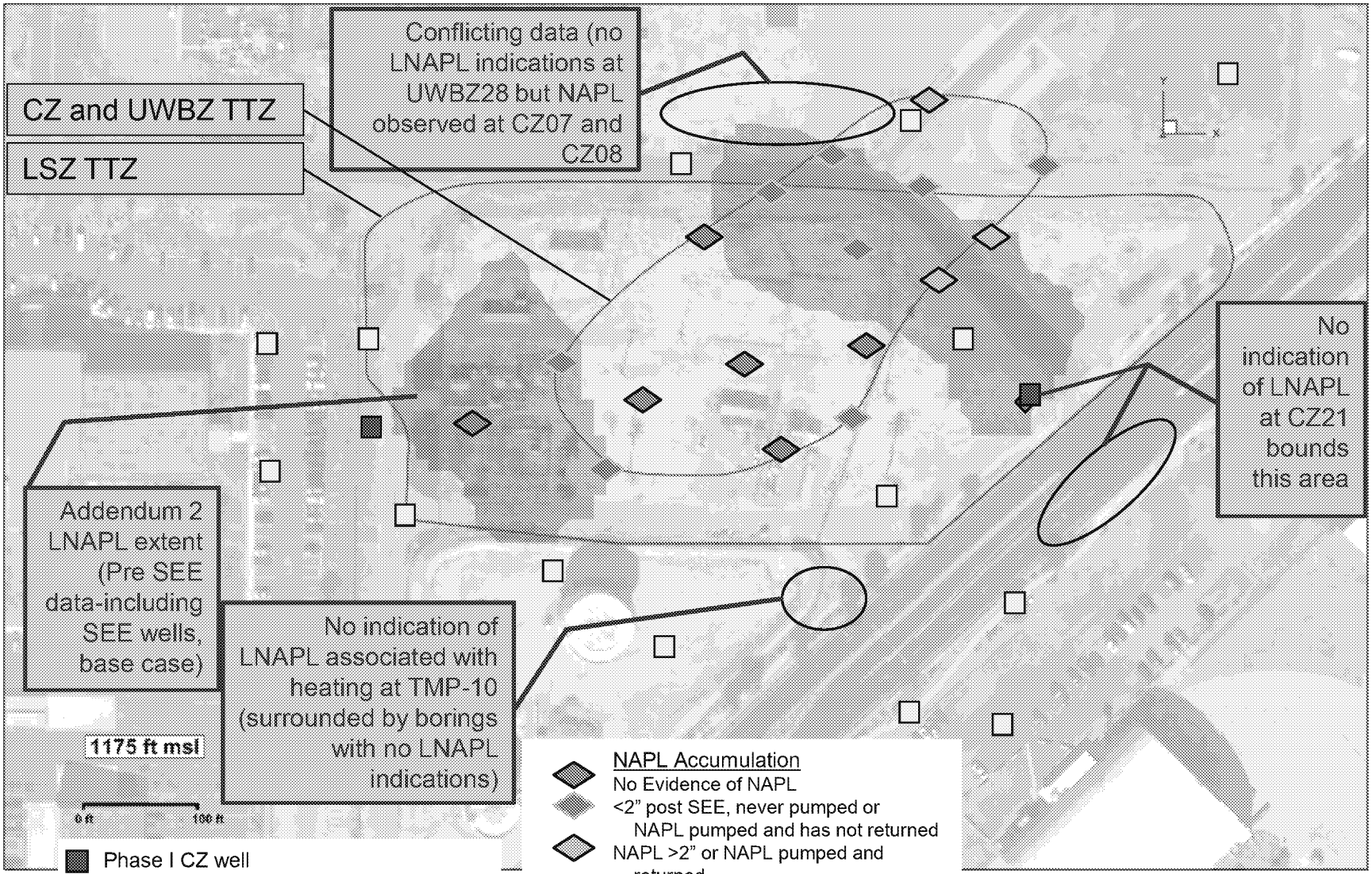


Phase I CZ well
Additional phase I characterization (deeper location)
LNAPL indication/positive dye test result

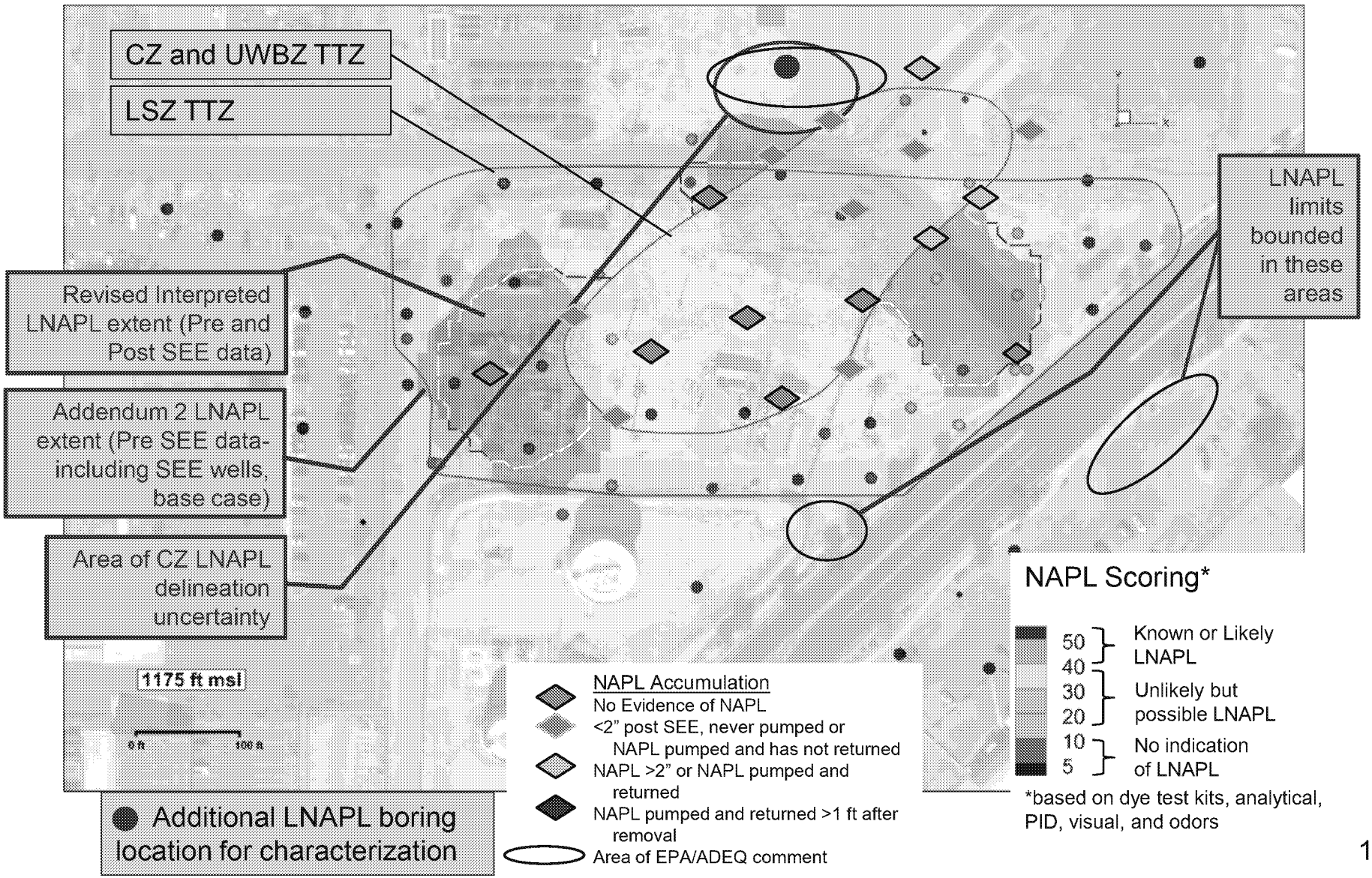
Evaluation of CZ LNAPL Characterization Post SEE LNAPL Presence



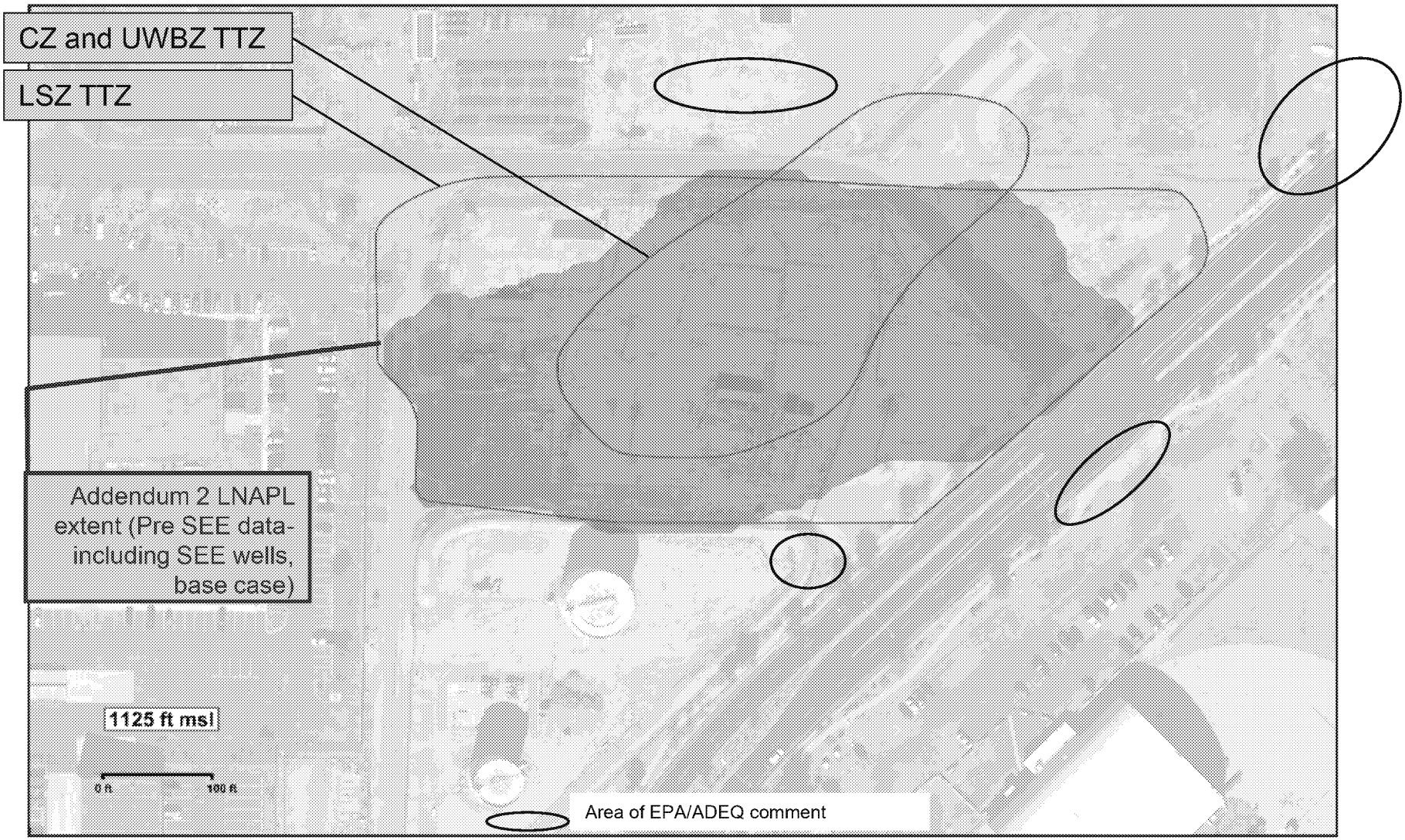
Evaluation of CZ LNAPL Characterization
Summary of Phase 1 LNAPL Data



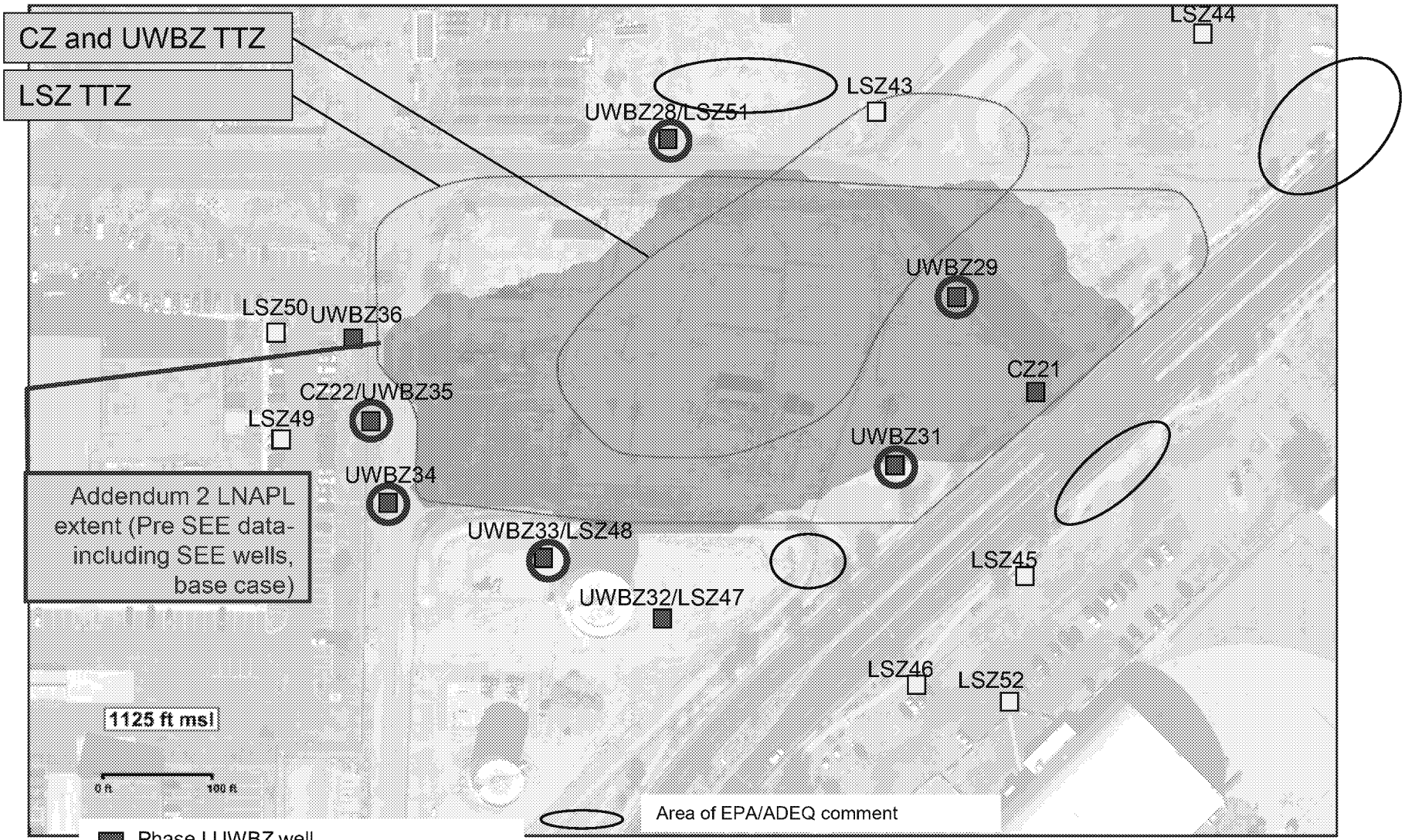
LNAPL Revised Interpretation Cobble Zone



Evaluation of UWBZ LNAPL Characterization Based on Pre SEE Data

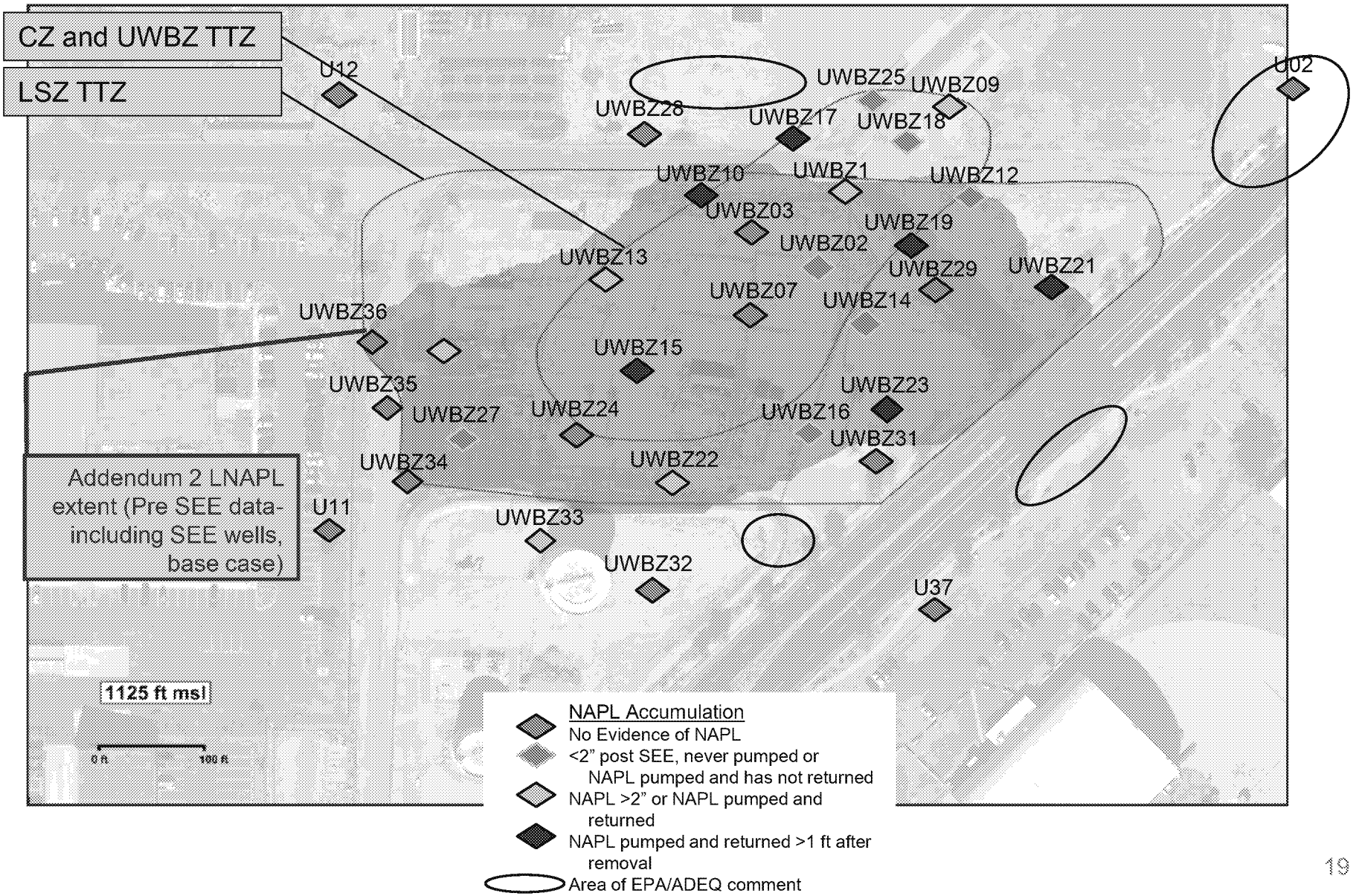


Evaluation of UWBZ LNAPL Characterization
LNAPL Indications/DyeTest

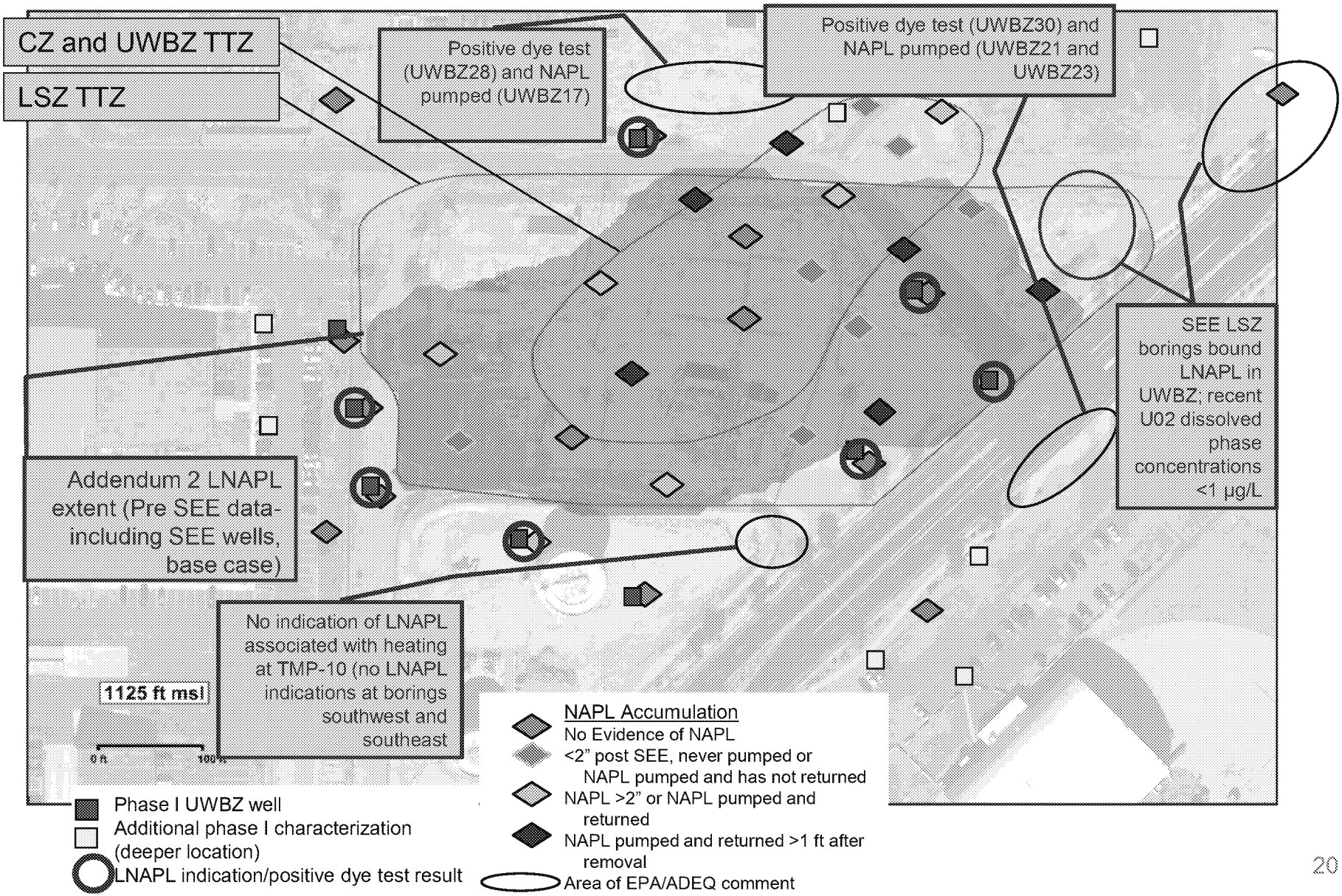


Phase I UWBZ well
Additional phase I characterization (deeper location)
LNAPL indication/positive dye test result

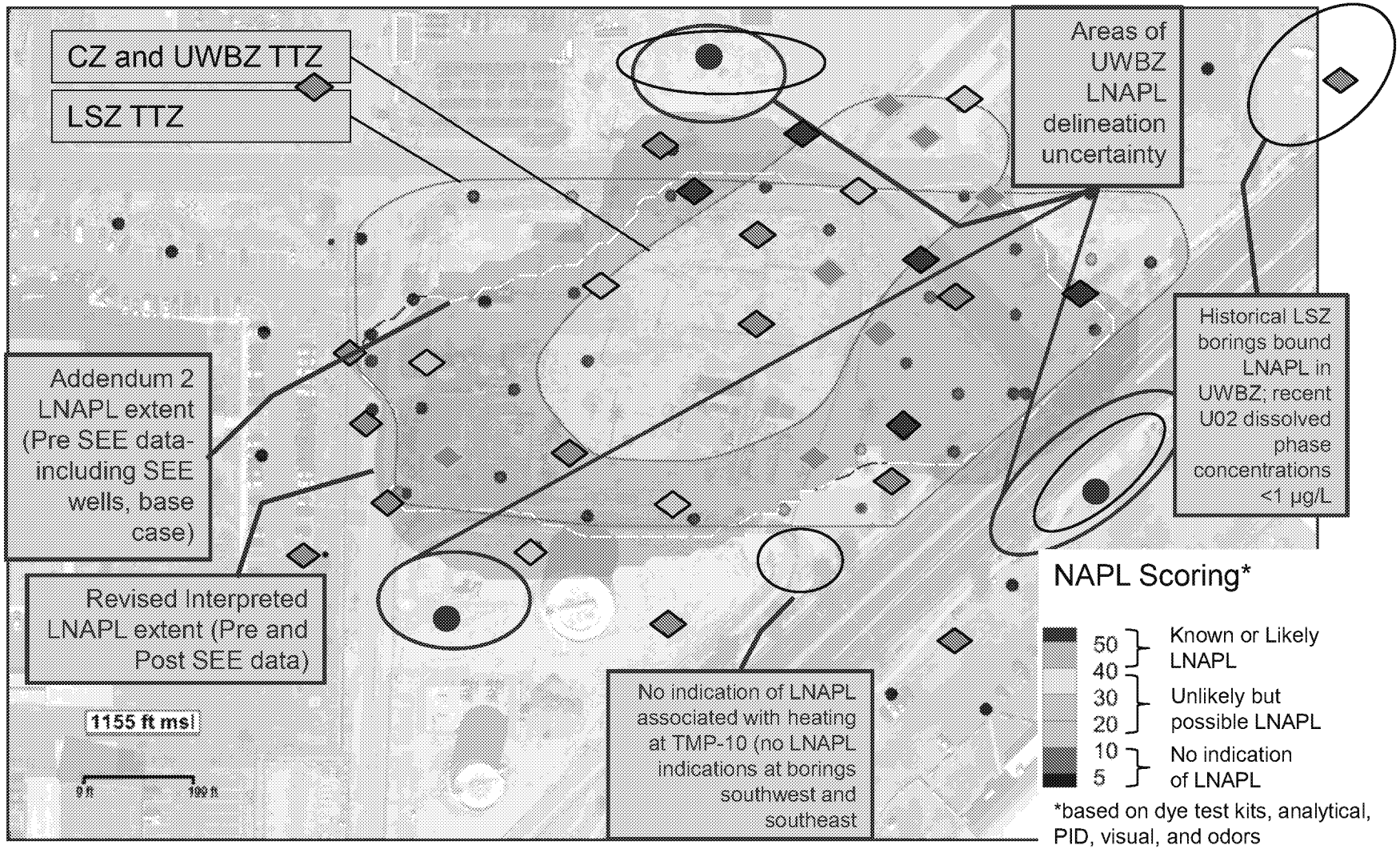
Evaluation of UWBZ LNAPL Characterization Post SEE LNAPL Presence



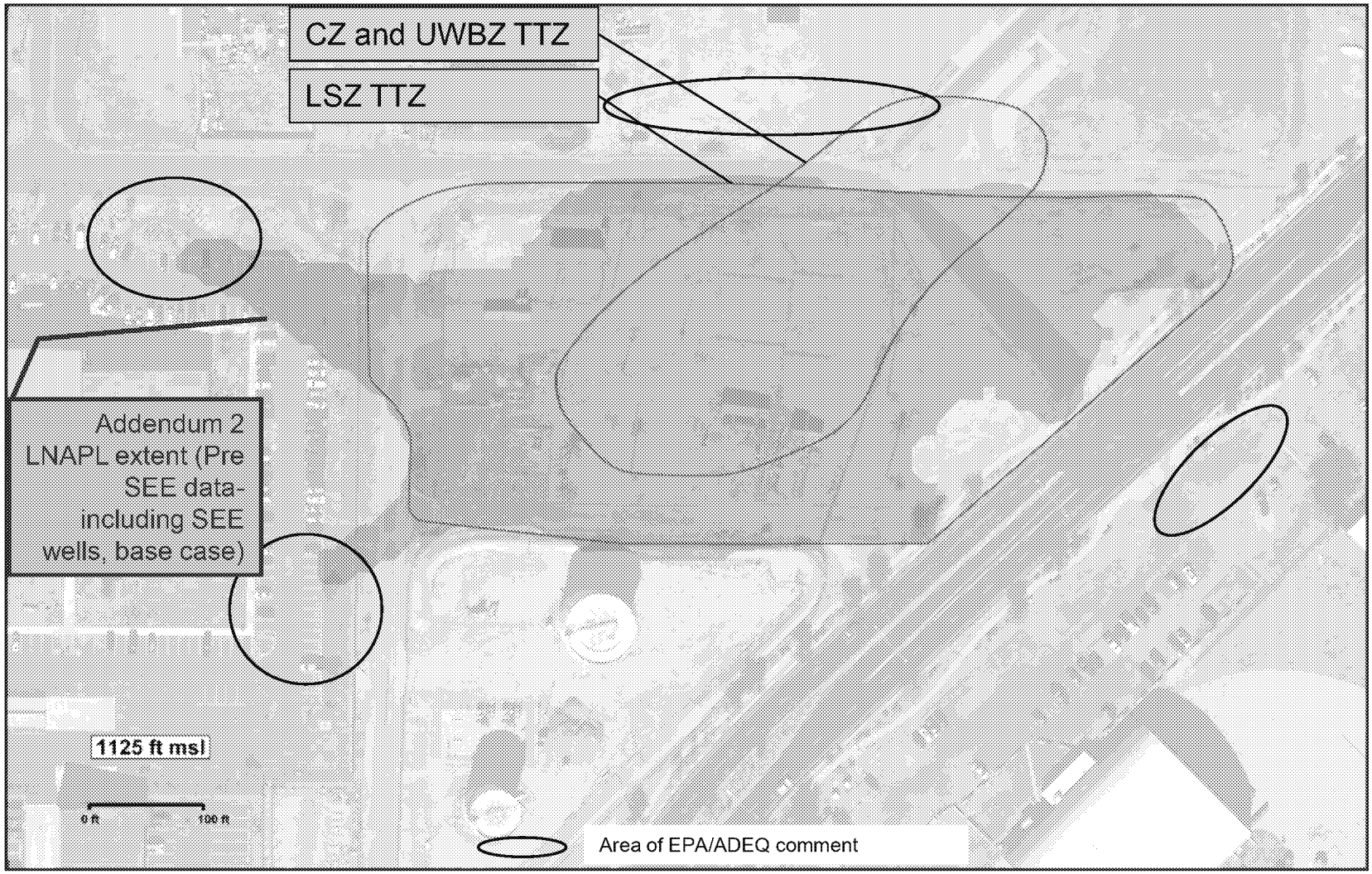
Evaluation of UWBZ LNAPL Characterization
Summary of Phase 1 LNAPL Data



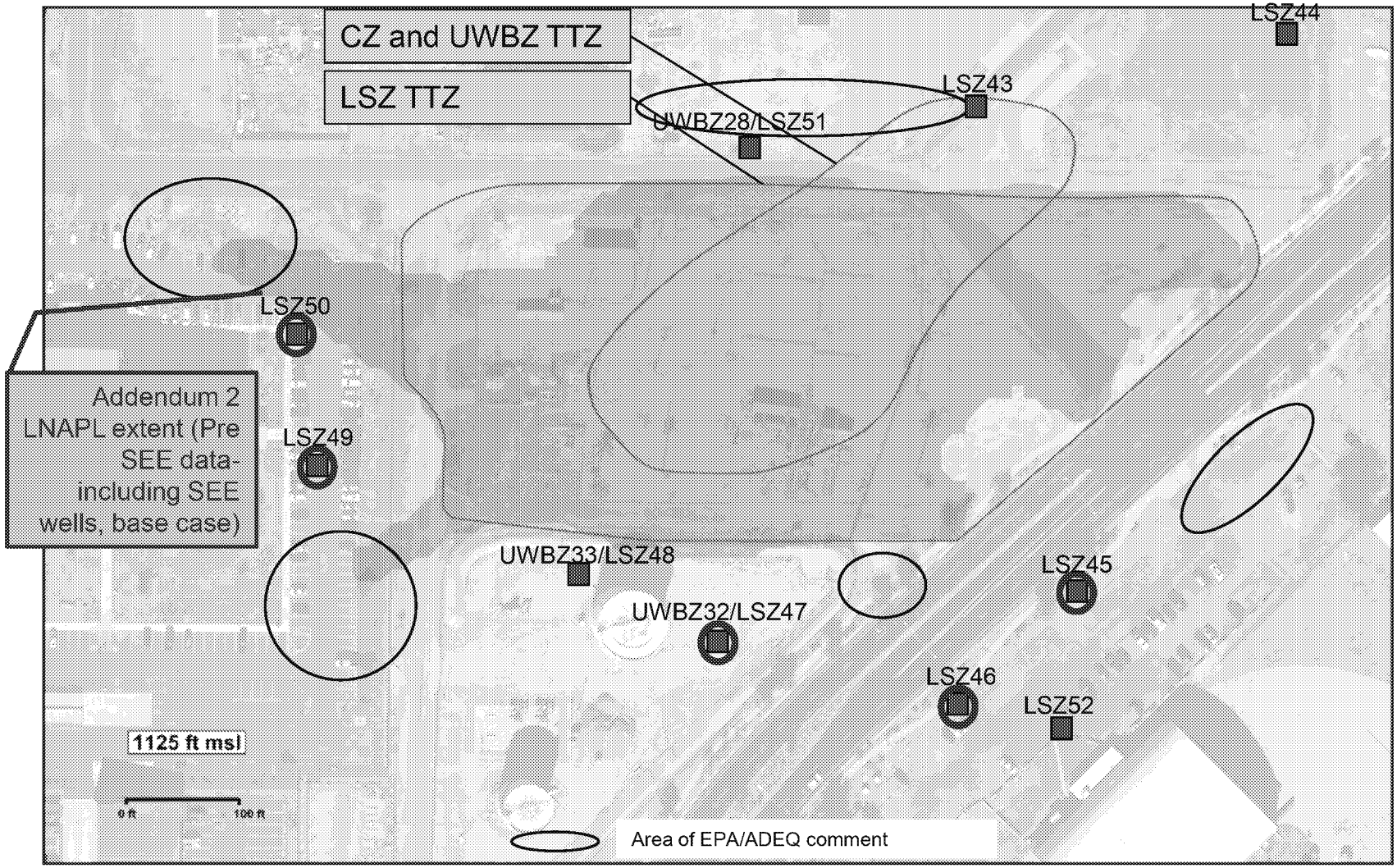
LNAPL Revised Interpretation Upper Water Bearing Zone



Evaluation of LSZ LNAPL Characterization Based on Pre SEE Data



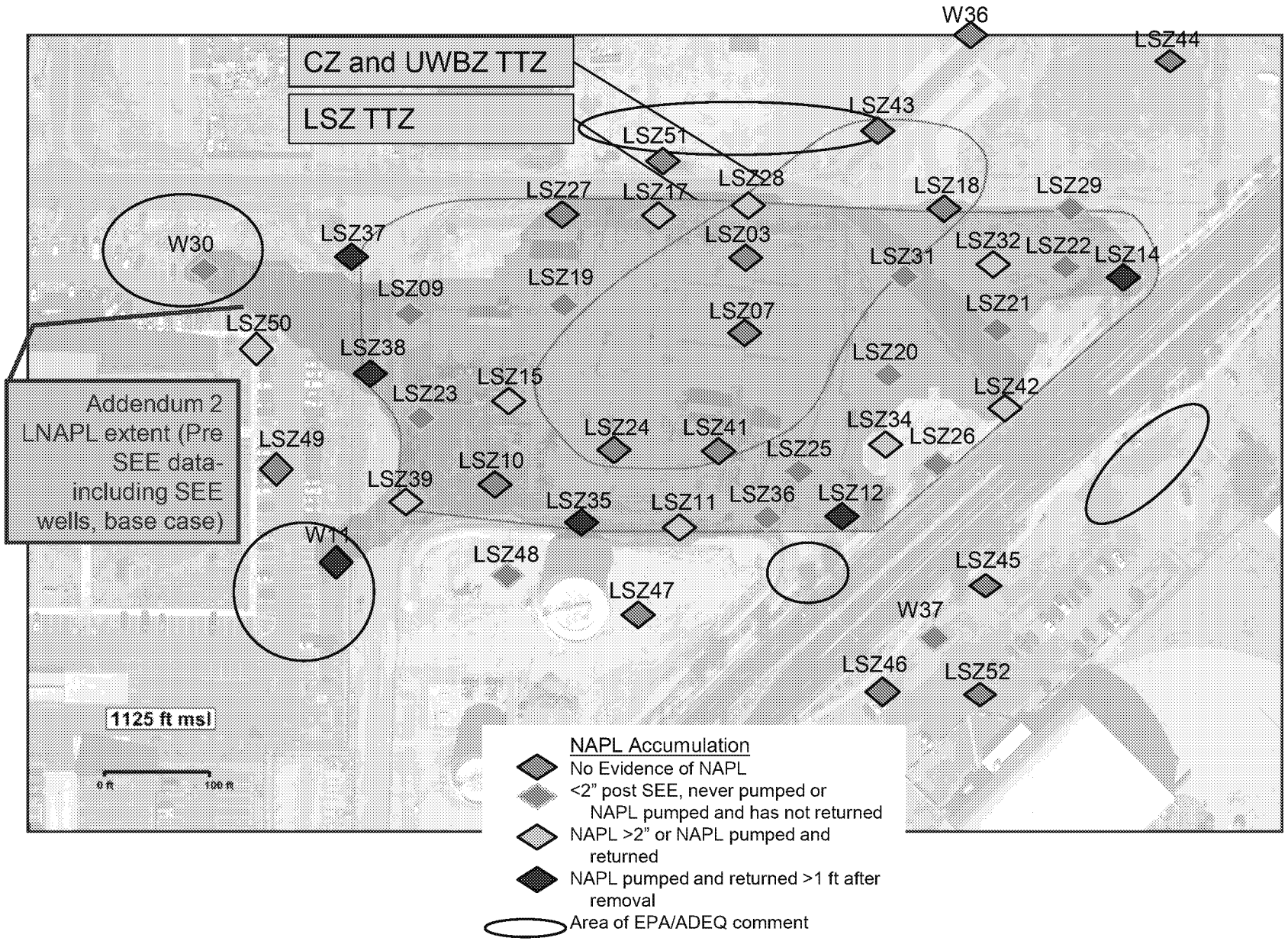
Evaluation of LSZ LNAPL Characterization
LNAPL Indications/Dye Test



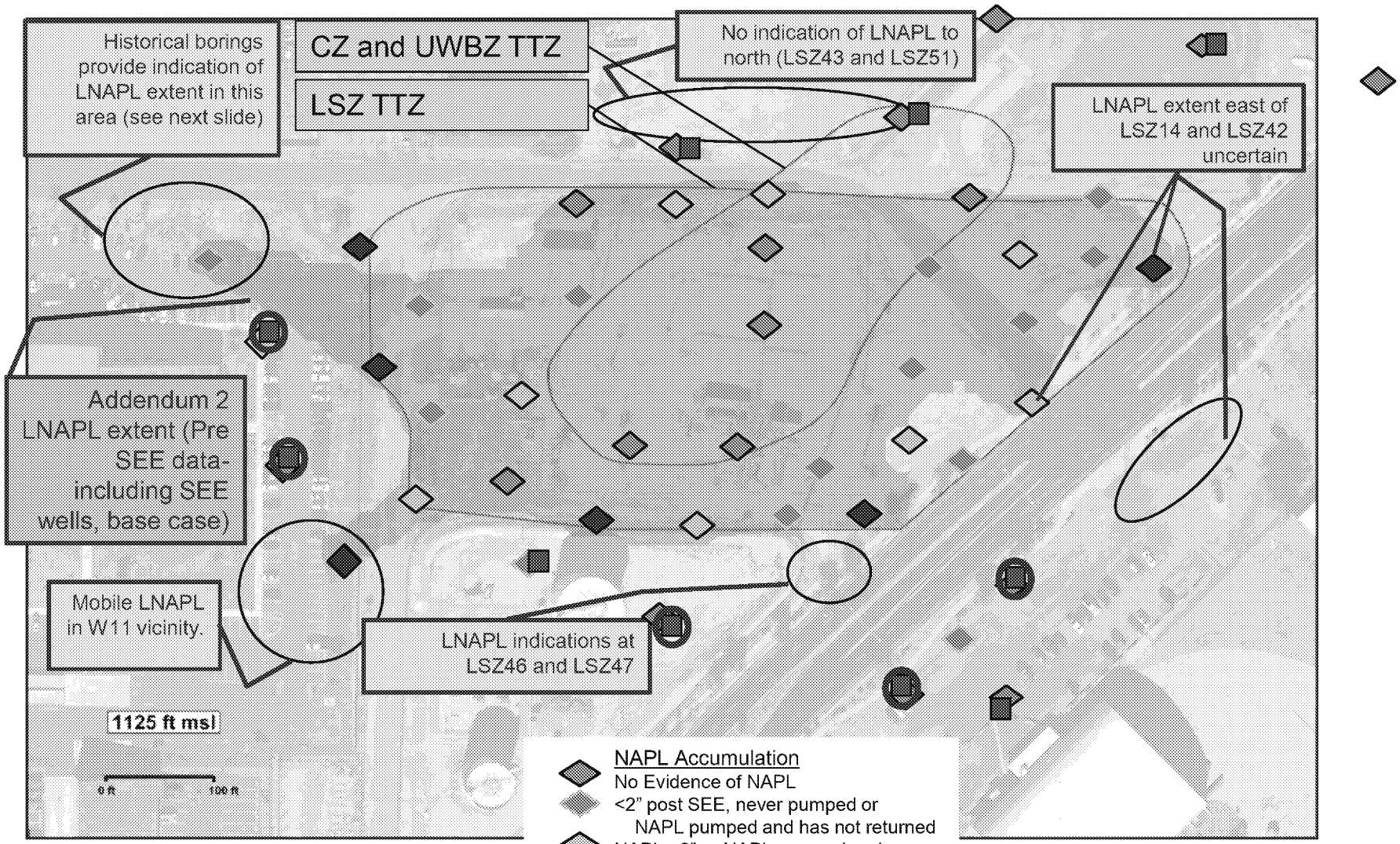
Phase I LSZ Well

LNAPL indication/positive dye test result

Evaluation of LSZ LNAPL Characterization Post SEE LNAPL Presence

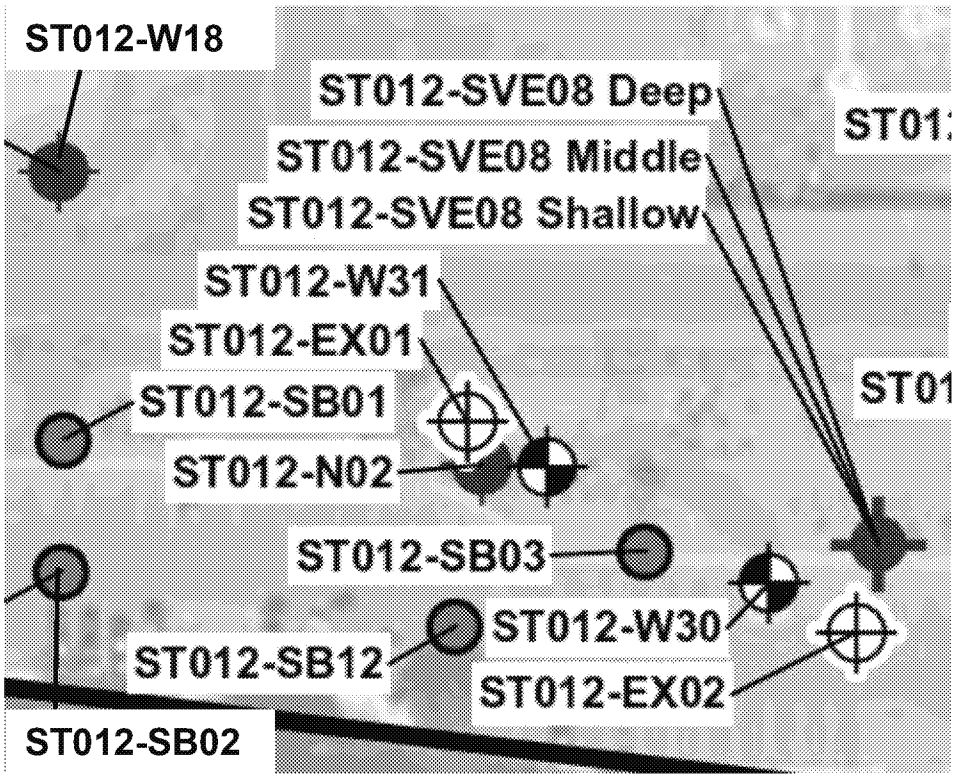


Evaluation of LSZ LNAPL Characterization
Summary of Phase 1 LNAPL Data



Evaluation of LNAPL Characterization
W-30 Area

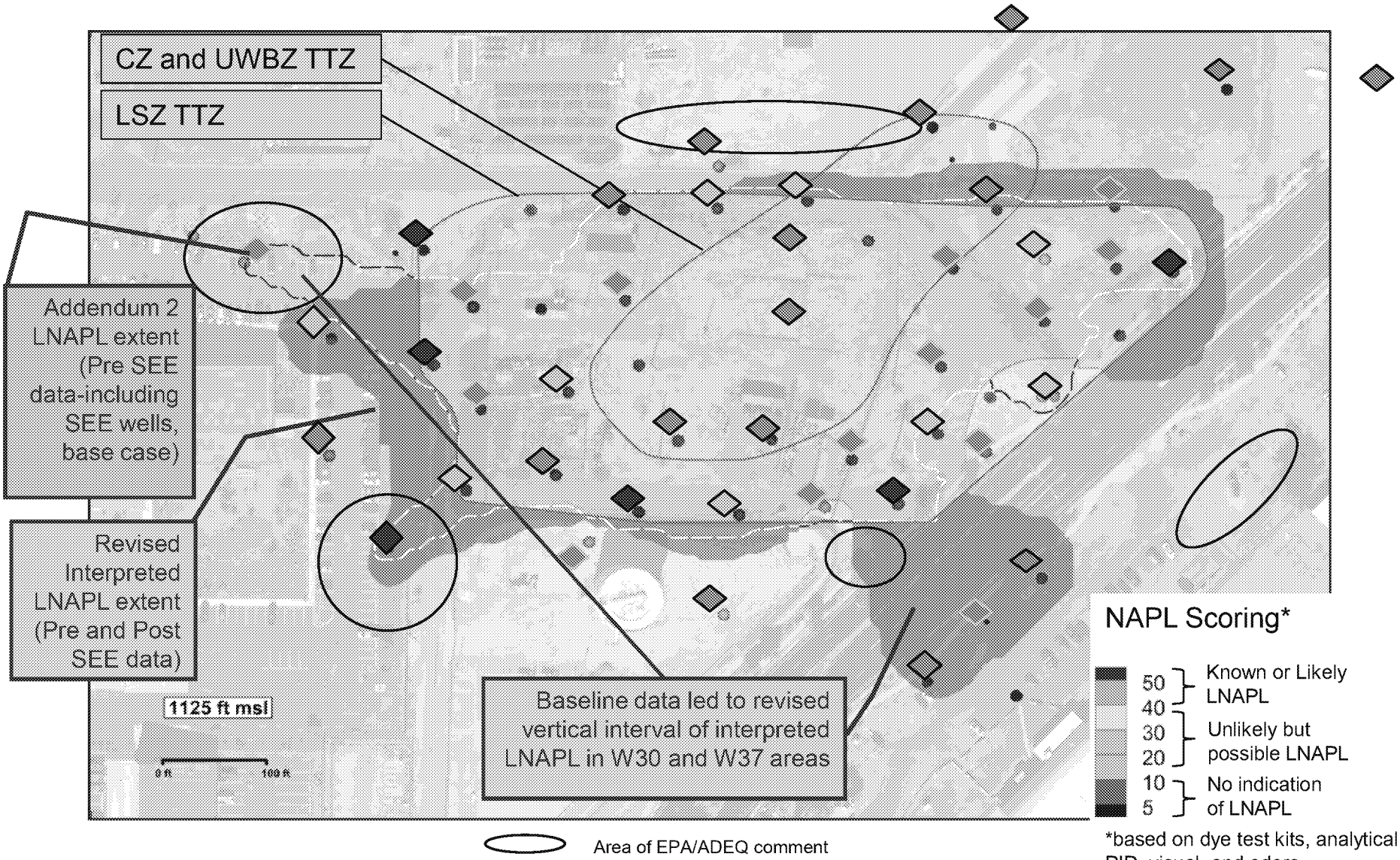
W-30 Area (Historical Borings)



- SB01
  - No indication of NAPL to 220 ft bgs
  - Odor and 29 mg/kg TPH at 220 ft bgs
- SB02
  - No indication of NAPL to 220 ft bgs
  - 17 mg/kg TPH at 220 ft bgs
- SB03
  - Likely NAPL at 215 to 220 ft bgs
  - Odor, benzene 20 mg/kg, TPH 3,200 mg/kg
- SB12
  - Possible NAPL at 212 to 217 ft bgs
  - Visible staining, odor, but soil analysis not available
- N02
  - Likely NAPL at 216 to 222 ft bgs
  - Strong odors, PID >1,000 ppm
- W18
  - Boring log not available
- W31
  - Boring log not available

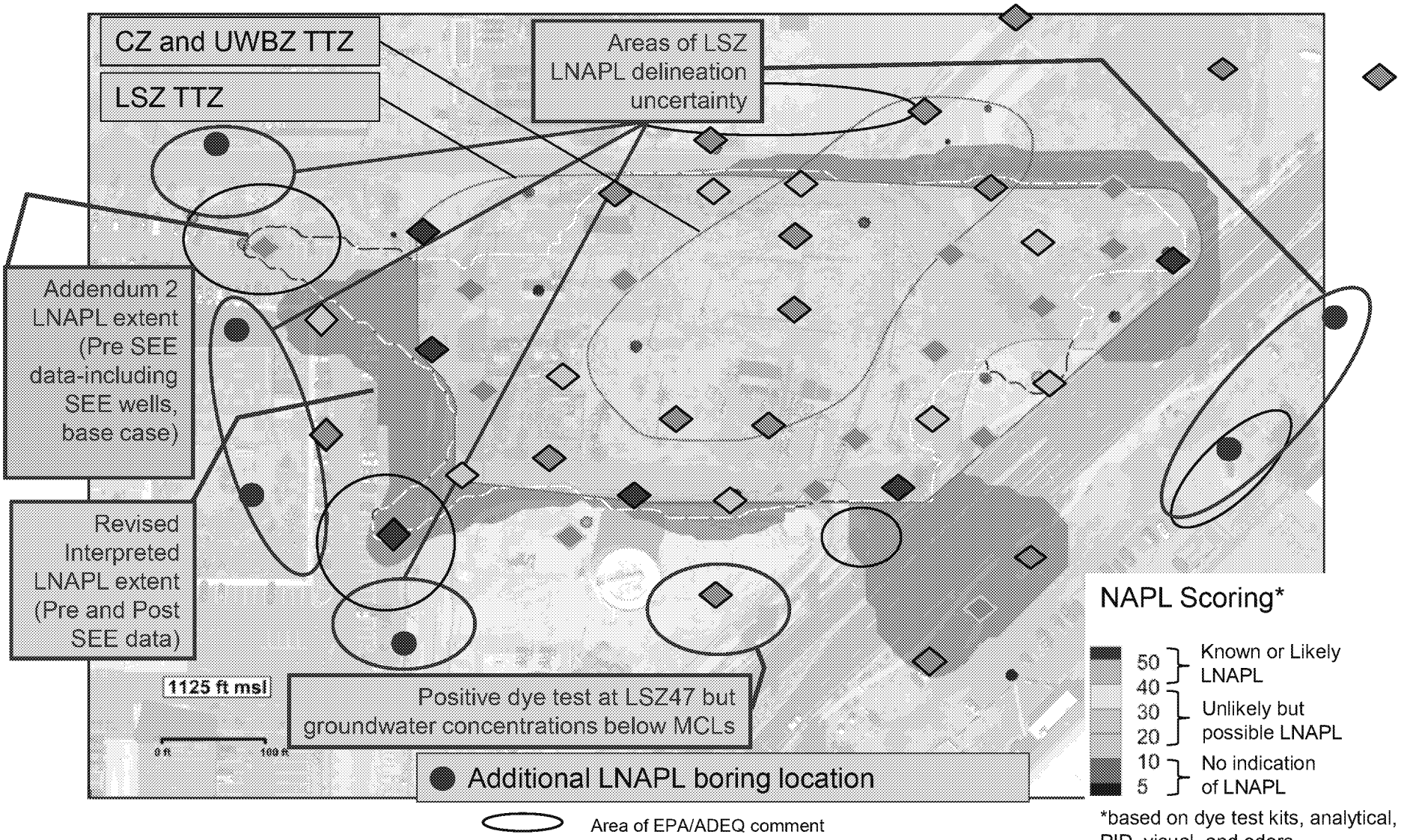
LNAPL extent extends west past SB12 and N02 but is bounded by SB01 and SB02 locations.

LNAPL Revised Interpretation Lower Saturated Zone



*based on dye test kits, analytical, PID, visual, and odors

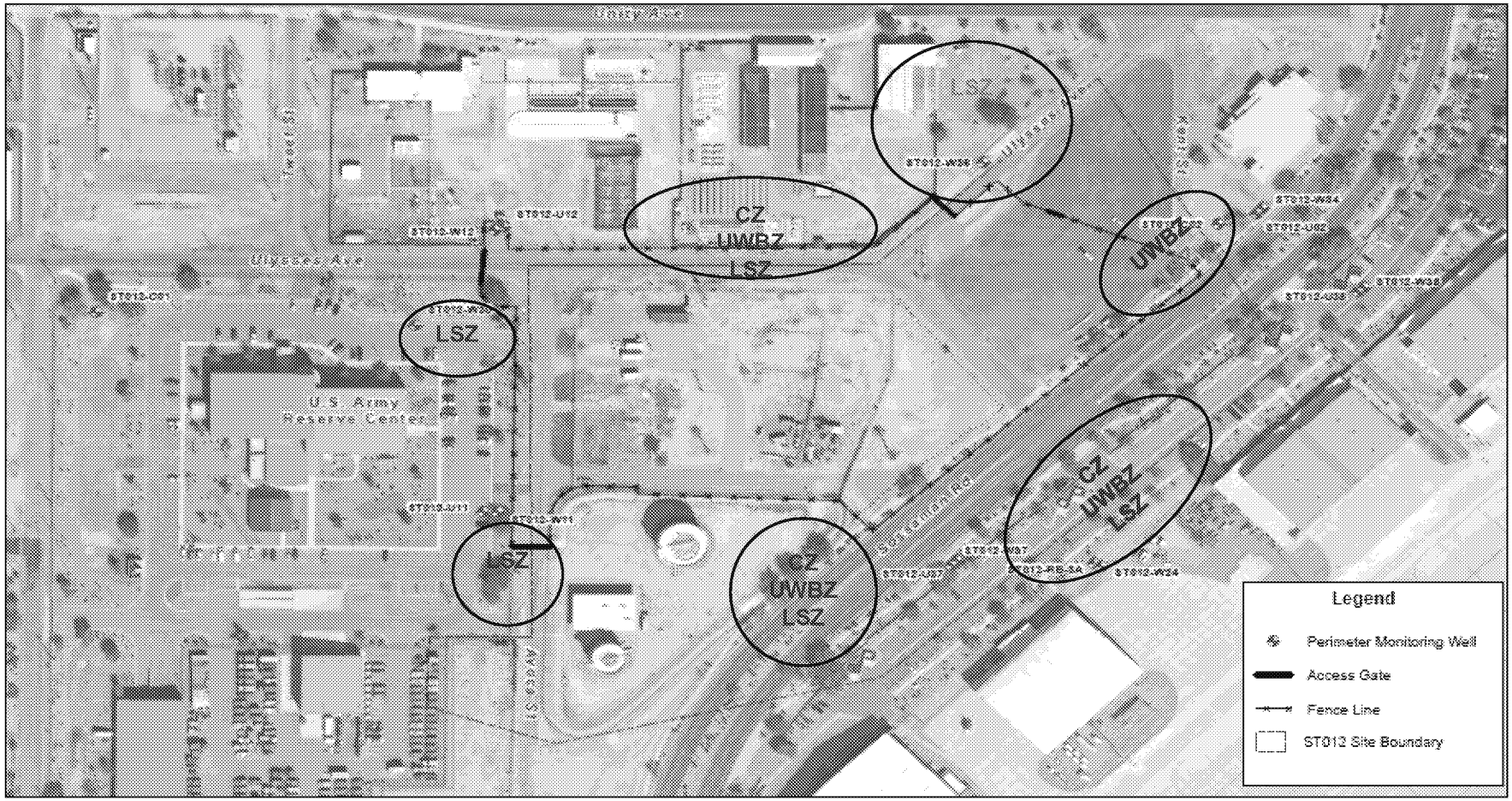
LNAPL Revised Interpretation
Lower Saturated Zone



Site ST012 Groundwater Characterization

- **Groundwater Characterization**
  - Evaluate EBR baseline and perimeter well groundwater data
  - Focus on dissolved phase concentrations of COCs
    - Benzene
    - BTEX+naphthalene

Site ST012 EPA/ADEQ Concerns for LNAPL and Groundwater (Benzene) Characterization



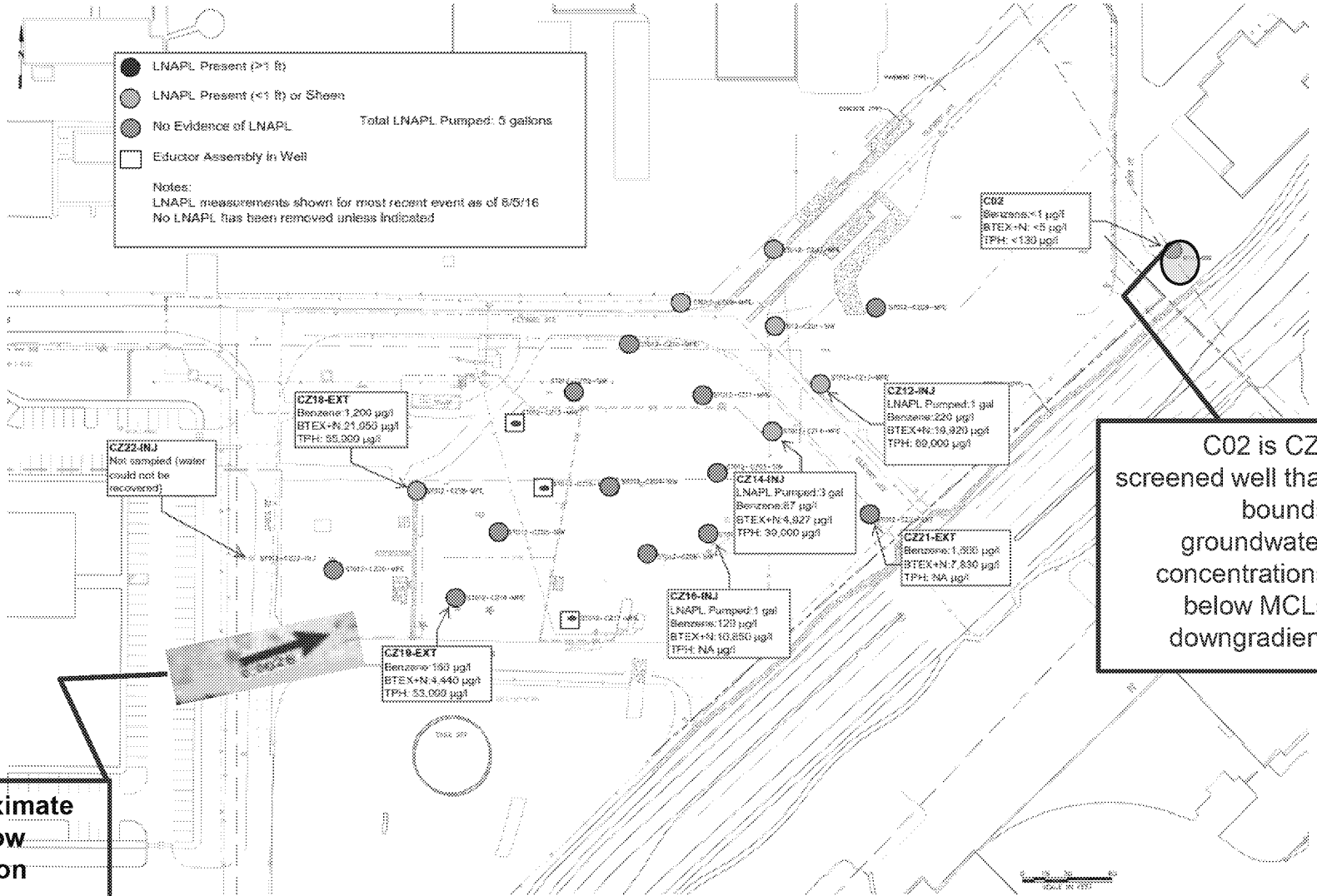
Red – LNAPL and dissolved phase

Green – dissolved phase

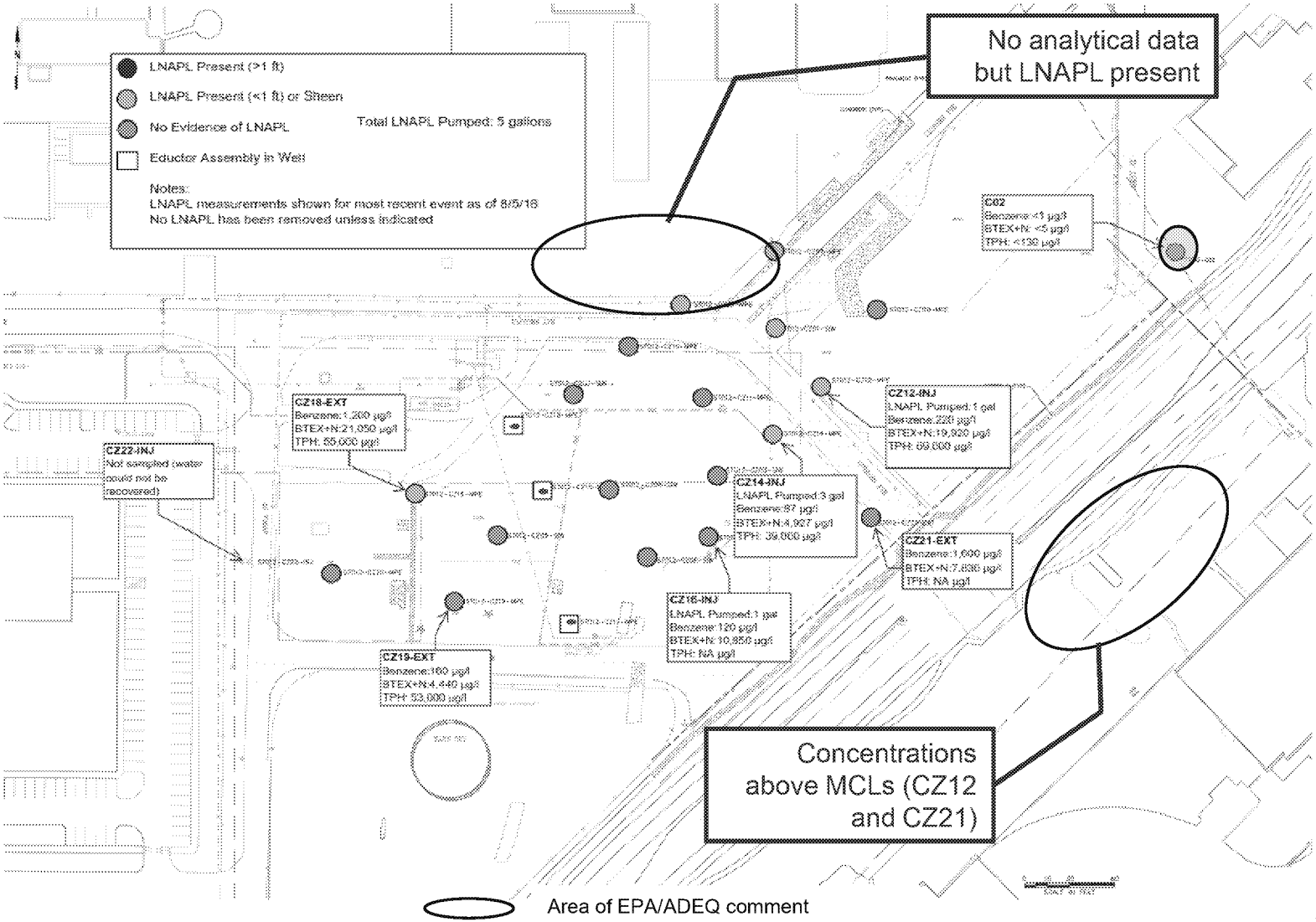
Blue – LNAPL

Area of EPA/ADEQ comment

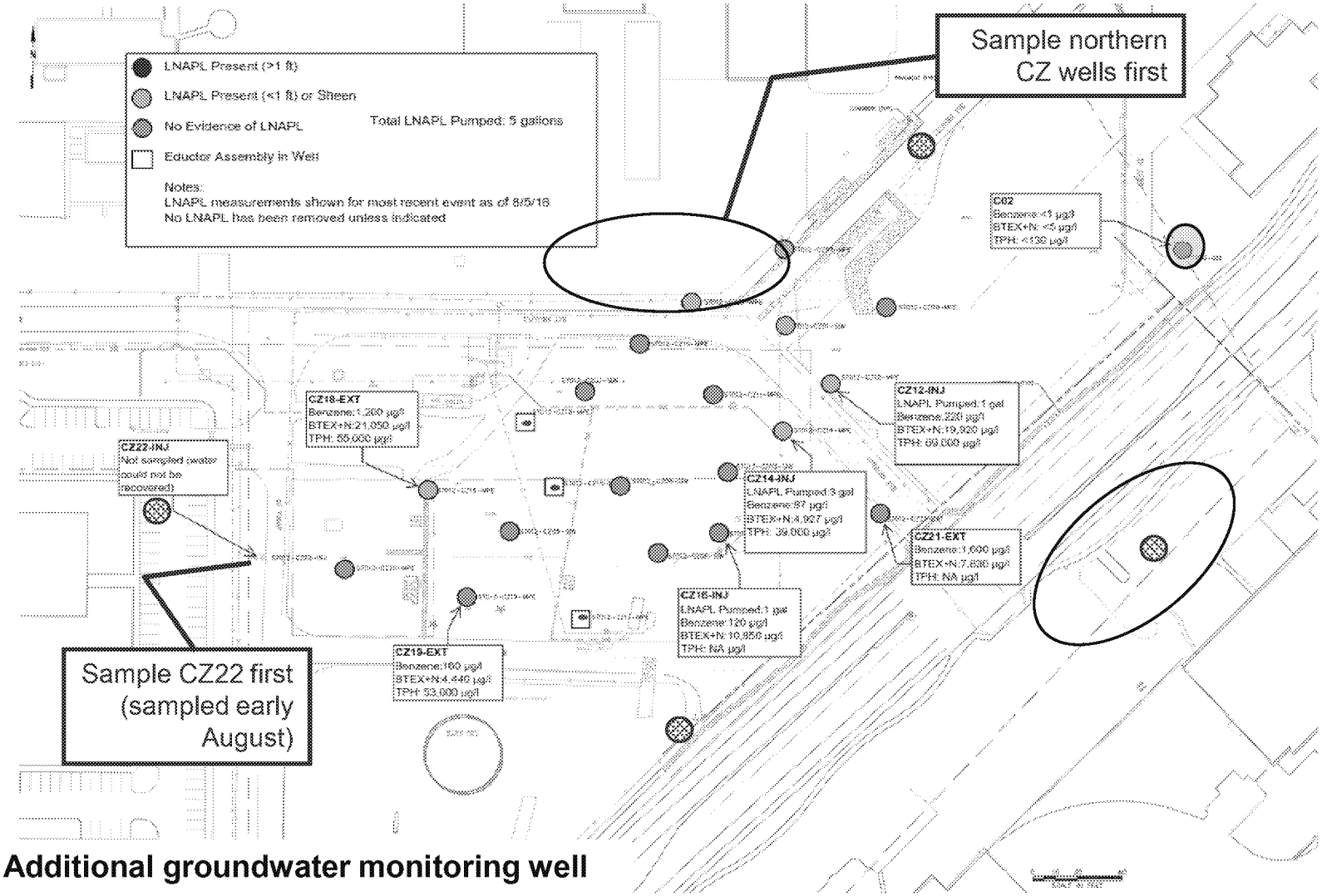
Site ST012 CZ Dissolved Phase Concentrations



Site ST012 CZ Evaluation of EPA/ADEQ Concerns



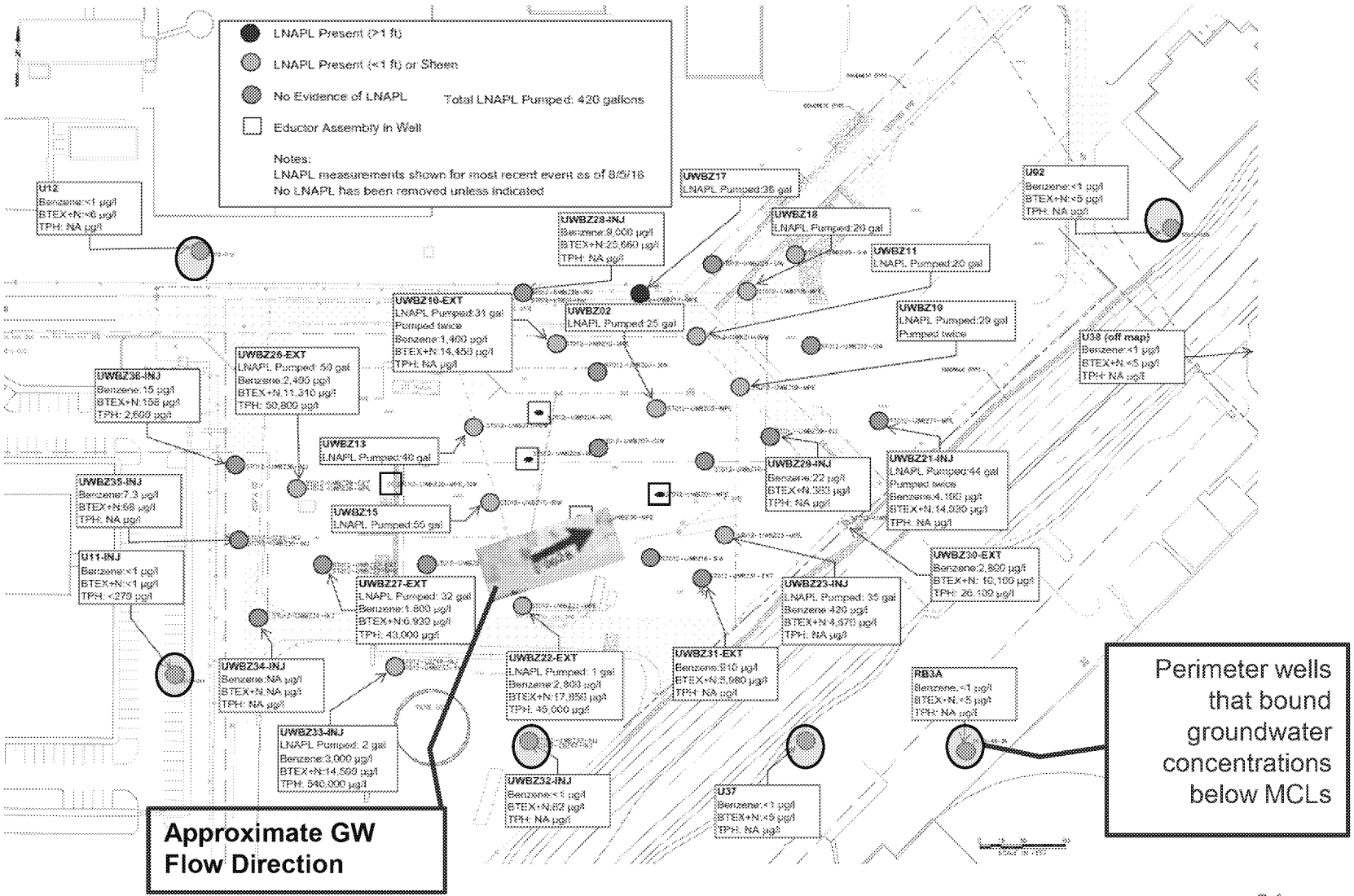
Site ST012 CZ Additional Characterization



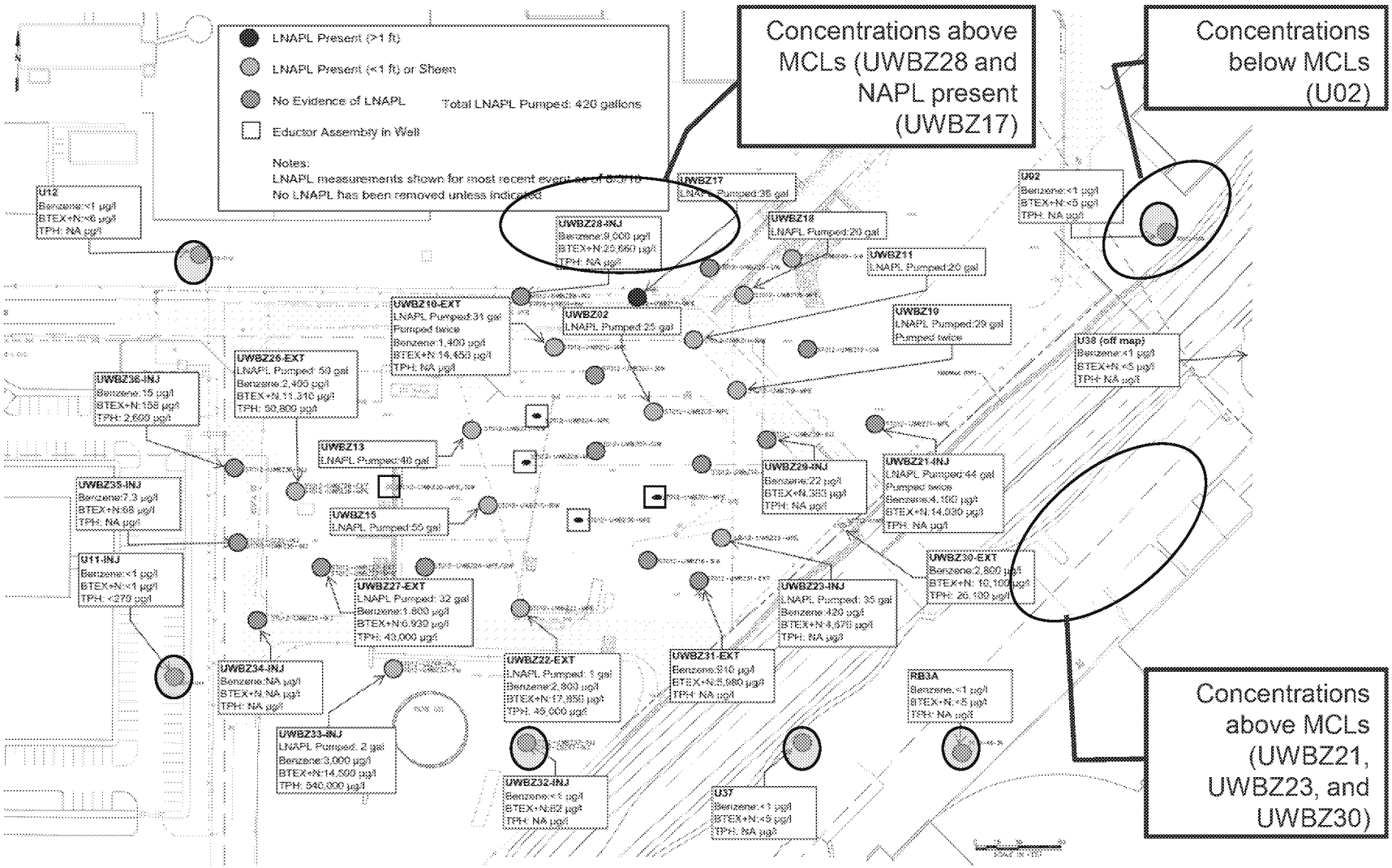
- **Additional groundwater monitoring well**

Area of EPA/ADEQ comment

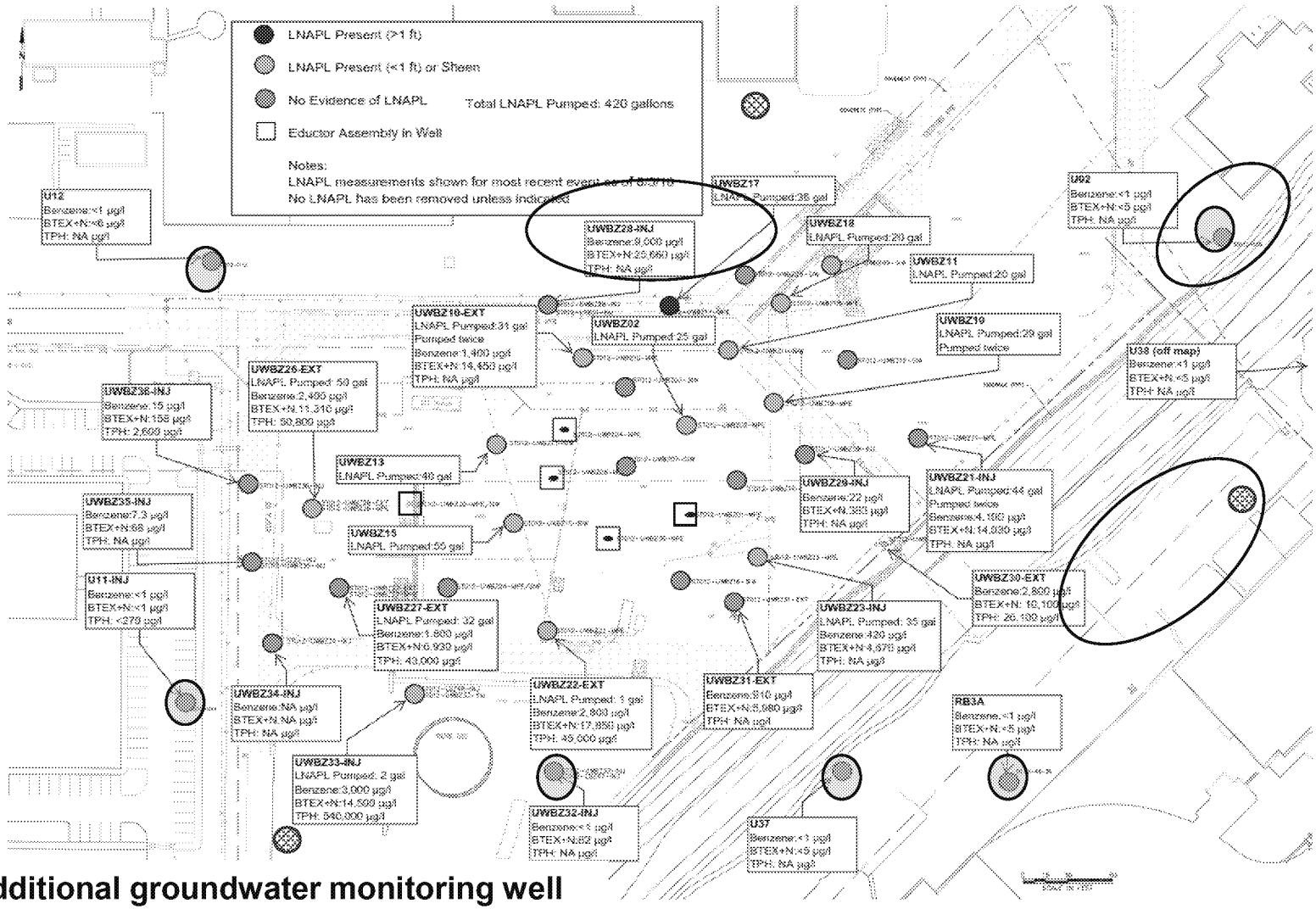
Site ST012 UWBZ Dissolved Phase Concentrations



Site ST012 UWBZ Evaluation of EPA/ADEQ Concerns



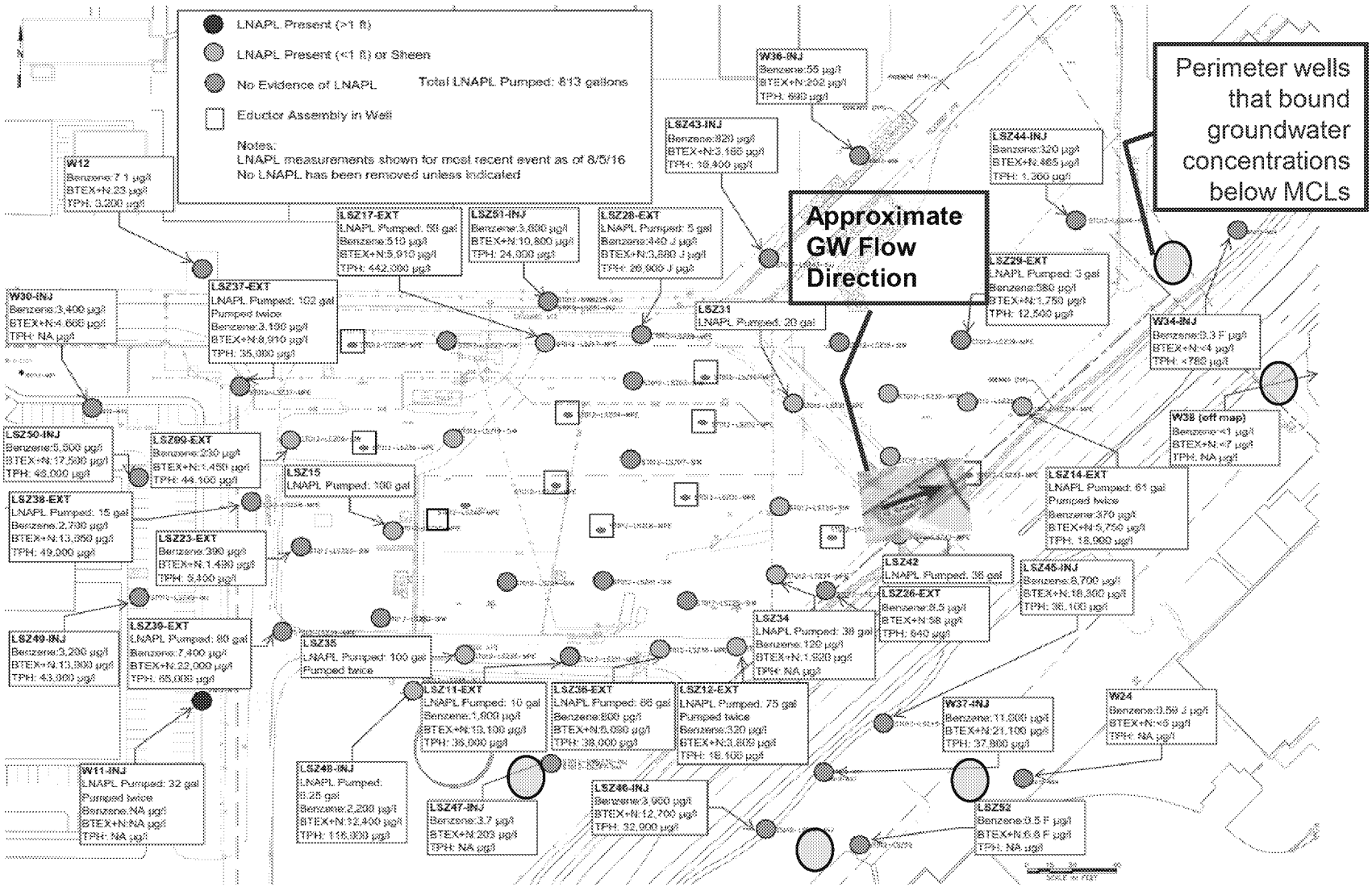
Site ST012 UWBZ Additional Characterization



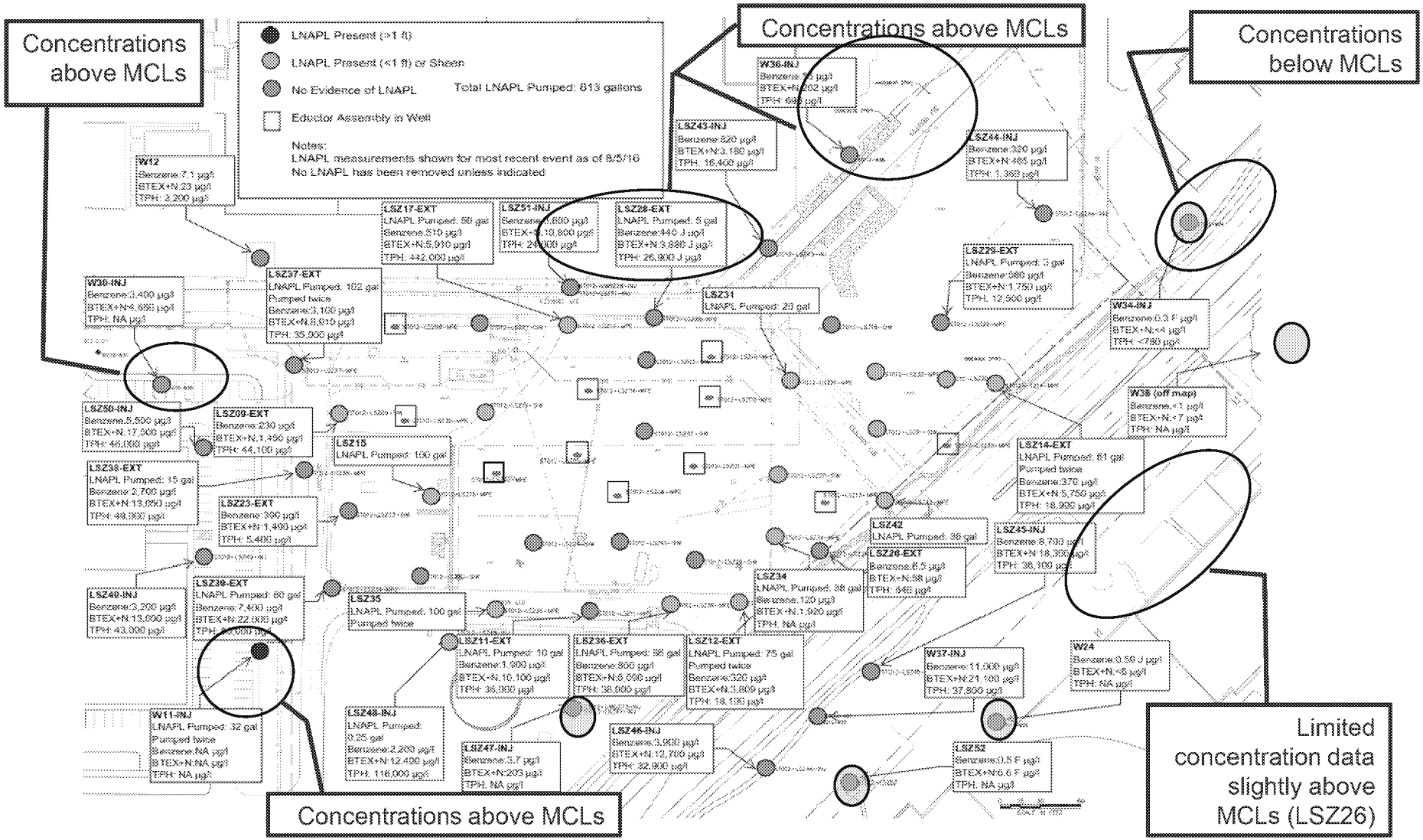
- Additional groundwater monitoring well

Area of EPA/ADEQ comment

Site ST012 LSZ Dissolved Phase Concentrations

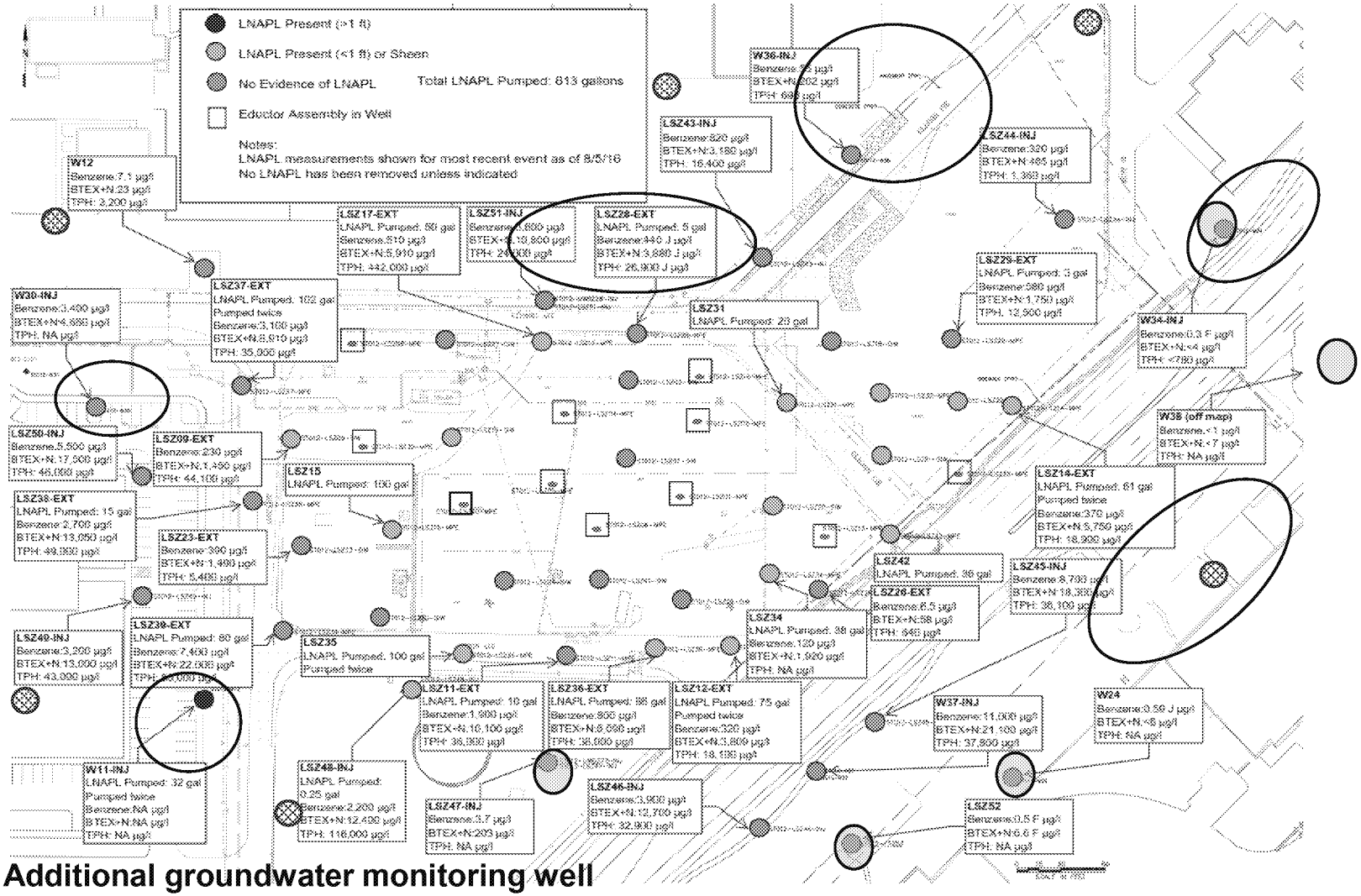


Site ST012 LSZ Evaluation of EPA/ADEQ Concerns



Area of EPA/ADEQ comment

Site ST012 LSZ Additional Characterization

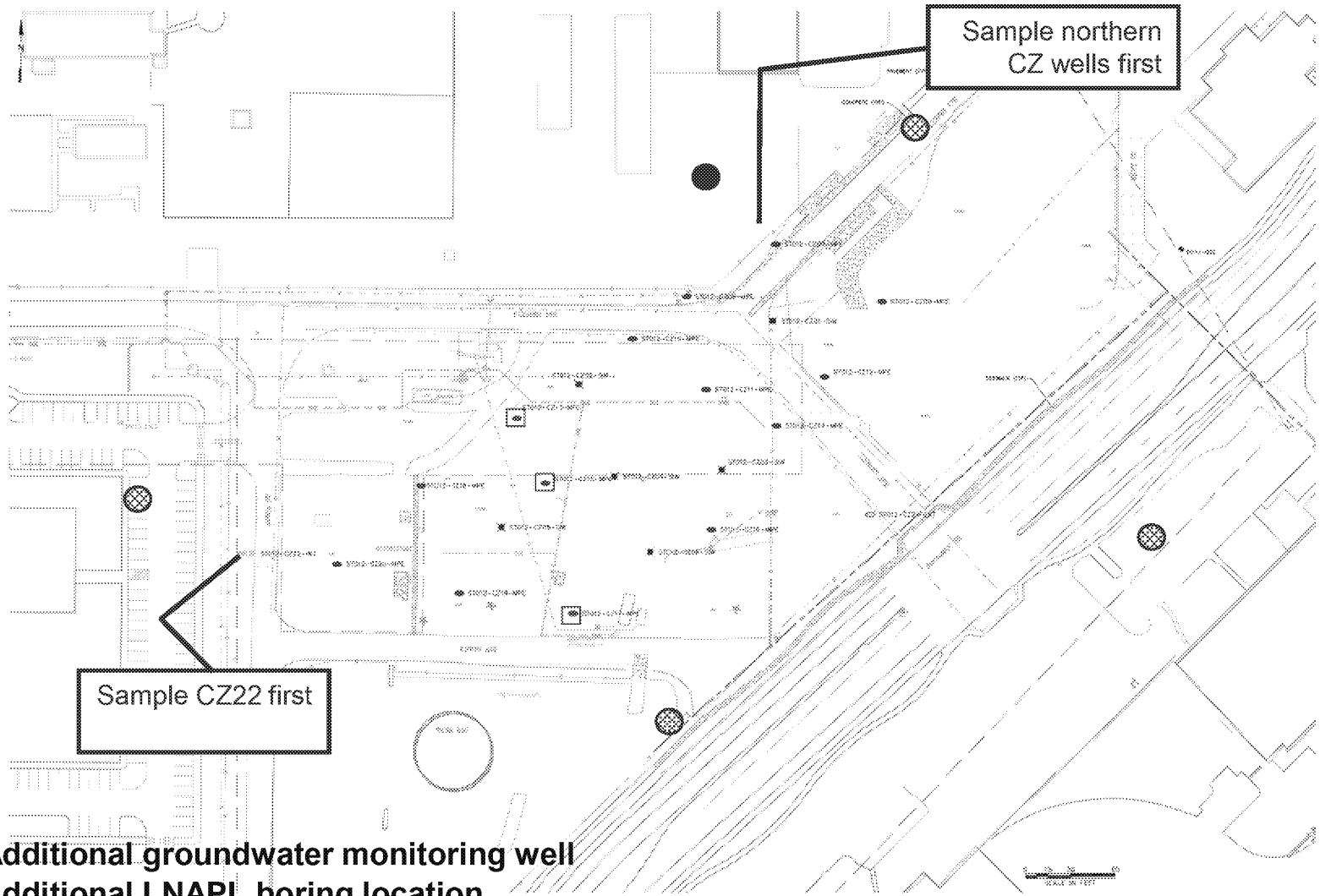


Additional groundwater monitoring well

Area of EPA/ADEQ comment

ST012
Summary of Additional Characterization

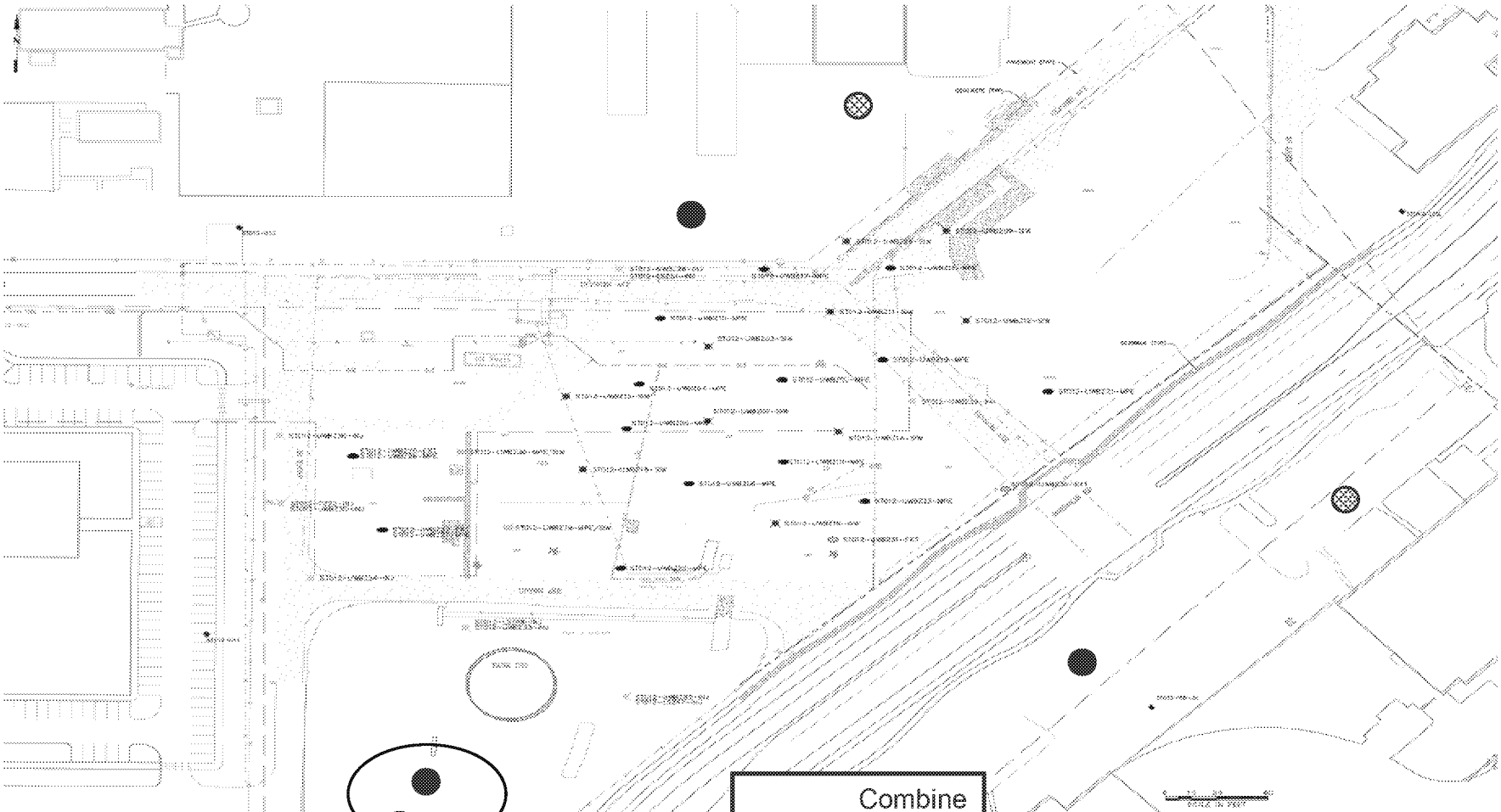
Summary of Additional CZ Characterization



- Additional groundwater monitoring well
- Additional LNAPL boring location

Some locations may also be combined across the vertical intervals (not shown)

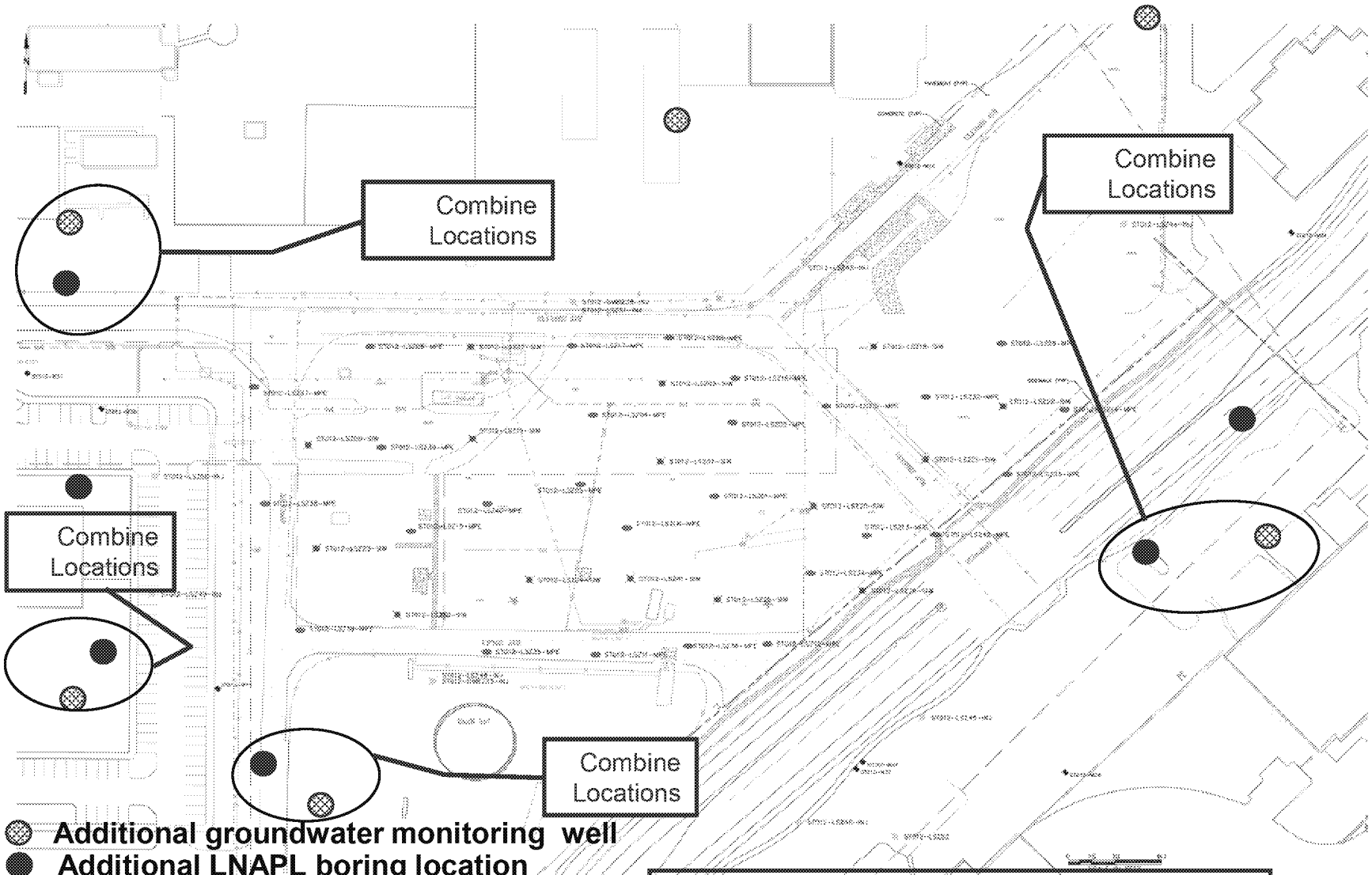
Summary of Additional UWBZ Characterization



- Additional groundwater monitoring
- Additional LNAPL boring location

Some locations may also be combined across the vertical intervals (not shown)

Summary of Additional LSZ Characterization



- Additional groundwater monitoring well
- Additional LNAPL boring location

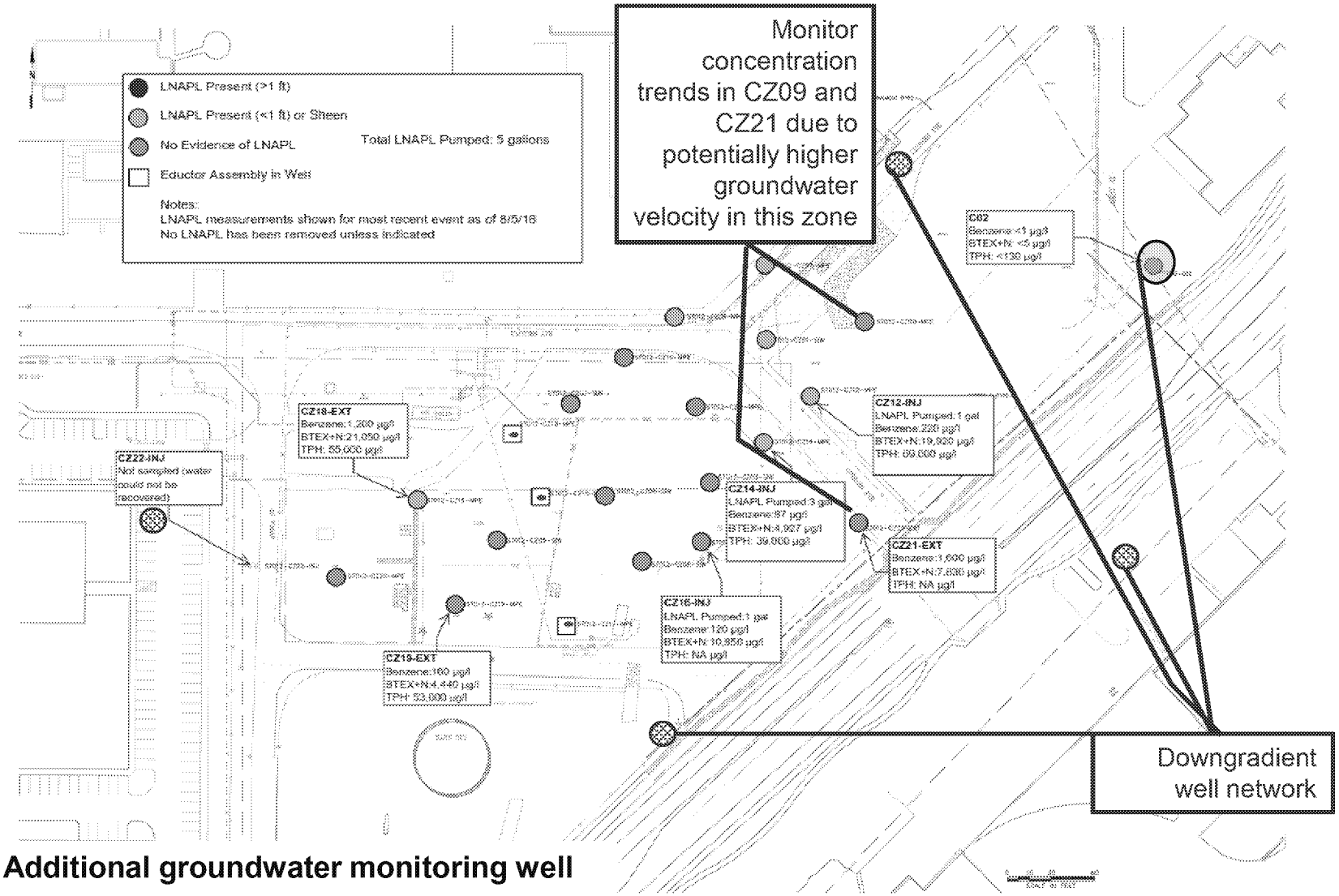
Some locations may also be combined across the vertical intervals (not shown)

ST012
Containment
Evaluation

Site ST012 Containment Evaluation

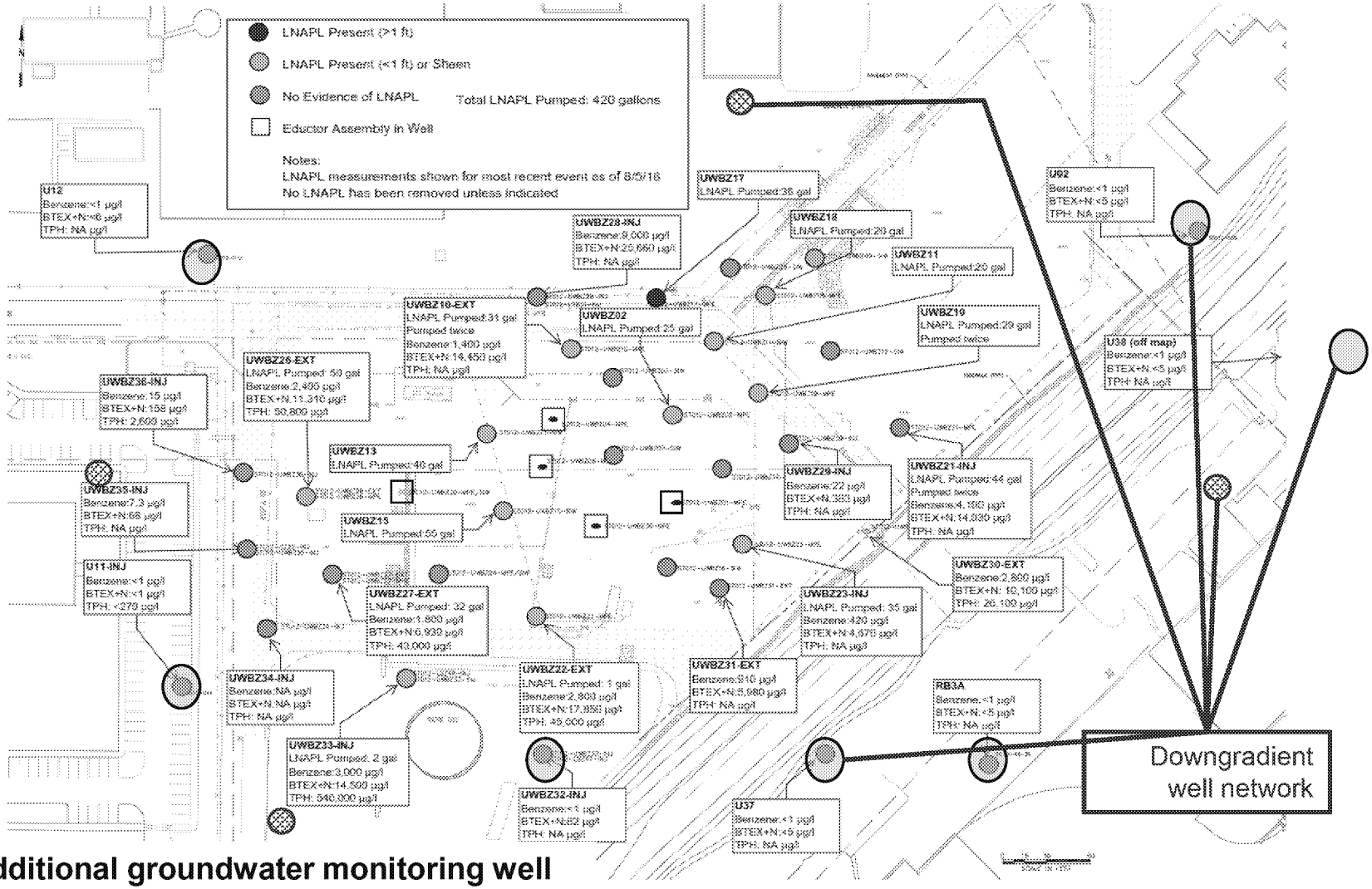
- **Containment**
  - **Containment demonstration using a monitoring well network based on:**
    - **Petroleum plumes typically have limited migration (primarily following initial release)**
    - **The plume has been generally stable for many years**
    - **No evidence of significant migration**
  - **Evaluated monitoring network considering existing plus additional characterization wells**

Site ST012 CZ Containment Monitoring



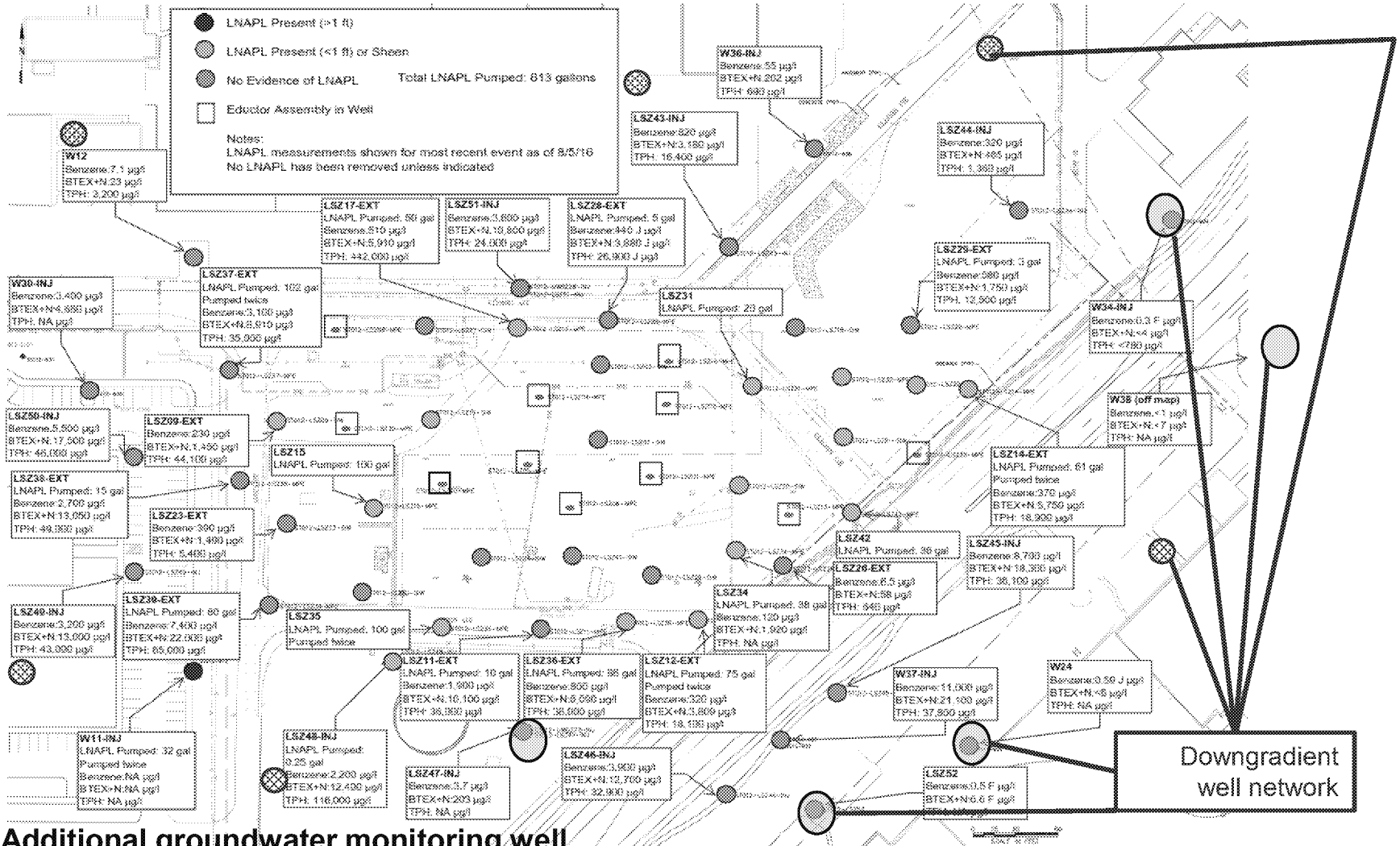
- Additional groundwater monitoring well

Site ST012 UWBZ Containment Monitoring



- Additional groundwater monitoring well

Site ST012 LSZ Containment Monitoring



- Additional groundwater monitoring well

ST012 Path Forward

- Continue SVE operation with flame oxidizer and thermal oxidizer, evaluate connection of additional CZ well(s)
- Continue monitoring/pumping of LNAPL in SEE and perimeter wells
- Proceed with Phase 2 borings and wells under Field Variance Memorandum
- Phase 2 drilling can be started by Sep 19, 2016 if acceptable to EPA/ADEQ
- Obtain and evaluate Phase 2 data for LNAPL and dissolved phase characterization (3 months)
- Construct active containment capability (2 month duration for construction, 100 gpm extraction/treatment system, existing design)

ST012
RD/RAWP
Addendum 2
Response to Comments

Site ST012 RD/RAWP Addendum #2 RTCs

- Response to Comments submitted to agencies on August 22, 2016
  - Mass of LNAPL outside of TTZs
  - EBR as a method for source treatment
  - Amendment secondary effects (arsenic, sulfate, salinity)
  - Injection Permit requirements

Air Force Civil Engineer Center

FORMER
WILLIAMS AIR FORCE BASE

Site LF004 Landfill Remedial Action

BCT Meeting
24 August 2016

Battle Ready…Built Right!

Site LF004
Former AST SVE System Update

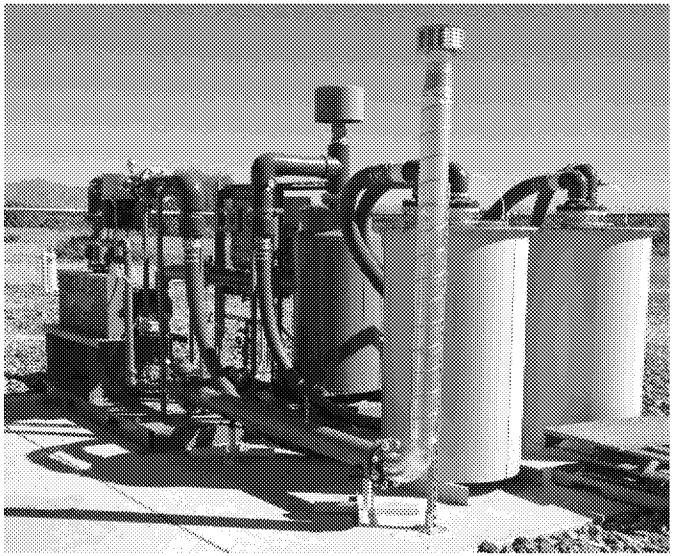
Operations Summary through 5 Aug 2016

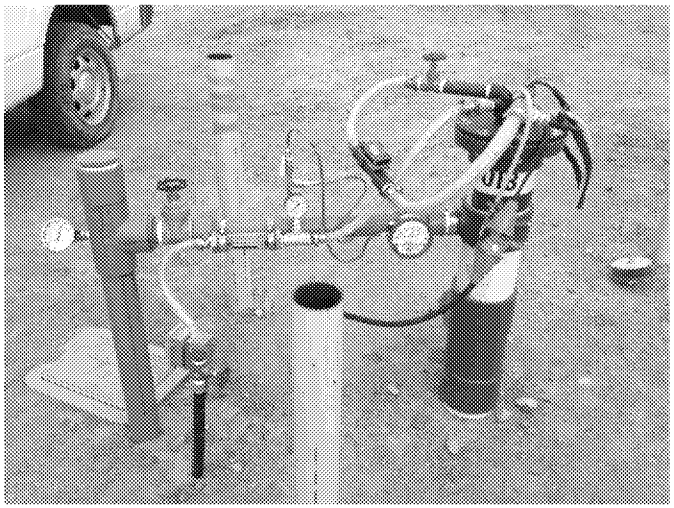
- Began operation 9 Sep 2014 to Nov 2015 (15 months of continuous operation)
- Shutdown for rebound testing Nov 2015-Jan 2016
- SVE system restarted and operated Jan 2016 thru Apr 2016
- Analytical data (May 2016) indicates TCE and PCE concentration remained below soil vapor goals for groundwater protection (SVSLs) in all SVE wells and VMPs except TCE in SVE6-D (5 mg/m^3 vs 2 mg/m^3)
- All shallow wells TCE and PCE remain below soil vapor goals for indoor vapor intrusion
- SVE system shutdown in May 2016. SVE6-D connected to IWAS system
- 93.6 pounds of TCE and PCE removed by SVE during entire operational period

LF01-W17 Area IWAS System Update

Operations Summary through 5 Aug 2016

- Began operation 29 Aug 2014 (approximately 22 months of operation)
- Average 99% operational uptime for reporting period
- TCE and PCE concentrations in extracted vapor are 640 and 120 micrograms per cubic meter ($\mu g/m^3$), respectively (Jul 2016); extracted vapor concentrations remain low. Air sparging shut down in Aug 2015 to increase soil gas mass removal (extracted vapor concentrations higher without air sparging)
- SVE 6D connected to IWAS system in May 2016
- Estimated 8.7 pounds of TCE and PCE removed by vapor extraction; 0.7 pounds since 8 Jul 2016
- Additional oxidant injection and recirculation scheduled in Aug 2016 at W30-M
- All remediation wells operating





Site LF004
Southeast Landfill SVE System Update

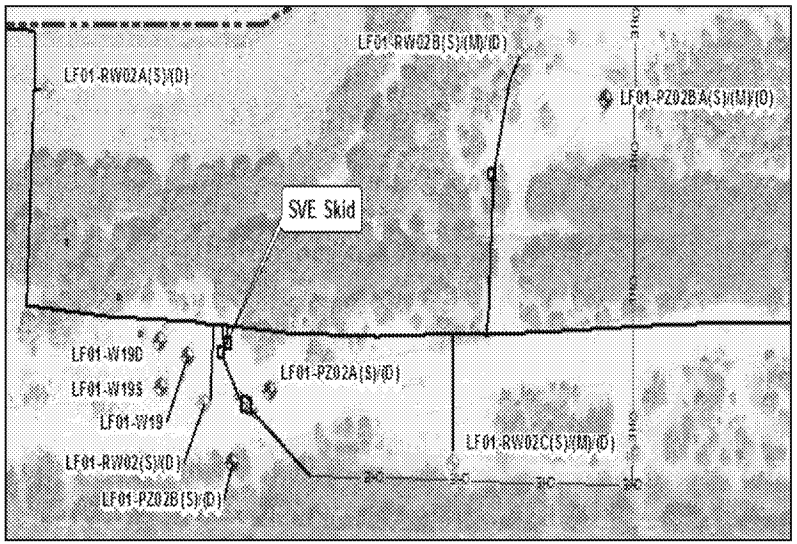
Operations Summary through 5 Aug 2016

- Began operation 12 Sep 2014 (15 months of continuous operation)
- Shutdown for rebound testing Nov 2015-Jan 2016
- SVE system restarted and operated Jan 2016 thru Apr 2016
- Analytical data (Jun 2016) indicates TCE and PCE concentration remained below soil vapor goals (SVSLs) for vapor intrusion in all shallow SVE wells and VMPs
- Analytical data (Jun 2016) indicates PCE concentration slightly above soil vapor goals (SVSLs) for groundwater protection in SVE-7M and SVE-7D (6.2 mg/m^3 and 8.2 vs 3.6 mg/m^3), respectively.
- 36.9 pounds of PCE and TCE removed by SVE during entire operational period

Site LF004
Southern Area Oxidant Injection

Activity Summary through 5 Aug 2016

- Began operation 15 Sep 2014 (approximately 22 months of operation)
- Field screening of residual oxidant ongoing
- Last injection completed week of 27 Feb 2016 at LA06-S and W19-S
- Oxidant concentrations range from 1 to 125 mg/L in LF01-W19 area and 1 to 200 mg/L in LF01-W17 area



LF004 Remediation System Recent and Upcoming Activities

- Operation of IWAS and Southern Area remediation wells will continue
- Oxidant injection and recirculation at LF01-W30M
- AST and SE Landfill SVE systems have been shutdown since May 2016
- Focused extraction at SVE6-D (AST) by IWAS system
- Continue quarterly soil vapor sampling
- Final Landfill Inspection Report submitted (no ADEQ comments)
- 2016 landfill inspection tentatively schedule in Sep; Coordination with ADEQ during inspection.
- Next groundwater semi-annual sampling event in Nov 2016
- Posting of analytical data to Sharepoint will continue as results are available
- LF004 Operating Properly and Successfully report in preparation. Anticipated submittal is Sep 2016.

Air Force Civil Engineer Center

FORMER
WILLIAMS AIR FORCE BASE

Site FT002
Fire Training Area Remedial Action

BCT Meeting
24 August 2016

Site FT002 Update and Path Forward

- **FT002 closure report under AF review. Anticipated submittal is Sep 2016.**

Air Force Civil Engineer Center

FORMER
WILLIAMS AIR FORCE BASE
Five-Year Review

BCT Meeting

24 August 2016

Battle Ready…Built Right!

Five-Year Review Path Forward

- Tentative report schedule
  - Draft submitted on Aug 8, 2016; under regulatory review
  - Agency review Aug/Sep 2016
  - Comment resolution Aug/Sep 2016 (A Draft Final is not anticipated); Conference call can be set up to expedite comment resolution
  - Final on September 30, 2016

Air Force Civil Engineer Center

FORMER
WILLIAMS AIR FORCE BASE

Site ST035

Former Building 760

BCT Meeting

24 August 2016

Battle Ready…Built Right!

ST035 Path Forward

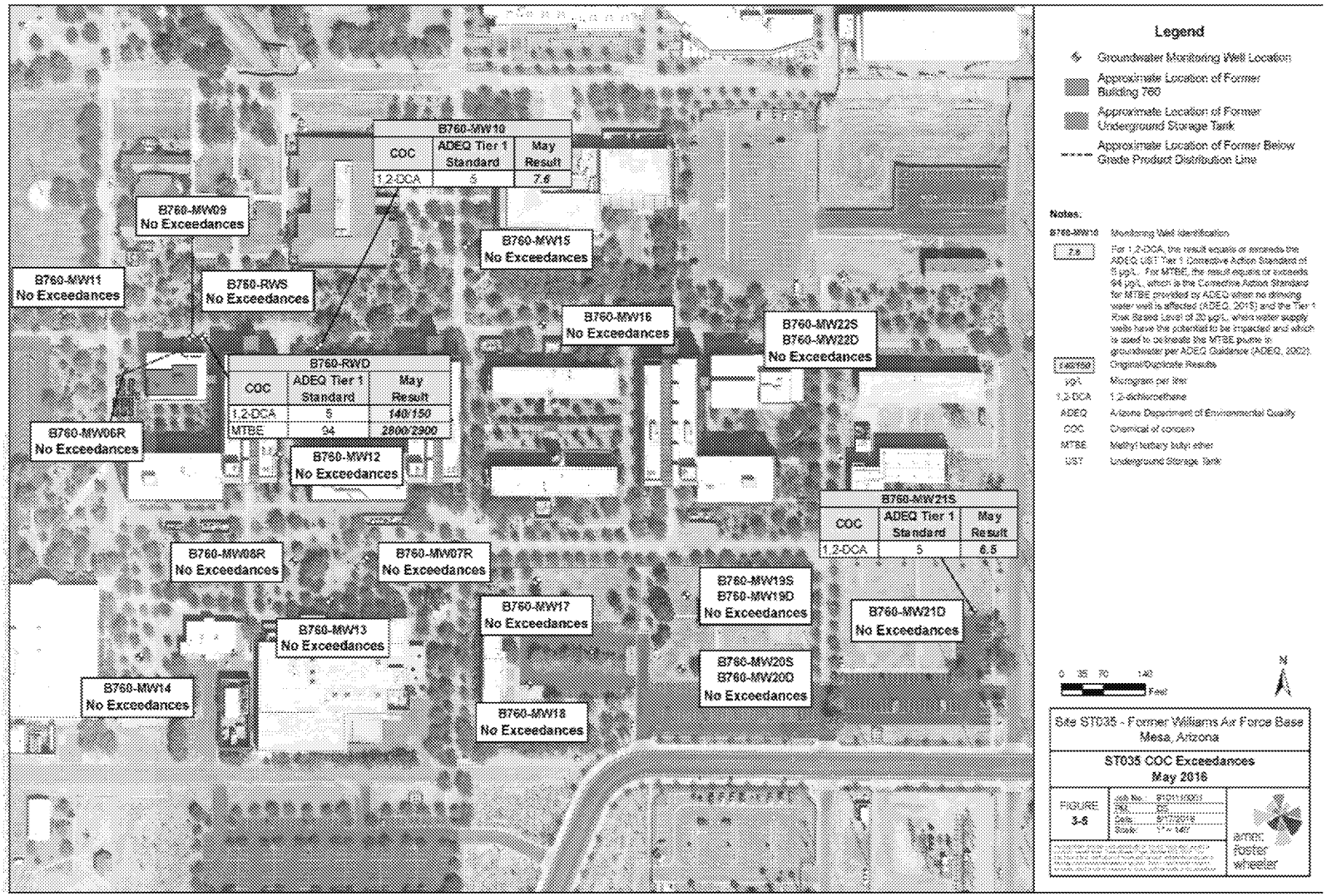
- Annual 2015 Groundwater Monitoring Report under AF review (results presented in January 2016 BCT Meeting)
- May 2016 Groundwater Monitoring Data (results in following slides)
- Site closure report under AF review; Draft submittal in Aug 2016
- Continue semiannual groundwater monitoring until site closure is obtained which is anticipated to be Oct 2016
- Once site closure has been obtained, groundwater sampling at ST035 will be discontinued and monitoring wells will be abandoned

ED_005025_00005105-00063

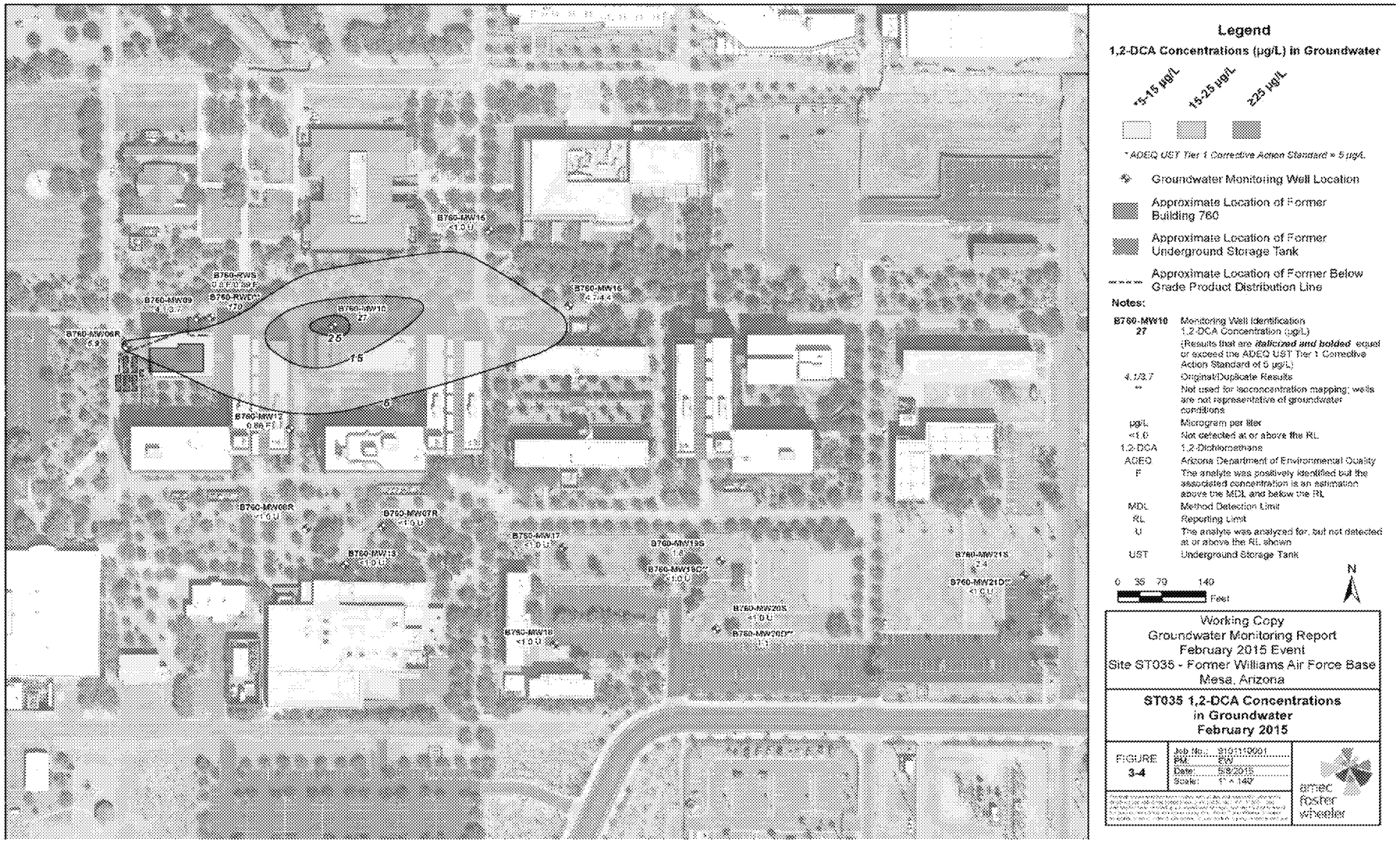
Site ST035 May 2016 Groundwater Monitoring

- All monitoring wells (23) sampled in May 2016
- Exceedances of MTBE (2800 µg/L) and 1,2-DCA (140 µg/L) seen in B760-RWD. Results consistent with November 2015 sampling.
- Two additional exceedances of 1,2-DCA in B760-MW10 (7.6 µg/L) and B760-MW21S (6.5 µg/L)
- 1,2-DCA plume footprint has decreased significantly in the last 15 months
- Groundwater flow direction – predominantly east
- Closure Report has been prepared and is under AF review

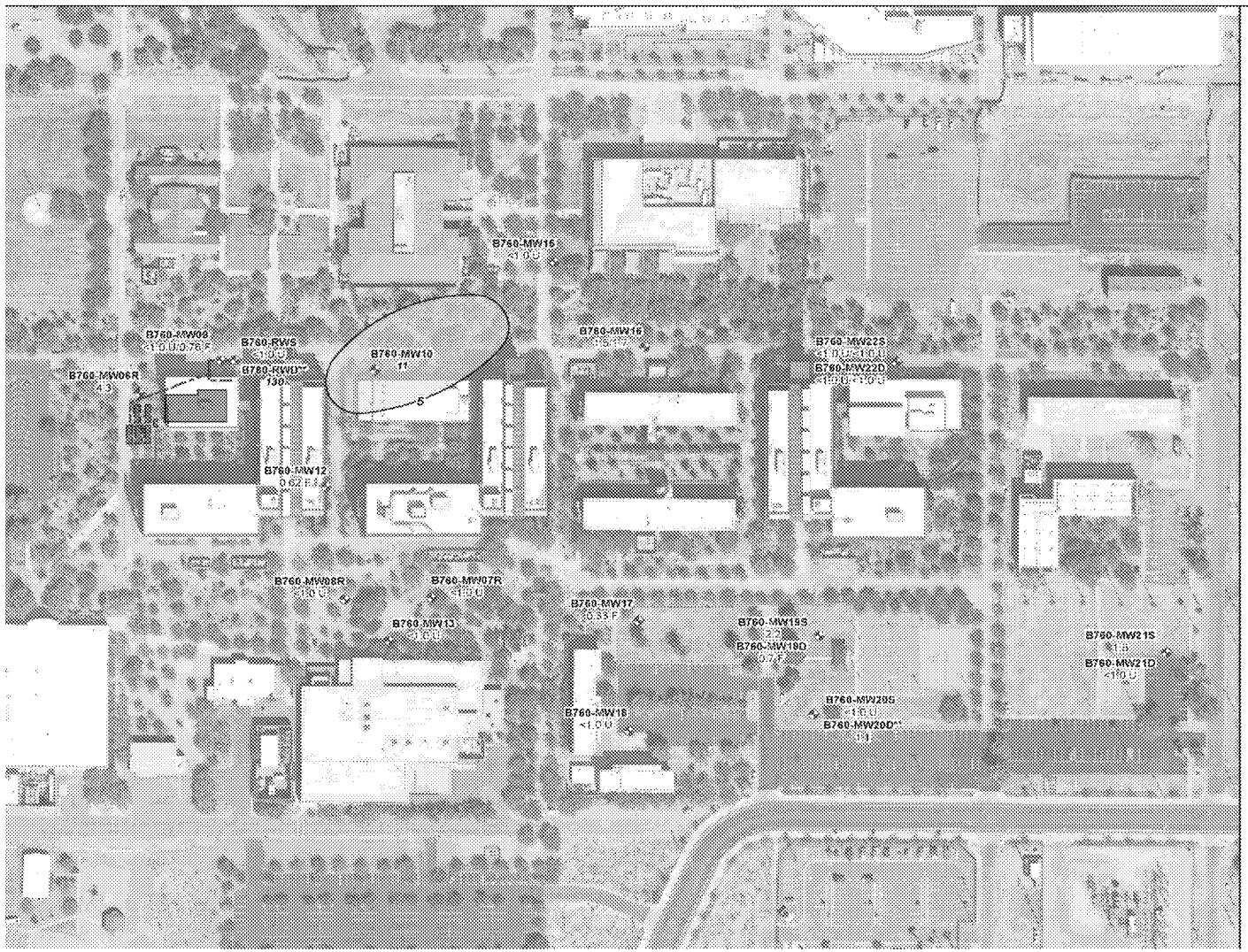
Site ST035 Groundwater Sampling Results for COCs May 2016



ST035 Groundwater Sampling Results for 1,2-DCA February 2015



ST035 Groundwater Sampling Results for 1,2-DCA November 2015



Legend

1,2-DCA Concentrations (µg/L) in Groundwater

*5-15 µg/L

** ADEQ UST Tier 1 Corrective Action Standard = 5 µg/L*

Groundwater Monitoring Well Location

Approximate Location of Former Building 760

Approximate Location of Former Underground Storage Tank

Approximate Location of Former Below Grade Product Distribution Line

Notes:

B760-MW10	Monitoring Well Identification
11	1,2-DCA Concentration (µg/L) (Results that are ***italicized and bolded*** equal or exceed the ADEQ UST Tier 1 Corrective Action Standard of 5 µg/L)
1.5/1.7	Original/Duplicate Results
**	Not used for isoconcentration mapping; wells are not representative of groundwater conditions
µg/L	Microgram per liter
<1.0	Not detected at or above the RL
1,2-DCA	1,2-Dichloroethane
ADEQ	Arizona Department of Environmental Quality
F	The analyte was positively identified but the associated concentration is an estimation above the MDL and below the RL
MDL	Method Detection Limit
RL	Reporting Limit
U	The analyte was analyzed for, but not detected at or above the RL shown
UST	Underground Storage Tank

0 35 70 140 Feet

N

Working Copy
Annual 2015
Groundwater Monitoring Report
Site ST035 - Former Williams Air Force Base
Mesa, Arizona

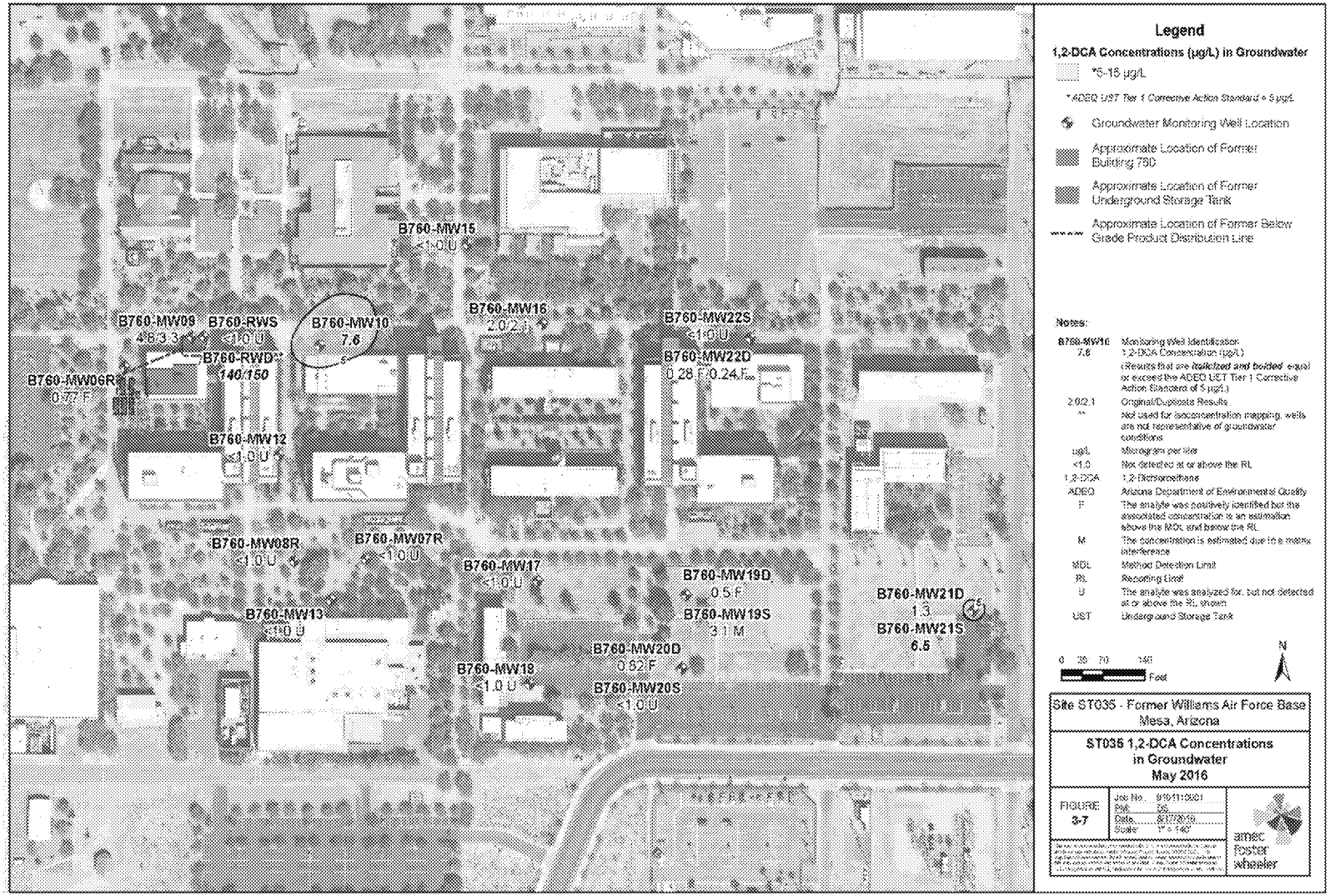
ST035 1,2-DCA Concentrations in Groundwater November 2015

FIGURE 3-4

Job No.: 9101110001
PM: DS
Date: 1/15/2016
Scale: 1" = 140'

amec foster wheeler

ST035 Groundwater Sampling Results for 1,2-DCA May 2016



Air Force Civil Engineer Center

2016 BCT MEETINGS/CONFERENCE CALLS SCHEDULE

BCT Meeting
24 August 2016

Battle Ready…Built Right!

Air Force Civil Engineer Center

BCT GENERAL UPDATE

BCT Meeting

24 August 2016

Battle Ready…Built Right!

Air Force Civil Engineer Center

ACTION ITEMS

BCT Meeting

24 August 2016

Battle Ready…Built Right!