Velsicol Chemical Superfund Site

Former Plant Site Design Investigation Data Overview

April 15, 2015

Community Advisory Group Meeting

Agenda

- Purpose
- Review Design Study Objectives for Former Plant Site Areas
- Geophysical Investigation
- Test Pit Investigation
- Drilling & Sampling Results by Investigation Area
  - Data
  - Photos
  - Maps

Purpose

- Protect groundwater – reduce DNAPL impact to aquifer by reducing mass and mobility.
- Address Principal Threat Waste.
  - Principal Threat Waste is found in:
    - Non-Aqueous Phase Liquid (NAPL) Areas
      - There are two NAPL Areas: NAPL Area 1, NAPL Area 2
    - Potential Source Areas (PSAs)
      - There are four PSAs
      - This study focused on the first two: PSA-1, PSA-2

Design Study Objectives - Former Plant Site Areas

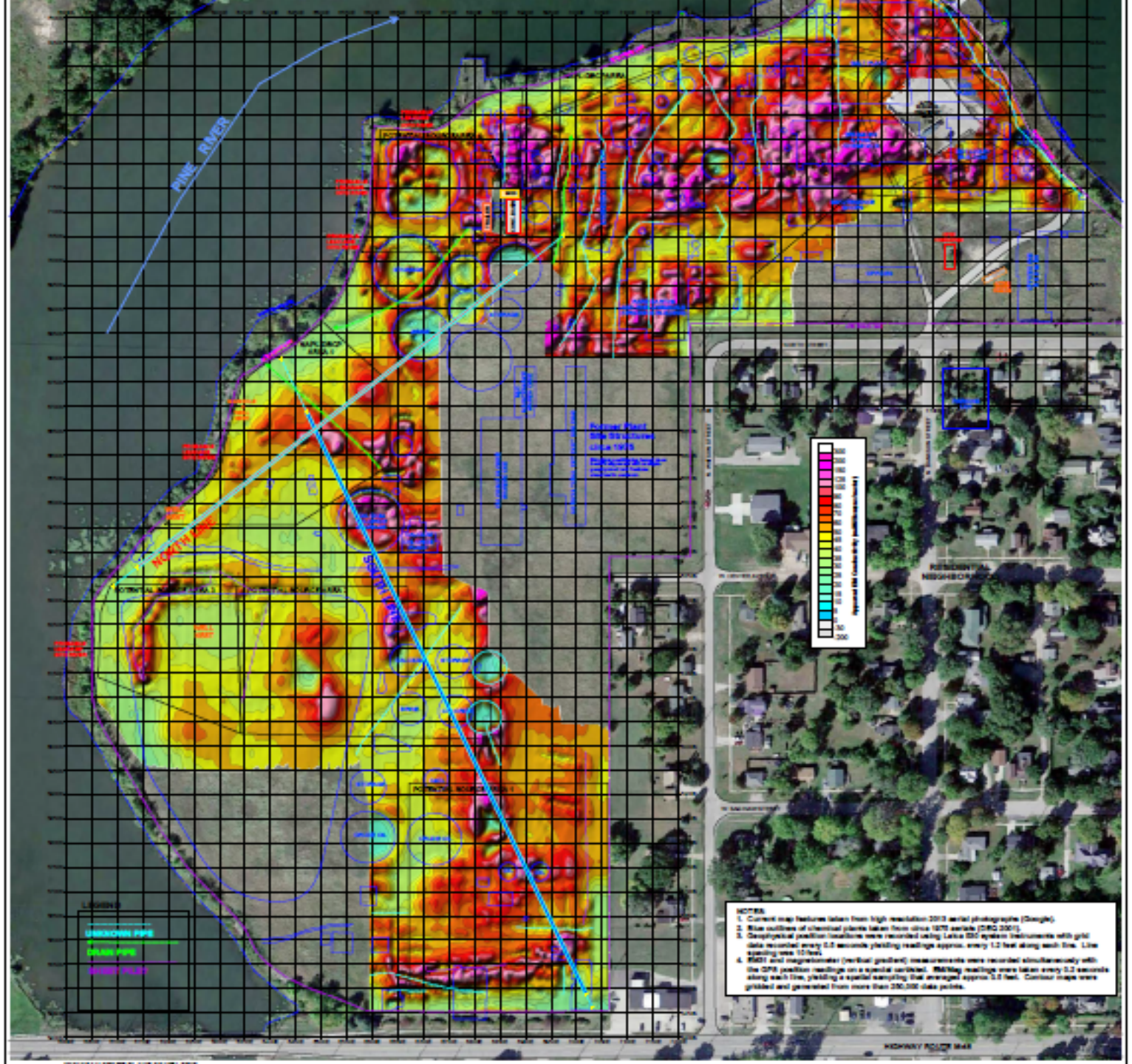
- PSA-1 and PSA-2
  - Refine the delineation of chlorobenzene, xylene and TRIS in the unsaturated zone.
  - Obtain soil samples for laboratory analysis to assist in remedial design.
  - Visually characterize subsurface debris.
- NAPL Areas 1 and 2
  - Refine delineation of NAPL-impacted soil and groundwater within the Shallow Unit to support lateral boundary definition for Thermal Treatment.
  - Refine contact elevation of Shallow Unit with underlying Till Unit.
  - Determine NAPL physical properties.
  - Visually characterize subsurface debris.
  - Obtain soil and groundwater samples to assist in Thermal Treatment design.

Geophysical and Test Pit Investigation

- Completed in phases
  - 12/2013-01/2014 - electromagnetic (EM) and magnetometry surveys
  - 06/2014 - seismic refraction survey
  - 07/2014 -Test pits completed
- Results described in report
  - *Geophysical Survey and Test Pit Results for Velsicol Chemical/Pine River Superfund Site, St. Louis, Michigan.*

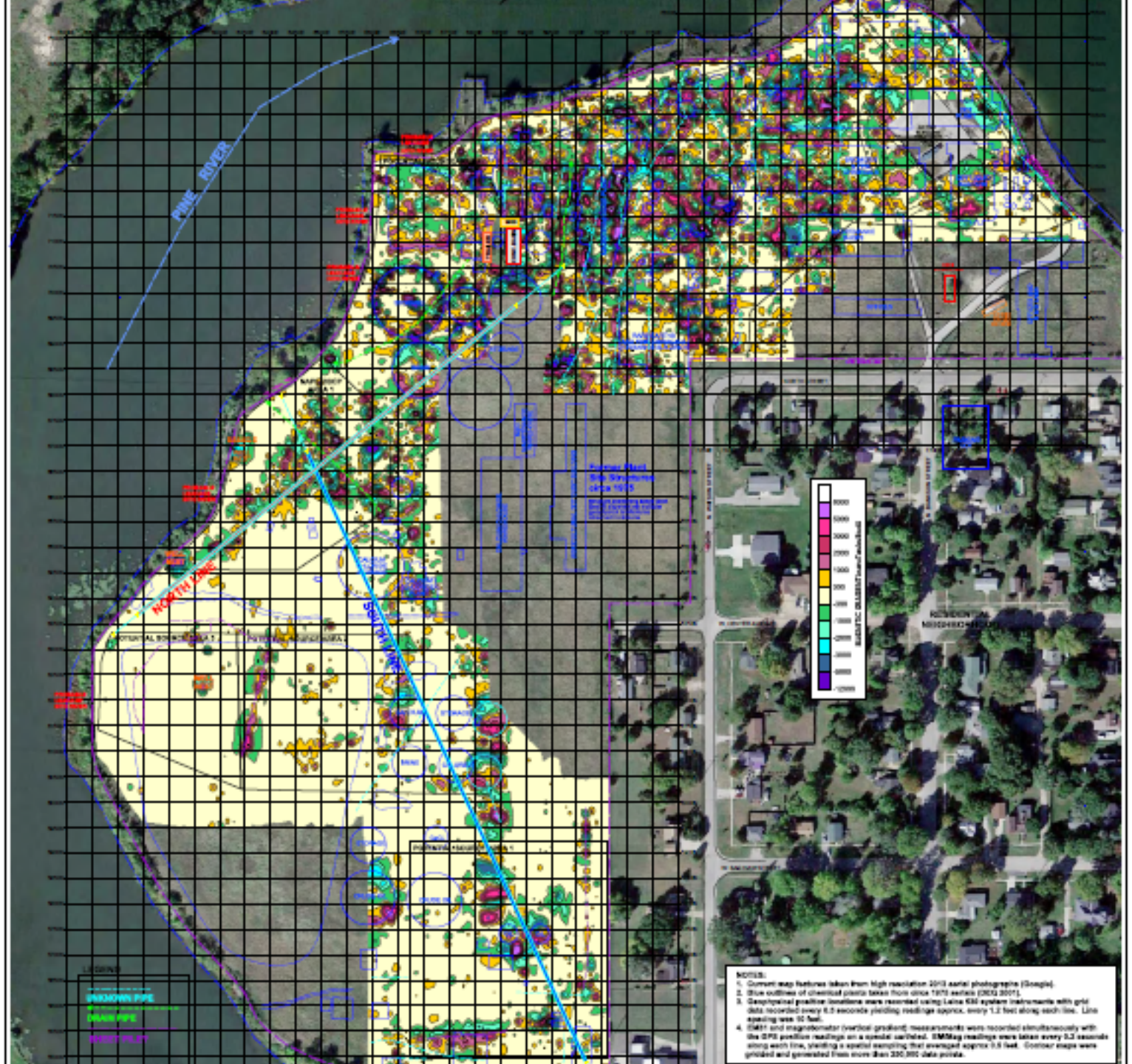
EM Conductivity Map with Seismic Lines Depicted

- Northern portion of the site has most concentrated area of elevated EM conductivity
- Greatest density of high EM conductivities associated with of former buildings
- Tank/building foundations clearly visible in NAPL Area 1
- Concentrated high EM conductivity in PSA-1



Magnetic Gradient Map with Seismic Lines Depicted

- Northern portion of the site has most concentrated area of elevated magnetic response
- Result of the demolition of large structures
- Magnetic response clearly diminishes to the south
- Linear Feature in the PSA-2 area correlates with surface pipe shown in historical photos
- Potential impact on technology selection



DIGITAL INSTANTANEOUS FLOATING POINT
SIGNAL STACKING SEISMOGRAPH
TOYOTA
MIDLAND
MICHIGAN

North Seismic Line

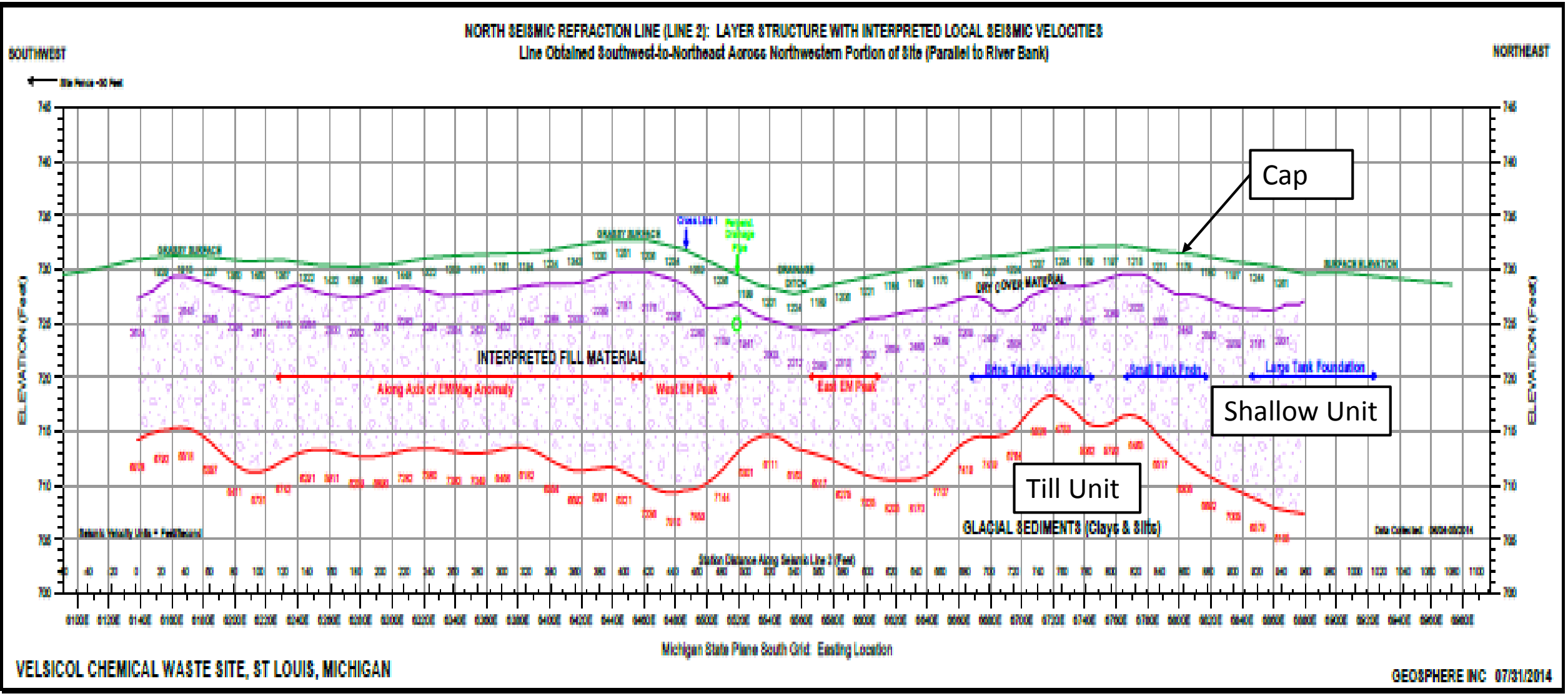


FIGURE 4.8

TP-13 - ~ 7 feet bgs

TP-8 – White granular material – 6 feet bgs

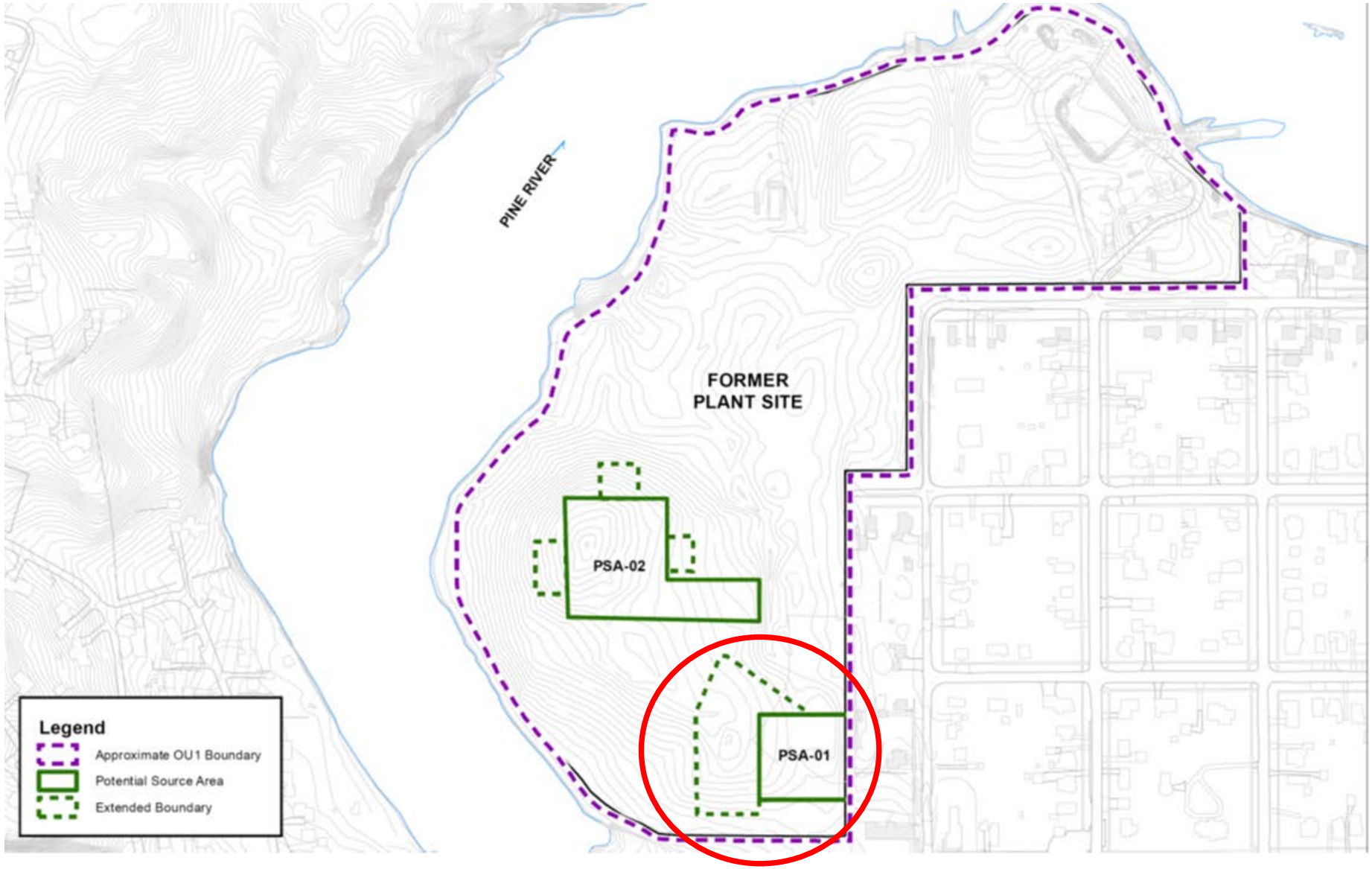
TP-15 – Pipe – 6 feet bgs

Drilling and Sampling Investigation

- Four Areas Investigated
  - PSA-1 – Planned for Excavation
  - PSA-2 – Planned for Excavation
  - NAPL Area 1 – Planned for Thermal Treatment
  - NAPL Area 2 – Planned for Thermal Treatment
- Results described in two reports
  - *Data Evaluation Report for Velsicol Former Plant Site, Potential Source Area 1 and Potential Source Area 2, Remedial Design Investigation*
  - *Data Evaluation Report for Velsicol Former Plant Site NAPL/DBCP Areas 1 and 2, Remedial Design Investigation*

1413
SPX
413
T300

PSA-1


PINE RIVER
FORMER
PLANT SITE
PSA-02
PSA-01
Legend
Approximate OU1 Boundary
Potential Source Area
Extended Boundary

PSA-1

Chemicals of Concern: Chlorobenzene and Xylene

- 64 soil borings
- 3 soil samples collected from each boring between the cap and water table
- NAPL Test Kits (NTK)

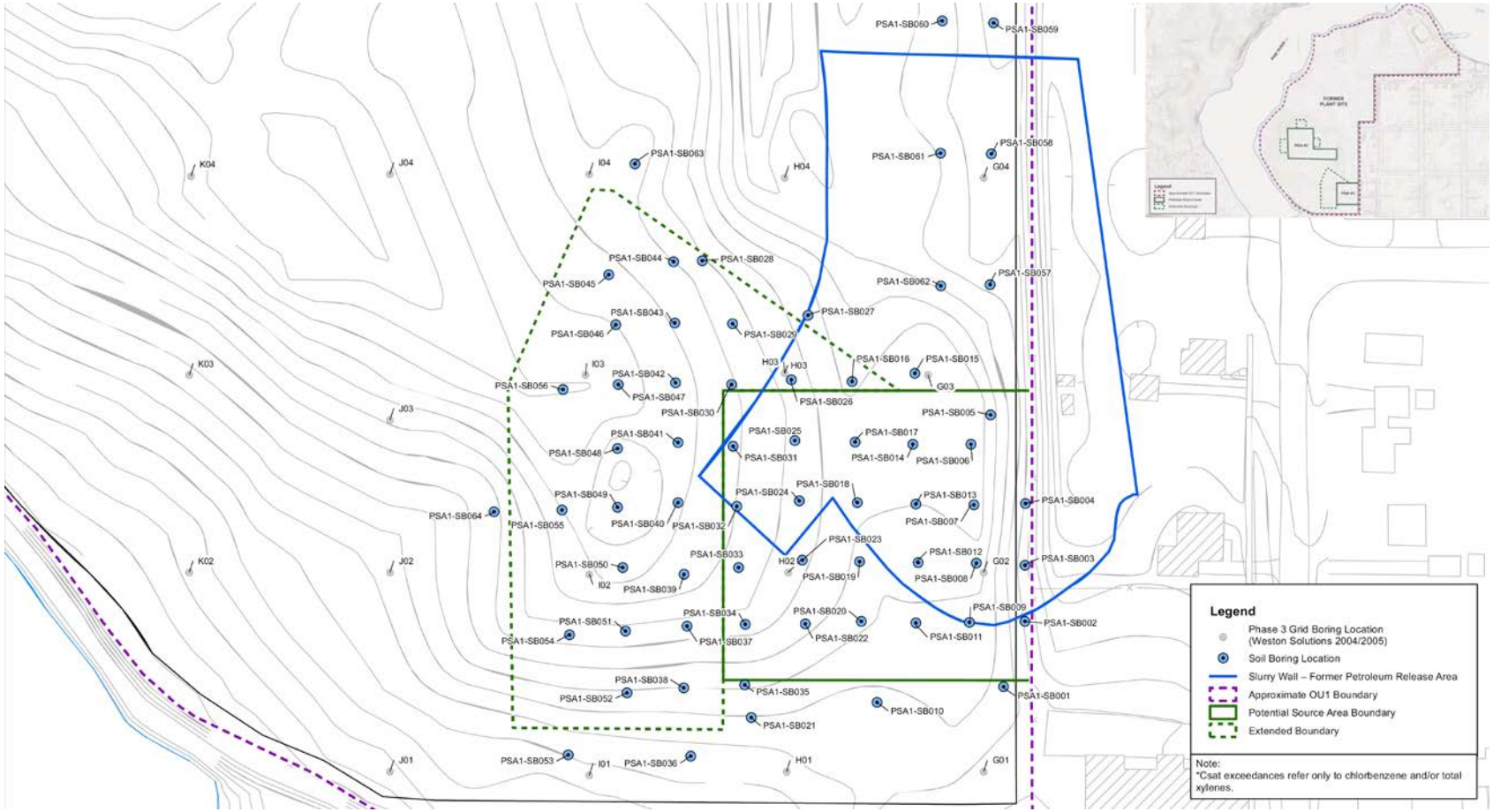
C_{sat} – *"Concentration of Saturation"* – A *theoretical* and *regulatory* (MDEQ) concentration of a chemical in soil at which the chemical potentially saturates the soil, and above which a NAPL may be present.

Data Summary:

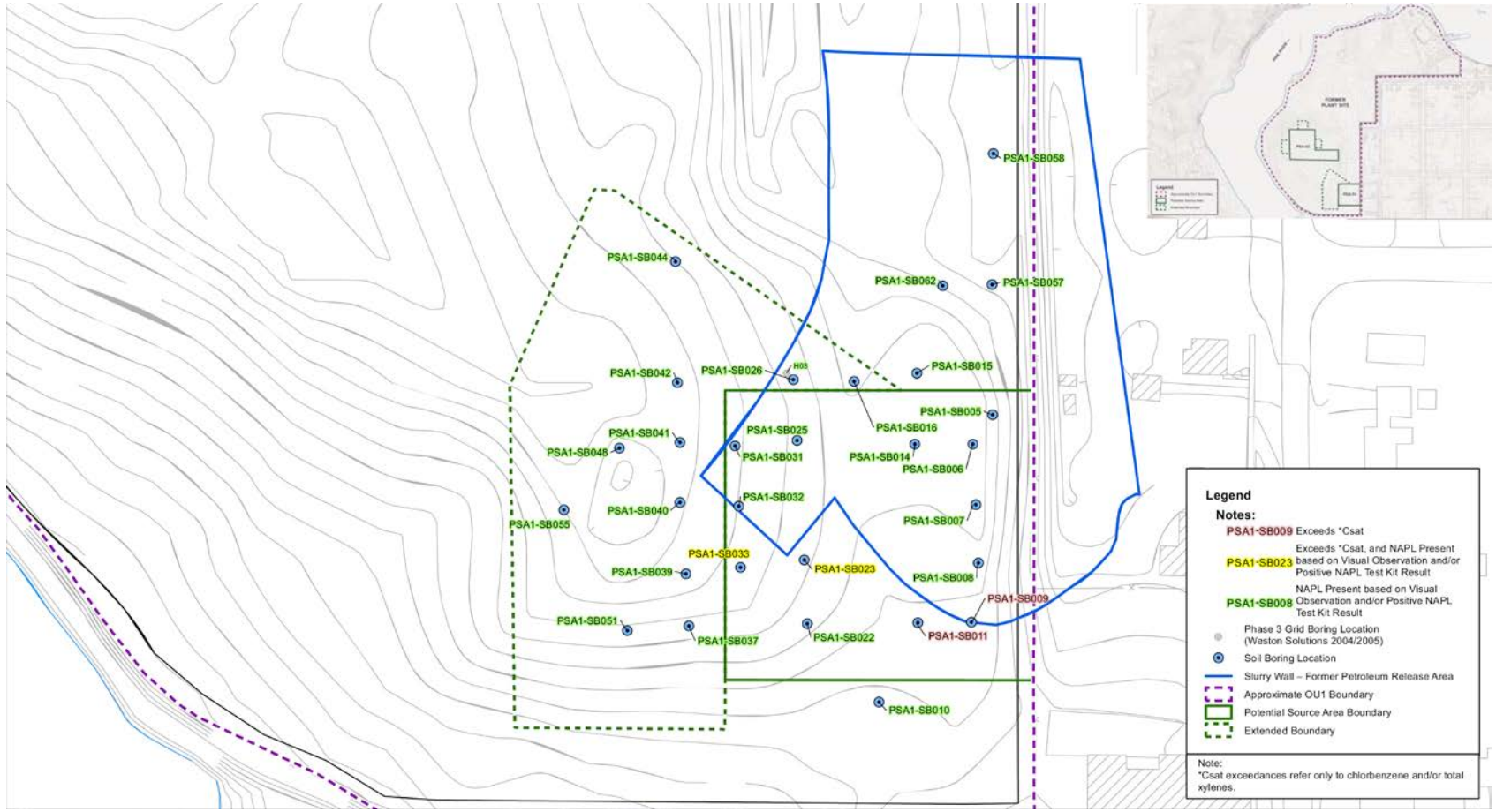
Parameter	Detected in	>C_{sat}	NAPL observation or + NTK
Chlorobenzene (Csat=260,000 ug/kg)	56 soil borings	2 soil borings	26 of 64
Xylene (Csat=150,000 ug/kg)	57 soil borings	2 soil borings	

PSA1-SB-005
15.7'-16.7'

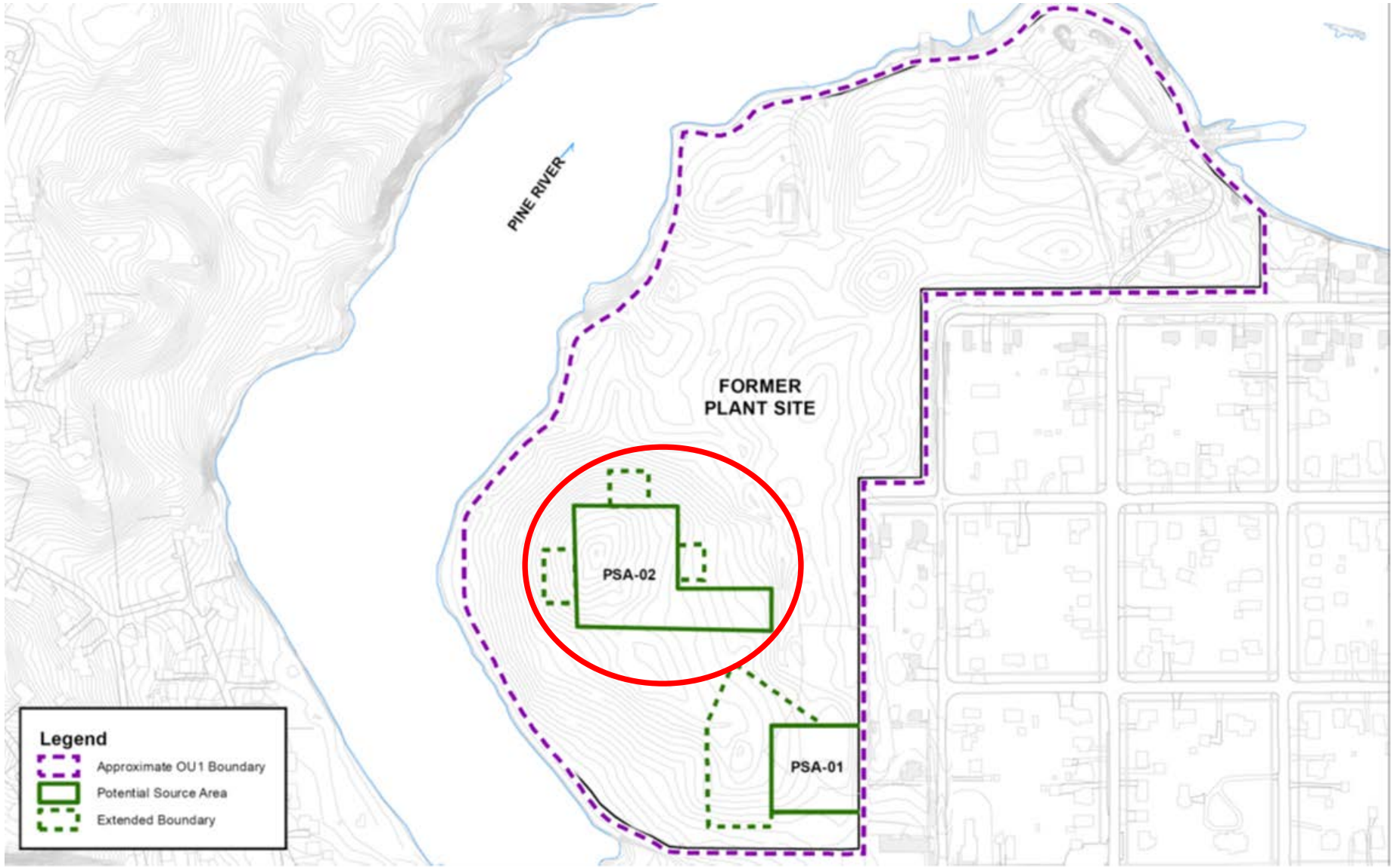
PSA 1 – Sampled Locations



PSA 1 – Observed Impacts



PSA-2


PINE RIVER
FORMER
PLANT SITE
PSA-02
PSA-01
Legend
Approximate OU1 Boundary
Potential Source Area
Extended Boundary

PSA-2
Chemicals of Concern: Chlorobenzene and TRIS

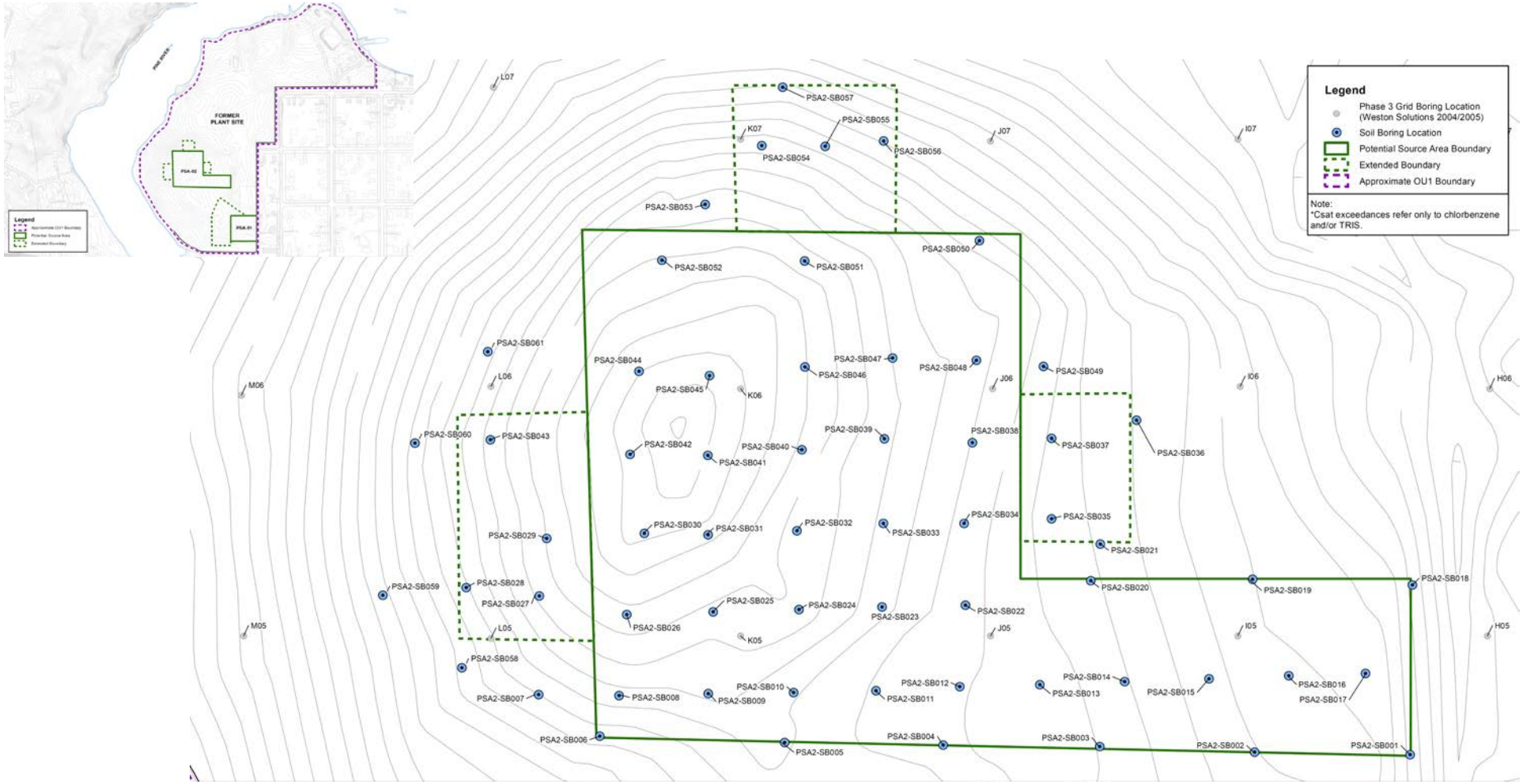
- 61 soil borings
- 3 soil samples collected from each boring between the cap and water table
- NAPL Test Kits (NTK)

Data Summary:

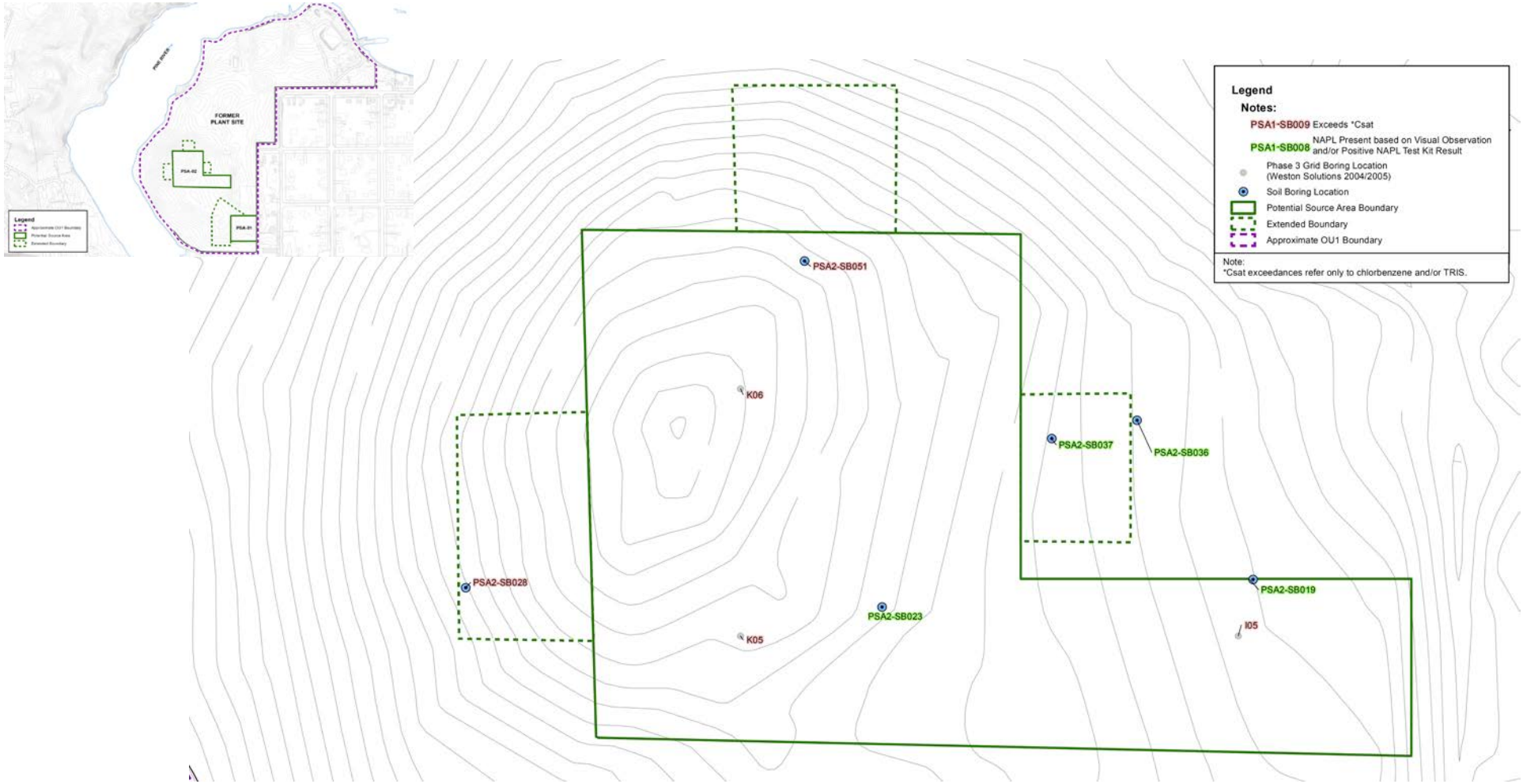
Parameter	Detected in	>C_{sat}	NAPL observation or + NTK
Chlorobenzene (Csat=260,000 ug/kg)	60 soil borings	1 soil boring	3 of 61
TRIS (Csat=27,000 ug/kg)	21 soil borings	1 soil boring	

PSA-2-SB-23- 17 feet BGS

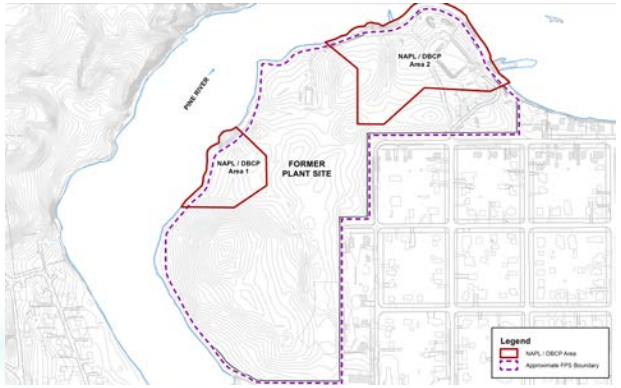
PSA 2 – Sampled Locations



PSA 2 – Observed Impacts

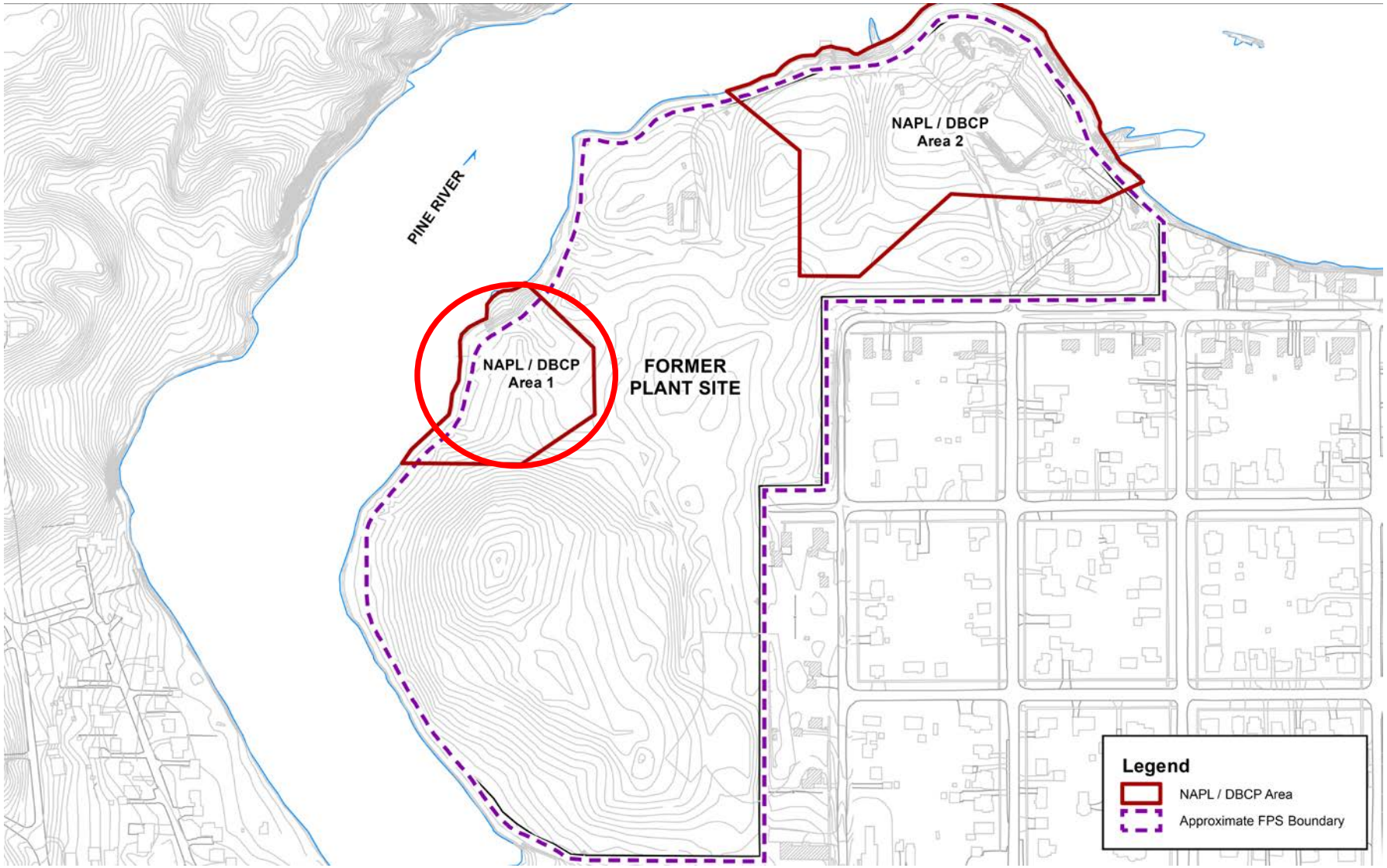


NAPL Areas


NAPL / DBCP
Area 2
PINE RIVER
NAPL / DBCP
Area 1
FORMER
PLANT SITE
Legend
NAPL / DBCP Area
Approximate FPS Boundary

TWIN AIR

NAPL Area 1


PINE RIVER
NAPL / DBCP
Area 2
NAPL / DBCP
Area 1
FORMER
PLANT SITE
Legend
NAPL / DBCP Area
Approximate FPS Boundary

NAPL Area 1

- 8 test pits – July 2014
- 47 soil borings – August -October 2014
- Drilling completion:
  - NAPL Test Kits (NTK) completed on 2 foot intervals – below the cap to till unit
  - 10 soil and 10 groundwater samples collected where:
    - Visually contaminated
    - Positive NTK

W_{sol} – *"Water Solubility"* – A *theoretical* threshold and *regulatory* (MDEQ) concentration of a chemical in water above which a free-phase chemical (i.e. NAPL) potentially exists.

Data Summary:

Total Soil Borings	Total NTK	NAPL by +NTK	NAPL - Visual	GW>W_{sol}	Soil>Csat
47	302	25	3	8 of 10	2 of 10

NAPL DBCP AREA 1
SB-030
0-5 FT. BGS.

NAPL DBCP AREA 1
SB-030
5-10 FT. BGS.

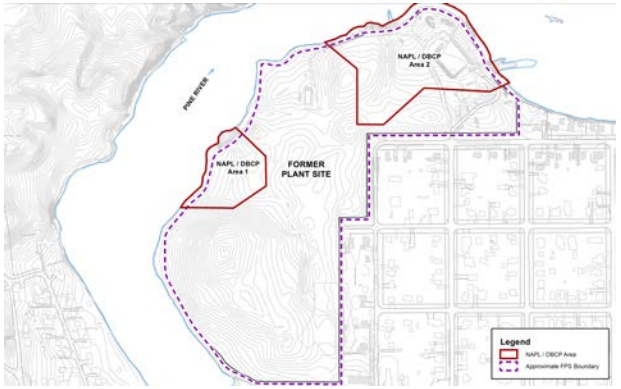
NAPL DBCP AREA 1
SB-030
10-15 FT. BGS.

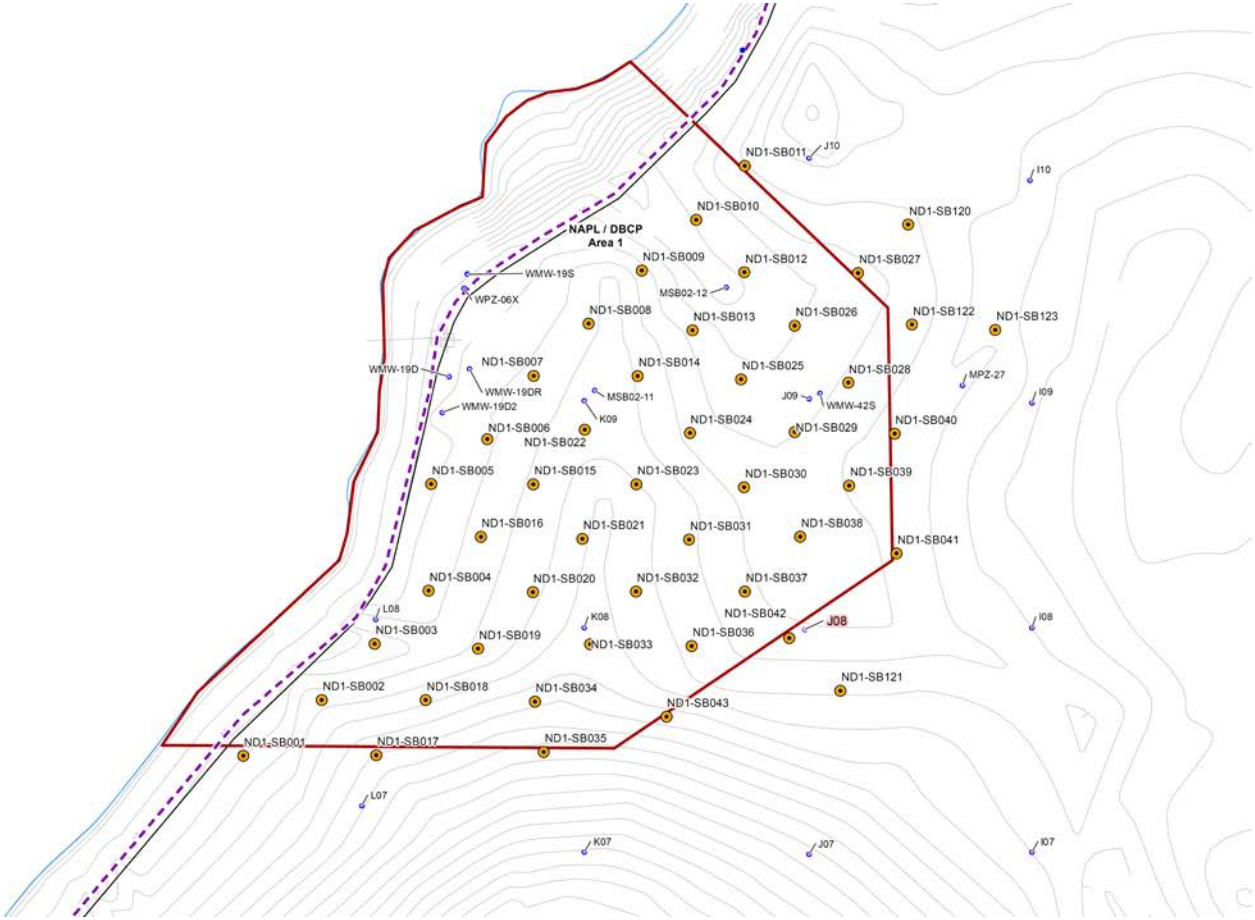
SB-030 11 feet BGS

NAPL DBCP AREA 1
SB-030
15-20 FT. BGS.

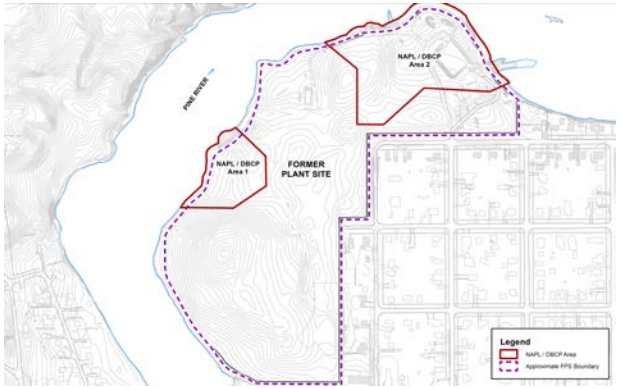
SB-030 18 feet BGS

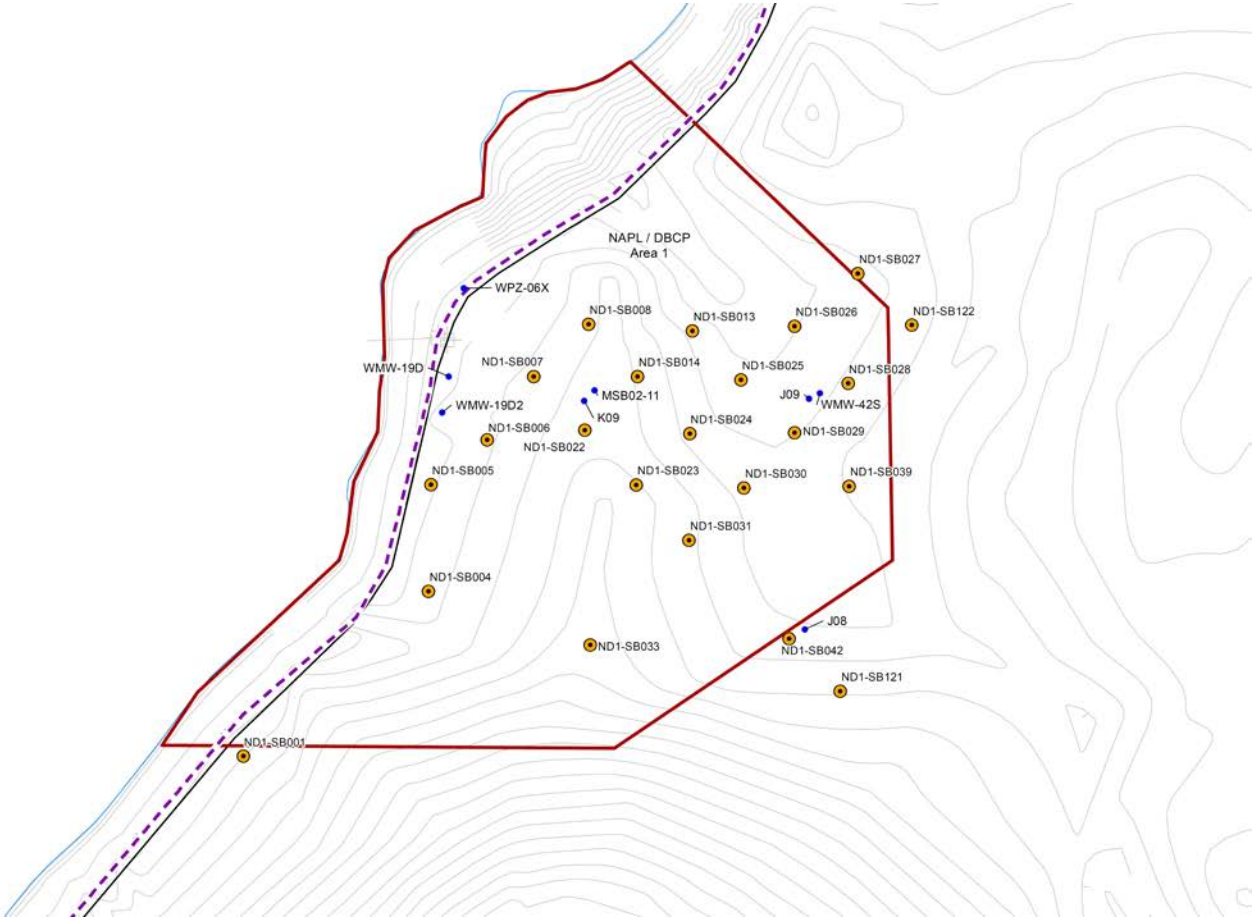
NAPL Area 1 – Sampled Locations



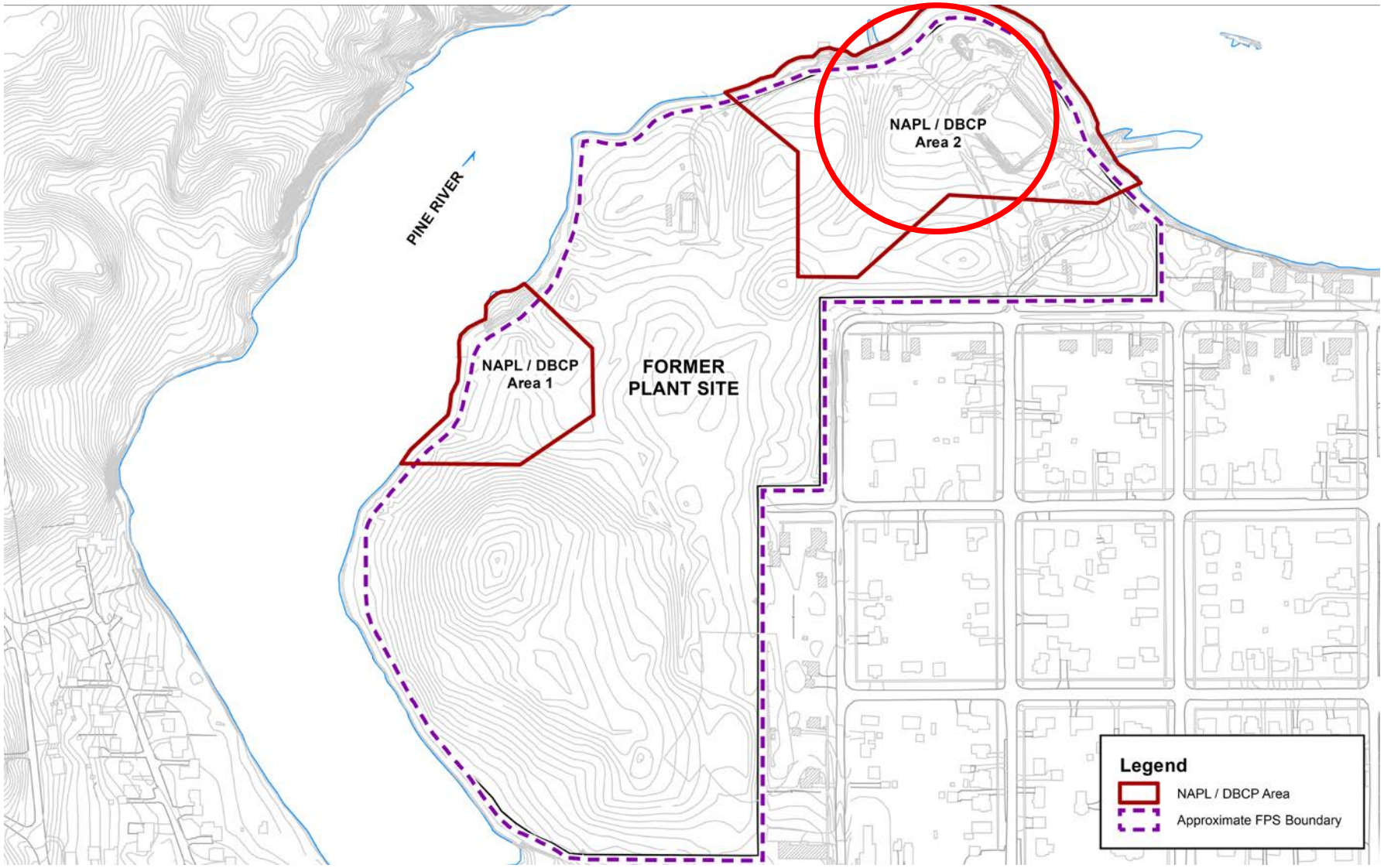


NAPL Area 1 – Observed Impacts





NAPL Area 2


NAPL / DBCP
Area 2
PINE RIVER
NAPL / DBCP
Area 1
FORMER
PLANT SITE
Legend
NAPL / DBCP Area
Approximate FPS Boundary

NAPL Area 2

- 12 test pits – July 2014
- 82 soil borings – August -October 2014
- Drilling completion:
  - NAPL Test Kits (NTK) completed on 2 foot intervals – below the cap to till unit
  - 15 groundwater and 18 soil samples collected where:
    - Visually contaminated
    - Positive NAPL Test Kit
- Data Summary:

Total Soil Borings	Total NTK	NAPL by +NTK	NAPL - Visual	GW>W_{sol}	Soil>Csat
82	518	21	2	9 of 15	3 of 18

NAPL DBCP AREA 2
SB-111
0-5 FT. BGS.

NAPL DBCP AREA 2
SB-111
5-10 FT. BGS.

NAPL DBCP AREA 2
SB-111
10-15 FT. BGS.

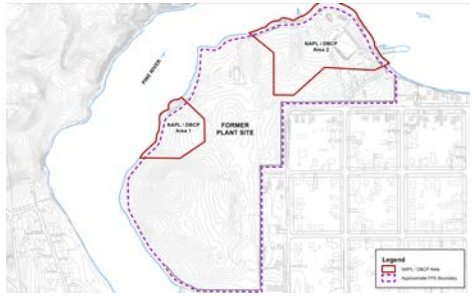
SB-111 12 feet BGS

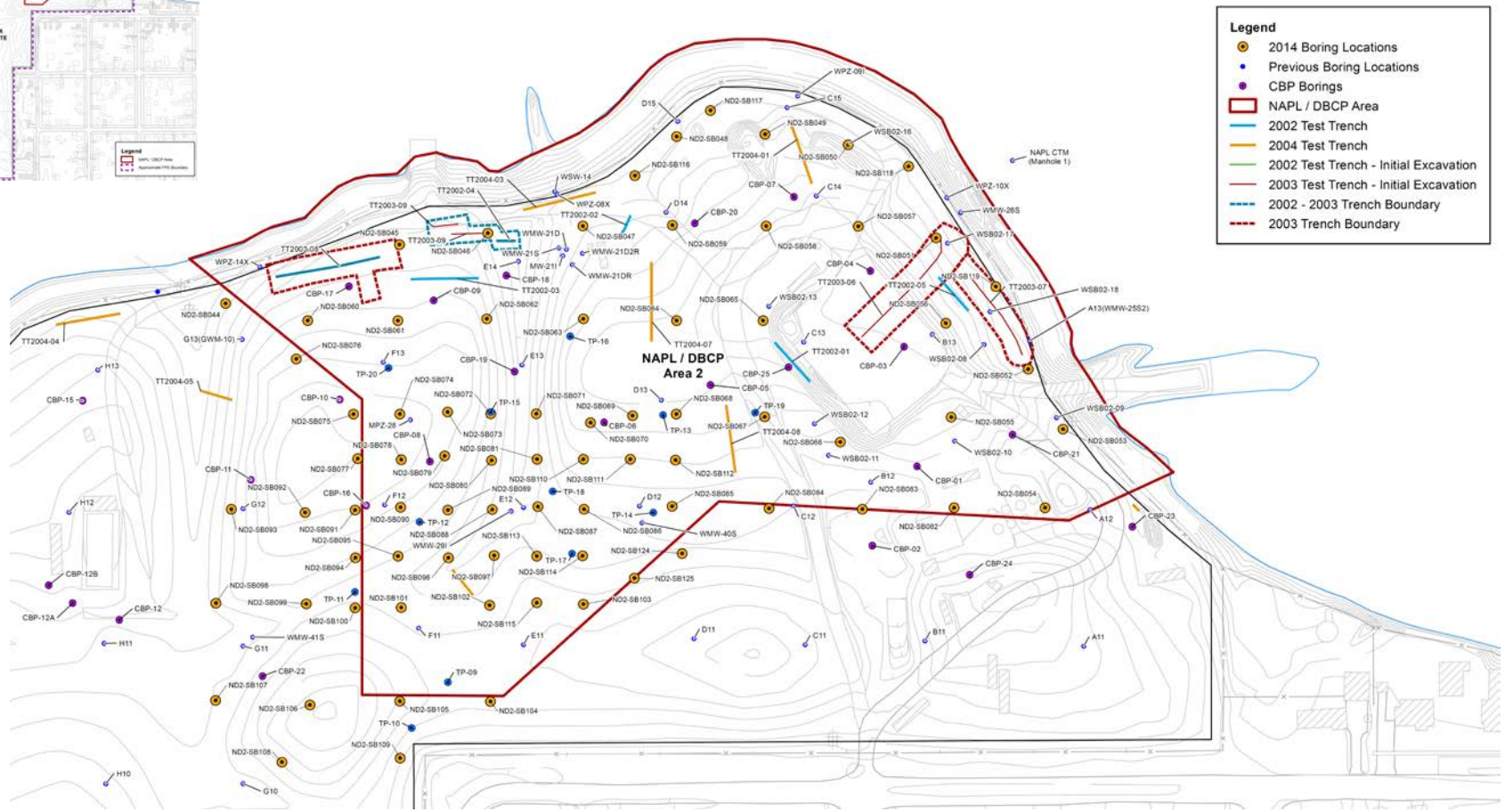
NAPL DBCP AREA 2
SB-111
15-20 FT. BGS.

SB-111 15 feet BGS

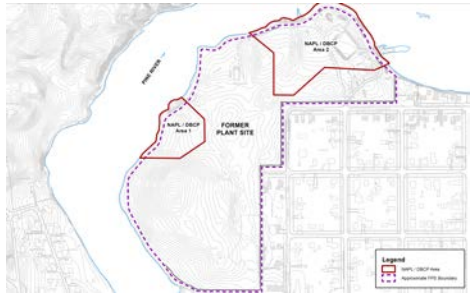
SB-111 DNAPL accumulated
from 16 feet BGS

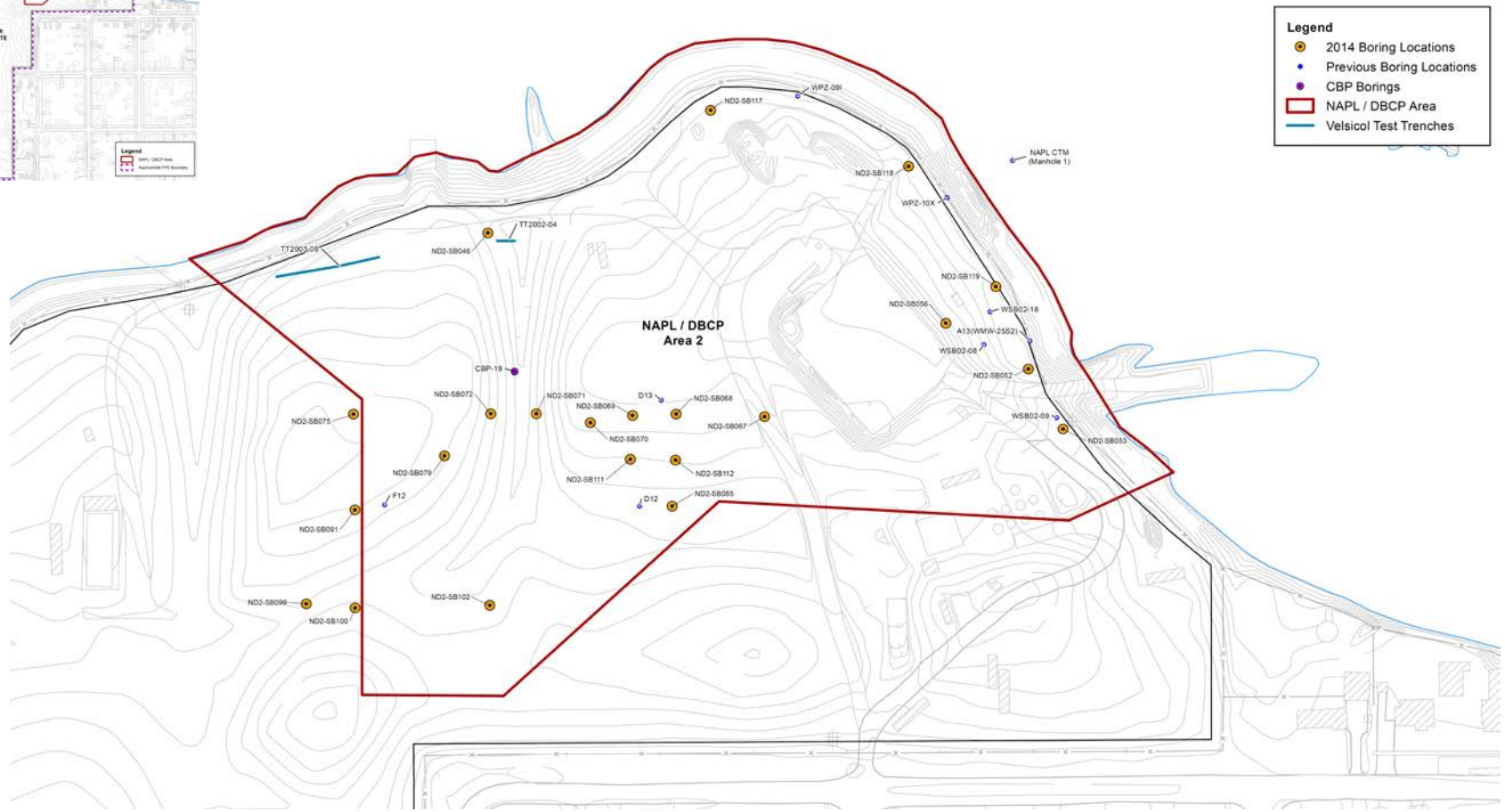
NAPL Area 2 – Sampled Locations





NAPL Area 2 – Observed Impacts





Any Questions?