Air Force Civil Engineer Center

FORMER
WILLIAMS AIR FORCE BASE

Site ST012

Former Liquid Fuel Storage Area

BCT Call

15 September 2016

Site ST012 Outline

- **Summary of Activities Since Aug BCT meeting**
- **Update on Additional Characterization**
  - **Review of Additional Characterization Comments from August BCT meeting**
  - **Finalize additional characterization locations**
- **Path Forward**

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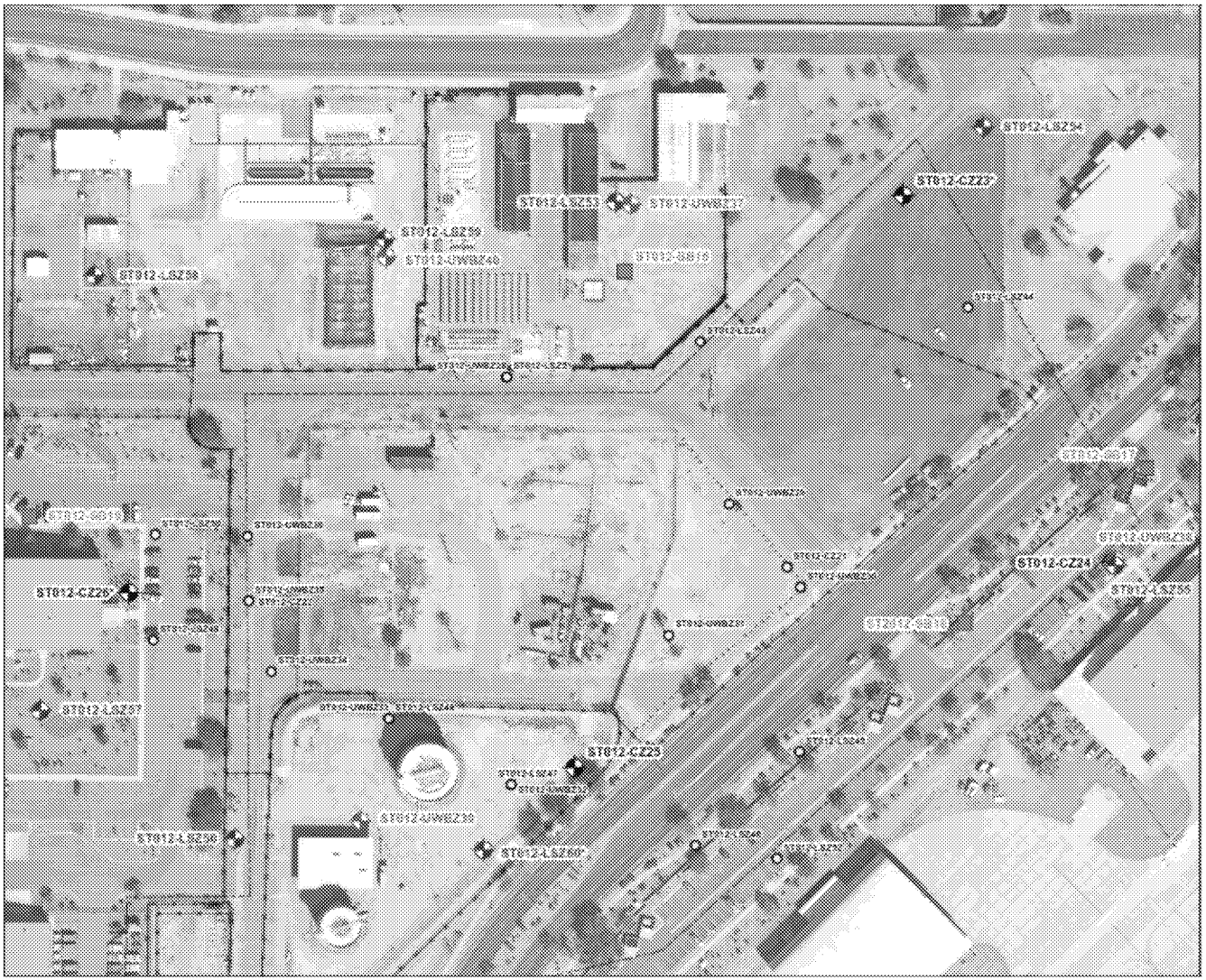
Site ST012 Activities Since August

- Continued LNAPL screening in accessible SEE wells and newly installed EBR wells
- Completed another round of perimeter well sampling and collected select additional samples from SEE/Phase 1 wells (results pending)
- Continued SVE operation
  - Rescreening CZ wells for PID concentrations
  - Connected ST012-CZ06 and ST012-CZ19 into the extraction system

ST012
Additional Characterization

Additional Characterization Plan



Legend

Proposed Characterization Investigation

- Upper Water-Bearing Zone Groundwater Monitoring Well Location
- Cobble Zone Groundwater Monitoring Well Location
- Lower Saturated Zone Groundwater Monitoring Well Location
- Soil Boring Location

Existing Features

- EBR Well Location
- Fence Line
- ST012 Site Boundary

Notes:

* Installation of well is contingent on additional sampling. See Drilling Plan table for details.

ST012-LSZ43 Well Identification

EBR Enhanced Bioremediation

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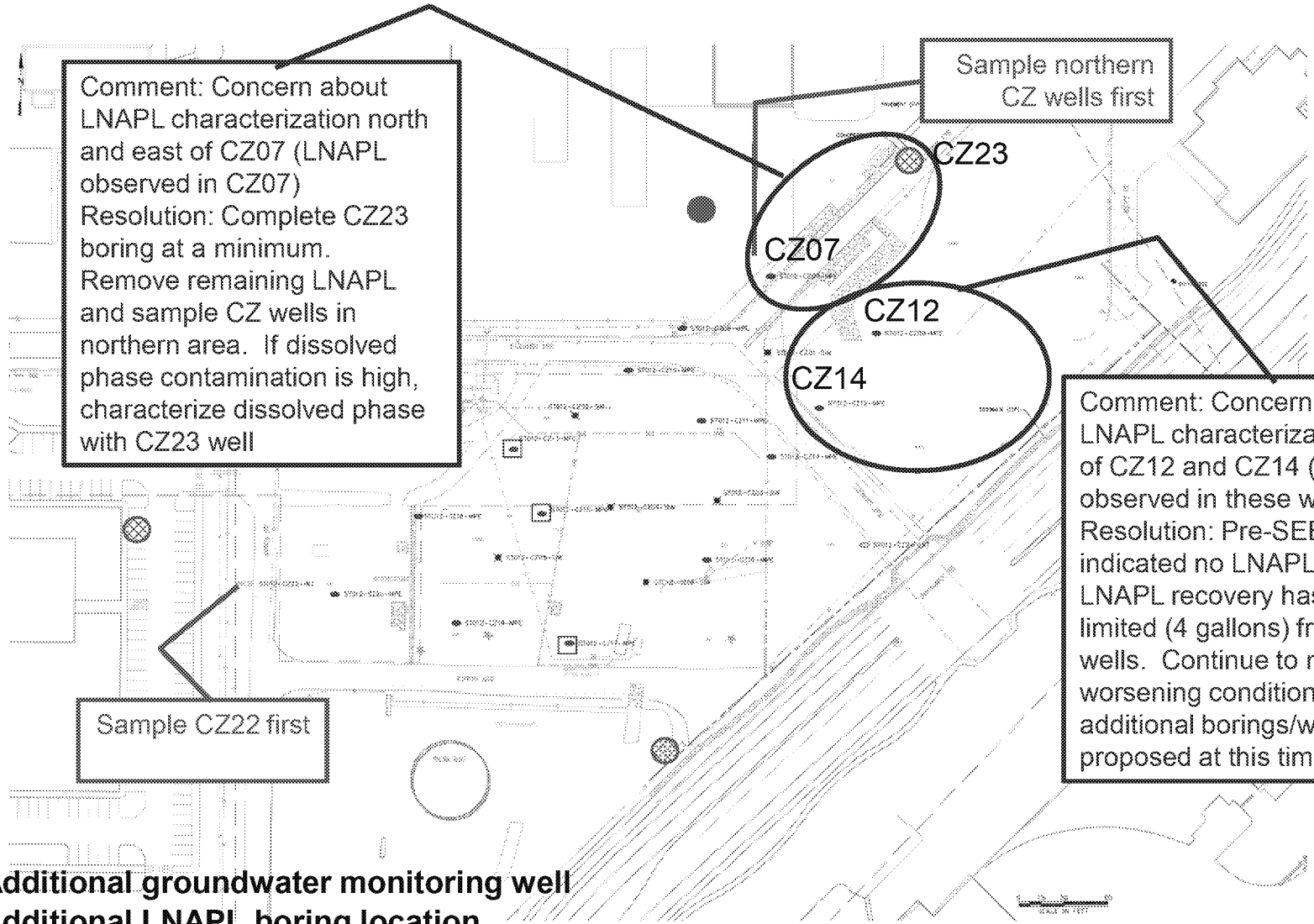
ST012

Review of Additional Characterization Comments from August BCT Meeting

Summary of Additional CZ Characterization Comments



- **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 Comments

U12

UWBZ28

UWBZ09

Comment: The area between U12 and UWBZ28 is a potential gap in dissolved phase characterization.
Resolution: Well added (UWBZ40) to characterization program.

Comment: Concern about LNAPL characterization east of UWBZ09 (LNAPL observed in UWBZ09)
Resolution: Remove LNAPL and sample groundwater in UWBZ09. Extend boring at CZ23 location through the UWBZ.

Comment: One boring across Sossaman may not be enough to characterize LNAPL in this area
Resolution: Two LNAPL characterization borings were proposed in this area for the LSZ. They will provide two locations for UWBZ LNAPL characterization.

Combine Locations

- Additional groundwater monitoring
- Additional LNAPL boring location

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

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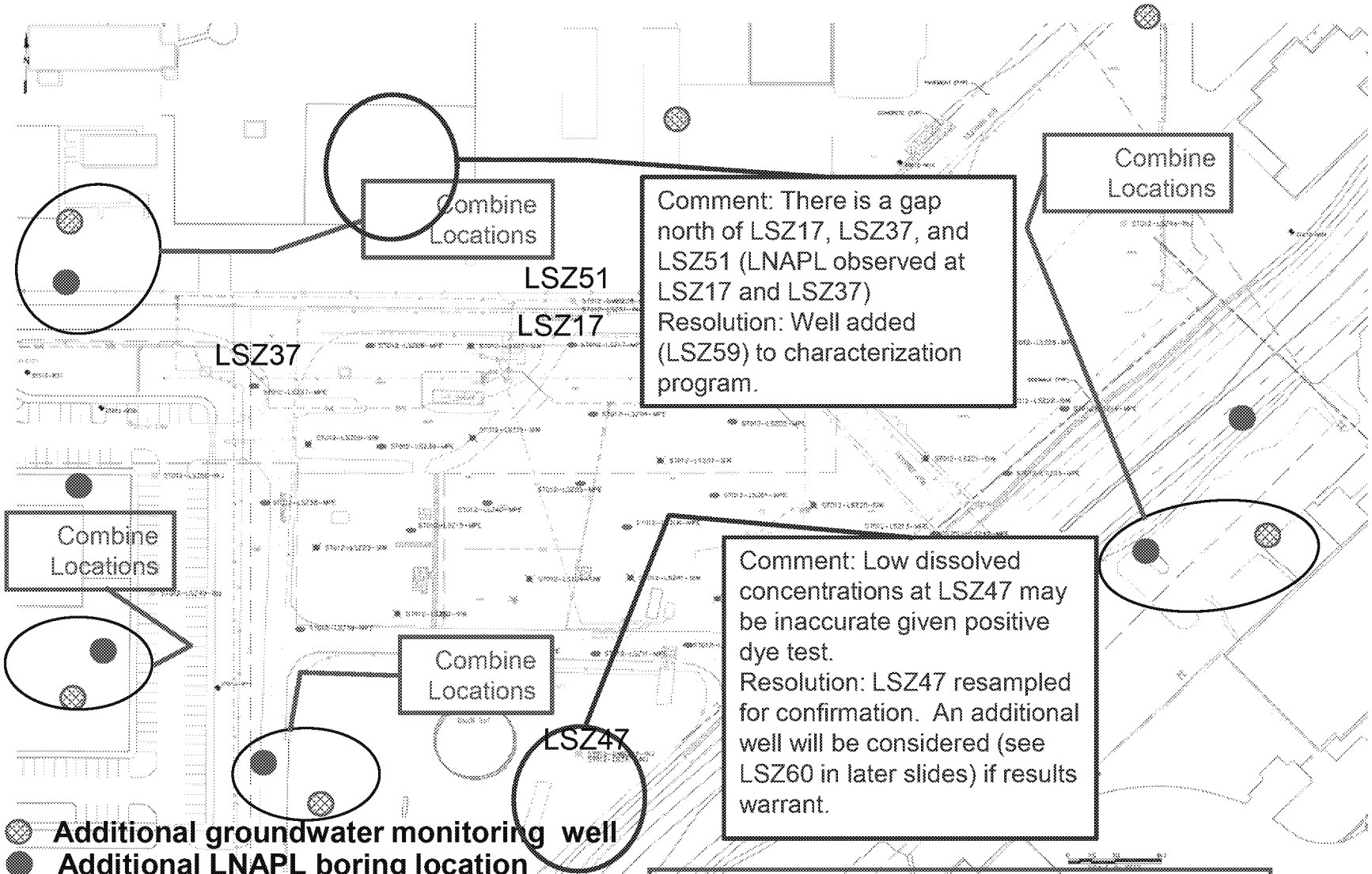
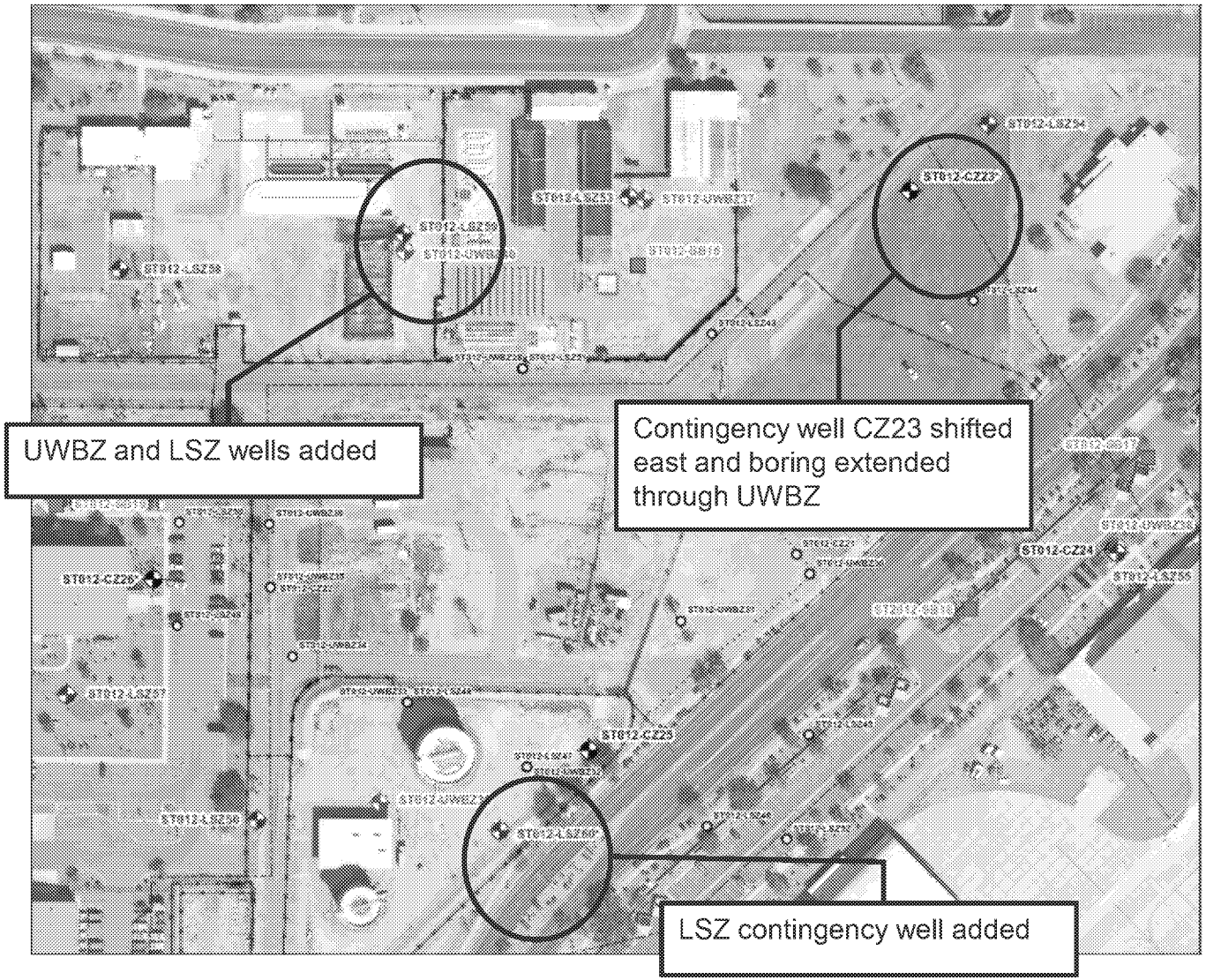
Summary of Additional LSZ Characterization Comments



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

Comment-Based Adjustments to Additional Characterization Plan



Legend

Proposed Characterization Investigation

- Upper Water-Bearing Zone Groundwater Monitoring Well Location
- Cobble Zone Groundwater Monitoring Well Location
- Lower Saturated Zone Groundwater Monitoring Well Location
- Soil Boring Location

Existing Features

- EBR Well Location
- Fence Line
- ST012 Site Boundary

Notes:

* Installation of well is contingent on additional sampling. See Drilling Plan table for details.

ST012-LSZ45 Well Identification

EBR Enhanced Bioremediation

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ST012
Characterization Program and Protocol

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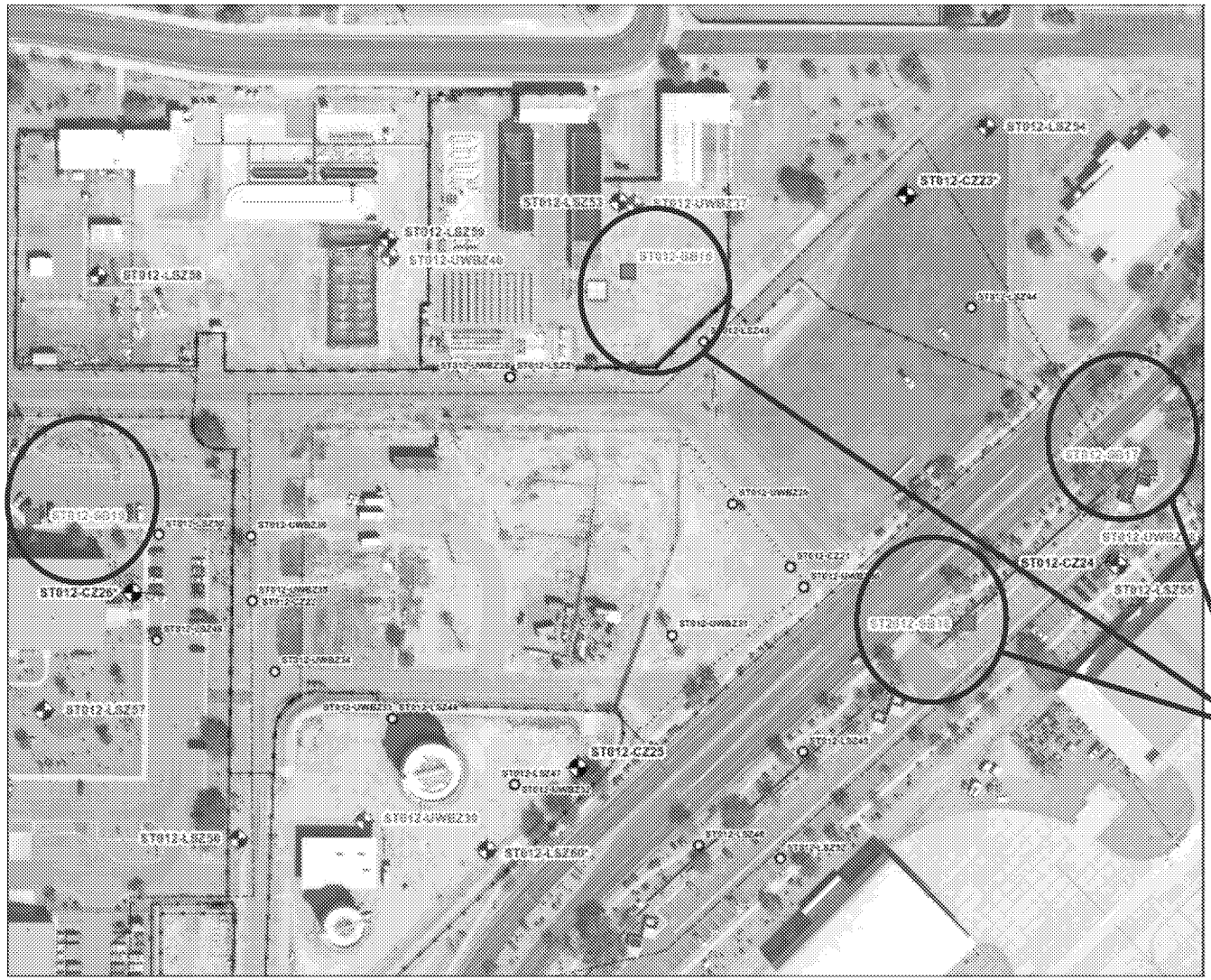
Site ST012 Additional Characterization Investigation Protocol

- **Soil Borings (SB16 though SB19)**
  - For LNAPL Characterization.
  - PID readings will be taken at least every 5 feet (more often at geologist's discretion)
  - PID readings > 250 ppmv will require dye test kit test (or lower at geologist's discretion)
  - If dye test kit results are pink or red, location has indications of LNAPL. Drilling will continue until negative dye test achieved. Drilling will continue below that only if there is a deeper zone to be investigated for LNAPL at this location.
  - Consider step out if positive indications of LNAPL
  - Step out timing subject to location (some ASU and PMGAA locations require longer coordination times)
  - SB16 location will proceed only after confirmation that LNAPL is not present at the UWBZ37/LSZ53 location

Soil Borings



Legend

Proposed Characterization Investigation

- Upper Water-Bearing Zone Groundwater Monitoring Well Location
- Cobble Zone Groundwater Monitoring Well Location
- Lower Saturated Zone Groundwater Monitoring Well Location
- Soil Boring Location

Existing Features

- EBR Well Location
- Fence Line
- ST012 Site Boundary

Notes:

* Installation of well is contingent on additional sampling. See Drilling Plan table for details.

ST012-LSZ43 Well Identification

EBR Enhanced Bioremediation

- **SB-16, SB-17, and SB-18 in locations where coordination with property owners will likely delay step out to a future mobilization**

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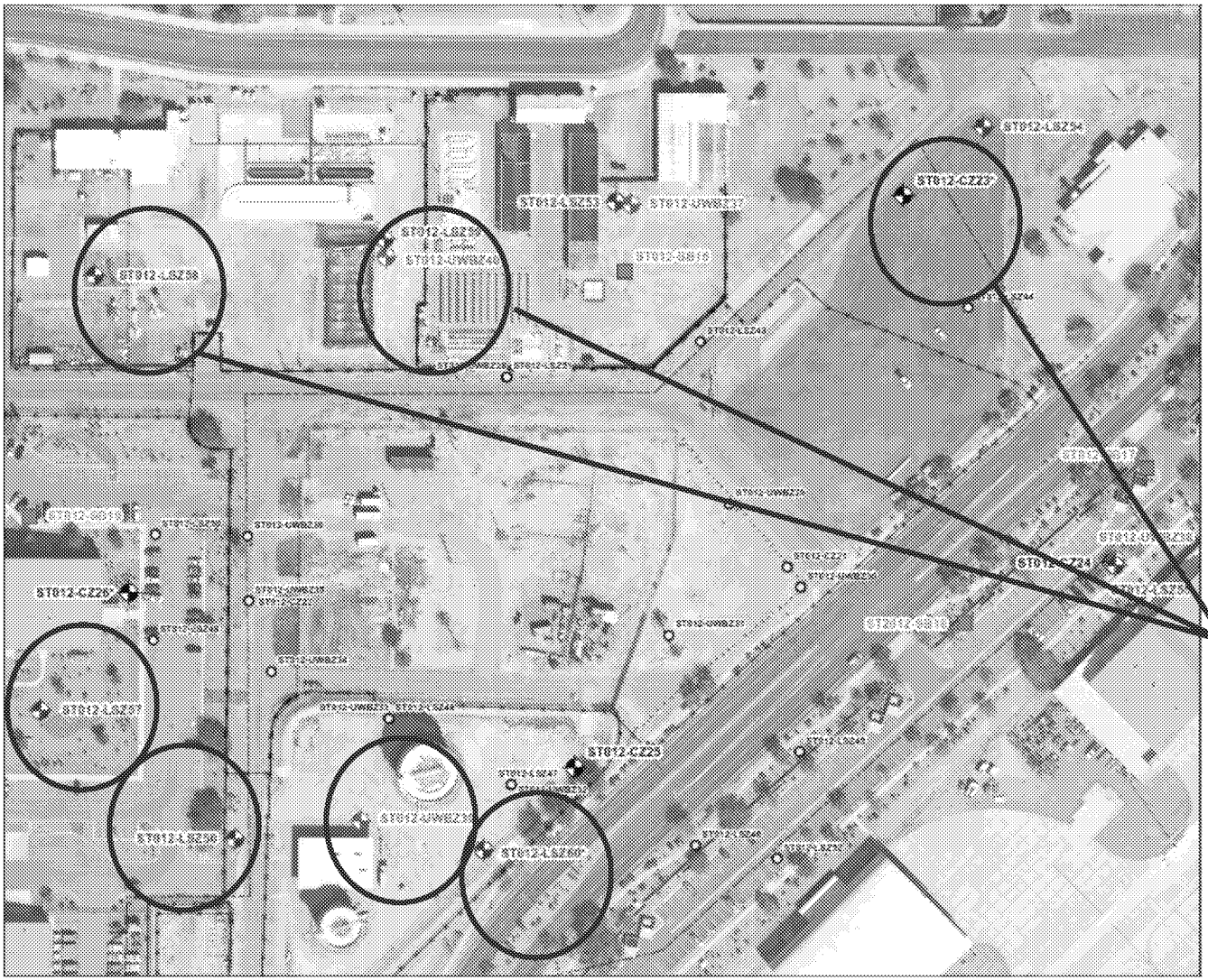
Site ST012 Additional Characterization Investigation Protocol

- **Soil Boring/Monitoring Wells (CZ23, UWBZ39, UWBZ40, LSZ56, LSZ57, LSZ58, LSZ59, LSZ60)**
  - For LNAPL and dissolved phase characterization
  - PID readings will be taken at least every 5 feet (more often at geologist's discretion)
  - PID readings > 250 ppmv will require dye test kit test (or lower at geologist's discretion)
  - If dye test kit results are pink or red, location has indications of LNAPL. Drilling will continue until negative dye test achieved. Drilling will continue below that only if there is a deeper zone to be investigated for LNAPL at this location. Consider step out for LNAPL and dissolved phase characterization if positive indications of LNAPL
  - If PID screening results are >15 ppmv in the planned screened interval, location may not bound dissolved phase contamination. Drilling will continue until PID readings return to background. Discuss grouting of the boring (not installing well) and additional step out location for a well with AF and regulators. If high PID readings are in a clay layer, potentially complete the well.
  - Step out timing subject to location (some ASU and PMGAA locations require longer coordination times)

Soil Borings/Monitoring Wells



Legend

Proposed Characterization Investigation

- Upper Water-Bearing Zone Groundwater Monitoring Well Location
- Cobble Zone Groundwater Monitoring Well Location
- Lower Saturated Zone Groundwater Monitoring Well Location
- Soil Boring Location

Existing Features

- EBR Well Location
- Fence Line
- ST012 Site Boundary

Notes:

* Installation of well is contingent on additional sampling. See Drilling Plan table for details.

ST012-LSZ43 Well Identification

EBR Enhanced Bioremediation

- **CZ23, UWBZ40, LSZ58, and LSZ59 in locations where coordination with property owners will likely delay step out to a future mobilization**

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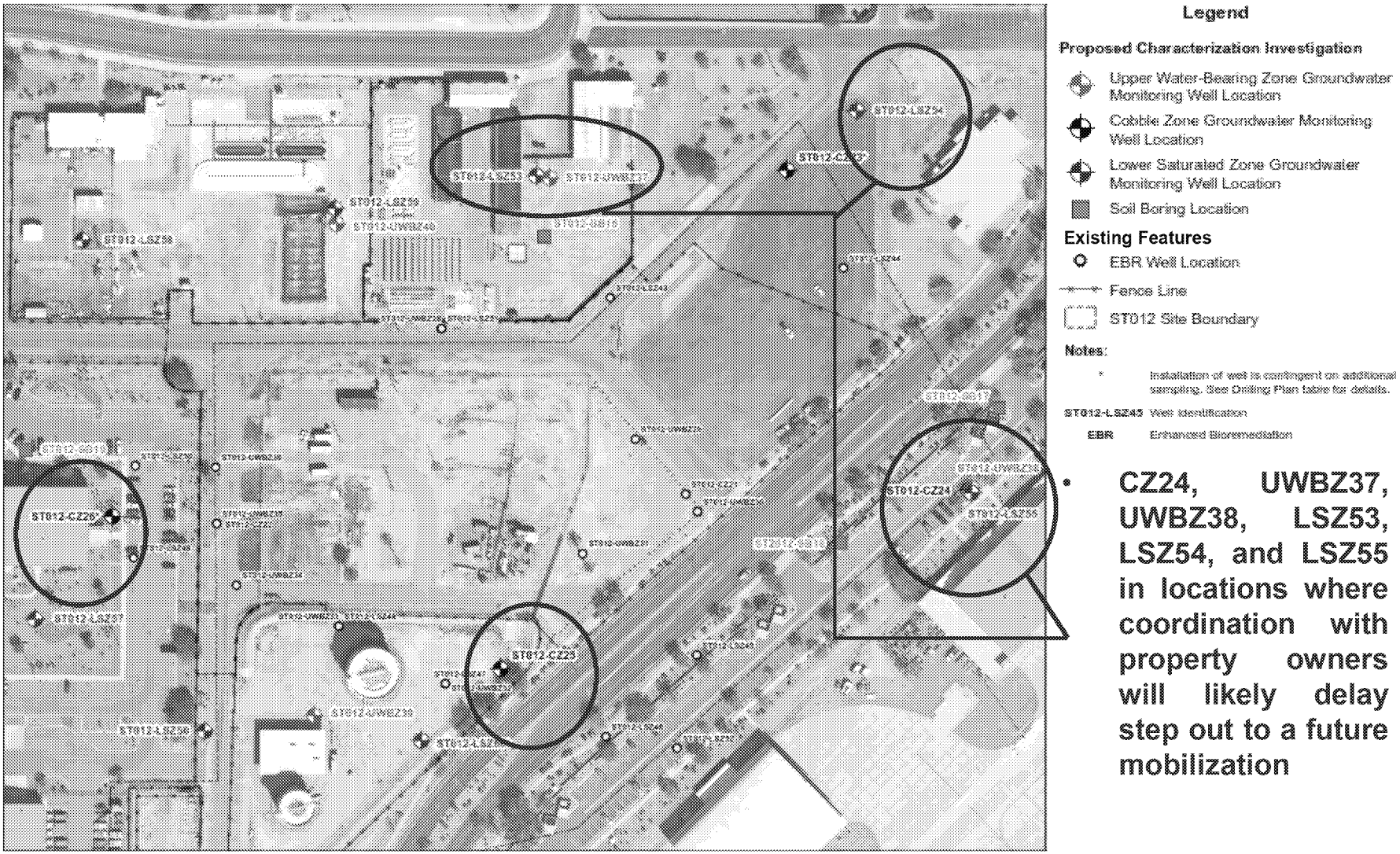
Site ST012 Additional Characterization Investigation Protocol

- **Monitoring Wells (CZ24, CZ25, CZ26, UWBZ37, UWBZ38, LSZ53, LSZ54, LSZ55)**
  - For dissolved phase characterization
  - PID readings will be taken at least every 5 feet (more often at geologist's discretion)
  - PID readings > 250 ppmv will require dye test kit test (or lower at geologist's discretion)
  - If dye test kit results are pink or red, location has indications of LNAPL. Drilling will continue until negative dye test achieved.
  - Consider step out for LNAPL and dissolved phase characterization if positive indications of LNAPL
  - If PID screening results are >15 ppmv in the planned screened interval, location may not bound dissolved phase contamination. Drilling will continue until PID readings return to background. Discuss grouting of the boring (not installing well) and additional step out location for a well with AF and regulators. If high PID readings are in a clay layer, potentially complete the well.
  - Consider step out if dissolved phase characterization if PID > 15 ppmv
  - Step out timing subject to location (some ASU and PMGAA locations require longer coordination times)

Monitoring Wells



- CZ24, UWBZ37, UWBZ38, LSZ53, LSZ54, and LSZ55 in locations where coordination with property owners will likely delay step out to a future mobilization

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Site ST012 Additional Characterization Investigation Protocol

- **Contingency Locations (CZ23, CZ26, LSZ60)**
  - CZ23 depends on results from samples collected in northeast CZ. These wells have not been sampled previously post SEE. If concentrations are below MCLs the boring will be advanced ton confirm LNAPL is bounded in the CZ and UWBZ but the well will not be installed. If concentrations are slightly above MCLs, the need for CZ23 well will be discussed among the BCT. Alternatively the AF may proceed with CZ23 well without further discussion at their discretion.
  - CZ26 depends on result from a confirmation sample collected at CZ22. CZ22 was sampled in early August and concentrations were below MCLs. CZ22 was resampled in late August. A decision protocol similar to CZ23 will be followed.
  - LSZ60 depends on results from a confirmation sample collected at LSZ47. LSZ47 had a positive dye test but the groundwater sample collected in July was below MCLs. LSZ47 was resampled in late August.

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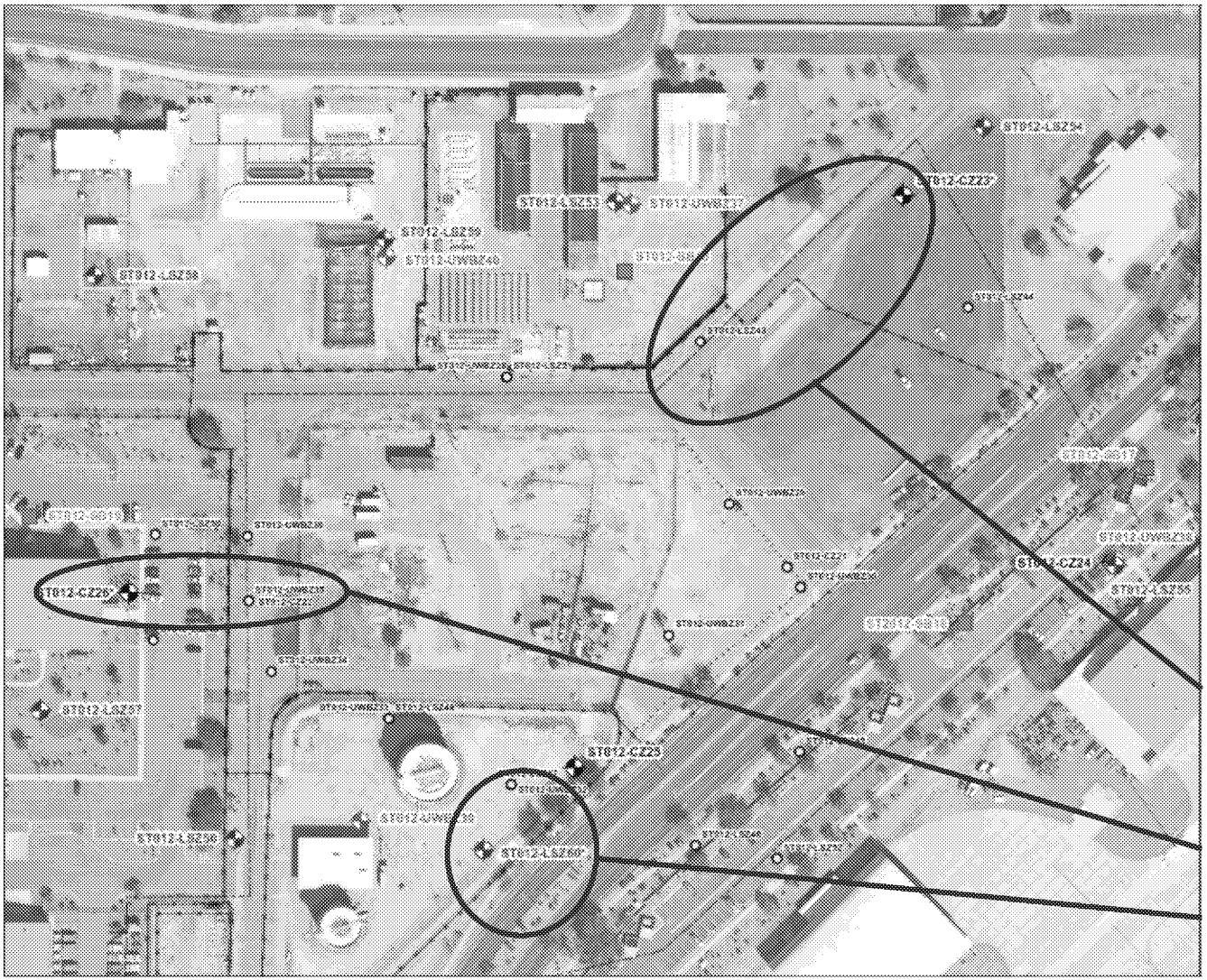
Contingency Locations



Legend

Proposed Characterization Investigation

- Upper Water-Bearing Zone Groundwater Monitoring Well Location
- Cobble Zone Groundwater Monitoring Well Location
- Lower Saturated Zone Groundwater Monitoring Well Location
- Soil Boring Location

Existing Features

- EBR Well Location
- Fence Line
- ST012 Site Boundary

Notes:

* Installation of well is contingent on additional sampling. See Drilling Plan table for details.

ST012-LSZ45 Well Identification

EBR Enhanced Bioremediation

Only install if need supported by additional groundwater samples

- **CZ23 (boring will be installed, well depends on sampling in northeast of CZ)**
- **CZ26 (depends on resampling CZ22)**
- **LSZ60 (depends on resampling LSZ47)**

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ST012
Path Forward

Site ST012 Path Forward

- Continue SVE operation with flame oxidizer and thermal oxidizer
- Continue monitoring/pumping of LNAPL in SEE and perimeter wells
- Submit Field Variance Memorandum to RD/RAWP Addendum 2 to formalize proposed additional characterization
- Submit Field Variance Memorandum to RD/RAWP Addendum 2 to formalize proposed completion of containment system
- Implement additional characterization
- Construct extraction and treatment systems for active hydraulic control