North Boeing Field/ Georgetown Steam Plant Site Remedial Investigation/Feasibility Study

Remedial Investigation/Feasibility Study Work Plan

VOLUME 2: FIGURES

FINAL

Prepared for

Toxics Cleanup Program
Northwest Regional Office
Washington State Department of Ecology
Bellevue, Washington

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November 11, 2013

Volume 2: Figures

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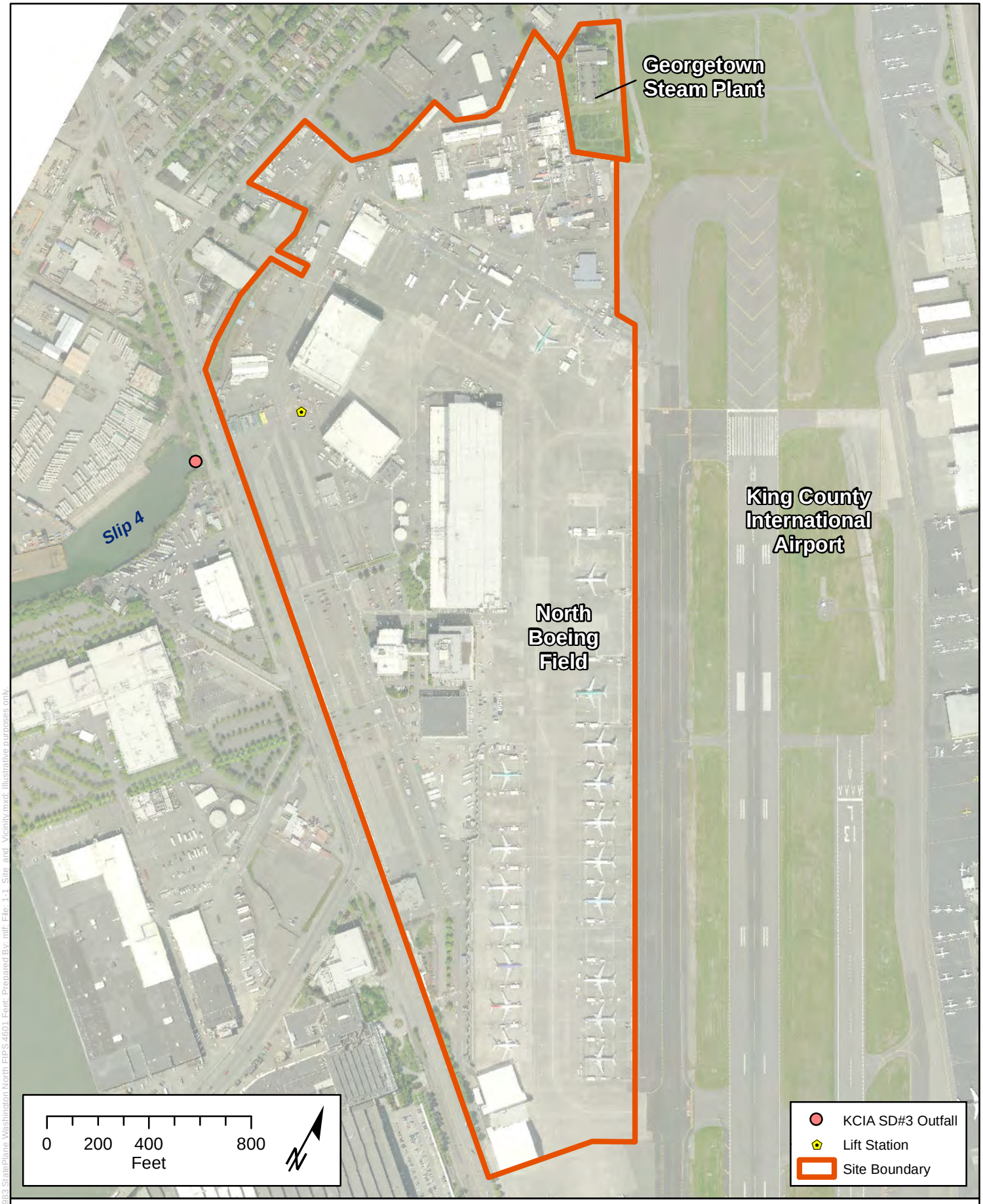

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet. Prepared By: mlf. File: 1-1 Site and Vicinity.mxd. Illustrative purposes only.

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Figure 1-1. NBF-GTSP Site and Vicinity

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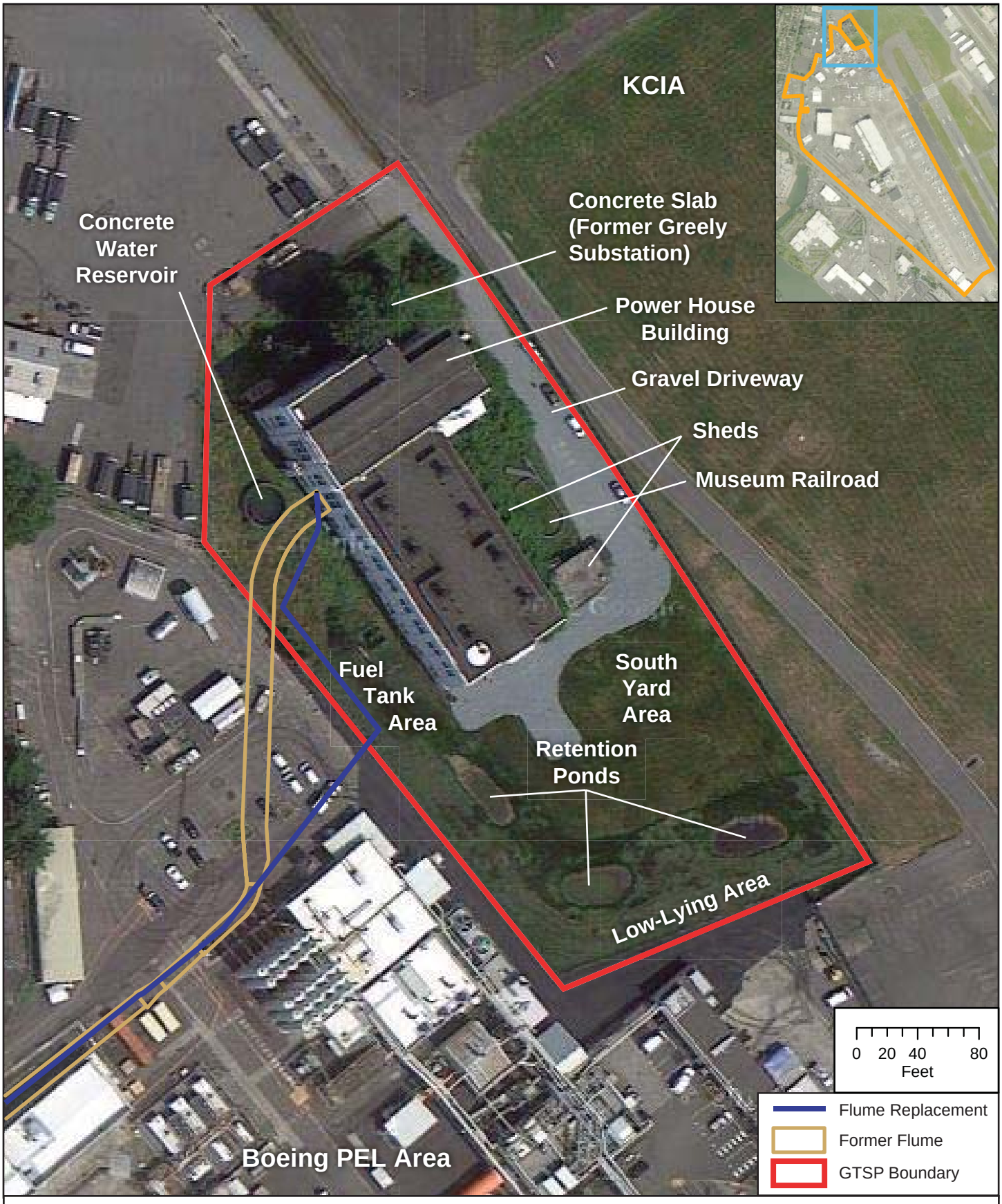

Source: Aerial photo from Google Maps/USGS 2013

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Figure 2–1. Georgetown Steam Plant Current Site Features

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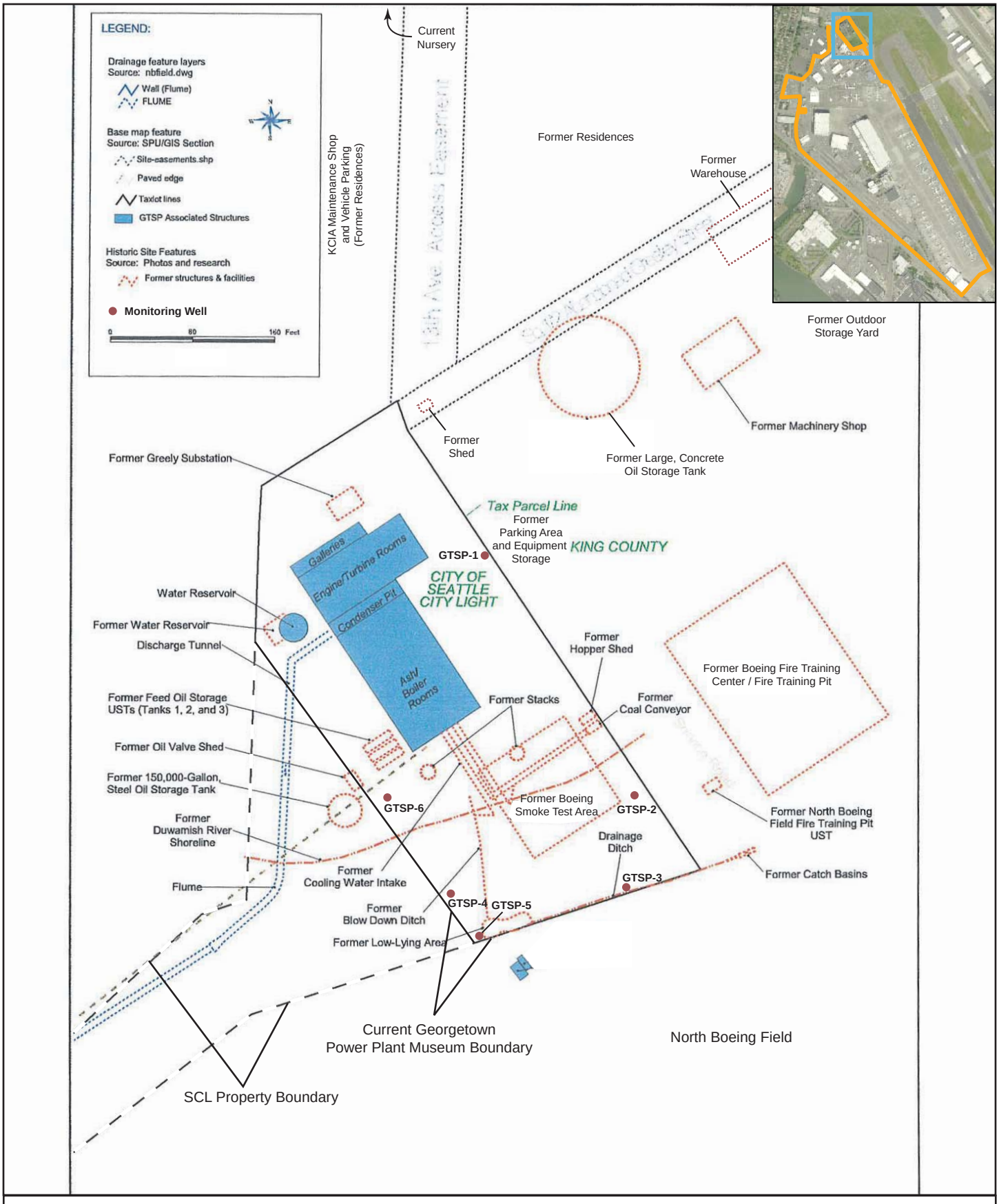

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Figure 2–2. Historical Site Features of GTSP and Vicinity

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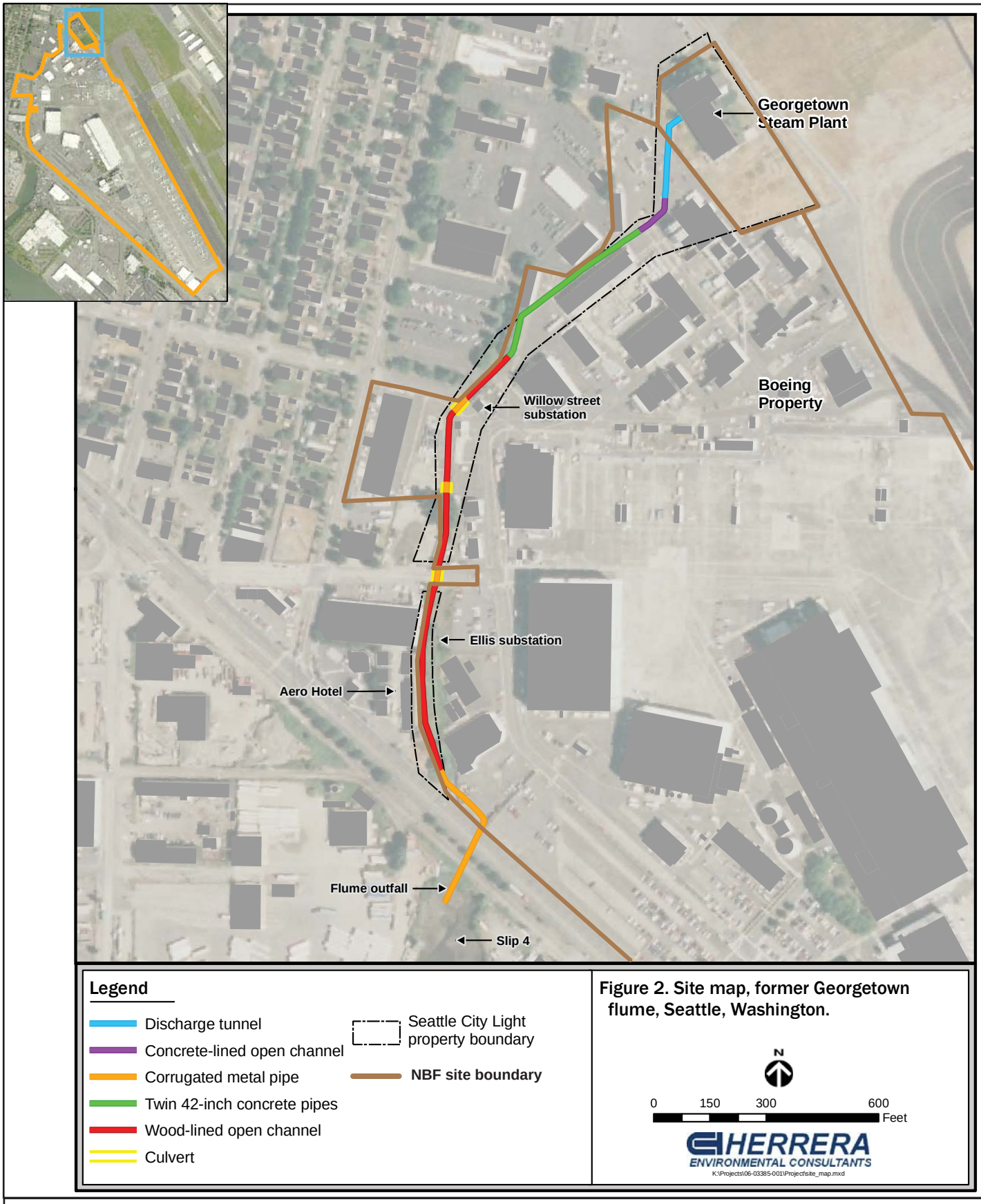

Figure 2. Site map, former Georgetown flume, Seattle, Washington.

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Source: Herrera 2010

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Figure 2–3. Former Georgetown Flume Location

Storm Drain Structures

- Catch Basin
- Drain
- Inlet
- Lift Station
- Manhole
- Oil/Water Separator
- Plug
- Vault
- R Roof Drain
- Channel Drain

Storm Drain Lines

- North Lateral
- KC Bypass Line
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- GTSP Flume Replacement Line
- Site Boundary
- Building
- Removed Building

Slip 4
S OTHELLO ST
12TH AVE S
14TH AVE S
S WEBSTER ST
EAST MARGINAL WAY S
S MYRTLE ST
FLORA AVE S
CARLETON AVE S
ELLIS AVE S
S WILLOW ST
AM/PM
Motel
Non-Boeing Office
Fire Station Seattle
7-27-1
7-27-3
7-27-2
GTSP Flume Replacement
King County Bypass Line
LTS Treatment Area
2-35
3-370
3-369
3-380
3-350
3-360
3-361
3-801
3-825
3-818
3-800
3-374
3-390
Boiler Room
3-324
3-329
National Guard
3-854
3-317
3-353
3-322
Wind Tunnel
3-313
GTSP
3-832
3-811
3-812
3-830
3-847
Main Fuel Farm
Flight Test and Operations Area
Concourse C
Concourse A
Propulsion Engineering Laboratory Area
Tent Hangars
Concourse B
King County International Airport
0 100 200 400 Feet

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Figure 2-4. Overview of NBF Property

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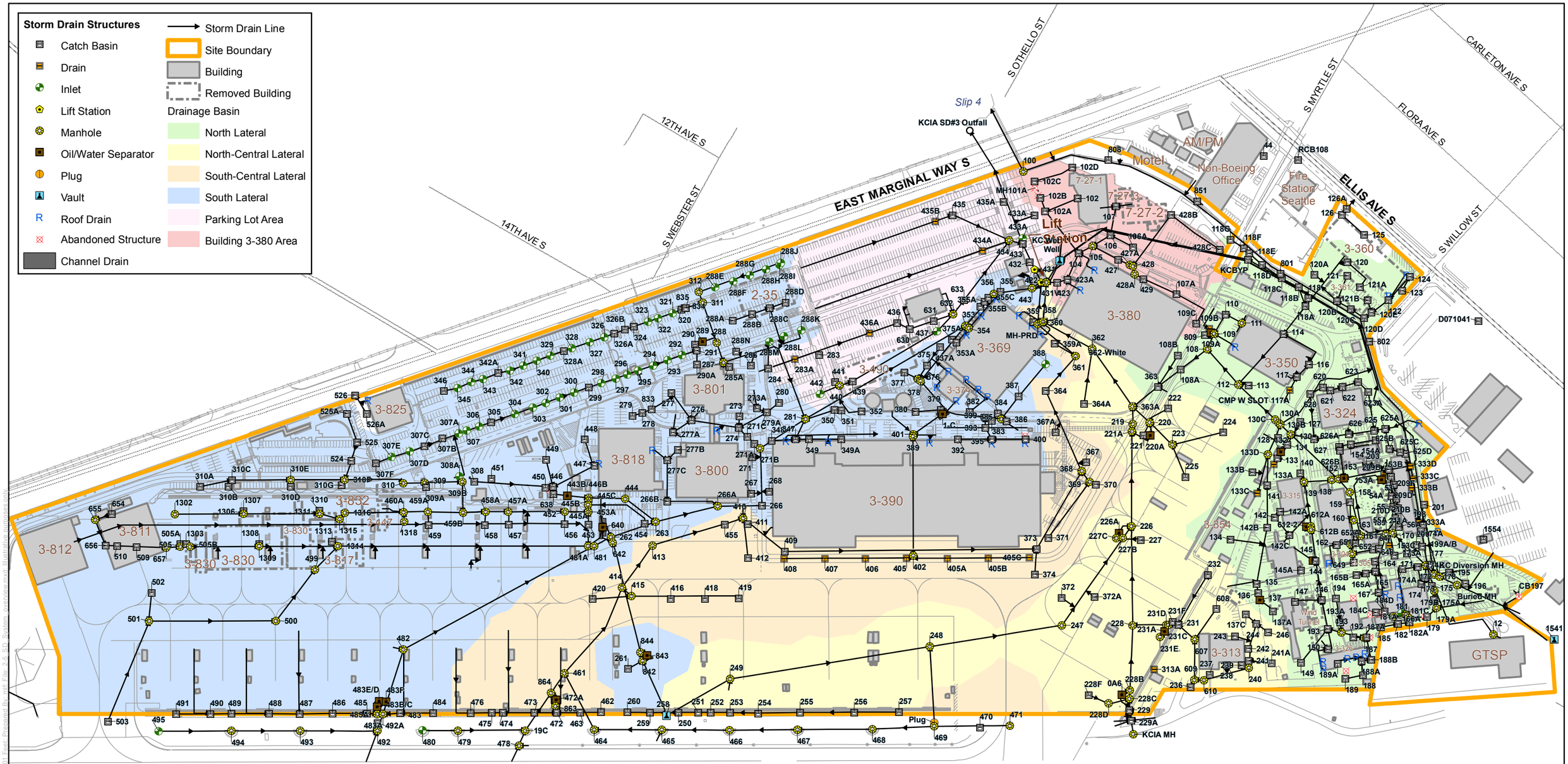
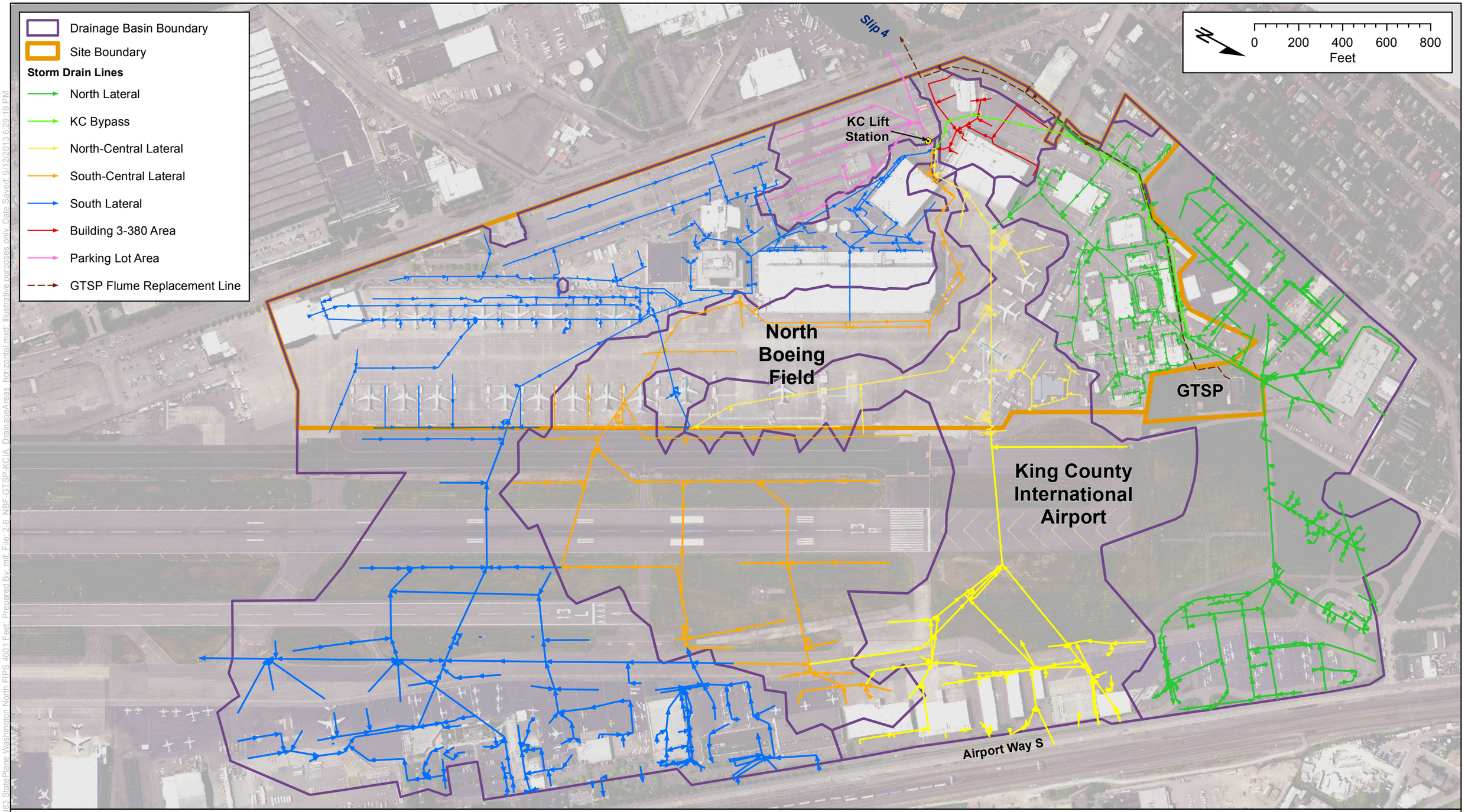


Figure 2-5. NBF Storm Drain System Overview



Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet; Prepared By: mlf; File: 2-6_NBF-GTSP-KCIA_DrainageAreas_horizontal.mxd; Illustrative purposes only. Date Saved: 9/12/2013 6:29:19 PM

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Figure 2-6. NBF-GTSP and KCIA Drainage Areas

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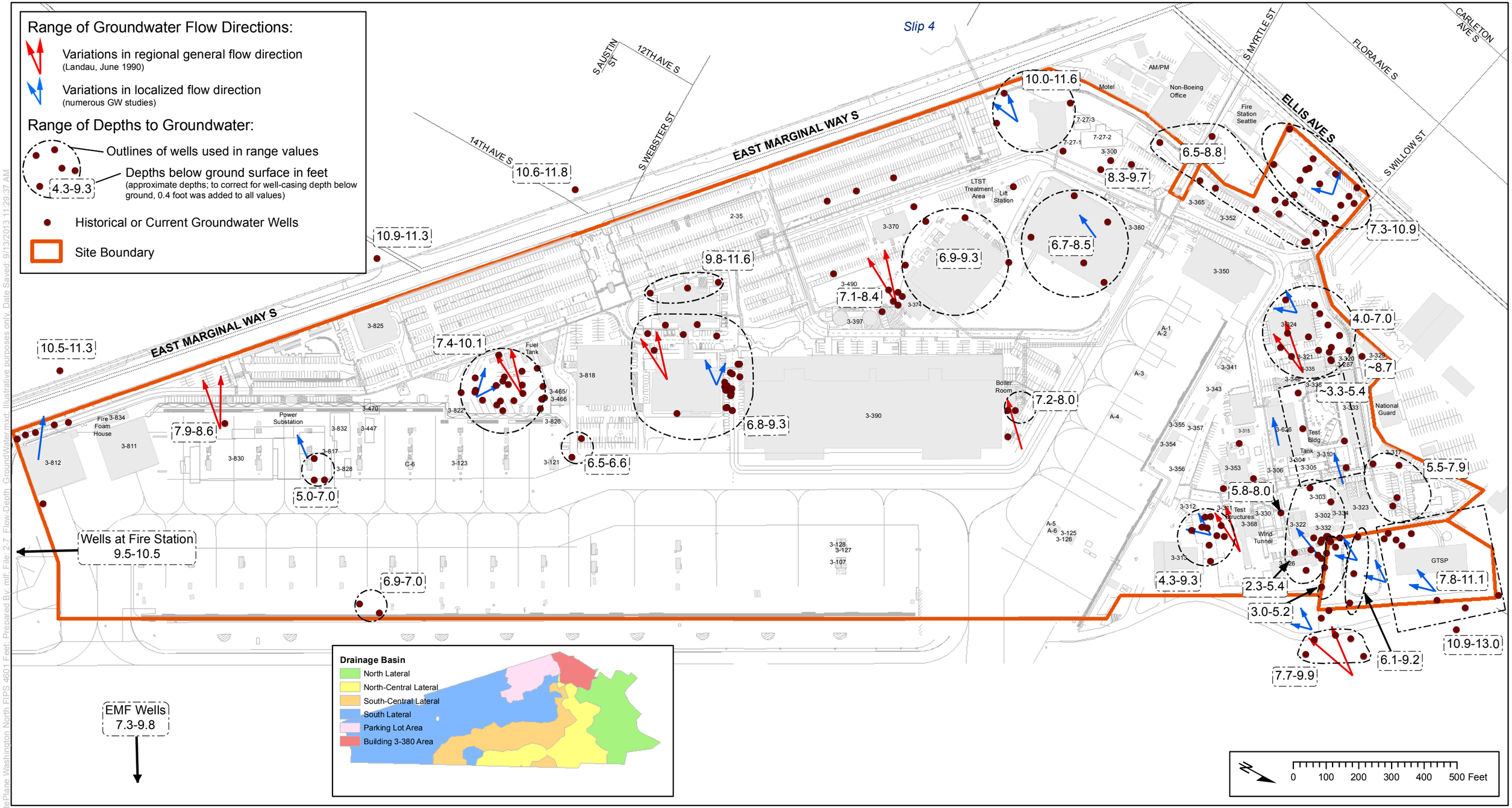

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Figure 2-7. Groundwater Flow and Depth at NBF-GTSP Site

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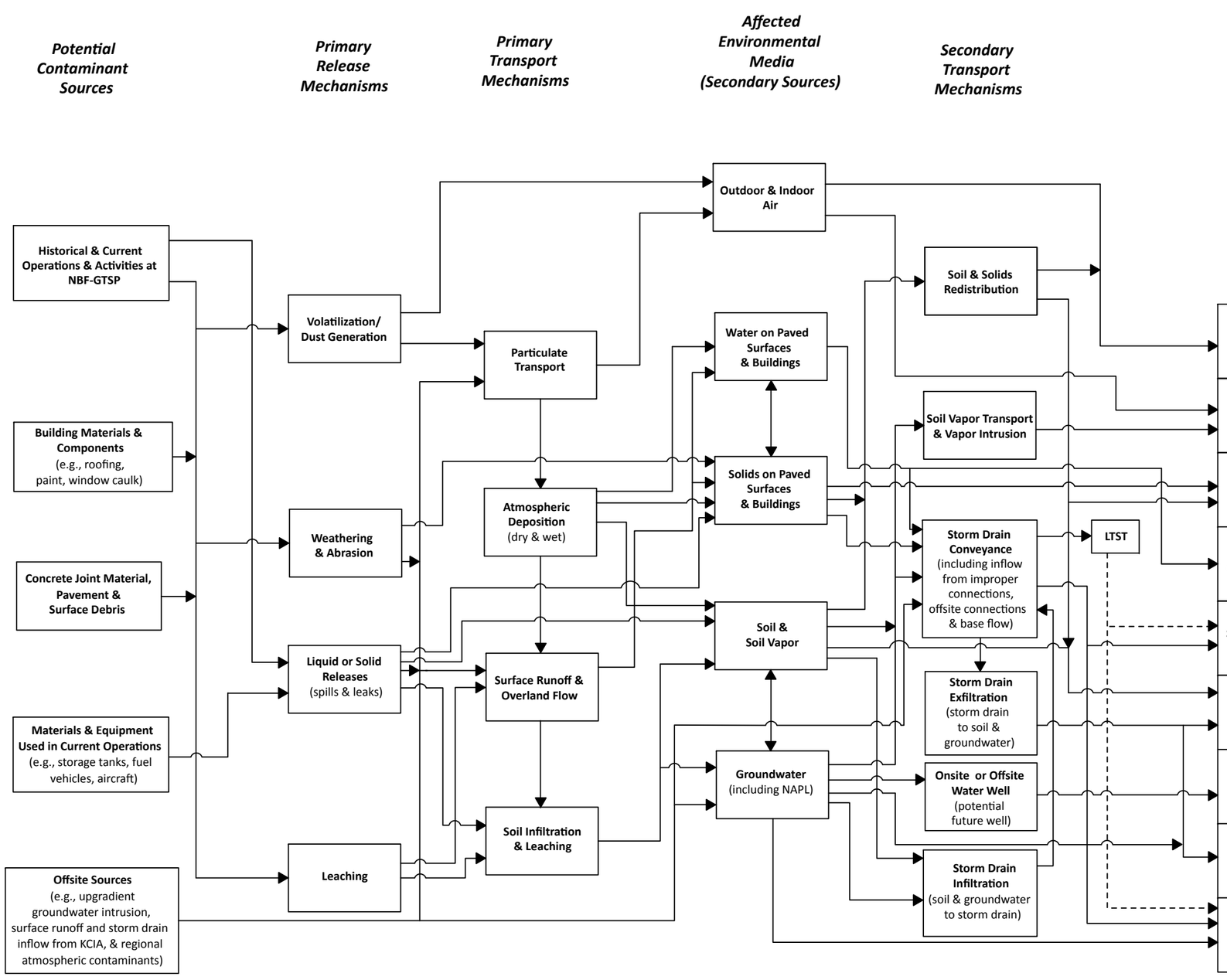
Figure 2-7



Exposure Media	Exposure Pathways		Onsite Industrial Workers	Onsite Construction Workers	GTSP Museum Visitors (Children & Adults)	Offsite Industrial & Construction Workers	Offsite Residents (Children & Adults)	Fishing/Recreational Users (Slip 4 area)*	Terrestrial Biological Receptors	Slip 4 Biological Receptors
			Potential Receptors							
			Human Receptors						**Ecological Receptors**	
Outdoor Air	Inhalation		●	●	○	○	○	○	○	–
Indoor Air	Inhalation		●	●	●	●	●	–	–	–
Surface Solids	Incidental Ingestion		●	●	●	–	–	–	○	–
	Dermal Contact		●	●	●	–	–	–	○	–
Water on Ground Surface	Incidental Ingestion		–	–	–	–	–	–	○	–
	Dermal Contact		○	○	○	–	–	–	○	–
Stormwater, Suspended Solids & Storm Drain Solids	Incidental Ingestion	U	○	○	○	○	–	–	–	–
		T	–	–	–	–	–	–	–	–
	Dermal Contact	U	○	●	○	○	–	–	–	–
		T	–	–	–	–	–	–	–	–
Soil	Incidental Ingestion		○	●	●	–	–	–	●	–
	Dermal Contact		○	●	●	–	–	–	●	–
Potable Groundwater	Ingestion		●	○	○	○	○	–	–	–
	Dermal Contact		●	○	○	○	○	–	–	–
Groundwater (in aquifer)	Incidental Ingestion		–	○	–	○	–	–	–	–
	Dermal Contact		–	●	–	○	–	–	○	–
Slip 4 Surface Water & Sediment*	Incidental Ingestion	U	–	–	–	○	–	○	–	●
		T	–	–	–	○	–	○	–	○
	Dermal Contact	U	–	–	–	●	–	●	–	●
		T	–	–	–	○	–	○	–	○

*Fish or shellfish contaminated by water/sediment may also be consumed by humans.

Exposure Pathways and Receptors

- ● Potentially Complete
- ○ Potentially Complete but Insignificant
- – Incomplete
- U Untreated Stormwater
- T Treated Stormwater (LTST)
- → Flow Path
- - - - - Treated Stormwater Path (LTST)

Figure 3–1. Preliminary Conceptual Site Model for NBF-GTSP Site

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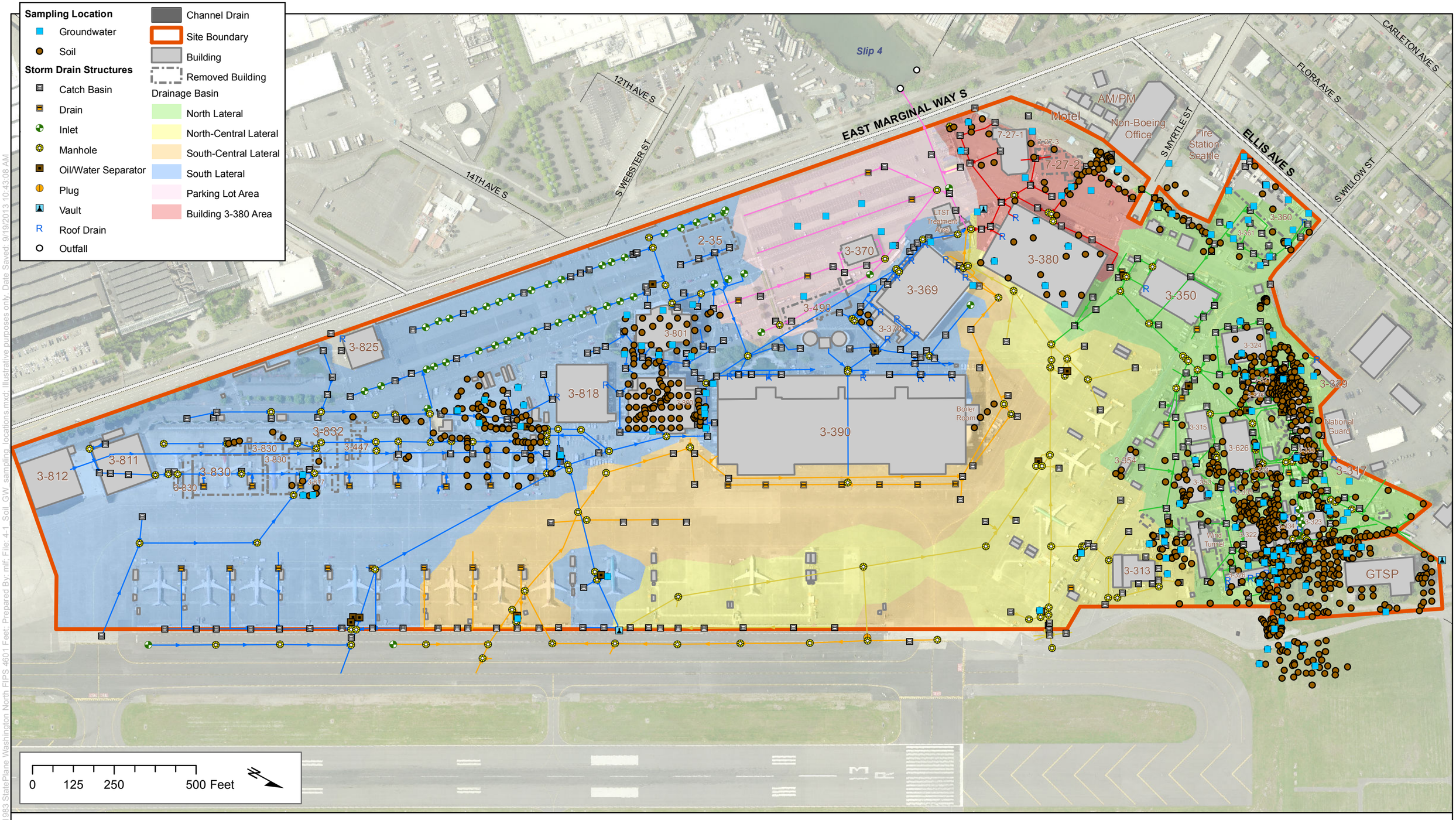

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet; Prepared By: mlf; File: 4-1 Soil GW sampling locations.mxd; Illustrative purposes only. Date Saved: 9/19/2013 10:43:08 AM

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Figure 4-1. Historical Soil and Groundwater Sampling Locations at NBF-GTSP

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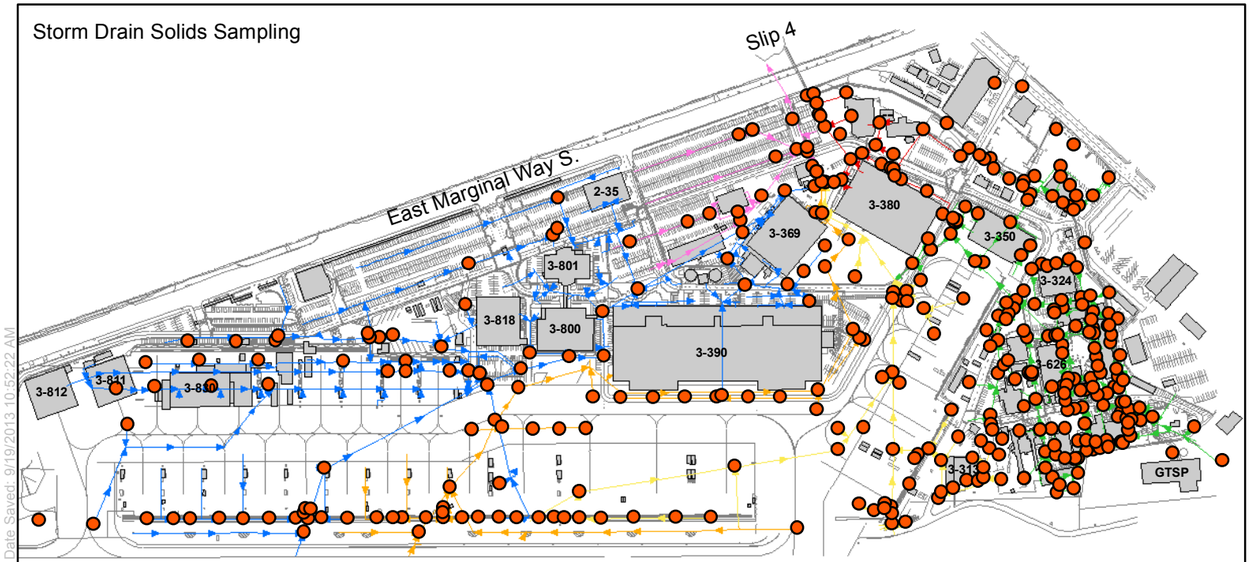
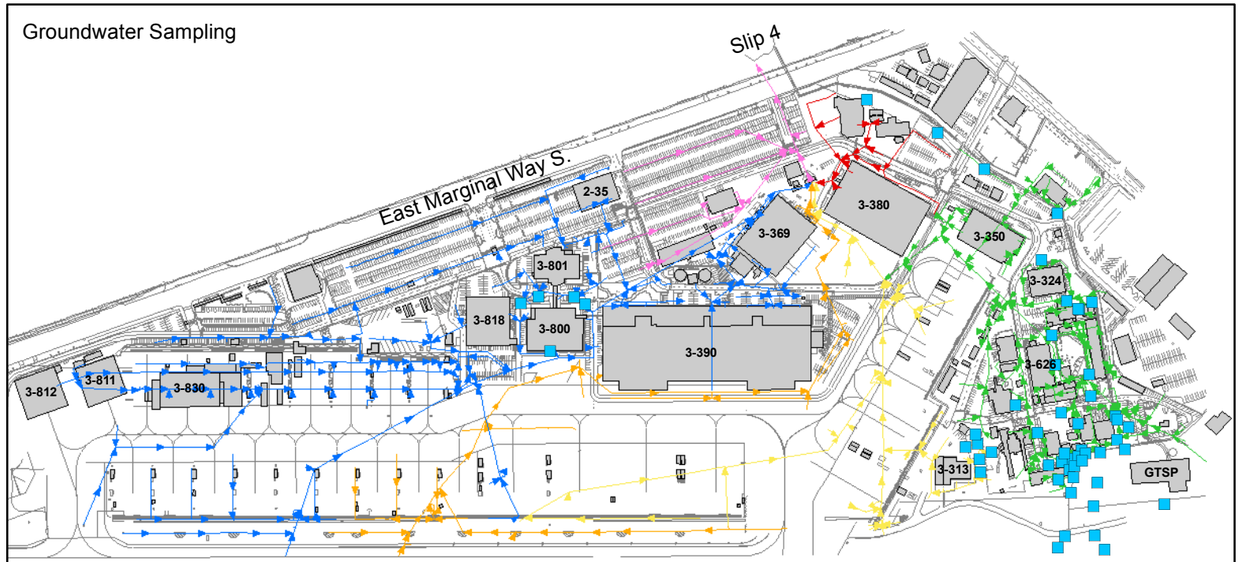
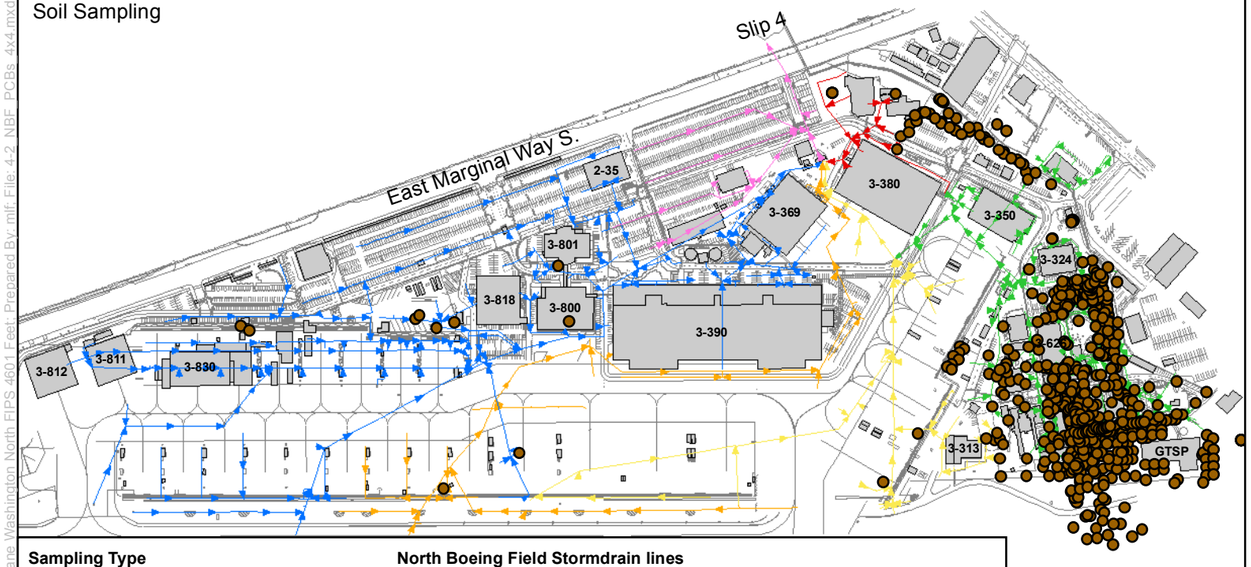
Storm Drain Solids Sampling



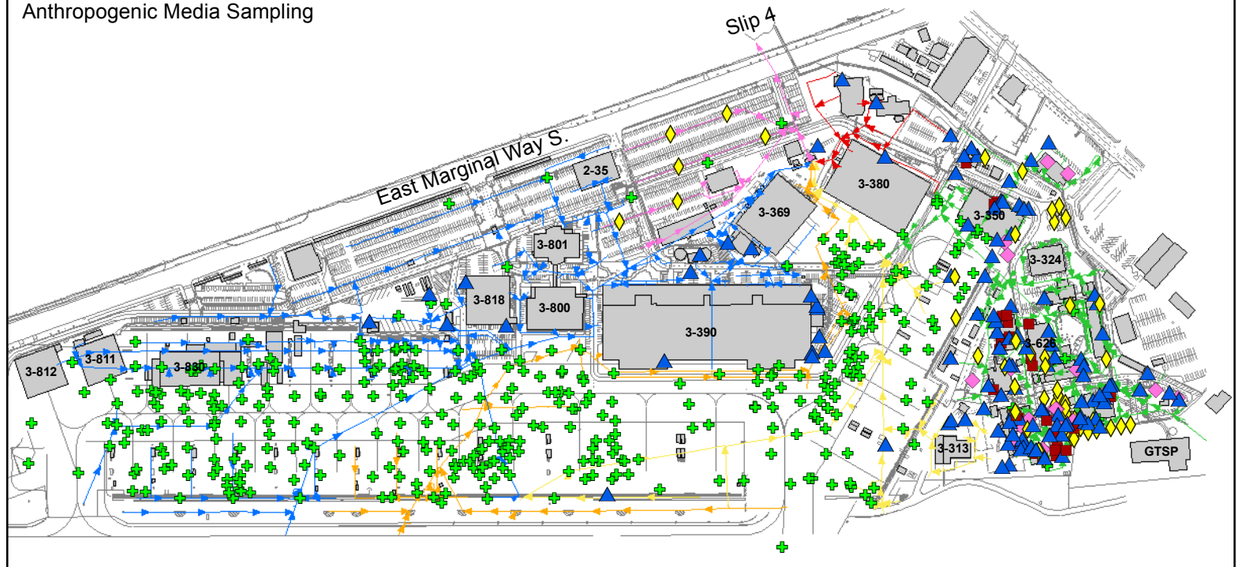
Groundwater Sampling



Soil Sampling



Anthropogenic Media Sampling



Sampling Type

- Storm Drain Solids
- Soil
- Groundwater
- Building Material
- CJM
- Paint
- Pavement
- Surface Debris

North Boeing Field Stormdrain lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Drainage from Building 3-380 Area
- Drainage from parking lot area
- Other lines

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0 250 500 1,000 Feet

Figure 4-2. Historical Sampling for PCB Analysis at NBF-GTSP

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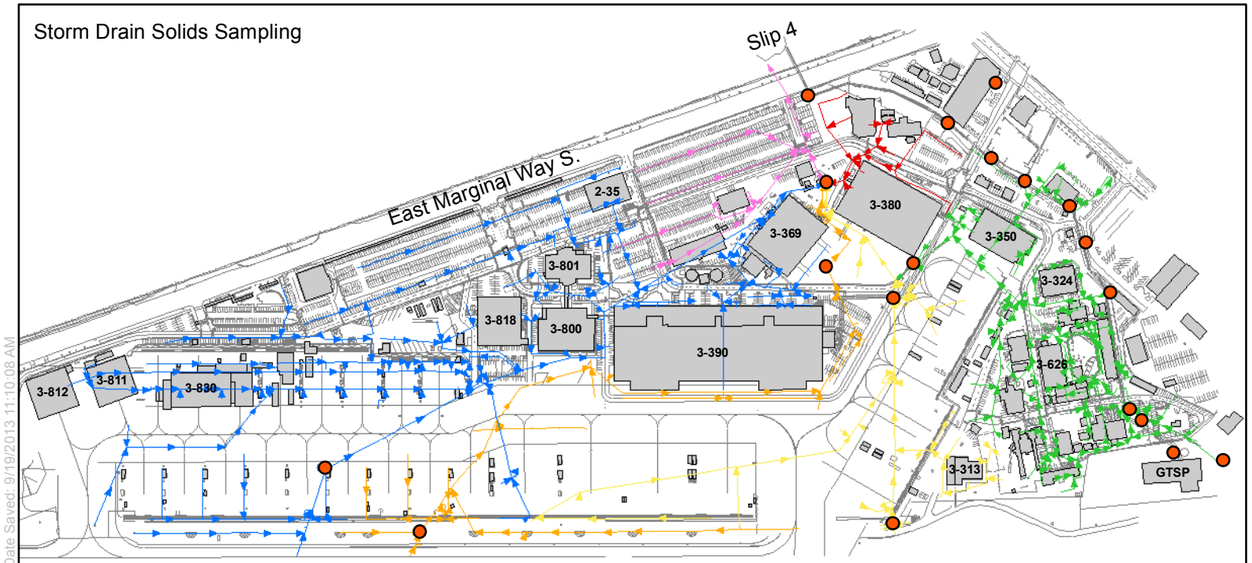
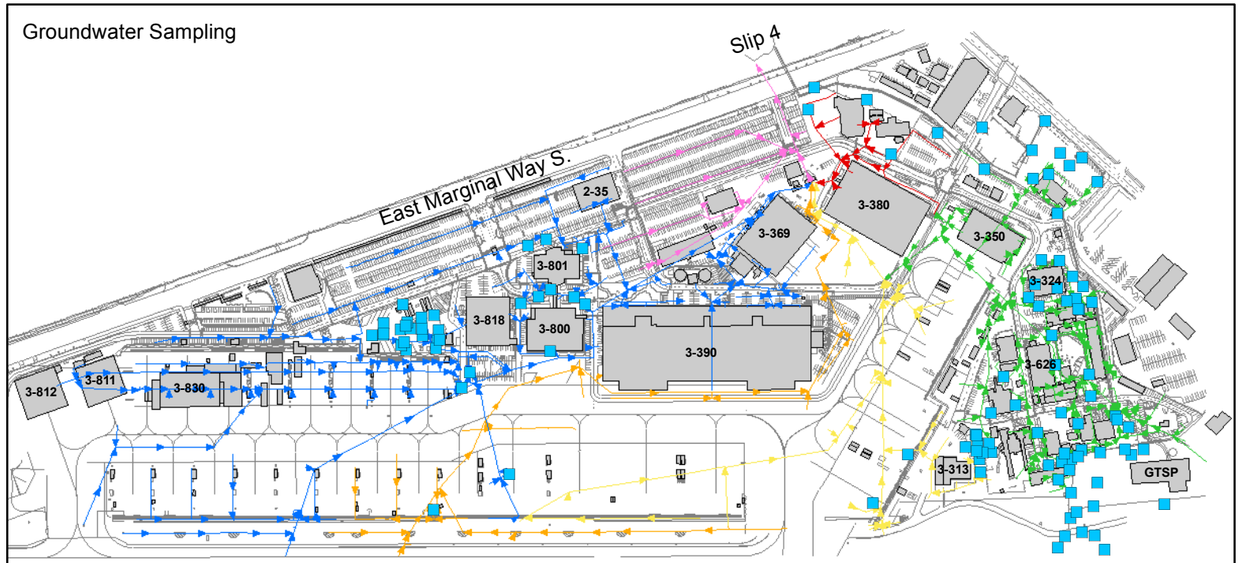
Figure 4-2

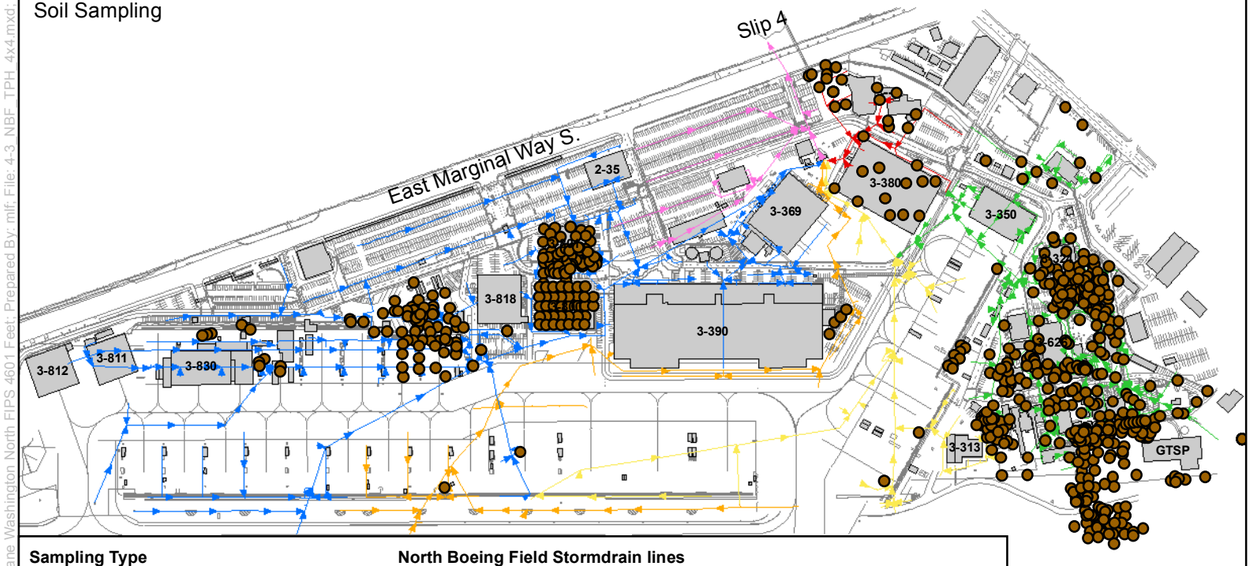
Storm Drain Solids Sampling



Groundwater Sampling



Soil Sampling



Sampling Type

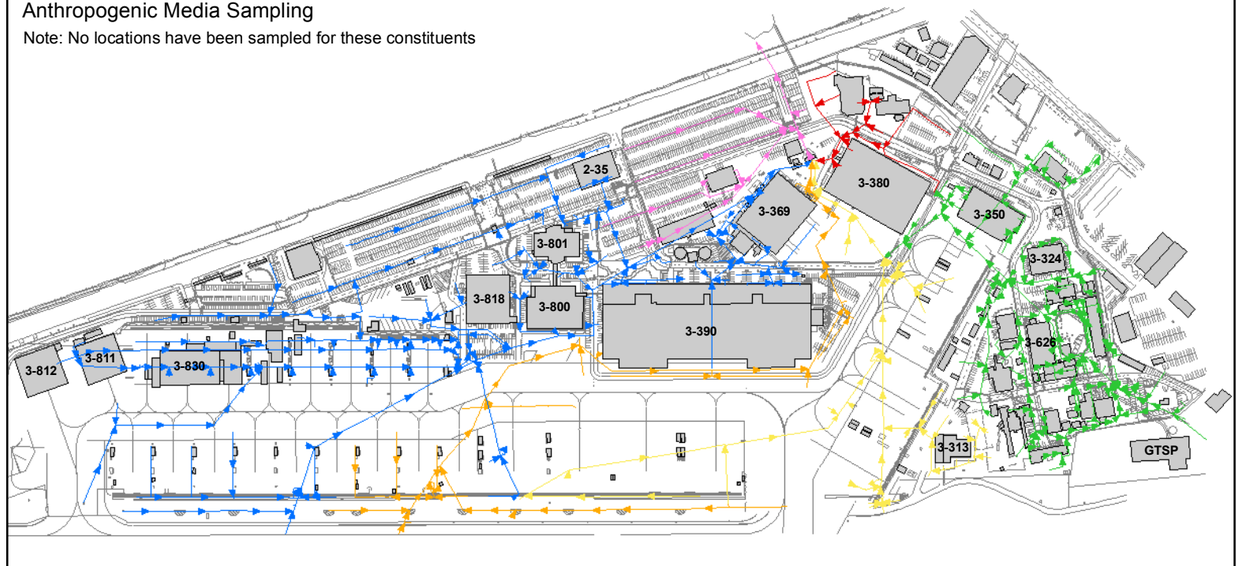
- Storm Drain Solids
- Soil
- Groundwater
- Building Material
- CJM
- Paint
- Pavement
- Surface Debris

North Boeing Field Stormdrain lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Drainage from Building 3-380 Area
- Drainage from parking lot area
- Other lines

Anthropogenic Media Sampling

Note: No locations have been sampled for these constituents



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0 250 500 1,000 Feet

Figure 4-3. Historical Sampling for TPH Analysis at NBF-GTSP

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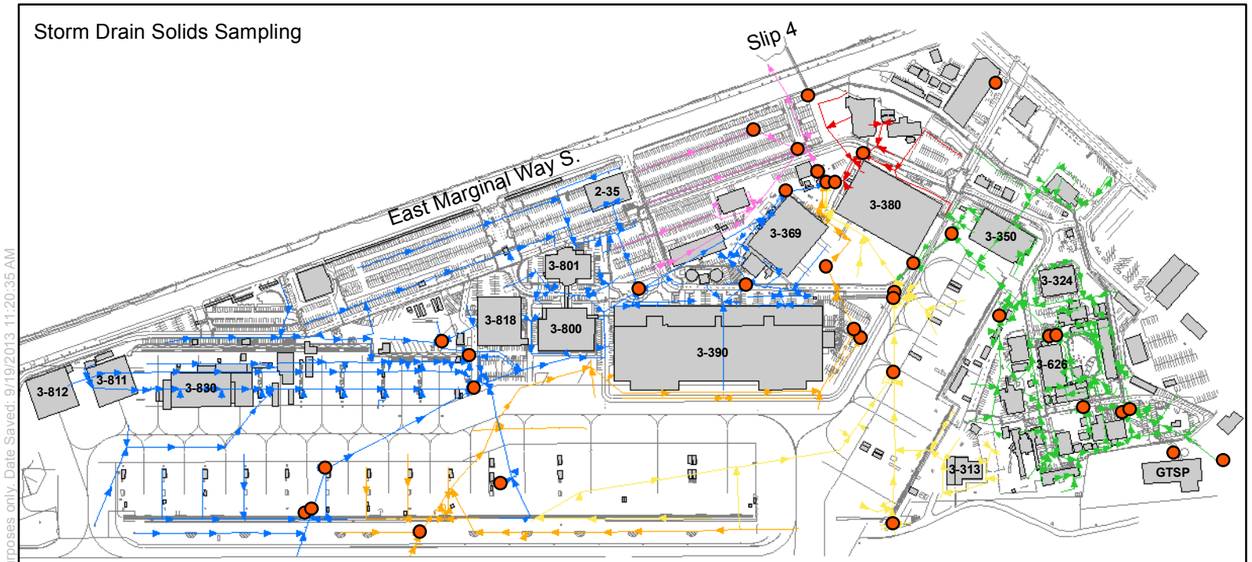
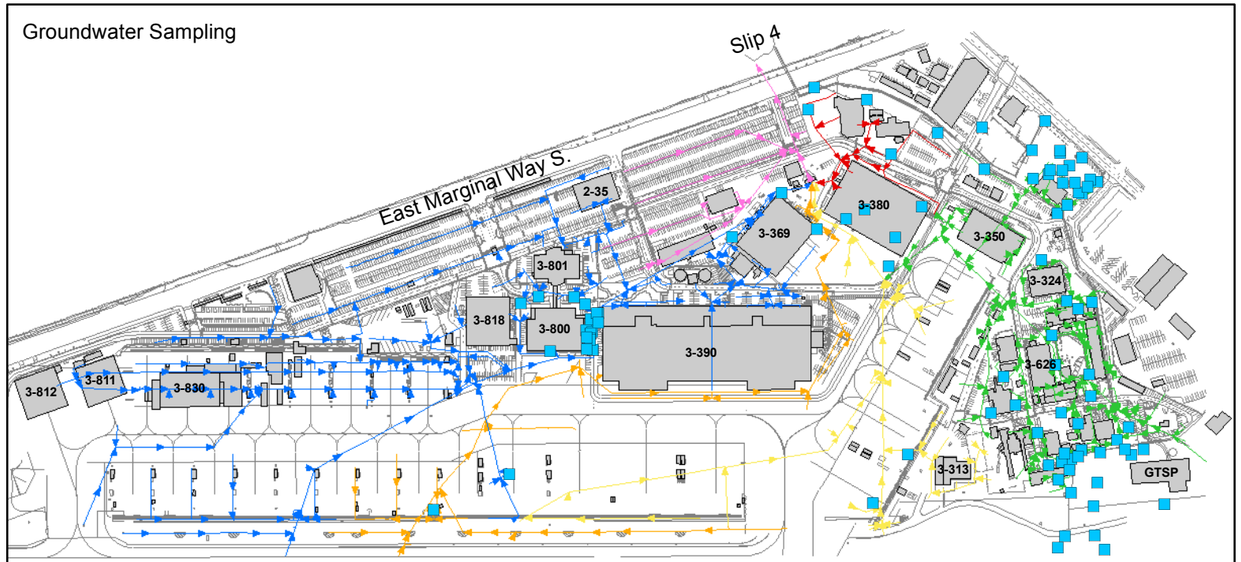
Figure 4-3

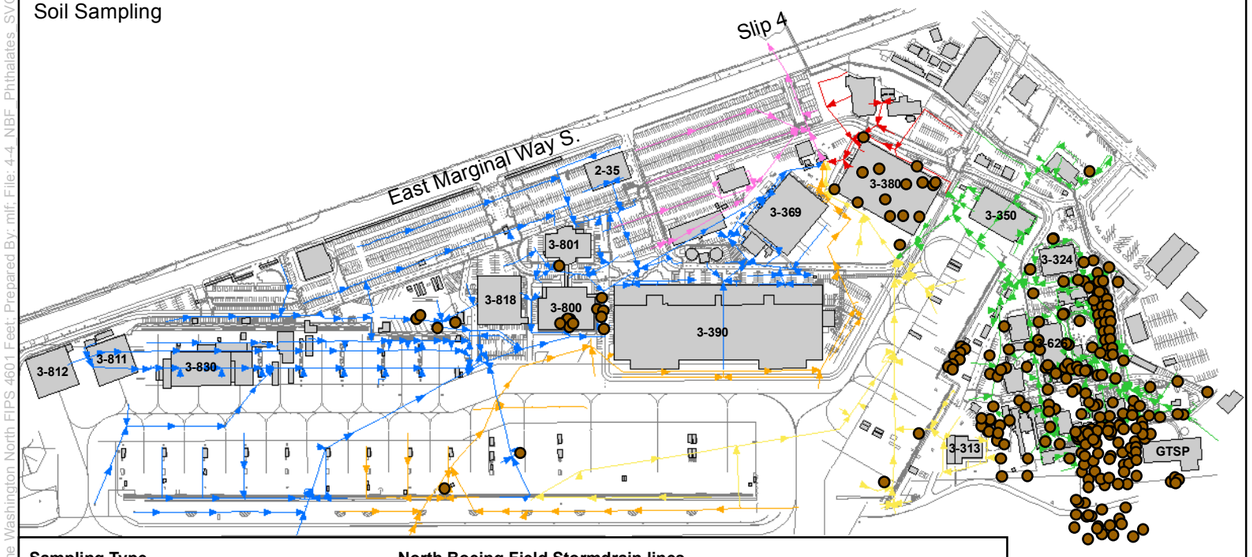
Storm Drain Solids Sampling



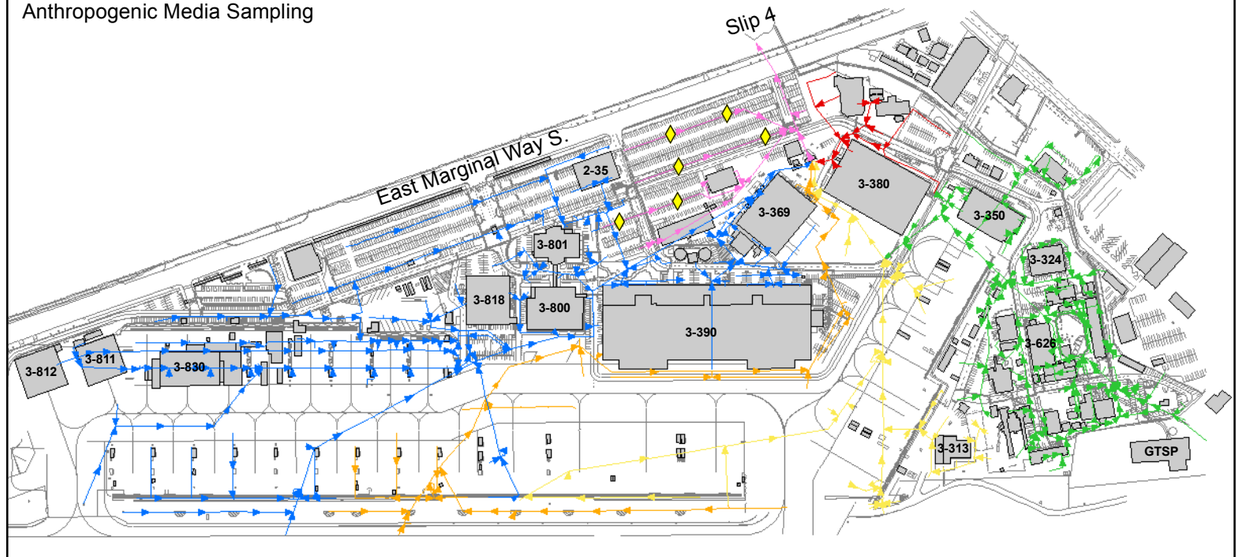
Groundwater Sampling



Soil Sampling



Anthropogenic Media Sampling



Sampling Type

- Storm Drain Solids
- Soil
- Groundwater
- Building Material
- CJM
- Paint
- Pavement
- Surface Debris

North Boeing Field Stormdrain lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Drainage from Building 3-380 Area
- Drainage from parking lot area
- Other lines

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0 250 500 1,000 Feet

Figure 4-4. Historical Sampling for SVOC Analysis at NBF-GTSP

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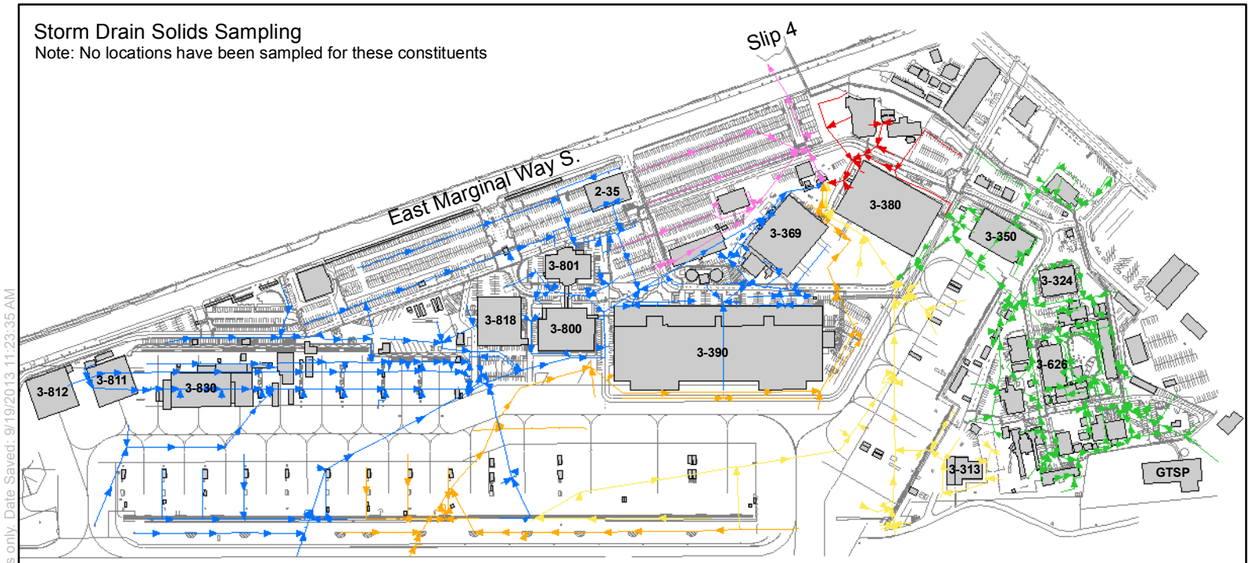
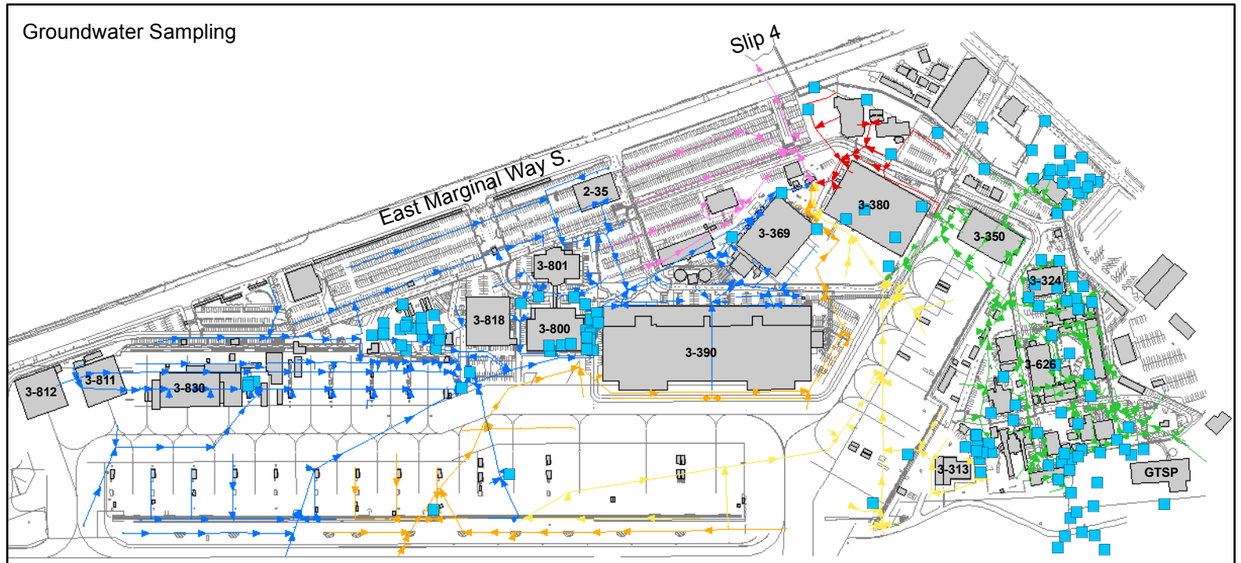
Figure 4-4

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet: Prepared By: mlf: File: 4-4_NBF_Phthalates_SVOC_4x4.mxd: Illustrative purposes only. Date Saved: 9/19/2013 11:20:35 AM

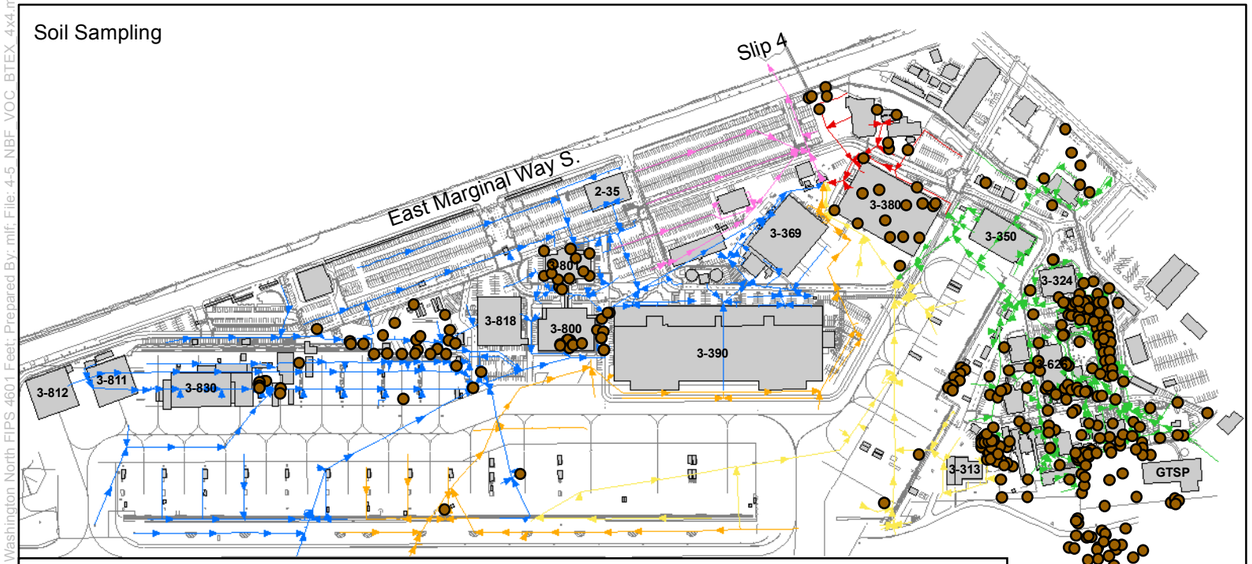
Storm Drain Solids Sampling
Note: No locations have been sampled for these constituents



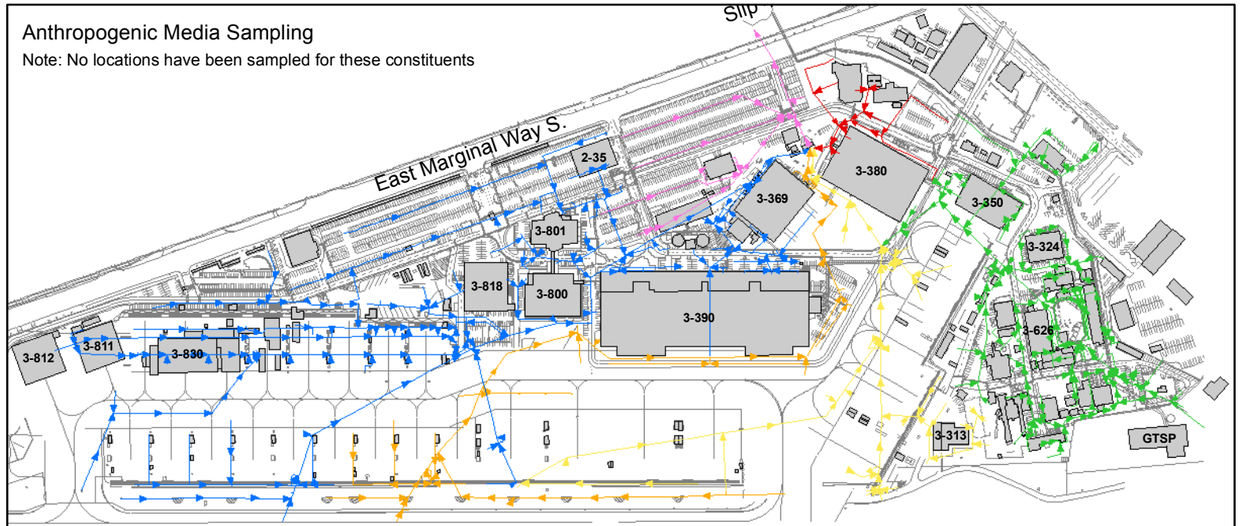
Groundwater Sampling



Soil Sampling



Anthropogenic Media Sampling
Note: No locations have been sampled for these constituents



Sampling Type
- Storm Drain Solids
- Soil
- Groundwater
- Building Material
- CJM
- Paint
- Pavement
- Surface Debris

North Boeing Field Stormdrain lines
- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Drainage from Building 3-380 Area
- Drainage from parking lot area
- Other lines

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0 250 500 1,000 Feet

Figure 4-5. Historical Sampling for VOC Analysis at NBF-GTSP

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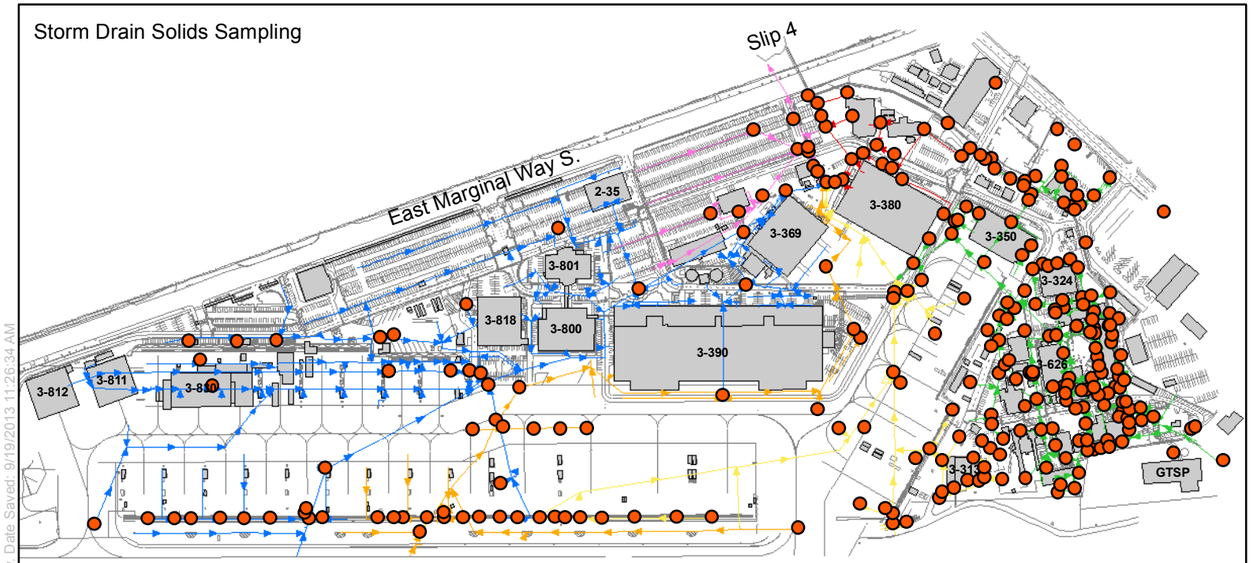
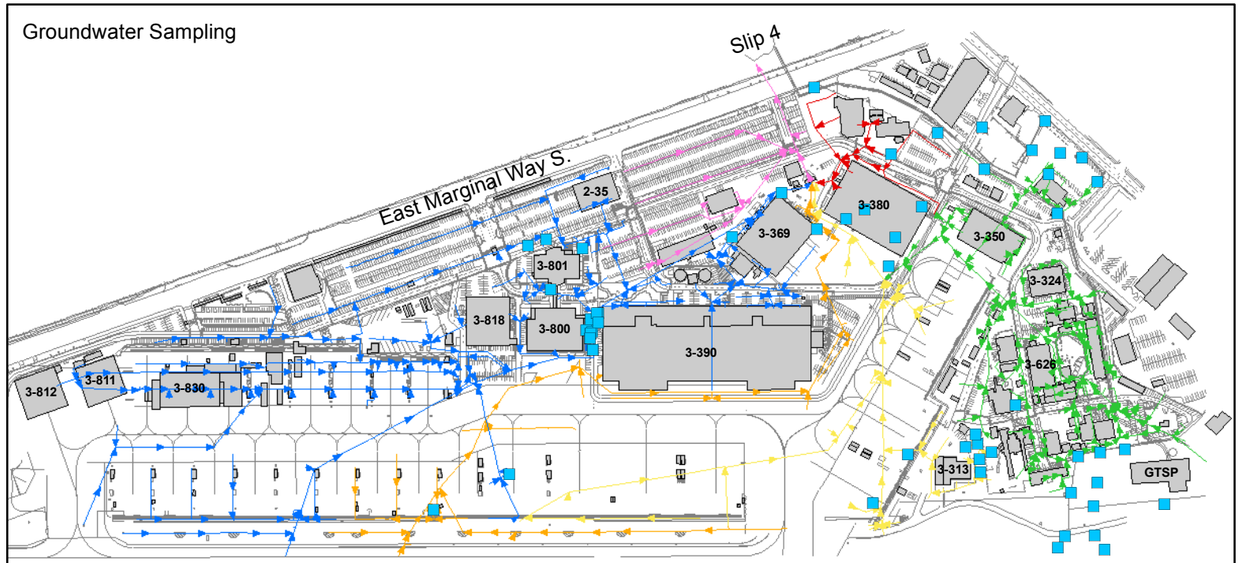
Figure 4-5

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet: Prepared By: mlf: File: 4-5_NBF_VOC_BTEX_4x4.mxd: Illustrative purposes only. Date Saved: 9/19/2013 11:23:35 AM

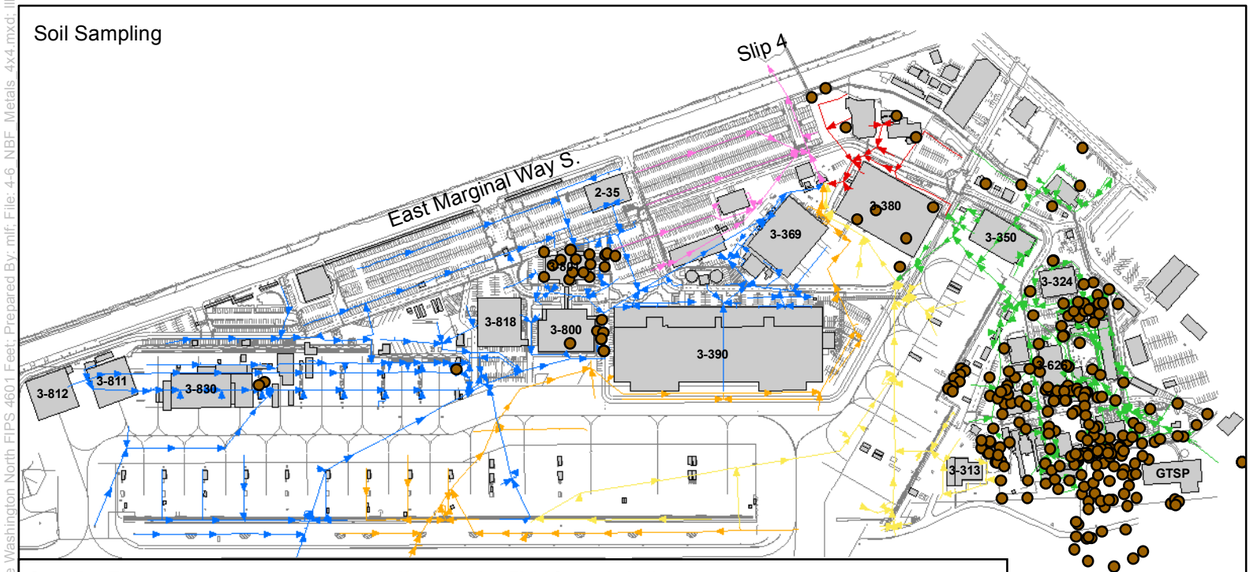
Storm Drain Solids Sampling



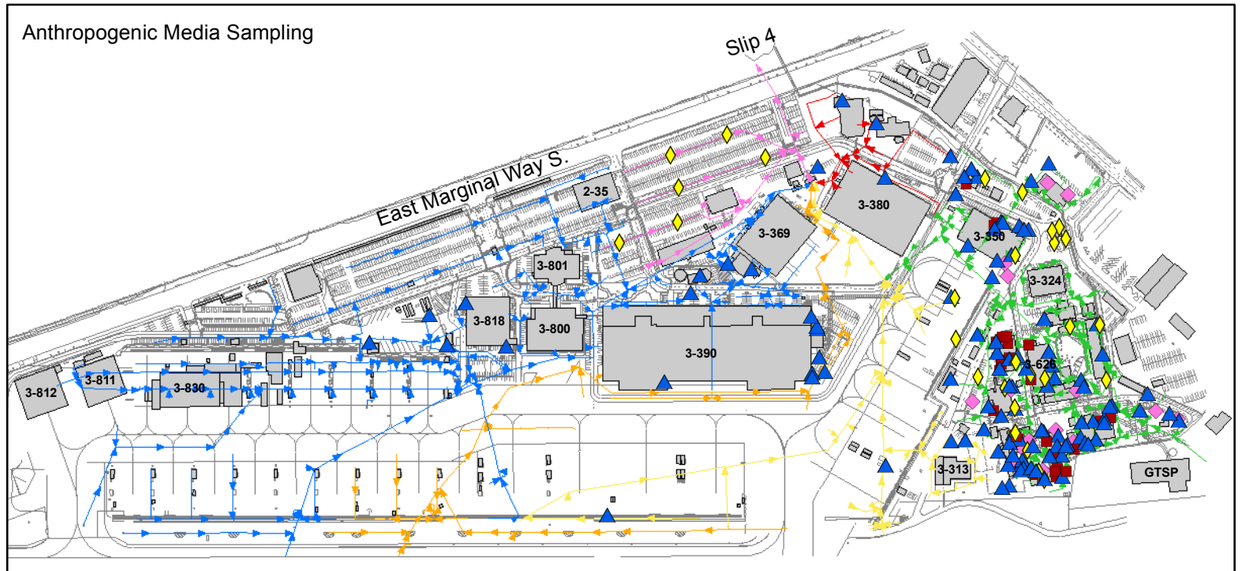
Groundwater Sampling



Soil Sampling



Anthropogenic Media Sampling



Sampling Type

- Storm Drain Solids
- Soil
- Groundwater
- Building Material
- CJM
- Paint
- Pavement
- Surface Debris

North Boeing Field Stormdrain lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Drainage from Building 3-380 Area
- Drainage from parking lot area
- Other lines

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0 250 500 1,000 Feet

Figure 4-6. Historical Sampling for Metals Analysis at NBF-GTSP

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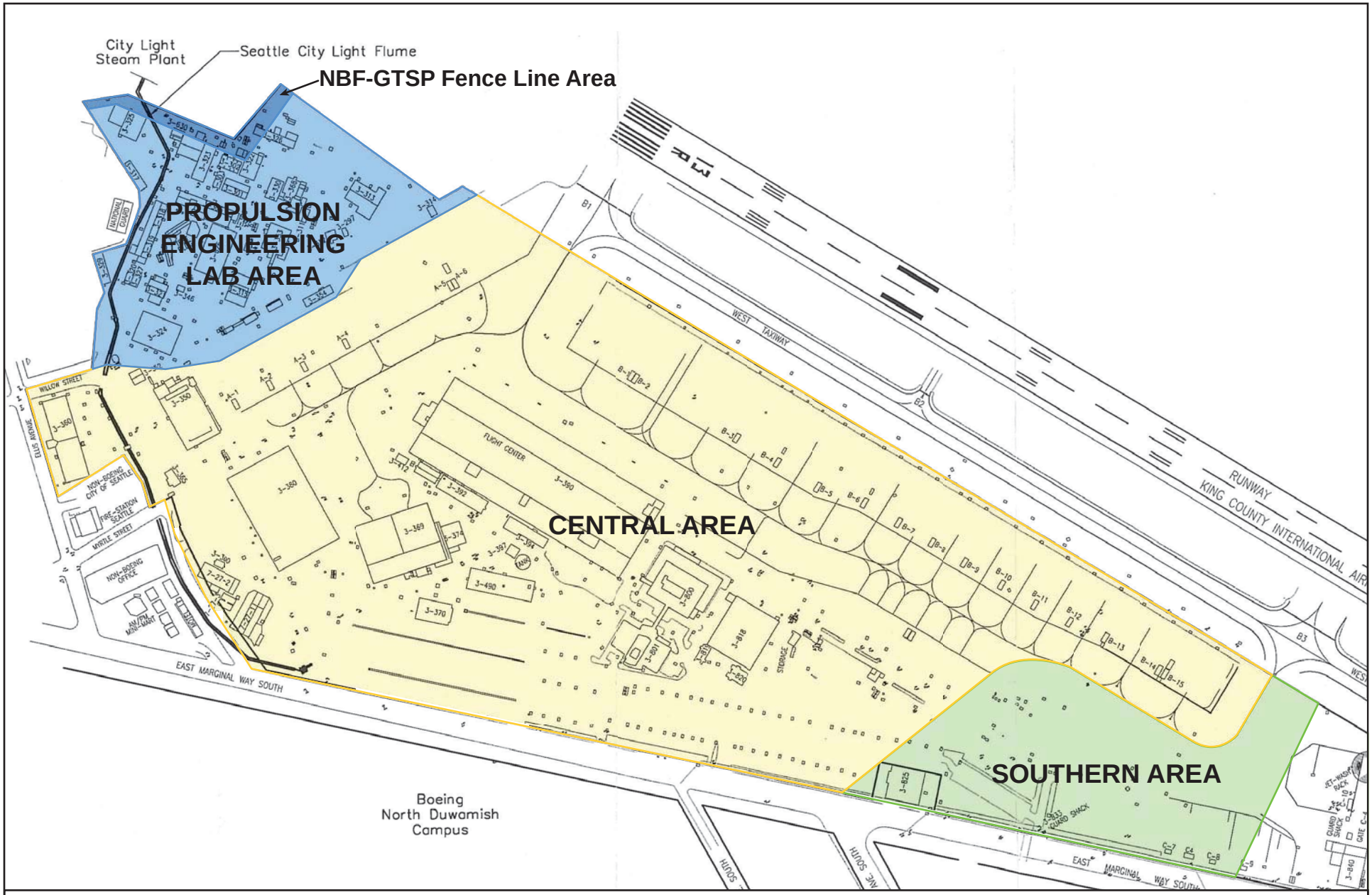
Figure 4-6

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet: Prepared By: mlf: File: 4-6 NBF Metals 4x4.mxd: Illustrative purposes only. Date Saved: 9/19/2013 11:26:34 AM



Source: SAIC 2009b

Figure 4–7. North Boeing Field Areas of Investigation

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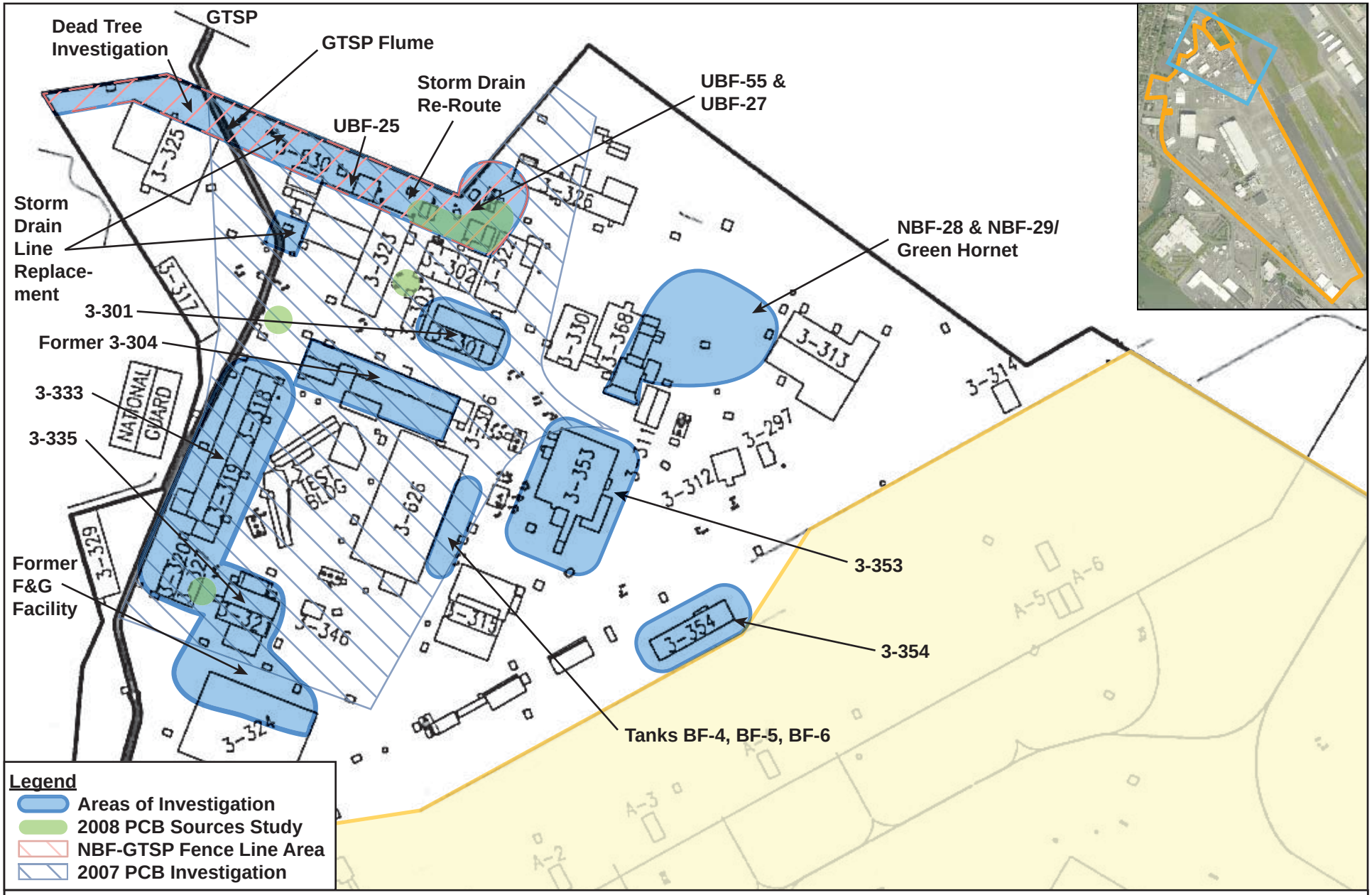
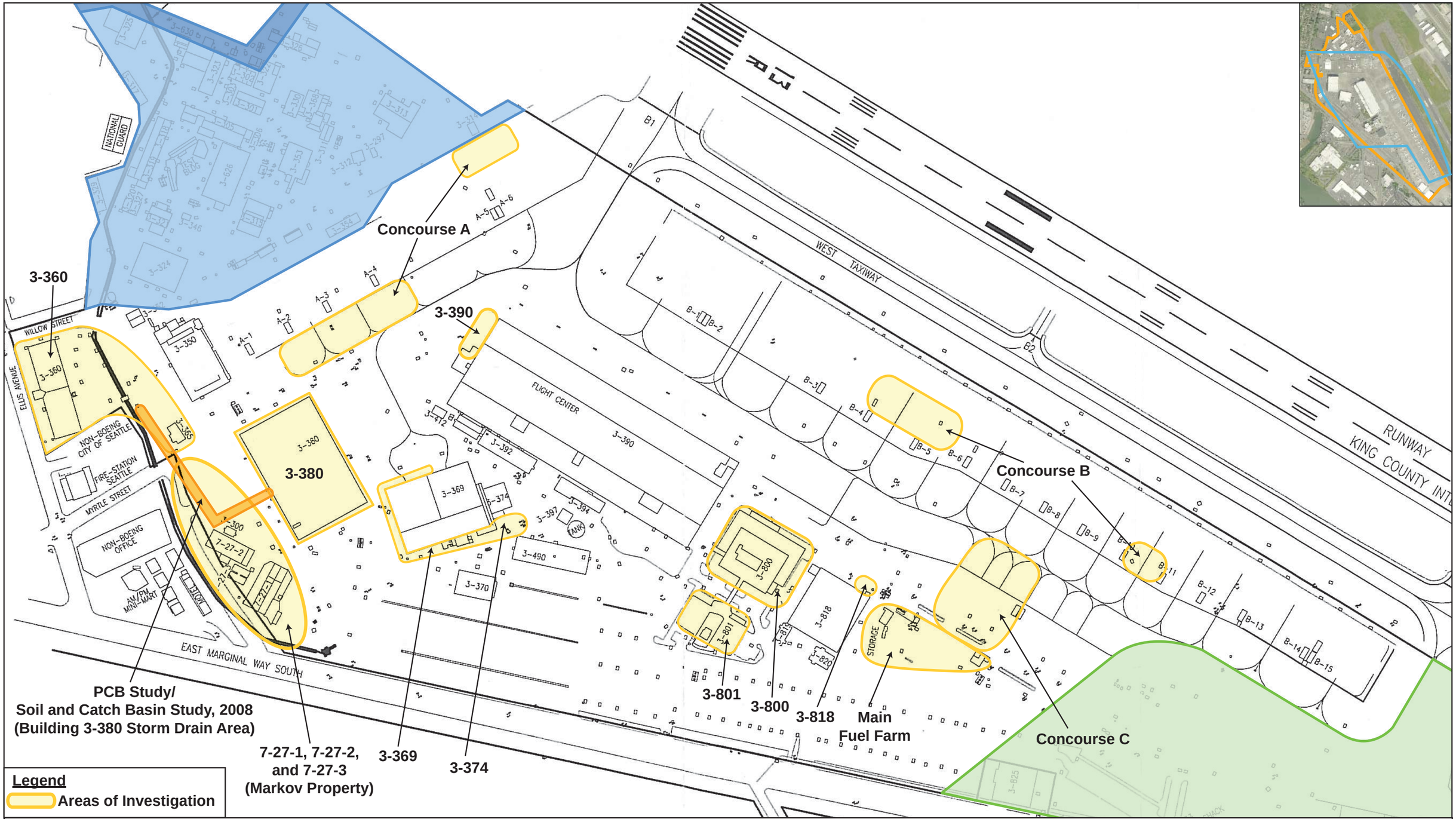


Source: SAIC 2009b

Figure 4–8. Historical Areas of Investigations: PEL Area



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Source: SAIC 2009b

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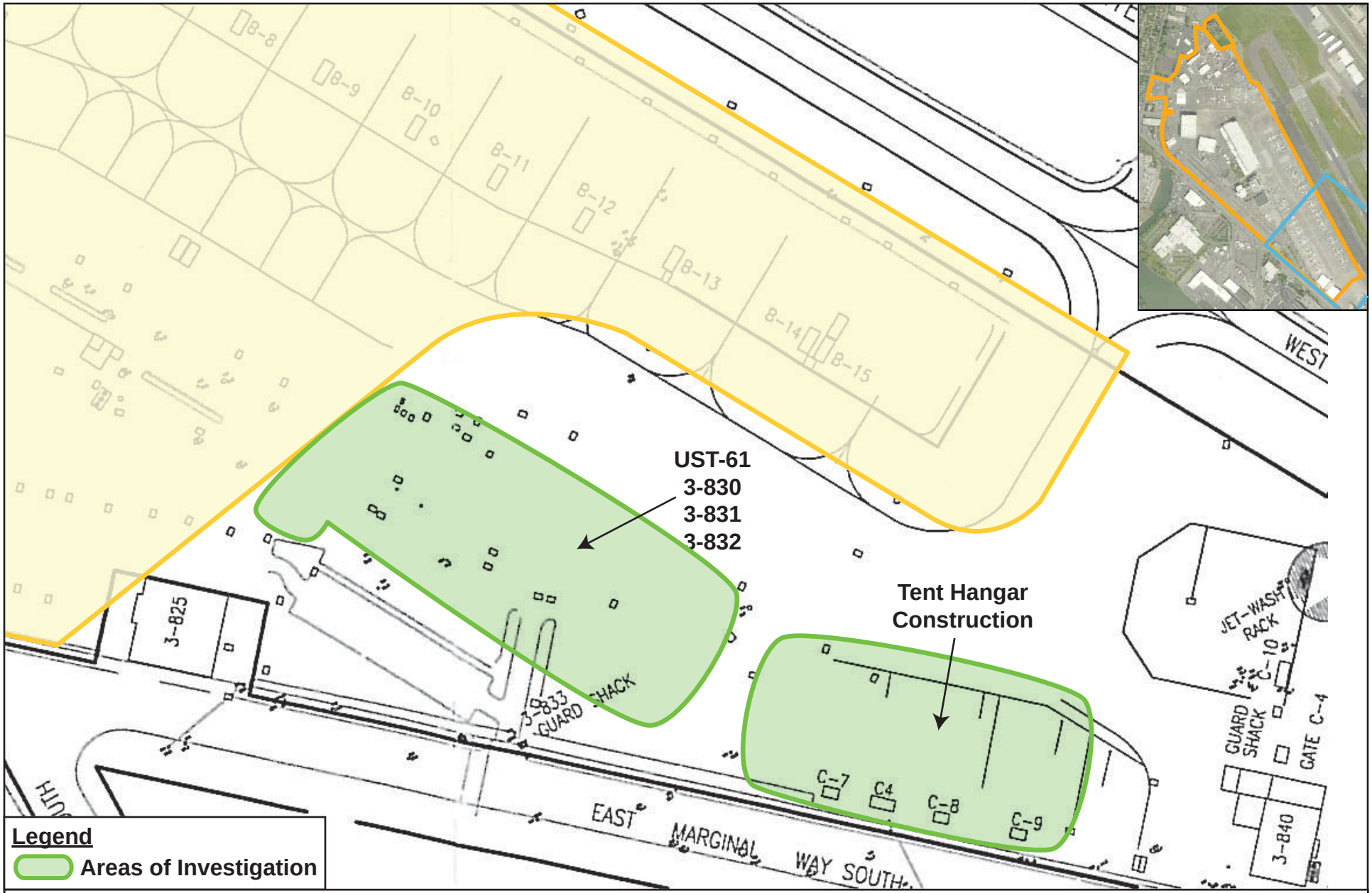
Figure 4–9. Areas of Investigation: Central Area of North Boeing Field



Source: SAIC 2009b

Figure 4–10. Areas of Investigation: Southern Area of North Boeing Field

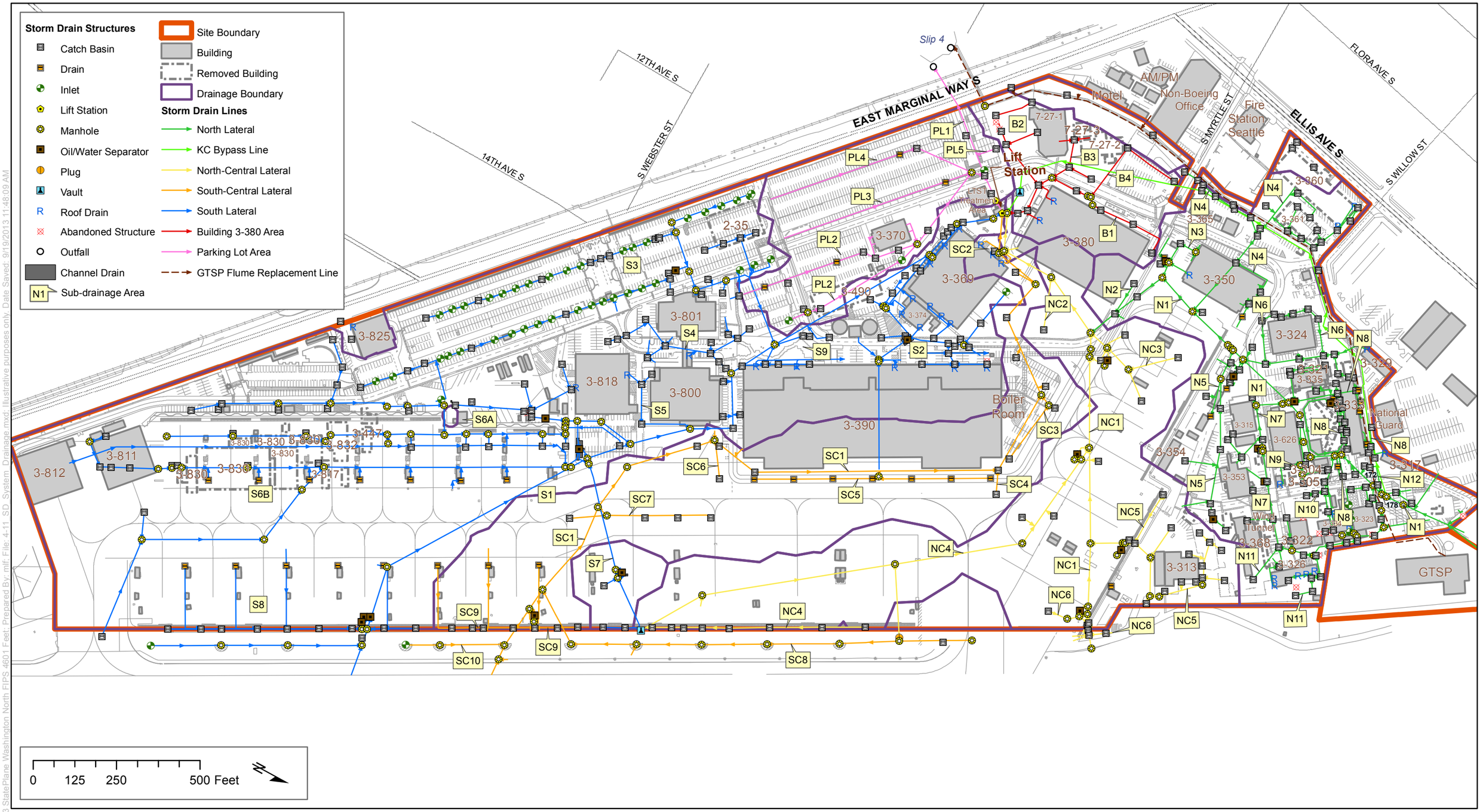


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Figure 4-11. NBF Storm Drain System Drainage Areas

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Historical PCB Areas
- Transformers or Capacitors

Historical PCB Features
- Gas sump
- Light
- Oil filled sump
- Sump
- Test Equipment
- Transformer
- Transformer Pole
- Transformers

Storm Drain Structures
- Catch Basin
- Drain
- Inlet
- Lift Station
- Manhole
- Oil/Water Separator
- Plug
- Vault
- UNK
- Abandoned

Storm Drain Lines
- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other

- Short-term Treatment System
- Site Boundary

NBF Structures
- Removed Buildings
- Existing Boeing Buildings
- Non-Boeing Buildings

0 100 200 400 Feet

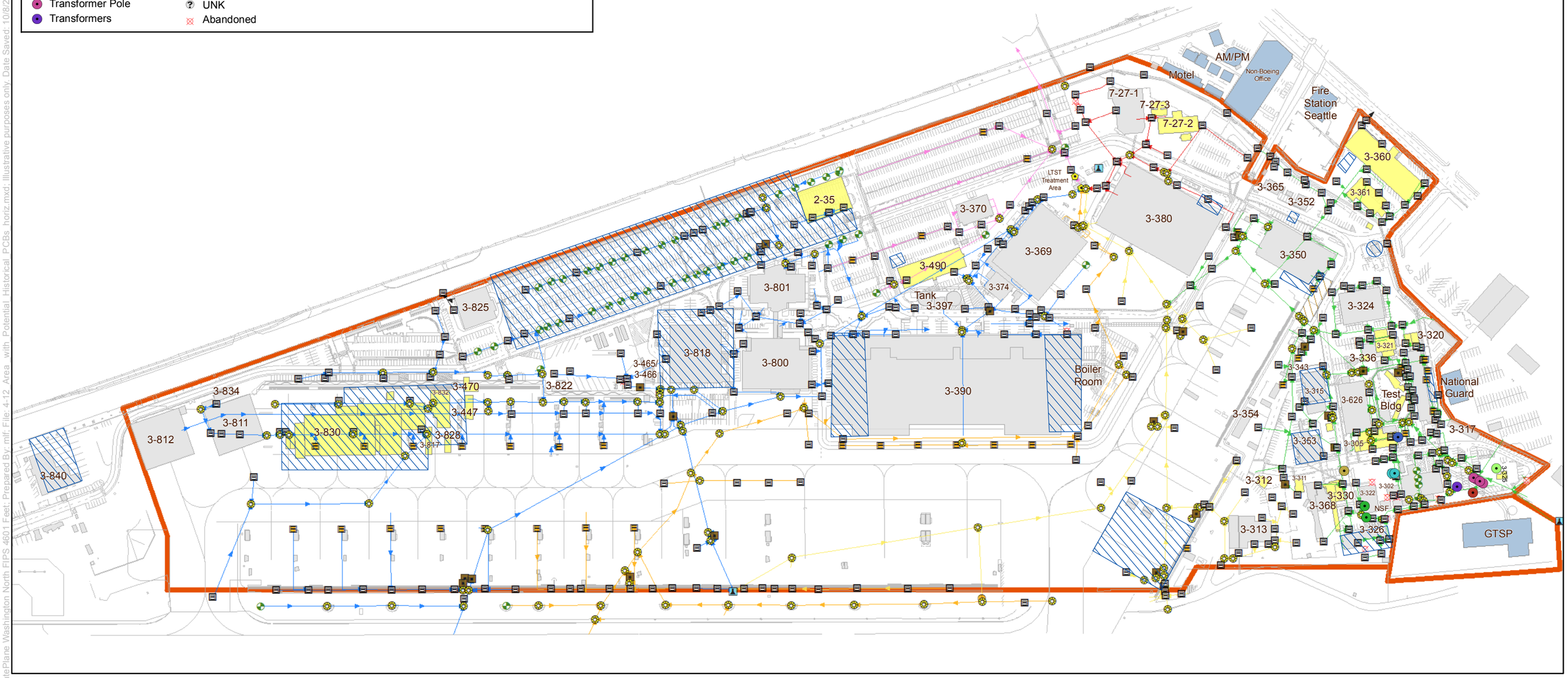

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Figure 4-12. NBF-GTSP Areas with Potential Historical PCB Sources

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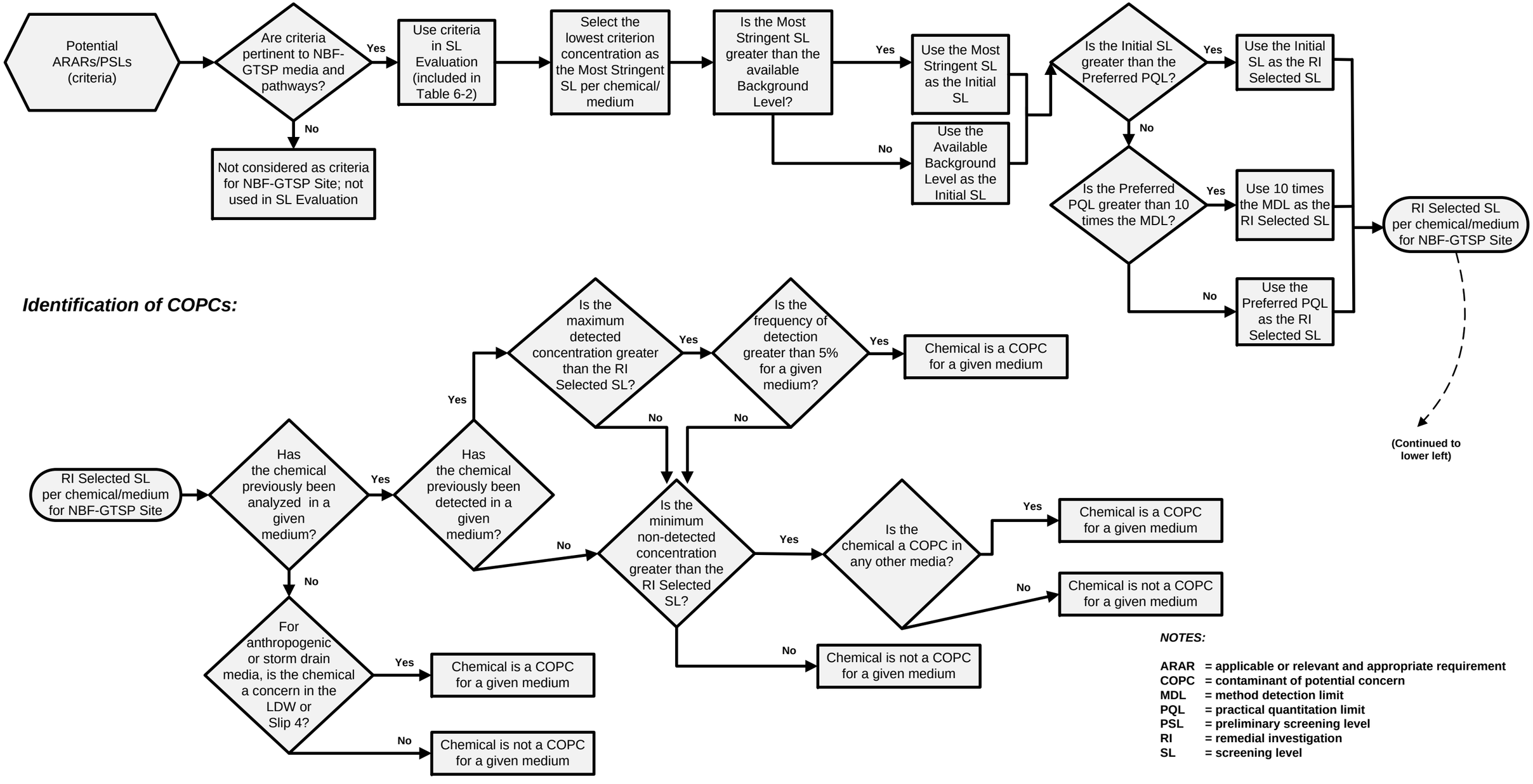
Figure 4-12

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet: Prepared By: mlf: File: 4-12 Area with Potential Historical PCBs horiz.mxd: Illustrative purposes only. Date Saved: 10/8/2013 9:27:59 PM

Screening Level Evaluation:



Identification of COPCs:

NOTES:

ARAR = applicable or relevant and appropriate requirement
COPC = contaminant of potential concern
MDL = method detection limit
PQL = practical quantitation limit
PSL = preliminary screening level
RI = remedial investigation
SL = screening level

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Figure 6-1. NBF-GTSP Site Screening Level Evaluation and Development of COPCs

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General Legend for Section 7.1 Figures

Soil and Groundwater Locations

○ Soil Sample Location

• Removed Soil Sample Location

□ Groundwater Sample Location

☒ Groundwater Well Location (new) with no data in project database

⧈ Groundwater Well Location (former or current) with only older, unused data

Soil and Groundwater Exceedances

Symbols (circle or square):

Exceedance Factor Color Ranges for Soil and Groundwater	
EF Colors	**EF Ranges**
	ND, EF >1 (all ND, but at least one value has EF >1)
	EF ≤1 (ND or detect, but all results have EF ≤1)
	Max detected EF >1 to 5
	Max detected EF >5 to 25
	Max detected EF >25 to 125
	Max detected EF >125

Text within boxes:

Bold Black: Max EF >5 (used for TPH only)
Bold Orange: Max EF >25 (all COPCs)
Bold Red: Max EF >125 (all COPCs)

Sample Location Result Labels

Soil [tan boxes]:

Location Name (Sample Year)
COPC (abbrev.) Concentration / EF (Depth)

- For each location (boring, pit, etc.), the maximum EF (when >1) is listed for each COPC
- Soil concentrations listed in mg/kg (except for Dioxins/Furans in ng/kg, on Figure 7.1-9)
- Depth of top of sample, in feet below ground surface

Groundwater [blue boxes]:

Location Name (Sample Year or Sample Year Range)
COPC (abbrev.) Concentration / EF

- For each well location, during the last 36-month period of sampling, the maximum EF (when >1) is listed for each COPC
- Sample year is expressed as a range of years when sampled during more than one year
- Groundwater concentrations listed in ug/L

Boundaries

Site Boundary and Sub-Area Boundary (five subdivisions of NBF-GTSP Site)
Area of Concern (AOC) Boundary

Other Features

Building
Former Building
Storm Drain Bypass Line
Flume Replacement Line

Storm Drain Structures

- Catch Basin
- Drain
- Inlet
- Lift Station
- Manhole
- Oil/Water Separator
- Plug
- Vault
- Abandoned Structure
- R Roof Drains

COPC Abbreviations

Ag – Silver
Al – Aluminum
As – Arsenic
Ba – Barium
Be – Beryllium
Cd – Cadmium
Cr – Chromium
Cu – Copper
Fe – Iron
Hg – Mercury
Mn – Manganese
Ni – Nickel
Pb – Lead
Sb – Antimony
Se – Selenium
Tl – Thallium
V – Vanadium
Zn – Zinc
PCB – Total PCBs
D/F – Total Dioxins/Furans (TEQ, NDx0.5)

TPHG – Gasoline Range Hydrocarbons (*HCID in italics*)
TPHD – Diesel Range Hydrocarbons (*HCID in italics*)
TPHO – Oil Range Hydrocarbons (*HCID in italics*)
TPH – Total Petroleum Hydrocarbons (for combined TPH ranges; *HCID in italics*)
JET – Jet Fuel
2MN – 2-Methylnaphthalene
BPer – Benzo(g,h,i)perylene
Fnth – Fluoranthene
cPAH – Total cPAHs (TEQ, NDx0.5)
BaP – Benzo(a)pyrene
BEHP – Bis(2-ethylhexyl) phthalate
Bnzn – Benzene
1DCE – 1,1-Dichloroethene
cDCE – cis-1,2-Dichloroethene
DCE – 1,2-Dichloroethene (mixed isomers)
PCE – Tetrachloroethene
TCE – Trichloroethene
VC – Vinyl chloride

Other Definitions

COPC – Contaminant of potential concern
EF – Exceedance factor
ND – Non-detect
SD – Storm drain

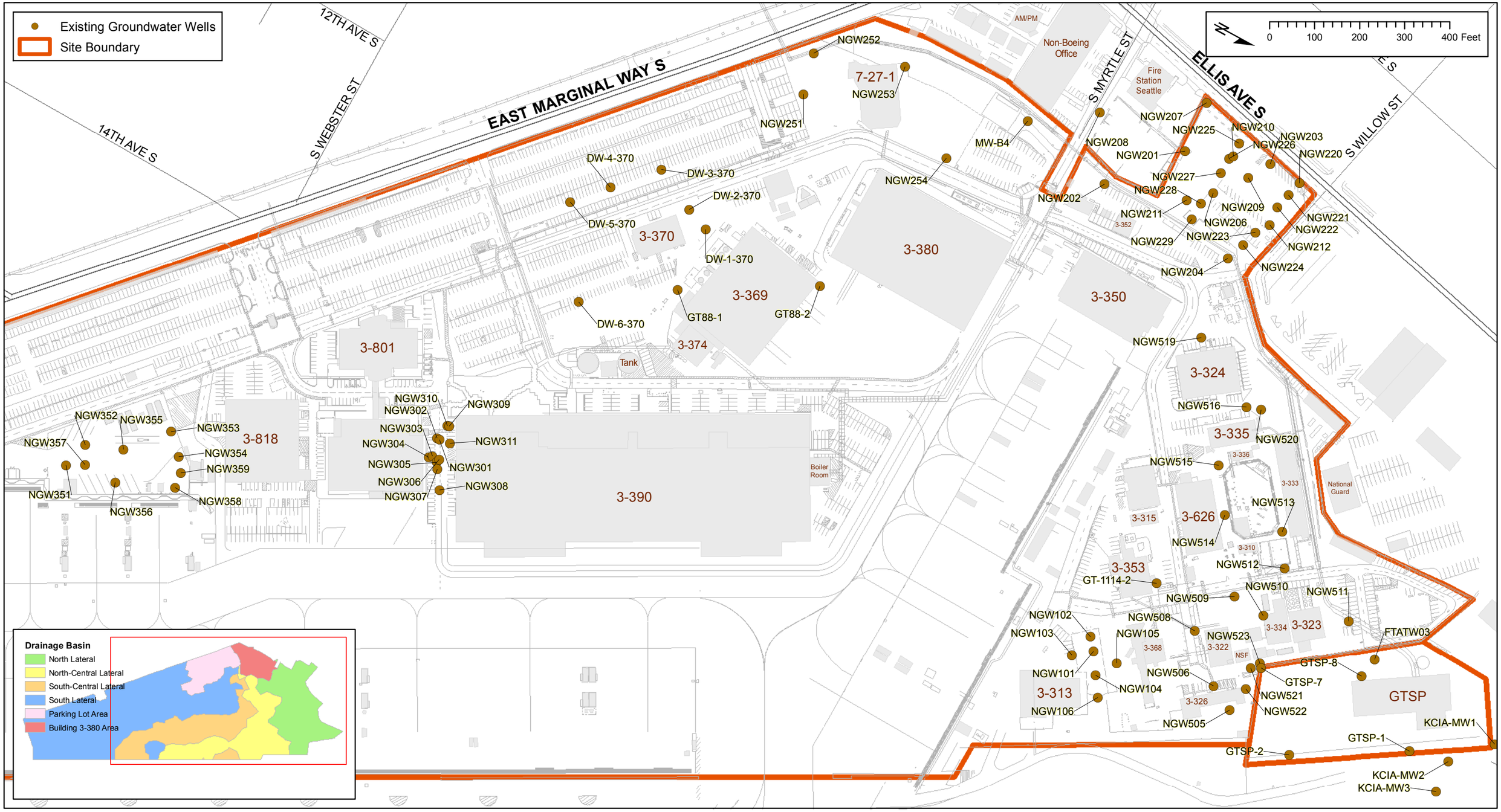

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Figure 7.1-1. Existing Groundwater Monitoring Well Locations at NBF-GTSP Site

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Coordinate System:
NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet
Prepared By: apw/mlf
File: Figure_7_1-01_GW_Monitoring_Wells.mxd
Illustrative purposes only.
Date Saved: 11/5/2013 1:53:47 PM

Storm Drain Structure

SD Line Video Observations:

- Significant Pipe Problem
- Significant Joint Problem
- Tap Connection
- Pipe Variation

SD Line Video Status:

- Problem Reported
- No Problem Reported
- Not Video Surveyed

SD Line Repair:

- Line Replaced, Rerouted,or Lined, 2007
- Line Replaced or Lined, 2008
- Line Replaced, 2010
- Area where SD line lies below the water table at high water levels
- Site Boundary

Areas Groundwater or Soil Infiltration

- Visible Infiltration
- Suspected Infiltration

Drainage Basin

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Parking Lot Area
- Building 3-380 Area

0 25 50 100 150 200
Feet

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Figure 7.1-2. Results of 2010 Storm Drain Video Inspection - North

SAIC® From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-02_North_Video_Lines.mxd
Illustrative purposes only.
Date Saved: 11/6/2013 3:27:54 PM

Storm Drain Structure

SD Line Video Observations:

- Significant Pipe Problem
- Significant Joint Problem
- Tap Connection
- Pipe Variation

SD Line Video Status:

- Problem Reported
- No Problem Reported
- Not Video Surveyed

Storm Drain Line

- Line Replaced or Lined, 2008
- Area where SD line lies below the water table at high water levels
- Site Boundary

Areas of Groundwater or Soil Infiltration

- Visible Infiltration
- Suspected Infiltration

Drainage Basin

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Parking Lot Area
- Building 3-380 Area

0 50 100 200 300 400
Feet

KCIA SD#3 Outfall
Motel
Lift Station
KC Wet Well
LTST Treatment Area
Boiler Room
Fire Foam House
3-380
3-390
3-369
3-374
3-370
3-397 Tank
3-490
3-801
3-800
3-818
3-825
3-834
3-812
3-811
3-830
3-832
3-817
3-828
3-470
3-447
3-465/ 3-466
3-822
2-35
7-27-1
7-27-2
7-27-3
B1
B2
B3
B4
PL1
PL2
PL3
PL4
SC1
SC2
SC3
SC4
SC5
SC6
SC7
S1
S2
S3
S4
S5
S6A
S6B
S7
S8
S9
NC1
NC2
NC3
NC4
NC5
NC6
N2
Plug
VAULT258

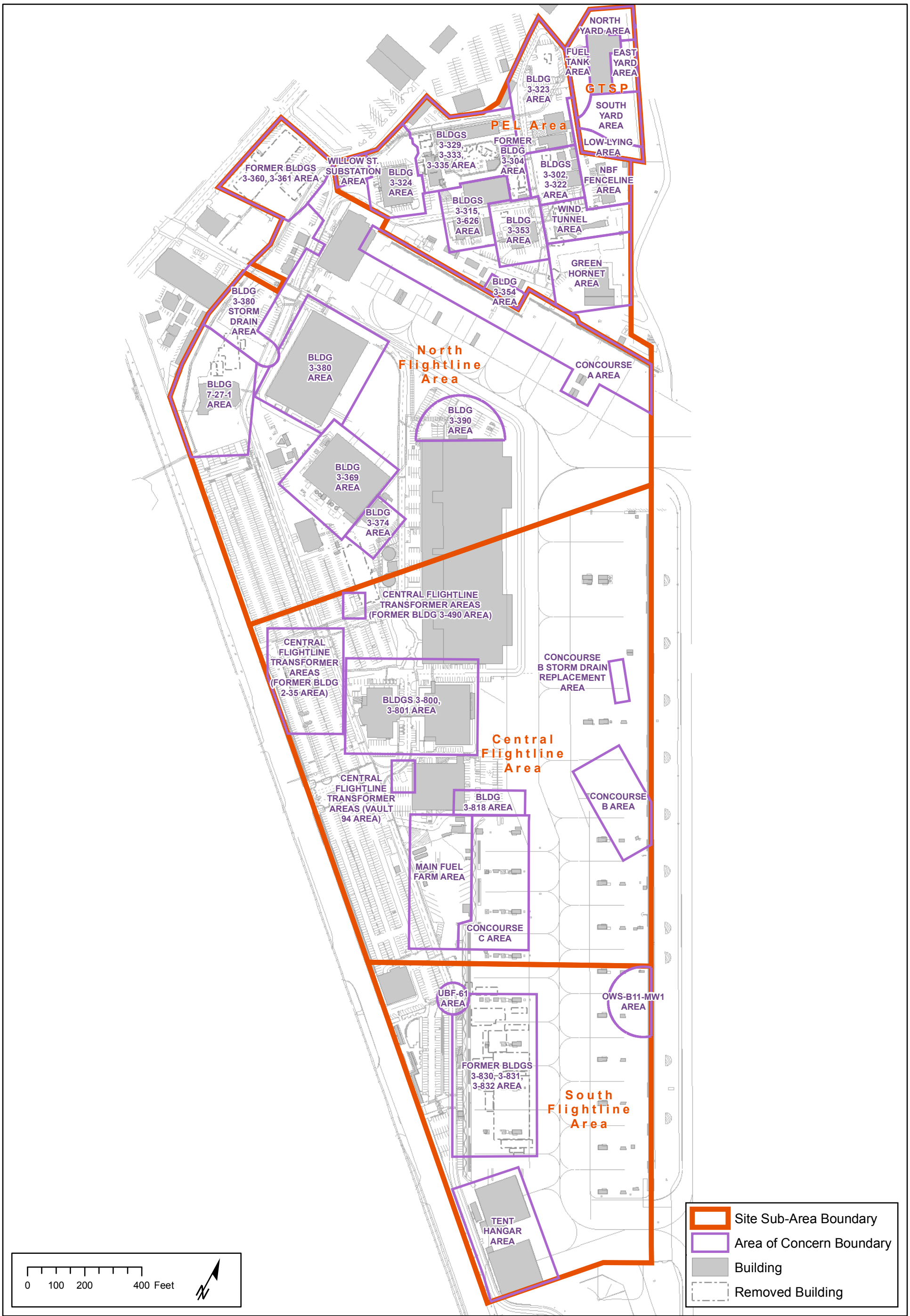

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Figure 7.1-4. Site Sub-Areas and Areas of Concern at NBF-GTSP Site

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-04_Areas_of_Concern.mxd
Illustrative purposes only.
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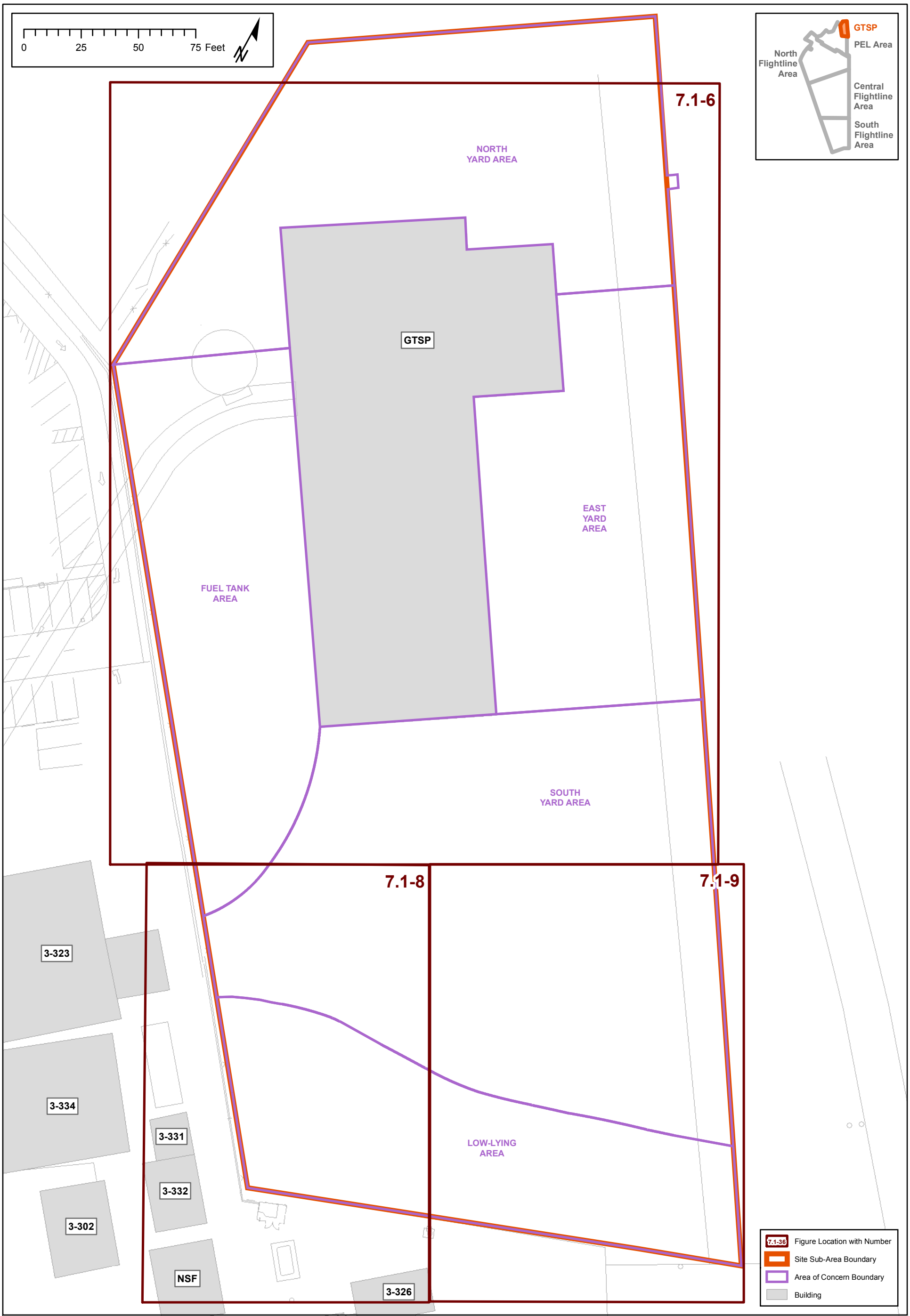

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Figure 7.1-5. Areas of Concern at GTSP

SAIC® From Science to Solutions

Coordinate System:
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Prepared By: mlf
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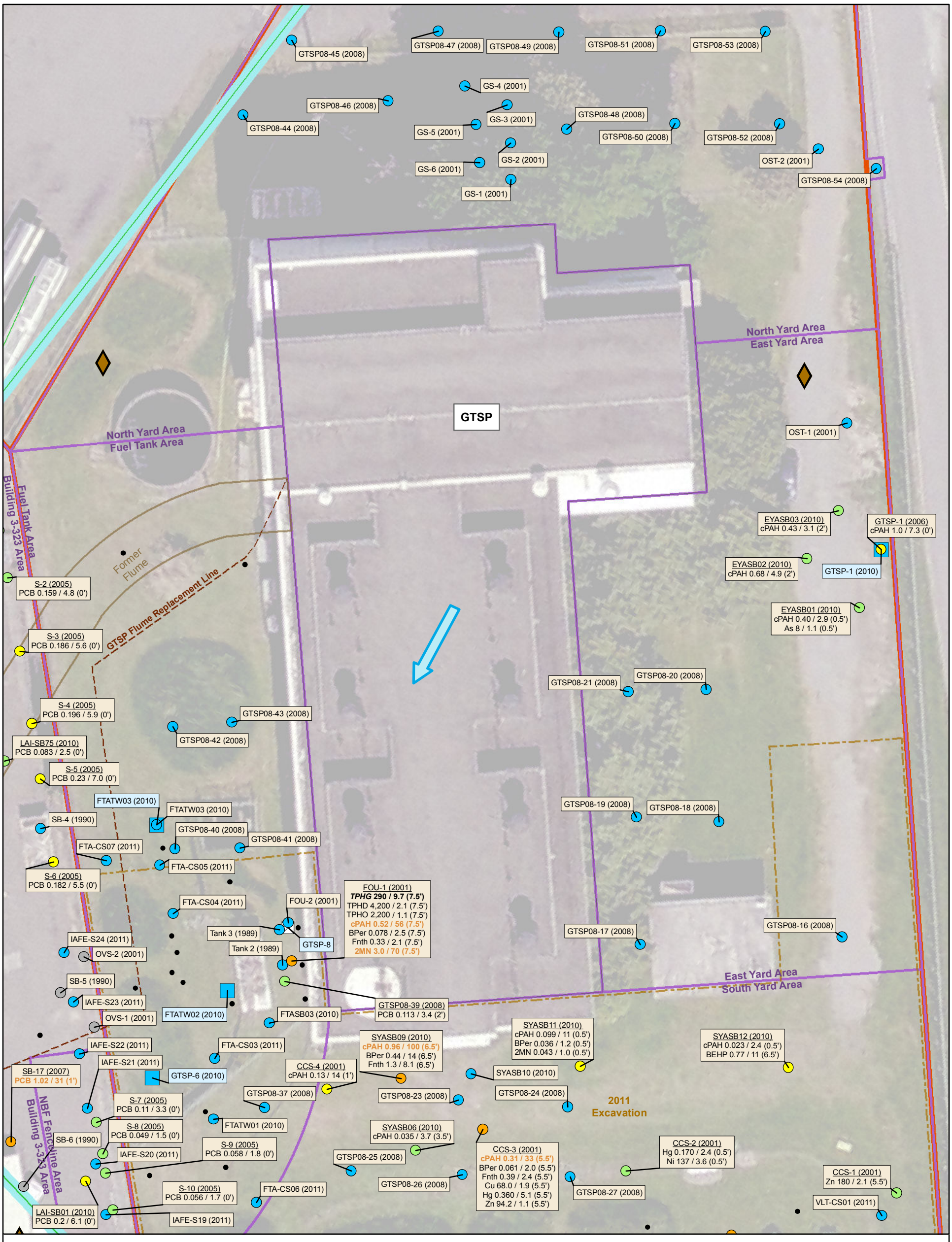

Figure 7.1-6. Soil and Groundwater Sample Locations at North Yard, East Yard, and Fuel Tank Areas

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-06_NorthGTSP.mxd
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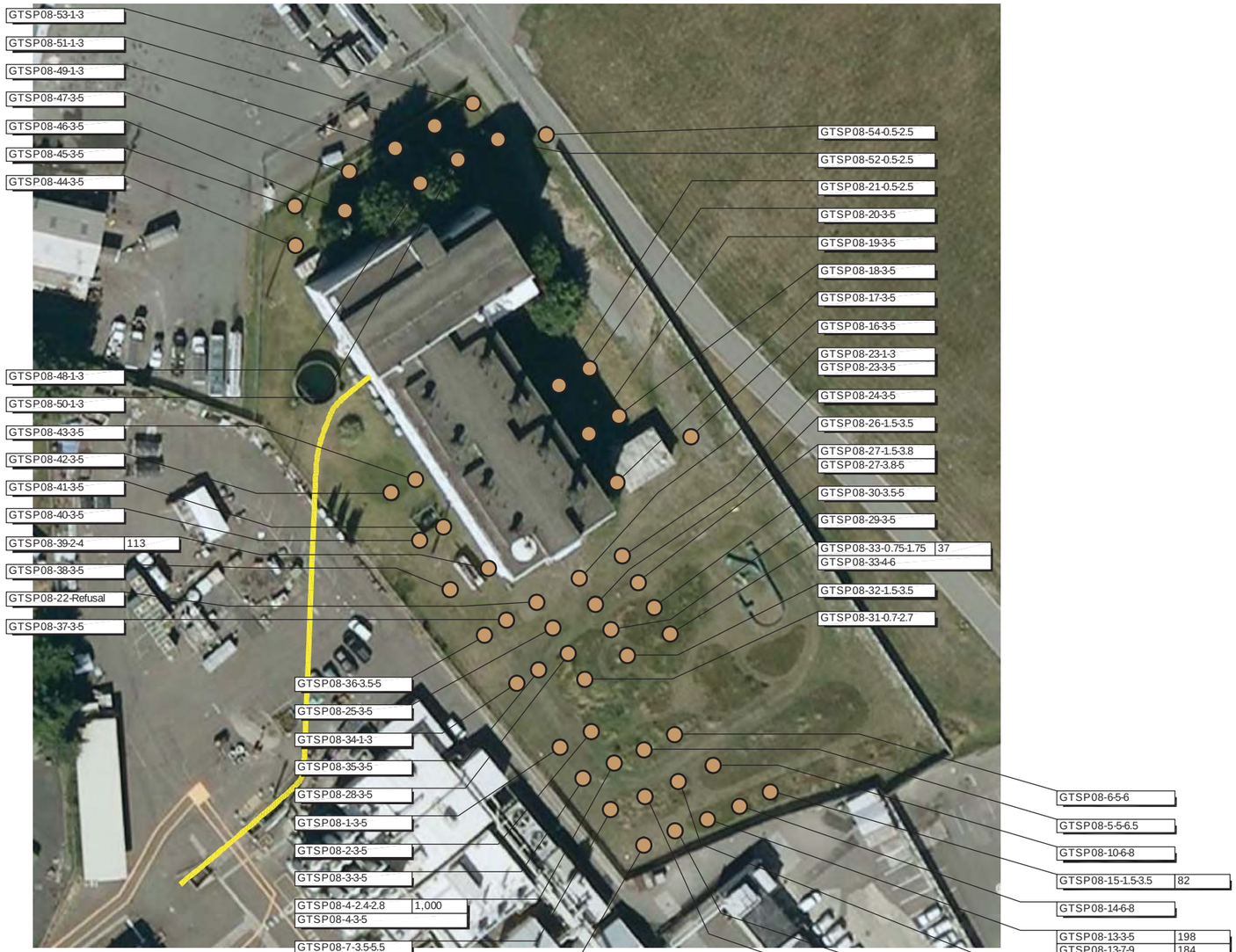

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Legend

- Approximate Soil Sample Locations
- Former Flume
- GTSP08-02-1-2 | 113 — Sample ID with Detected Total PCB Concentrations in µg/kg
- GTSP08-54-0.5-2.5 — Sample ID with no Detected PCB Concentrations

N

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Source: Landau 2008a

Figure 7.1–7a. Investigation of Potential PCB Sources to Slip 4 (2008)

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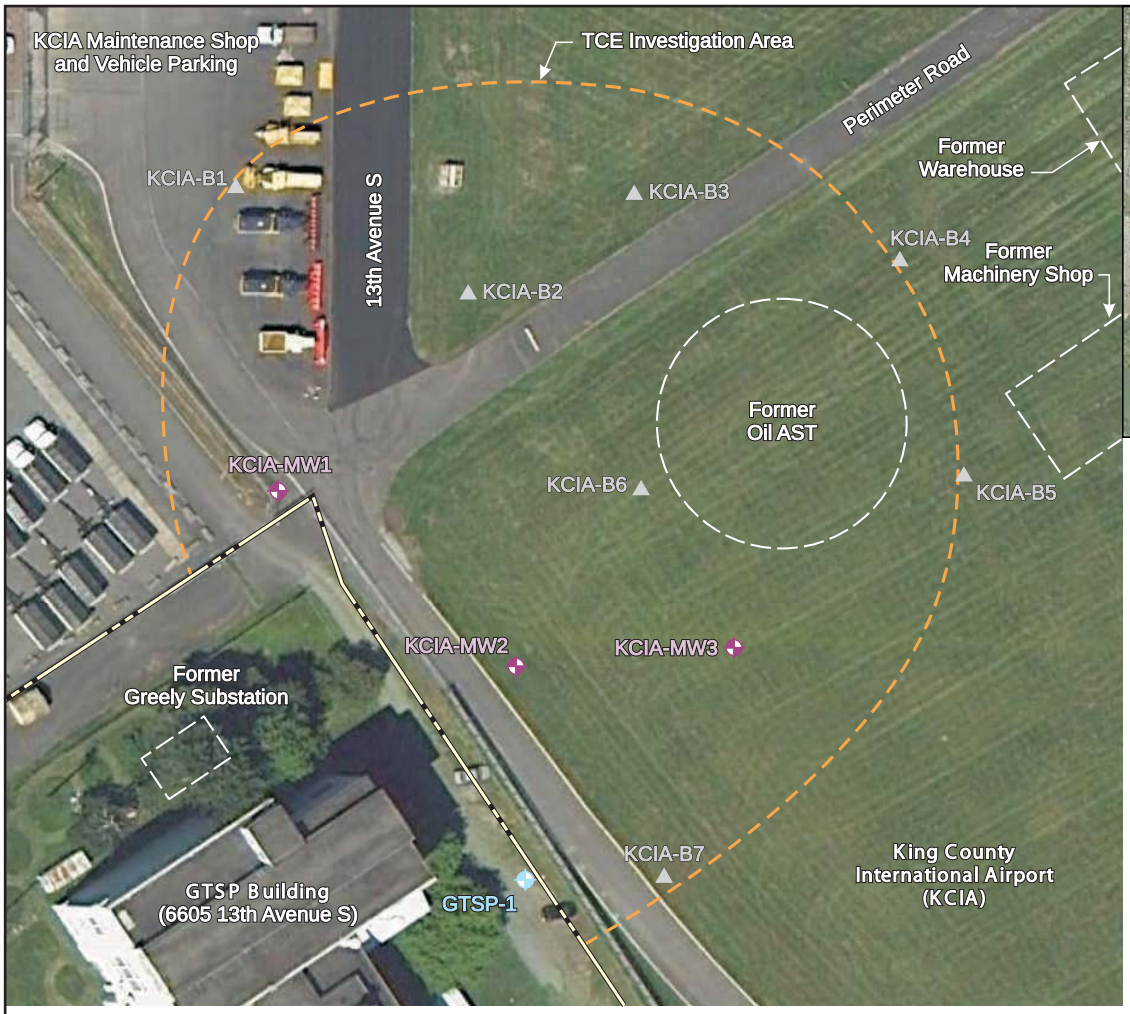
Figure 7.1-7a



SOURCE: Google Earth Pro

LEGEND

- Georgetown Steam Plant (GTSP) boundary/SCL property
- GTSP-6 Monitoring well
- KCIA-MW3 GeoProbe monitoring well
- KCIA-B7 GeoProbe boring
- TCE investigation area

0 60 120

Approximate Scale in Feet

Job No. 33762738

Figure 3

KCIA TCE Investigation Area

King County International Airport/GTSP
Seattle, Washington

URS

Source: URS 2011

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Figure 7.1–7b. Soil and Groundwater Investigation of TCE Contamination at KCIA (2011)

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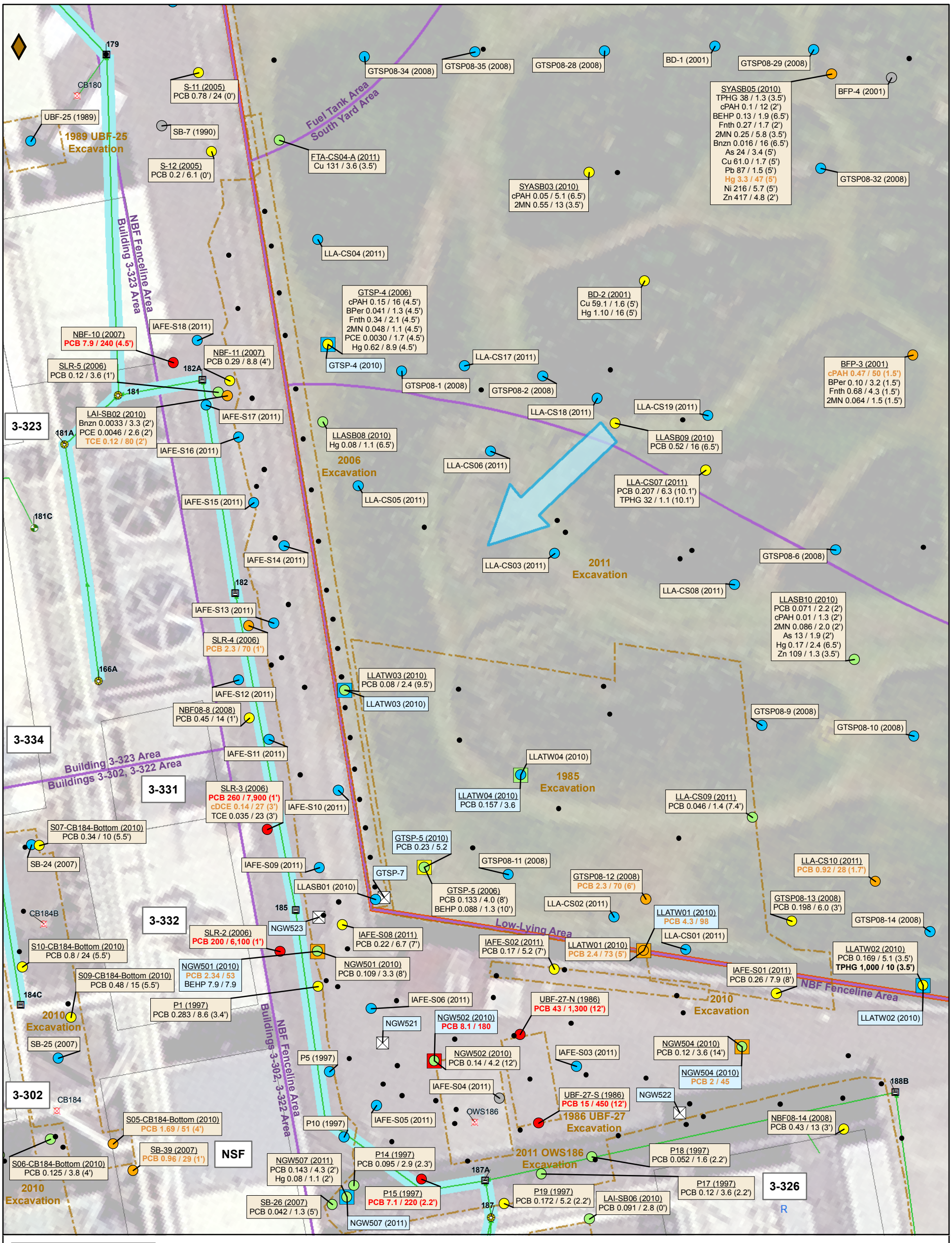

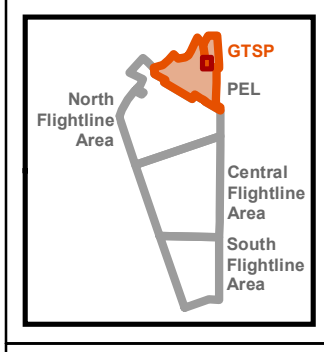

Labels:

Groundwater: Sample ID (Date) / Concentration / EF

Soil: Sample ID (Date) / Concentration / EF (Depth)

Bold Black: Max EF > 5 (for TPH only)
Orange: Max EF >25 (all COPCs)
Red: Max EF >125 (all COPCs)

Concentrations in mg/kg for soil.
Concentrations in ug/L for groundwater.

Soil and Groundwater Exceedances

EF Range
(only detected results unless stated):

- ND > 1 (all results ND)
- ≤ 1 (ND or detect)
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125
- All sampled soil excavated at location

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other
- Area where SD Line lies below the water table at high water levels

Approximate Groundwater Flow Direction

Approximate Outline of Excavation

Proposed Sample Locations

Monitoring Well Soil Boring

0 5 10 20
Feet

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Figure 7.1-8. Soil and Groundwater Sample Locations at Southern GTSP and NBF Fenceline Areas (West Half)

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-08_SouthWestGTSP.mxd
Illustrative purposes only.
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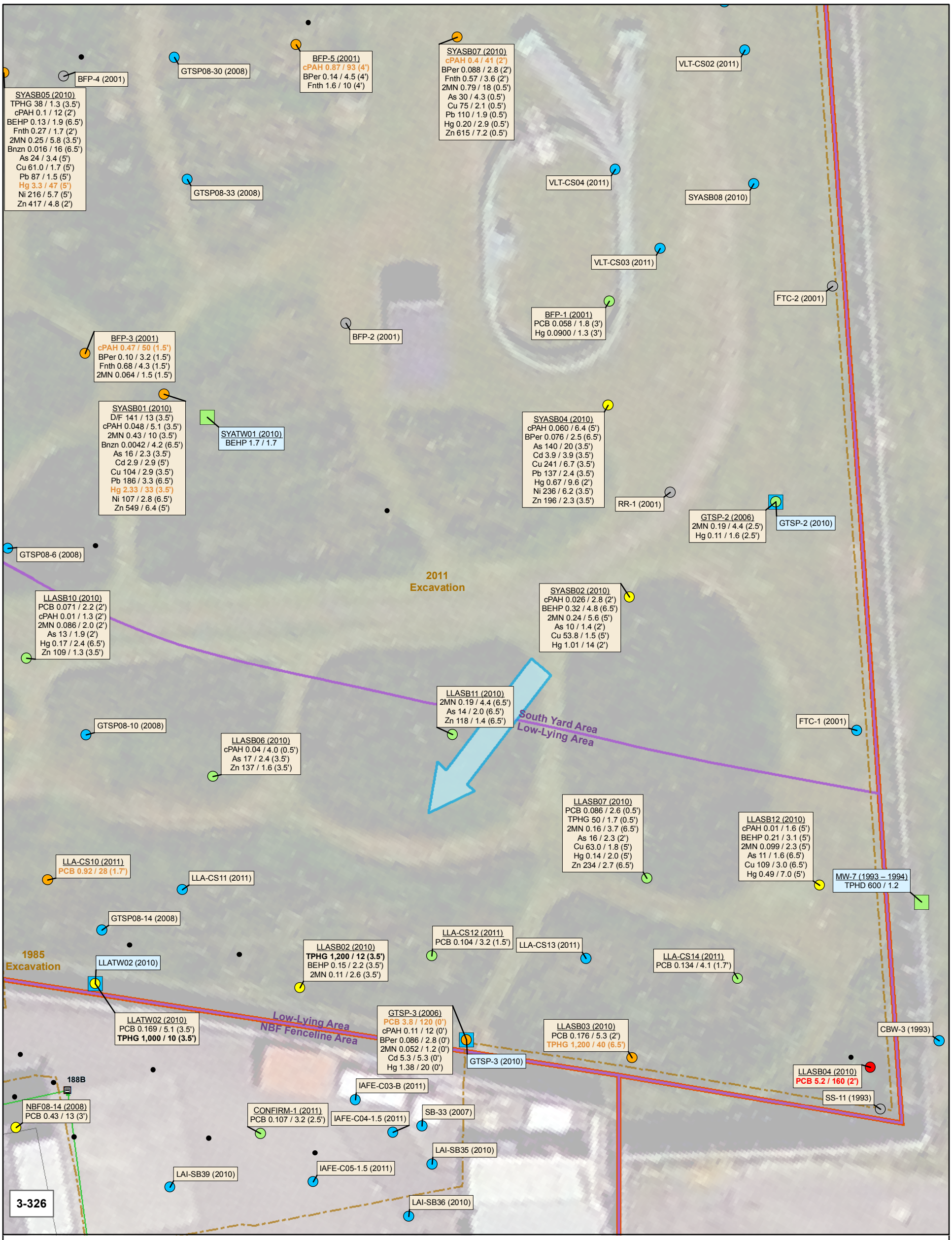

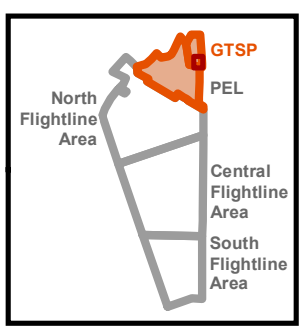

Labels:

Groundwater: Sample ID (Date) / Concentration / EF

Soil: Sample ID (Date) / Concentration / EF (Depth)

Bold Black: Max EF > 5 (for TPH only)
Orange: Max EF >25 (all COPCs)
Red: Max EF >125 (all COPCs)

Concentrations in mg/kg for soil (Dioxins/Furans in ng/kg).
Concentrations in ug/L for groundwater.

Soil and Groundwater Exceedances

EF Range (only detected results unless stated):

- ND > 1 (all results ND)
- ≤ 1 (ND or detect)
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125
- All sampled soil excavated at location

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other
- Area where SD Line lies below the water table at high water levels

- Approximate Groundwater Flow Direction
- Approximate Outline of Excavation

Proposed Sample Locations

Monitoring Well Soil Boring

0 5 10 20
Feet

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Figure 7.1-9. Soil and Groundwater Sample Locations at Southern GTSP and NBF Fenceline Areas (East Half)

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-09_SouthEastGTSP.mxd
Illustrative purposes only.
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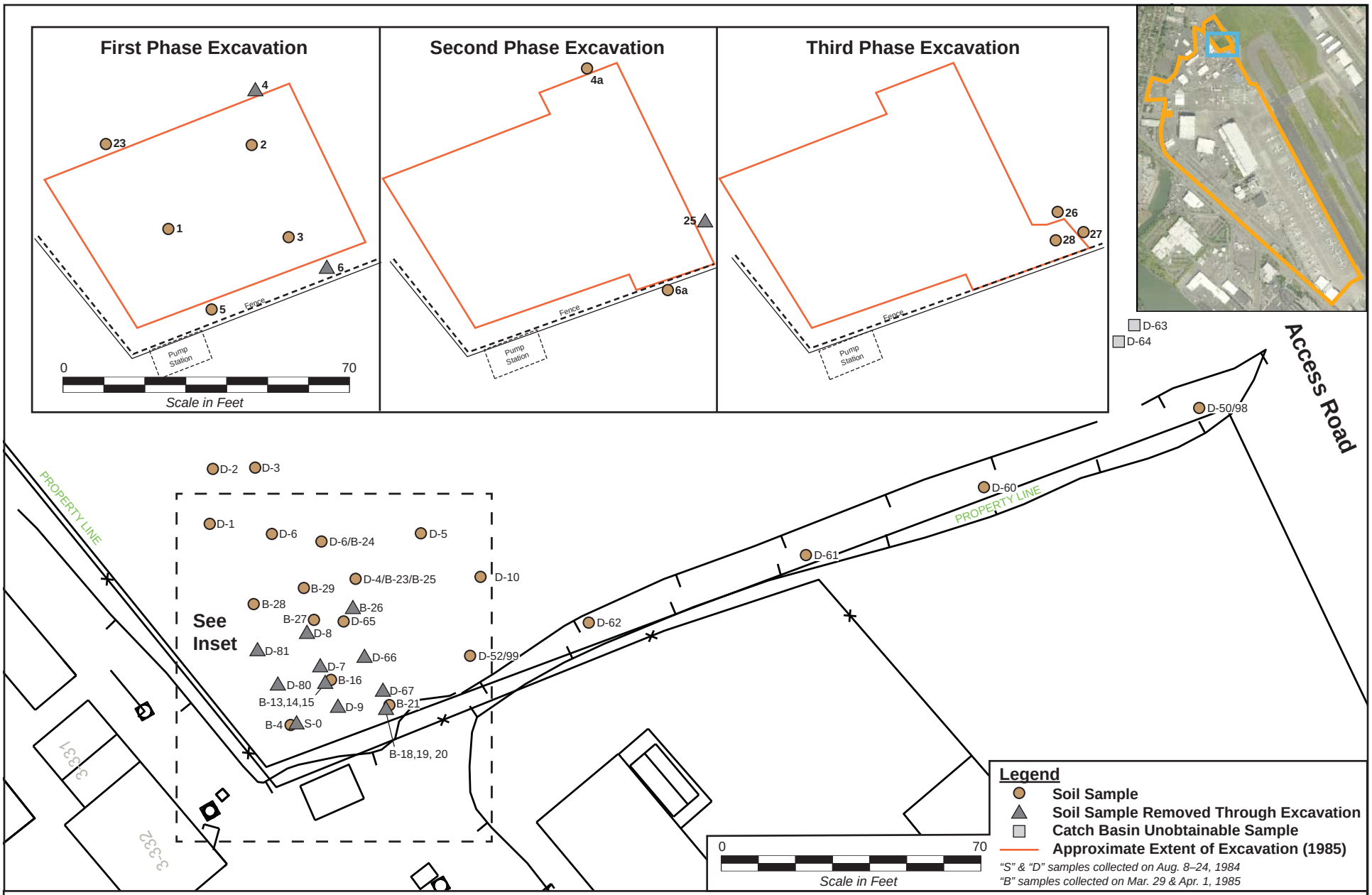

Sources: AB Consulting 1986; Raven 1984, 1985

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Figure 7.1–10. GTSP
Drainage Ditch and Excavation Sampling Locations
(1984–1985)

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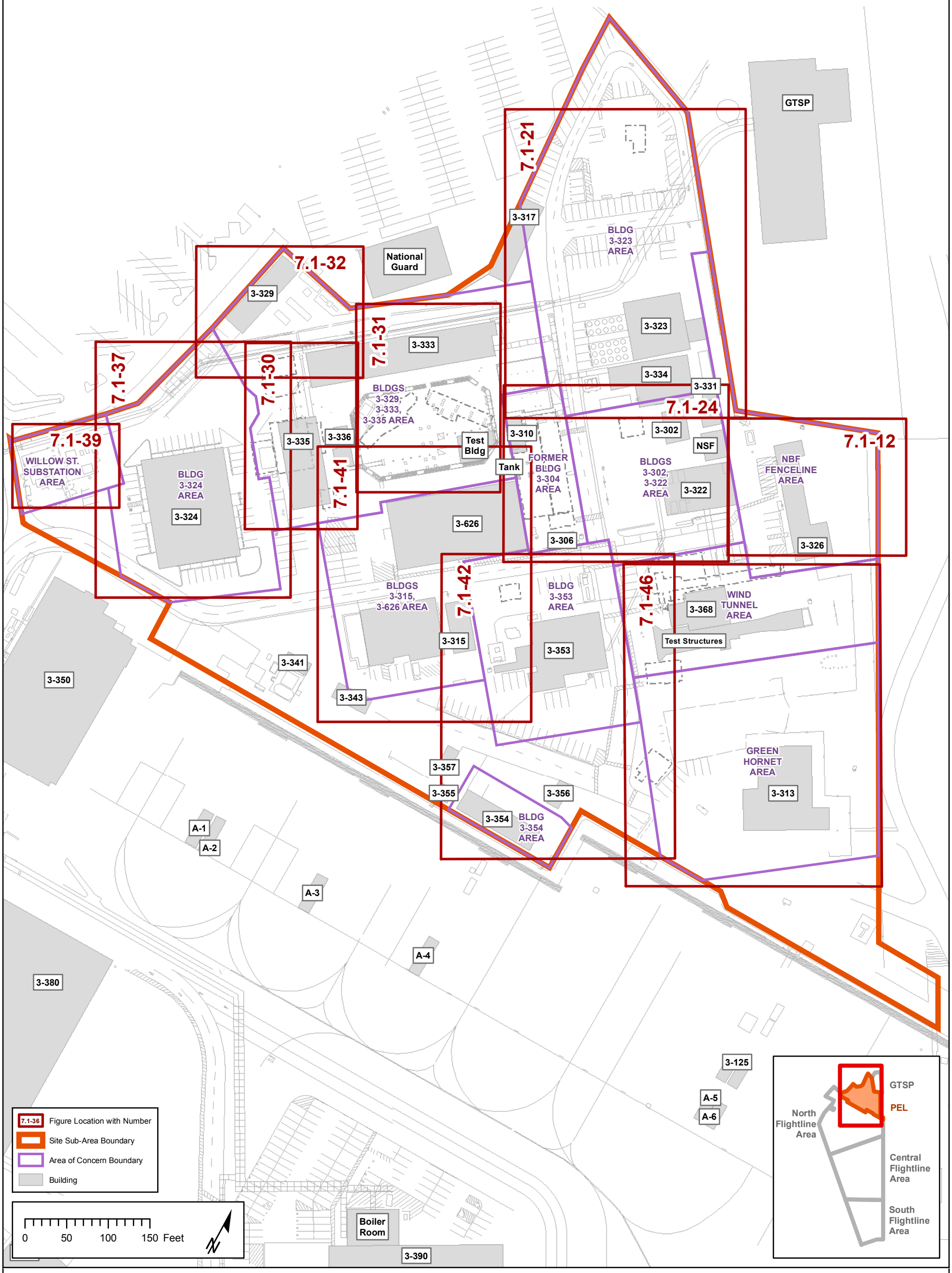

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Figure 7.1-11. Areas of Concern at PEL Area

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-11_Area_of_Concern_at_PEL_Area.mxd
Illustrative purposes only.
Date Saved: 11/7/2013 4:30:30 PM

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Figure 7.1-12. Soil and Groundwater Sample Locations at NBF Fenceline Area (Southeast Portion)

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-12_Fenceline_PEL.mxd
Illustrative purposes only.
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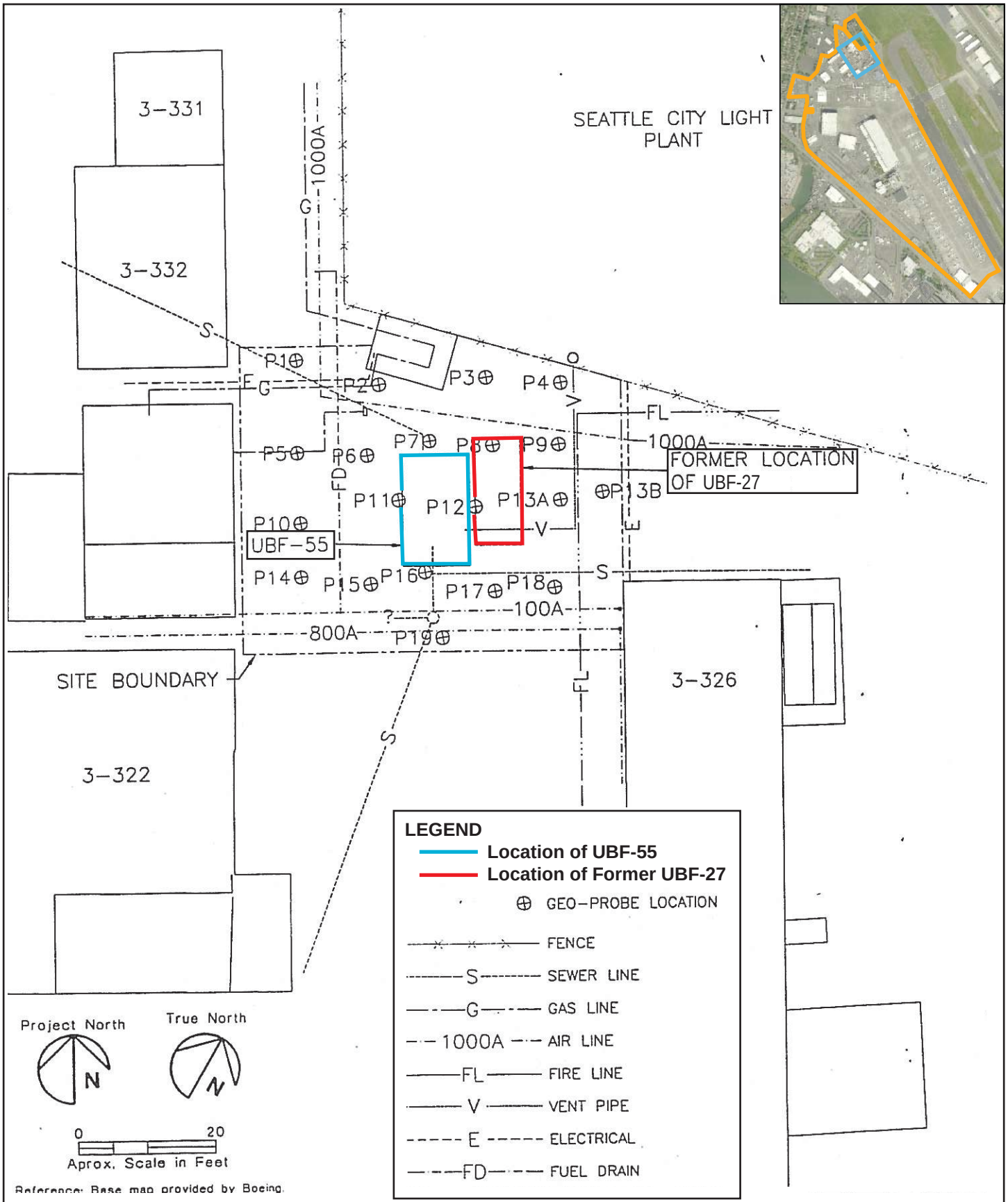

Source: AGI Technologies 1997

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Figure 7.1–13. Oil/Water Separator UBF-55 and UBF-27 (1997)

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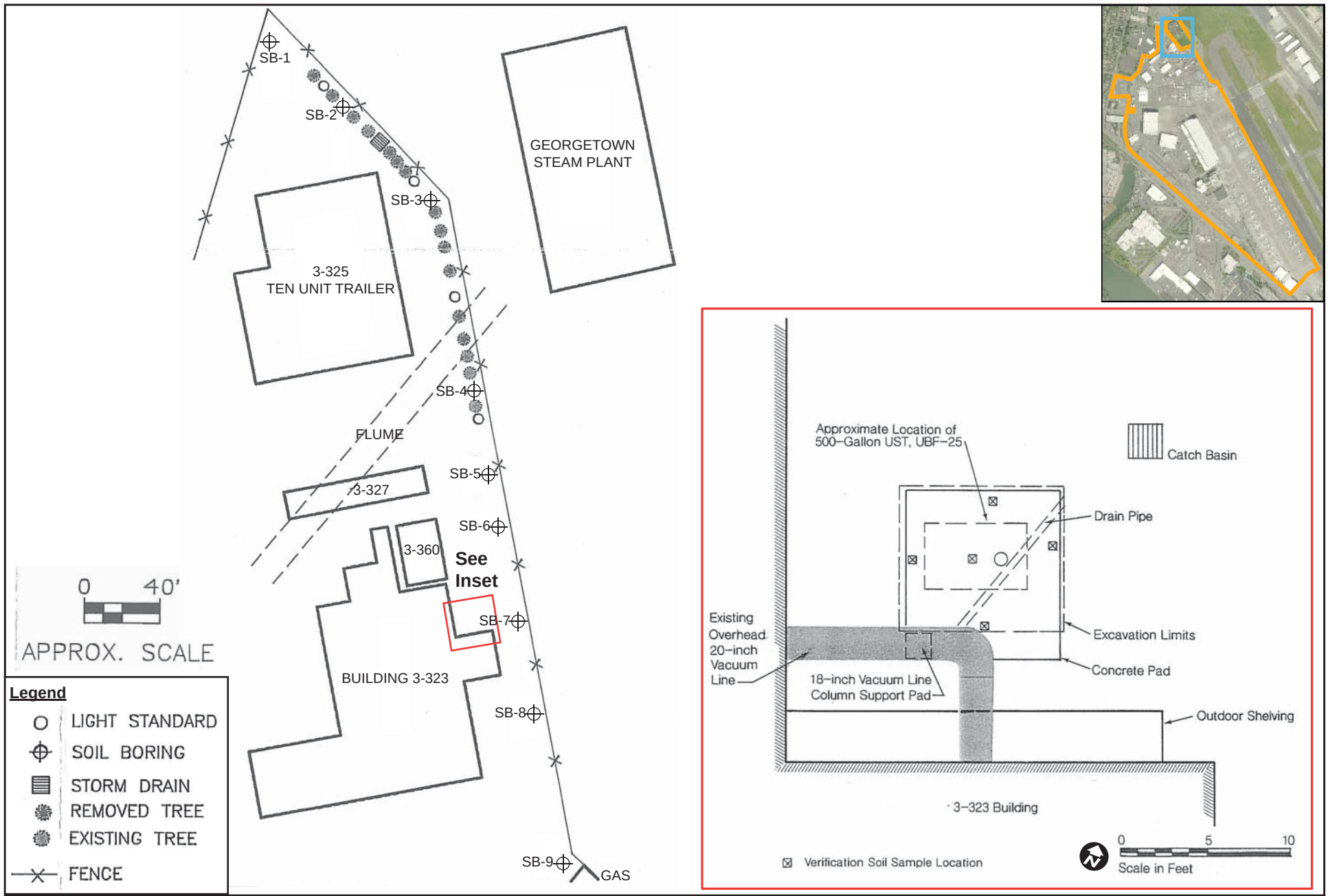
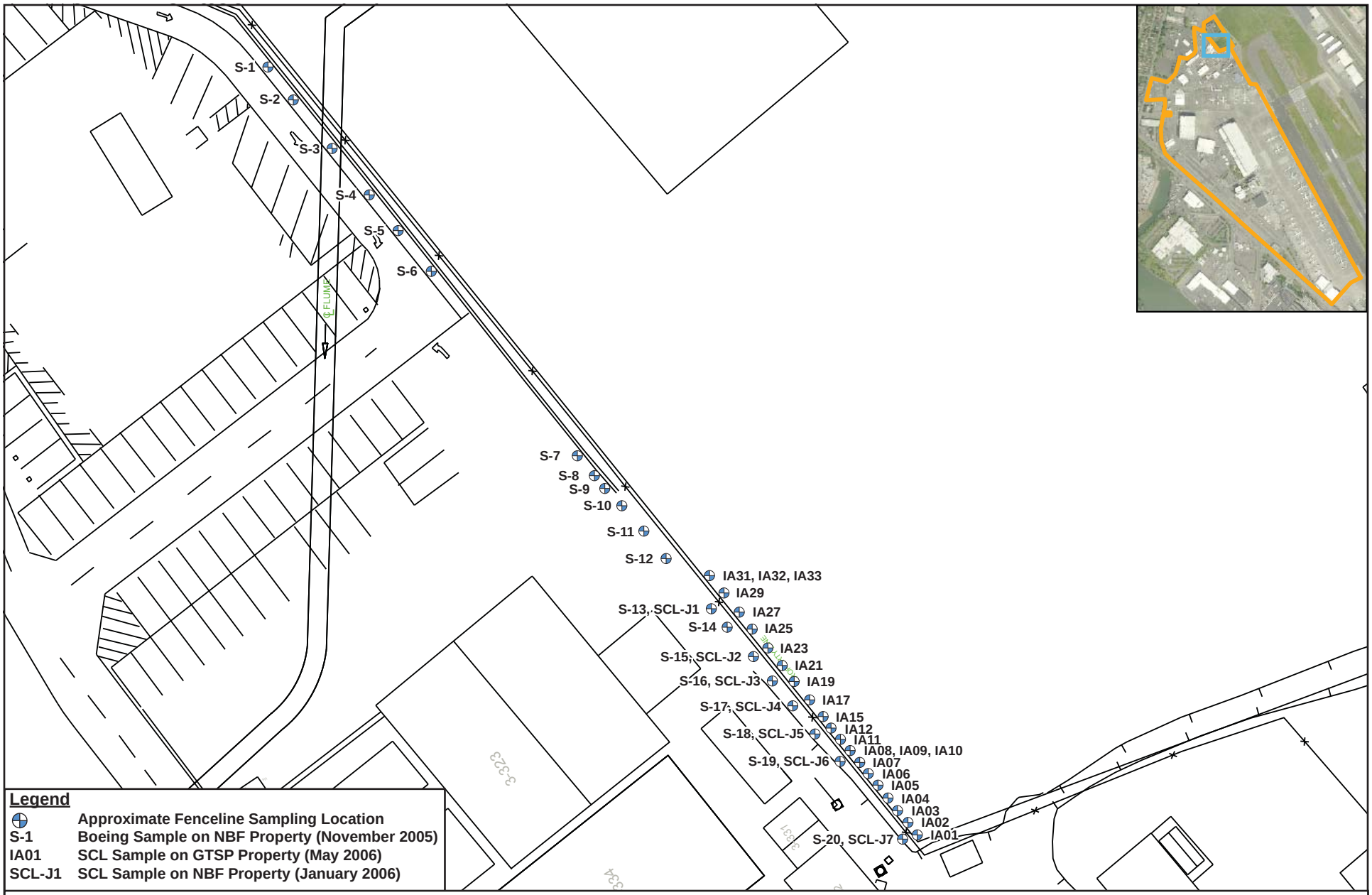


Source: GTI 1990c

Figure 7.1–14. UBF-25 Removal (1989) and Dead Tree Investigation (1990)



Sources: Integral 2006a, 2006b

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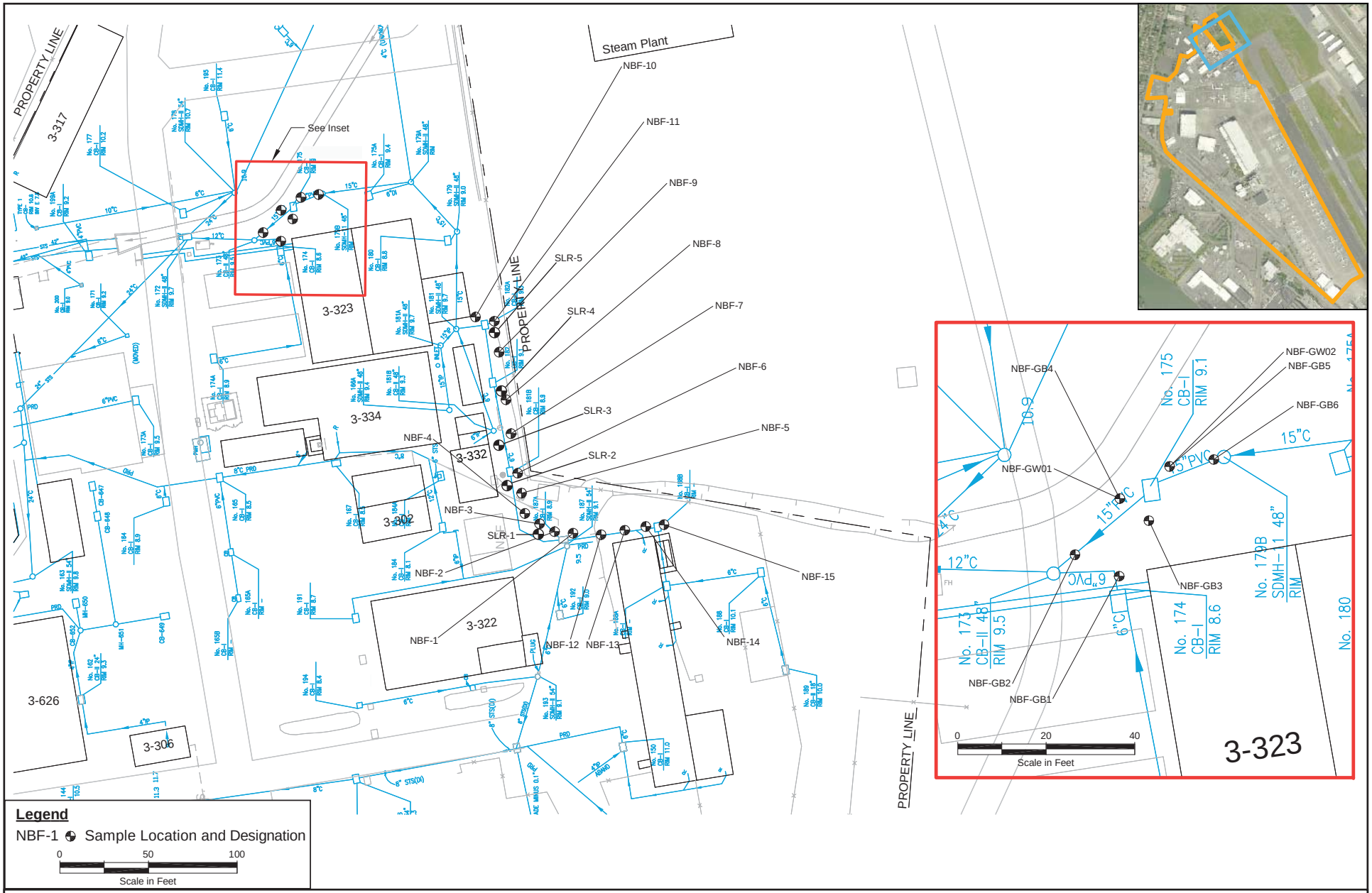
Figure 7.1–15. NBF-GTSP Fenceline Soil Sampling Locations



Source: Landau 2007d

Figure 7.1–16. Soil Samples Associated with Storm Drain Line Replacement (2006–2007)

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Figure 7.1–17. Soil Sampling Locations with PCB Concentrations (2007)

Source: Landau 2007c

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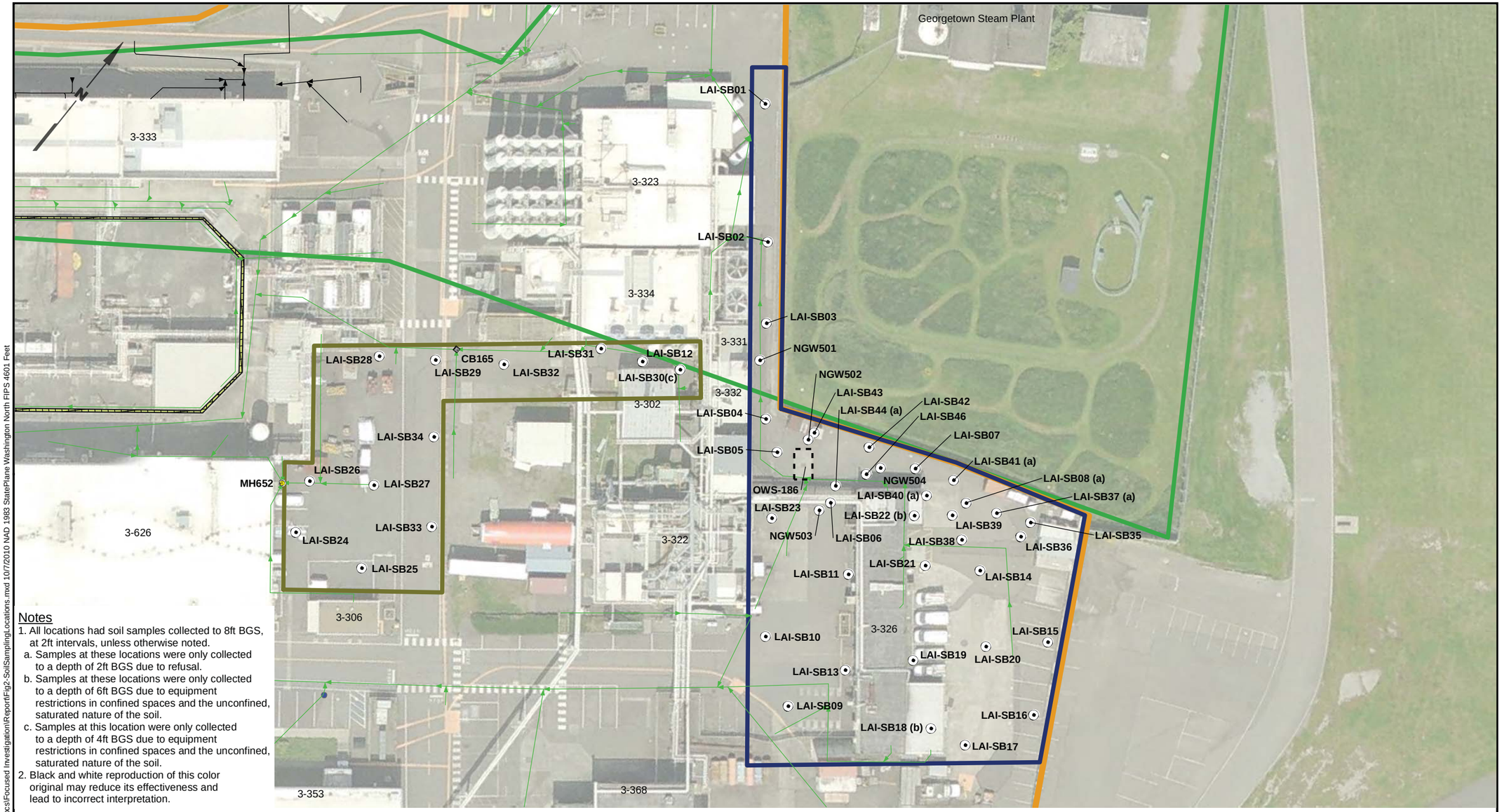
Figure 7.1-17



Notes

1. All locations had soil samples collected to 8ft BGS, at 2ft intervals, unless otherwise noted.
   a. Samples at these locations were only collected to a depth of 2ft BGS due to refusal.
   b. Samples at these locations were only collected to a depth of 6ft BGS due to equipment restrictions in confined spaces and the unconfined, saturated nature of the soil.
   c. Samples at this location were only collected to a depth of 4ft BGS due to equipment restrictions in confined spaces and the unconfined, saturated nature of the soil.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Soil Boring Locations
- Manhole
- Catch Basin
- North Lateral
- Other lines
- Building 3-302 Area
- Fenceline Area
- PEL Boundary
- Seattle City Light Property Boundary (from City of Seattle, 2010)

0 50 100
Scale in Feet

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North Boeing Field Seattle, Washington	**Focused Investigation Soil Sample Locations**	Figure 2

Y:\Projects\025082\MapDocs\Focused Investigation\Report\Fig2-SoilSamplingLocations.mxd 10/7/2010 NAD 1983 StatePlane Washington North FIPS 4601 Feet

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Source: Landau 2010e

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Figure 7.1–18. Focused Investigation Soil Sample Locations (2010)

Legend

- Soil Boring
- Soil Boring for New Groundwater Monitoring Well
- Oil Water Separator
- Drain
- Locations sampled for PCBs, TPH, BTEX, and PAHs at All Depth Intervals; Plus SVOCs and Metals at the 2-4 and 4-6 Foot Depth Intervals.
- Locations sampled for PCBs only.
- Locations sampled for PCBs at all Depth Intervals; TPH-Gx and VOC at 8-10 Foot Depth Interval
- Locations sampled for PCBs, TPH, BTEX, PAHs at all Depth Intervals; Plus Dioxins/Furans and Metals at the 2-4 and 4-6 Foot Depth Intervals.
- Locations sampled for PCBs, TPH, BTEX, PAHs at All Depth Intervals; Plus Metals at the 2-4 and 4-6 Foot Depth Intervals.
- North Lateral
- Other lines
- Area of Known PCBs
- PEL Boundary

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Note
1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.
2. Planned sample analytes resented, actual analytes based on soil volumes in field. See table tables for full list of analytes sampled at each location.

0 120 240
Scale in Feet

North Boeing Field Seattle, Washington	**Soil Sample Locations and Sample Analytes**	Figure 2

Y:\Projects\025082\MapDocs\Soil and GW Investigation\Revised\Feb\SoilSampleLocations.mxd 3/16/2011 NAD 1983 StatePlane Washington North FIPS 4601 Feet

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Figure 7.1–19. PEL Area Soil and Groundwater Sample Locations (2010–2011)

Source: Landau 2011c

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Y:\Projects\025082\212.005\MapDocs\Interim Action Fenceline Excavation Completion Report\Figure4FencelineAreaExcavationPCBs.mxd 8/15/2012 NAD 1983 StatePlane Washington North FIPS 4601 Feet

IAFE-S18
5/19/2011
5-6 ft
PCB Total:<0.031
7-8 ft
PCB Total:<0.032

IAFE-S17
5/19/2011
5-6 ft
PCB Total:<0.032
7-8 ft
PCB Total:<0.032

IAFE-S16
5/19/2011
5-6 ft
PCB Total: 0.076
7-8 ft
PCB Total:<0.032

IAFE-S15
5/19/2011
5-6 ft
PCB Total: 0.16
7-8 ft
PCB Total:<0.030

IAFE-S14
5/19/2011
5-6 ft
PCB Total: 11
7-8 ft
PCB Total:<0.031

IAFE-S13
5/19/2011
5-6
PCB Total: 3.5
7-8
PCB Total:<0.030

IAFE-S12
5/19/2011
5-6 ft
PCB Total: 340
7-8 ft
PCB Total:<0.031

IAFE-S11
5/20/2011
4-5 ft
PCB Total: 56
7-8 ft
PCB Total:<0.032

IAFE-S09
5/20/2011
5-6 ft
PCB Total: 10.4
7-8 ft
PCB Total:<0.032

IAFE-S10
5/20/2011
5-6 ft
PCB Total: 1.27
7-8 ft
PCB Total:<0.032

IAFE-S08
5/20/2011
5-6 ft
PCB Total: 14
7-8 ft
PCB Total: 0.22

LAI-SB-04
7/13/2010
0-2 ft
PCB Total: 5.4
2-4 ft
PCB Total: 0.47
4-6 ft
PCB Total: 0.108
6-8 ft
PCB Total:<0.001

NGW501
8/24/2010
0-2 ft
PCB Total: 18
2-4 ft
PCB Total: 8.9
4-6 ft
PCB Total: 2.1
6-8 ft
PCB Total:<0.001
8-10 ft
PCB Total: 0.05
10-12 ft
PCB Total:<0.001
12-14 ft
PCB Total:<0.001
14-15 ft
PCB Total:<0.001

LAI-SB-42
8/3/2010
0-2 ft
PCB Total: 264
2-4 ft
PCB Total: 560
4-6 ft
PCB Total: 100
6-8 ft
PCB Total: 0.037

NGW504
8/24/2010
0-2 ft
PCB Total: 64
2-4 ft
PCB Total: 156
4-6 ft
PCB Total: 104
6-8 ft
PCB Total: 11.5
8-10 ft
PCB Total: 52
10-12 ft
PCB Total: 0.039
12-14 ft
PCB Total: 0.041
14-15 ft
PCB Total: 0.12

IAFE-S01
5/20/2011
8-9 ft
PCB Total: 0.26

IAFE-S02
5/19/2011
7-8 ft
PCB Total: 0.17

IAFE-S04
5/20/2011
7-7.5
PCB Total:<0.031

LAI-SB-07
7/14/2010
0-2 ft
PCB Total: 3.2
2-4 ft
PCB Total: 640
4-6 ft
PCB Total: 2300
6-8 ft
PCB Total: 0.26

IAFE-S06
5/20/2011
5-6 ft
PCB Total: 25.9
7-8 ft
PCB Total: 11.7
11-12 ft
PCB Total:<0.032

IAFE-S05
5/20/2011
7-8 ft
PCB Total:<0.032

IAFE-S03
5/19/2011
8-9 ft
PCB Total:<0.032
10.5-11.5 ft
PCB Total:<0.032

LAI-SB-46
8/3/2010
0-2 ft
PCB Total: 320
2-4 ft
PCB Total: 0.105
4-6 ft
PCB Total: 1.79
6-8 ft
PCB Total:<0.032

CONFIRM-1
8/9/2011
2.0-2.5 ft
PCB Total:<0.001
2.5-3.0 ft
PCB Total: 0.107

IAFE-C03-B
8/29/2011
2.0 ft
PCB Total:<0.001

IAFE-C04-B
8/29/2011
1.5 ft
PCB Total:<0.001

IAFE-C05-B
8/29/2011
1.5 ft
PCB Total:<0.001

NGW507
1/21/2011
0-2 ft
PCB Total: 0.79
2-4 ft
PCB Total: 0.143
4-6 ft
PCB Total:<0.001
6-8 ft
PCB Total:<0.001
8-10 ft
PCB Total:<0.001
10-12 ft
PCB Total:<0.001
12-14 ft
PCB Total:<0.001
14-15 ft
PCB Total:<0.001

NGW502
8/24/2010
0-2 ft
PCB Total: 48
2-4 ft
PCB Total: 61
4-6 ft
PCB Total: 520
6-8 ft
PCB Total: 211
8-10 ft
PCB Total: 223
10-12 ft
PCB Total: 0.097
12-14 ft
PCB Total: 0.14
14-15 ft
PCB Total: 0.07

NGW503
8/24/2010
0-2 ft
PCB Total: 1.6
2-4 ft
PCB Total:<0.001
4-6 ft
PCB Total: 0.12
6-8 ft
PCB Total:<0.001
8-10 ft
PCB Total: 0.11
10-12 ft
PCB Total:<0.001
12-14 ft
PCB Total:<0.001
14-15 ft
PCB Total:<0.001

LAI-SB-39
8/3/2010
0-2 ft
PCB Total: 1.05
2-4 ft
PCB Total:<0.031
4-6 ft
PCB Total:<0.031
6-8 ft
PCB Total:<0.031

3-323
3-331
3-332
3-326

Legend

- North Lateral Storm Drain
- NBF Lease Property Line
- Seattle City Light Property Boundary (from City of Seattle, 2010)
- IAFE Confirmation Sample Locations
- Historic Confirmation Sample Locations
- Approximate Boundary of Groundwater with PCBs ≥ 0.03 µg/L

IAFE-S04 — Sample ID
6/3/2011 — Date
7-7.5ft — Sample Depth
PCB Total: <0.031 — Concentrations Reported in mg/kg

0 20 40
Scale in Feet

Notes

1. Grey text indicates that sample represents soil that was removed during excavation activities.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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North Boeing Field
Seattle, Washington

Fenceline Area Excavation Confirmation Soil Sample PCB Results

Figure 4

Source: Landau 2012g

DEPARTMENT OF ECOLOGY State of Washington

Figure 7.1–20. Fenceline Area Excavation Characterization Soil Sample Locations

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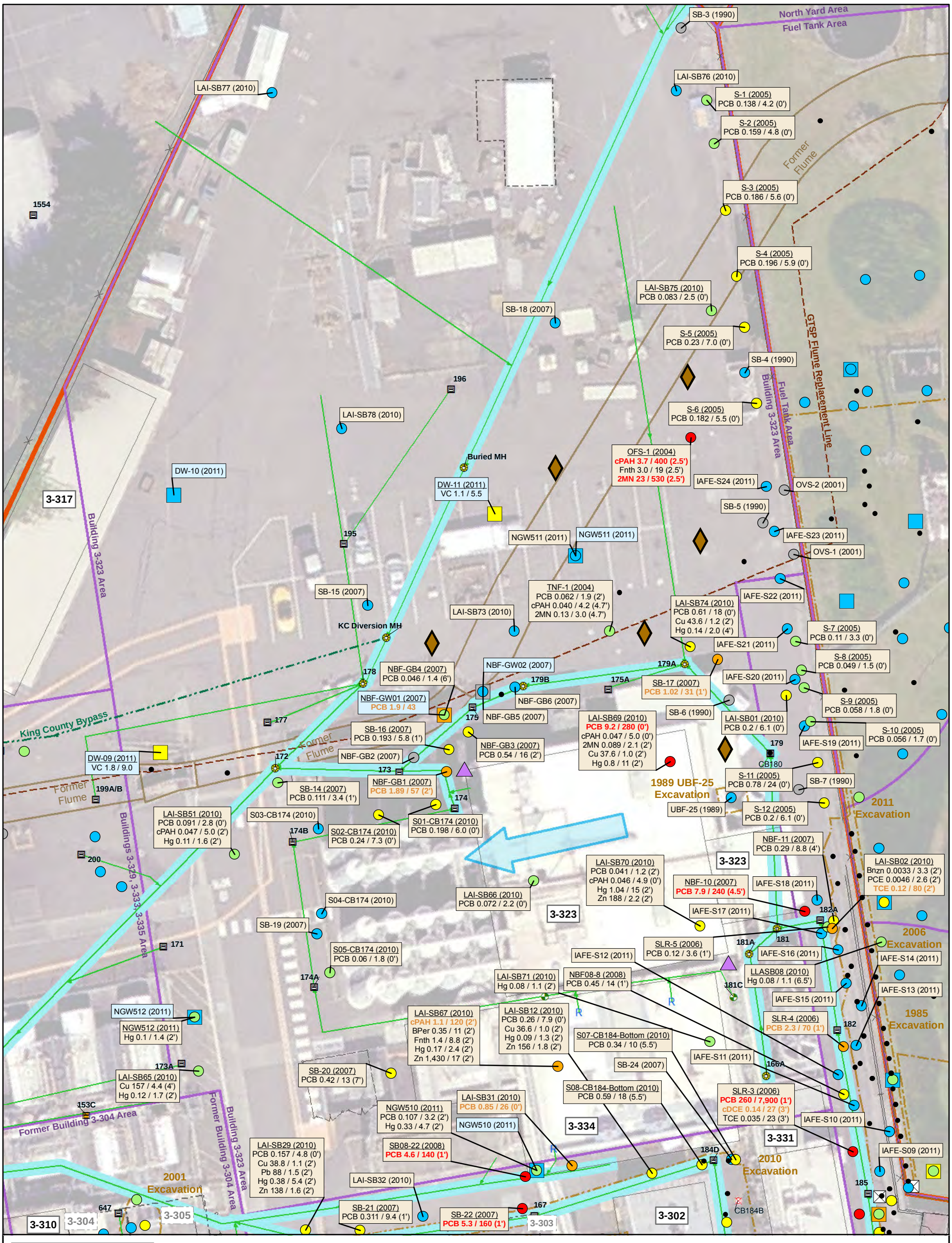
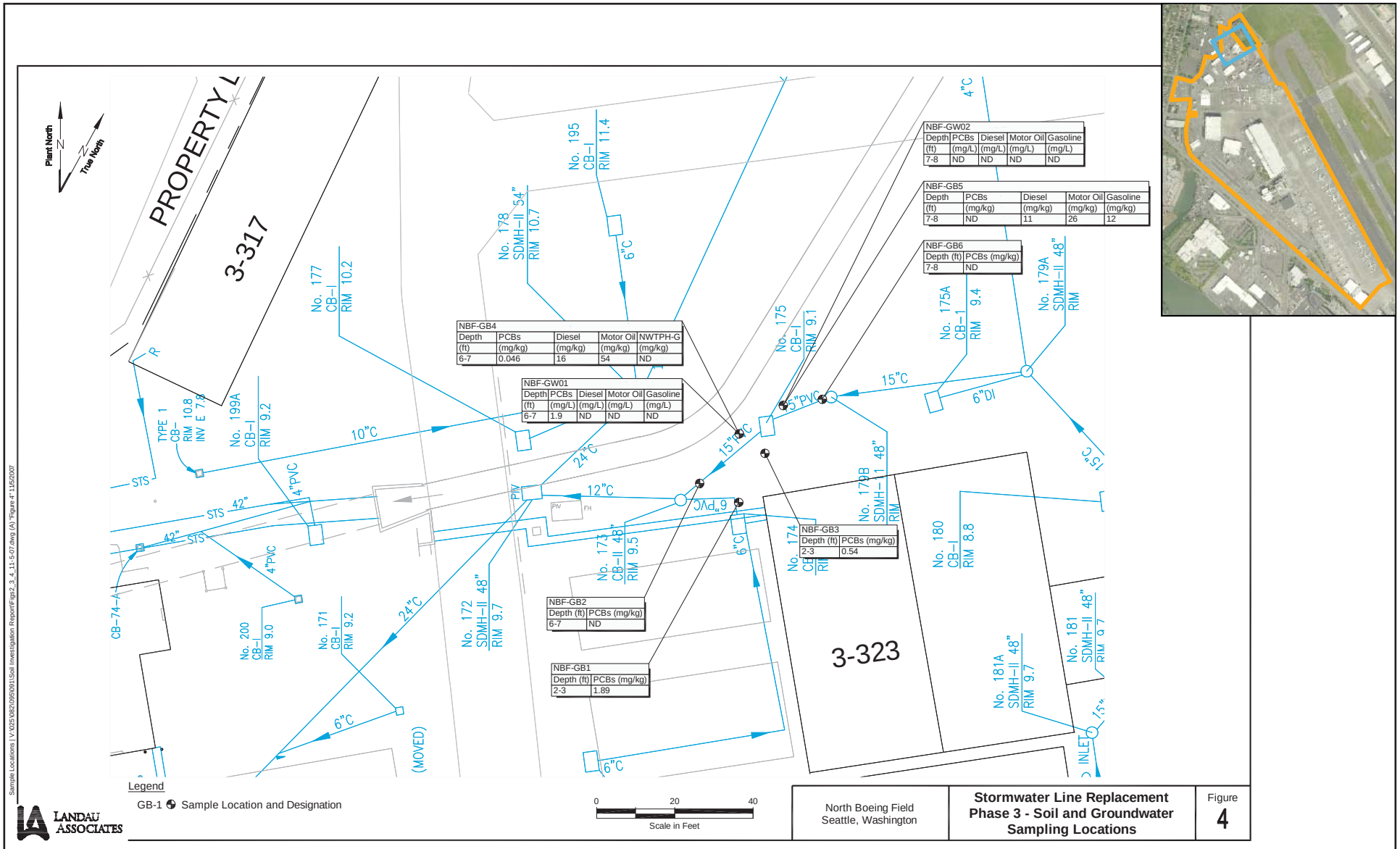


Figure 7.1-21. Soil and Groundwater Sample Locations at Building 3-323 Area

DEPARTMENT OF ECOLOGY
State of Washington

SAIC
From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-21_Bldg3-323_PEL.mxd
Illustrative purposes only.
Date Saved: 9/24/2013 7:20:40 PM



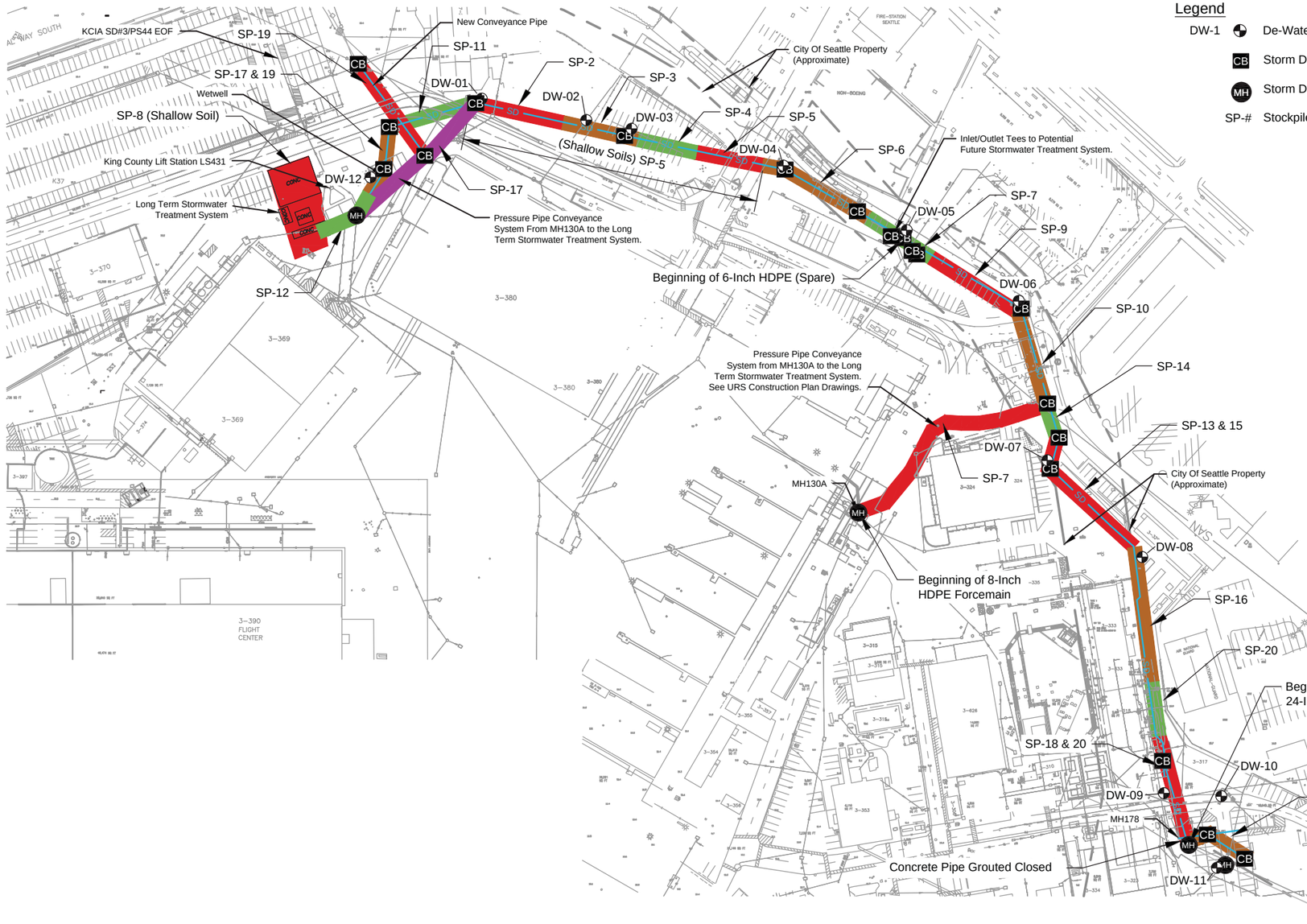
Sample Locations | V:\025\82\09\91\Soil Investigation Report\Figs\2_3_4_11-5-07.dwg (A) "Figure 4" 11/5/2007

DEPARTMENT OF ECOLOGY
State of Washington

Figure 7.1–22. Soil and Groundwater Samples Associated with Storm Drain Line Replacement (2006–2007)

Source: Landau 2007d

SAIC® From Science to Solutions



LANDAU ASSOCIATES, INC. | V:\025\082311\001\Completion Report\Figure 1 SP Locations.dwg (A) "Figure 1" 11/15/2012

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

N

0 150 300

Scale in Feet

Well Locations: DHA De-Watering Well Survey for North Boeing Field Dated 10/04/11
Base map source: Boeing Stormwater Conveyance Plan C504 Dated 06/23/11

LANDAU ASSOCIATES

North Boeing Field Long Term Stormwater Treatment System Installation	**New Storm Drain Construction Soil Stockpile Source Locations**	Figure 1

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Figure 7.1–23. Storm Drain Construction (2011)

Source: Landau 2012i

SAIC From Science to Solutions

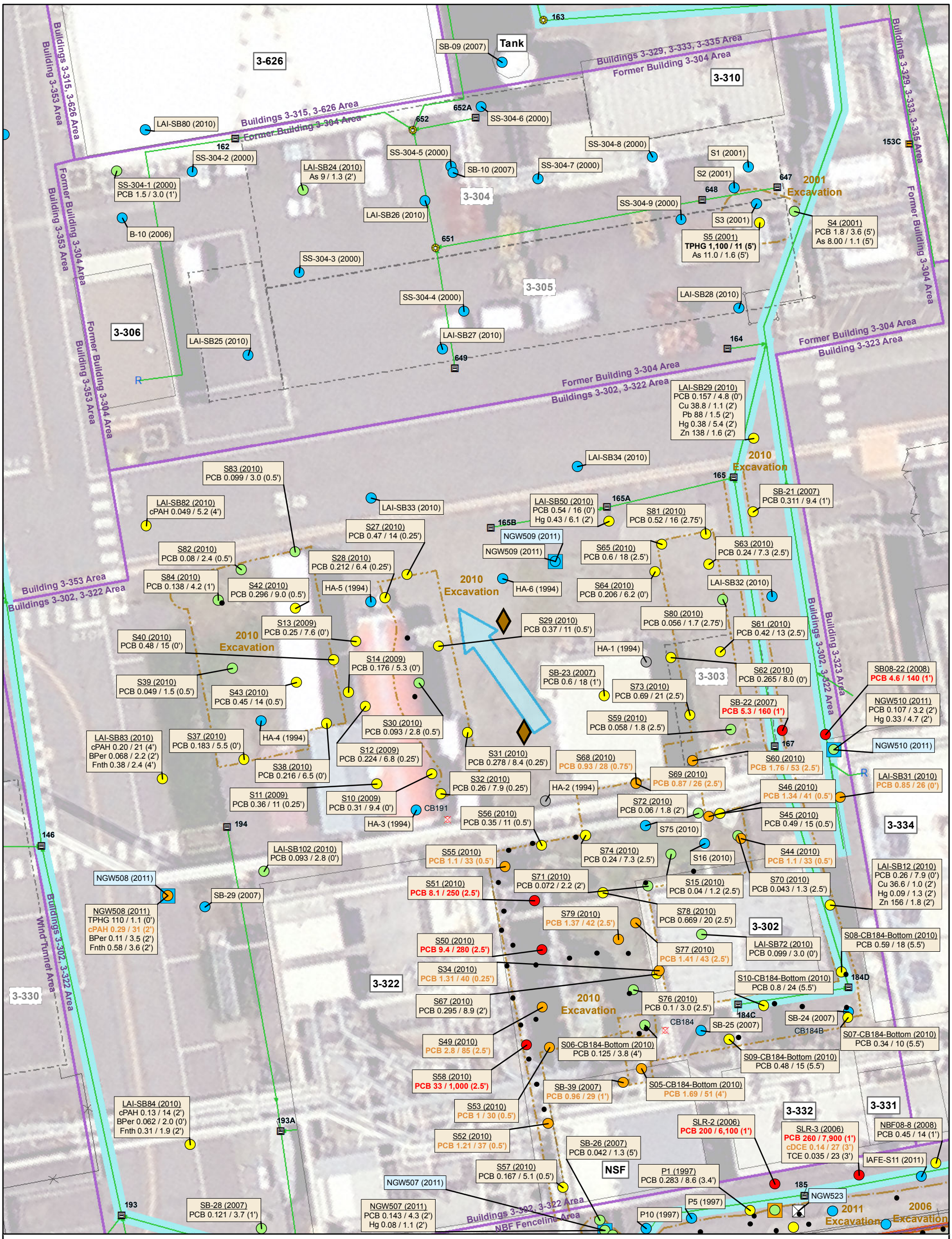

Figure 7.1-24. Soil and Groundwater Sample Locations at Buildings 3-302, 3-322, and Former 3-304 Areas

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State of Washington

SAIC
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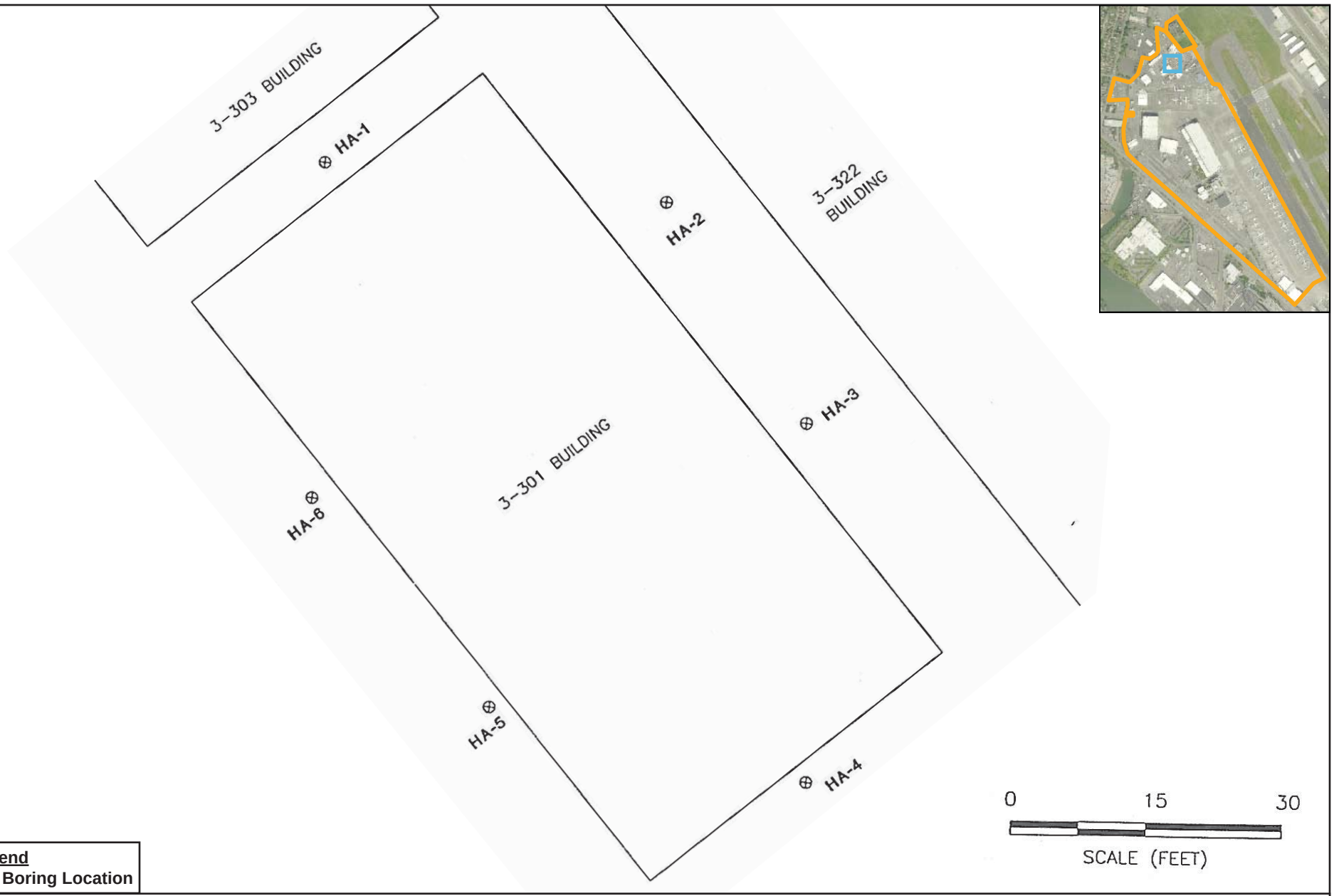
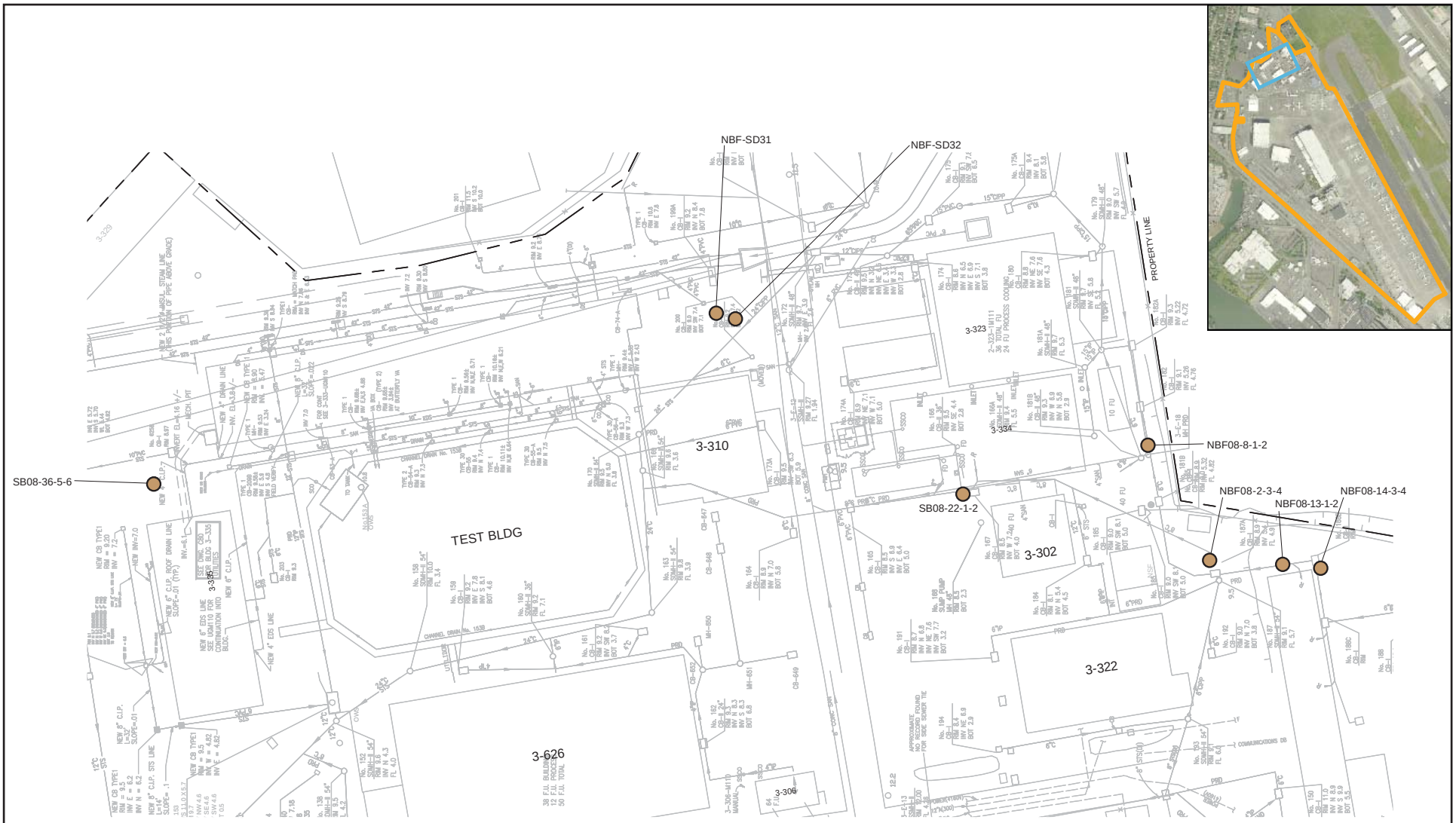
Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-24_Bldg3-302_PEL.mxd
Illustrative purposes only.
Date Saved: 9/24/2013 7:20:47 PM



Source: SECOR 1994g

Figure 7.1–25. Former Building 3-301 Environmental Assessment (1994)



Sources: Landau 2008a, 2008b

Figure 7.1–26. Investigation of PCB Sources to Slip 4 (2008) and Soil and Catch Basin Investigation (2008), PEL Area

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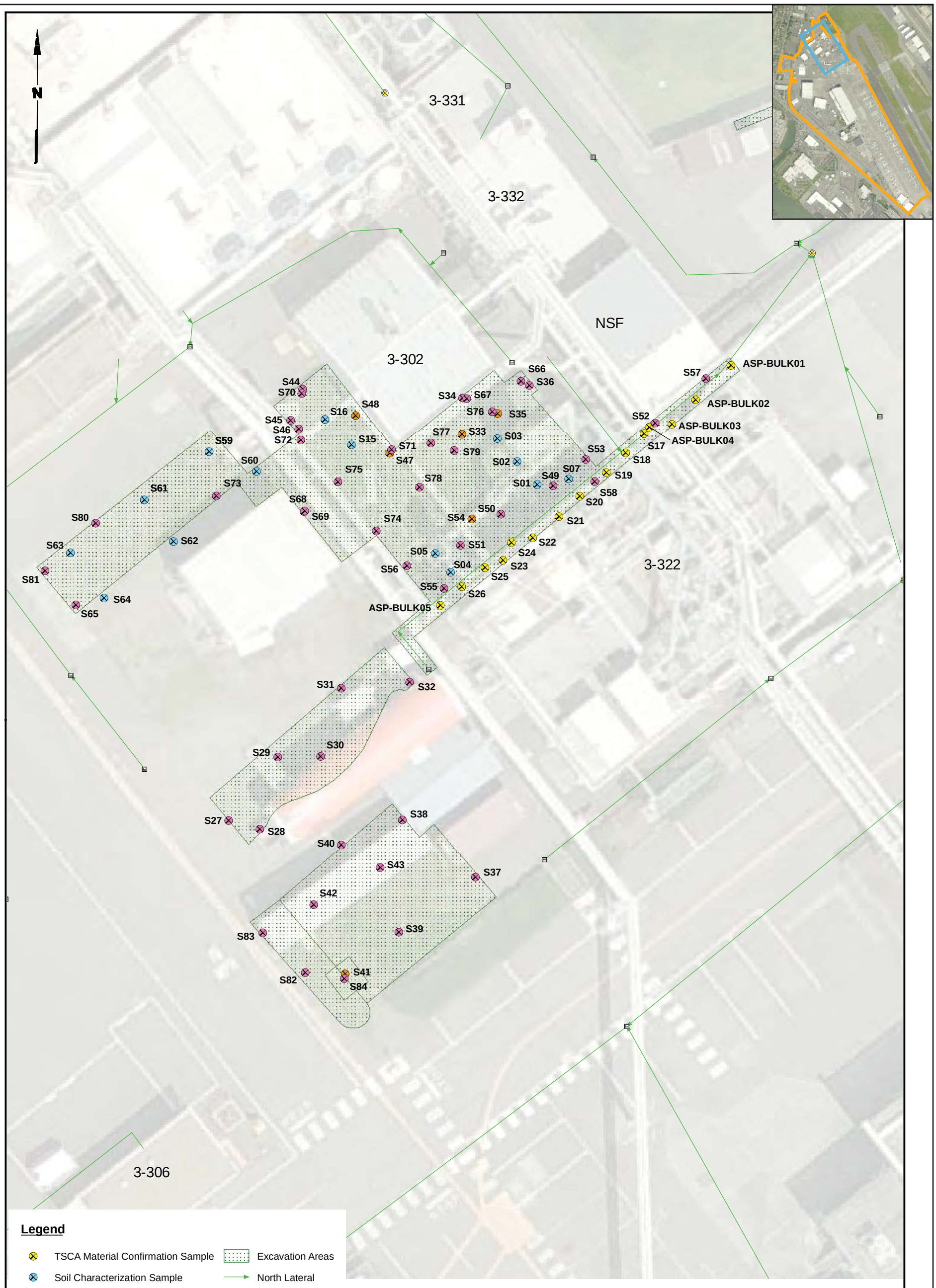
State of Washington

SAIC
From Science to Solutions



Note
1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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North Boeing Field
Seattle, Washington

Excavation Areas with Sample Locations

Figure 3

Source: Landau 2010a

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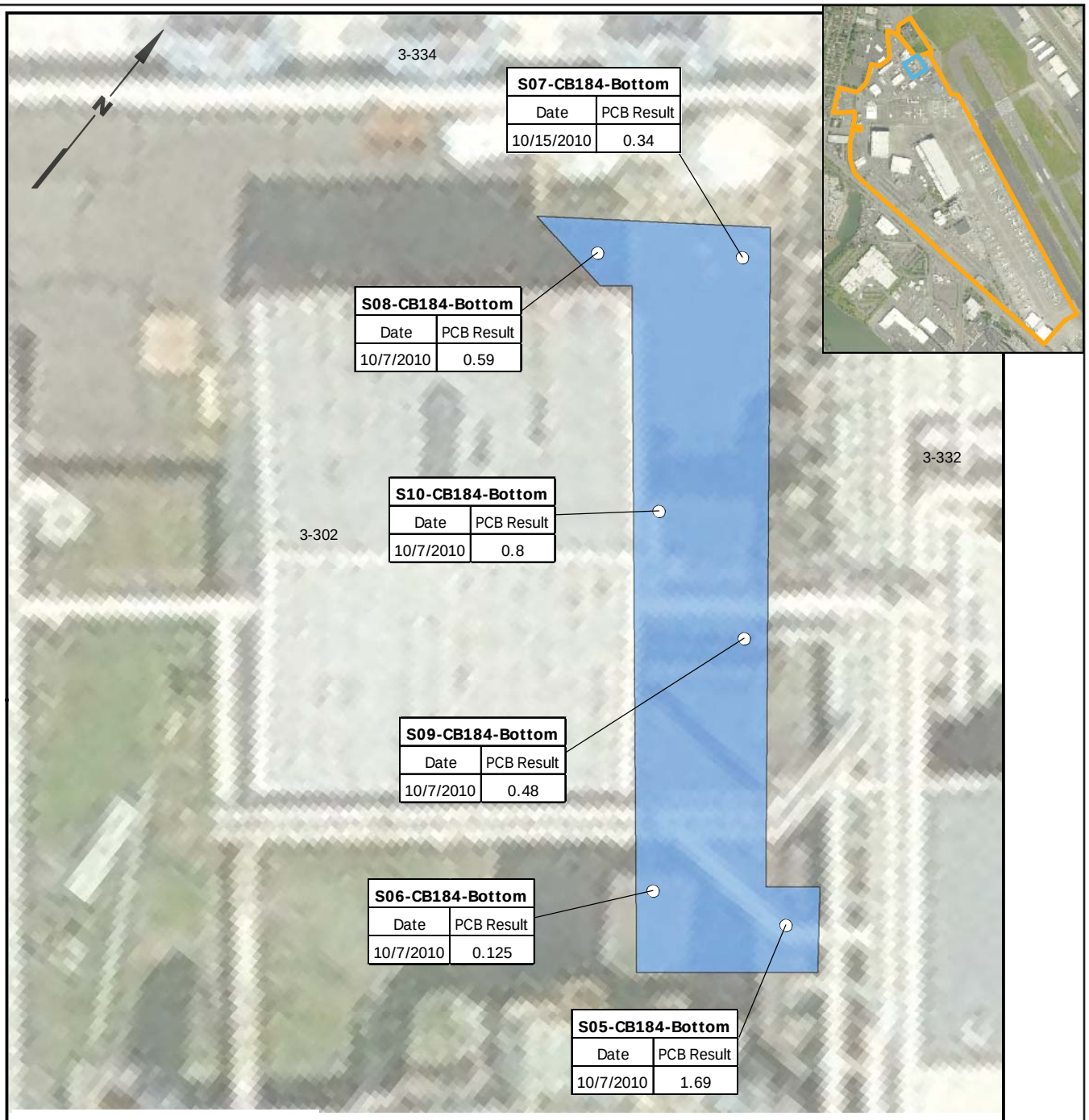
State of Washington

Figure 7.1–27. Excavation Areas and Sample Locations at Buildings 3-302 and 3-322 (2010)

SAIC
From Science to Solutions



LANDAU ASSOCIATES	North Boeing Field Seattle, Washington	**PCB Excavation Area and Confirmation Sample Results Representing Soil Left in Place**
		Figure 3

Source: Landau 2010j

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State of Washington

Figure 7.1–28. Building 3-302 PCB Excavation Area and Confirmation Sample Results (2010)

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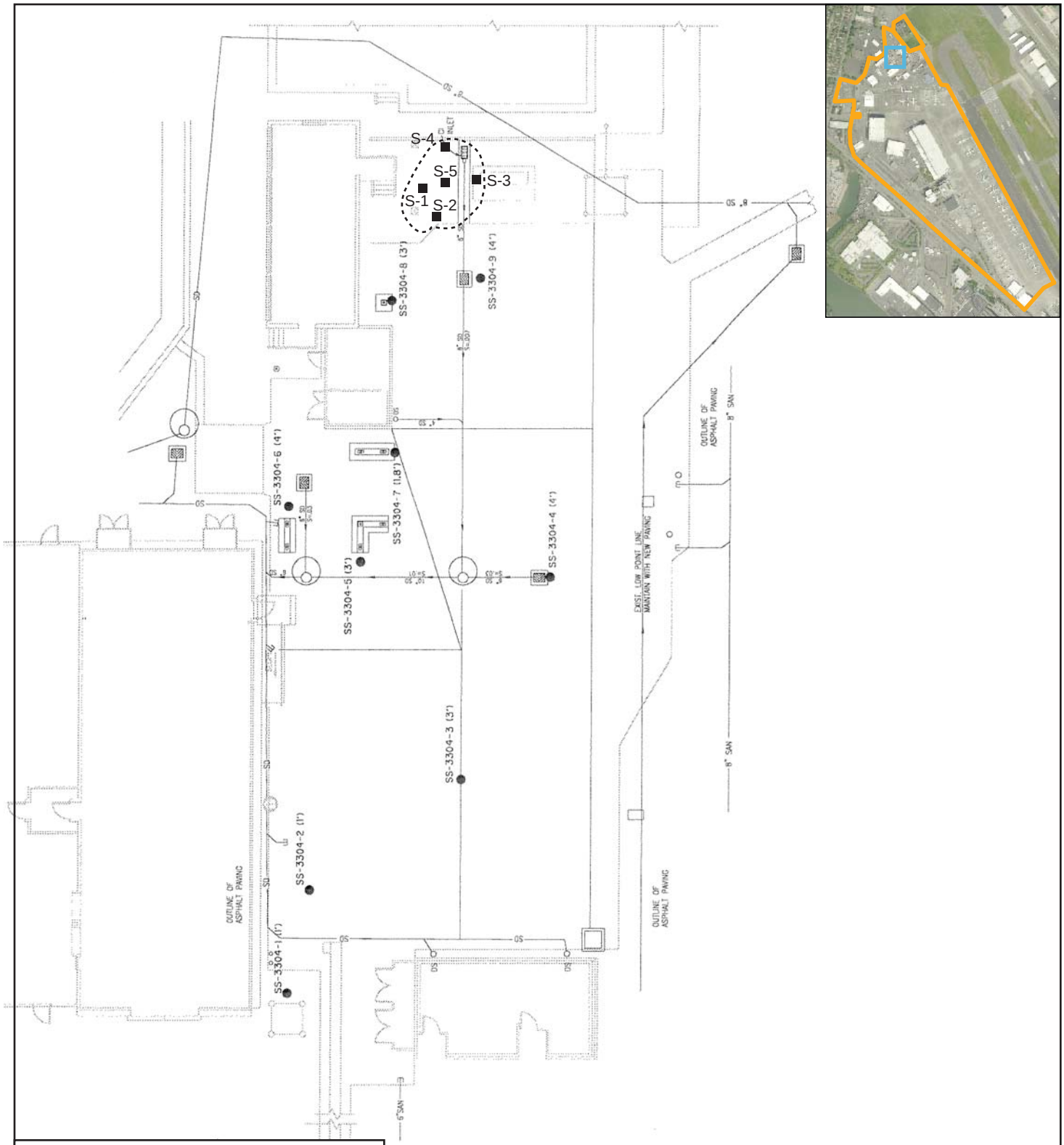

Legend

- Sample Location and Depth
- 2001 Excavation Confirmation Sample
- 2001 Limits of Excavation

1/16" = 1'- 0"

8 4 0 8 16

Sources: CDM 2000, 2001

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Figure 7.1–29. Former Building 3-304 Environmental Assessments and Remedial Excavation (2000–2001)

SAIC® From Science to Solutions

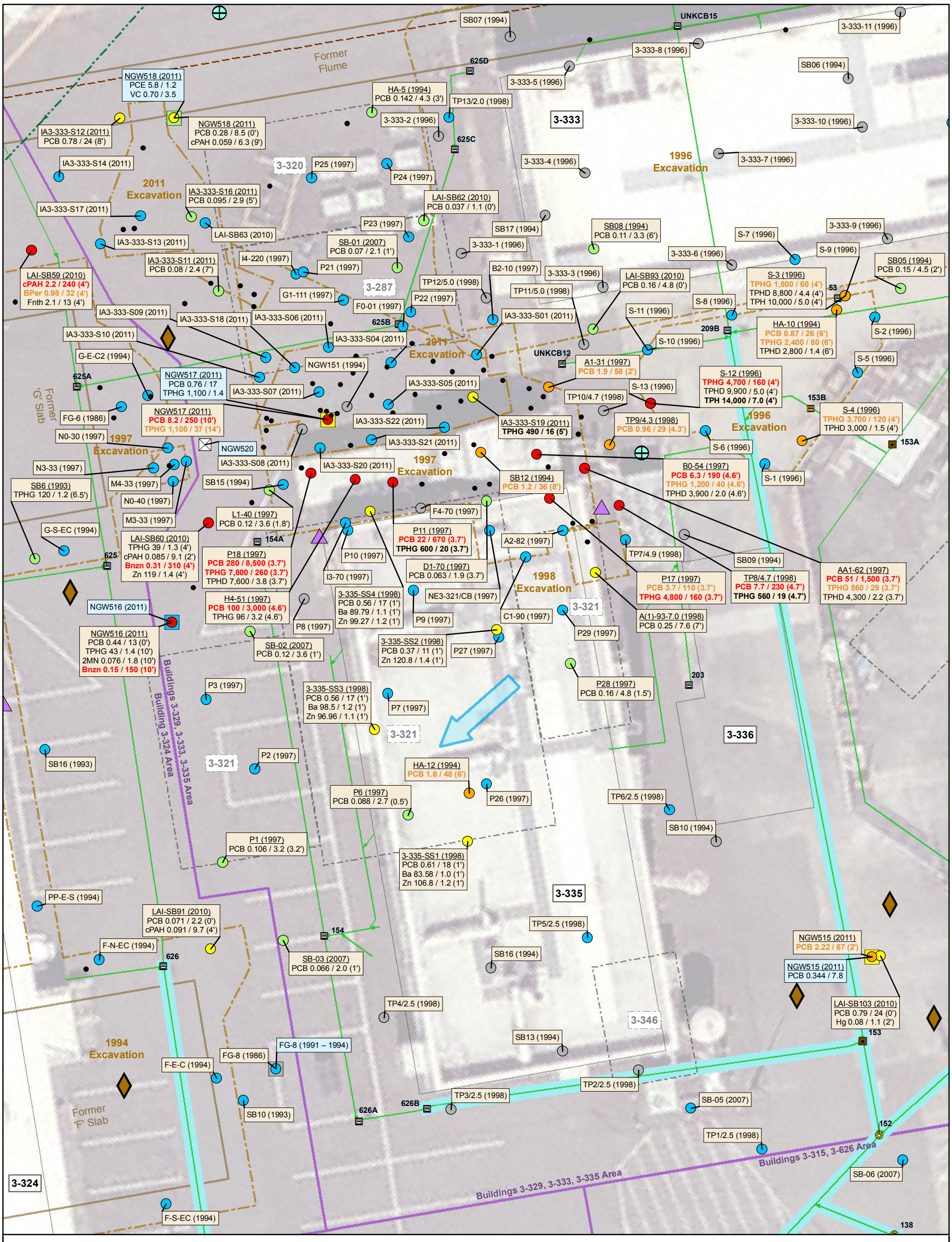

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Figure 7.1-30. Soil and Groundwater Sample Locations at Buildings 3-329, 3-333, and 3-335 Area (West Zone)

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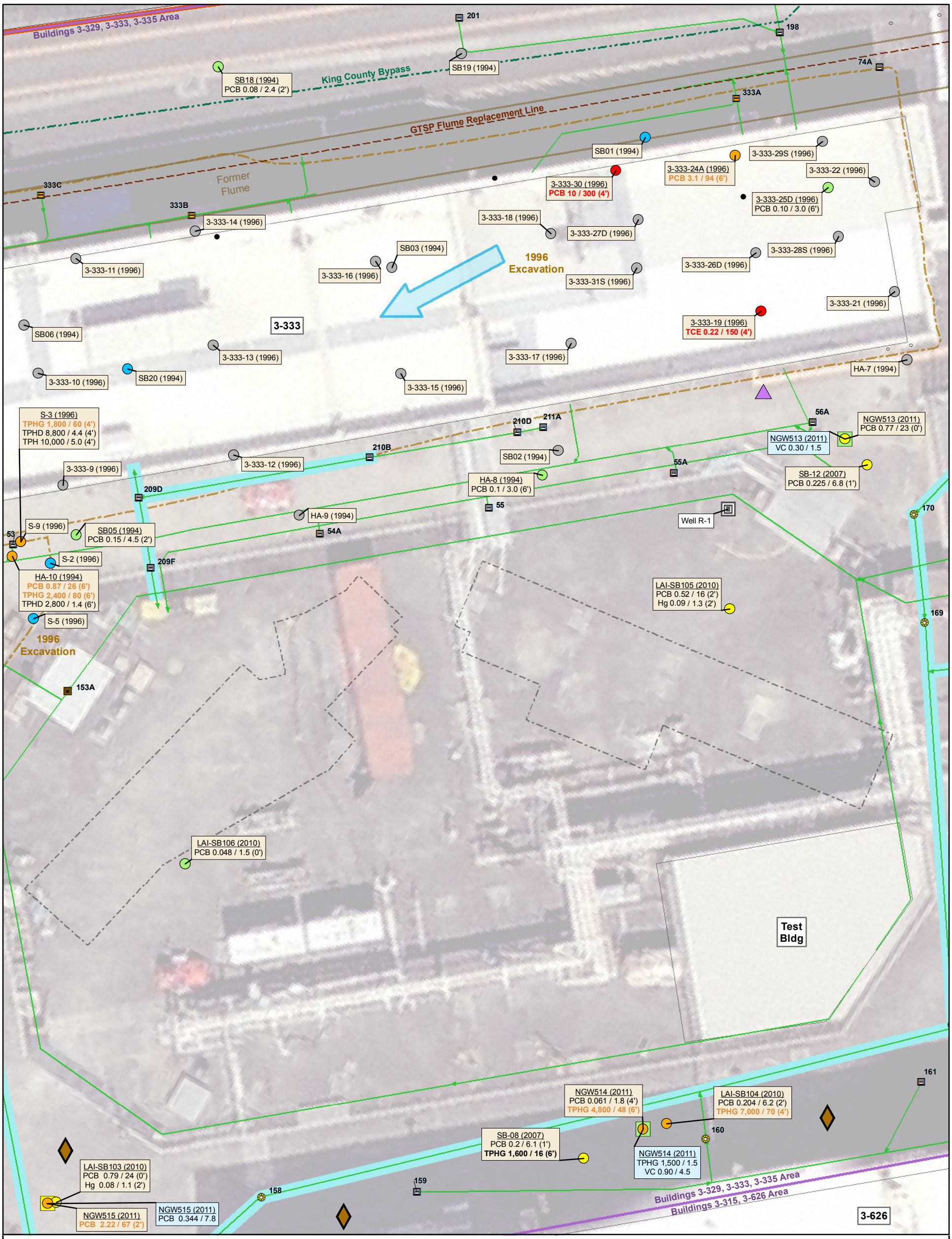
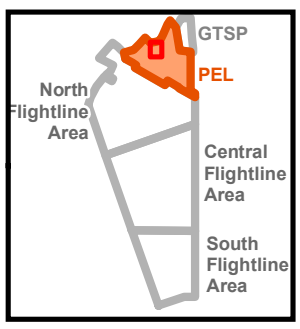
Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-31_Bldg3-333West_PEL.mxd
Illustrative purposes only.
Date Saved: 10/30/2013 11:16:00 AM





Labels:

Groundwater: Sample ID (Date) / Concentration / EF

Soil: Sample ID (Date) / Concentration / EF (Depth)

Bold Black: Max EF > 5 (for TPH only)
Orange: Max EF > 25 (all COPCs)
Red: Max EF > 125 (all COPCs)

Concentrations in mg/kg for soil.
Concentrations in ug/L for groundwater.

Soil and Groundwater Exceedances

EF Range
(only detected results unless stated):

- ND > 1 (all results ND)
- ≤ 1 (ND or detect)
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125
- All sampled soil excavated at location

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other
- Area where SD Line lies below the water table at high water levels

- Approximate Groundwater Flow Direction
- Approximate Outline of Excavation

Proposed Sample Locations

- Monitoring Well
- Soil Boring
- Soil Vapor Point

0 5 10 15 20
Feet

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State of Washington

Figure 7.1-31. Soil and Groundwater Sample Locations at Buildings 3-329, 3-333, and 3-335 Area (East Zone)

SAIC® From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-31_Bldg3-333East_PEL.mxd
Illustrative purposes only.

Date Saved: 9/29/2013 7:37:58 PM

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Figure 7.1-32. Soil and Groundwater Sample Locations at Buildings 3-329, 3-333, and 3-335 Area (Northwest Zone)

SAIC
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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-32_Bldg3-329_PEL.mxd
Illustrative purposes only.
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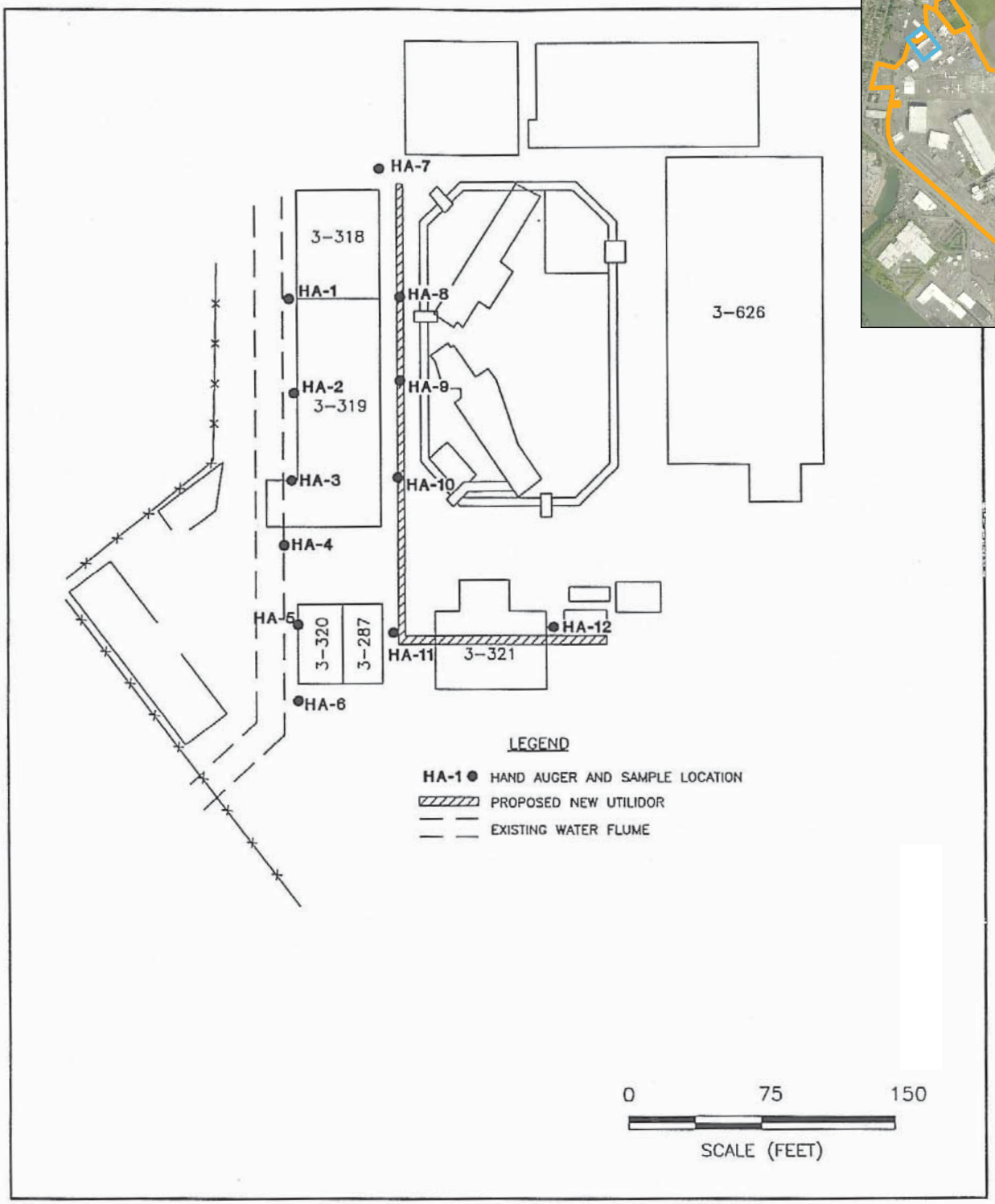

SECOR
Science & Engineering Analysis Corporation
Environmental Engineering

DWN AJW
APPR
DATE 10/3/94
JOB# 00100-095-01

FIGURE 4 - BORING LOCATIONS
PROPOSED 3-333 BUILDING
PRELIMINARY SITE ASSESSMENT
NORTH BOEING FIELD
SEATTLE, WASHINGTON

Sources: SECOR 1994d

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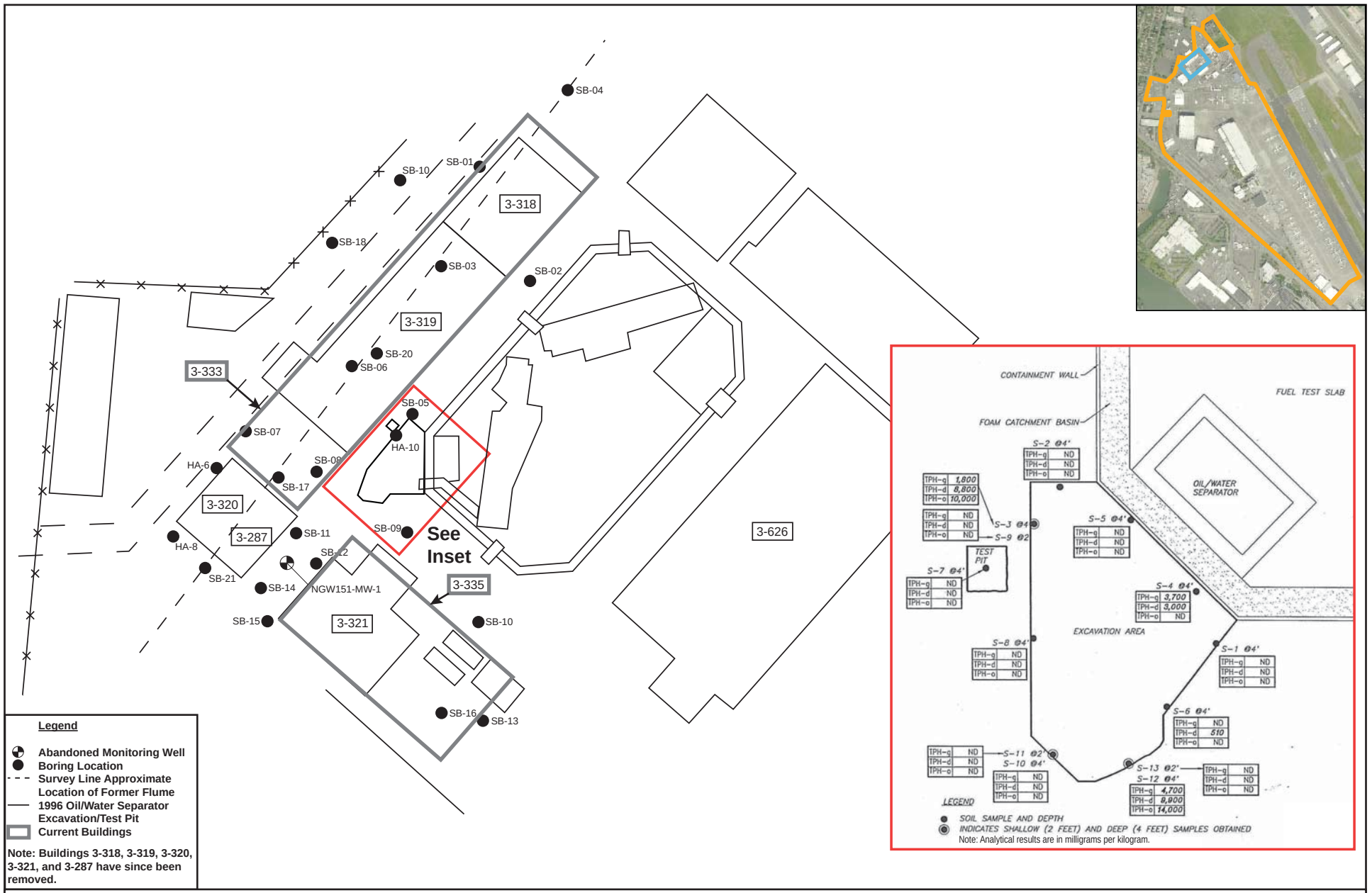
State of Washington

Figure 7.1–33. Building 3-333 Preliminary Site Assessment (1994)

SAIC
From Science to Solutions

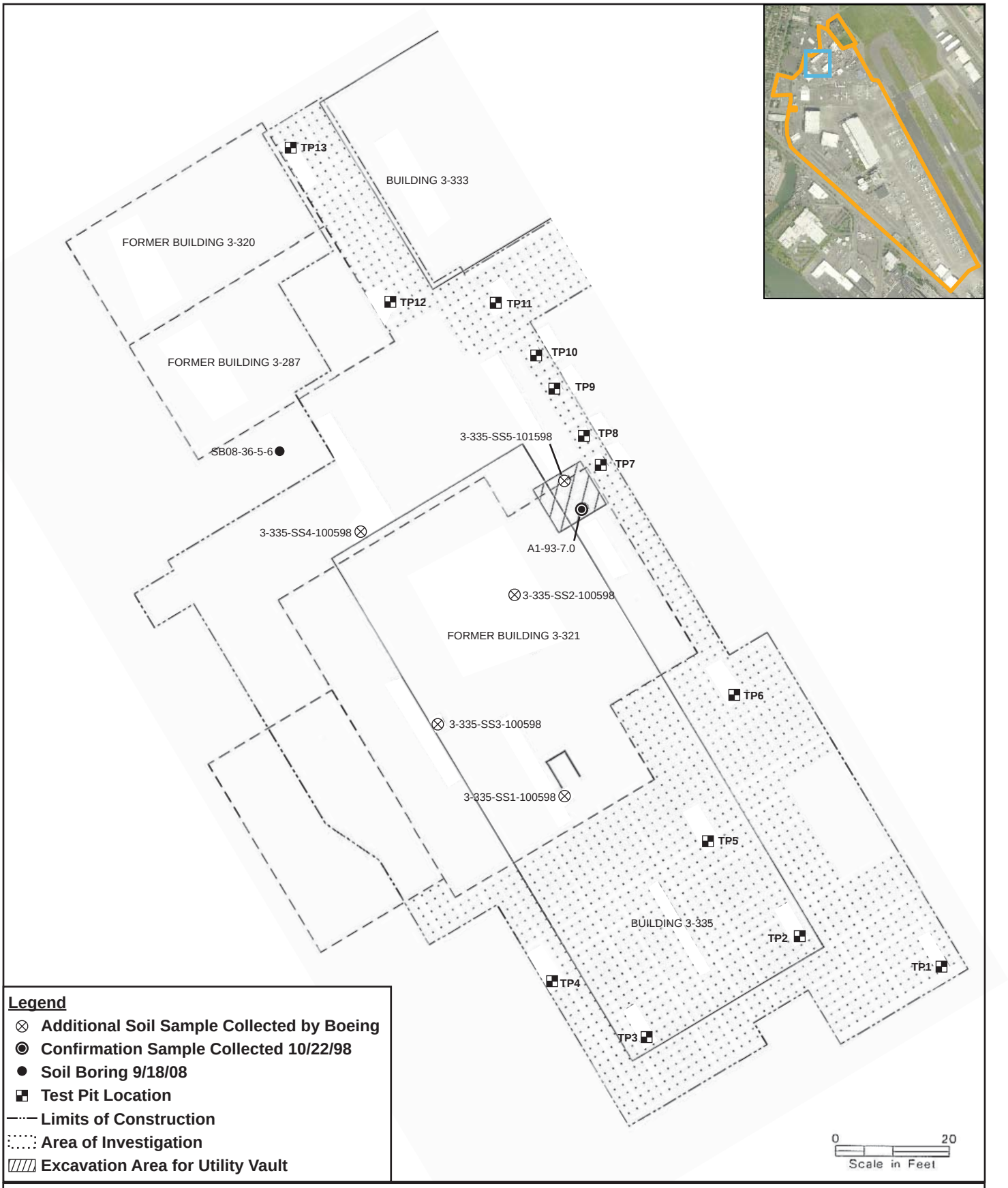


Sources: SECOR 1995, 1996a

Figure 7.1–34. Building 3-333 Assessments and Remedial Excavation (1994–1996)

DEPARTMENT OF ECOLOGY State of Washington

SAIC From Science to Solutions



Legend

- ⊗ Additional Soil Sample Collected by Boeing
- ◉ Confirmation Sample Collected 10/22/98
- ● Soil Boring 9/18/08
- ▪ Test Pit Location
- Limits of Construction
- Area of Investigation
- Excavation Area for Utility Vault

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N

Source: AGI 1999

Figure 7.1–35. Building 3-335 Environmental Assessment (1998)

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Y:\Projects\025082\212.002\MapDocs\3-333 Excavation\Figure 5 Building Excavation Areas.mxd 5/8/2012 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Result ≤ 0.5 mg/kg
Result > 0.5 mg/kg
Result ≥ 50 mg/kg
Confirmation Soil Sample Location Remaining in Place
Abandoned Groundwater Monitoring Well
Non-TSCA Excavation
TSCA Excavation
Utility Bank/Excavation Obstruction
Excavation Area
North Lateral
North-Central Lateral
Other lines
PEL Boundary

0 20 40
Scale in Feet

LANDAU ASSOCIATES

Notes

1. Samples shown represent soil left in place.
2. Excavation was completed to 6 ft BGS except where noted.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

North Boeing Field Seattle, Washington	**3-333 Building Final Excavation Areas, Depths, and PCB Confirmation Locations and Results**	Figure 5

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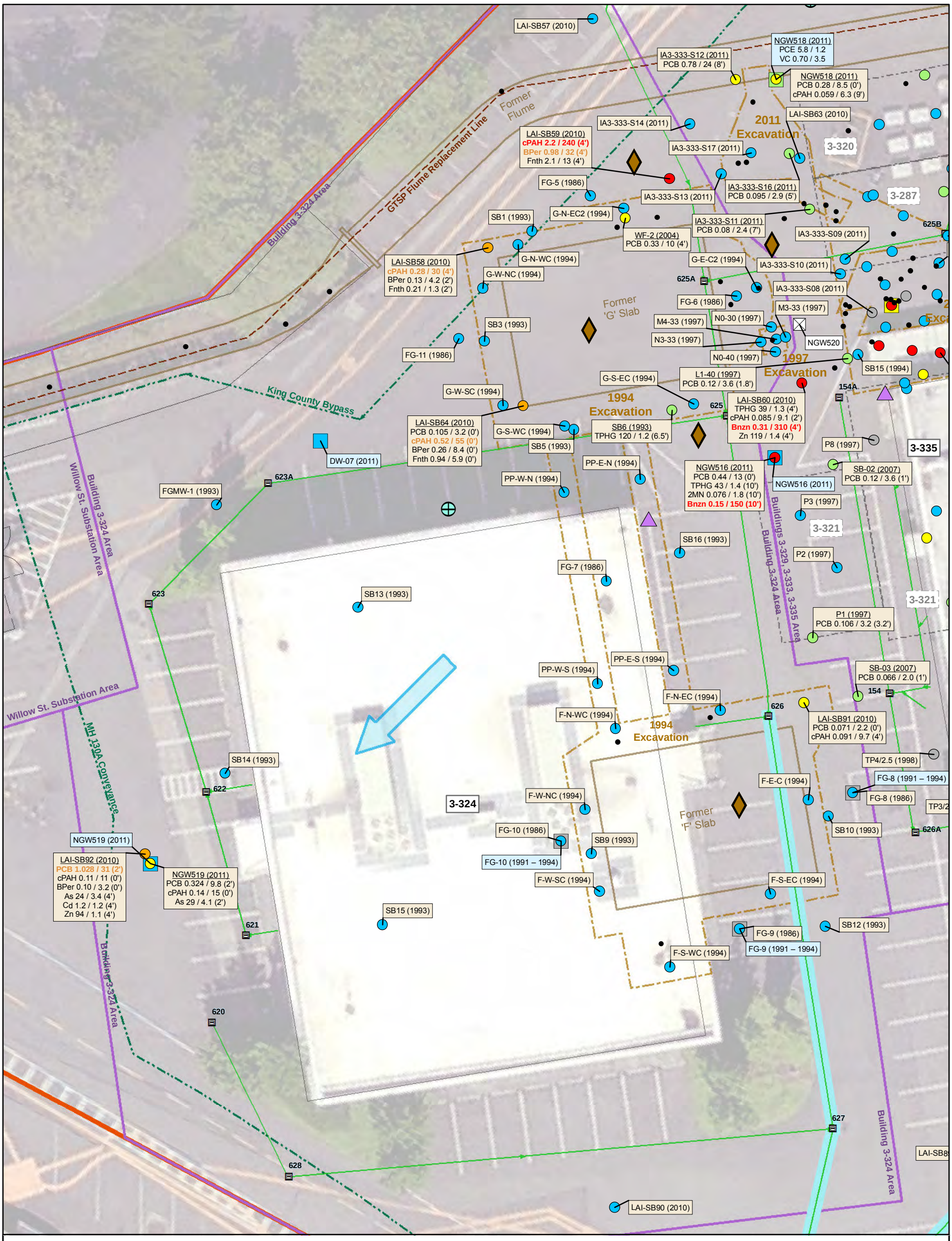
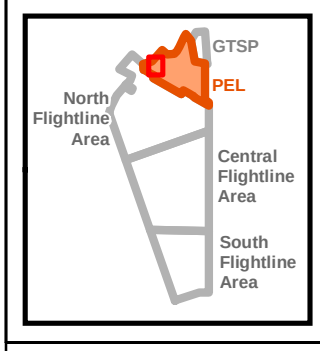
Figure 7.1–36. Building 3-333 Excavation Area (2011)

Source: Landau 2012f

SAIC® From Science to Solutions





Labels:

Groundwater: Sample ID (Date) Concentration / EF

Soil: Sample ID (Date) Concentration / EF (Depth)

Bold Black: Max EF > 5 (for TPH only)
Orange: Max EF > 25 (all COPCs)
Red: Max EF > 125 (all COPCs)

Concentrations in mg/kg for soil.
Concentrations in ug/L for groundwater.

Soil and Groundwater Exceedances

EF Range
(only detected results unless stated):

- ND > 1 (all results ND)
- ≤ 1 (ND or detect)
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125
- All sampled soil excavated at location

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other
- Area where SD Line lies below the water table at high water levels

- Approximate Groundwater Flow Direction
- Approximate Outline of Excavation

Proposed Sample Locations

- Monitoring Well
- Soil Boring
- Soil Vapor Point

0 5 10 15 20 Feet

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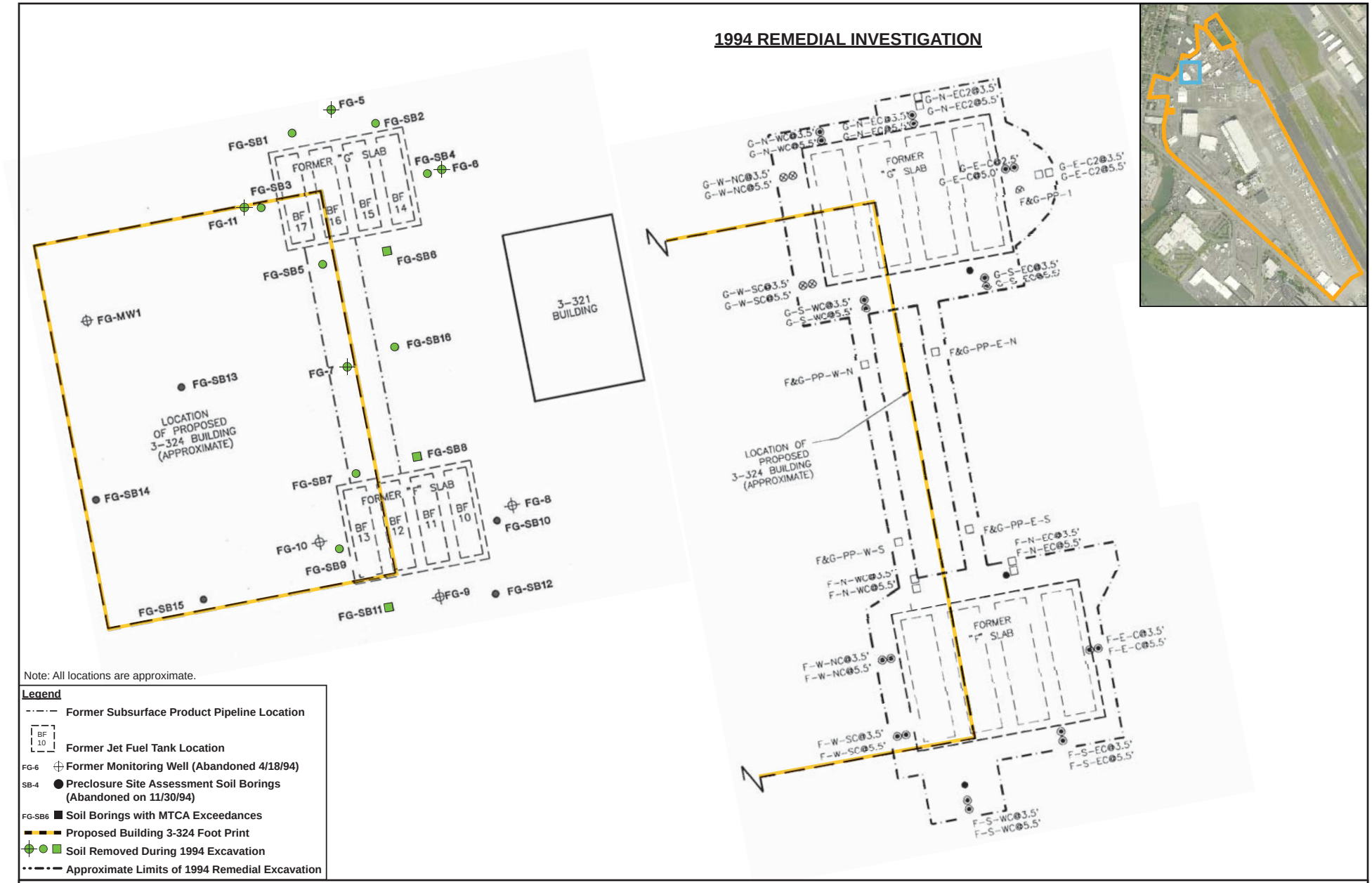
Figure 7.1-37. Soil and Groundwater Sample Locations at Building 3-324 Area

SAIC From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-37_Bldg3-324_PEL.mxd
Illustrative purposes only.

Date Saved: 9/27/2013 4:11:42 PM



Note: All locations are approximate.

Legend

- Former Subsurface Product Pipeline Location
- BF 10 — Former Jet Fuel Tank Location
- FG-6 — Former Monitoring Well (Abandoned 4/18/94)
- SB-4 — Preclosure Site Assessment Soil Borings (Abandoned on 11/30/94)
- FG-SB6 — Soil Borings with MTCA Exceedances
- Proposed Building 3-324 Foot Print
- Soil Removed During 1994 Excavation
- Approximate Limits of 1994 Remedial Excavation

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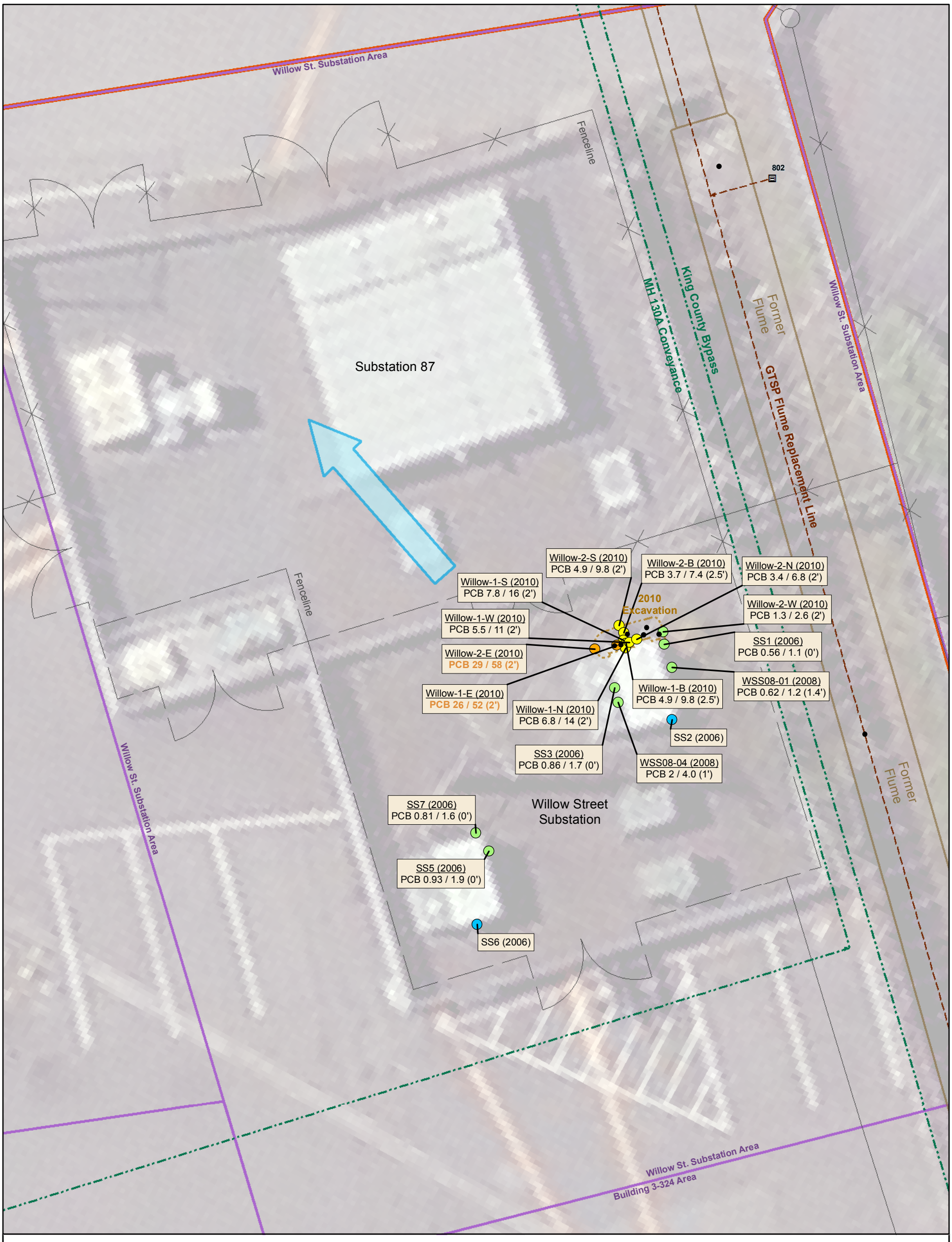
State of Washington

N

Source: SECOR 1994e

SAIC
From Science to Solutions

Figure 7.1–38. Former F&G Facility Environmental Assessments (1986, 1993–1994)

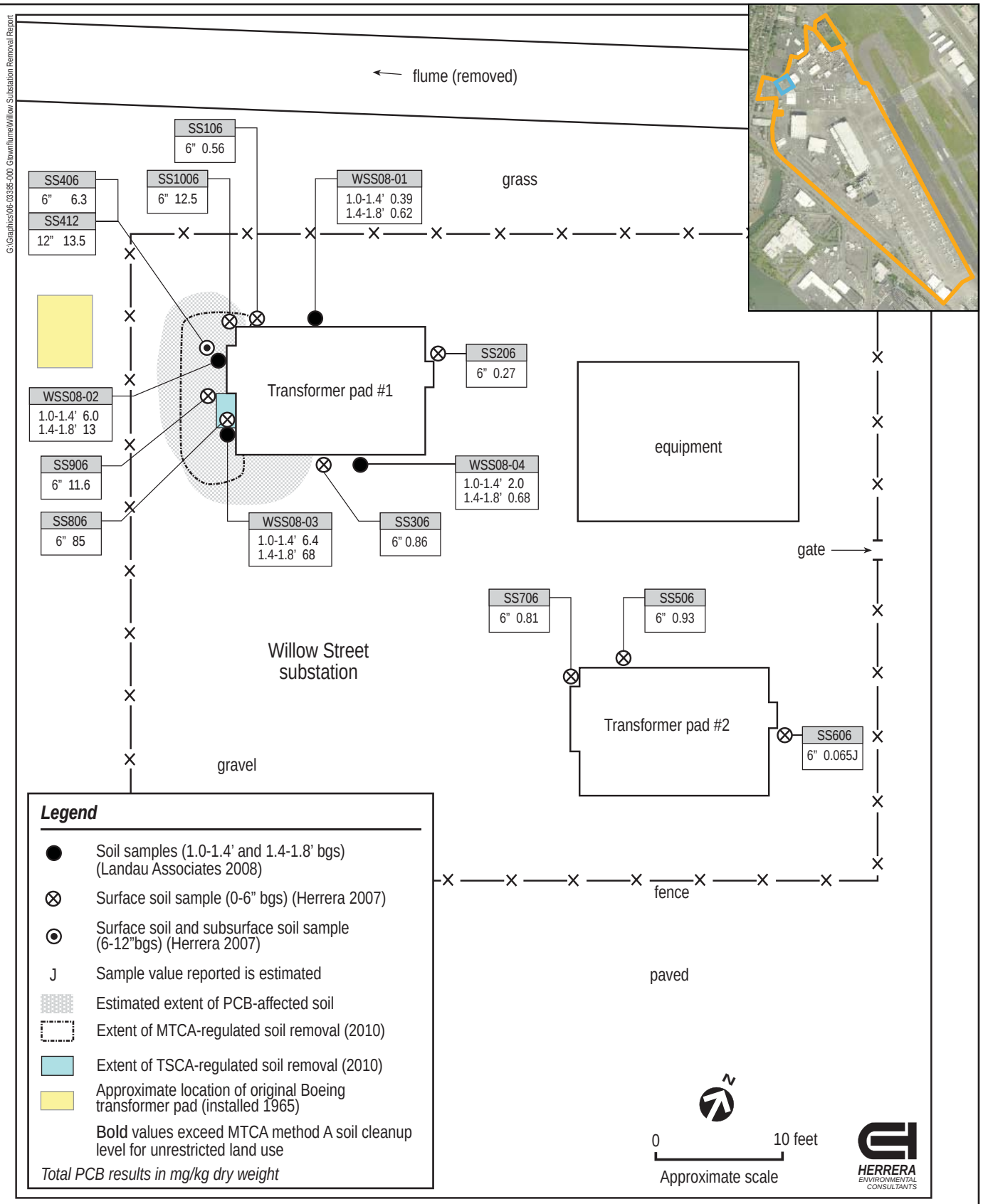


DEPARTMENT OF ECOLOGY
State of Washington

Figure 7.1-39. Soil and Groundwater Sample Locations at Willow Street Substation Area

SAIC From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-39_WillowStreetSS_PEL.mxd
Illustrative purposes only.
Date Saved: 9/29/2013 3:42:37 PM



Source: Herrera 2011

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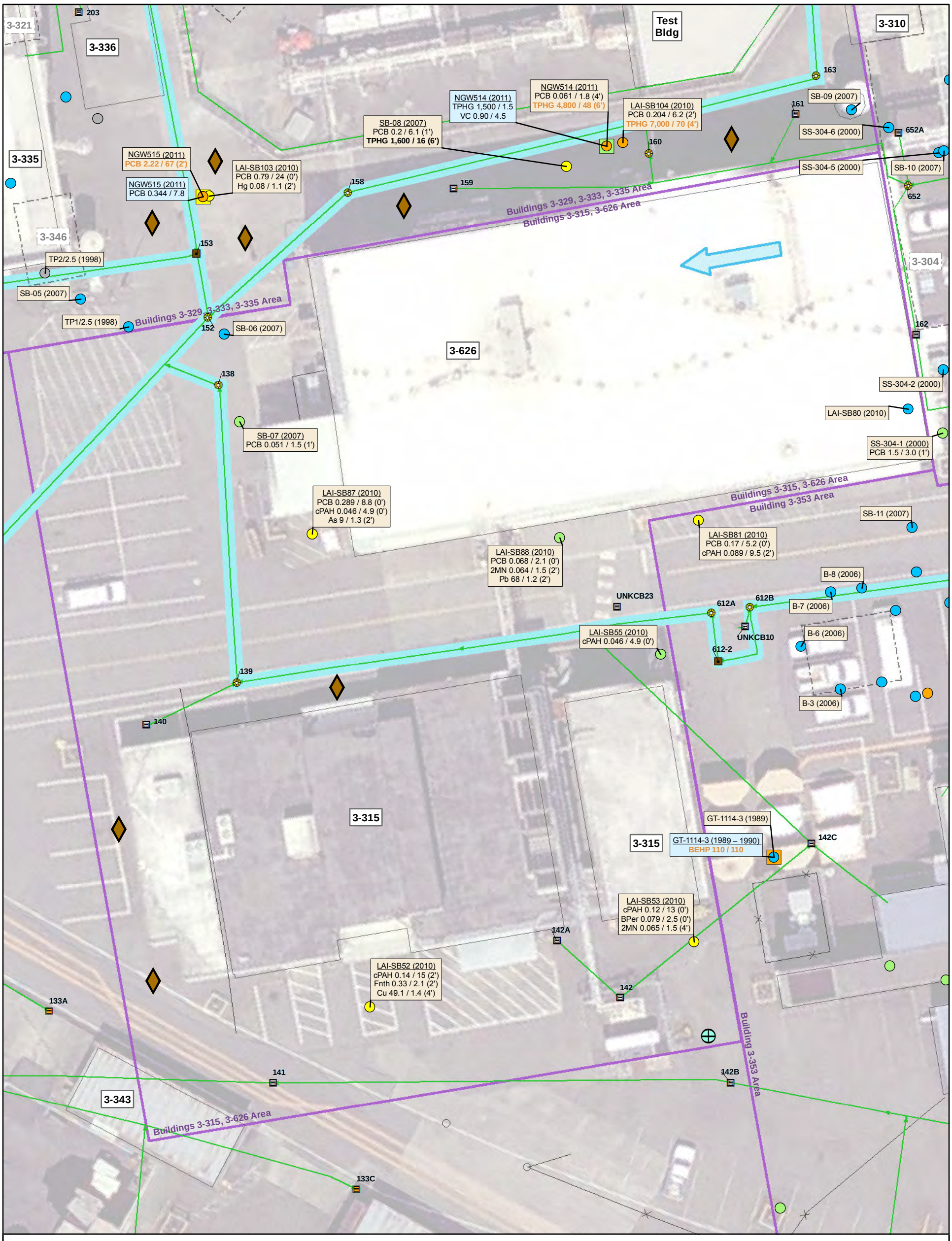
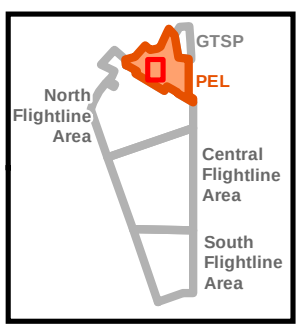
Figure 7.1–40. Willow Street Substation Assessments and Remedial Excavation (2006–2010)

SAIC® From Science to Solutions





Labels:

Groundwater: Sample ID (Date) / Concentration / EF

Soil: Sample ID (Date) / Concentration / EF (Depth)

Bold Black: Max EF > 5 (for TPH only)
Orange: Max EF > 25 (all COPCs)
Red: Max EF > 125 (all COPCs)

Concentrations in mg/kg for soil.
Concentrations in ug/L for groundwater.

Soil and Groundwater Exceedances

EF Range
(only detected results unless stated):

- ND > 1 (all results ND)
- ≤ 1 (ND or detect)
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125
- All sampled soil excavated at location

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other
- Area where SD Line lies below the water table at high water levels

- Approximate Groundwater Flow Direction
- Approximate Outline of Excavation

Proposed Sample Locations

- Monitoring Well
- Soil Boring

0 10 20 30
Feet

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State of Washington

Figure 7.1-41. Soil and Groundwater Sample Locations at Buildings 3-315 and 3-626 Areas

SAIC From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-41_Bldg3-315_PEL.mxd
Illustrative purposes only.
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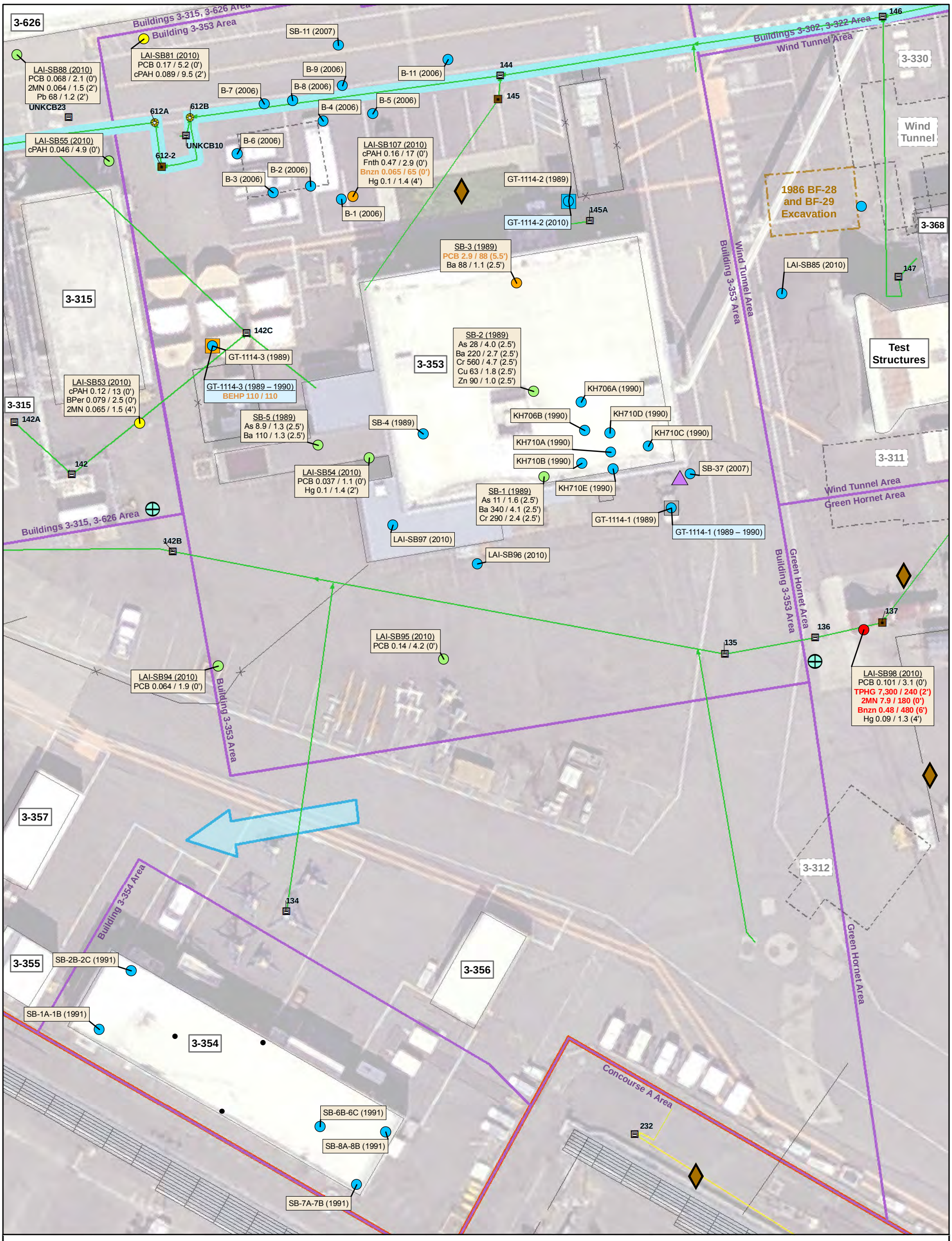


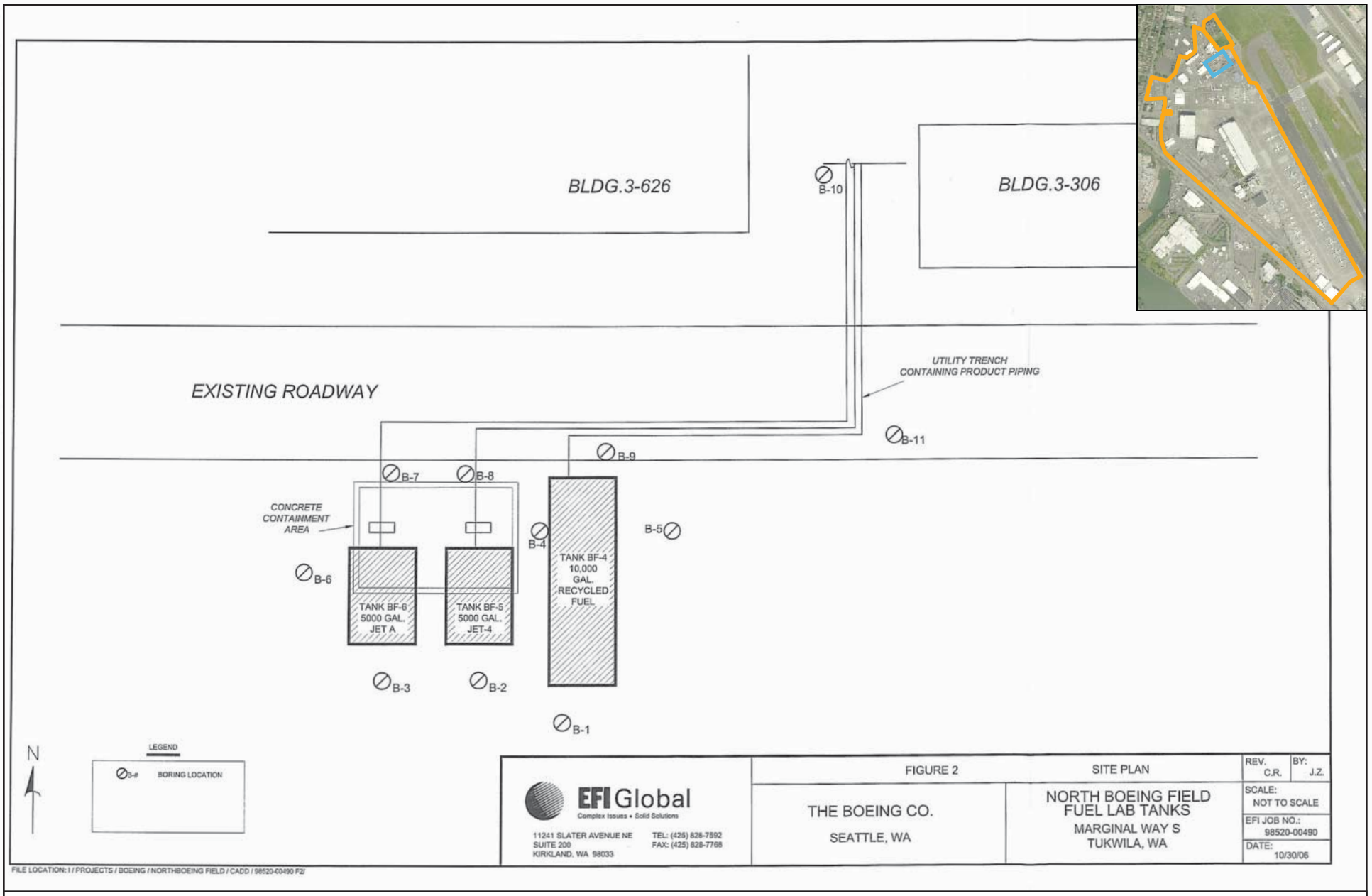
DEPARTMENT OF ECOLOGY
State of Washington

Figure 7.1-42. Soil and Groundwater Sample Locations at Buildings 3-353 and 3-354 Area

SAIC
From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-42_Bldg3-353_PEL.mxd
Illustrative purposes only.

Date Saved: 8/2/2013 7:07:42 PM



Source: EFI Global 2006

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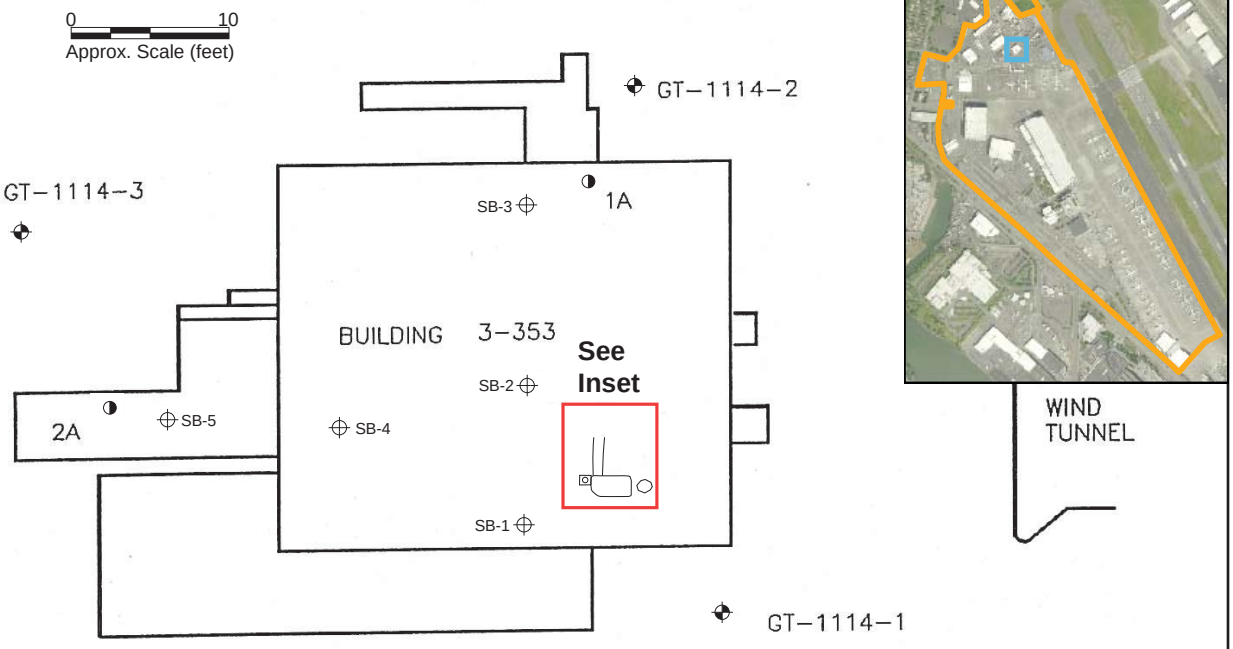
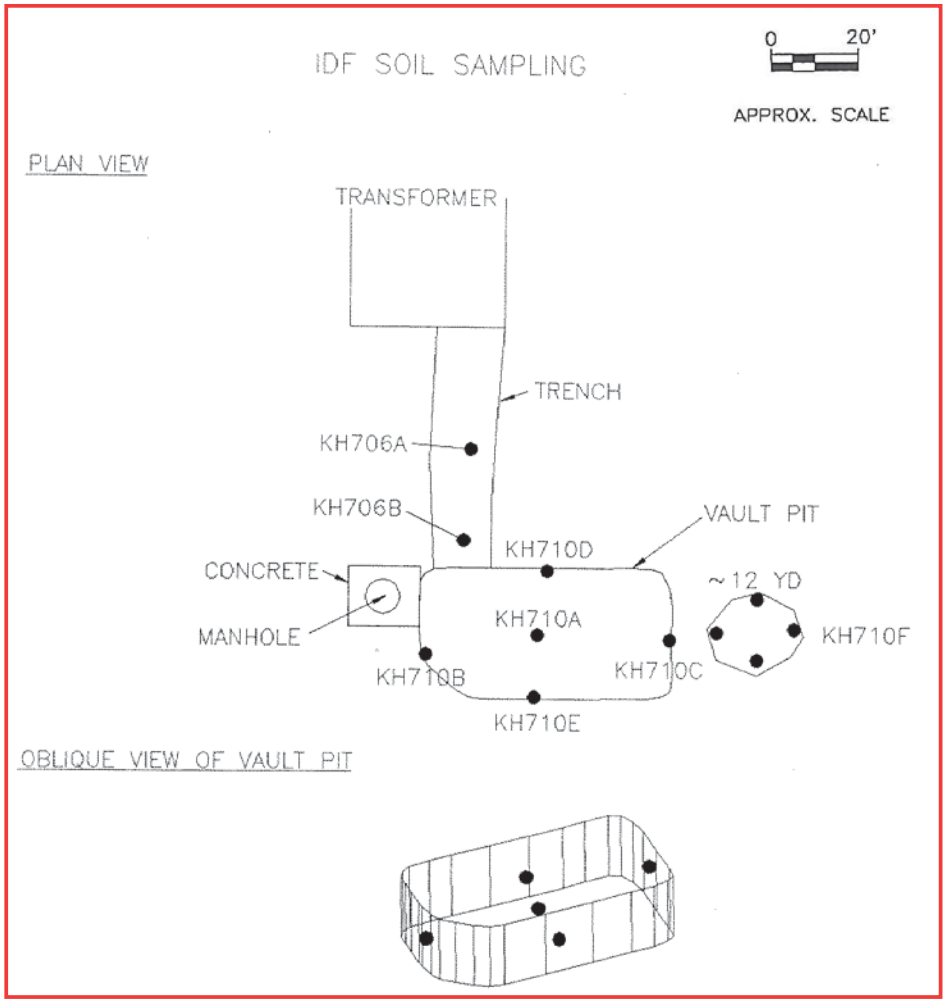
Figure 7.1–43. Tanks BF-4, BF-5, and BF-6 Assessment





Legend

- Monitoring Well
- Soil Boring
- Sampling Point
- Unknown Sampling Point

Sources: GTI 1990a, 1990e

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Figure 7.1–44. Building 3-353 Assessment and Remedial Excavation (1989–1990)

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FUTURE EXPANSION

SB–5

SB–2

SB–3

SB–1

CONCRETE PAD

SB–6

SB–8

PHASE 1
PROP. BLDG. 3–354

SB–4

SB–7

BLAST FENCE

Legend

- Soil boring
- Soil boring with soil in the vicinity excavated in 1992. Excavation limits are unknown.

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N

Source: GTI 1991b

Figure 7.1–45. Building 3-354 Assessment and Remedial Excavation

0 20’

Approx. Scale

SAIC® From Science to Solutions

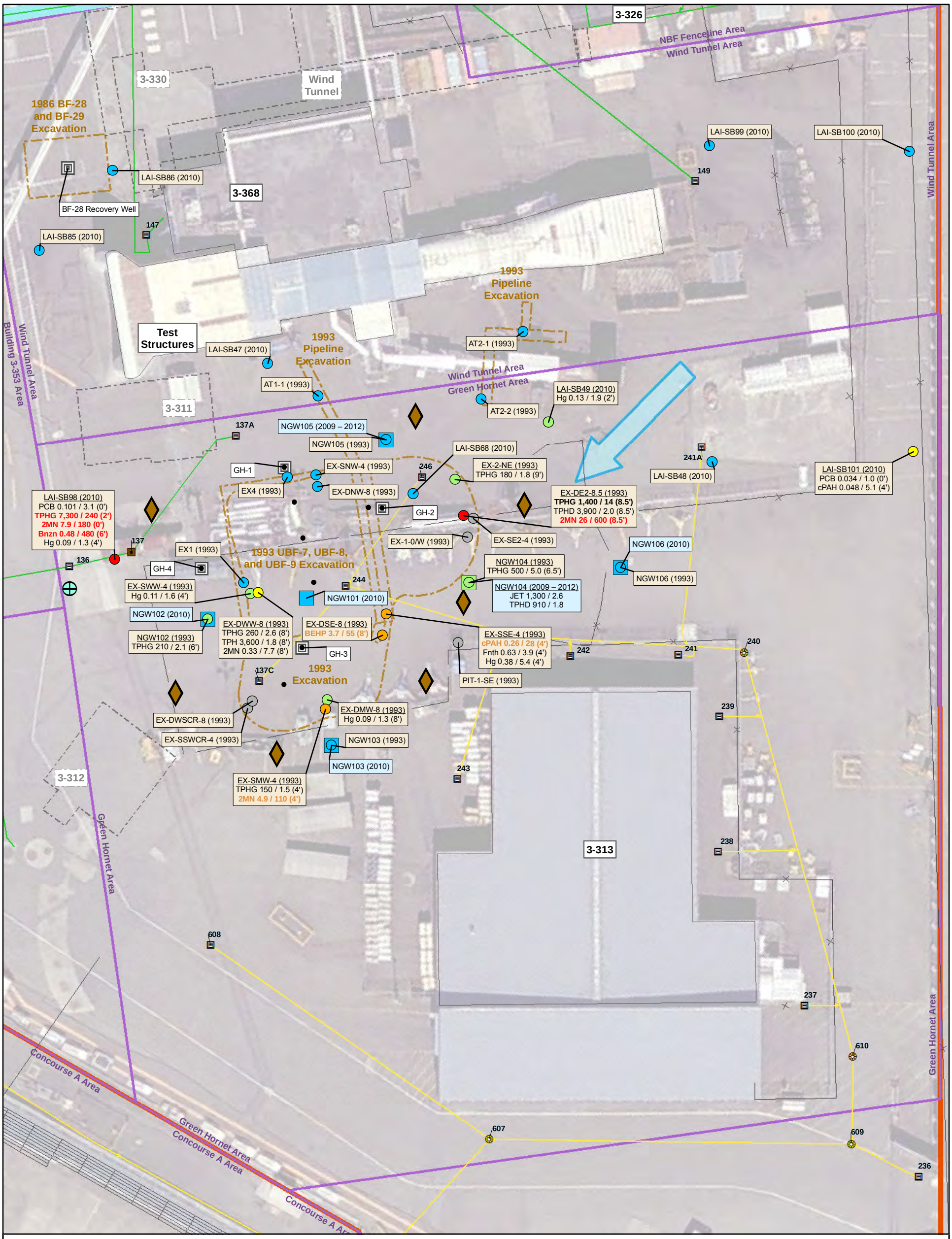

Figure 7.1-46. Soil and Groundwater Sample Locations at Wind Tunnel and Green Hornet Areas

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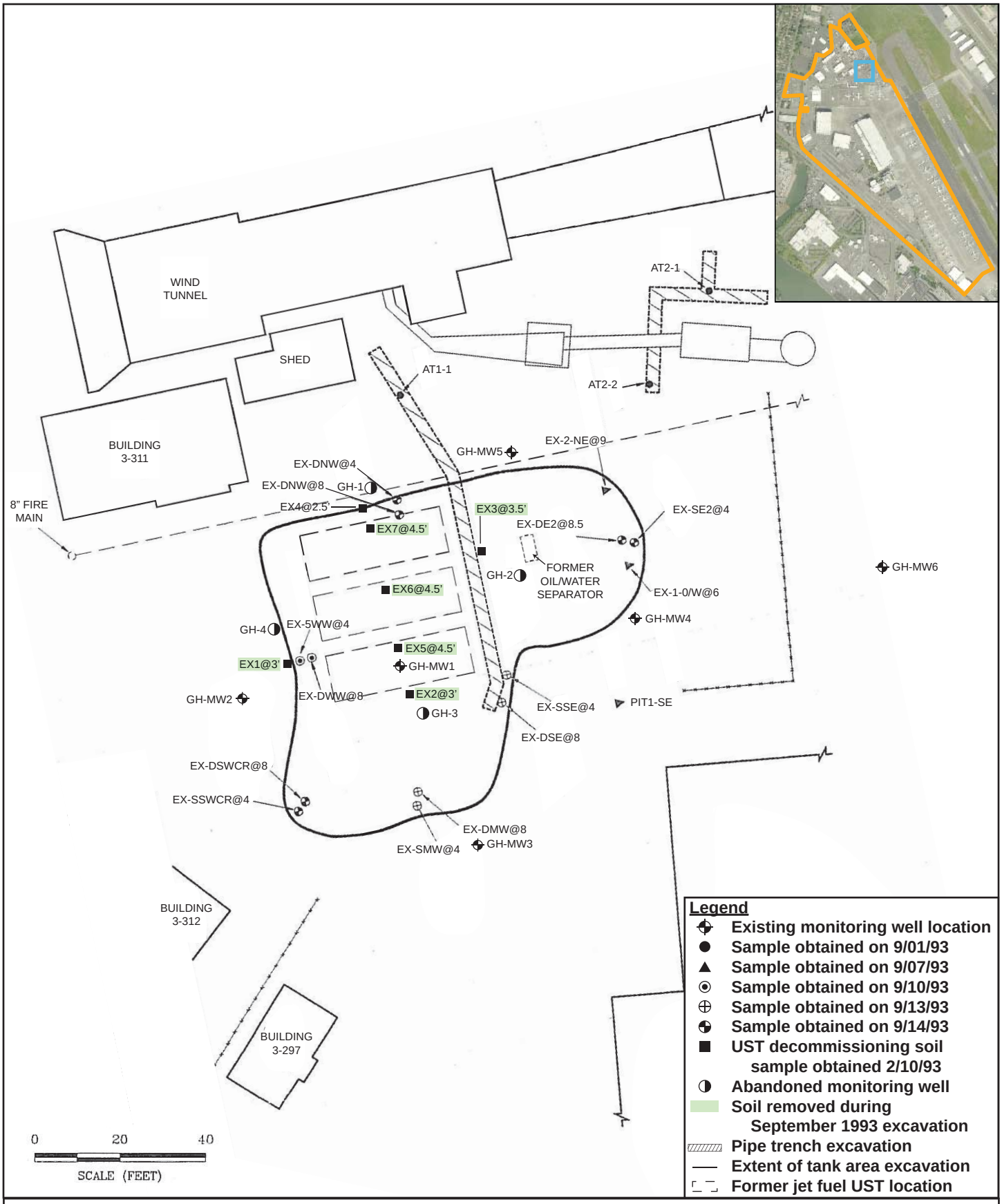
From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-46_WindTunnel&GreenHornet_PEL.mxd
Illustrative purposes only.
Date Saved: 9/29/2013 7:00:10 PM



Sources: Landau 1986d; SEACOR 1993d, 1994c

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Figure 7.1–47. Green Hornet Area Assessments and Remedial Excavation (1985–1986 and 1992–1994)

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KCIA-MW1
GTSP
GTSP-1
FTATW03
GTSP-8
BLDG 3-323 AREA
3-317
National Guard
NGW511
3-329
3-323
3-333
NGW512
NGW513
BLDGS 3-329, 3-333, 3-335 AREA
3-334
3-331
NGW510
NGW523
GTSP-7
GTSP-2
3-302
3-332
NGW522
NGW521
NSF
NGW520
NGW516
3-336
3-310
Test Bldg
NGW509
WILLOW ST. SUBSTATION AREA
3-335
NGW514
Tank
FORMER BLDG 3-304 AREA
NGW505
NGW515
BLDGS 3-302, 3-322 AREA
3-322
NGW506
NBF FENCELINE AREA
NGW519
3-324
3-626
NGW508
3-306
BLDG 3-324 AREA
BLDGS 3-315, 3-626 AREA
3-326
GT-1114-2
WIND TUNNEL AREA
3-368
3-315
Test Structures
3-353
3-341
BLDG 3-353 AREA
NGW105
3-350
3-343
NGW106
NGW102
NGW101
NGW104
3-357
NGW103
3-355
3-356
GREEN HORNET AREA
3-313
3-354
BLDG 3-354 AREA
A-1
A-2
A-3
A-4
3-380
3-1
3-12
A-5
Existing Groundwater Wells
Proposed Sample Locations
Monitoring Well
Soil Boring
Soil Vapor Point
Site Sub-Area Boundary
Area of Concern Boundary
Building
0 50 100 150 Feet
Boiler Room
3-390
3-369
GTSP
PEL
North Flightline Area
Central Flightline Area
South Flightline Area

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Figure 7.1-48. Proposed Locations of Soil Borings, Groundwater Monitoring Wells, and Soil Vapor Points at PEL and Surrounding Areas

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-48_Wells_at_PEL_Area.mxd
Illustrative purposes only.
Date Saved: 11/7/2013 5:01:07 PM

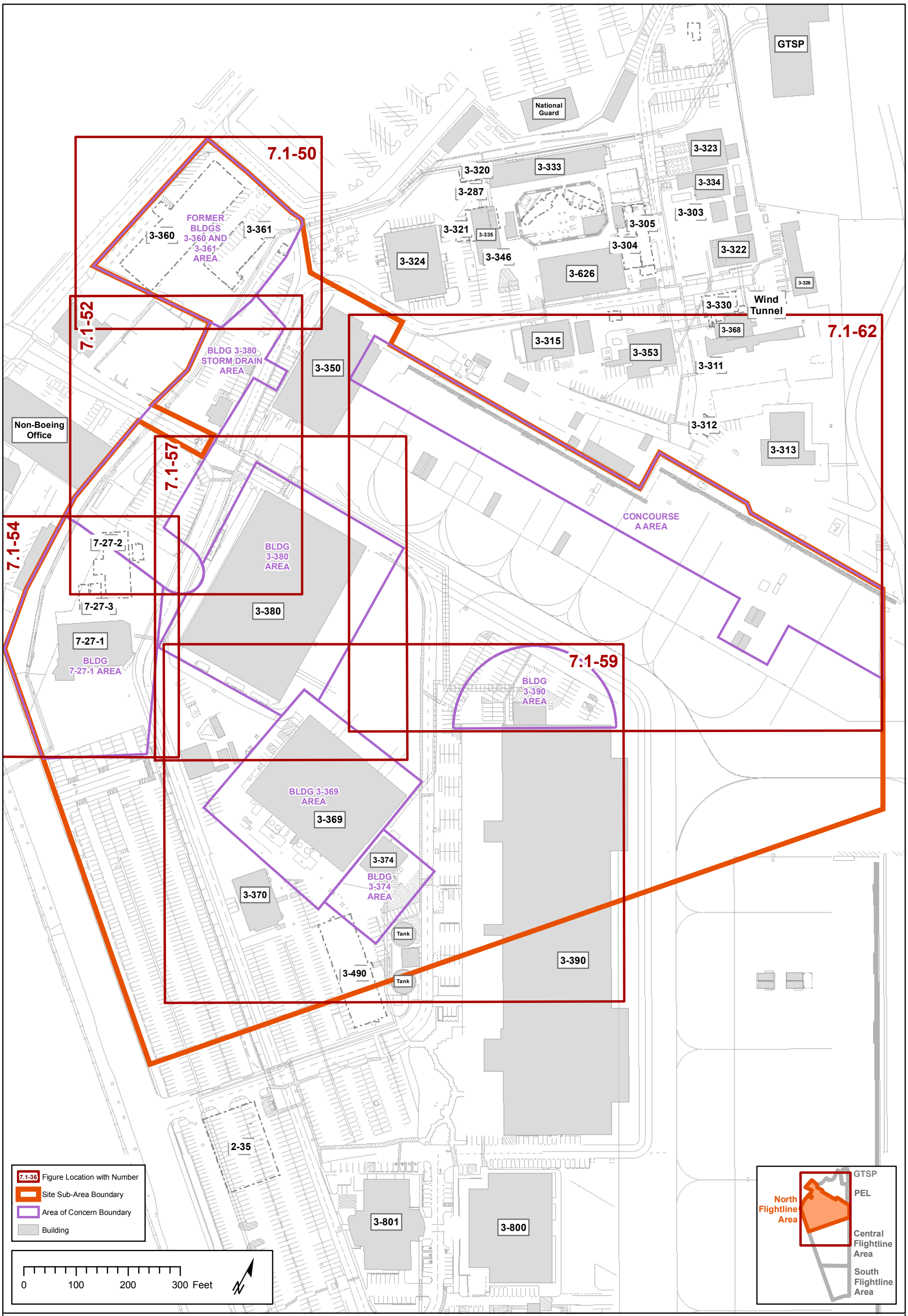

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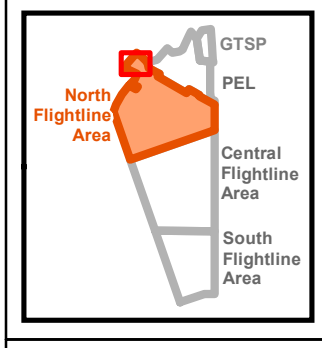
Figure 7.1-49. Areas of Concern at North Flightline Area

SAIC® From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-49_Area_of_Concern_at_North_Flightline_Area.mxd
Illustrative purposes only.
Date Saved: 10/7/2013 6:18:04 PM

Fire Station Seattle

NGW207 (2010 – 2012)
126A
126
360-HA-2 (1991)
125
NGW225 (2011)
TCE 4.3 / 1.1
360-HA-1 (1991)
NGW201 (2008 – 2010)
cDCE 55 / 3.4
TCE 30 / 7.5
DP10
DP6
NGW210
NGW210 (1995)
NGW203 (2010 – 2012)
cDCE 86 / 5.4
TCE 15 / 3.8
VC 0.70 / 3.5
DP11
Former Buildings 3-360, 3-361 Area
3-360
DP13
NGW227 (2011)
TCE 4.4 / 1.1
120
NGW209
NGW209 (1995)
DP8
DP4
NGW220 (2011)
NGW206 (2010 – 2012)
cDCE 73 / 4.6
TCE 64 / 16
VC 0.80 / 4.0
120A
121
DP12
124
DP5
NGW211 (2010 – 2012)
TCE 13 / 3.3
NGW211 (1995)
DP7
DP3
NGW222 (2011)
TCE 8.4 / 2.1
NGW205
360-SB-2 (1991)
Hg 0.35 / 5.0 (4.5')
121A
360-SB-8 (1991)
SD08-14 (2008)
DW-05 (2011)
118B
DP9
123
3-361
NGW229 (2011)
NGW212 (2010 – 2012)
TCE 6.6 / 1.7
VC 7.0 / 35
DP1
DP1 (2002)
cDCE 0.034 / 6.5 (8')
TCE 0.20 / 130 (8')
SD30 (2008)
360-SB-5 (1991)
GTSP Flume Replacement Line
118
120B
121B
SS-6-360 (2002)
cDCE 0.50 / 96 (9')
TCE 5.4 / 3,600 (9')
122
2002 Excavation
SD08-15 (2008)
118A
360-SB-3 (1991)
120C
King County Bypass
Former Flume
NGW224 (2011)
120E
DP2
Building 3-380 Storm Drain Area
360-SB-7 (1991)
120D
DW-06 (2011)
NGW204
MH 130 Conveyance
Willow St. Substation Area
802
Former Flume
3-350



Labels:

Groundwater: Sample ID (Date) / Concentration / EF

Soil: Sample ID (Date) / Concentration / EF (Depth)

Bold Black: Max EF > 5 (for TPH only)
Orange: Max EF > 25 (all COPCs)
Red: Max EF > 125 (all COPCs)

Concentrations in mg/kg for soil.
Concentrations in ug/L for groundwater.

Soil and Groundwater Exceedances

EF Range
(only detected results unless stated):

- ND > 1 (all results ND)
- ≤ 1 (ND or detect)
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125
- All sampled soil excavated at location

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other
- Area where SD Line lies below the water table at high water levels

- Approximate Groundwater Flow Direction
- Approximate Outline of Excavation

Proposed Sample Locations

Monitoring Well Soil Boring

0 10 20 30 40 50
Feet

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Figure 7.1-50. Soil and Groundwater Sample Locations at Former Buildings 3-360 and 3-361 Area

SAIC From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-50_Bldg3-360_361Areas.mxd
Illustrative purposes only.
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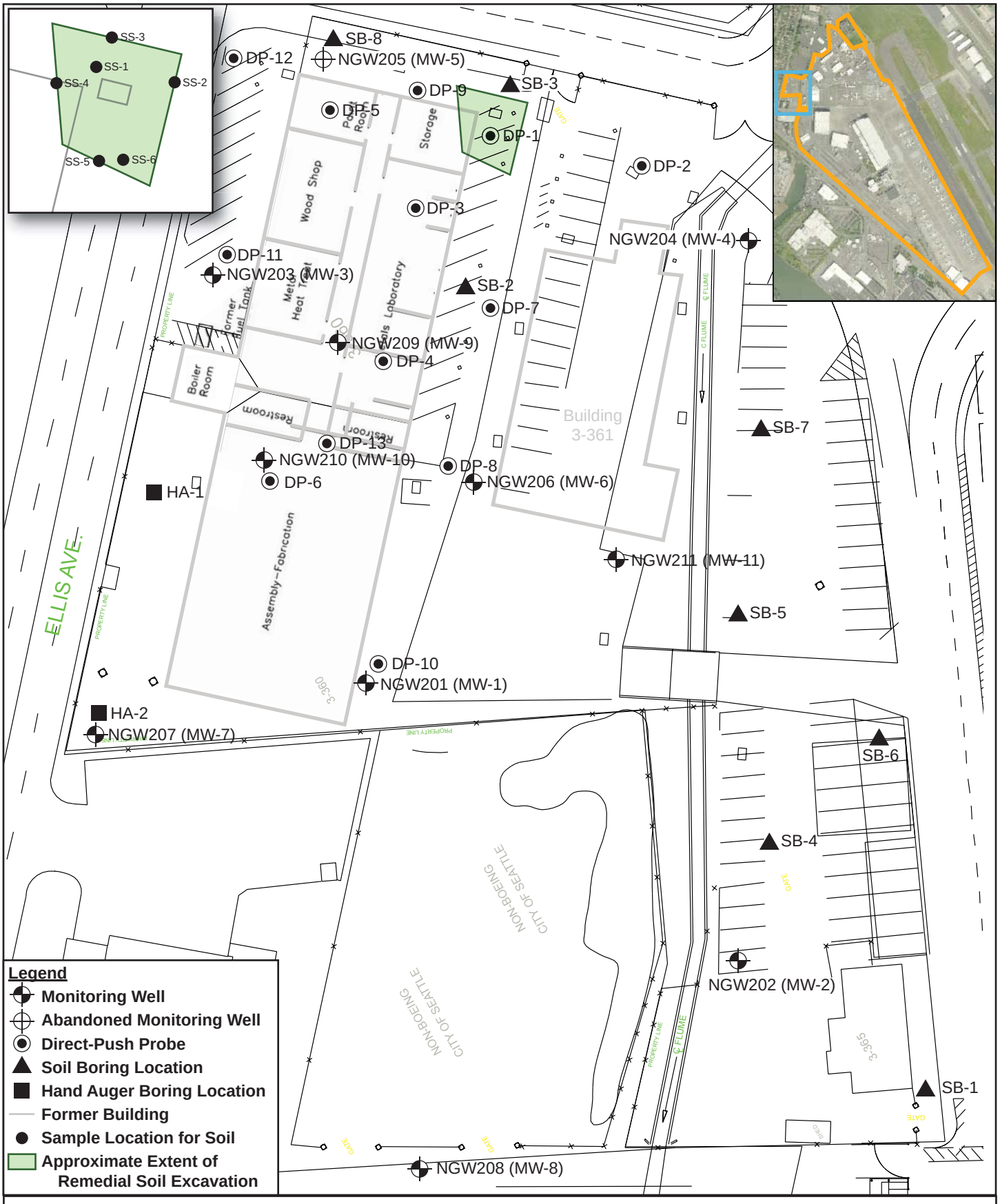

Sources: Landau 2002b, 2002c

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Figure 7.1–51. Buildings 3-360, 3-361, and 3-365 Assessments (1991, 1993–2003)

SAIC® From Science to Solutions

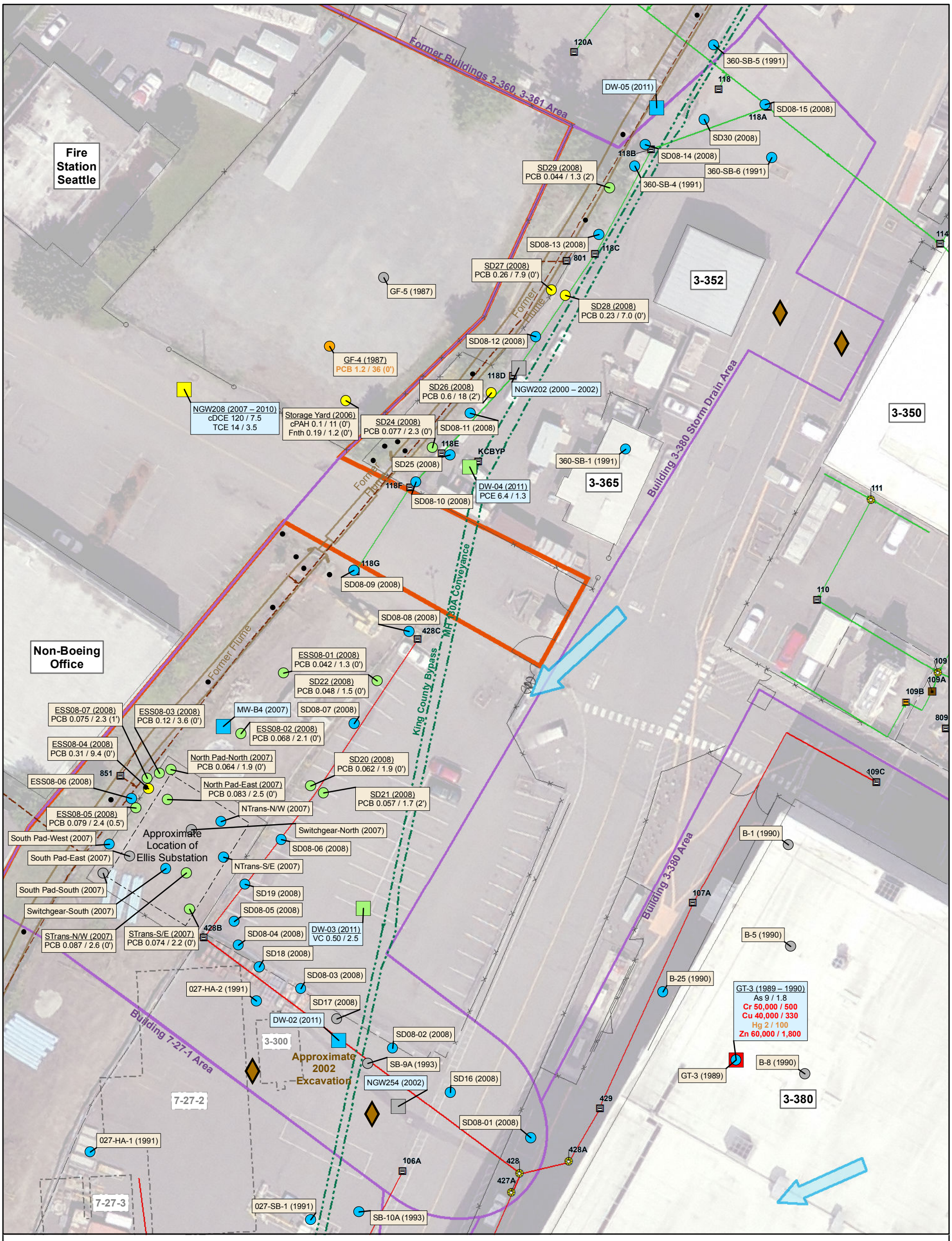

Figure 7.1-52. Soil and Groundwater Sample Locations at Building 3-380 Storm Drain Area

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SAIC
From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-52_Bldg3-380Area.mxd
Illustrative purposes only.
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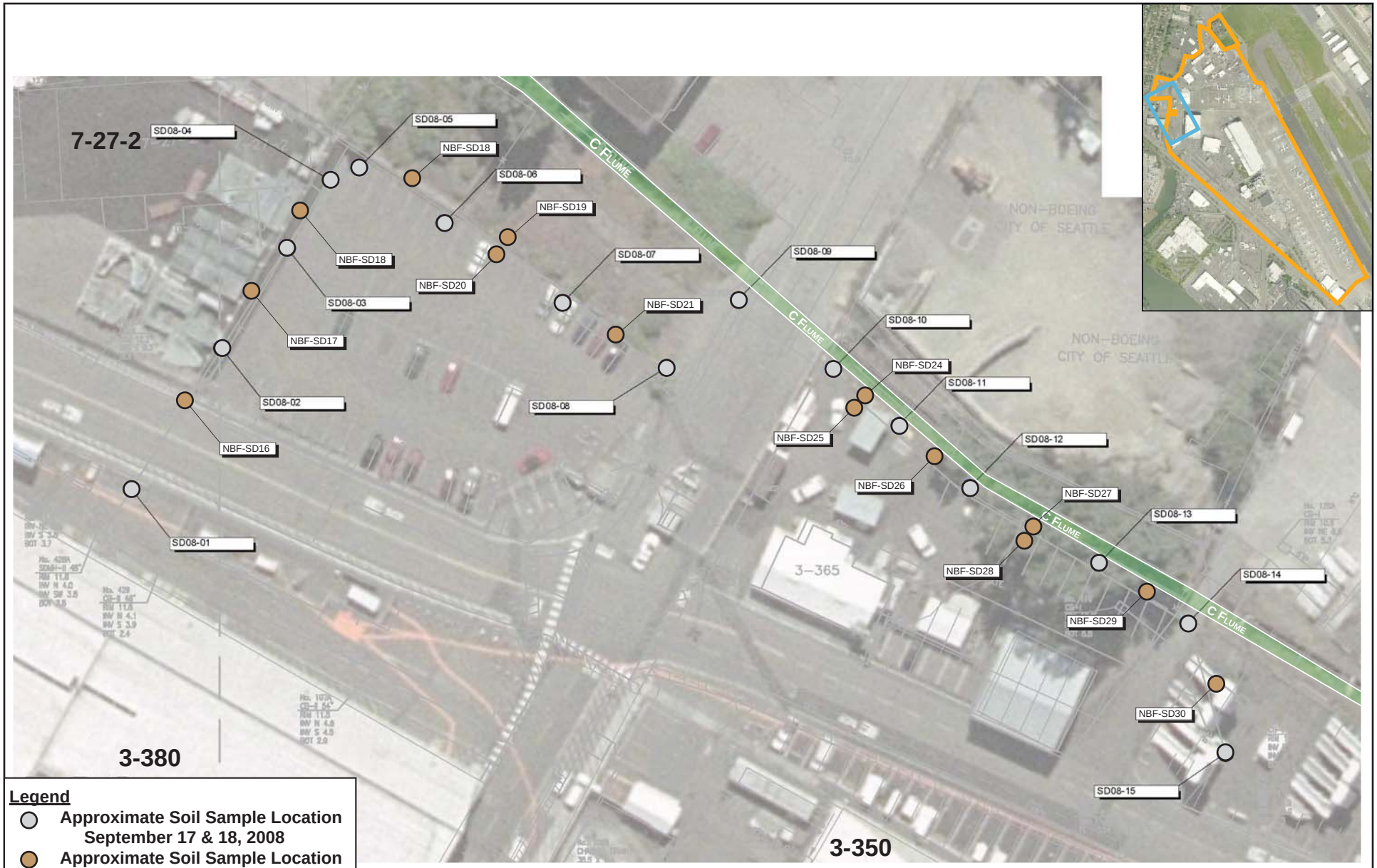

Sources: Landau 2008a, 2008b

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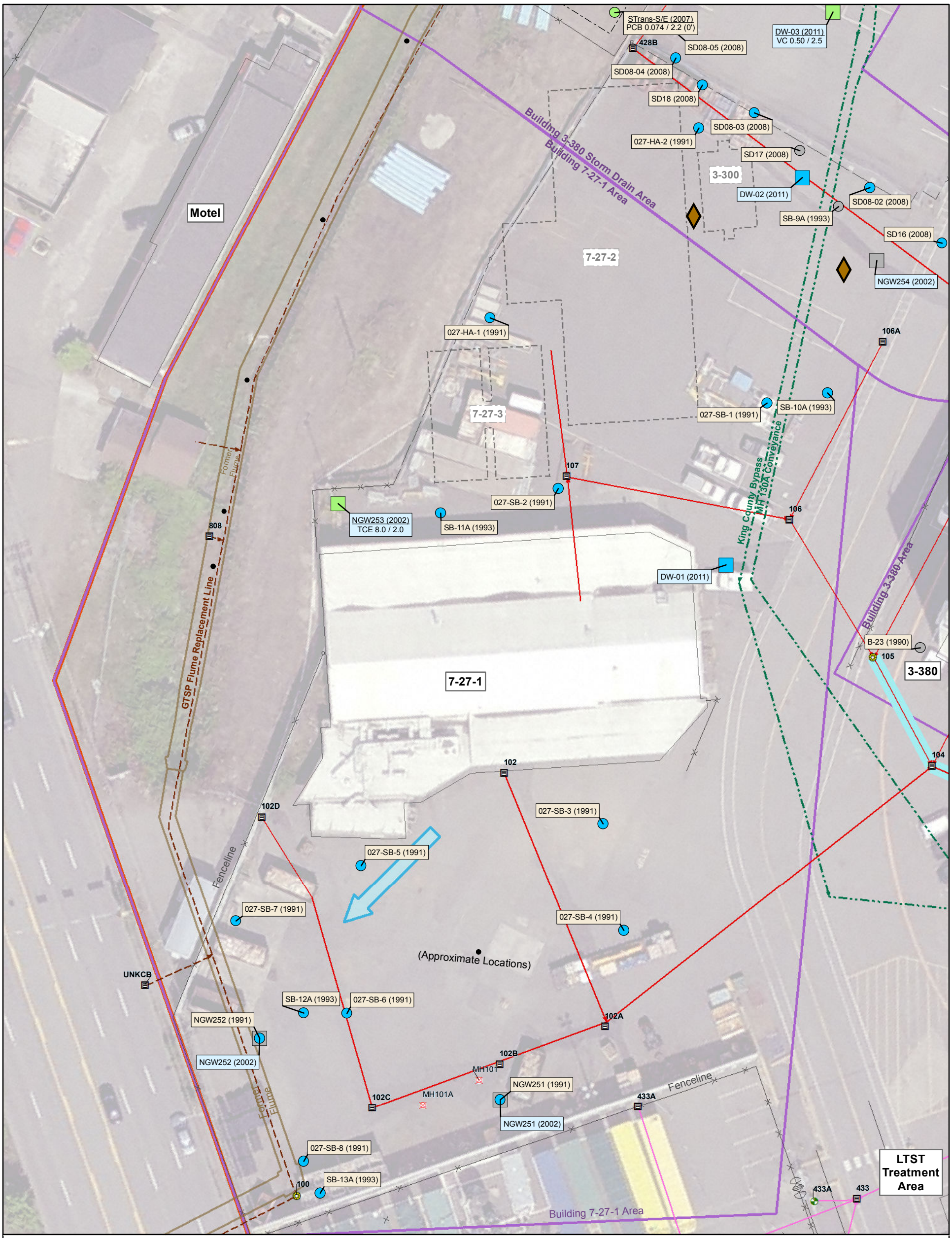
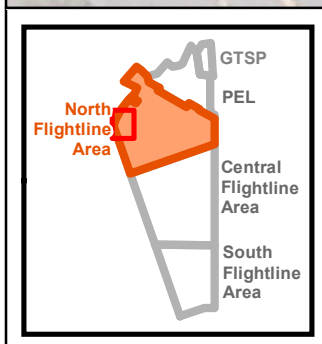
Figure 7.1–53. Potential PCB Sources to Slip 4 Study and Soil and Catch Basin Investigation (2008) North Flightline Area

SAIC® From Science to Solutions





Labels:

Groundwater: Sample ID (Date) Concentration / EF

Soil: Sample ID (Date) Concentration / EF (Depth)

Bold Black: Max EF > 5 (for TPH only)
Orange: Max EF > 25 (all COPCs)
Red: Max EF > 125 (all COPCs)

Concentrations in mg/kg for soil.
Concentrations in ug/L for groundwater.

Soil and Groundwater Exceedances

EF Range
(only detected results unless stated):

- ND > 1 (all results ND)
- ≤ 1 (ND or detect)
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125
- All sampled soil excavated at location

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other
- Area where SD Line lies below the water table at high water levels

- Approximate Groundwater Flow Direction
- Approximate Outline of Excavation

Proposed Sample Locations

Monitoring Well Soil Boring

0 10 20 30
Feet

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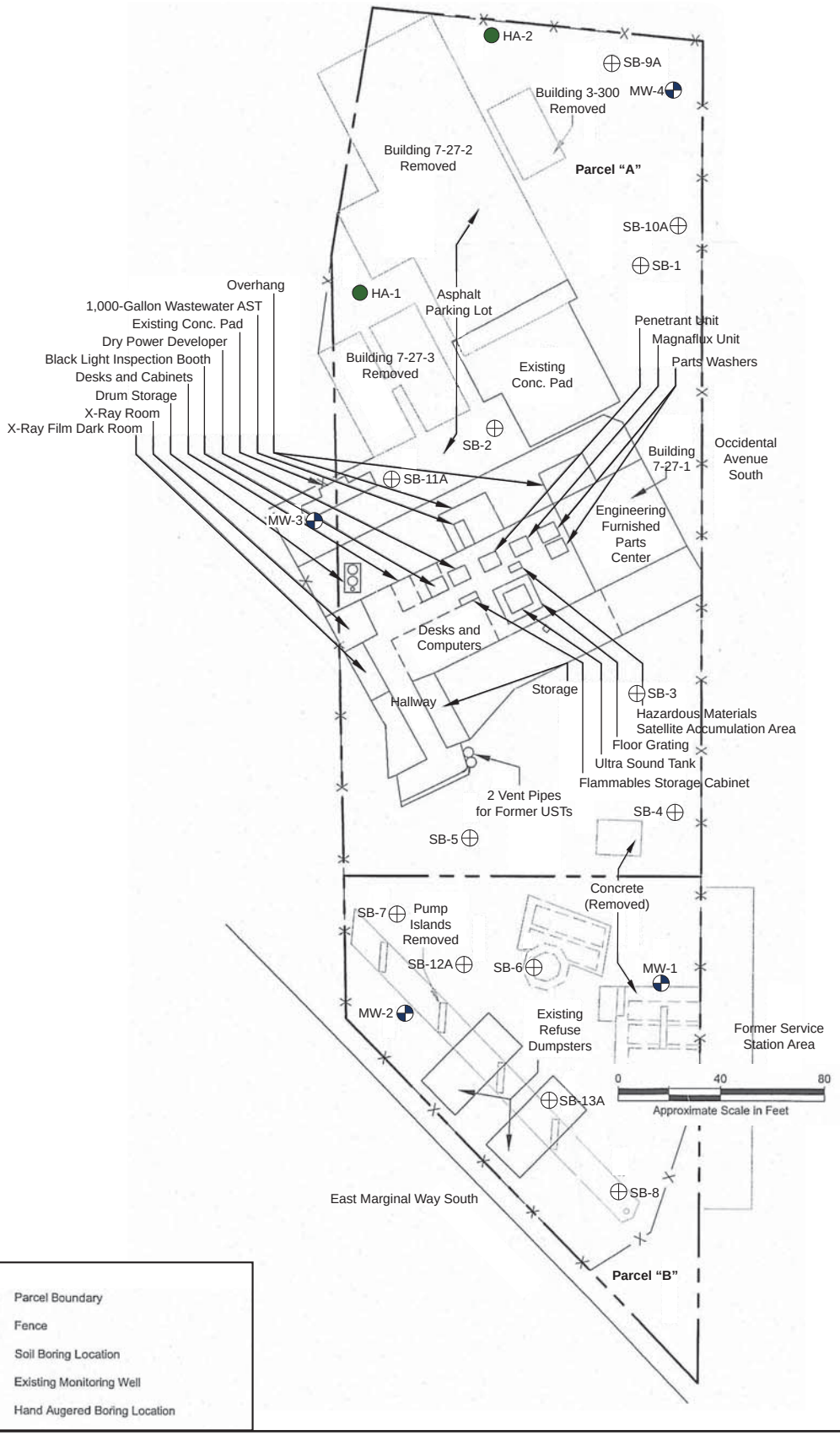
Figure 7.1-54. Soil and Groundwater Sample Locations at Building 7-27-1 Area

SAIC From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-54_Bldg7-27-1.mxd
Illustrative purposes only.
Date Saved: 8/5/2013 3:53:13 PM



Legend

- Parcel Boundary
- Fence
- SB-8 Soil Boring Location
- MW-1 Existing Monitoring Well
- HA-1 Hand Augered Boring Location

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Source: Landau 2002a

Figure 7.1–55. Buildings 7-27-1, 7-27-2, and 7-27-3 Property and Building Features and Assessments (1991)

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Figure 7.1–56. Asphalt Paving Location at Building 7-27-1 (2009)

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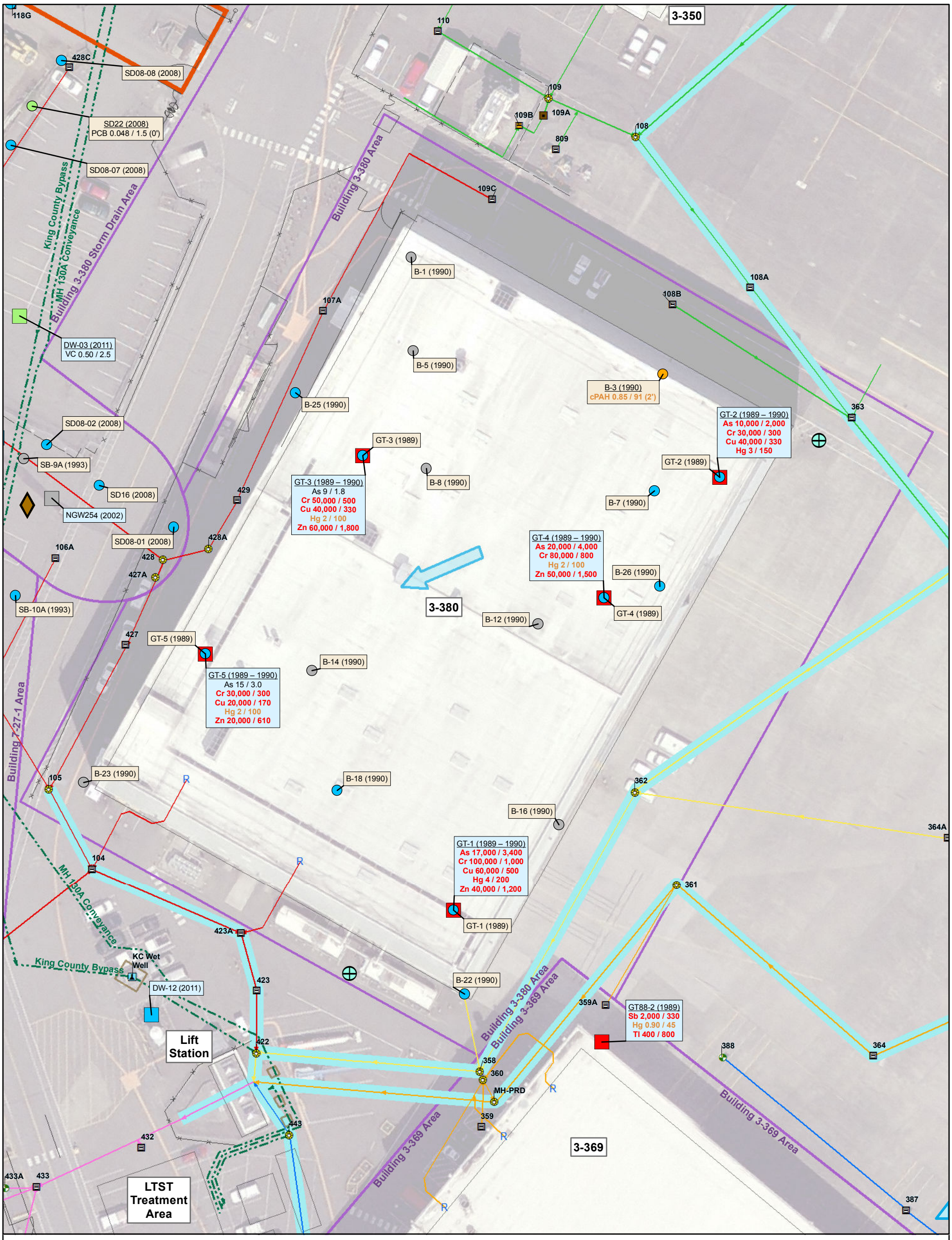

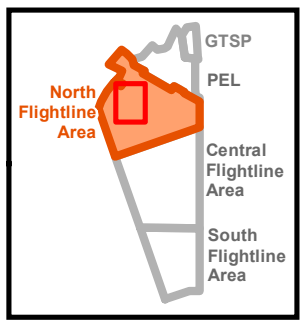

Labels:

Groundwater: Sample ID (Date) / Concentration / EF

Soil: Sample ID (Date) / Concentration / EF (Depth)

Bold Black: Max EF > 5 (for TPH only)
Orange: Max EF > 25 (all COPCs)
Red: Max EF > 125 (all COPCs)

Concentrations in mg/kg for soil.
Concentrations in ug/L for groundwater.

Soil and Groundwater Exceedances

EF Range
(only detected results unless stated):

- ND > 1 (all results ND)
- ≤ 1 (ND or detect)
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125
- All sampled soil excavated at location

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other
- Area where SD Line lies below the water table at high water levels

Approximate Groundwater Flow Direction

Approximate Outline of Excavation

Proposed Sample Locations

Monitoring Well Soil Boring

0 20 40 60
Feet

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Figure 7.1-57. Soil and Groundwater Sample Locations at Building 3-380 Area

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-57_Bldg3-380Area.mxd
Illustrative purposes only.
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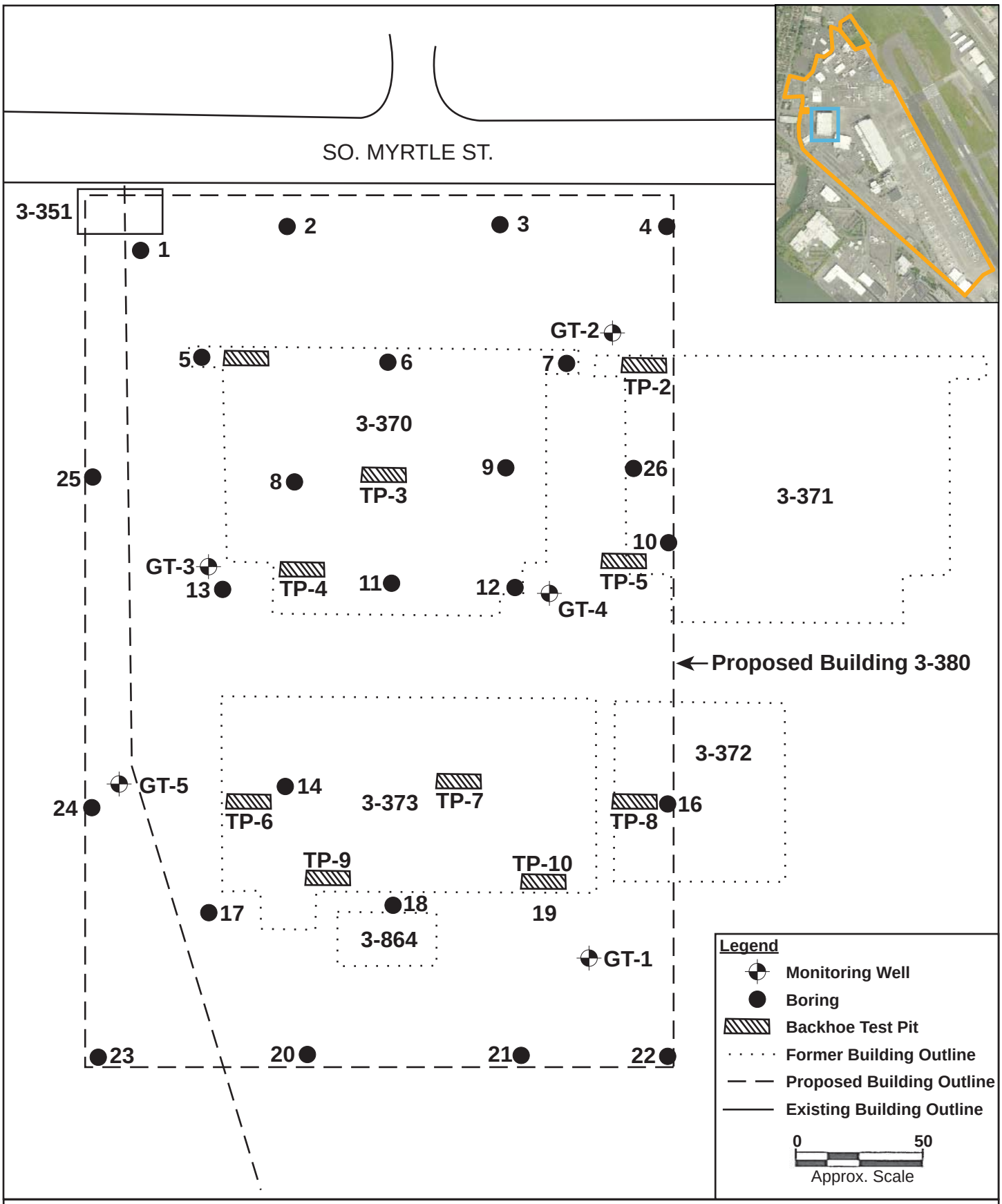

Source: GTI 1990b

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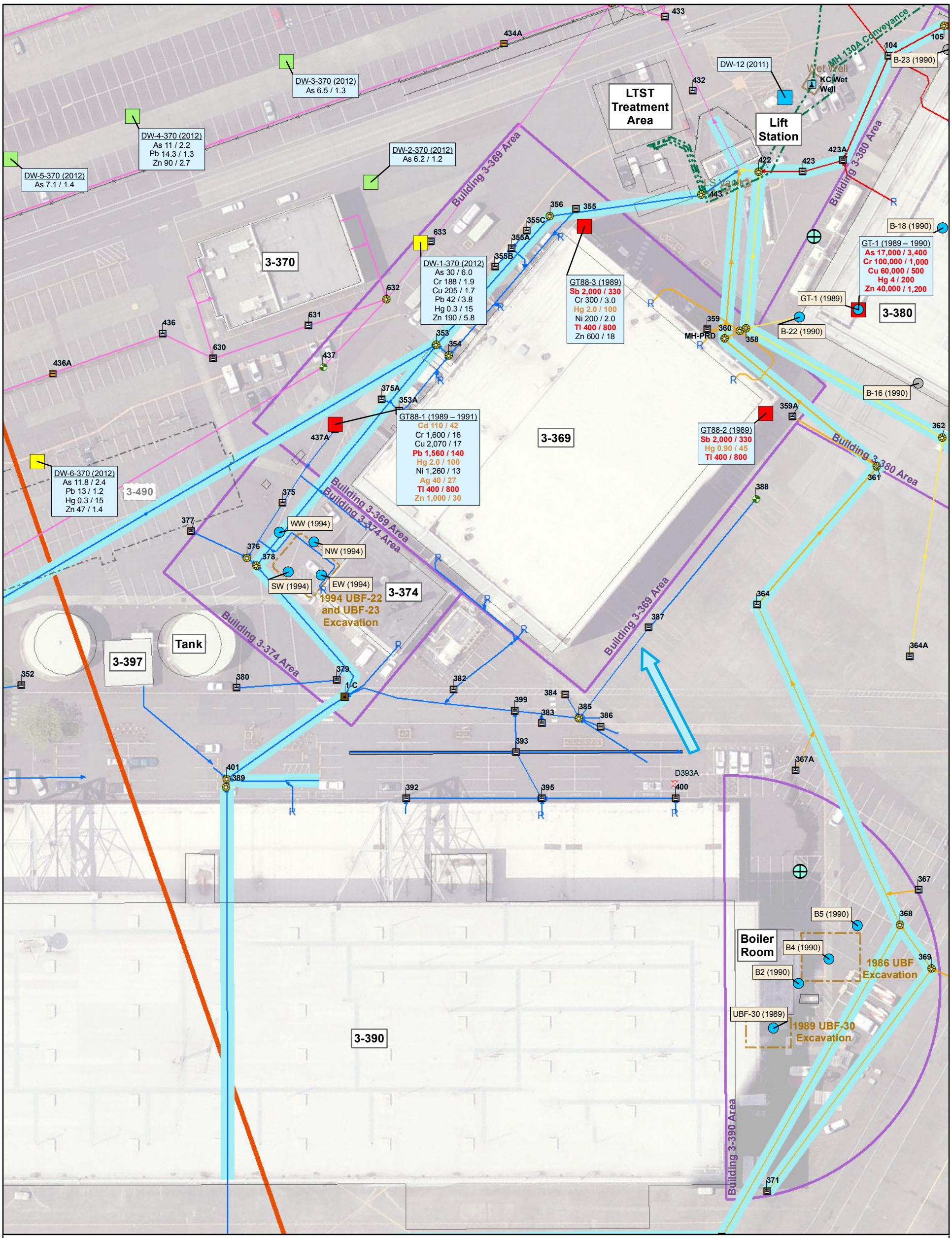
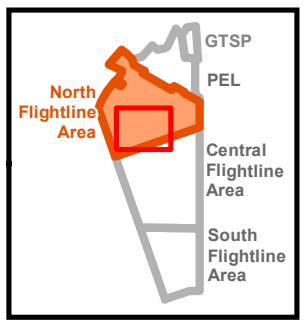
Figure 7.1–58. Building 3-380
Pre-Construction Site Assessments (1989–1990)

SAIC
From Science to Solutions





Labels:

Groundwater: Sample ID (Date) / Concentration / EF

Soil: Sample ID (Date) / Concentration / EF (Depth)

Bold Black: Max EF > 5 (for TPH only)
Orange: Max EF > 25 (all COPCs)
Red: Max EF > 125 (all COPCs)

Concentrations in mg/kg for soil.
Concentrations in ug/L for groundwater.

Soil and Groundwater Exceedances

EF Range
(only detected results unless stated):

- ND > 1 (all results ND)
- ≤ 1 (ND or detect)
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125
- All sampled soil excavated at location

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other
- Area where SD Line lies below the water table at high water levels

- Approximate Groundwater Flow Direction
- Approximate Outline of Excavation

Proposed Sample Locations

Monitoring Well Soil Boring

0 20 40 60 80
Feet

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Figure 7.1-59. Soil and Groundwater Sample Locations at Buildings 3-369, 3-374, and 3-390 Areas

SAIC From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-59_Bldgs3-369_3-374_3-390.mxd
Illustrative purposes only.
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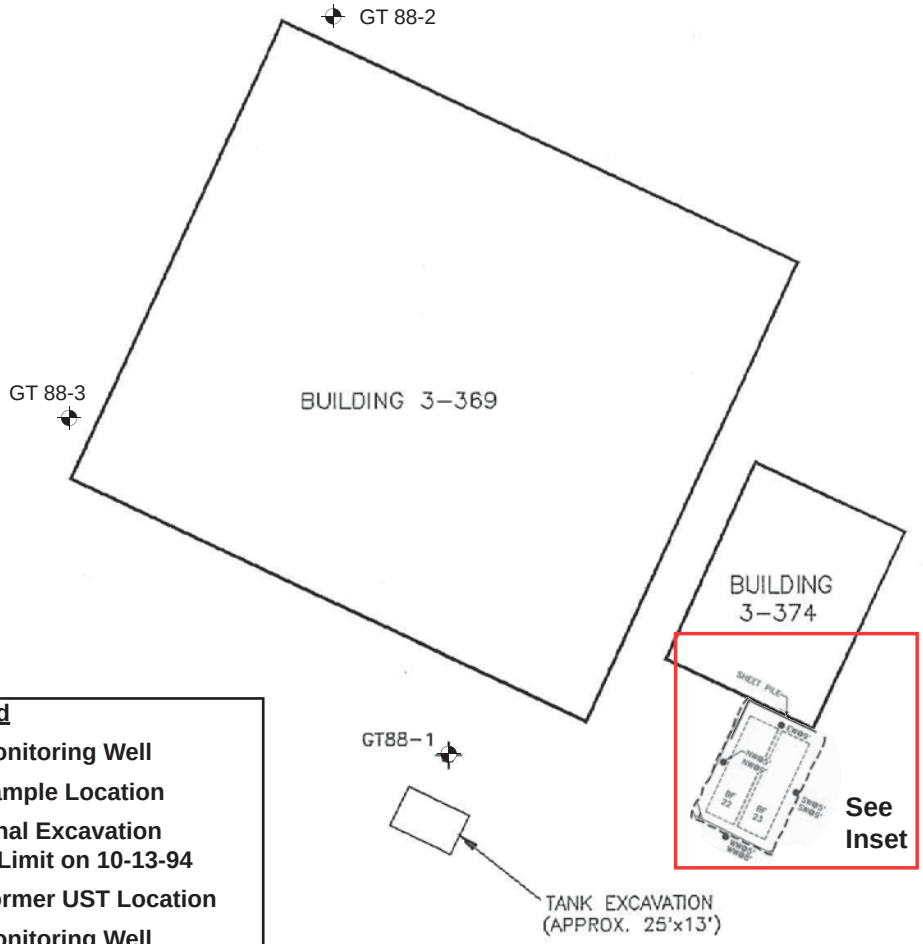

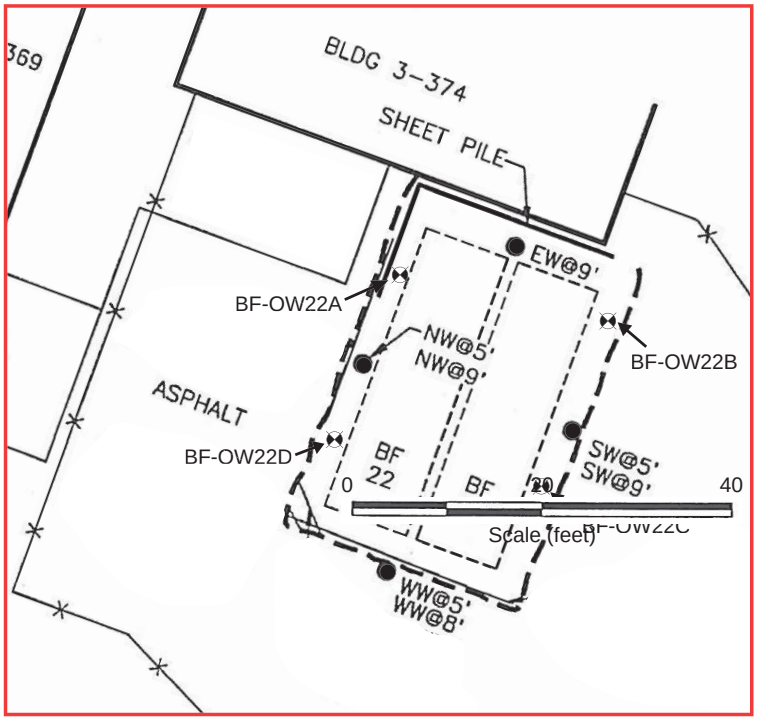

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Figure 7.1–60. Buildings 3-369 and 3-374 Assessments (1989–1991, 1995)

Sources: GTI 1989b, 1991a; SEACOR 1993a; SECOR 1994h

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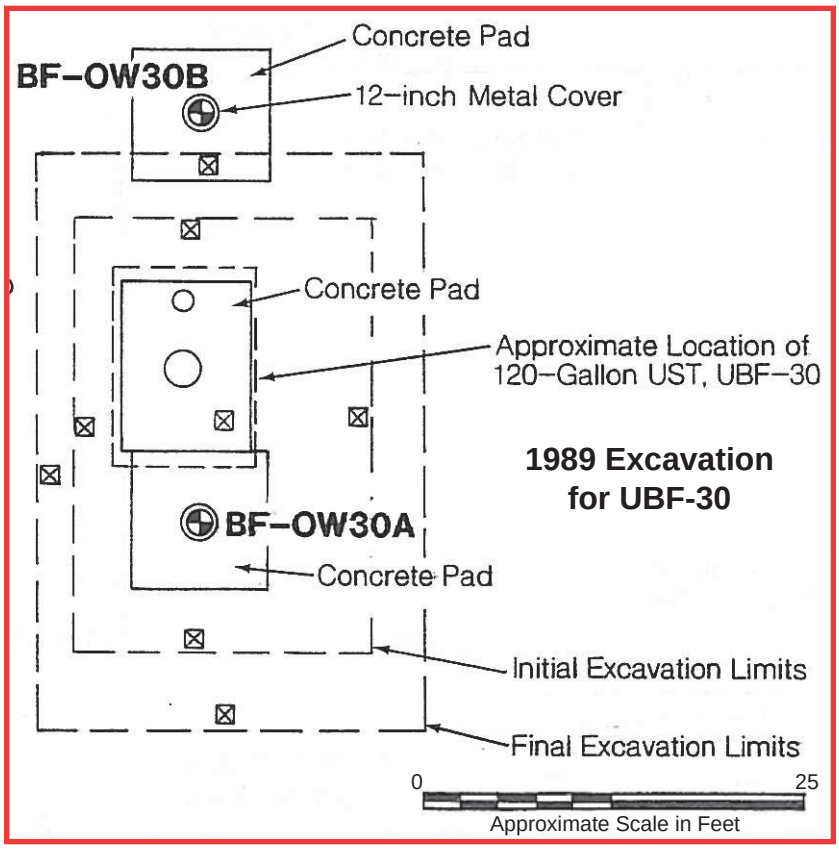

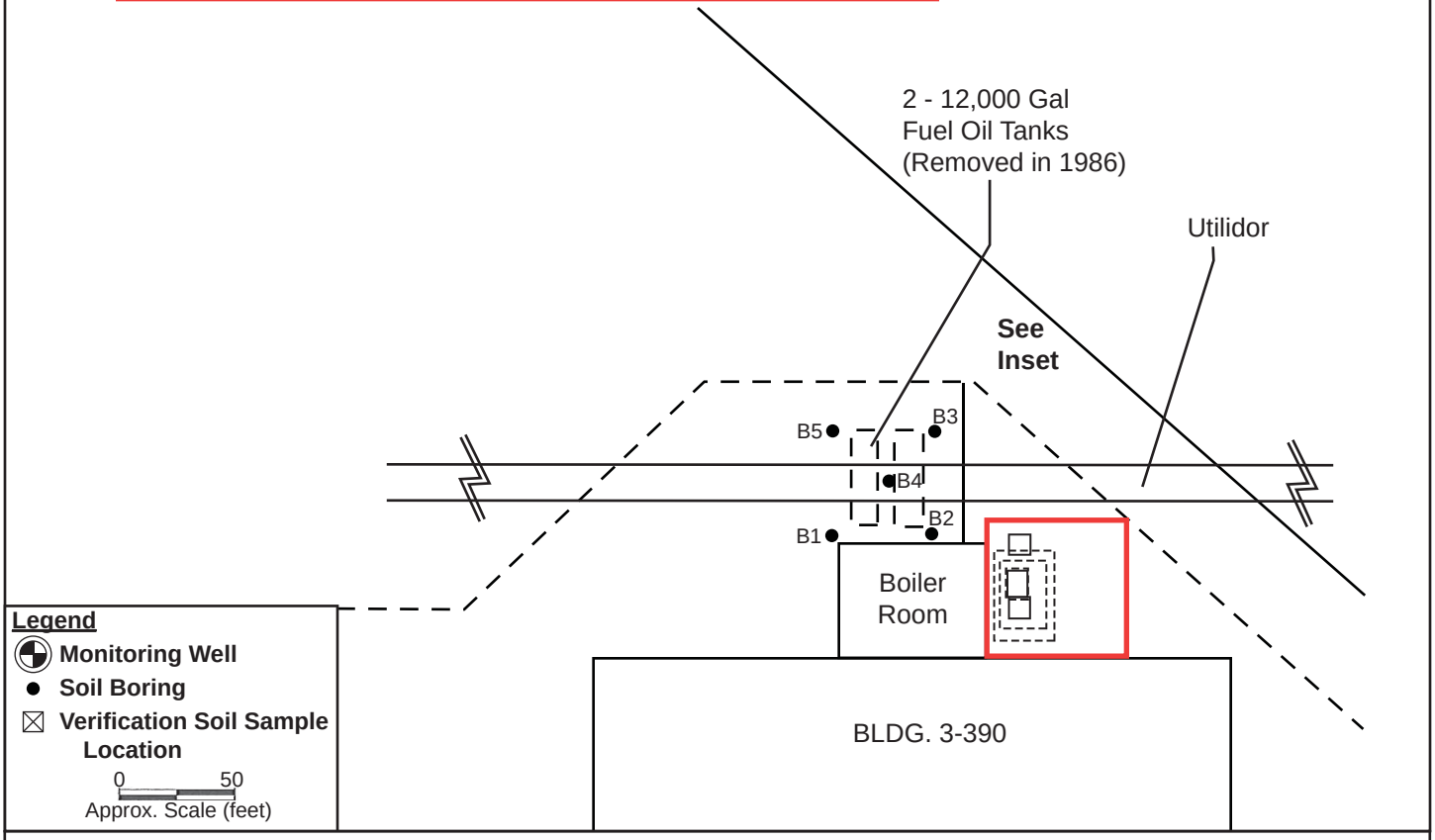

Sources: GTI 1990b; Hart Crowser 1990b

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Figure 7.1–61. Building 3-390 UST Assessments (1989–1991)

SAIC® From Science to Solutions

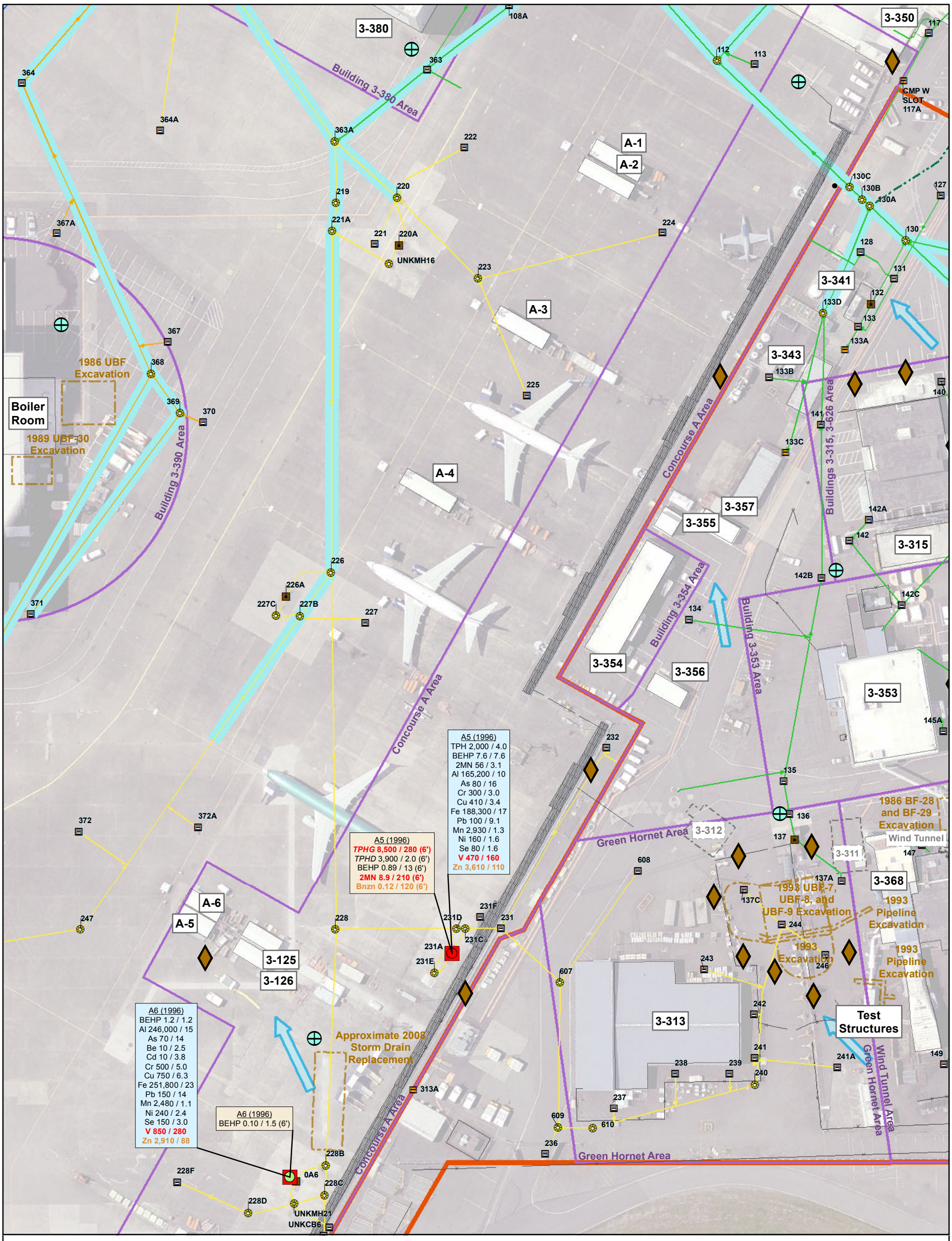

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Figure 7.1-62. Soil and Groundwater Sample Locations at Concourse A Area

SAIC From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-62_ConcourseA.mxd
Illustrative purposes only.
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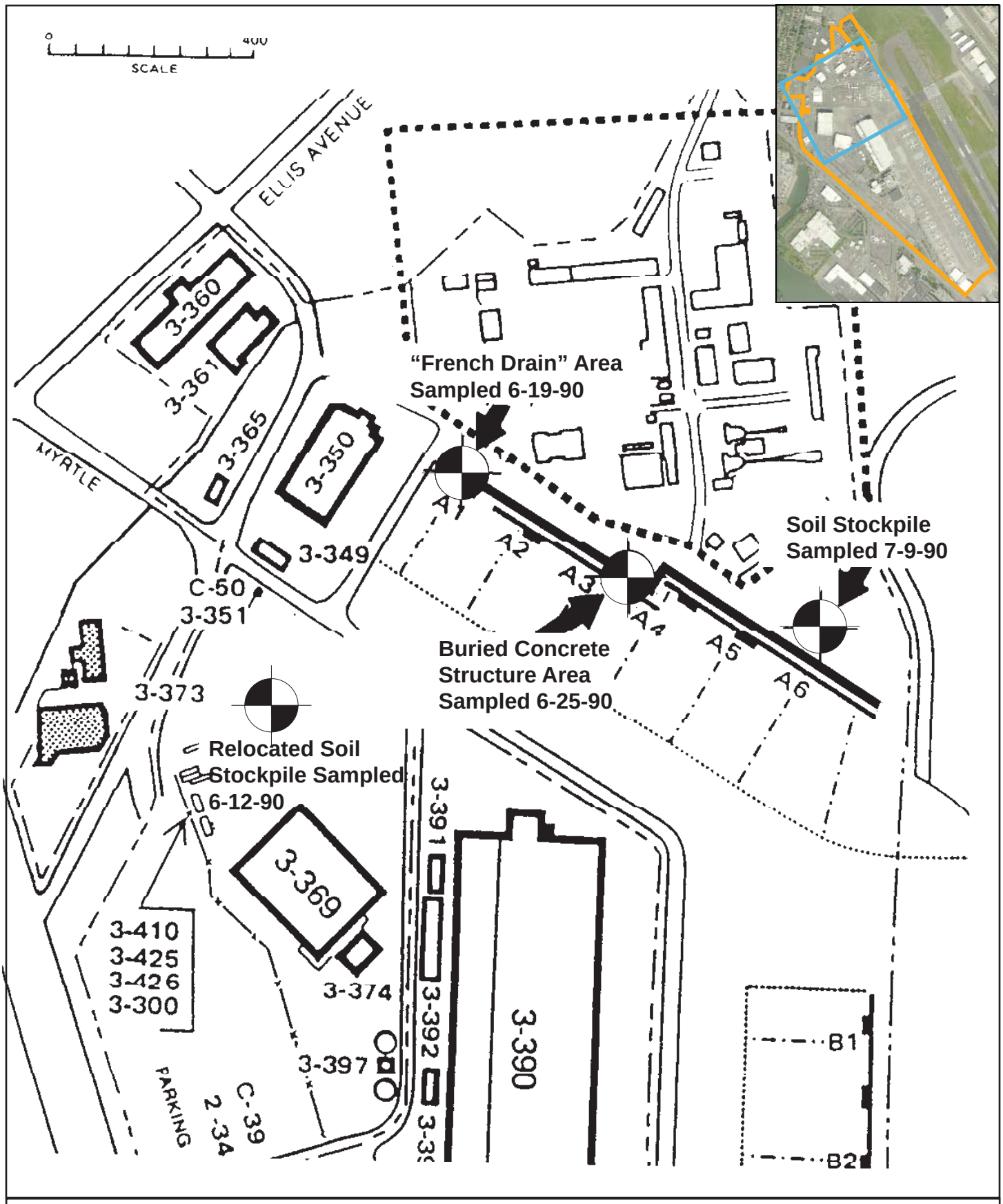

Source: GTI 1990d

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Figure 7.1–63. Utilidor Project (1990)

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REFERENCE: COVER SHEET, 7/25/96, DRAWING NO. 3.YD-CO. BOEING FACILITIES DEPARTMENT

Sources: SECOR 1996b; SAIC 2009b

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State of Washington

Figure 7.1–64. Concourses A and B Oil/Water Separator Pre-Construction Assessments (1996)

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LTST Treatment Area
3-369
3-374
3-370
Tank
3-397
3-490
Tank
3-390
3-128
3-107
7.1-75
CENTRAL FLIGHTLINE TRANSFORMER AREAS (FORMER BLDG 3-490 AREA)
2-35
CENTRAL FLIGHTLINE TRANSFORMER AREAS (FORMER BLDG 2-35 AREA)
7.1-66
7.1-74
CONCOURSE B STORM DRAIN REPLACEMENT AREA
BLDGS 3-800, 3-801 AREA
3-801
3-800
CENTRAL FLIGHTLINE TRANSFORMER AREAS (VAULT 94 AREA)
3-818
7.1-73
CONCOURSE B AREA
7.1-69
BLDG 3-818 AREA
3-465/ 3-466
3-826
3-121
Fuel Tank
MAIN FUEL FARM AREA
Fuel Tank
CONCOURSE C AREA
3-822
3-123
C-6
3-825
3-470
3-447
3-828
3-832
3-817
3-830
GTSP
PEL
North Flightline Area
Central Flightline Area
South Flightline Area
7.1-36 Figure Location with Number
Site Sub-Area Boundary
Area of Concern Boundary
Building
0 50 100 200 Feet
N

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State of Washington

Figure 7.1-65. Areas of Concern at Central Flightline Area

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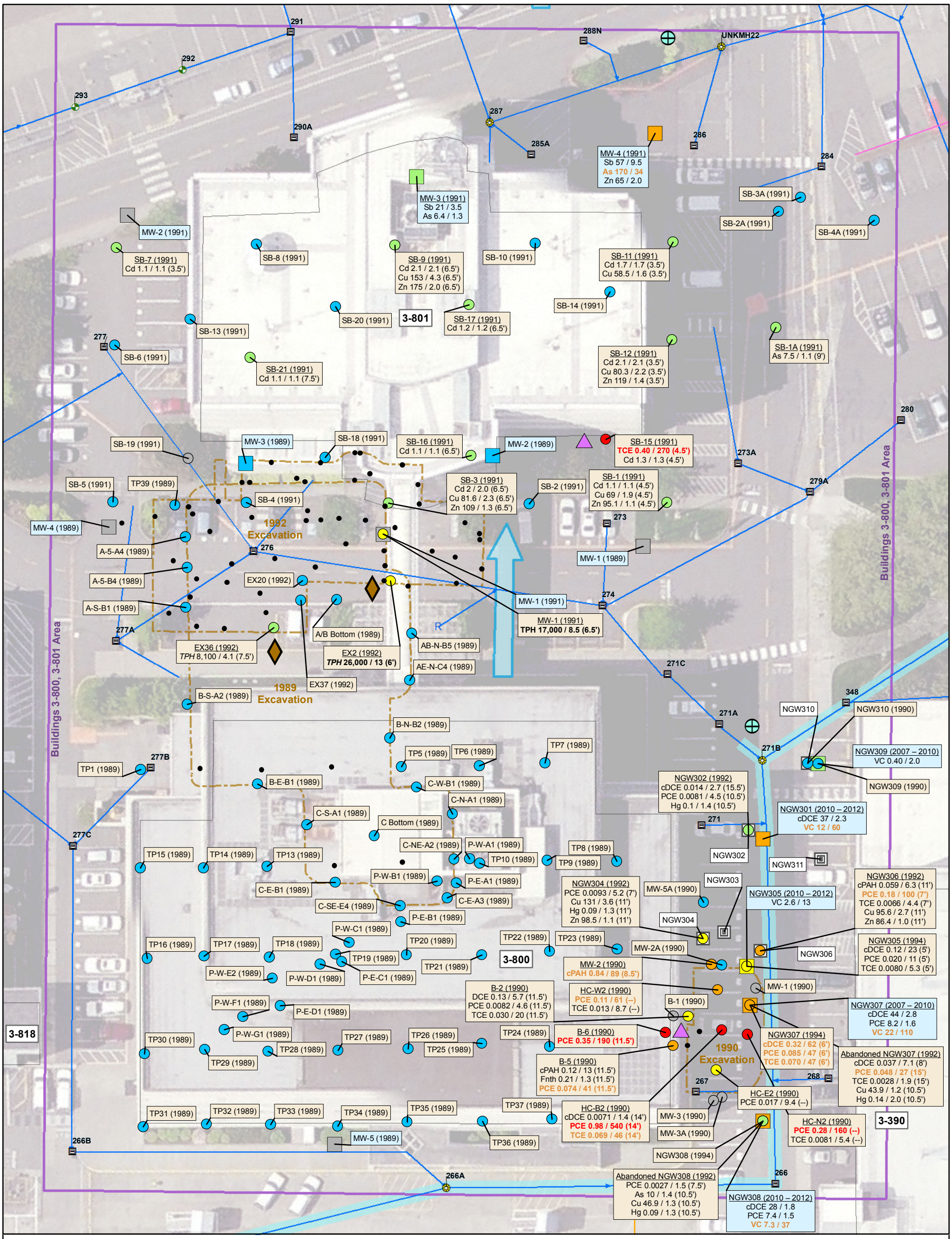
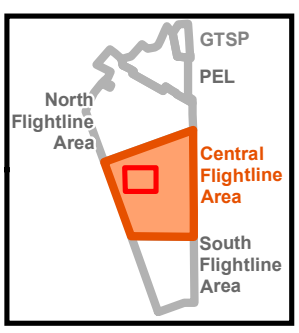
Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File:
Figure_7_1-65_Area_of_Concern_at_Central_Flightline_Area.mxd
Illustrative purposes only.
Date Saved: 10/8/2013 12:33:43 PM





Labels:

Groundwater: Sample ID (Date) / Concentration / EF

Soil: Sample ID (Date) / Concentration / EF (Depth)

Bold Black: Max EF > 5 (for TPH only)
Orange: Max EF > 25 (all COPCs)
Red: Max EF > 125 (all COPCs)

Concentrations in mg/kg for soil.
Concentrations in ug/L for groundwater.

Soil and Groundwater Exceedances

EF Range
(only detected results unless stated):

- ND > 1 (all results ND)
- ≤ 1 (ND or detect)
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125
- All sampled soil excavated at location

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other
- Area where SD Line lies below the water table at high water levels

- Approximate Groundwater Flow Direction
- Approximate Outline of Excavation

Proposed Sample Locations

- Monitoring Well
- Soil Boring
- Soil Vapor Point

Feet
0 10 20 30

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Figure 7.1-66. Soil and Groundwater Sample Locations at Buildings 3-800 and 3-801 Area

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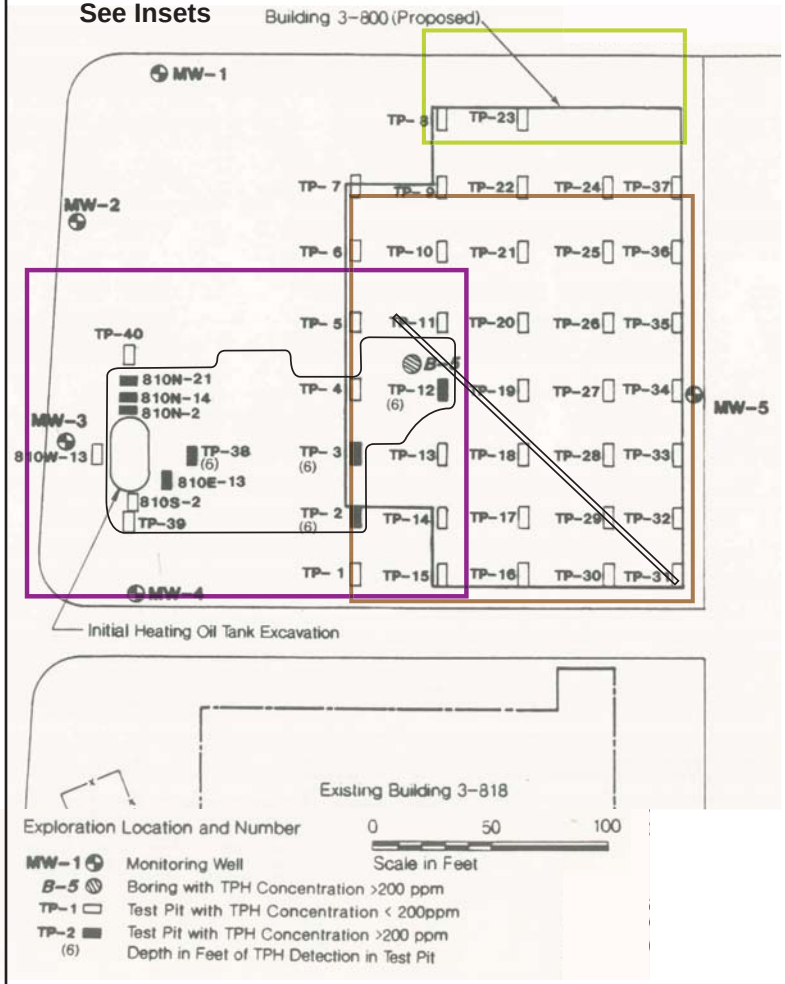
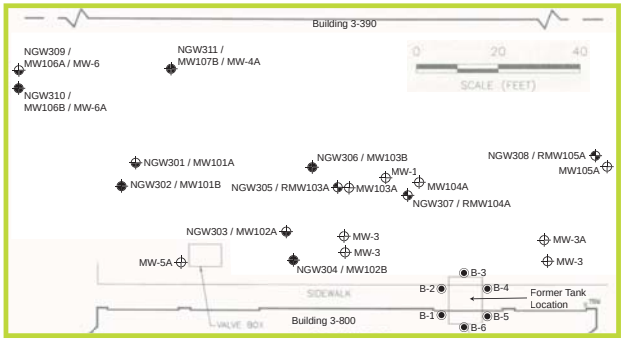
Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: RI_Soil&GW_Exceedances_CFA.mxd
Illustrative purposes only.
Date Saved: 8/6/2013 9:26:42 PM

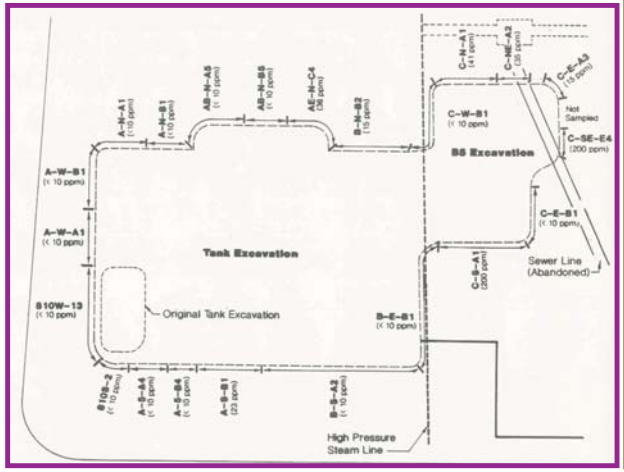


Shallow Monitoring Well Location (Approx. 15 ft deep)
Deep Monitoring Well Location (Approx. 40 ft deep)
Abandoned Monitoring Well Location (Abandoned 1-17-94)
Replacement Monitoring Well Location (Installed 1-17-94)
Soil Boring

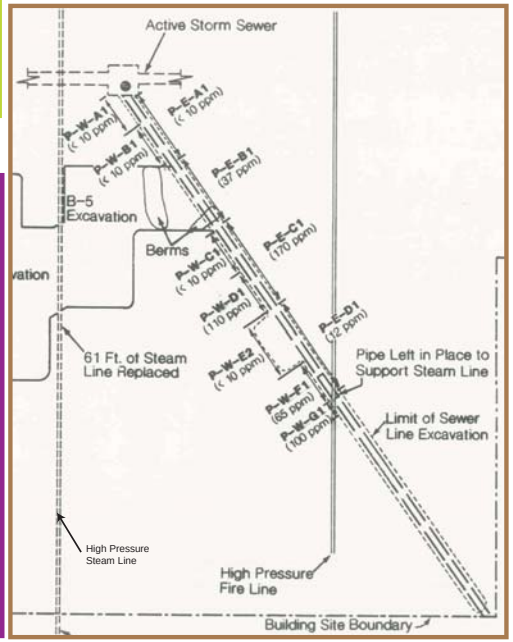
September – October 1989



September – December 1989



September – December 1989



Sources: Adapted from Hart Crowser 1990a and SEACOR 1992g

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Figure 7.1–67. Building 3-800 Assessment (1989)

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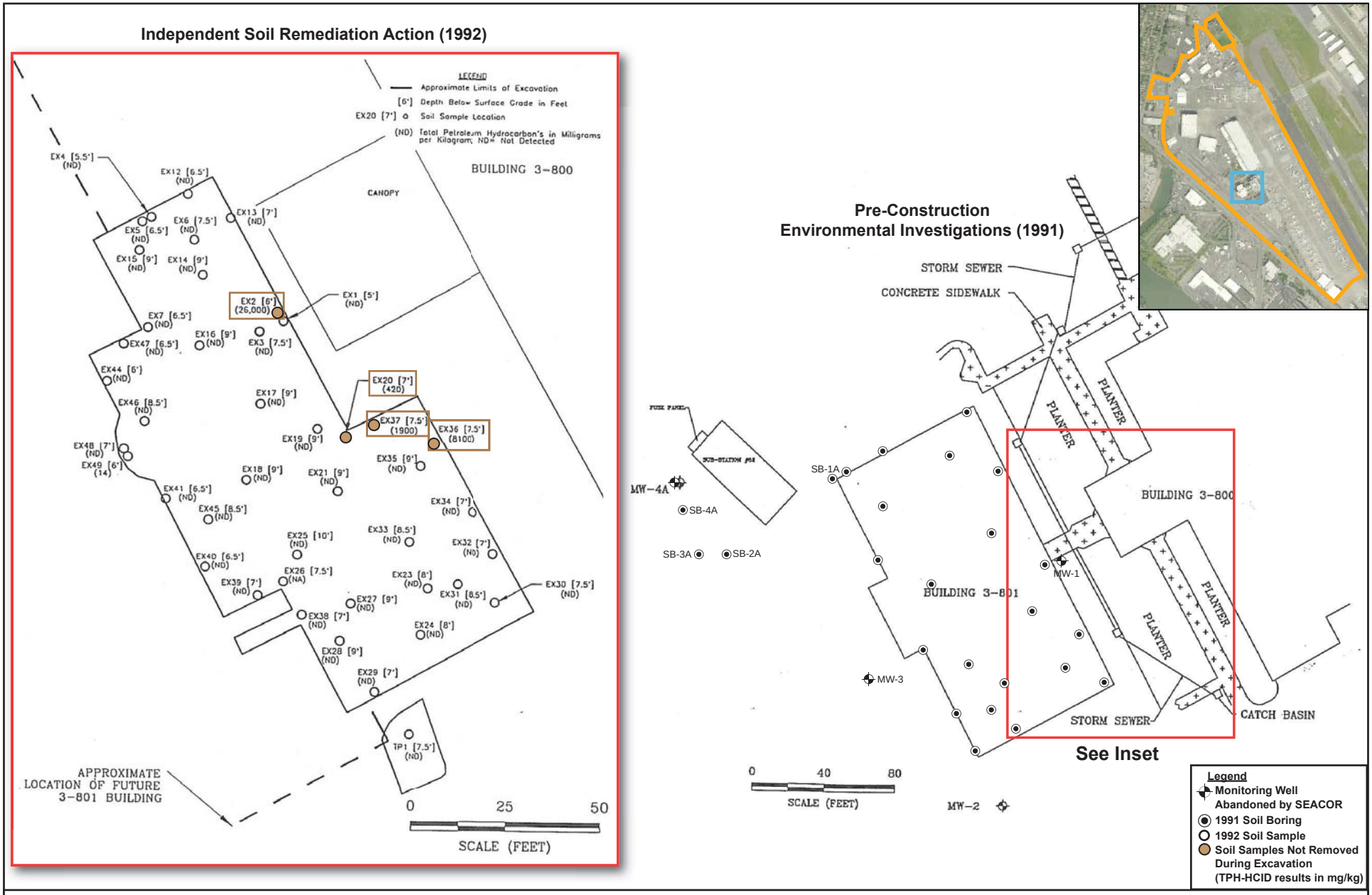

Source: SEACOR 1992f

Figure 7.1–68. Building 3–801 Assessment and Remedial Excavation (1991–1992)

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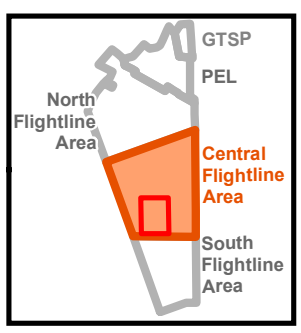
SAIC From Science to Solutions



Labels:

Groundwater: Sample ID (Date) / Concentration / EF

Soil: Sample ID (Date) / Concentration / EF (Depth)

Bold Black: Max EF > 5 (for TPH only)
Orange: Max EF > 25 (all COPCs)
Red: Max EF > 125 (all COPCs)

Concentrations in mg/kg for soil.
Concentrations in ug/L for groundwater.

Soil and Groundwater Exceedances

EF Range
(only detected results unless stated):

- ND > 1 (all results ND)
- ≤ 1 (ND or detect)
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125
- All sampled soil excavated at location

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other

Area where SD Line lies below the water table at high water levels

- Approximate Groundwater Flow Direction
- Approximate Outline of Excavation

Proposed Sample Locations

- Monitoring Well
- Soil Boring
- Soil Vapor Point

0 20 40 60
Feet

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Figure 7.1-69. Soil and Groundwater Sample Locations at Building 3-818, Main Fuel Farm, and Concourse C Areas

SAIC
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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: RI_Soil&GW_Exceedances_CFA.mxd
Illustrative purposes only.
Date Saved: 10/16/2013 12:02:20 PM

PROPOSED OIL/WATER SEPARATOR LOCATION

NBF-3-818-MW1

BUILDING 3-818

PROPOSED CATCH BASIN LOCATIONS

NBF-3-818-MW2

BLAST FENCE

Legend

Monitoring Well Locations (Abandoned 10-21-93)

0 30 60

Scale (feet)

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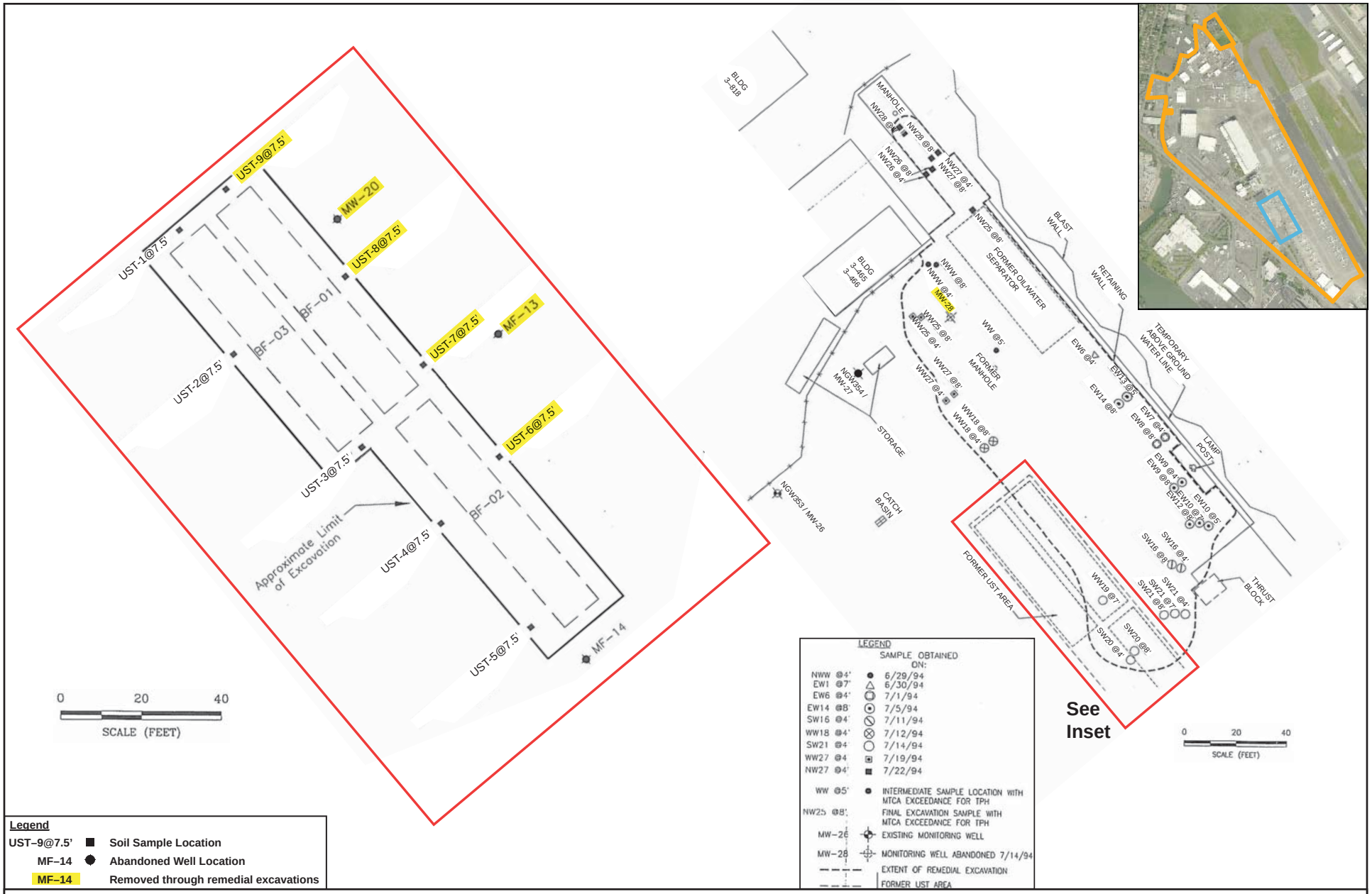
Source: SEACOR 1993c

Figure 7.1–70. Building 3-818
Oil/Water Separator Pre-Construction Environmental Assessment (1993)

SAIC® From Science to Solutions



Source: SECOR 1994f

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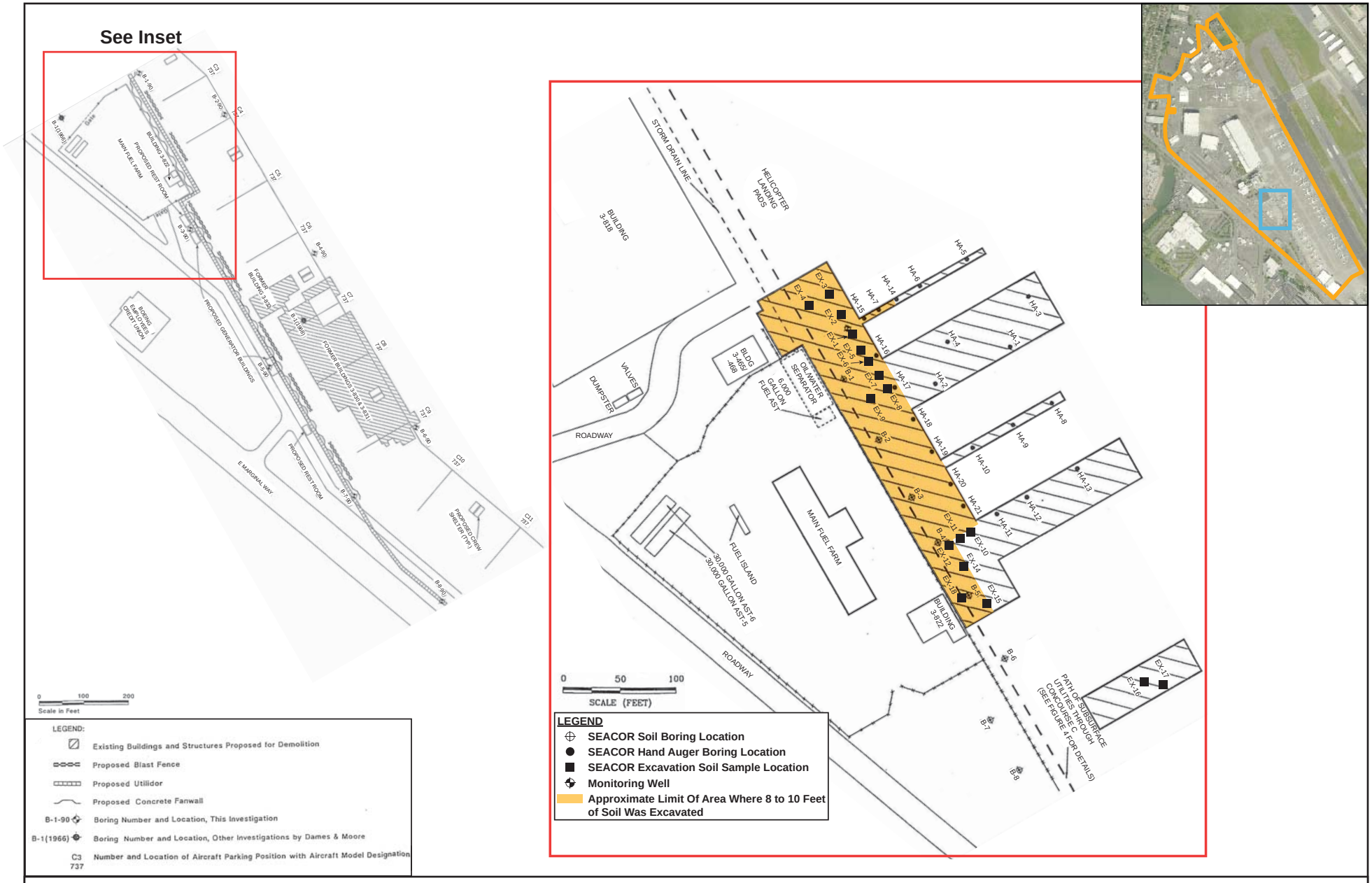
Figure 7.1–71. Main Fuel Farm Remedial Excavations and Assessments (1992–1994)

SAIC® From Science to Solutions



Sources: Dames & Moore 1990; SEACOR 1992c

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Figure 7.1–72. Concourse C Assessments and Remedial Excavation (1990–1992)

SAIC® From Science to Solutions

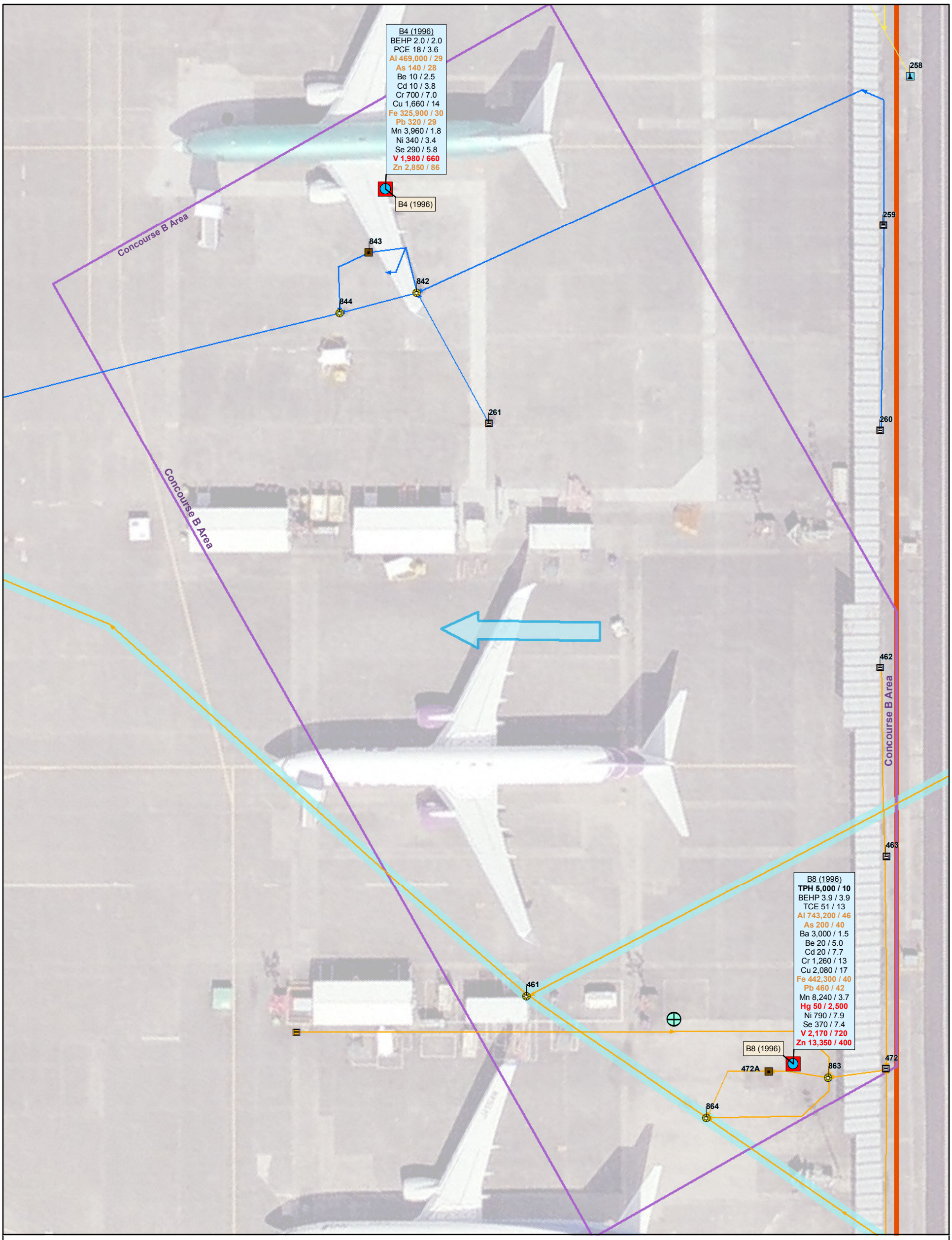

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Figure 7.1-73. Soil and Groundwater Sample Locations at Concourse B Area

SAIC From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: RI_Soil&GW_Exceedances_CFA.mxd
Illustrative purposes only.
Date Saved: 10/14/2013 5:02:12 PM

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Figure 7.1-74. Soil and Groundwater Sample Locations at Concourse B Storm Drain Replacement Area

SAIC
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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: RI_Soil&GW_Exceedances_CFA.mxd
Illustrative purposes only.
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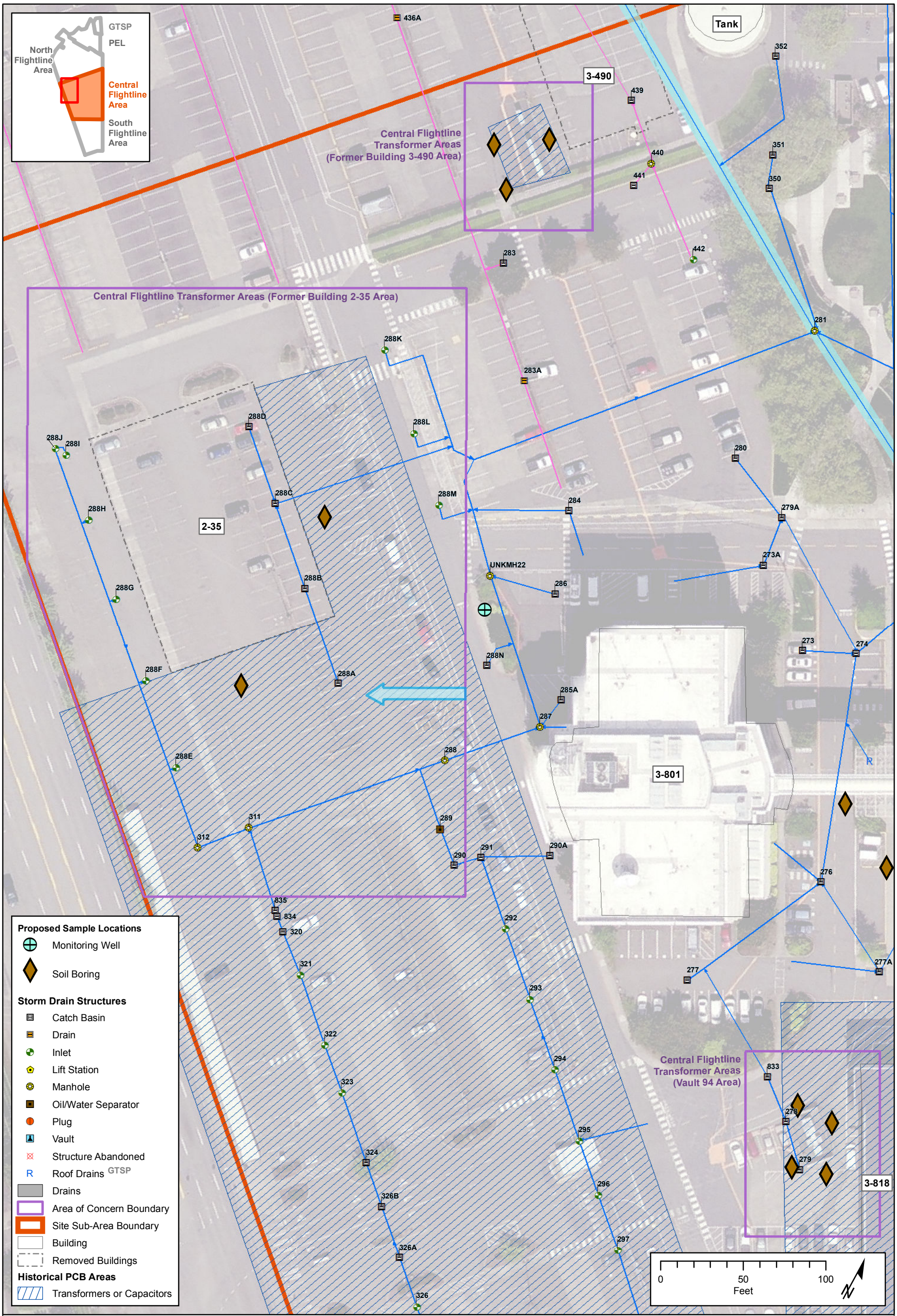

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Figure 7.1-75. Soil and Groundwater Sample Locations at Central Flightline Transformer Areas

SAIC® From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-75_Area _with_Potential_Historical_PCBs.mxd
Illustrative purposes only.

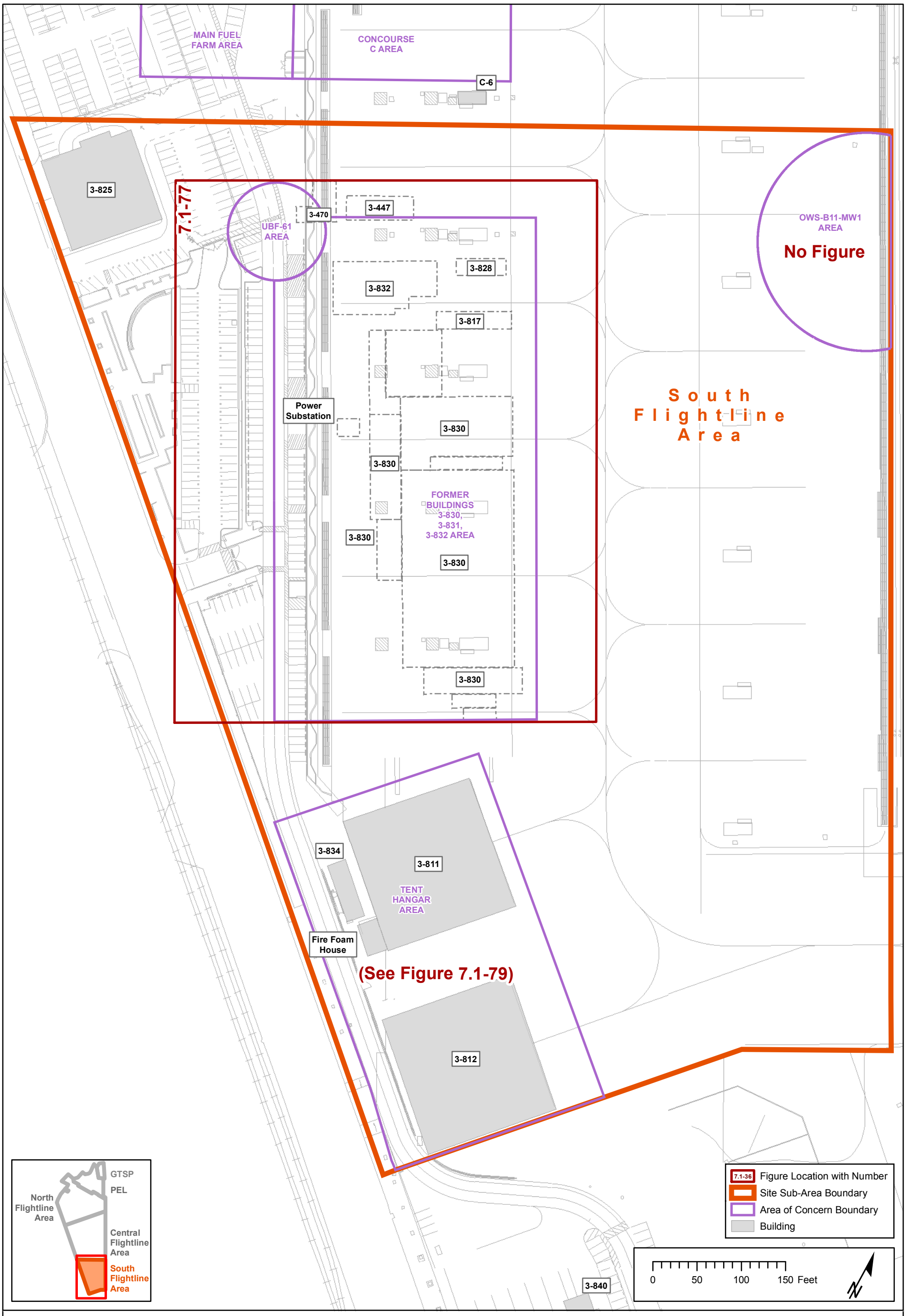

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Figure 7.1-76. Areas of Concern at South Flightline Area

SAIC
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Coordinate System:
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Prepared By: mlf
File: Figure_7_1-76_Area_of_Concern_at_South_Flightline.mxd
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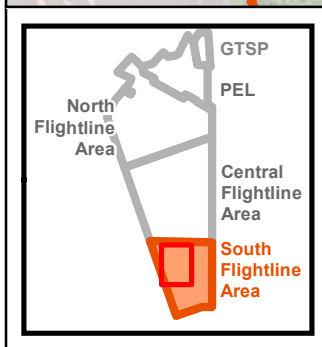

Labels:

Groundwater: Sample ID (Date) Concentration / EF

Soil: Sample ID (Date) Concentration / EF (Depth)

Bold Black: Max EF > 5 (for TPH only)
Orange: Max EF > 25 (all COPCs)
Red: Max EF > 125 (all COPCs)

Concentrations in mg/kg for soil.
Concentrations in ug/L for groundwater.

Soil and Groundwater Exceedances

EF Range
(only detected results unless stated):

- ND > 1 (all results ND)
- ≤ 1 (ND or detect)
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125
- All sampled soil excavated at location

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other
- Area where SD Line lies below the water table at high water levels

Approximate Groundwater Flow Direction

Approximate Outline of Excavation

Proposed Sample Locations

Monitoring Well Soil Boring

0 10 20 40 60
Feet

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Figure 7.1-77. Soil and Groundwater Sample Locations at UBF-61 and Former Buildings 3-830, 3-831, and 3-832 Area

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: RI_Soil&GW_Exceedances_SFA.mxd
Illustrative purposes only.
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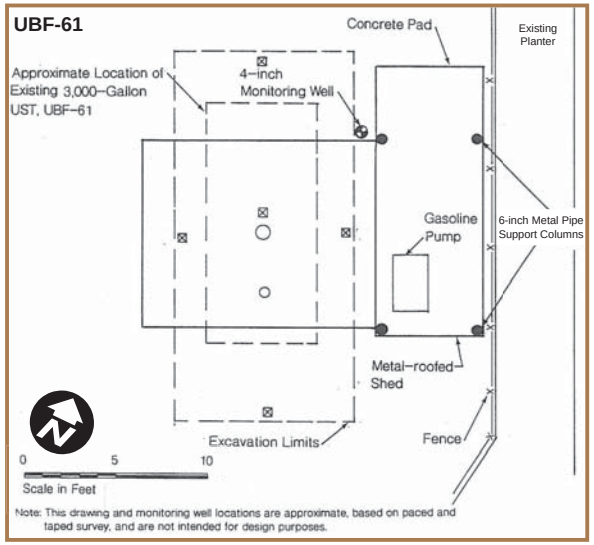
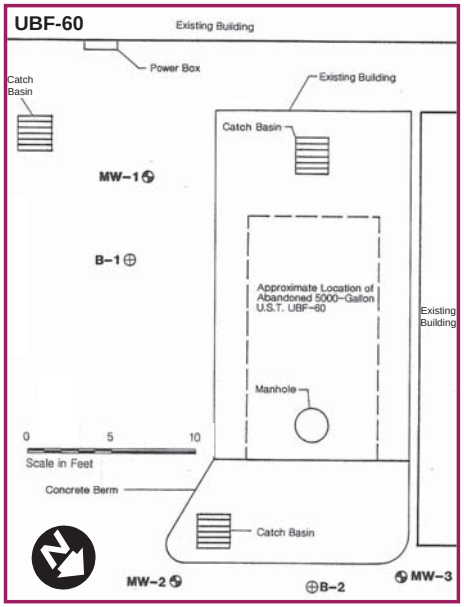
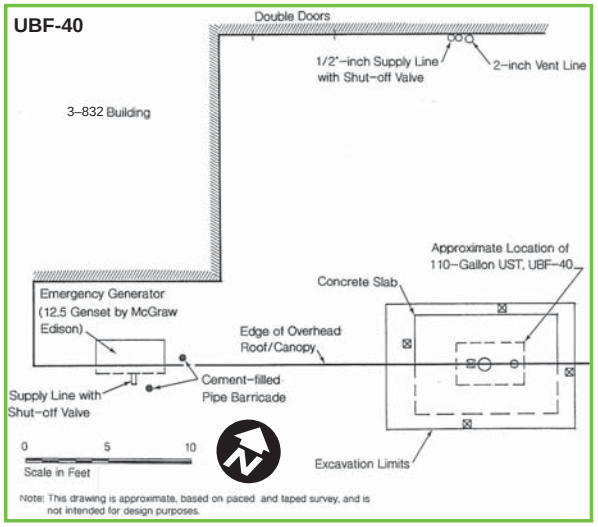
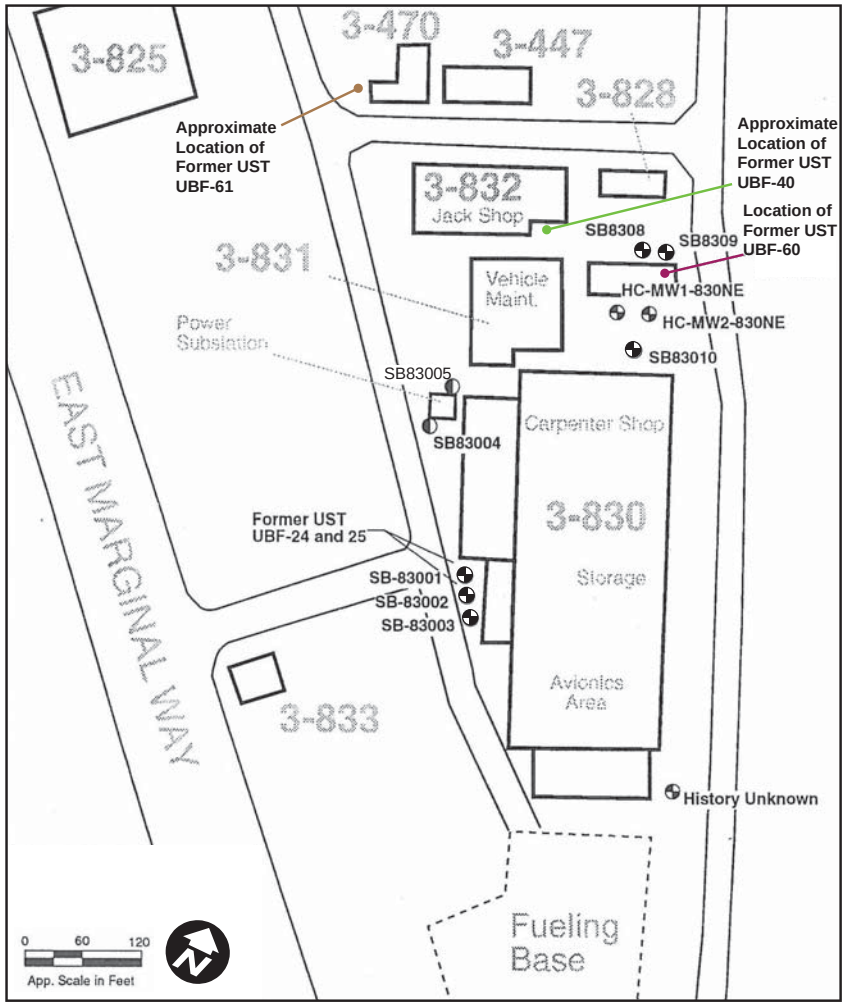






Legend

MW–1	Monitoring Well Location and Number
B–1	Soil Boring Location and Number
	Hand Auger
	Verification Soil Sample Location



Sources: Hart Crowser 1990a,1990b; Weston 1997

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Figure 7.1–78. Former Buildings 3-830, 3-831, and 3-832 UST Removals and Assessments (1987, 1989, 1990, and 1997)

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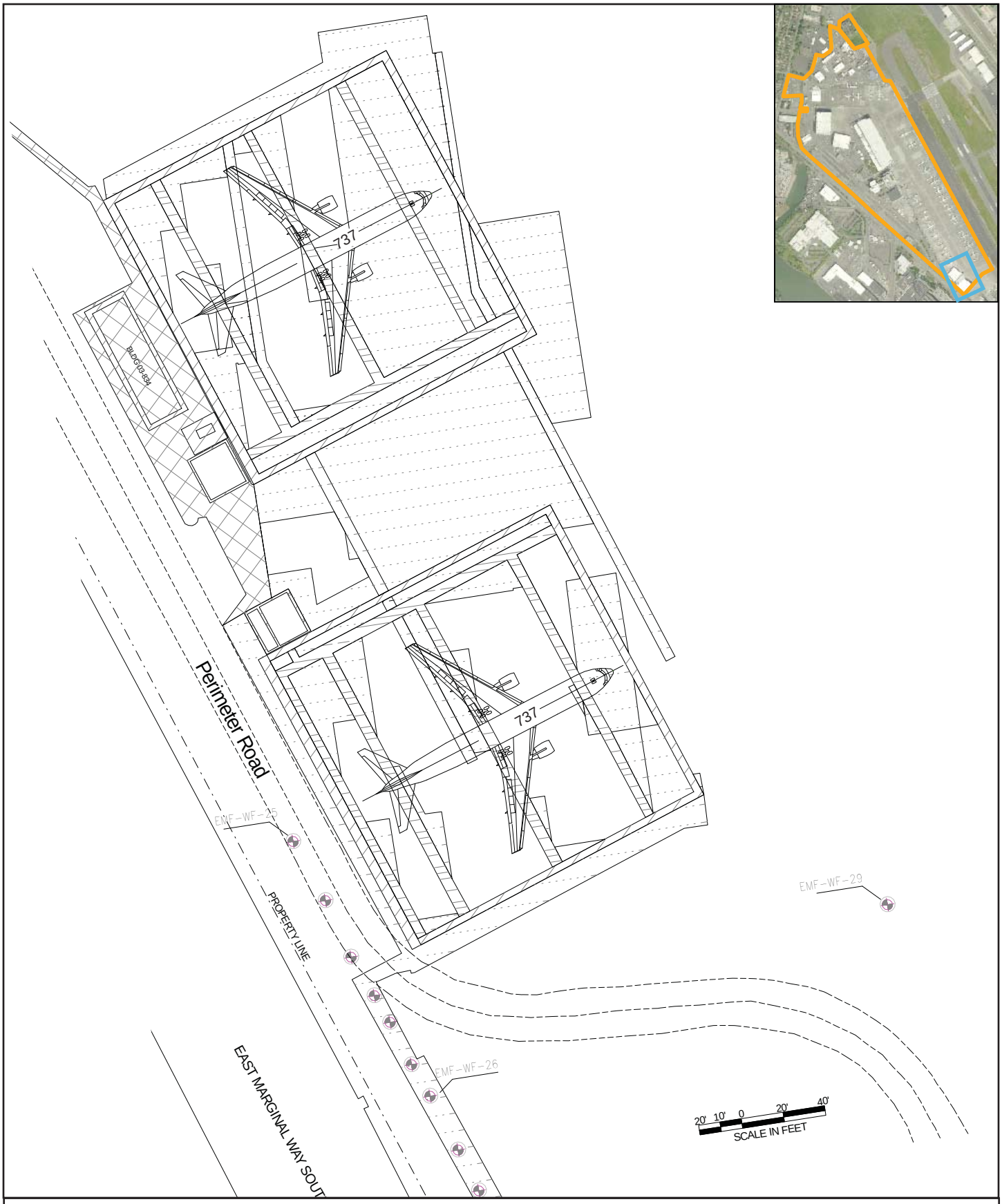

Source: CALIBRE 2008

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Figure 7.1–79. Tent Hangar Construction (2008)

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Existing Groundwater Wells
Proposed Monitoring Well
Site-wide Proposed Monitoring Well
Site Boundary

0 100 200 300 400 Feet

Slip 4
EAST MARGINAL WAY S
16TH AVE S
14TH AVE S
12TH AVE S
S WEBSTER ST
S OTHELLO ST
S MYRTLE ST
FLORA AVE S
ELLIS AVE S
S WILLOW ST
ALETON AVE S

NGW252 NGW251 NGW253 NGW254 NGW208 NGW207 NGW210 NGW225 NGW226 NGW209 NGW201 NGW203 NGW227 NGW211 NGW228 NGW212 NGW220 NGW202 NGW206 NGW221 NGW222 NGW229 NGW223 NGW224 NGW204 NGW519 NGW516 NGW520 NGW515 NGW514 NGW513 NGW509 NGW512 NGW508 NGW510 NGW511 NGW102 NGW101 NGW103 NGW105 NGW521 NGW523 NGW104 NGW506 NGW522 NGW106 NGW505

DW-3-370 DW-2-370 DW-4-370 DW-1-370 DW-5-370 DW-6-370 GT88-1 GT88-2 GT-1114-2

MW-B4 7-27-1 AM/PM Non-Boeing Office Fire Station Seattle

3-370 3-380 3-369 3-374 Tank 3-350 3-324 3-335 3-336 3-315 3-626 3-353 3-352 3-333 National Guard 3-310 3-323 3-334 3-322 NSF 3-368 3-313 3-326 GTSP

NGW353 NGW355 NGW352 NGW351 NGW357 NGW356 NGW354 NGW359 NGW358 NGW309 NGW310 NGW302 NGW301 NGW303 NGW311 NGW304 NGW306 Replacement NGW305 NGW307 Replacement NGW308

3-825 3-818 3-801 3-800 3-390 Boiler Room

EMF-WF-25 EMF-IW-12 EMF-IW-31 EMF-IW-32 EMF-IW-13 3-812 3-811 EMF-WF-29

FTATW03 GTSP-8 GTSP-7 GTSP-2 GTSP-1 KCIA-MW2 KCIA-MW3

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Figure 7.1-80. Existing and Proposed Groundwater Well Locations

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Coordinate System:
NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet
Prepared By: apw/mlf
File: Figure_7_1-80_Existing&Proposed_GW_Wells.mxd
Illustrative purposes only.
Date Saved: 11/5/2013 2:10:31 PM

SD Structures with SD Solids
Total PCB SL Exceedance Factors
- Non-detect
- ≤ 1
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125

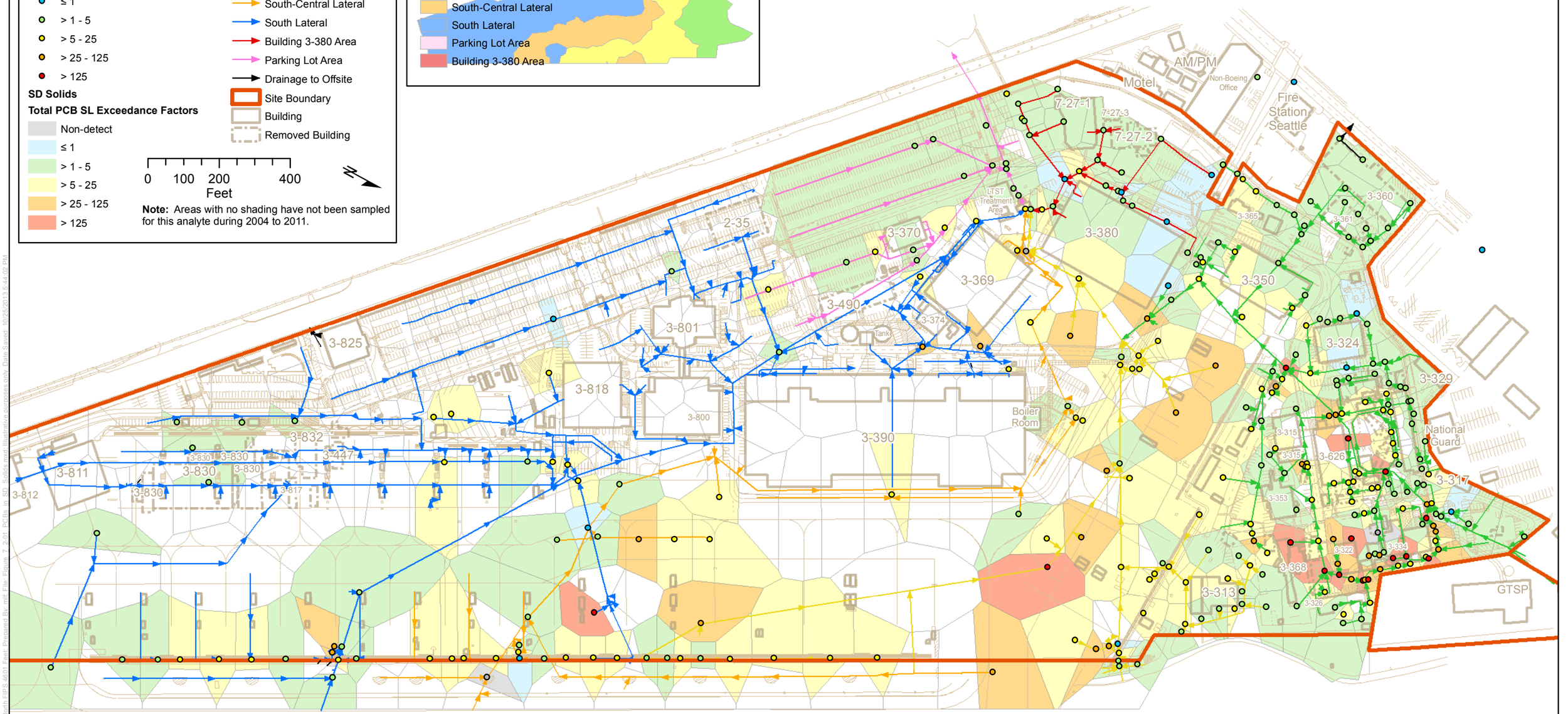
SD Solids
Total PCB SL Exceedance Factors
- Non-detect
- ≤ 1
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125

Storm Drain Lines
- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Drainage to Offsite
- Site Boundary
- Building
- Removed Building

0 100 200 400
Feet

Note: Areas with no shading have not been sampled for this analyte during 2004 to 2011.

Drainage Basin
- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Parking Lot Area
- Building 3-380 Area



Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet Proposed By: mlf File: Figure_7.2-01_PCBs_in_SD_Solids.mxd (Illustrative purposes only. Date Saved: 10/25/2013 5:44:02 PM

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Figure 7.2-1. PCBs in Storm Drain Solids at NBF-GTSP Site

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SD Structures with SD Solids

Total cPAH SL Exceedance Factors

- Non-detect
- ≤ 1
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125

SD Solids

Total cPAH SL Exceedance Factors

- Non-detect
- ≤ 1
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125

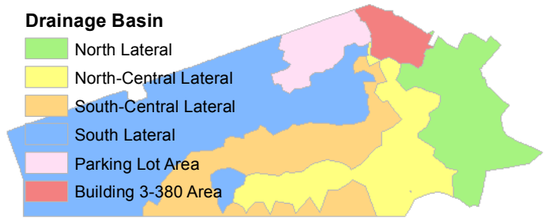
0 100 200 400
Feet

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Drainage to Offsite
- Site Boundary
- Building
- Removed Building

Note: Areas with no shading have not been sampled for this analyte during 2004 to 2011.

Drainage Basin



- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Parking Lot Area
- Building 3-380 Area

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet Projected By: mxf File: Figure_7_2-02_cPAH_in_SD_Solids_v2.mxd Illustrative purposes only. Date Saved: 10/25/2013 6:59:48 PM

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Figure 7.2-2. Total cPAHs in Storm Drain Solids at NBF-GTSP Site

SAIC® From Science to Solutions

Figure 7.2-2

SD Structures with SD Solids

Mercury SL Exceedance Factors

- Non-detect
- ≤ 1.0
- > 1.0 - 5.0
- > 5.0 - 25
- > 25 - 125
- > 125

SD Solids

Mercury SL Exceedance Factors

- Non-detect
- ≤ 1.0
- > 1.0 - 5.0
- > 5.0 - 25
- > 25 - 125
- > 125

Storm Drain Lines

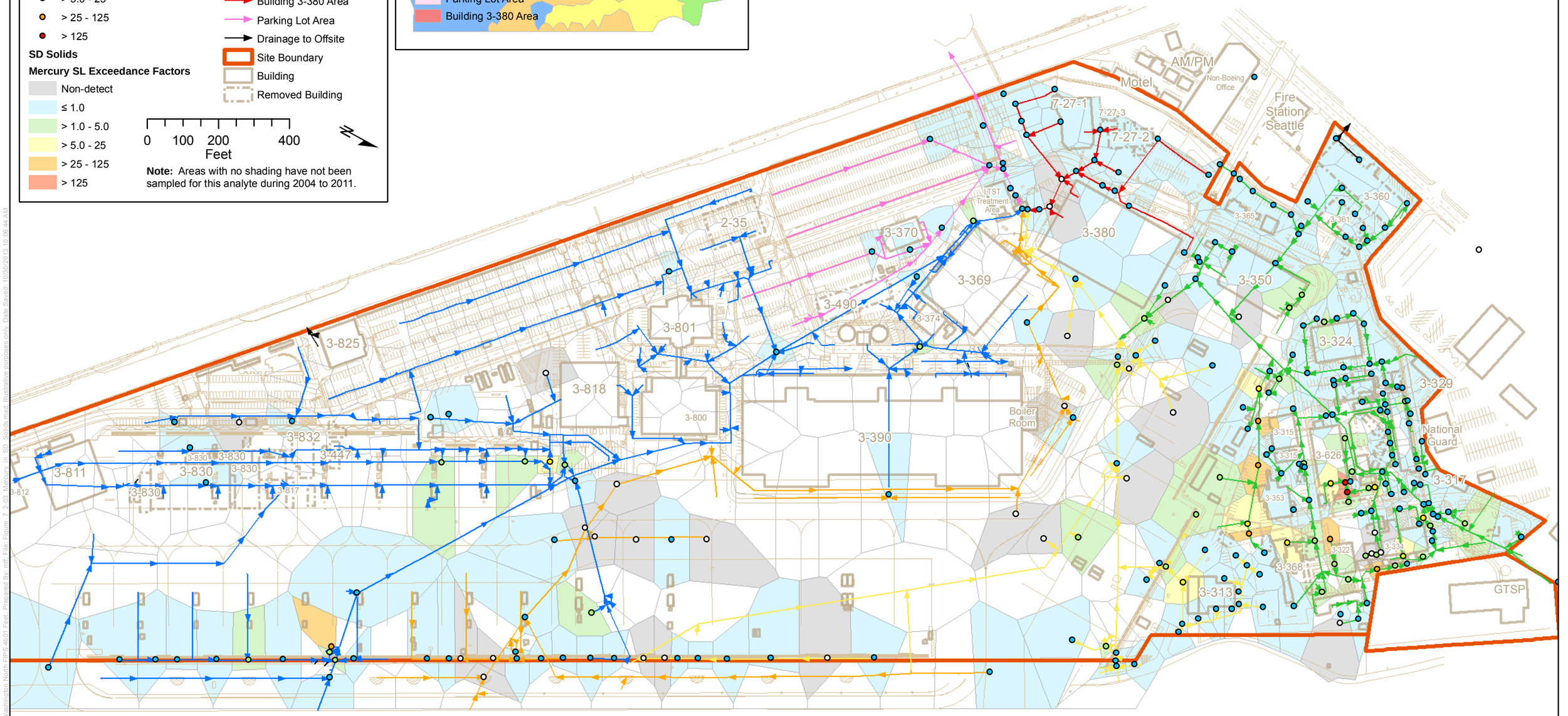
- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Drainage to Offsite
- Site Boundary
- Building
- Removed Building

0 100 200 400
Feet

Note: Areas with no shading have not been sampled for this analyte during 2004 to 2011.

Drainage Basin

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Parking Lot Area
- Building 3-380 Area



Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet Prepared By: mlf File: Figure_7.2-03_Mercury_in_SD_Solids.mxd (Illustrative purposes only. Date Saved: 10/30/2013 10:06:44 AM

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Figure 7.2-3. Mercury in Storm Drain Solids at NBF-GTSP Site

SAIC
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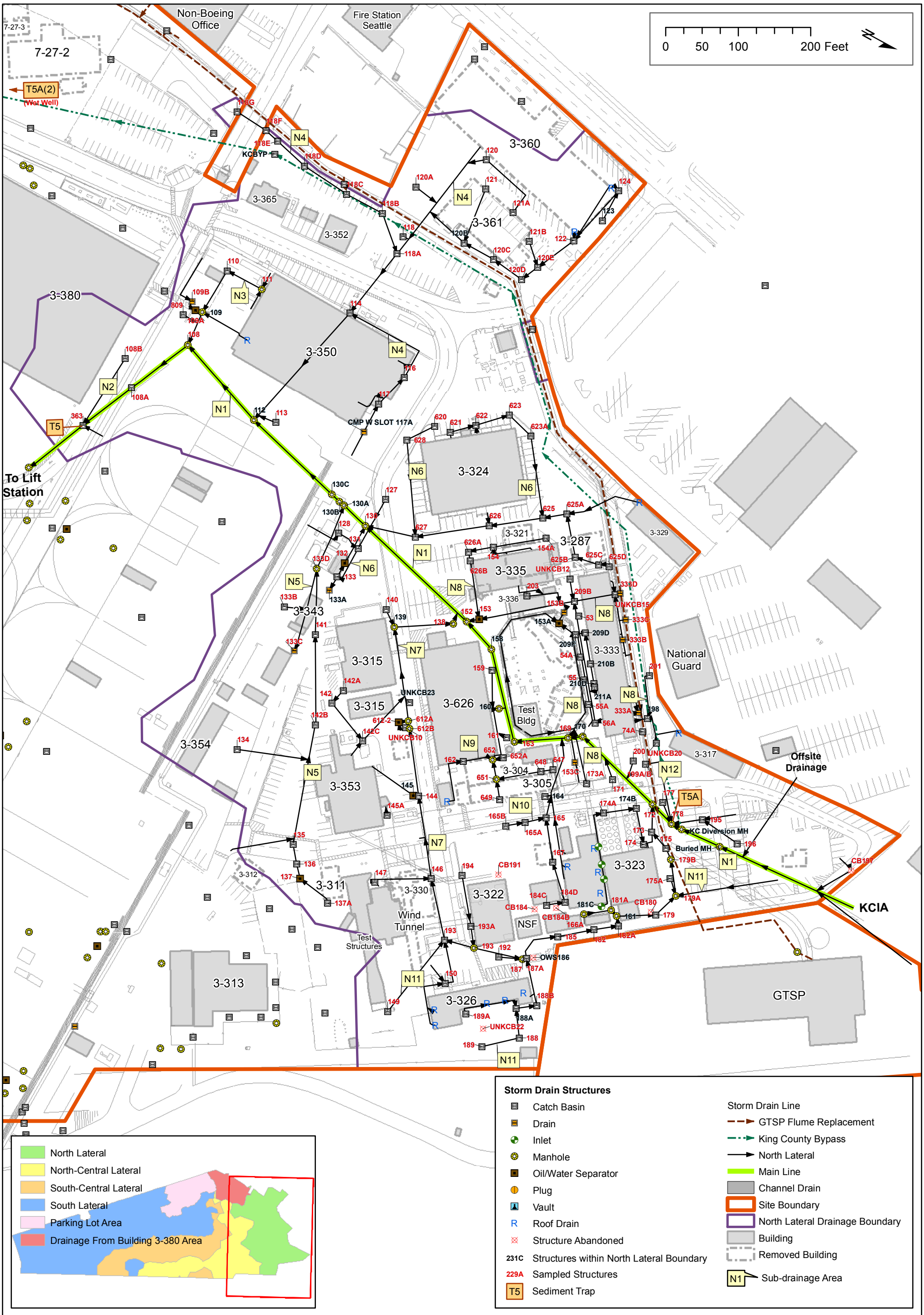

Figure 7.2-4. North Lateral Storm Drain Line

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SAIC
From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_2-04_SDSystem_NorthLateral.mxd
Illustrative purposes only.
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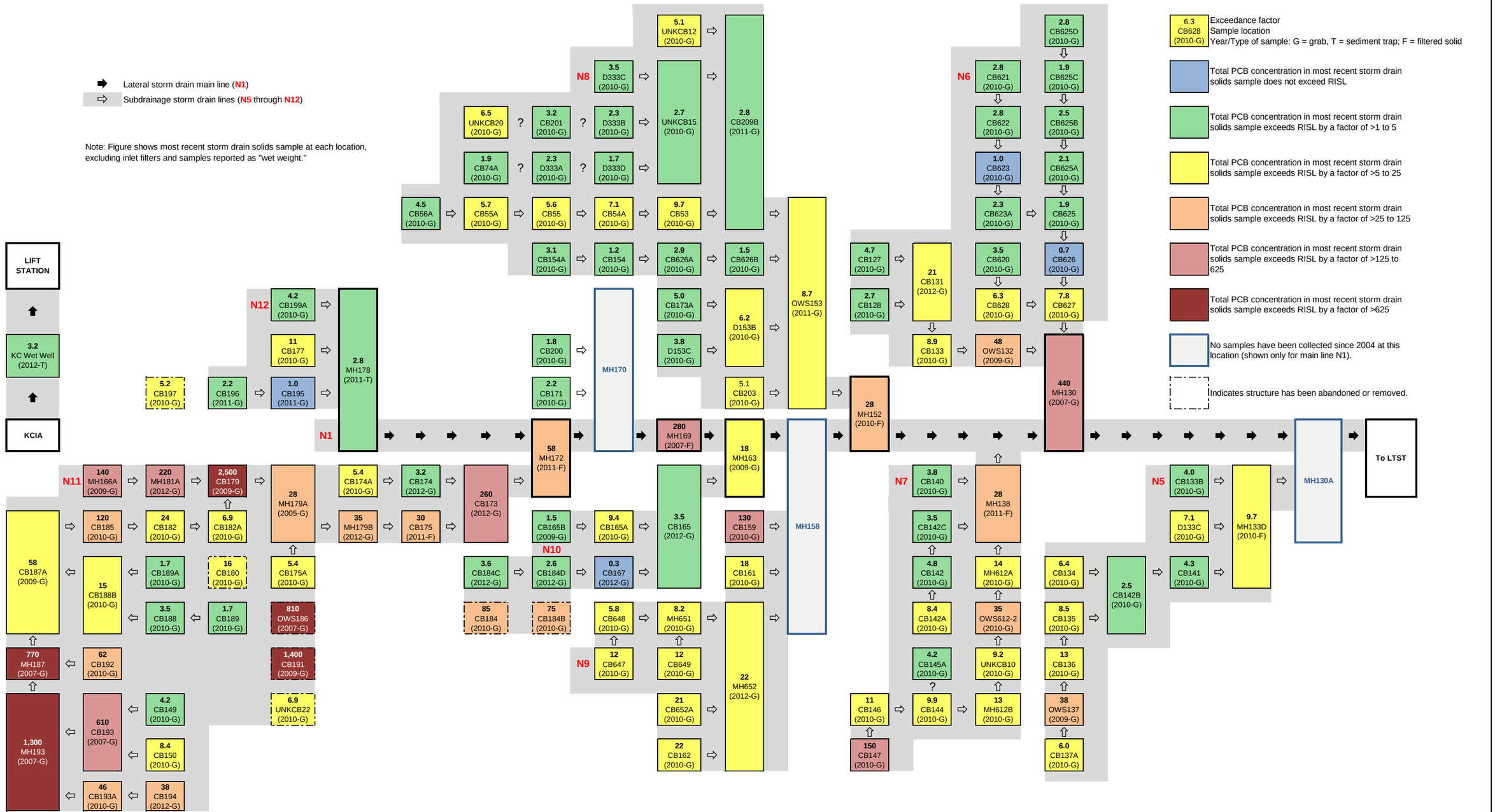
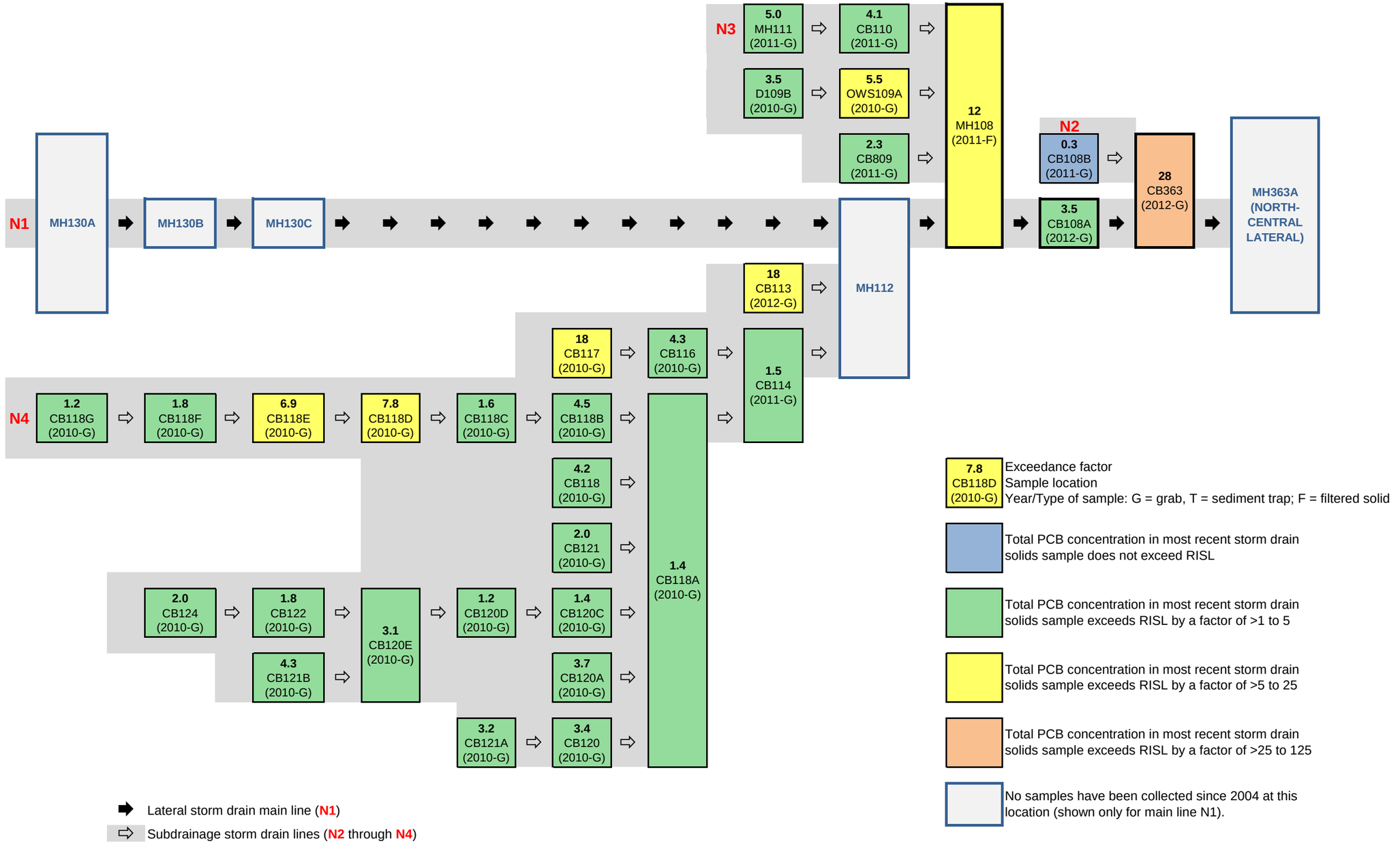


Figure 7.2-5. Most Recent PCB Exceedance Factors in the North Lateral Drainage Area Upstream of MH130A

Figure 7.2-5



Note: Figure shows most recent storm drain solids sample at each location, excluding inlet filters and samples reported as "wet weight."

Figure 7.2-6. Most Recent PCB Exceedance Factors in the North Lateral Drainage Area Downstream of MH130A

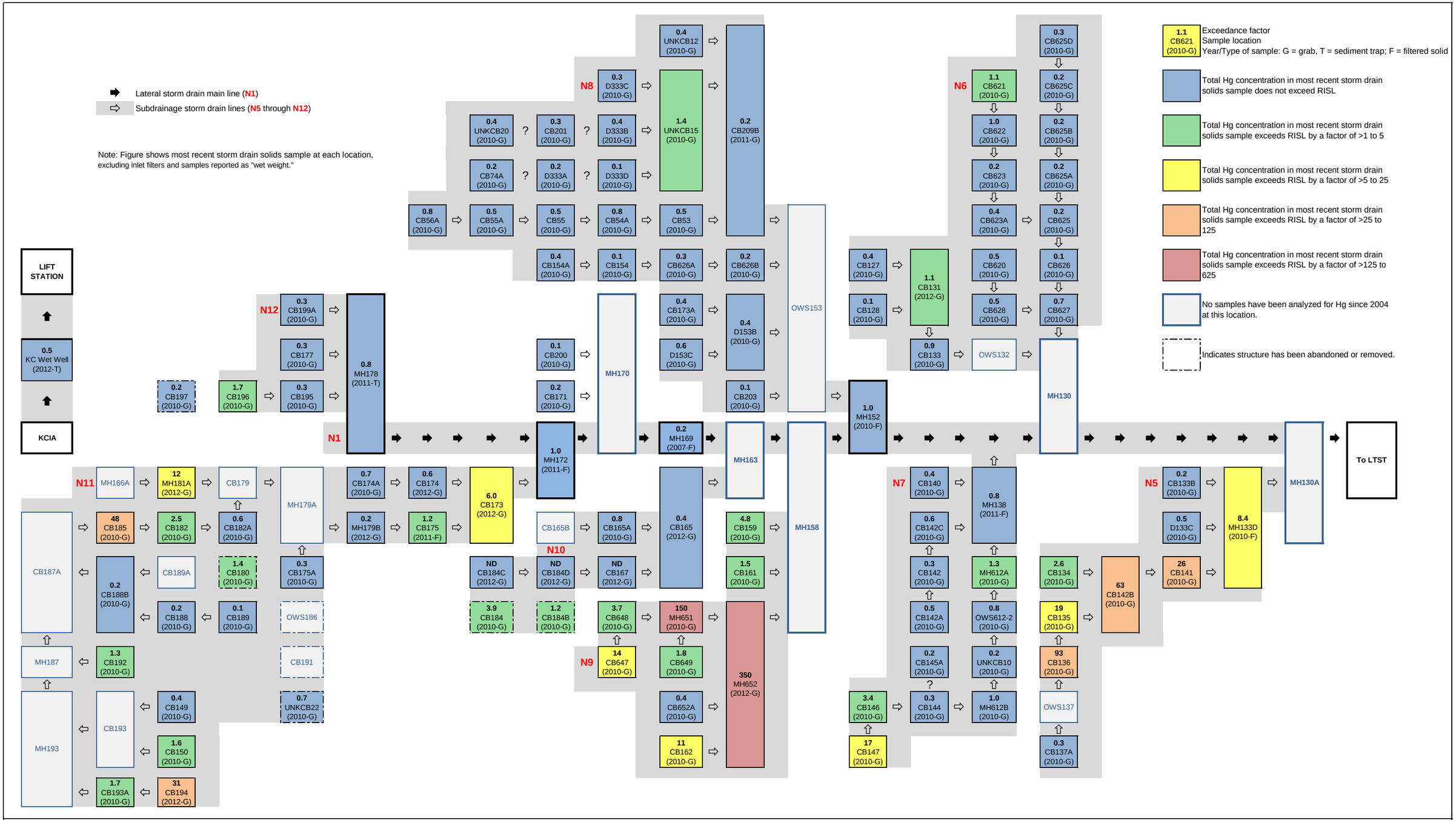


Figure 7.2-7. Most Recent Mercury Exceedance Factors in the North Lateral Drainage Area Upstream of MH130A

Figure 7.2-7

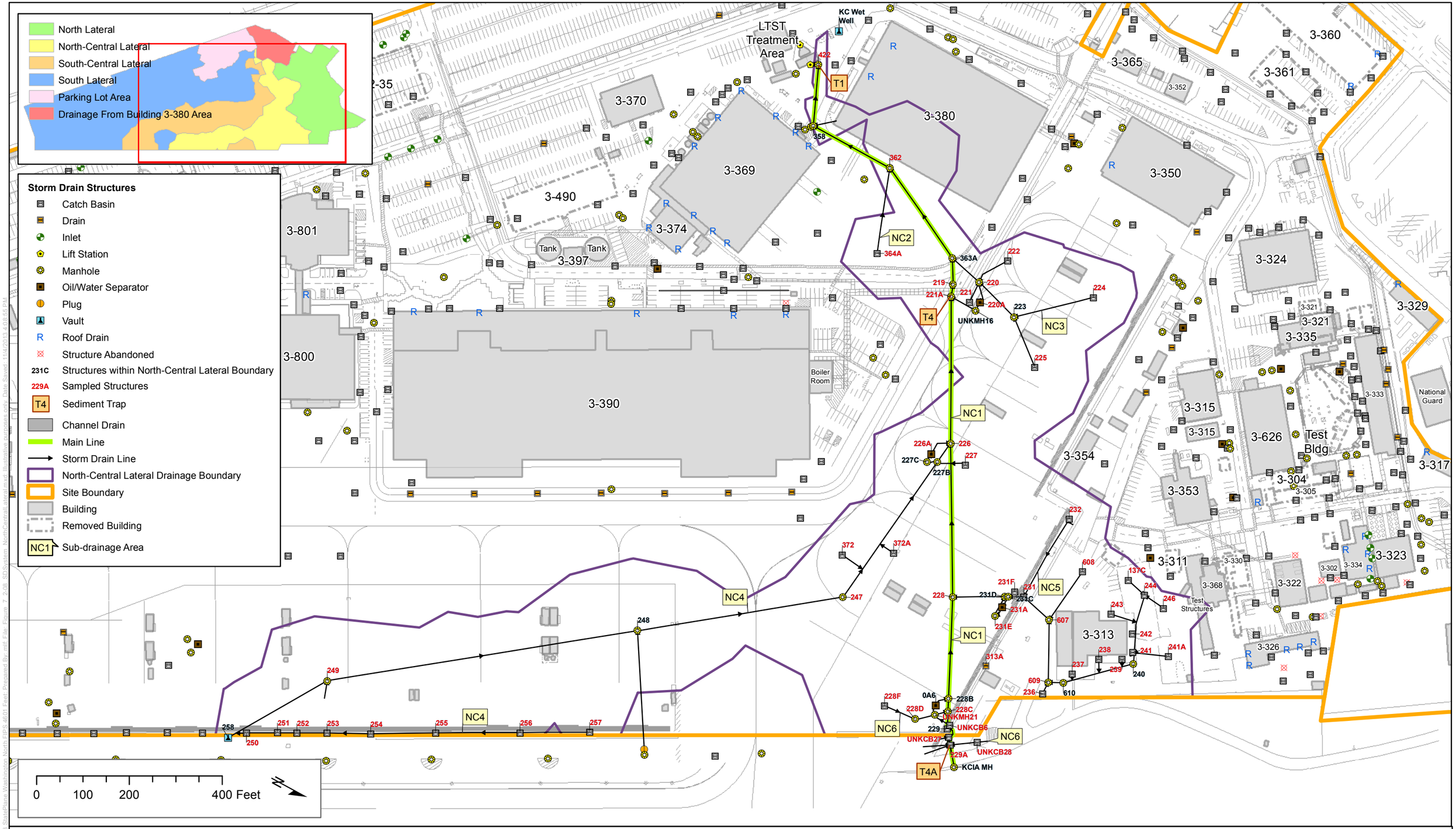
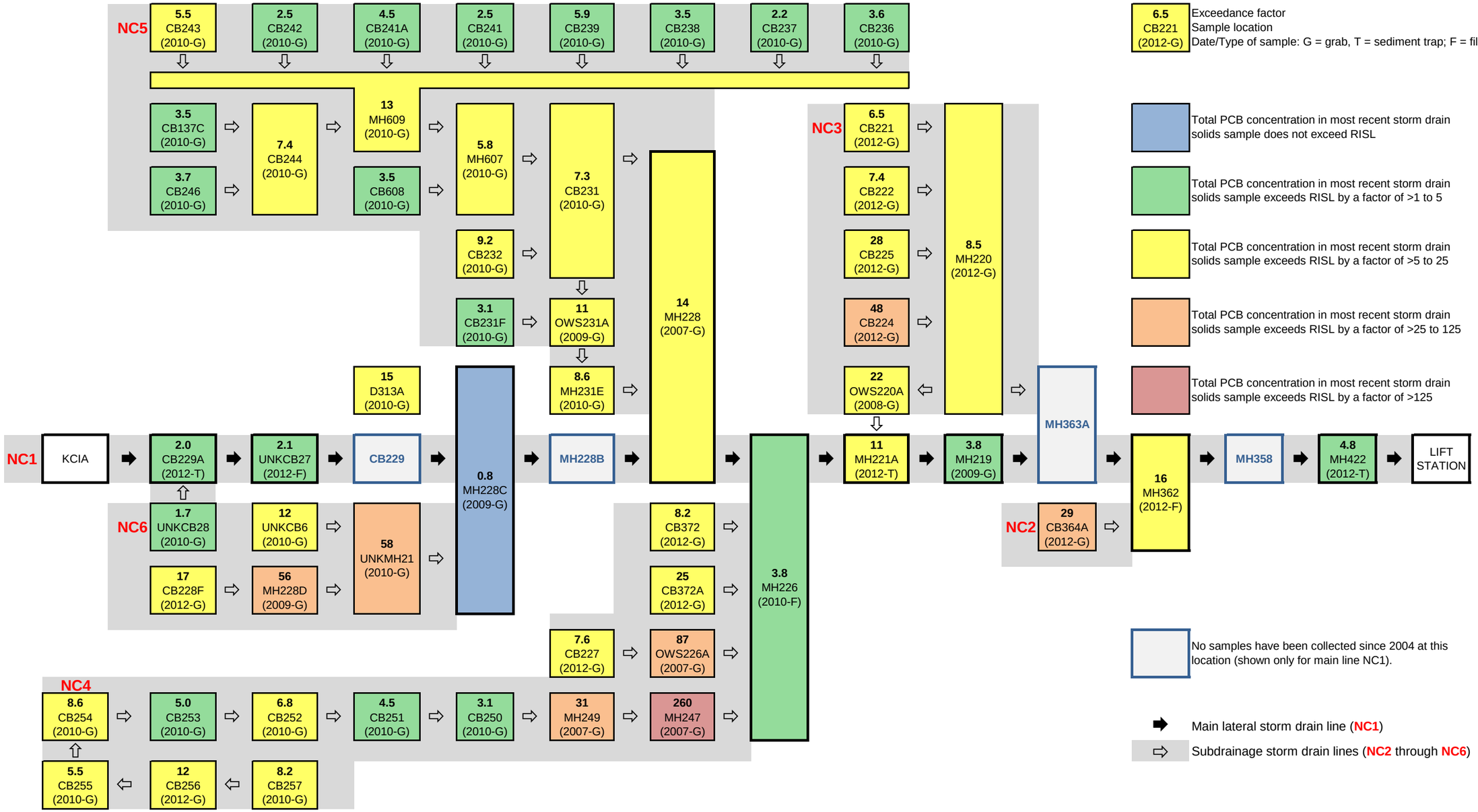


Figure 7.2-8. North-Central Lateral Storm Drain Line

Figure 7.2-8



Note: Figure shows most recent storm drain solids sample at each location, excluding inlet filters and samples reported as "wet weight."

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Figure 7.2-9. Most Recent PCB Exceedance Factors in North-Central Lateral Drainage Area

SAIC From Science to Solutions

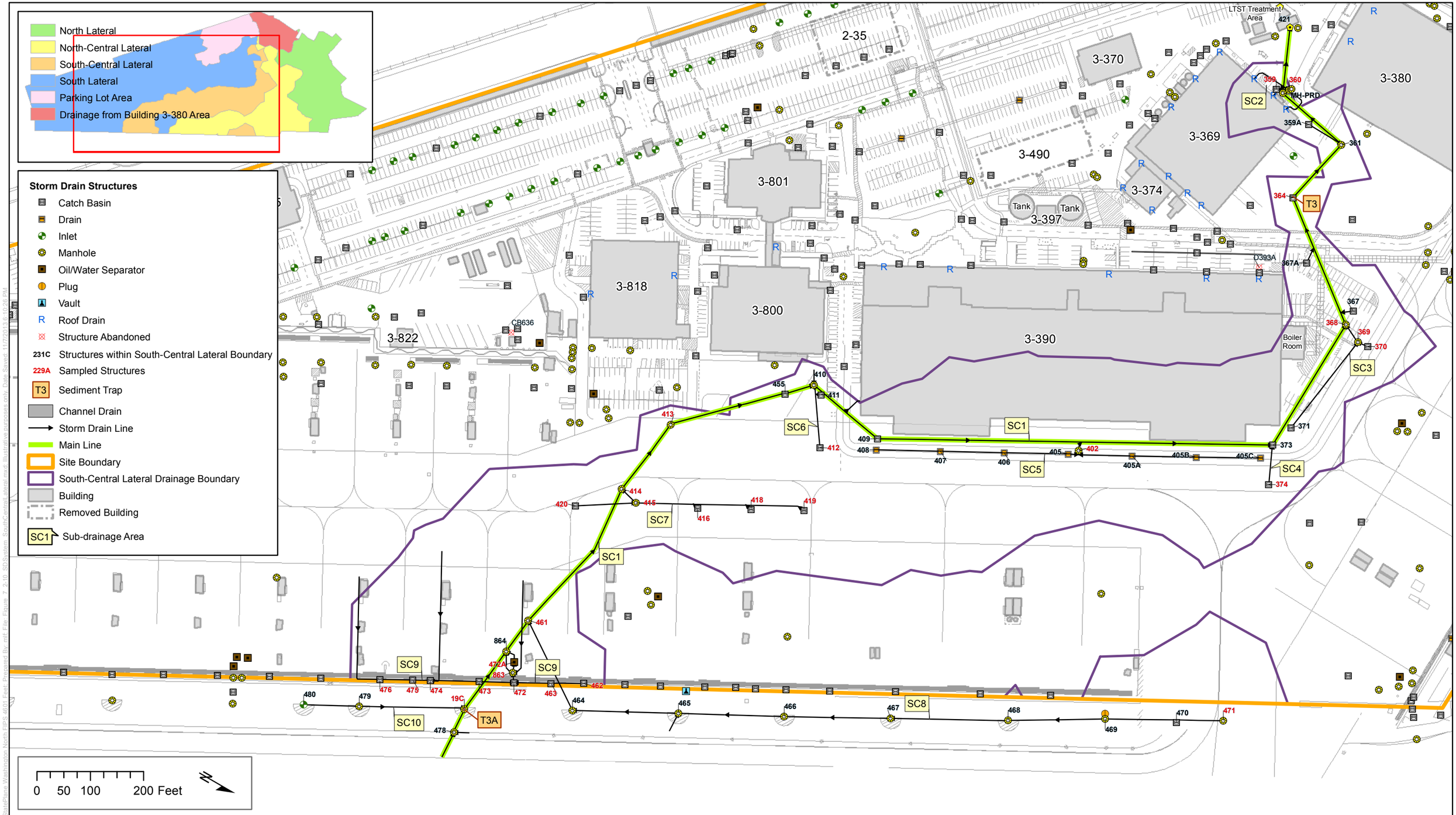

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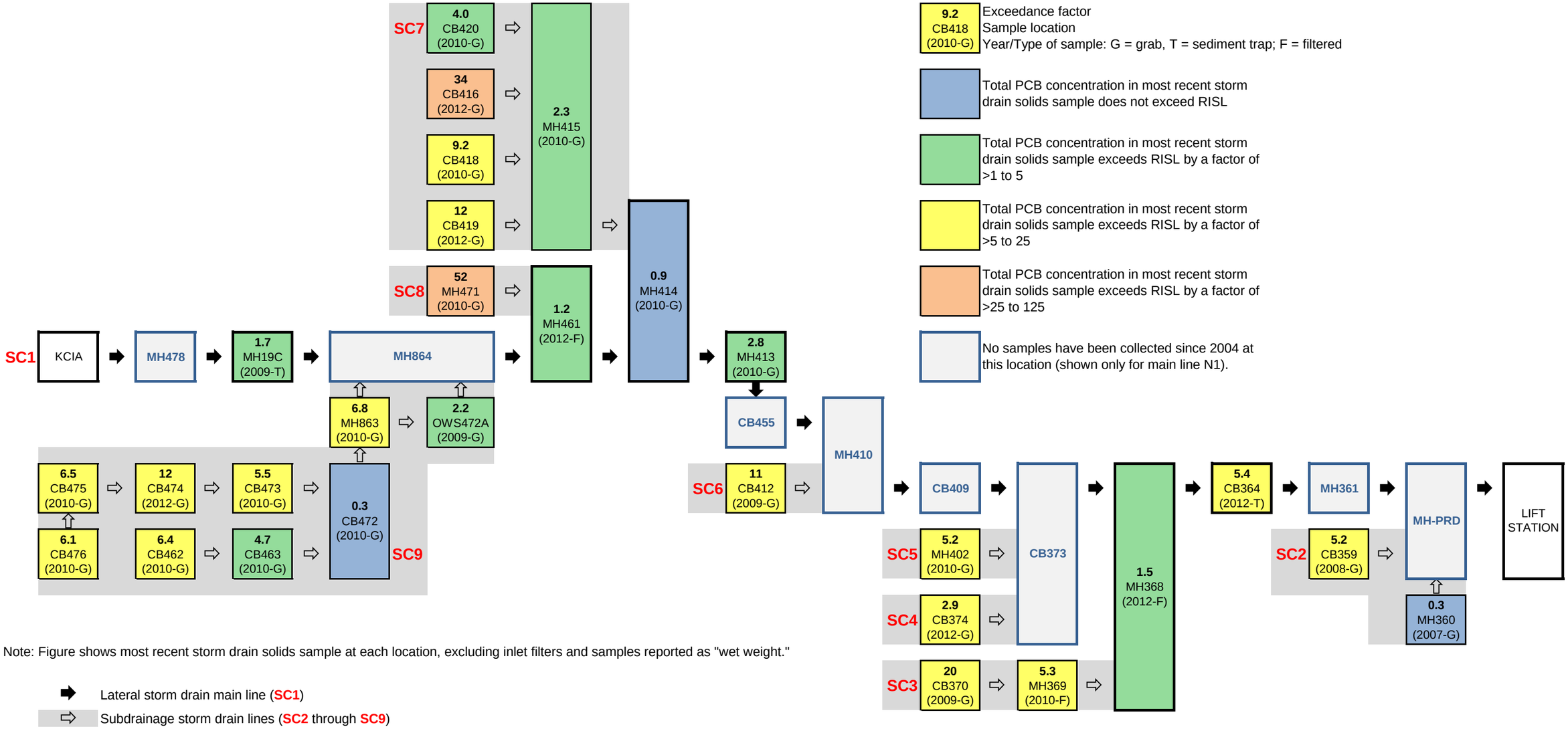
Figure 7.2-10. South-Central Lateral Storm Drain Line

SAIC
From Science to Solutions



Note: Figure shows most recent storm drain solids sample at each location, excluding inlet filters and samples reported as "wet weight."

➡ Lateral storm drain main line (SC1)

⇨ Subdrainage storm drain lines (SC2 through SC9)

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Figure 7.2-11. Most Recent PCB Exceedance Factors in the South-Central Lateral Drainage Area

SAIC From Science to Solutions

Storm Drain Structures

- Catch Basin
- Drain
- Inlet
- Manhole
- Oil/Water Separator
- Plug
- Vault
- R Roof Drain
- Structure Abandoned
- 231C Structures within South Lateral Boundary
- 229A Sampled Structures
- T2 Sediment Trap
- Channel Drain
- Storm Drain Line
- Main Line
- Site Boundary
- Building
- Removed Building
- South Lateral Drainage Boundary
- S1 Sub-drainage Area

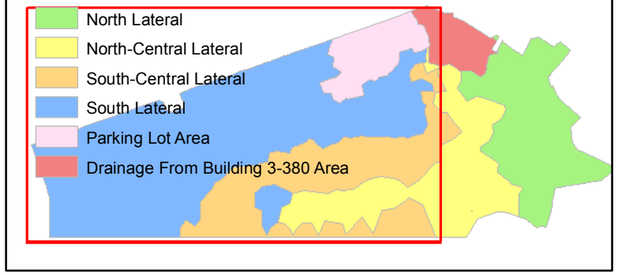

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Figure 7.2-12. South Lateral Storm Drain Line

SAIC
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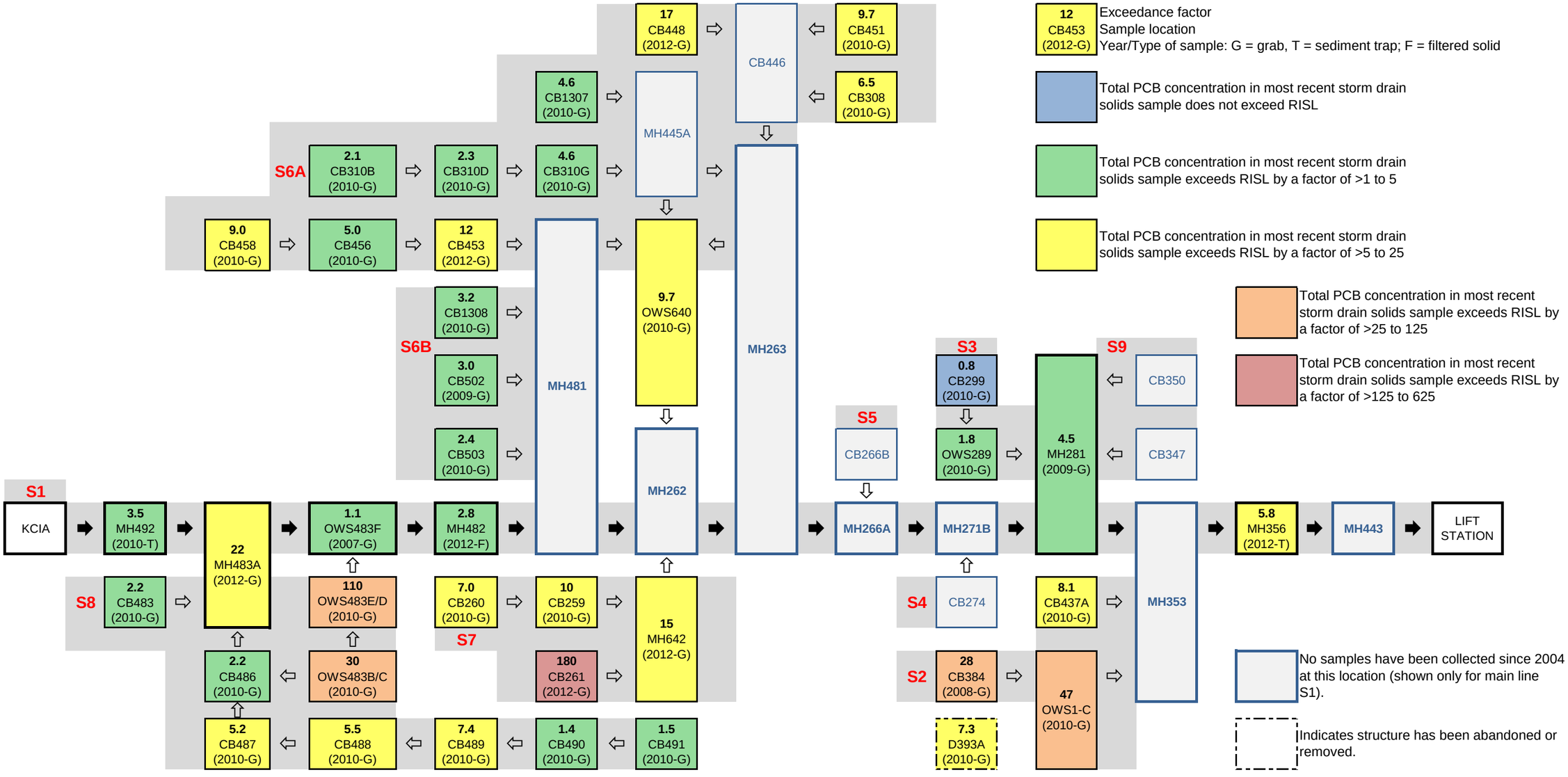
Figure 7.2-12



Note: Figure shows most recent storm drain solids sample at each location, excluding inlet filters and samples reported as "wet weight."

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Figure 7.2-13. Most Recent PCB Exceedance Factors in the South Lateral Drainage Area

SAIC From Science to Solutions

Storm Drain Structures

- Catch Basin
- Drain
- Inlet
- Manhole
- Oil/Water Separator
- Plug
- Vault
- R Roof Drain
- Structure Abandoned
- 231C Structures within Building 3-380 Area Boundary
- 229A Sampled Structures

Storm Drain Line

- GTSP Flume Replacement
- King County Bypass
- Building 3-380 Area
- Main Line
- Site Boundary
- Building 3-380 Area Drainage Boundary
- Building
- Removed Building
- B1 Sub-drainage Area

Motel

Non-Boeing Office

7-27-1

7-27-3

7-27-2

3-300

3-365

3-380

3-370

LTST Treatment Area

LTST Treatment Area

Lift Station

KC Wet Well

100 102D 102C MH101A MH101 102B 102A 102 PL5 B2 107 428B B3 106 105 106A B4 428C 104 427 427A 428 428A 429 423 423A B1 107A 109C

North Lateral
North-Central Lateral
South-Central Lateral
South Lateral
Parking Lot Area
Drainage From Building 3-380 Area

0 25 50 100 Feet

N

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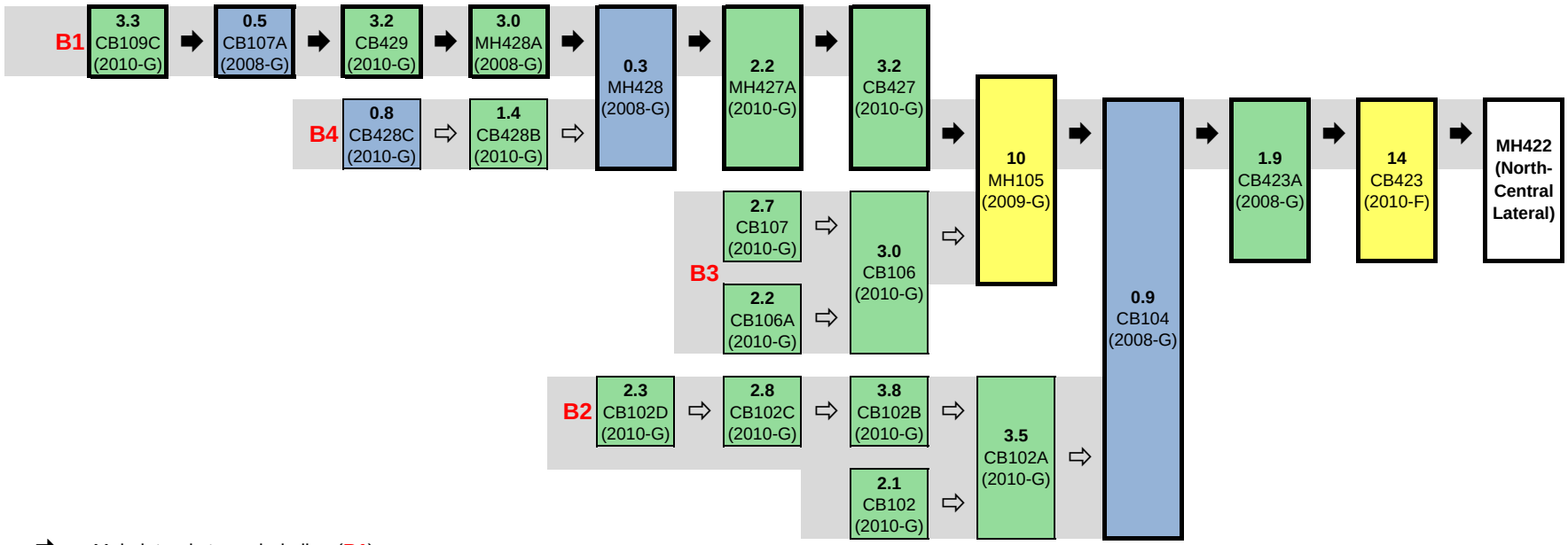
Figure 7.2-14. Building 3-380 Storm Drain Line

SAIC From Science to Solutions

Figure 7.2-14

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet Projected By: mlf File: Figure_7.2-14_SDSystem_Bldg3-380.mxd Illustrative purposes only. Date Saved: 11/6/2013 6:29:53 PM



Main lateral storm drain line (**B1**)
Subdrainage storm drain lines (**B2** through **B4**)

2.3 CB102D (2010-G)
Exceedance factor
Sample location
Date/Type of sample: G = grab, T = sediment trap; F = filtered solid

PCB concentration in most recent storm drain solids sample does not exceed RISL
PCB concentration in most recent storm drain solids sample exceeds RISL by a factor of >1 to 5
PCB concentration in most recent storm drain solids sample exceeds RISL by a factor of >5 to 25

Note: Figure shows most recent storm drain solids sample at each location, excluding inlet filters and samples reported as "wet weight."

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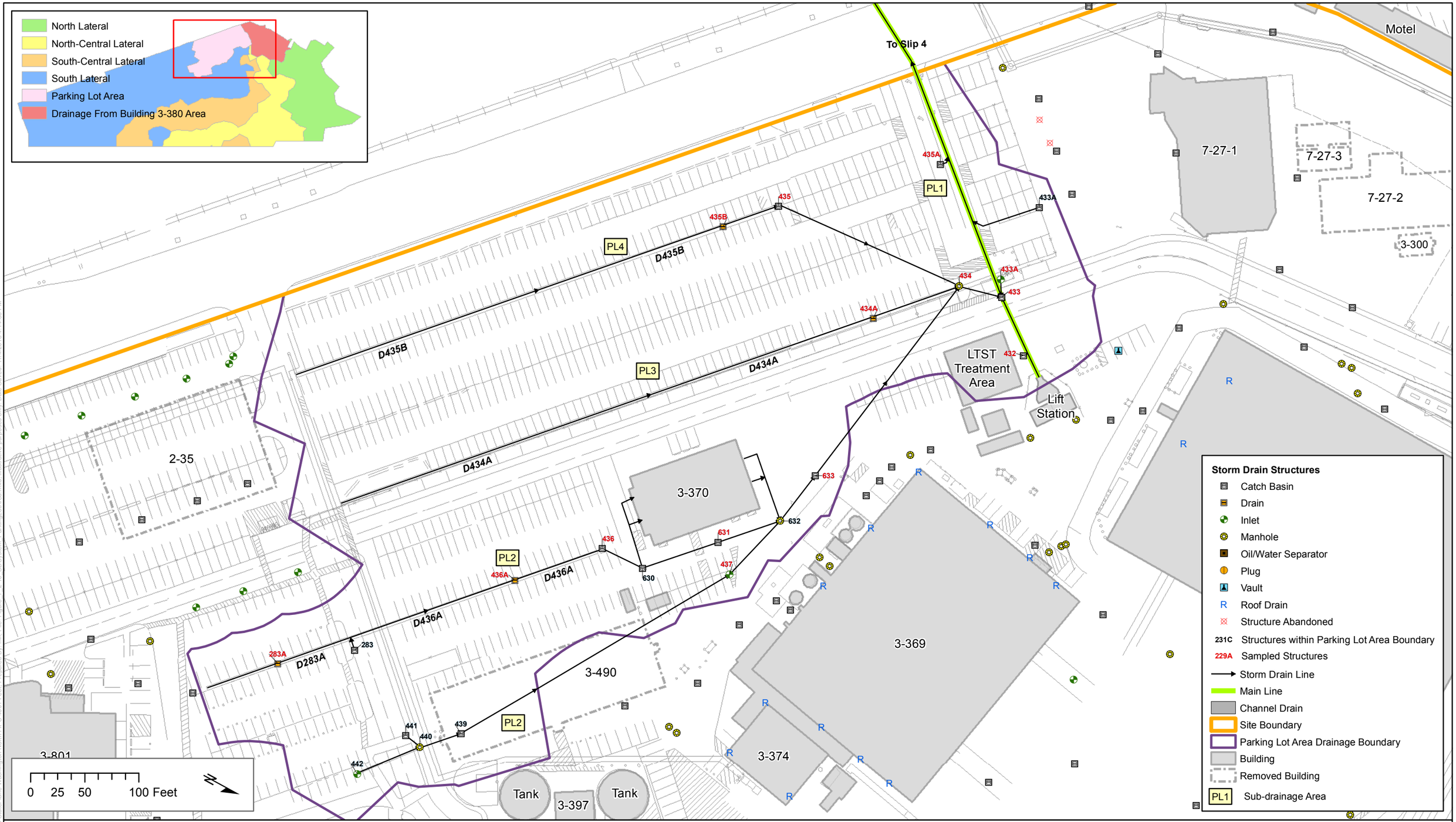
Figure 7.2-15. Most Recent PCB Exceedance Factors in Building 3-380 Drainage Area

SAIC From Science to Solutions



Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet Projected By: mlf File: Figure_7_2-16_SDSystem_ParkingLotArea.mxd Illustrative purposes only. Date Saved: 11/4/2013 4:14:36 PM

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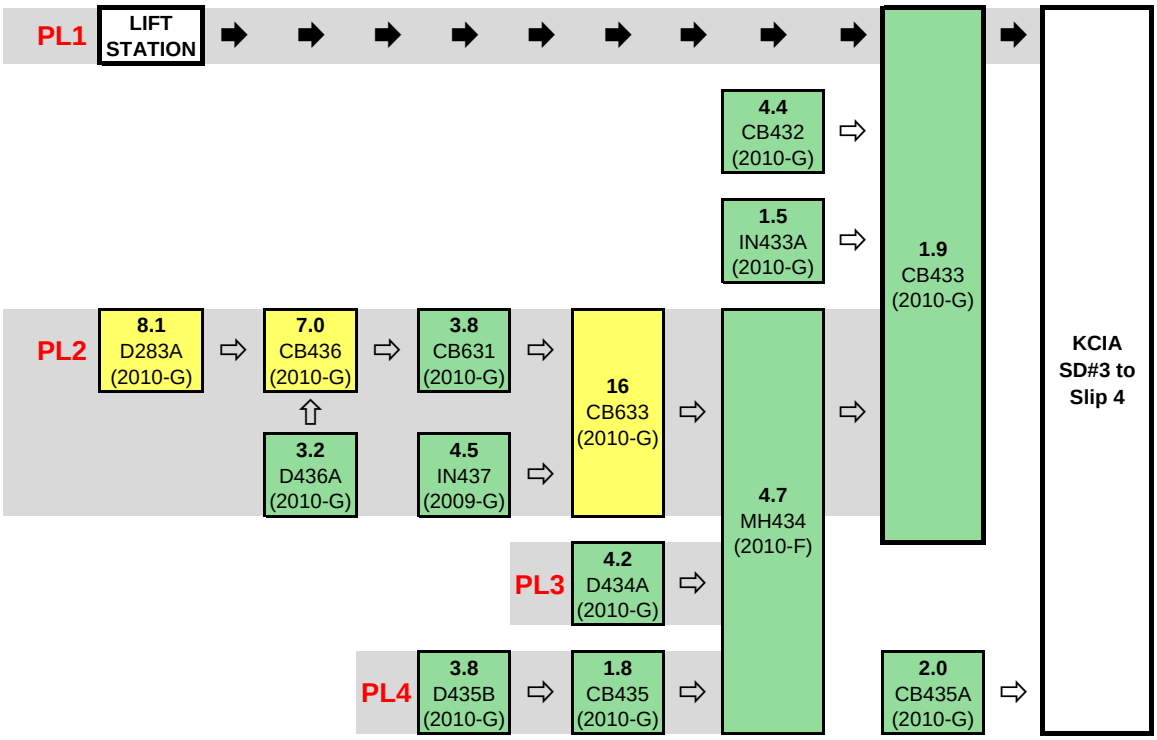
Figure 7.2-16. Parking Lot Area Storm Drain Line

SAIC From Science to Solutions



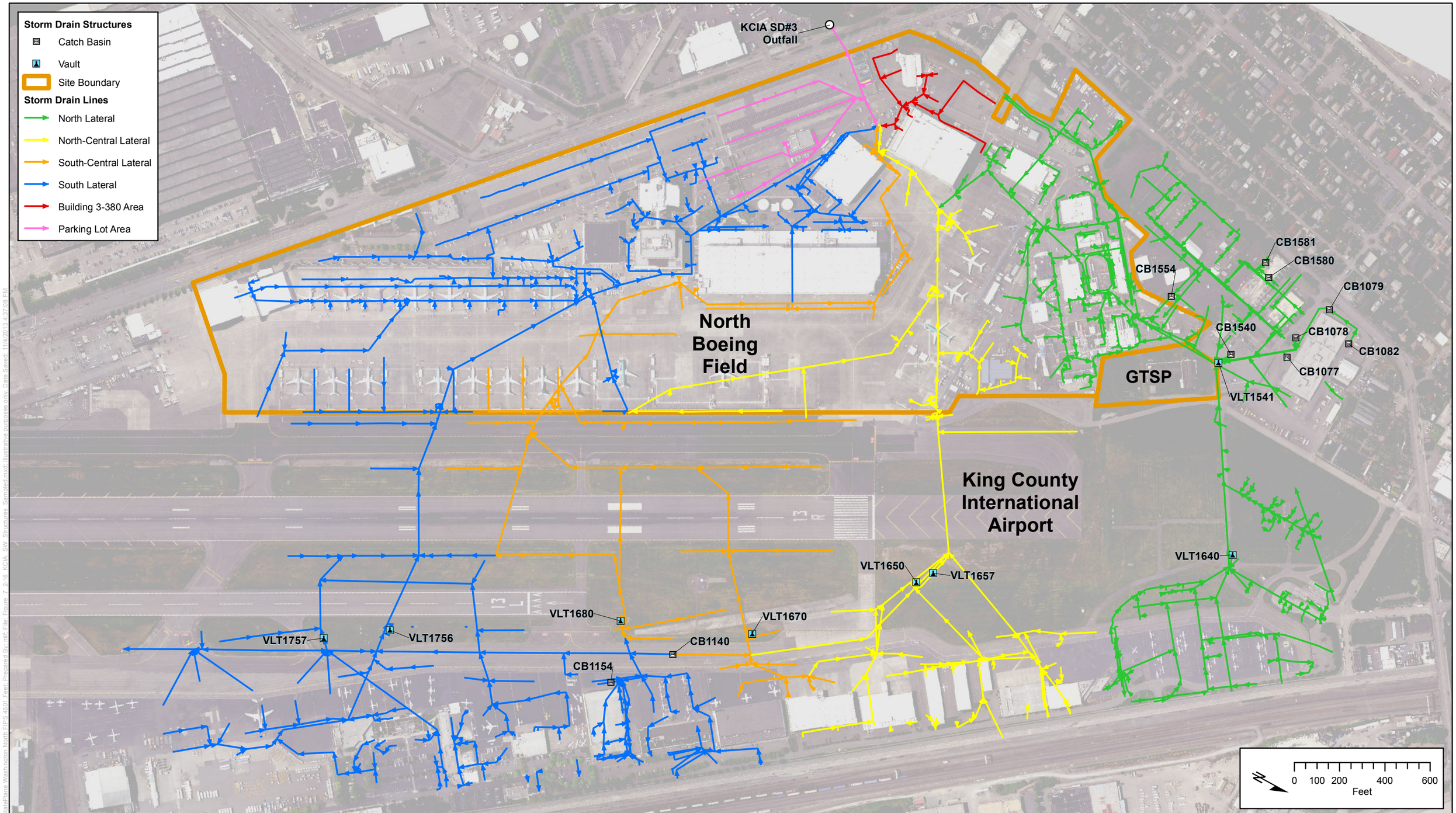
Main lateral storm drain line (PL1)
Subdrainage storm drain lines (PL2 through PL4)

7.0 CB436 (2010-G)
Exceedance factor
Sample location
Date/Type of sample: G = grab, T = sediment trap; F = filtered solid

PCB concentration in most recent storm drain solids sample does not exceed RISL
PCB concentration in most recent storm drain solids sample exceeds RISL by >1 to 5
PCB concentration in most recent storm drain solids sample exceeds RISL by >5 to 25

Note: Figure shows most recent storm drain solids sample at each location, excluding inlet filters and samples reported as "wet weight."

Figure 7.2-17. Most Recent PCB Exceedances in Parking Lot Drainage Area



Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet Prepared By: mxf File: Figure_7.2-18_KCIA_SW_Structures_Sampled.mxd Date Saved: 11/4/2013 4:37:08 PM

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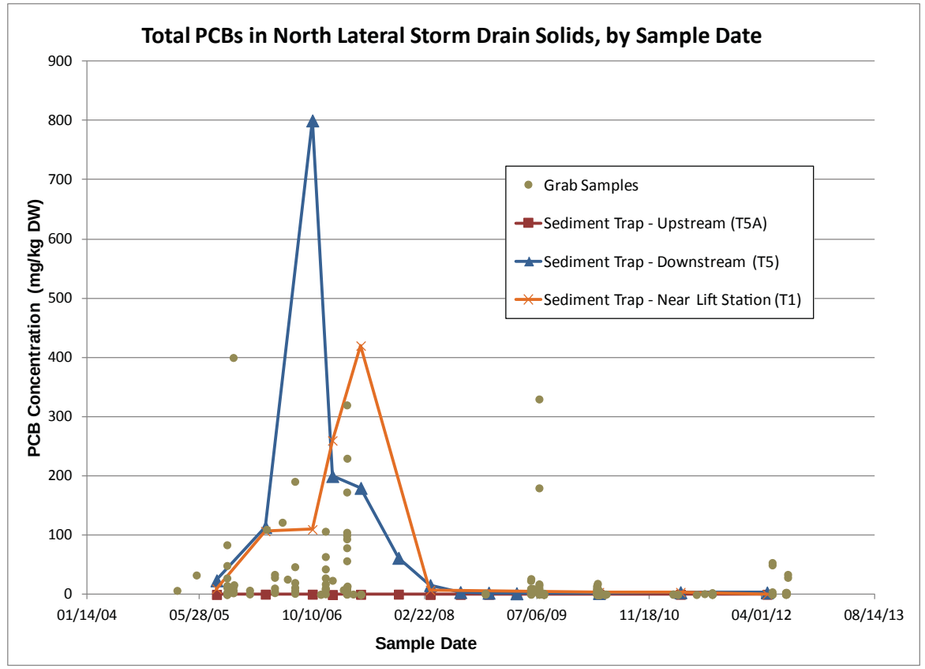
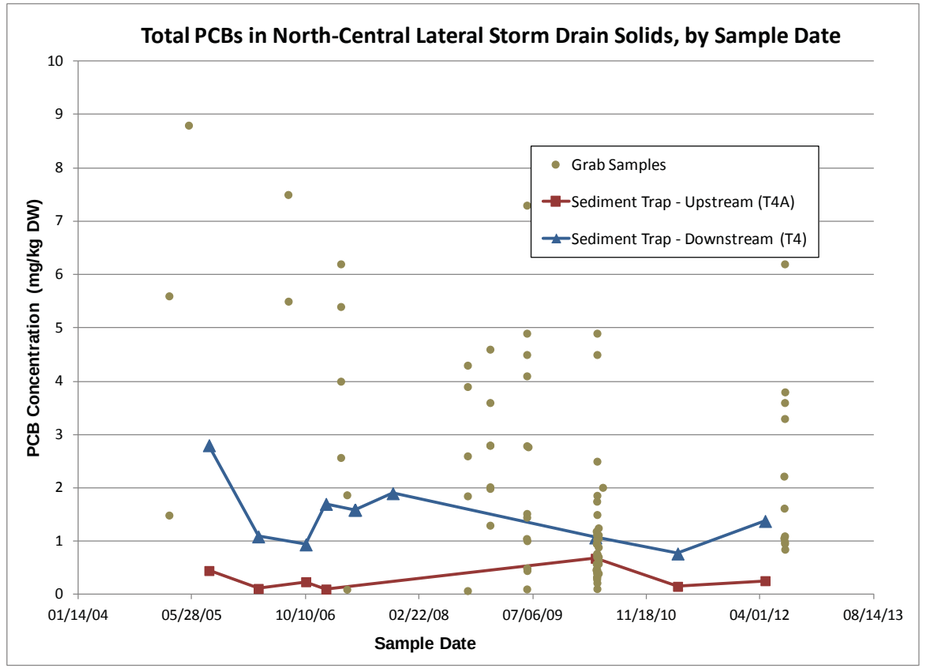
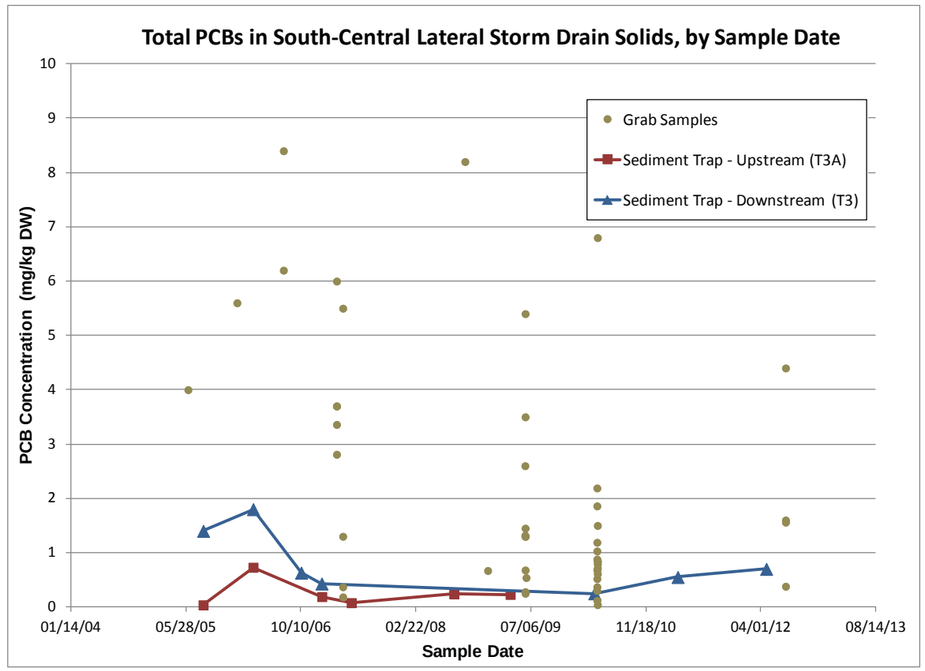
Figure 7.2-18. KCIA Storm Drain Structures Sampled Between 2004 and 2011

SAIC
From Science to Solutions







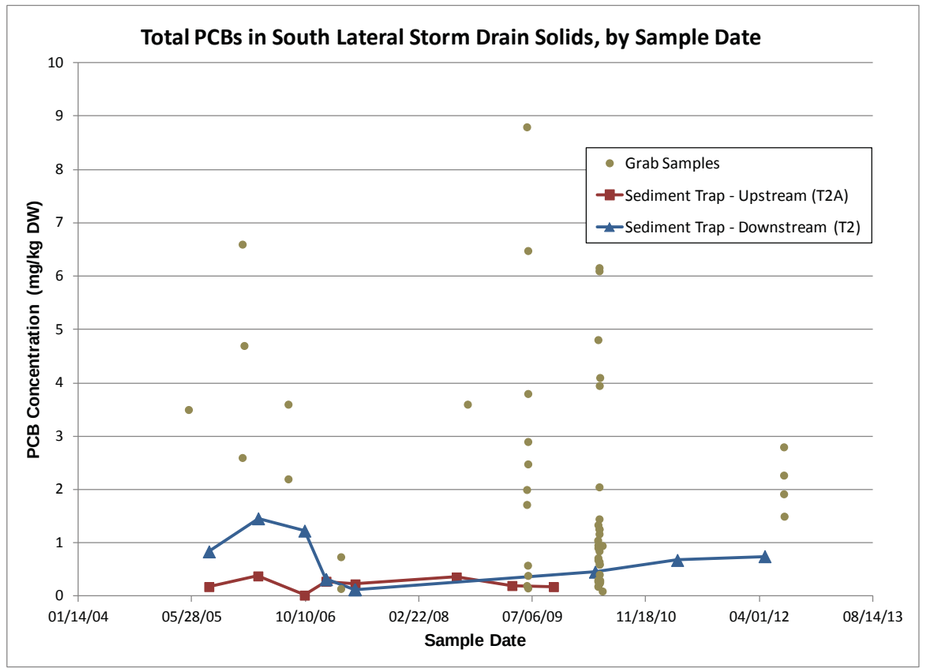


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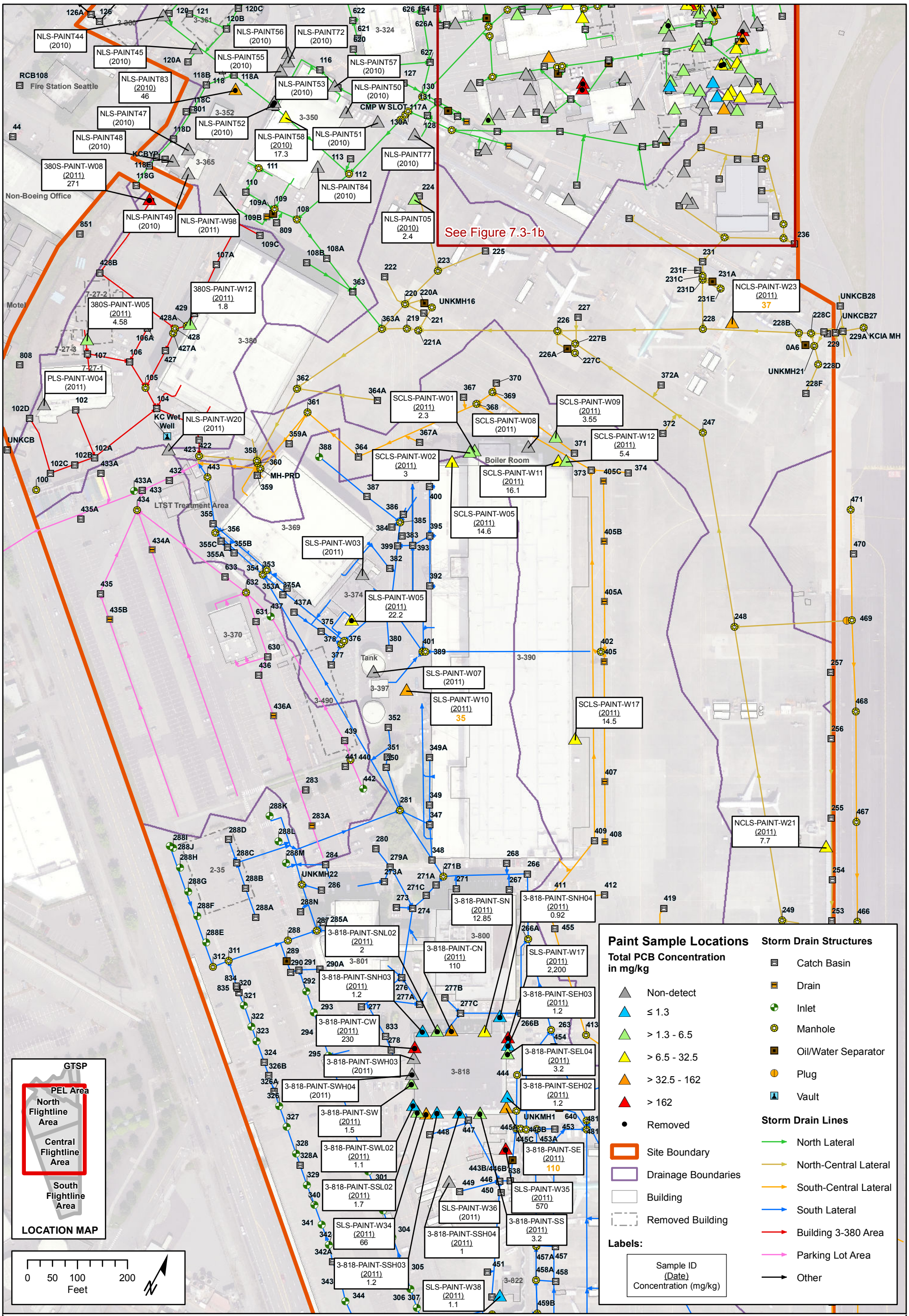
Figure 7.2-19. Total PCB Concentrations in Storm Drain Solids, by Sample Date

SAIC® From Science to Solutions



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7.3-1a. Paint Sample Locations at NBF

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_3-1a_Paint_Samples.mxd
Illustrative purposes only.
Date Saved: 11/5/2013 6:34:39 PM

0 50 100 Feet

Note: Refer to Legend on Figure 7.3-1a

NLS-PAINT36 (2010)
NLS-PAINT37 (2010) 4.9
GTSP
1554
NLS-PAINT-W70 (2011)
NLS-PAINT35 (2010)
196
Buried MH
195
3-317
National Guard
3-329
KC Diversion MH
UTIL-PAINT-05 (2011) 10.9
UTIL-PAINT-06 (2011) 1
NLS-PAINT38 (2010) 750
177
178
175
179B
175A
179A
179
UNKCB20
201
198
74A
NLS-PAINT-W62 (2011)
172
173
199A/B
NLS-PAINT43 (2010)
NLS-PAINT79 (2010) 1.7
NLS-PAINT01 (2010)
333A
200
NLS-PAINT85 (2010) 5.3
NLS-PAINT41 (2010) 6.4
3-323
333C
333B
NLS-PAINT04 (2010)
333D
UNKCB15
NLS-PAINT86 (2010) 22.6
NLS-PAINT39 (2010) 3.3
NLS-PAINT62 (2010)
171
3-333
NLS-PAINT76 (2010)
174A
NLS-PAINT42 (2010) 25.5
181
181C
NLS-PAINT61 (2010) 136
UTIL-PAINT-09 (2011) 4.7
625C
3-320
210B
211A
56A
209D
210D
55A
170
NLS-PAINT34 (2010)
173A
3-334
UTIL-PAINT-10 (2011) 2.77
182
UTIL-PAINT-07 (2011) 4.9
NLS-PAINT-W60 (2011) 120
3-287
625B
UNKCB12
209B
53
209F
54A
55
NLS-PAINT59 (2010)
153C
NLS-PAINT33 (2010)
NLS-PAINT75 (2010)
NLS-PAINT60 (2010) 98
3-331
3-332-PAINT-01 (2011) 10.8
PAS-PAINT02 (2012) 5.6
153B
153A
647
164
165
3-303
167
NLS-PAINT64 (2010) 8.6
185
184C
3-332
PAS-PAINT03 (2012) 39
PAS-PAINT01 (2012) 28
203
3-321
3-336
Test Bldg
3-310
648
NLS-PAINT82 (2010) 1.1
UTIL-PAINT-11 (2011)
3-302
188B
187A
UTIL-PAINT-13 (2011) 4
NLS-PAINT71 (2010)
165A
NLS-PAINT65 (2010) 250
UTIL-PAINT-08 (2011) 2.45
UTIL-PAINT-04 (2011) 3.2
187
NSF
188
188A
3-335
163
3-305
UTIL-PAINT-03 (2011) 8.4
NLS-PAINT66 (2010) 12.1
UTIL-PAINT-16 (2011)
NLS-PAINT16 (2010)
160
161
652A
3-304
651
649
652
NLS-PAINT70 (2010) 160
UTIL-PAINT-02 (2011) 8.7
158
159
NLS-PAINT17 (2010) 9.4
NLS-PAINT18 (2010) 16.9
3-322
NLS-PAINT-W43 (2011) 135
NLS-PAINT-W52 (2011)
NLS-PAINT-W84 (2011)
153
626B
3-346
626A
152
NLS-PAINT15 (2010) 2.6
PAS-PAINT05 (2012) 6.8
PAS-PAINT04 (2012) 250
PAS-PAINT06 (2012) 4.1
193
193A
UTIL-PAINT-01 (2011)
UTIL-PAINT-12 (2011) 2.3
NLS-PAINT74 (2010) 1,900
NLS-PAINT-W37 (2011) 480
162
138
3-626
UTIL-PAINT-15 (2011) 2.3
NLS-PAINT68 (2010) 5.9
NLS-PAINT-W41 (2011) 5.6
193
150
3-326
NLS-PAINT-W38 (2011) 160
3-306
NLS-PAINT-W81 (2011) 56
NLS-PAINT-W24 (2011) 12
146
UTIL-PAINT-14 (2011)
NLS-PAINT28 (2010) 4.4
3-330
144
NLS-PAINT-W32 (2011) 7.2
UNKCB23
612A
612B
145
NLS-PAINT20 (2010) 1.4
WIND-PAINT-02 (2011) 3.2
NLS-PAINT29 (2010) 27
NLS-PAINT73 (2010)
NLS-PAINT06 (2010)
NLS-PAINT32 (2010) 4.5
NLS-PAINT11 (2010)
UNKCB10
NLS-PAINT08 (2010) 1,700
139
NLS-PAINT78 (2010)
140
612-2
NLS-PAINT19 (2010) 5.4
Wind Tunnel
NLS-PAINT27 (2010) 30
NLS-PAINT31 (2010) 6.6
149
WIND-PAINT-03 (2011)
145A
NLS-PAINT10 (2010)
3-368
WIND-PAINT-01 (2011) 1.2
Test Structures
3-315
142C
NLS-PAINT-W50 (2011) 206
NLS-PAINT07 (2010)
NLS-PAINT22 (2010) 5.77
WIND-PAINT-07 (2011) 13.1
NLS-PAINT09 (2010)
NLS-PAINT12 (2010)
NLS-PAINT13 (2010)
NLS-PAINT80 (2010) 4.6
132
3-341
133
133A
142A
142
3-353
WIND-PAINT-12 (2011) 2.22
NLS-PAINT24 (2010) 2.4
241A
WIND-PAINT-13 (2011)
WIND-PAINT-10 (2011) 2.8
3-311
137A
133D
141
142B
246
NLS-PAINT-W45 (2011)
NLS-PAINT-W30 (2011) 1.2
WIND-PAINT-09 (2011) 38
NLS-PAINT25 (2010)
3-343
NLS-PAINT14 (2010)
133C
133B
135
136
137
NLS-PAINT21 (2010)
WIND-PAINT-05 (2011)
WIND-PAINT-04 (2011) 8.8
NLS-PAINT23 (2010)
244
WIND-PAINT-11 (2011) 18.8
242
241
240
137C
WIND-PAINT-08 (2011) 1.3
WIND-PAINT-06 (2011) 3.25
239
NCLS-PAINT-W04 (2011)
243
3-312
3-357
134
NLS-PAINT-W29 (2011) 8.6
238
NCLS-PAINT-W01 (2011)
NLS-PAINT81 (2010)
3-313
NLS-PAINT03 (2010)
3-355
3-356
608
3-354
232
237
607

GTSP
PEL Area
North Flightline Area
Central Flightline Area
South Flightline Area
LOCATION MAP

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State of Washington

7.3-1b. Paint Sample Locations at NBF

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_3-1b_Paint_Samples_PEL.mxd
Illustrative purposes only.
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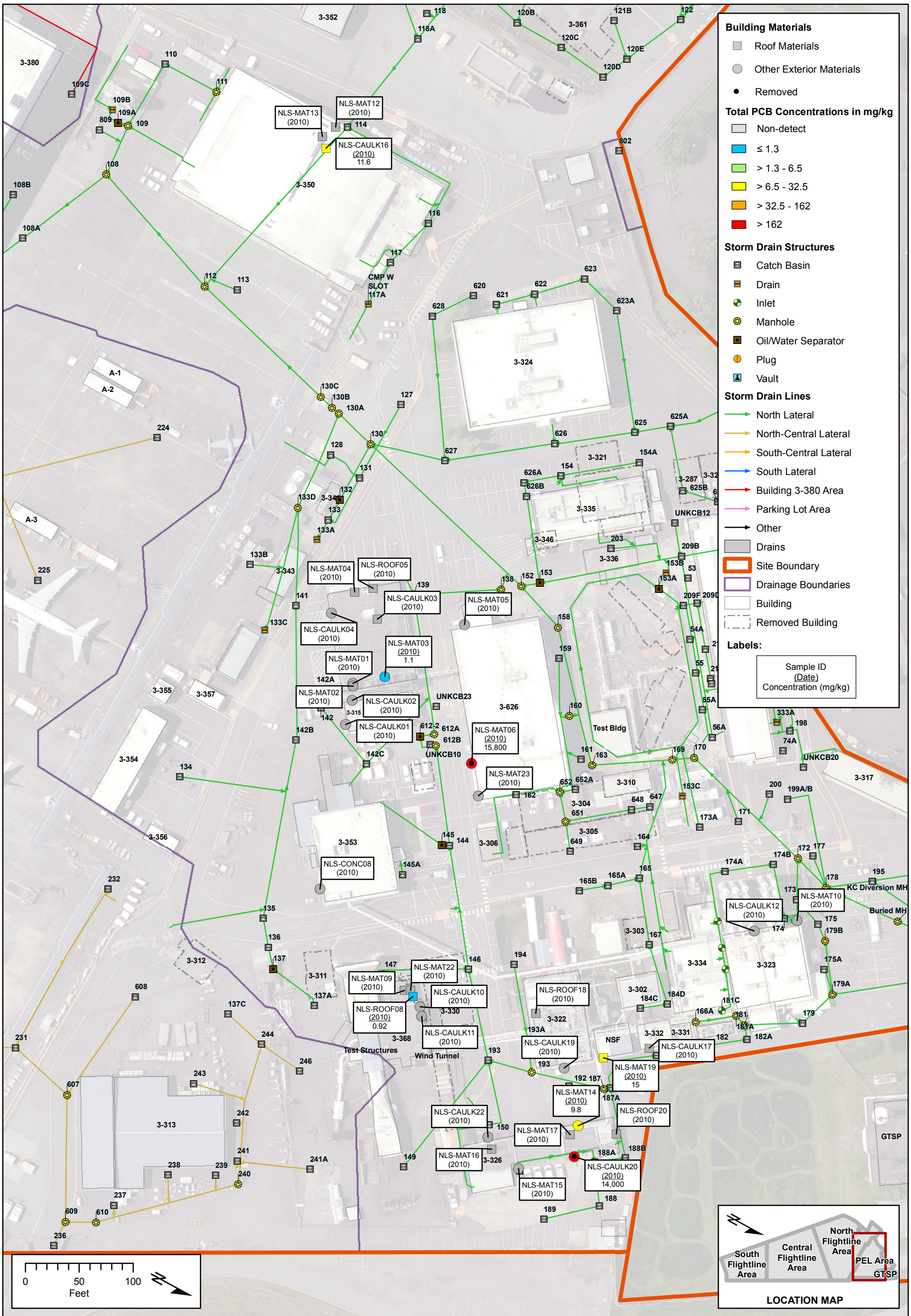

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7.3-2. Roof Materials and Other Exterior Materials Sample Locations at NBF

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_3-2_Roof_Exterior_Materials.mxd
Illustrative purposes only.
Date Saved: 10/28/2013 9:49:03 AM

CJM Sample Locations

Total PCB Concentration in mg/kg

- Non-detect
- ≤ 1.3
- > 1.3 - 6.5
- > 6.5 - 32.5
- > 32.5 - 162
- > 162
- Removed

Storm Drain Structures

- Catch Basin
- Drain
- Inlet
- Manhole
- Oil/Water Separator
- Plug
- Vault

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other

- Drains
- Area of CJM Removed in 2002-2006
- Area of CJM Removed in 2010-2012
- Site Boundary
- Drainage Boundaries
- Building
- Removed Building

Labels: Sample ID / (Date) / Concentration (mg/kg)

Example labels: CJM-232 (2011) 1.3; SP54 (2001) 0.78; SP55 (2001); SP56 (2001) 49; SP58 (2001) 35,000; SP33 (2000) 50,000; SP57 (2001) 3,900; SP09 (2000) 19.9; SP10 (2000) 1.4; CJM-020 (2010) 1.5; CJM-233 (2011) 2.5; SP11 (2000) 0.96; CJM-230 (2011) 26; CJM-CB364A (2010) 3.2; CJM-234 (2011) 6.2; CJM-235 (2011) 130; SP14 (2000) 23,000; SP66 (2006) 370; CJM-236 (2011) 2,300; SP73 (2001) 1; CJM-CB221 (2010) 2.3; CJM-MH220 (2010); CJM-013 (2010) 1; CJM-007 (2010) 1.5; SP59 (2001) 20,000; SP08 (2000) 41.9; SP60 (2001) 42; SP61 (2001) 19,900; CJM-004 (2010); SP62 (2001) 17.3; CJM-033 (2010) 22; CJM-209 (2011) 14; SP15 (2000) 1.7; CJM-210 (2011) 13.7; SP64 (2001) 2.7; CJM-208 (2011) 6.1; CJM-213 (2011) 8.3; CJM-015 (2010); CJM-009 (2010); SP67 (2001) 25,700; SP53 (2001) 9; CJM-034 (2010); CJM-CB370 (2010) 2.7; CJM-212 (2011) 2.99; CJM-211 (2011); CJM-214 (2011) 0.85; CJM-035 (2010); CJM-016 (2010) 6.3; CJM-010 (2010) 25.5; CJM-196 (2011) 1.9; CJM-194 (2011) 2.4; CJM-195 (2011) 17.2; CJM-193 (2011); CJM-197 (2011) 1.8; SP68 (2001) 20.9; CJM-200 (2011) 14.7; CJM-199 (2011) 14.4; CJM-198 (2011) 16.2; CJM-036 (2010) 45; CJM-018 (2010) 1.8; CJM-011 (2010); SP52 (2001) 0.61; SP49 (2001) 270; SP50 (2001) 25.1; SP51 (2001); SP01 (2000) 164; SP02 (2000); SP04 (2000) 0.78; SP03 (2000) 5.2; CJM-039 (2010) 31.5; SP19 (2000); CJM-019 (2010); CJM-CB228F (2010); SP74 (2001) 1.8; CJM-UNKMH21 (2010); CJM-040 (2010); SP18 (2000); SP34 (2000) 1.1; UNKMH16; KCIA MH

Buildings / areas: 3-360, 3-361, 3-350, 3-324, 3-329, 3-321, 3-320, 3-287, 3-335, 3-336, 3-333, 3-343, 3-315, 3-626, 3-354, 3-353, 3-304, 3-305, 3-312, 3-311, 3-330, 3-322, 3-332, 3-334, 3-323, 3-302, 3-313, 3-326, Test Bldg, Test Structures, 3-368 Wind Tunnel, NSF, A-1, A-3, A-4, CMP W SLOT 117A, UNKCB12, UNKCB15, UNKCB20, UNKCB23, UNKCB10, UNKCB6, UNKCB27, UNKCB28

0 50 100 Feet

LOCATION MAP: South Flightline Area; Central Flightline Area; North Flightline Area; PEL Area GTSP

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7.3-3a. Concrete Joint Material Sample Locations at NBF

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Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet
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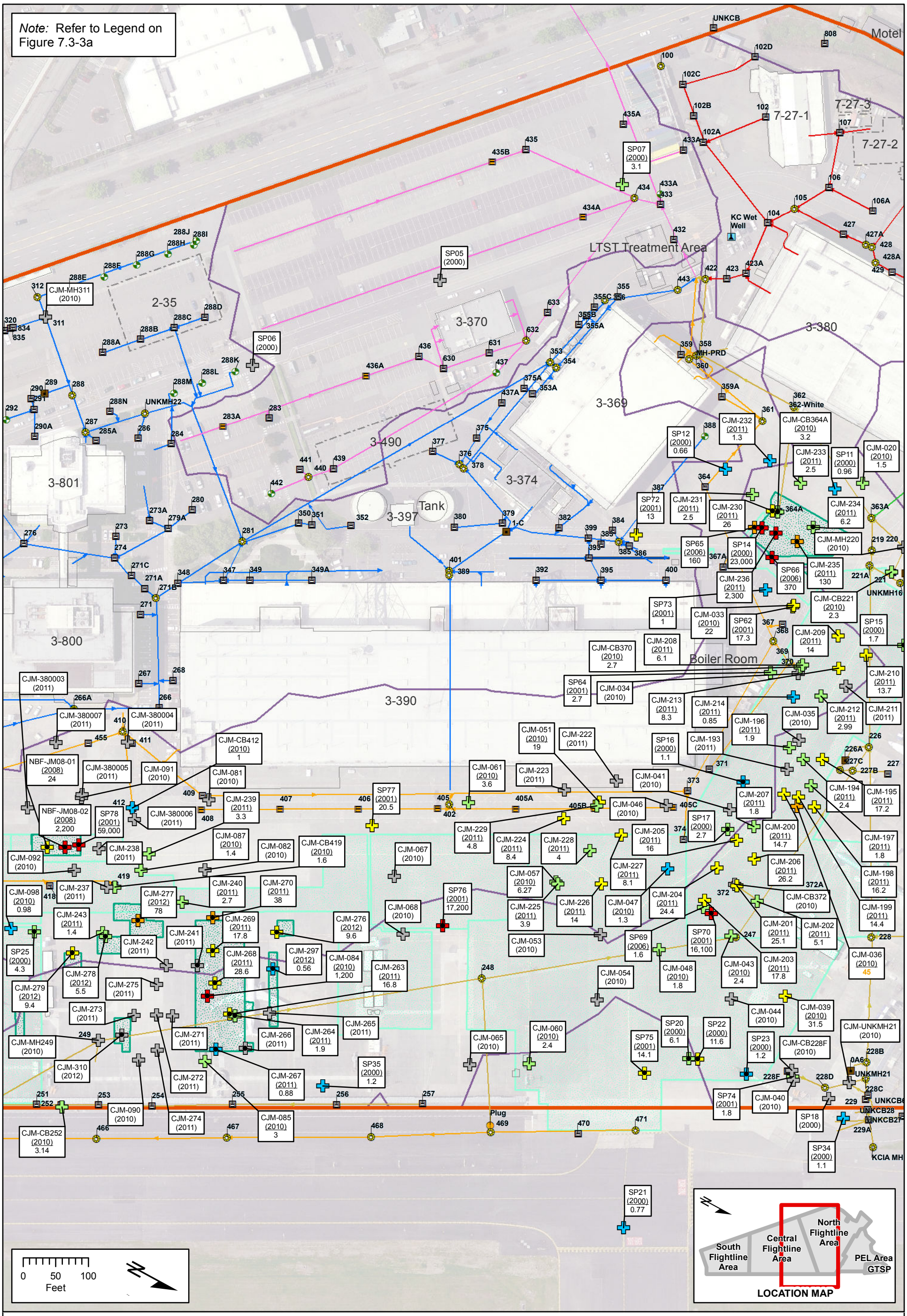
Note: Refer to Legend on Figure 7.3-3a



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State of Washington

7.3-3b. Concrete Joint Material Sample Locations at NBF

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
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File: Figure_7_3-3b_CJM_Samples.mxd
Illustrative purposes only.
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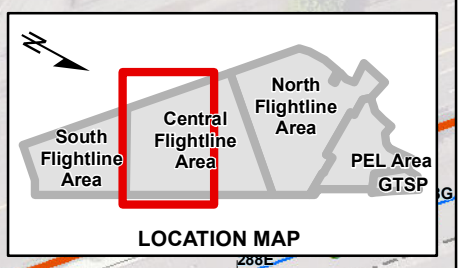
Note: Refer to Legend on Figure 7.3-3a



3-825
3-822
3-465/ 3-466
3-818
3-801
3-800
2-35

SP88 (2001) 4.4
CJM-MH311 (2010)
SP87 (2001) 0.78
SP32 (2000)
NBF-JM08-05 (2008) 1.6
SP31 (2000) 1.3
CJM-MH459B (2010)
CJM-CB458 (2010)
CJM-C0504 (2011)
CJM-C0503 (2011)
CJM-C0502 (2011)
CJM-136 (2010)
CJM-309 (2012)
CJM-308 (2012)
CJM-C0601 (2011)
CJM-137 (2010)
CJM-283 (2012) 0.19
CJM-282 (2012)
CJM-C0501 (2011)
CJM-132 (2010) 1.1
CJM-127 (2010)
CJM-126 (2010)
CJM-C0402 (2011)
CJM-189 (2011)
CJM-188 (2011) 2.6
CJM-CB457 (2010)
CJM-187 (2011)
CJM-186 (2011)
SP26 (2000)
CJM-121 (2010)
CJM-122 (2010) 2.7
CJM-123 (2010) 3.7
CJM-190 (2011)
CJM-C0401 (2011)
CJM-192 (2011)
CJM-191 (2011)
CJM-C0302 (2011)
CJM-116 (2010)
CJM-C0303 (2011) 3.14
CJM-C0301 (2011) 0.96
CJM-118 (2010) 2.8
SP85 (2001) 4,200
CJM-CB453 (2010) 5.2
CJM-111 (2010) 5.1
CJM-381801 (2011) 1.1
CJM-112 (2010)
CJM-113 (2010) 6.2
CJM-109 (2010) 730
NBF-JM08-04 (2008) 0.67
CJM-114 (2010)
CJM-246 (2011) 6.38
CJM-245 (2011) 23.7
CJM-254 (2011) 3.2
CJM-281 (2012)
CJM-MH642 (2010) 0.9
SP84 (2001) 24
CJM-106 (2010) 1.3
CJM-381802 (2011)
CJM-280 (2012)
CJM-307 (2012)
CJM-107 (2010) 1.5
CJM-102 (2010)
CJM-108 (2010) 2.4
SP80 (2006) 1.9
CJM-255 (2011) 2.4
CJM-256 (2011) 3.8
CJM-257 (2011)
CJM-262 (2011)
CJM-258 (2011) 1.7
CJM-260 (2011)
CJM-259 (2011)
SP24 (2000) 1.2
CJM-261 (2011)
CJM-249 (2011) 14.7
CJM-250 (2011) 2.5
CJM-248 (2011) 26,000
CJM-251 (2011) 4.9
CJM-252 (2011) 2.6
CJM-253 (2011) 2.2
CJM-110 (2010) 14
CJM-247 (2011) 12.5
CJM-244 (2011) 15.2
SP82 (2006)
CJM-B0603 (2011)
SP30 (2000) 35,300
CJM-119 (2010) 0.97
CJM-284 (2012) 0.56
CJM-285 (2012) 0.24
CJM-B0602 (2011)
CJM-115 (2010)
CJM-B0501 (2011) 66
SP36 (2000)
CJM-CB472 (2010)
SP83 (2001) 43
NBF-JM08-03 (2008) 51
SP81 (2001) 50
CJM-CB260 (2010) 2.2
CJM-CB454 (2010)
CJM-MH413 (2010)
CJM-380001 (2011) 89
CJM-380002 (2011)
CJM-380003 (2011)
CJM-380004 (2011)
CJM-380007 (2011)
CJM-380005 (2011)
CJM-380006 (2011)
CJM-CB412 (2010) 1
CJM-091 (2010)
CJM-381803 (2011)
NBF-JM08-02 (2008) 2,200
SP78 (2001) 59,000
NBF-JM08-01 (2008) 24
CJM-238 (2011)
CJM-087 (2010) 1.4
CJM-CB416 (2010)
CJM-092 (2010)
CJM-B0401 (2011) 7.2
CJM-237 (2011)
CJM-CB419 (2010) 1.6
CJM-098 (2010) 0.98
SP25 (2000) 4.3
CJM-243 (2011) 1.4
CJM-277 (2012) 78
CJM-279 (2012) 9.4
CJM-278 (2012) 5.5
CJM-273 (2011)
CJM-310 (2012)
CJM-MH249 (2010)
CJM-090 (2010)
CJM-CB252 (2010) 3.14
CJM-B0901 (2011)
CJM-B0701 (2011)
CJM-289 (2012)
CJM-MH482 (2010) 0.92
CJM-B0801 (2011) 50
CJM-290 (2012)
CJM-140 (2010)
CJM-288 (2012)
CJM-287 (2012) 0.91
CJM-B0702 (2011) 10
CJM-130 (2010) 1.7
CJM-CB475 (2010)
CJM-CB474 (2010)
CJM-B0601 (2011)
SP29 (2000) 1.1
CJM-124 (2010) 1.5
CJM-125 (2010) 12.7
CJM-286 (2012) 0.96
CJM-B0501 (2011) 66
CJM-CB260 (2010) 2.2

0 50 100 Feet

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7.3-3c. Concrete Joint Material Sample Locations at NBF

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_3-3c_CJM_Samples.mxd
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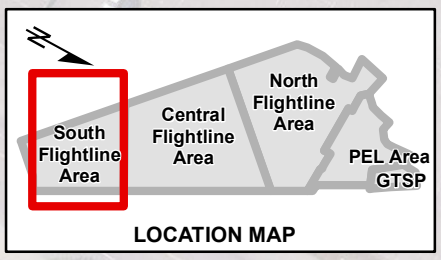
Note: Refer to Legend on Figure 7.3-3a



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7.3-3d. Concrete Joint Material Sample Locations at NBF

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_3-3d_CJM_Samples.mxd
Illustrative purposes only.
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Pavement Sample Locations
Total PCB Concentrations in mg/kg

- Non-detect
- ≤ 1.3
- > 1.3 - 6.5
- > 16.5 - 32.5
- > 32.5 - 162
- > 162
- Removed

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other

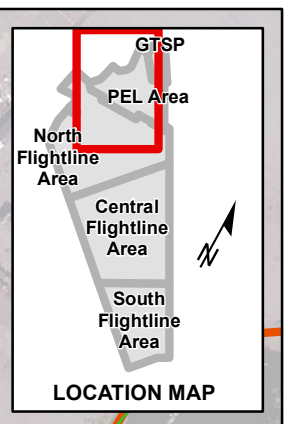
Storm Drain Structures

- Catch Basin
- Drain
- Inlet
- Manhole
- Oil/Water Separator
- Plug
- Vault

- Site Boundary
- Drainage Boundaries
- Building
- Removed Building
- Drains

Labels:

Sample ID
(Date)
Concentration (mg/kg)



NLS-CONC09 (2010)
NLS-ASP02 (2010)
GTSP
D071041
1554
196
Buried MH
195
3-317
National Guard
KC Diversion MH
178
179B
175A
179A
175
177
179
UNKCB20
172
173
174
199A/B
200
174B
3-323
201
198
74A
333A
3-329
333C
333B
333D
UNKCB15
625D
625C
3-333
124
123
122
3-360
NLS-ASP03 (2010) 0.045
121B
120E
120D
121A
802
623A
623
3-320
3-287
625B
625A
625
154A
209D
210B
210D
56A
55A
54A
53
209F
UNKCB12
153B
209B
153A
170
169
153C
NLS-CONC04 (2010) 0.551
647
648
164
165
167
3-334
184D
3-331
185
3-332
3-303
3-302
184C
165A
165B
Test Bldg
3-310
3-305
649
651
652
3-304
652A
163
161
160
158
159
203
3-336
3-335
3-321
154
626
626A
626B
3-346
153
152
138
162
3-626
See Inset Map
NSF
187A
187
188B
188A
3-326
192
193
193A
194
3-322
NLS-ASP01 (2010) 1.04
NLS-ASP07 (2010) 1.09
146
NLS-CONC02 (2010)
3-330
Wind Tunnel
144
145
145A
UNKCB23
612B
612A
UNKCB10
NLS-CONC10 (2010)
NLS-ASP08 (2010) 0.074
142C
142A
142
3-315
3-353
147
3-368
NLS-CONC03 (2010) 0.066
Test Structures
149
120A
118
118A
118B
118C
801
3-352
114
3-350
116
117
NLS-ASP05 (2010) 0.6
CMP W SLOT 117A
NLS-ASP04 (2010) 0.16
127
130
131
132
133
133A
133D
130A
130C
130B
128
3-341
141
142B
3-343
133C
133B
NLS-CONC01 (2010)
135
136
137
137A
3-311
241A
246
244
242
241
137C
243
3-312
3-313
3-357
134
3-355
3-356
3-354
608
232
224
A-1
A-2
111
112
113
110
109
109A
109B
809
108
109C
3-365
107A
108B
108A
222
363
220
220A
221
429
428A
363A
219
221A
3-380
362
362-White
364A
361
367A
Boiler Room
0 5 10 20 Feet
0 50 100 200 Feet
NLS-ASP06 (2010) 0.051
ASP06 (2009) 0.35
ASP-Bulk05 (2010)
NLS-CONC07 (2010)
ASP01 (2009) 34
ASP02 (2009) 380
ASP03 (2009) 23.1
ASP04 (2009) 0.7
ASP05 (2009) 18.5
ASP-Bulk01 (2010) 7.4
ASP-Bulk04 (2010) 7.8
ASP-Bulk03 (2010) 3.8
ASP-Bulk02 (2010) 14

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7.3-4. Pavement Sample Locations at NBF

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Prepared By: mlf
File: Figure_7_3-4_Pavement.mxd
Illustrative purposes only.
Date Saved: 10/21/2013 12:01:30 PM

Surface Debris Sample Locations

Total PCB Concentration in mg/kg

- Non-detect
- ≤ 0.13
- > 0.13 - 0.65
- > 0.65 - 3.25
- > 3.25 - 16.2
- > 16.2
- Removed

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other
- Drains

Storm Drain Structures

- Catch Basin
- Drain
- Inlet
- Manhole
- Oil/Water Separator
- Plug
- Vault

- Site Boundary
- Drainage Boundaries
- Building
- Removed Building

Labels:

Sample ID
(Date)
Concentration (mg/kg)

0 50 100 200
Feet

GTSP
PEL Area
North Flightline Area
Central Flightline Area
South Flightline Area

LOCATION MAP

See Inset Map

NLS-SURFACE01 (2010) 0.35
NLS-SURFACE02 (2010) 0.66
NLS-SURFACE03 (2010) 0.34
NLS-SURFACE04 (2010) 0.6
NLS-SURFACE05 (2010)
NLS-SURFACE06 (2010)
NLS-SURFACE07 (2010)
NLS-SURFACE08 (2010)
NLS-SURFACE09 (2010) 9.8
NLS-SURFACE10 (2010) 0.212
NLS-SURFACE11 (2010) 3.11
NLS-SURFACE12 (2010) 1.33
NLS-SURFACE13 (2010) 0.208
NLS-SURFACE14 (2010) 0.2
NLS-SURFACE15 (2010) 0.74
NLS-SURFACE16 (2010) 0.145
NLS-SURFACE17 (2010) 0.24
NLS-SURFACE18 (2010) 0.041
NLS-SURFACE19 (2010) 0.238
NLS-SURFACE20 (2010) 0.361
NLS-SURFACE21 (2010) 0.133
NLS-SURFACE22 (2010)
NLS-SURFACE23 (2010) 11.1
Surface11 (2009) 1.09
Surface23 (2009) 0.254
D434AN (2010) 0.116
D435BN (2010) 0.314
D435BS (2010) 0.253
D434AS (2010) 0.205
D436A (2010) 0.199
D283A (2010) 0.34

Surface01 (2009) 7.6
Surface02 (2009) 30
Surface03 (2009) 8.8
Surface03b (2009) 8.8
Surface04 (2009) 8.9
Surface05 (2009) 1.32
Surface06 (2009) 5.19
Surface07 (2009) 160
Surface08 (2009) 17.8
Surface09 (2009) 0.6
Surface10 (2009) 2.09
Surface12 (2009) 46.2
Surface12b (2009) 36
Surface12c (2009) 19
Surface13 (2009) 557
Surface14 (2009) 290
Surface15 (2009) 3.34
Surface16 (2009) 1.52
Surface17 (2009) 0.77
Surface18 (2009) 0.1
Surface19 (2009) 0.33
Surface20 (2009) 0.195
Surface21 (2009) 0.192
Surface22 (2009) 0.57

Fire Station Seattle
Non-Boeing Office
Lift Station
MH-PRD
KC Wet Well
KCBYP
CMP W SLOT
LTST Treatment Area
Boiler Room
Wind Tunnel
Test Structures
Test Bldg
Tank
NSF
Buried MH
UNKMH16
UNKMH22
UNKCB10
UNKCB23
UNKCB27
UNKCB28

0 10 20 40
Feet

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7.3-5. Surface Debris Sample Locations at NBF

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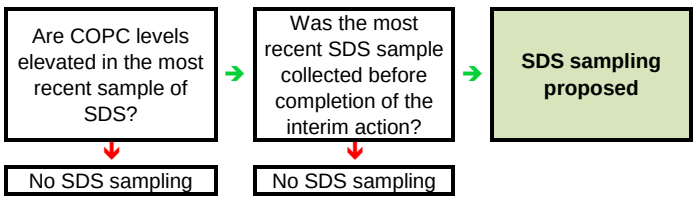
Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_3-5_Surface_Debris.mxd
Illustrative purposes only.
Date Saved: 10/21/2013 12:04:43 PM

Phase I: Storm Drain Solids and Surface Debris Sampling

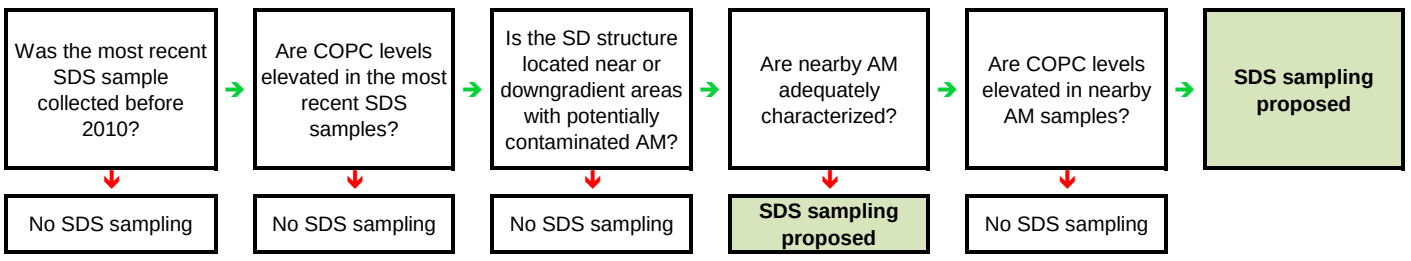
1a. Storm Drain Solids Grab Sampling[1]

For SD structures located within or near an interim action conducted since the beginning of 2010:



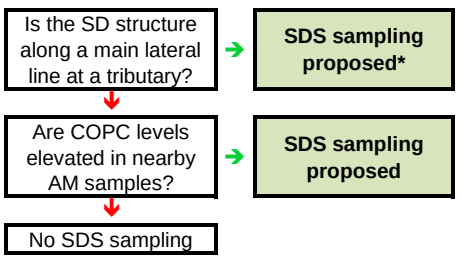
1b. Storm Drain Solids Grab Sampling[1]

For SD structures sampled since 2004 (not generally near interim action areas):



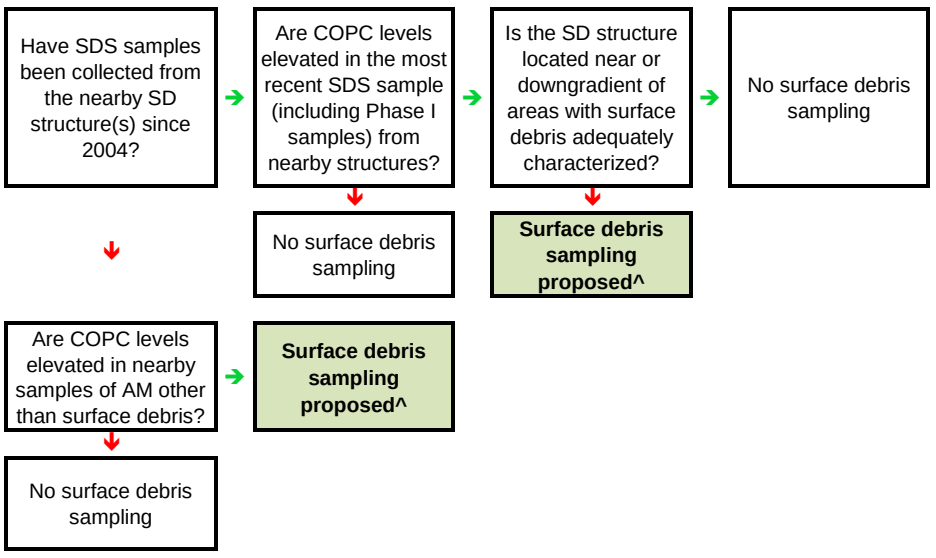
1c. Storm Drain Solids Grab Sampling

For SD structures not sampled since 2004 (not generally near interim action areas):



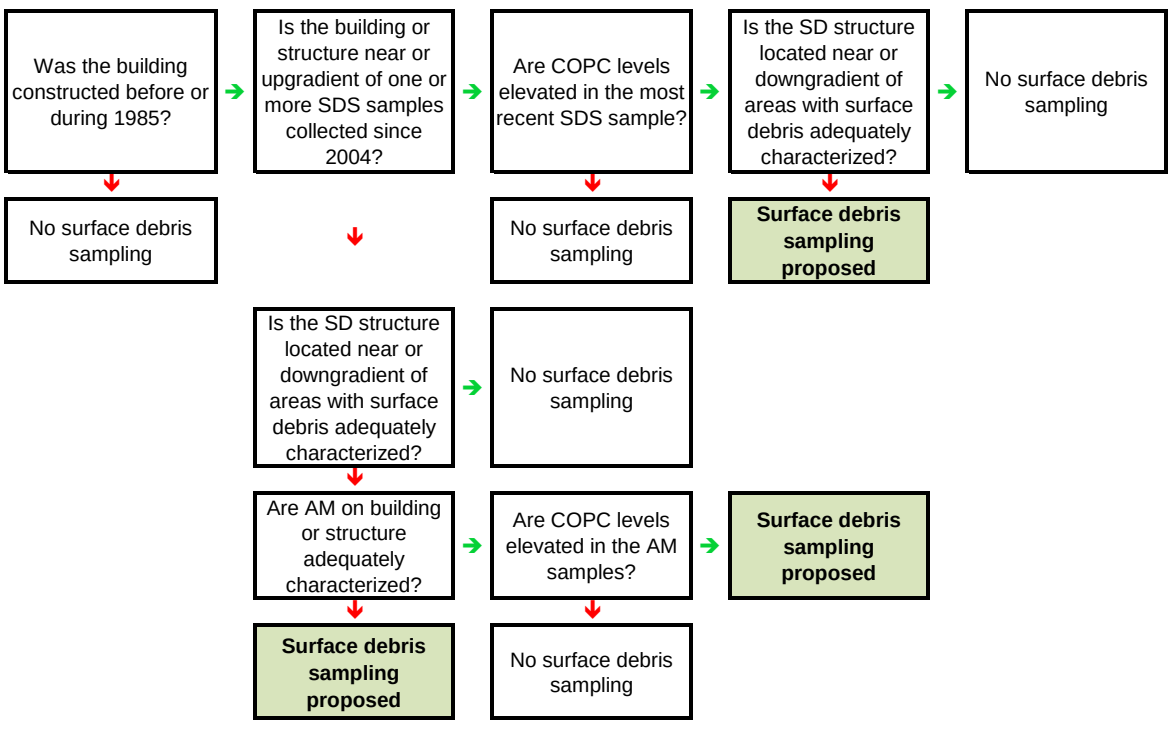
2a. Surface Debris Sampling

For surface debris in proximity to SD structures:



2b. Surface Debris Sampling

For surface debris along base of buildings or large structures:



Notes:

1. SD structures CB173, CB261, MH181A, and MH652 are included for SDS sampling due to significantly elevated levels of PCB or mercury in 2012 sampling.

AM - Anthropogenic media
COPCs - Contaminants of potential concern
SD - Storm drain
SDS - Storm drain solids
Green Arrow = Yes
Red Arrow = No

"Elevated" COPC levels are generally considered to be exceedance factor ranges >25.

* SDS sampling will be proposed at selected locations along the main lateral line at tributaries.

^ Many areas on the flightline are unlikely to contain sampleable amounts of surface debris, and determination of amounts will be made in the field.

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Figure 7.3-6a. Phased Sampling Approach for Storm Drain Solids and Anthropogenic Media

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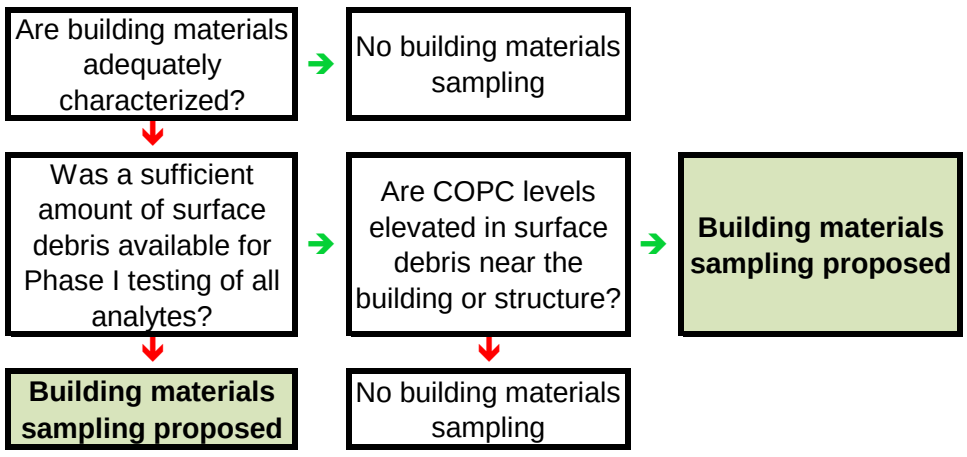
Phase II: Anthropogenic Media Sampling

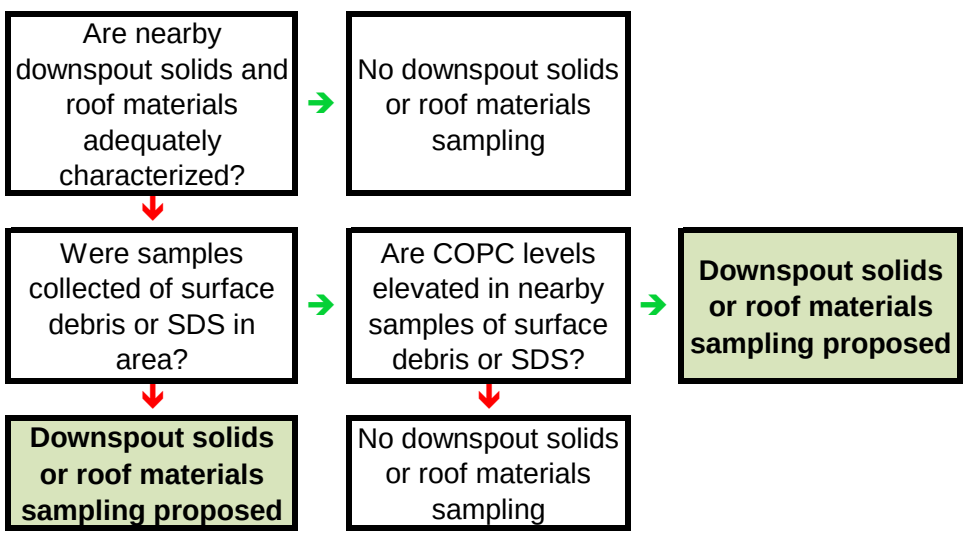
1. Building Materials

For surface debris along base of buildings or large structures built/renovated before or during 1985:



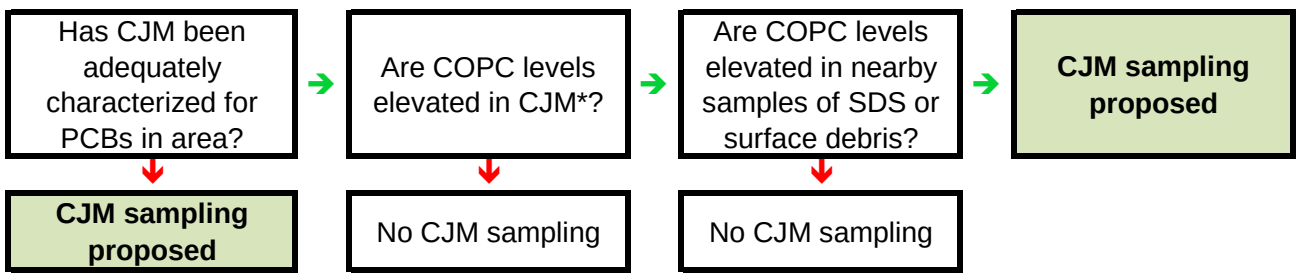
2, 3. Downspout Solids and Roof Materials

For areas with downspout solids or roof materials/debris:



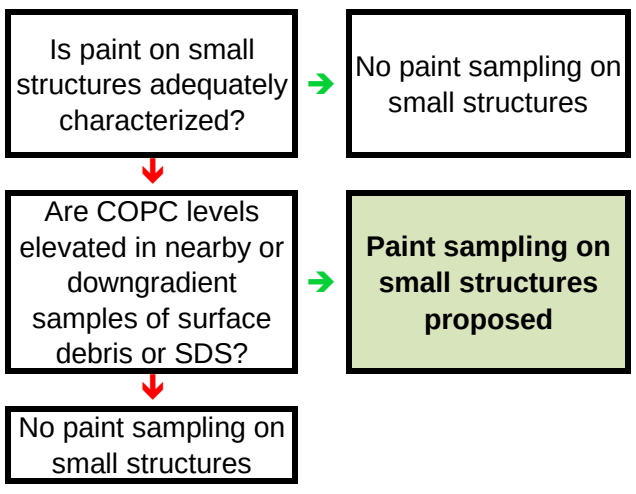
4. CJM

For CJM mostly in flightline areas:



5. Paint on Small Structures

For small painted structures identified in initial Phase I survey:



Notes:

Building materials include paint on buildings or large structures, caulk, or other exterior materials.
Downspout solids include material from the roof that is discharged to the ground surface (or to a primary catch basin) from a downspout.
Small structures include bollards, PIVs, etc.

AM - Anthropogenic media
COPCs - Contaminants of potential concern
SD - Storm drain
SDS - Storm drain solids
Green Arrow = Yes
Red Arrow = No

"Elevated" COPC levels are generally considered to be exceedance factor ranges >25.

* Excludes CJM recently installed as part of the 2010-2012 CJM removal interim actions; PCBs at elevated levels in older removed CJM could resorb into replaced CJM.

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Figure 7.3-6b. Phased Sampling Approach for Storm Drain Solids and Anthropogenic Media

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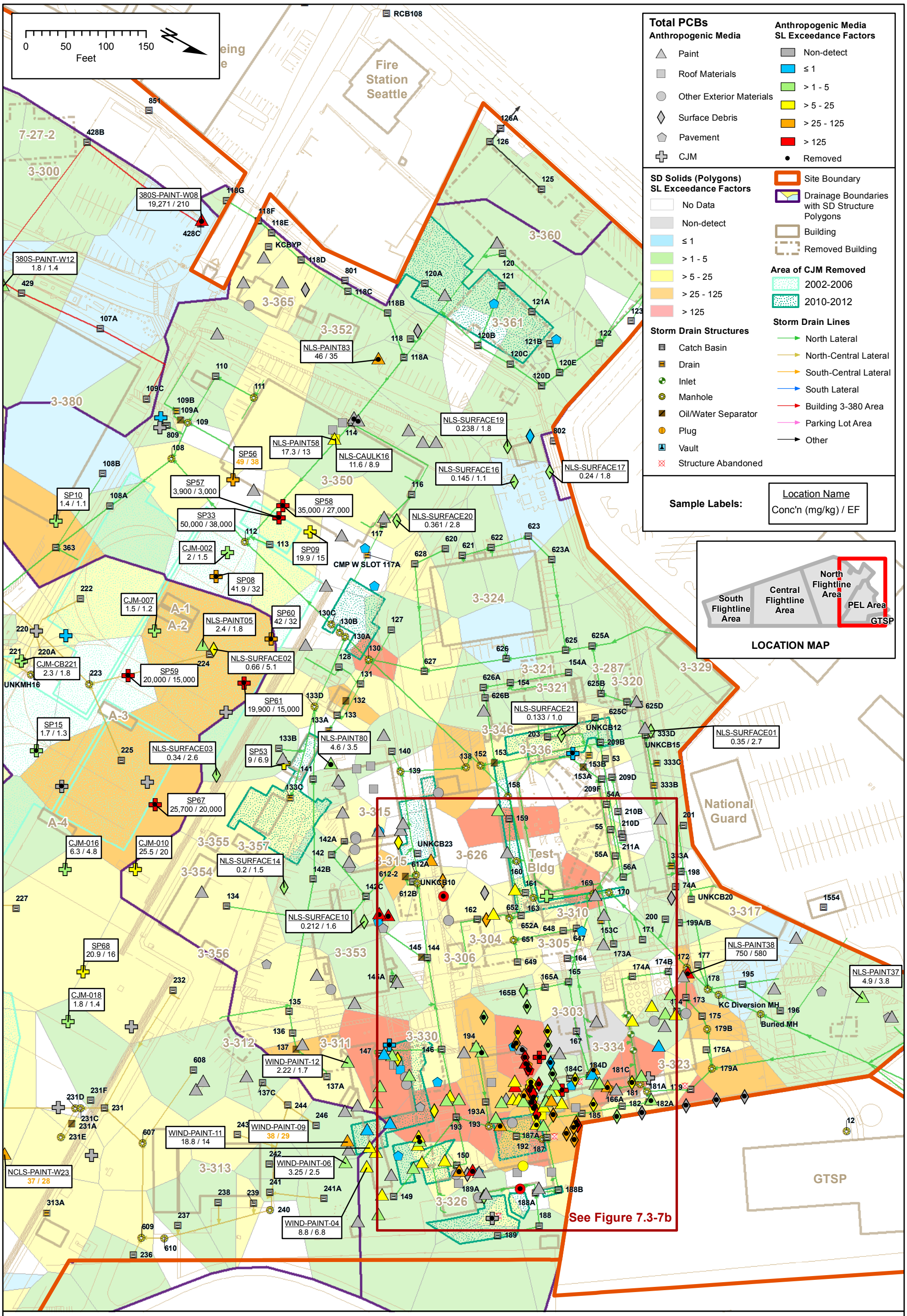

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Figure 7.3-7a. Total PCB Results for Anthropogenic Media and SD Solids at NBF

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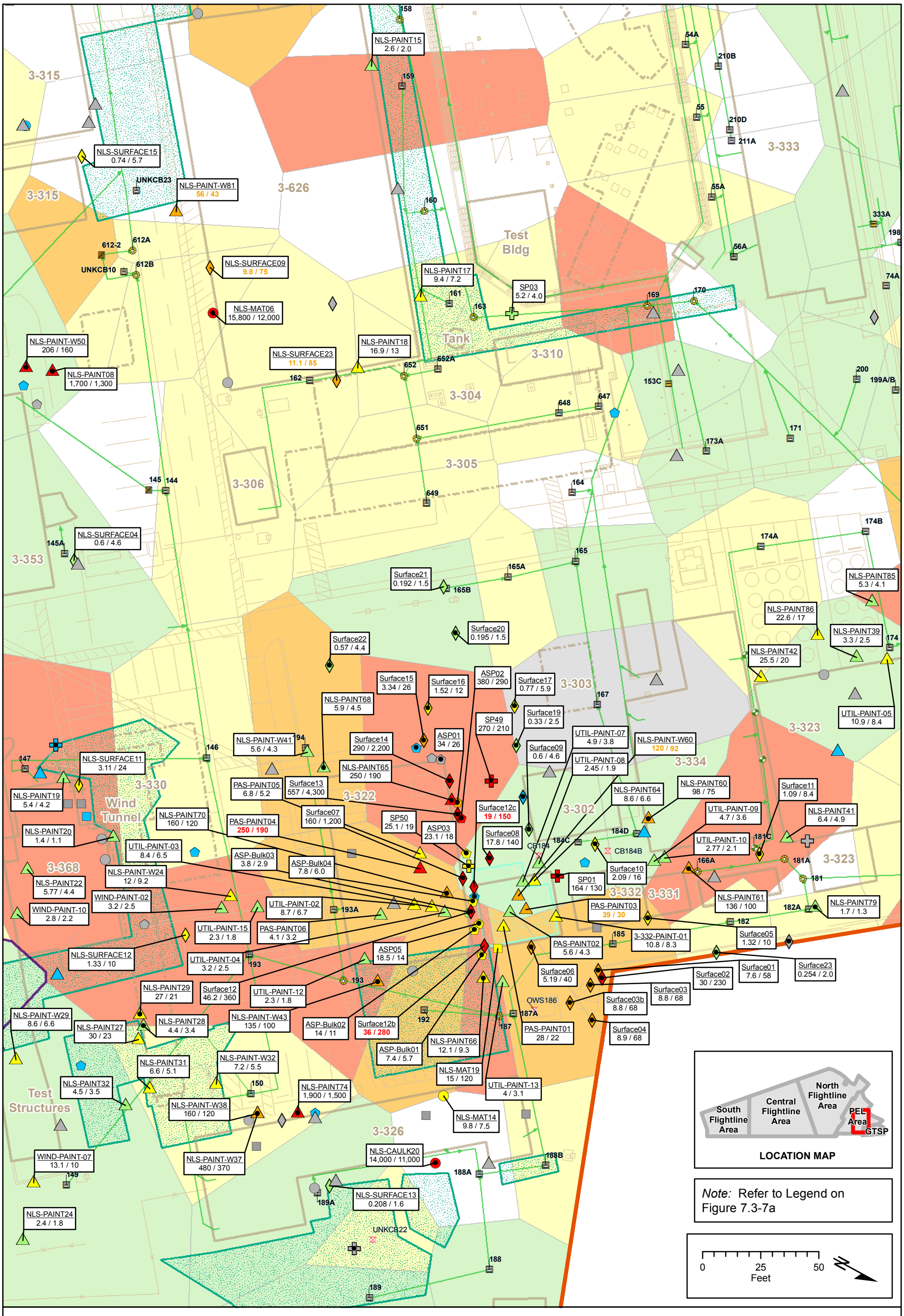
Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_3-07a_TotalPCBs_Samples.mxd
Illustrative purposes only.
Date Saved: 11/5/2013 12:48:01 PM



Note: Refer to Legend on Figure 7.3-7a

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Figure 7.3-7b. Total PCB Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_3-07b_TotalPCBs_Samples.mxd
Illustrative purposes only.
Date Saved: 10/29/2013 4:00:27 PM

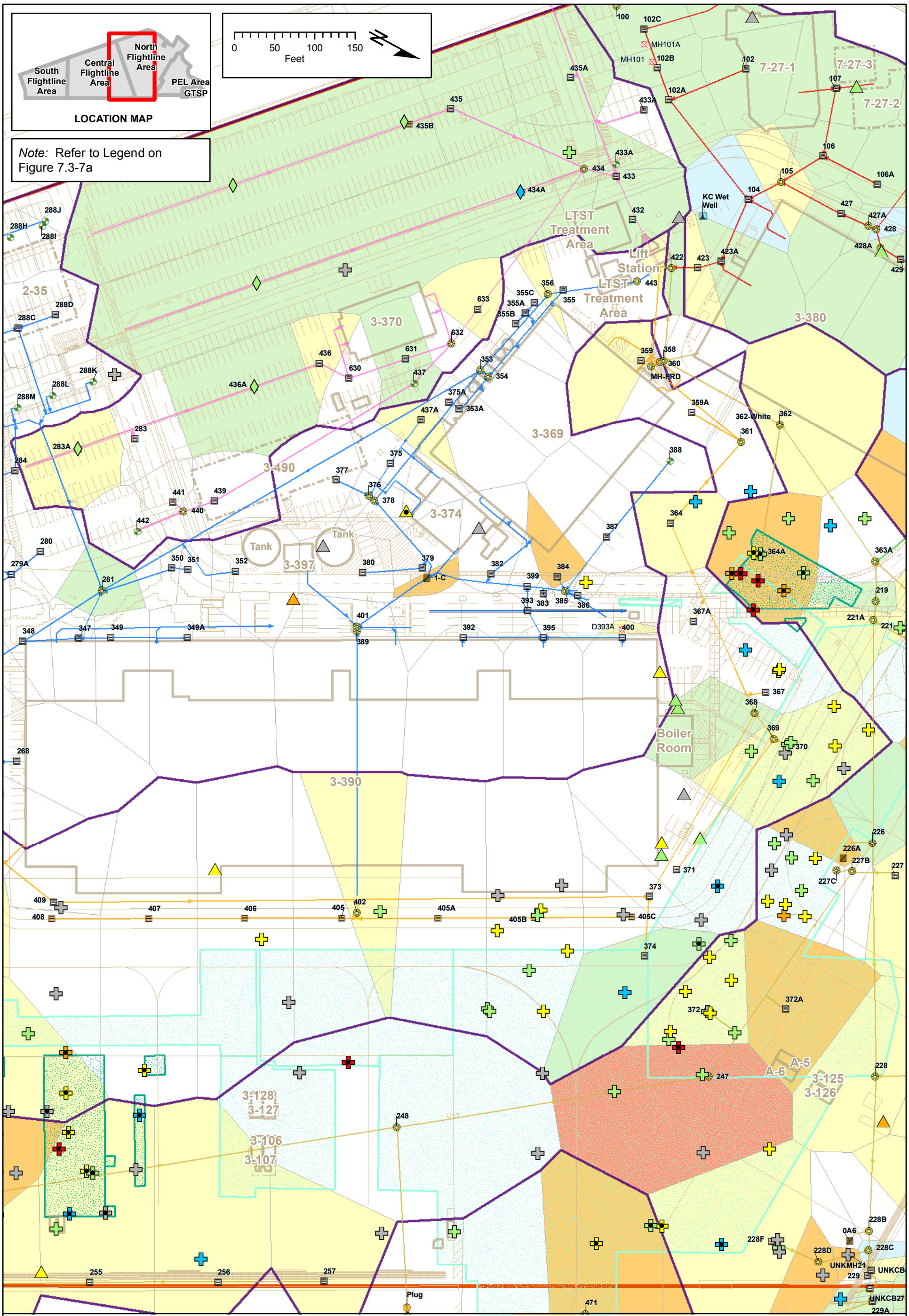

Figure 7.3-7c. Total PCB Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_3-07c_TotalPCBs_Samples.mxd
Illustrative purposes only.
Date Saved: 9/19/2013 7:43:58 PM

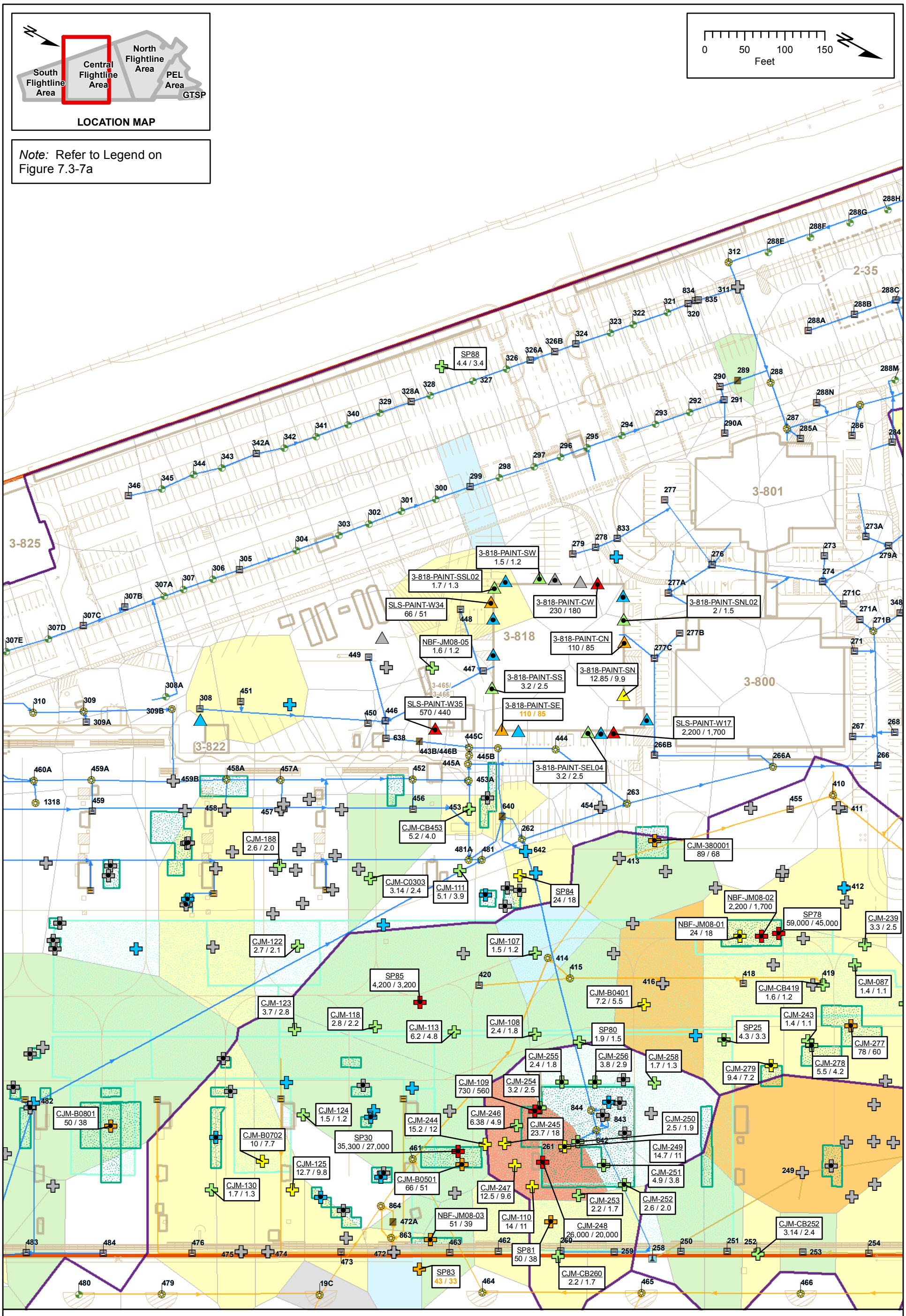

Figure 7.3-7d. Total PCB Results for Anthropogenic Media and SD Solids at NBF

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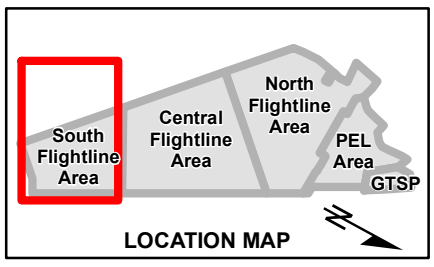
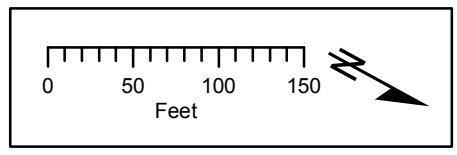
Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_3-07d_TotalPCBs_Samples.mxd
Illustrative purposes only.
Date Saved: 9/19/2013 8:00:42 PM



Note: Refer to Legend on Figure 7.3-7a



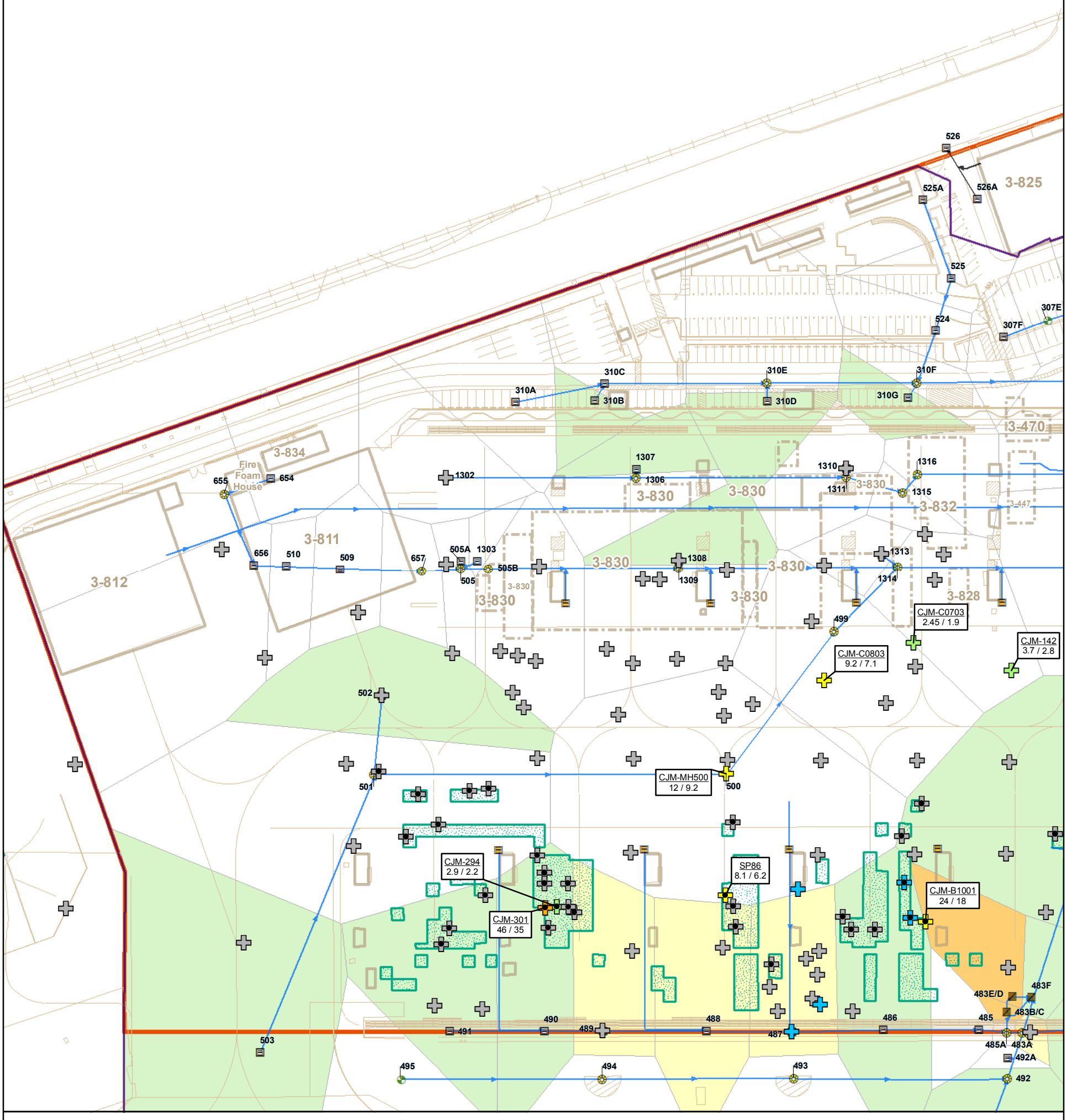


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Figure 7.3-7e. Total PCB Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_3-07e_TotalPCBs_Samples.mxd
Illustrative purposes only.
Date Saved: 9/19/2013 7:43:43 PM

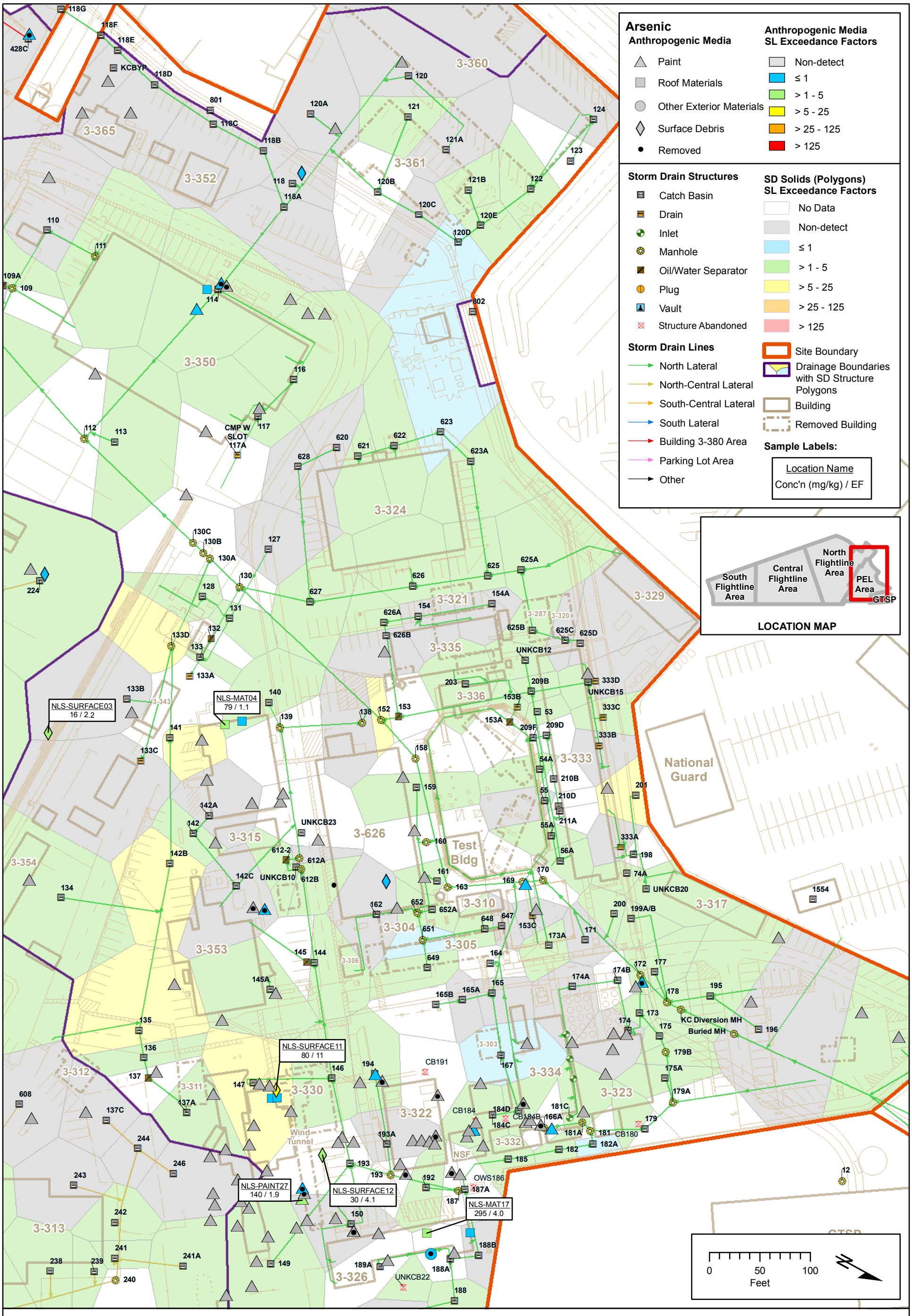

Figure 7.3-8a. Arsenic Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_3-08a_Arsenic_Samples.mxd
Illustrative purposes only.
Date Saved: 11/5/2013 12:39:03 PM

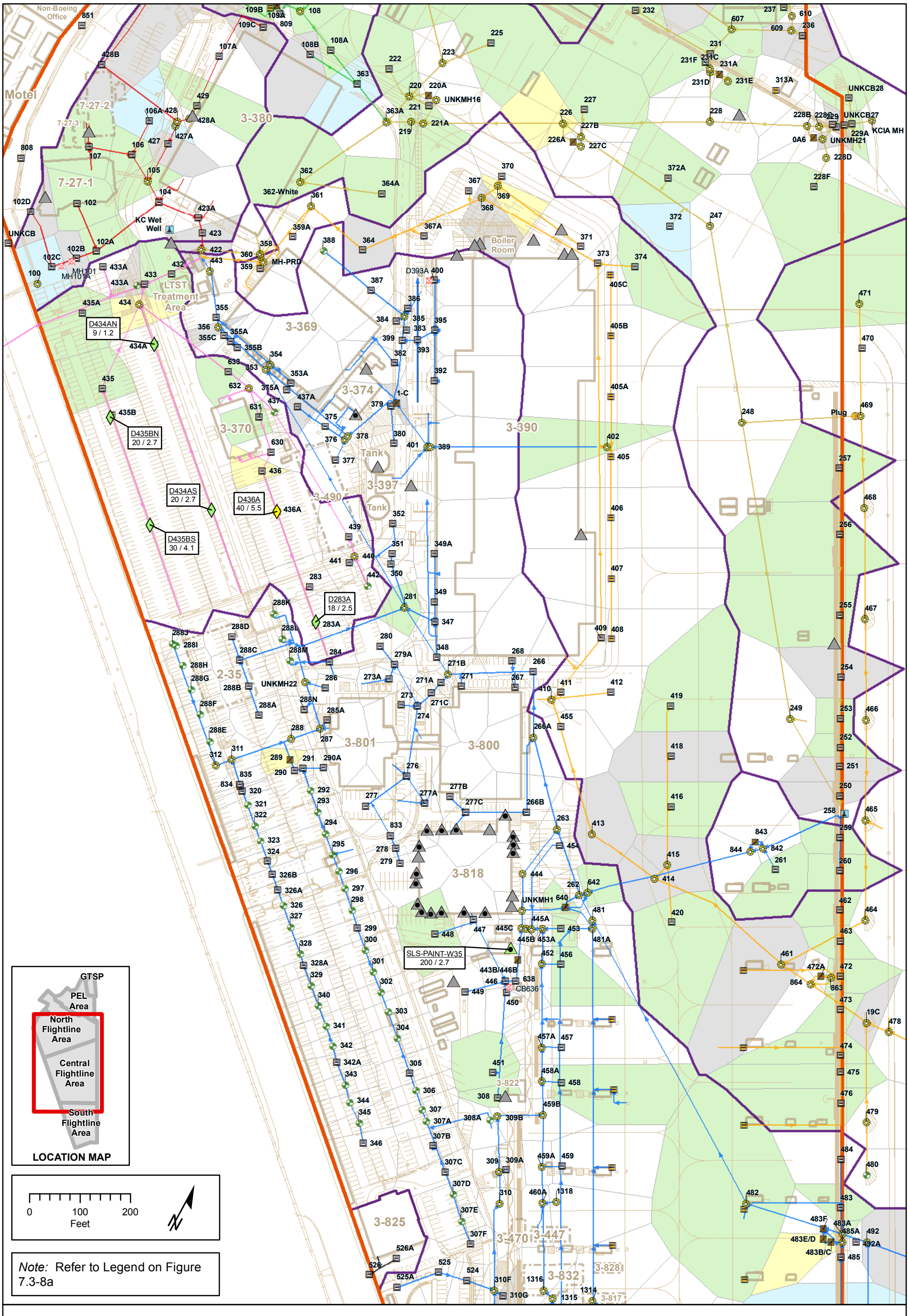

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Figure 7.3-8b. Arsenic Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_3-08b_Arsenic_Samples.mxd
Illustrative purposes only.
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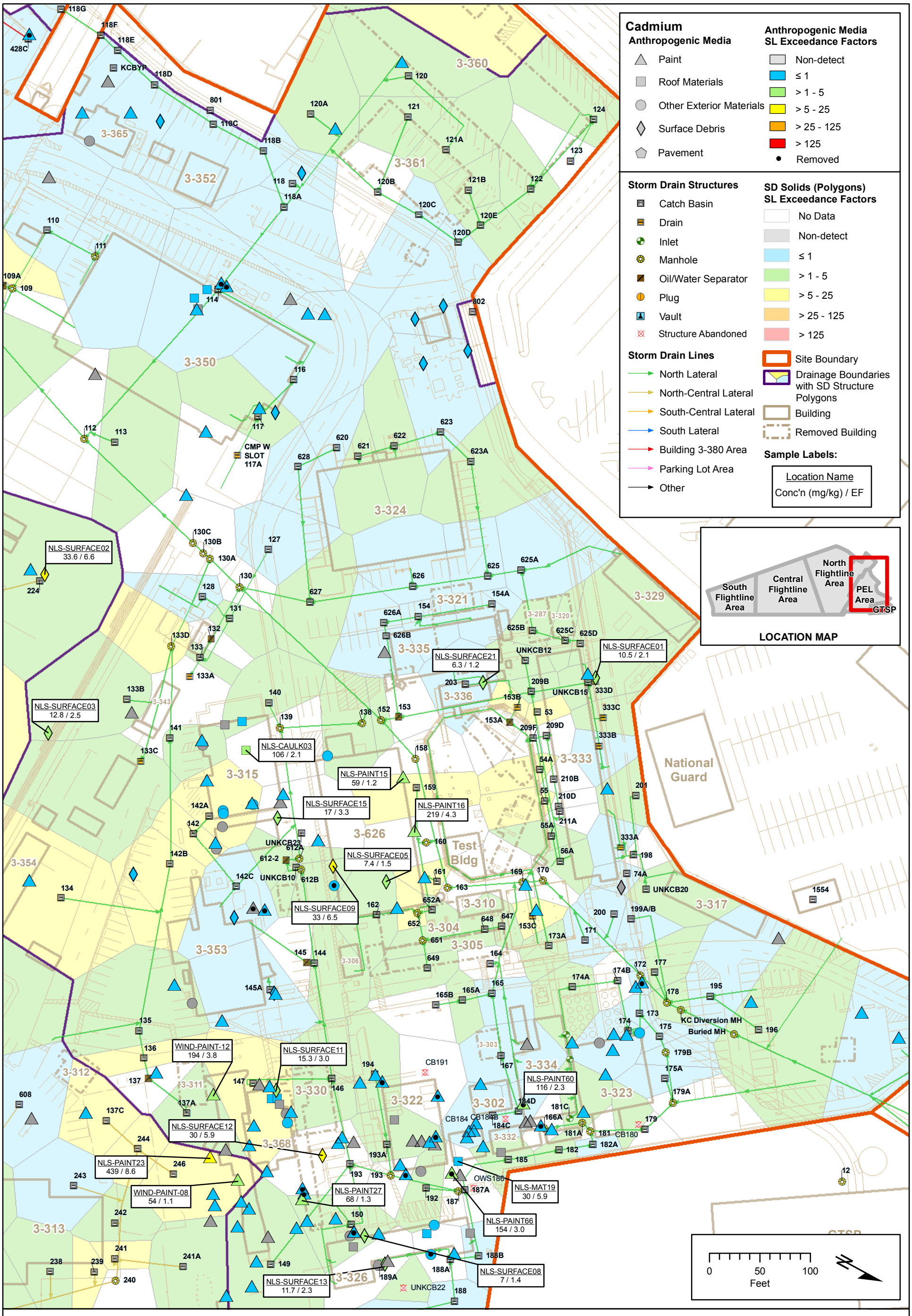

Figure 7.3-9a. Cadmium Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
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Prepared By: mlf
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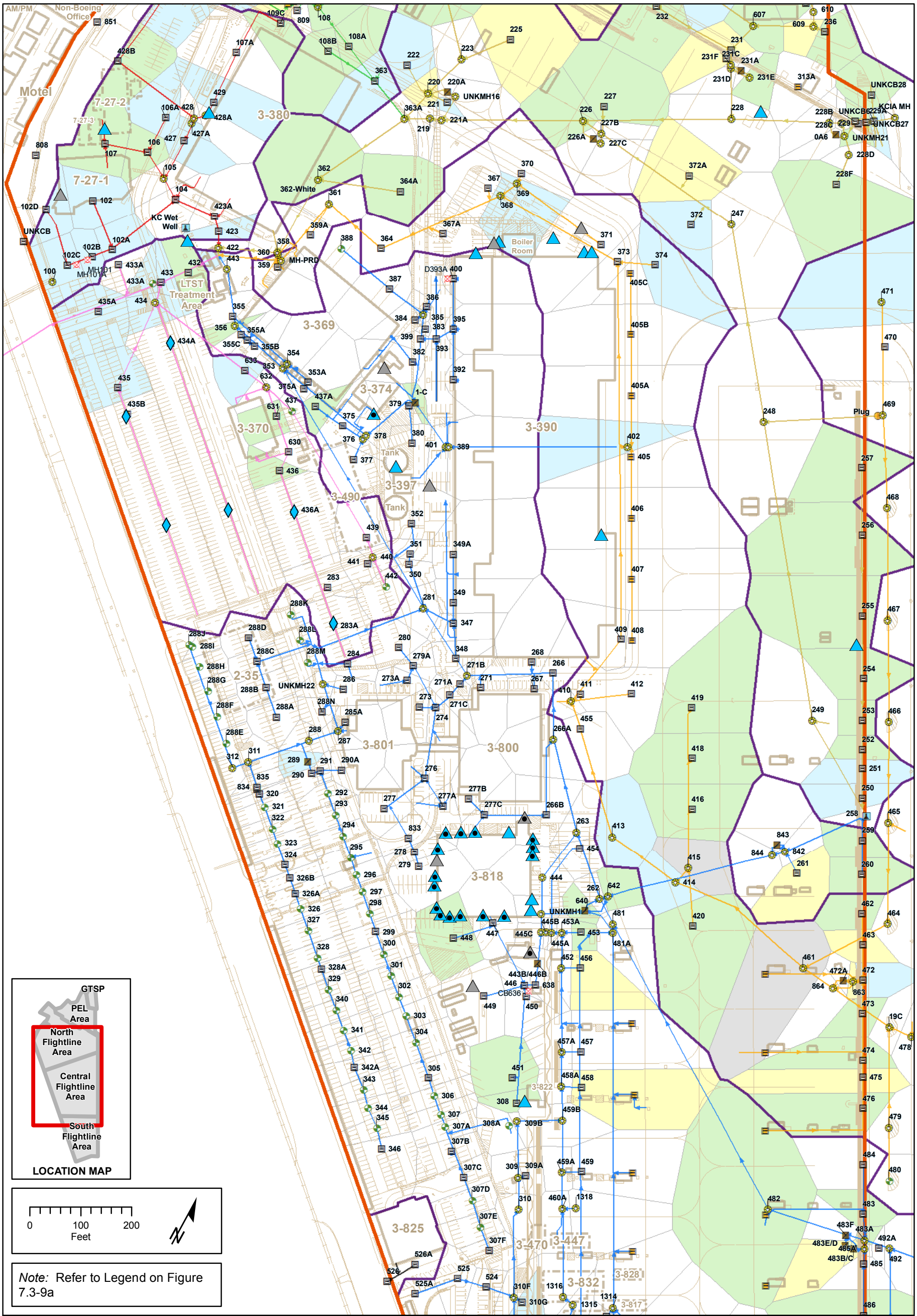

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Figure 7.3-9b. Cadmium Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
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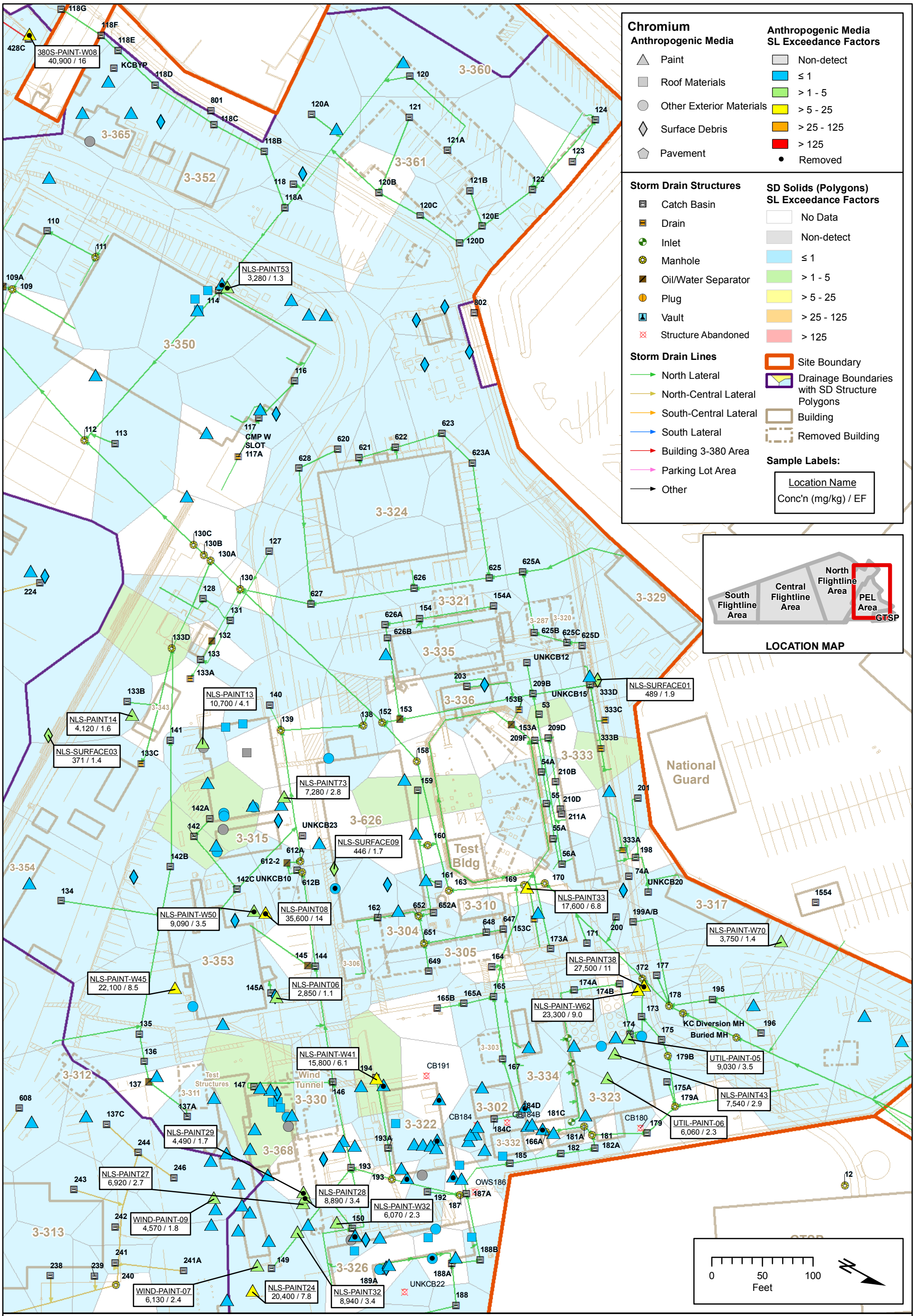

Figure 7.3-10a. Chromium Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
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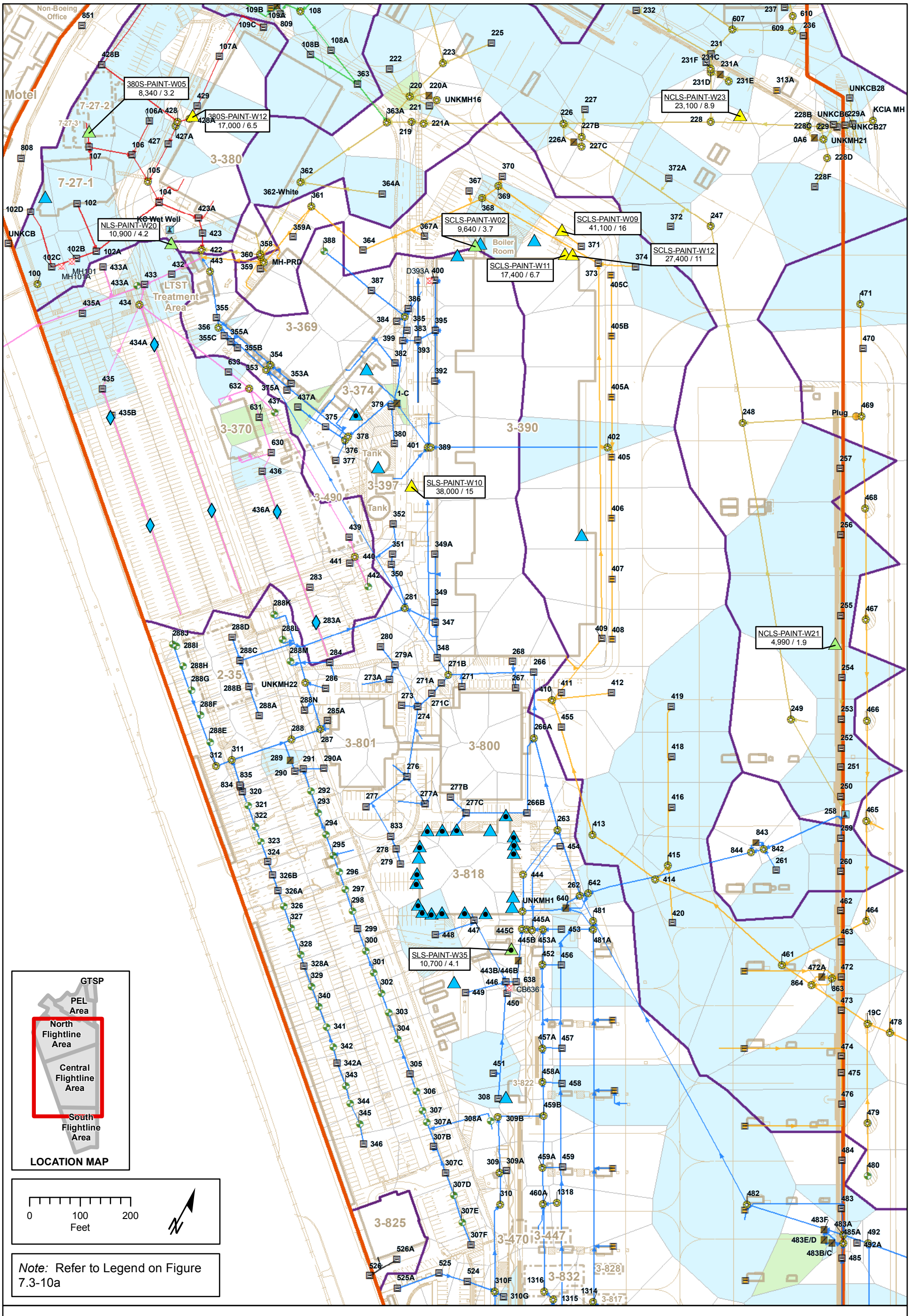

Figure 7.3-10b. Chromium Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
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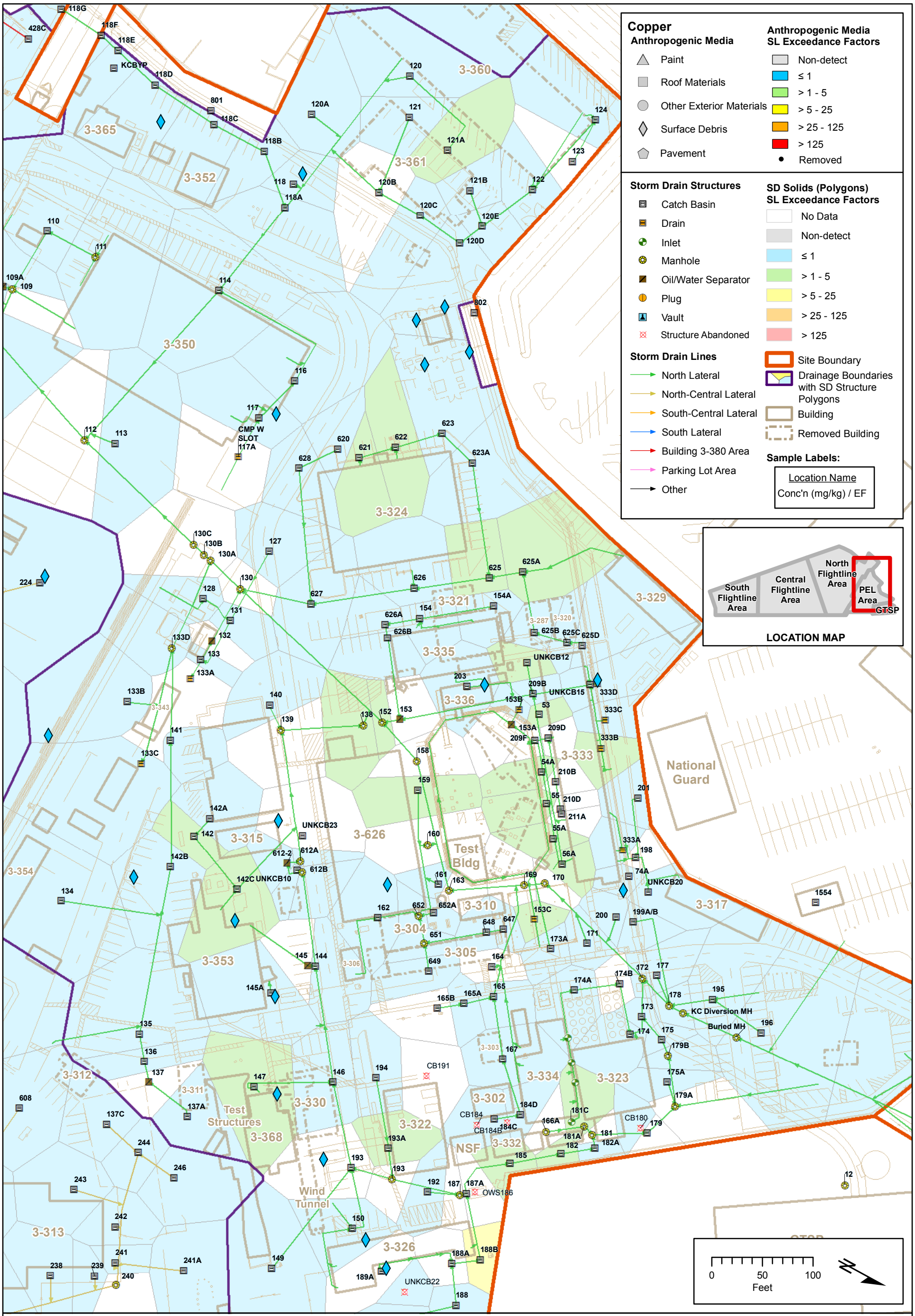

Figure 7.3-11a. Copper Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
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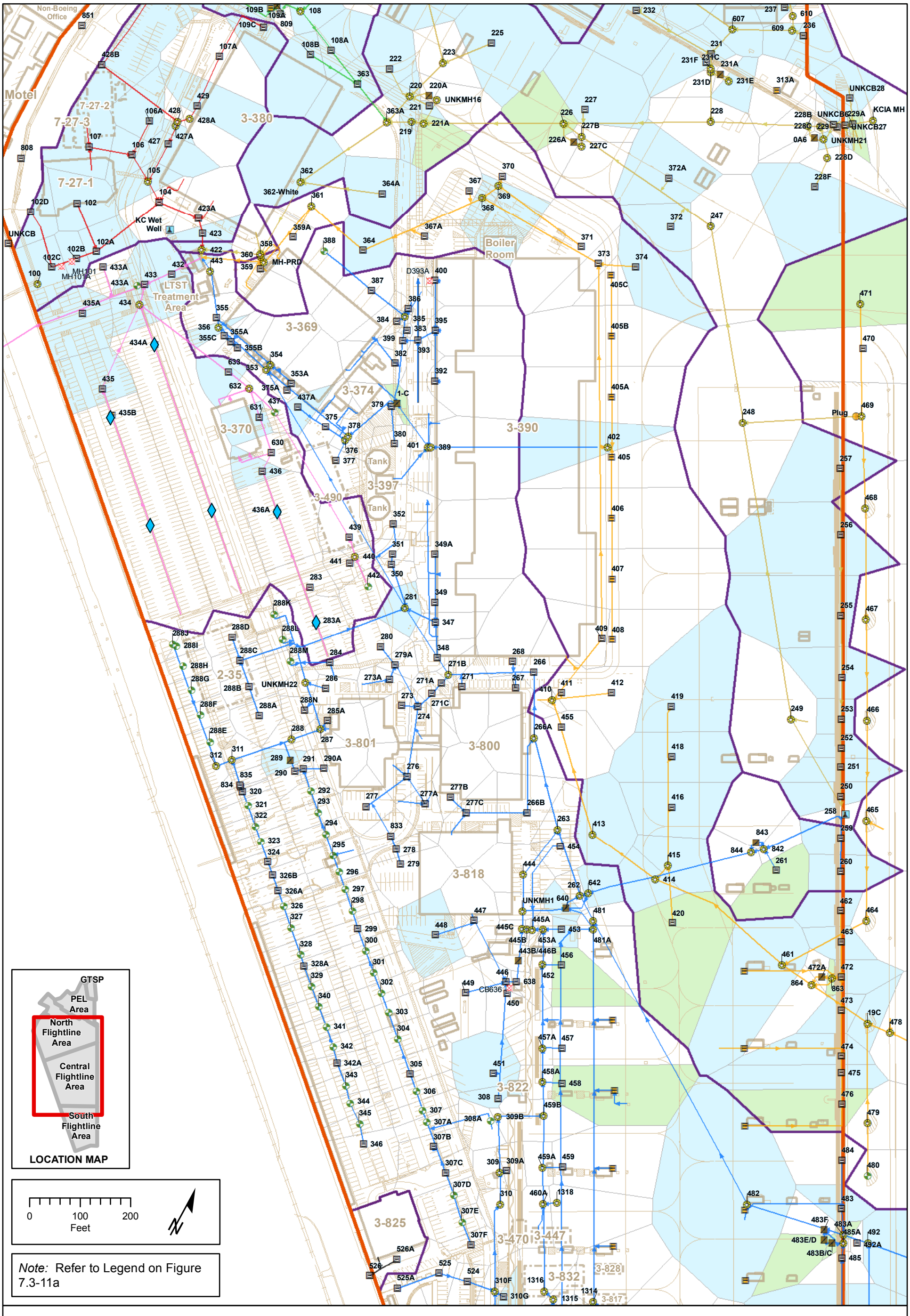

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Figure 7.3-11b. Copper Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
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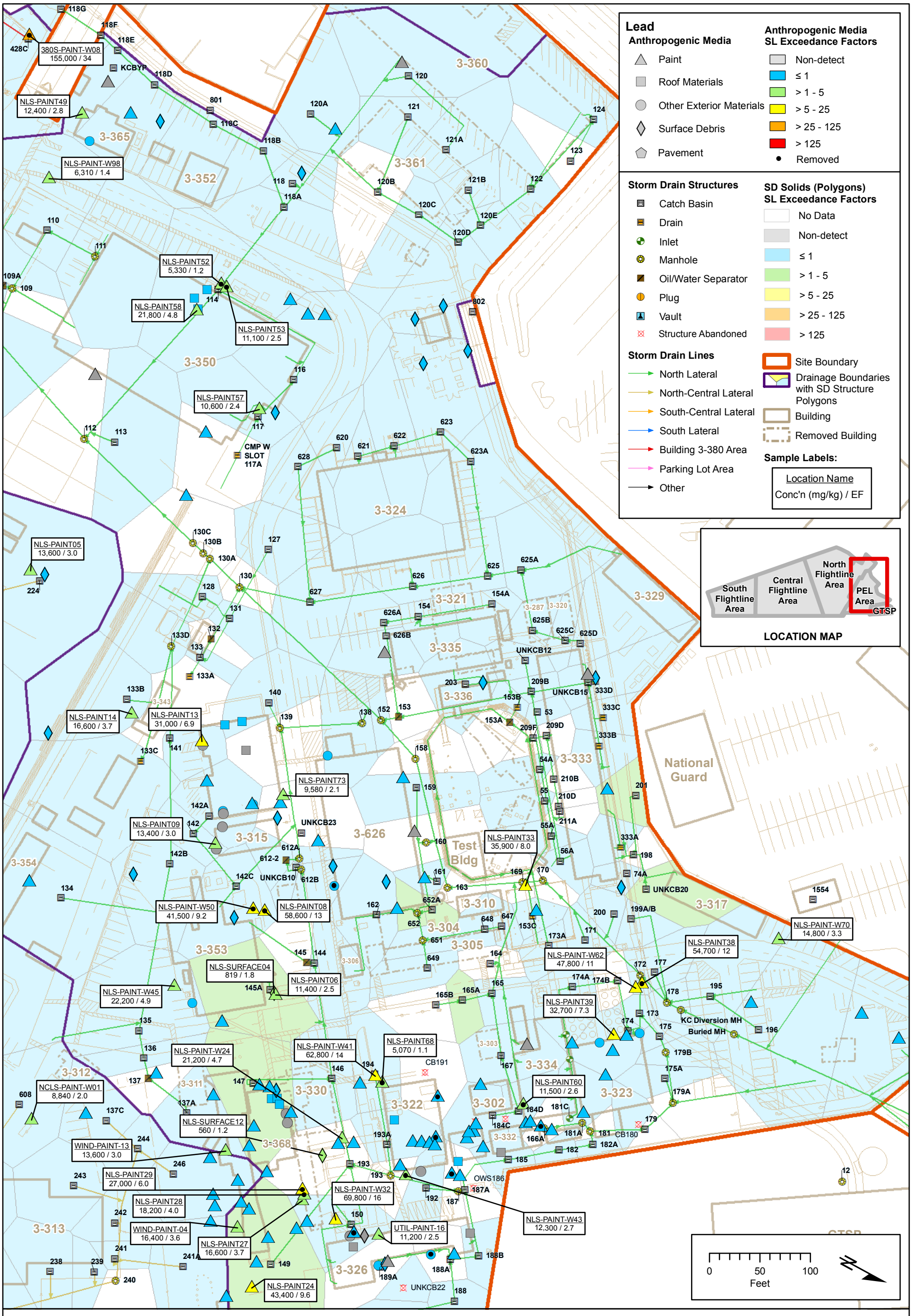

Figure 7.3-12a. Lead Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
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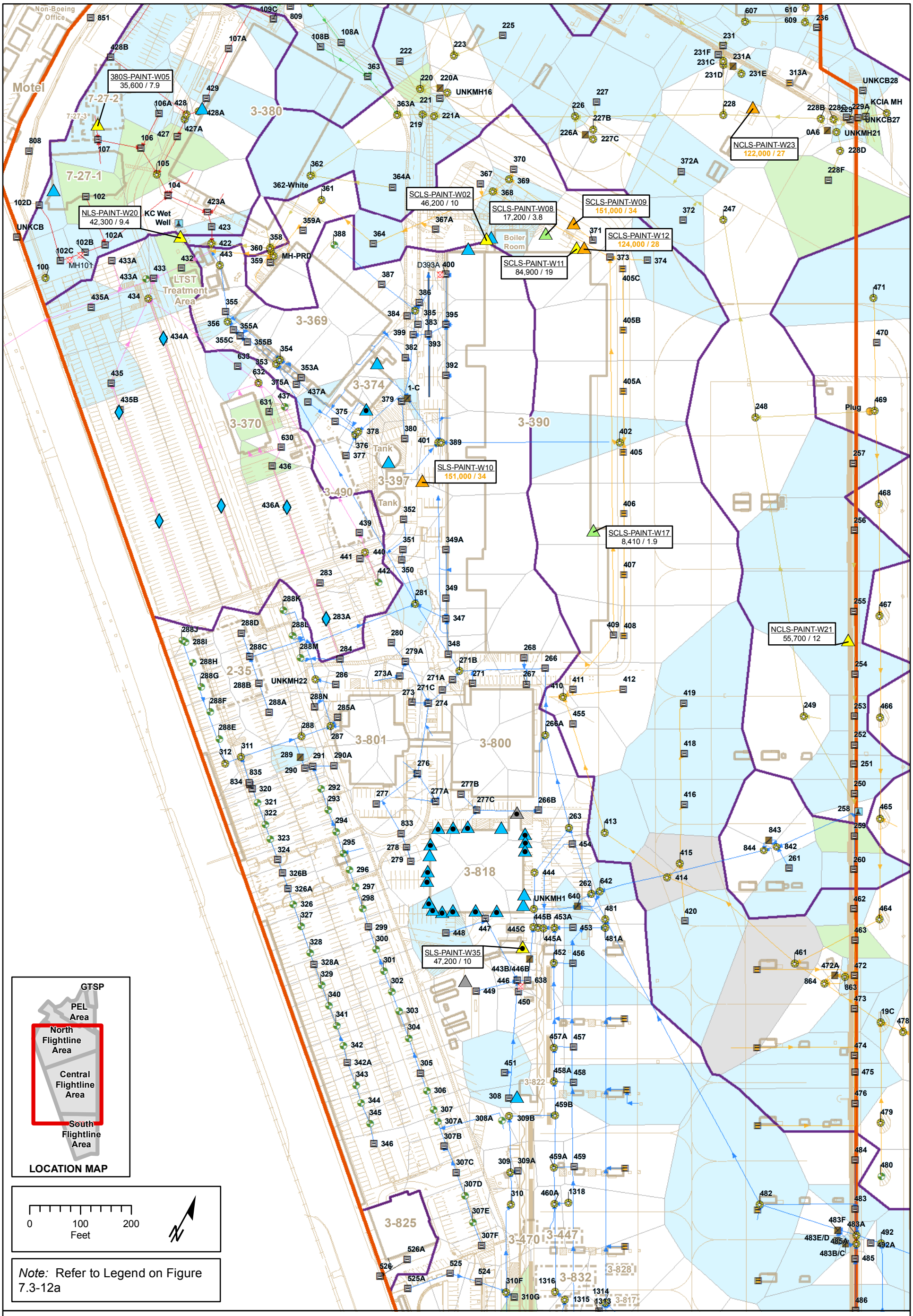

Figure 7.3-12b. Lead Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
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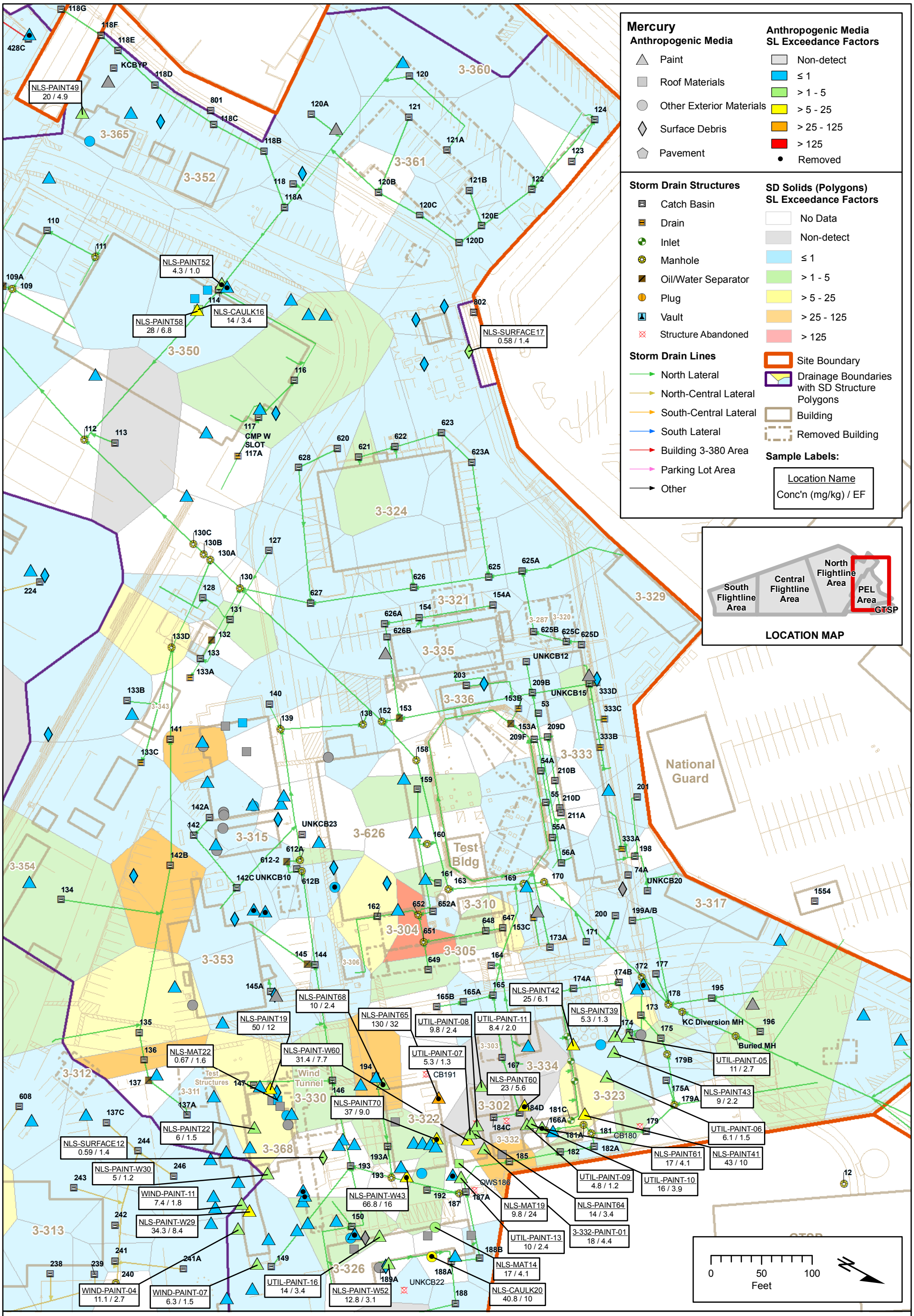

Figure 7.3-13a. Mercury Results for Anthropogenic Media and SD Solids at NBF

Coordinate System:
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Prepared By: mlf
File: Figure_7_3-13a_Mercury_Samples.mxd
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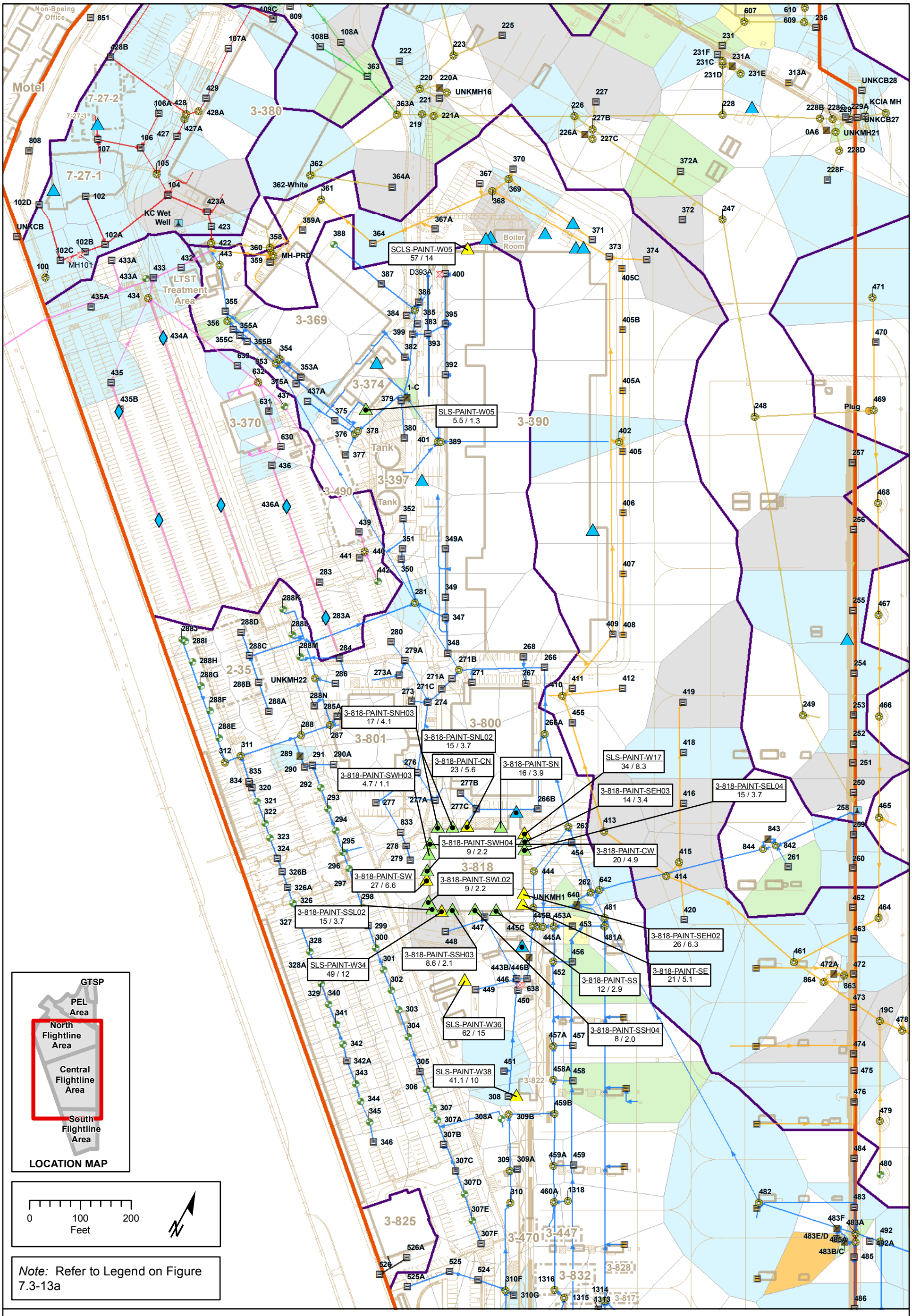

Note: Refer to Legend on Figure 7.3-13a

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Figure 7.3-13b. Mercury Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
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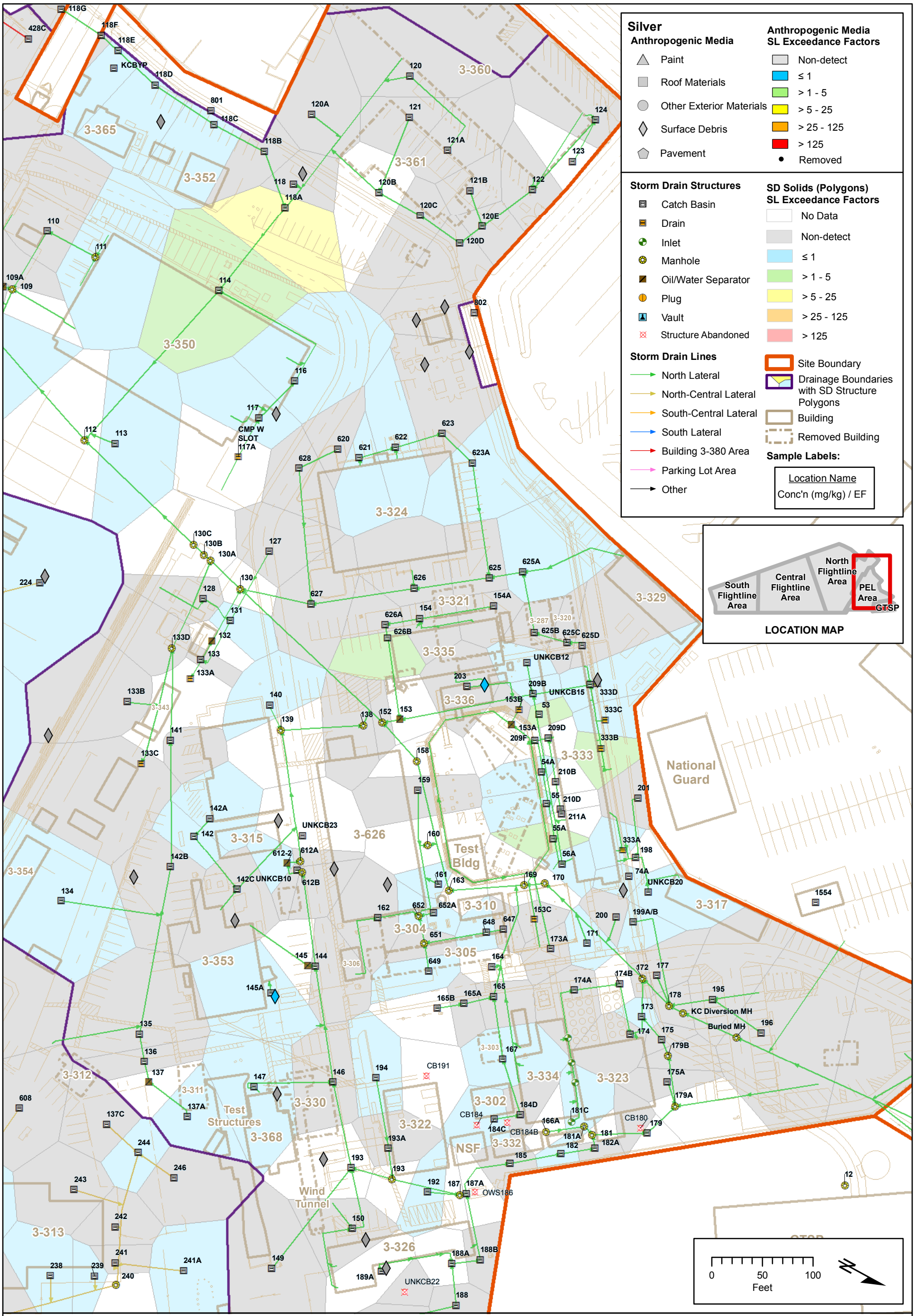

Figure 7.3-14a. Silver Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
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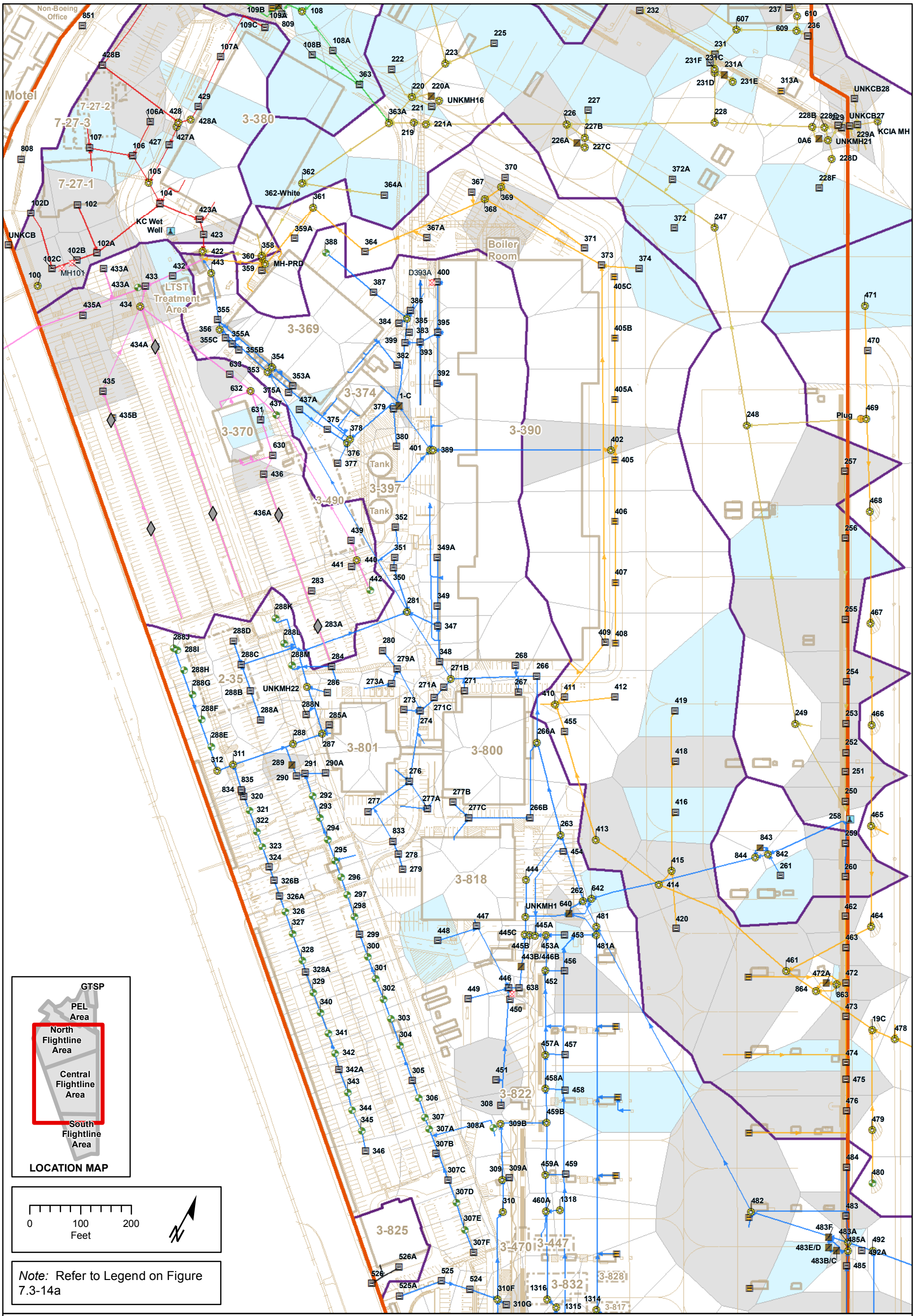

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Figure 7.3-14b. Silver Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
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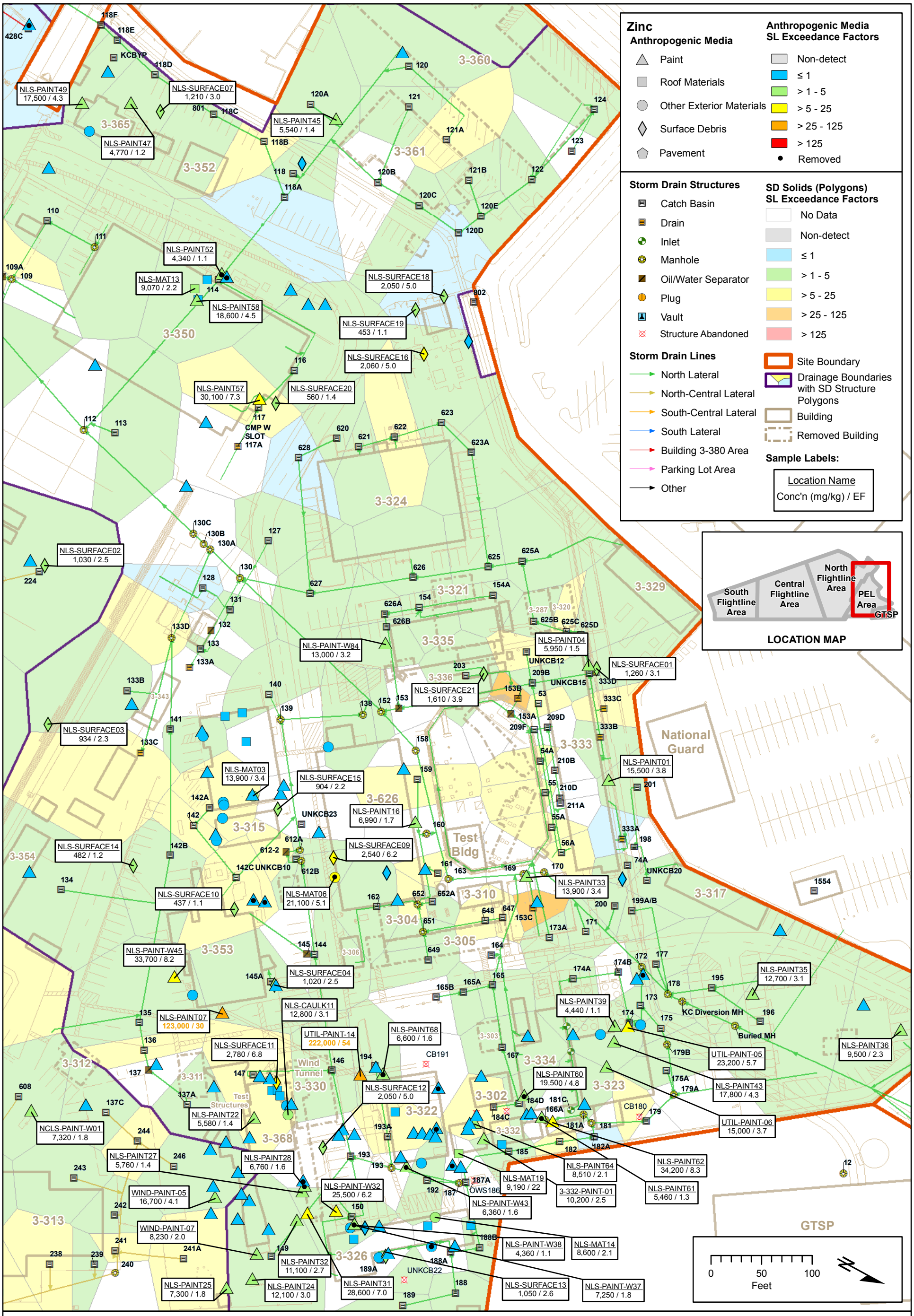

Figure 7.3-15a. Zinc Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
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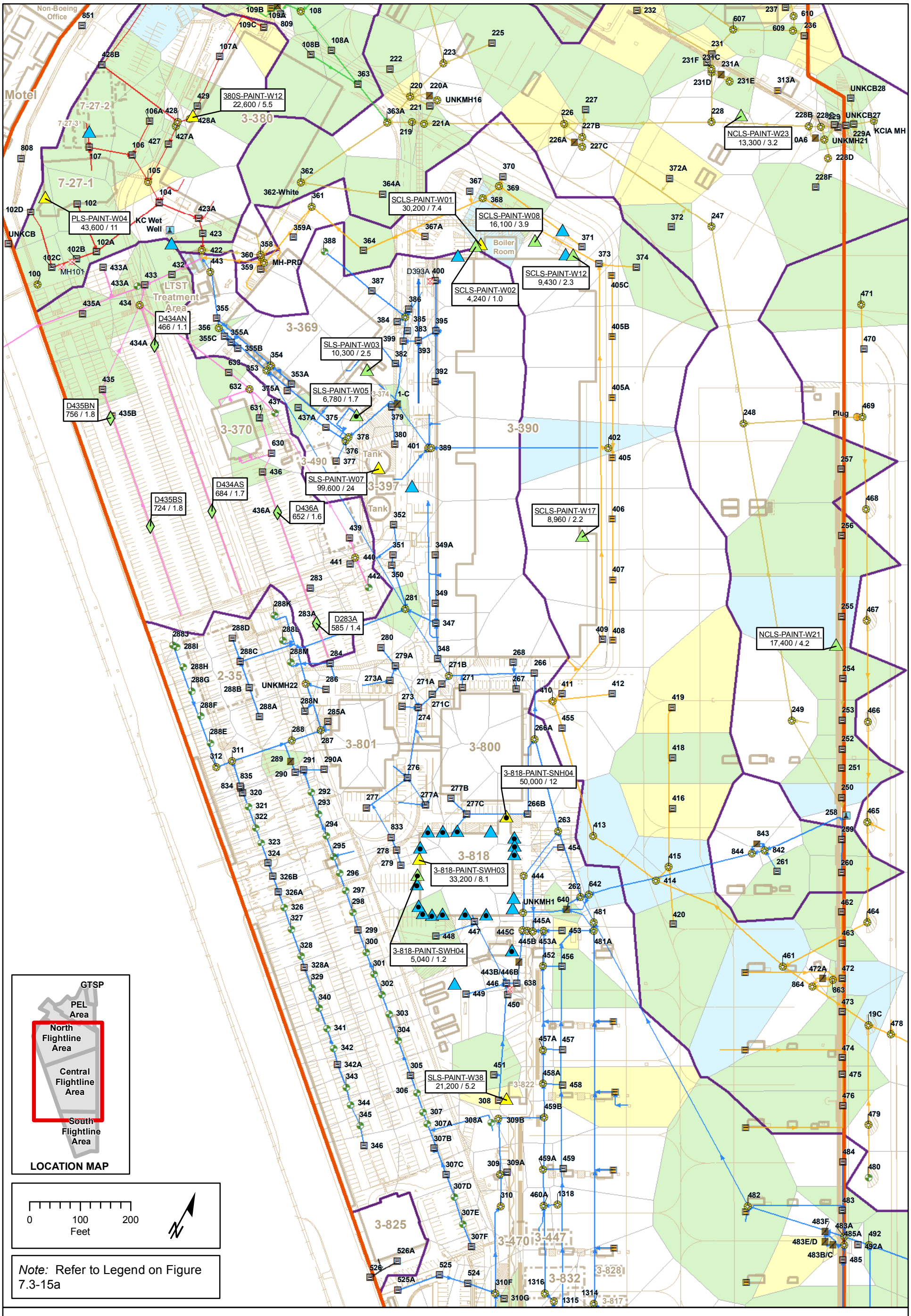

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Figure 7.3-15b. Zinc Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
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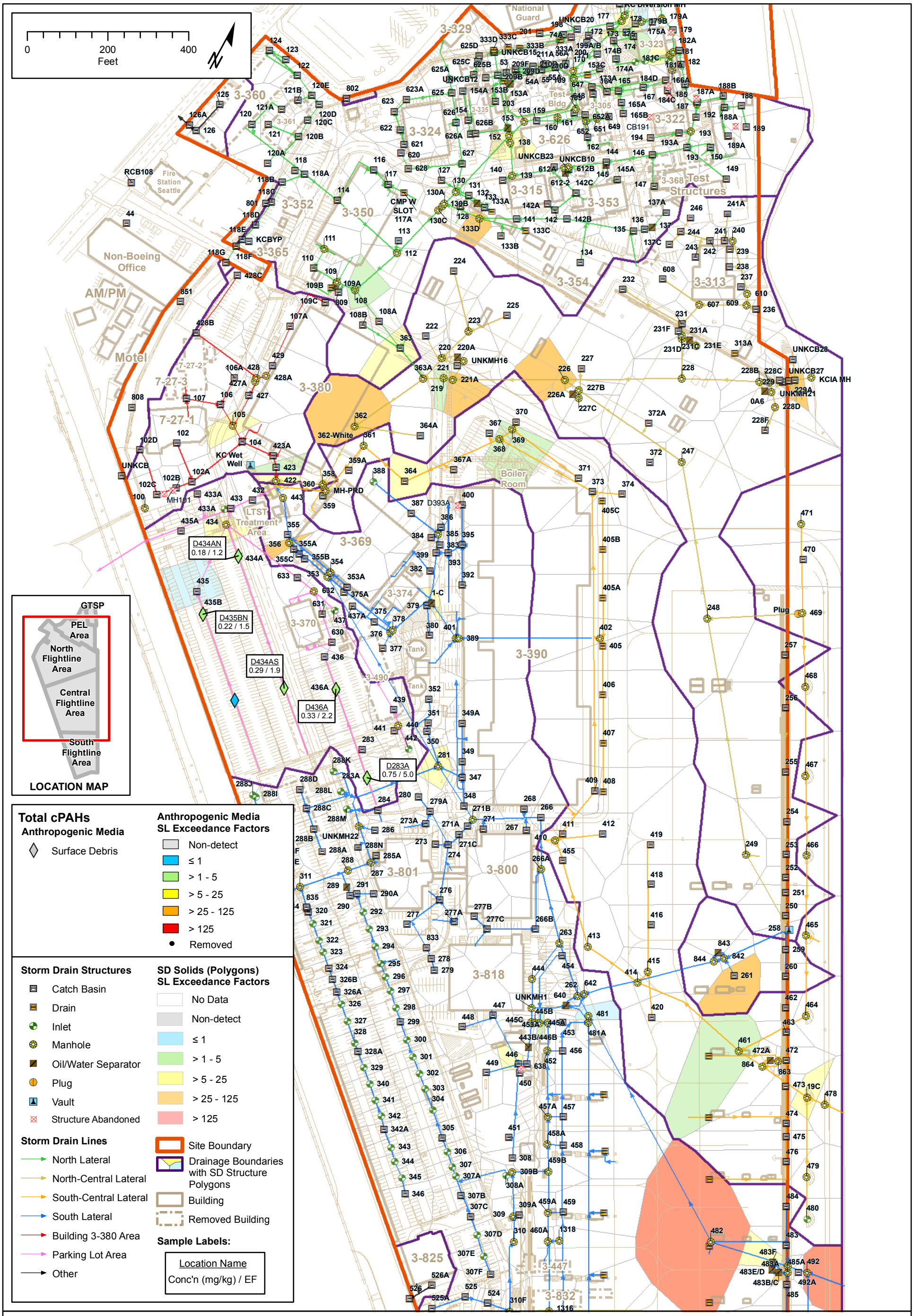

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Figure 7.3-16. Total cPAH Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
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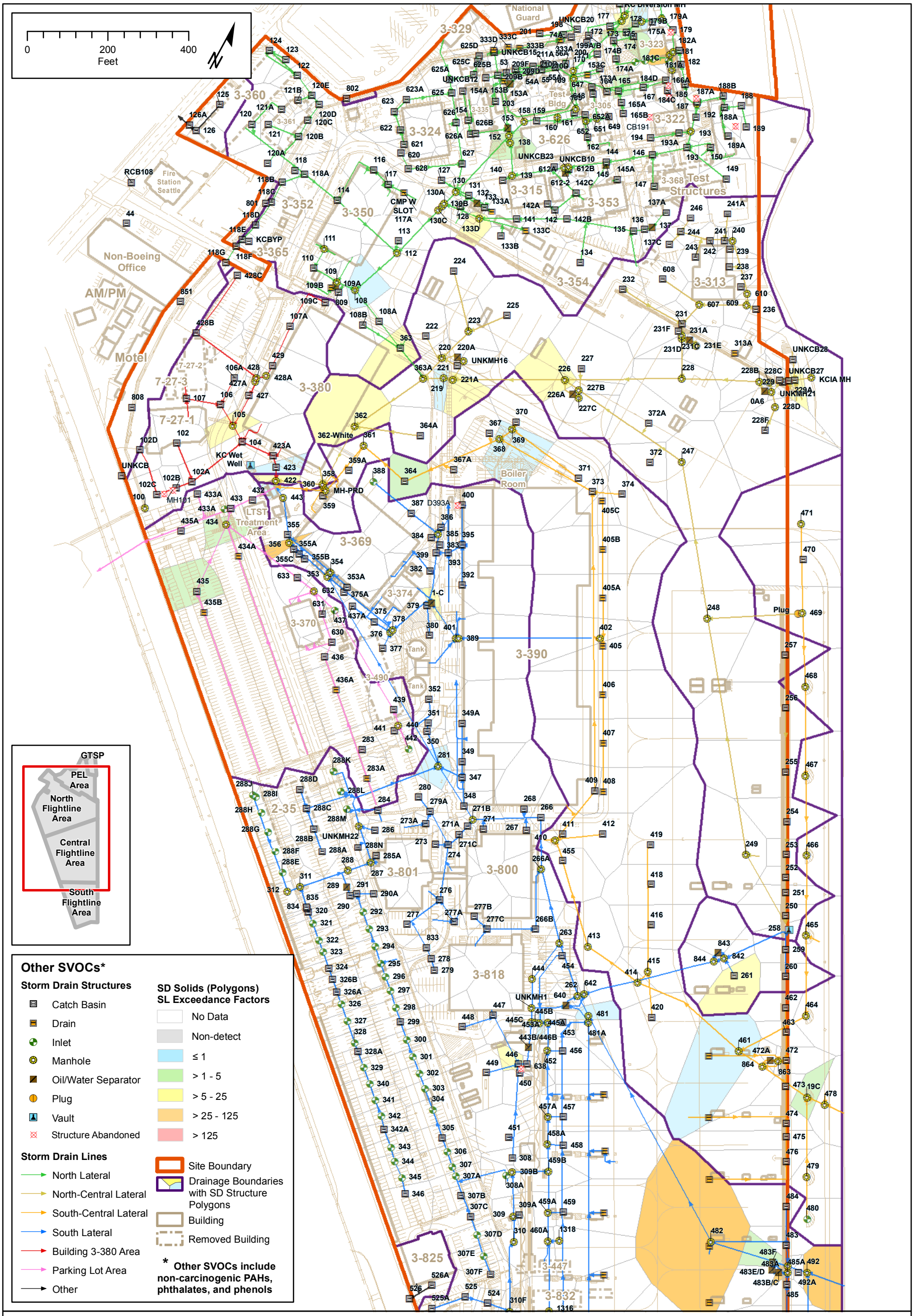

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Figure 7.3-17. Other SVOC Results for Anthropogenic Media and SD Solids at NBF

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Coordinate System:
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Prepared By: mlf
File: Figure_7_3-17_otherSVOCs_Samples.mxd
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Storm Drain Structures

- Catch Basin
- Drain
- Inlet
- Manhole
- Oil/Water Separator
- Plug
- Vault
- Structure Abandoned

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- KC Bypass Line and MH 130a Conveyance
- GTSP Flume Replacement
- Other

- Drains
- Site Boundary
- Drainage Boundaries
- Building
- Removed Building

Proposed Sample Locations

- 130 Proposed SD Solids Sampling Locations
- Proposed Surface Debris Sampling Locations near Buildings/Structures
- Proposed Surface Debris Sampling Locations near SD Structures

LOCATION MAP

South Flightline Area
Central Flightline Area
North Flightline Area
PEL Area
GTSP

0 50 100
Feet

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Figure 7.3-18a. Storm Drain Solids and Surface Debris Sample Locations at NBF-GTSP

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Coordinate System:
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Prepared By: mlf
File: Figure_7_3-18a_SDS_and_Surface_Debris.mxd
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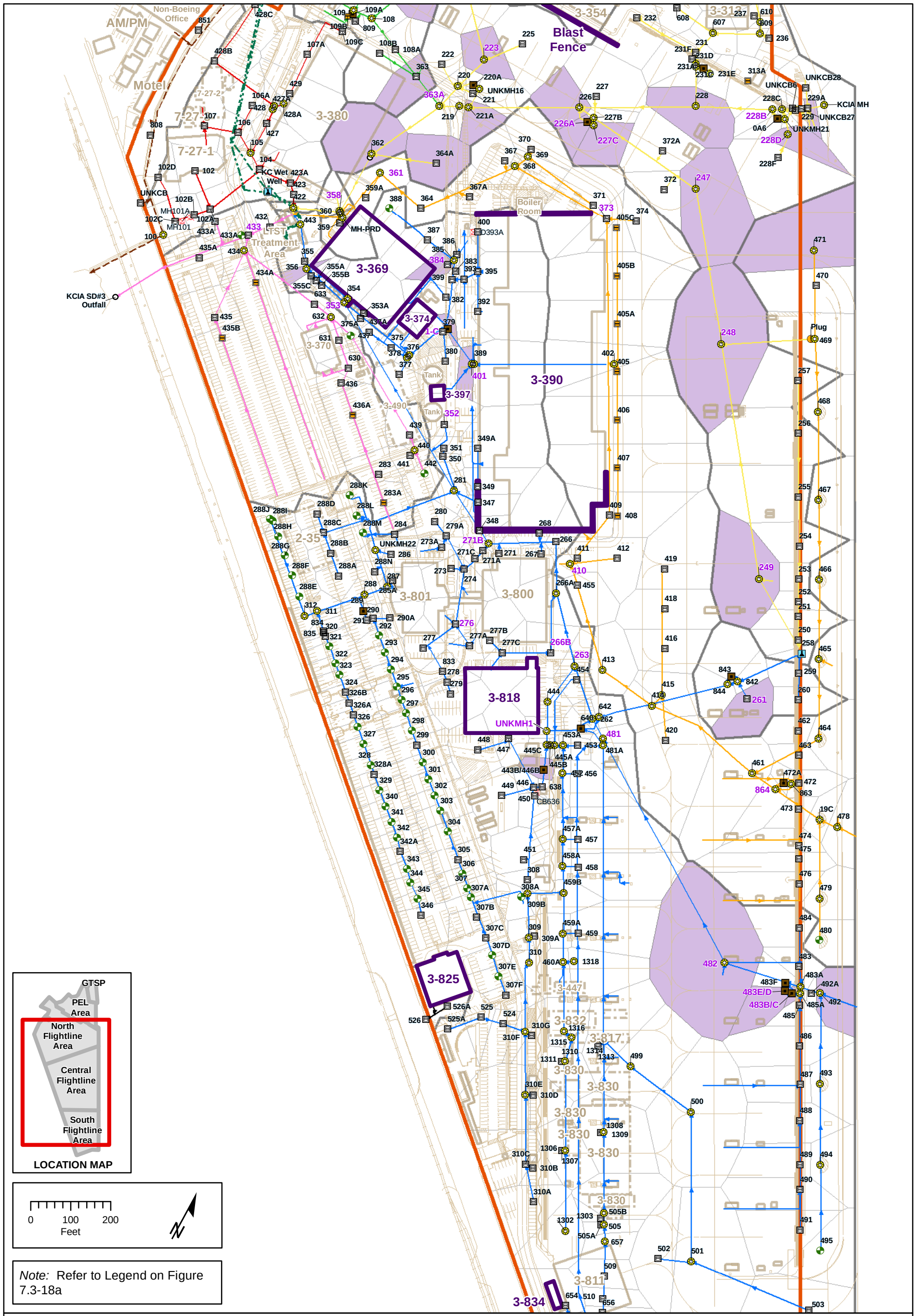

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Figure 7.3-18b. Storm Drain Solids and Surface Debris Sample Locations at NBF-GTSP

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Coordinate System:
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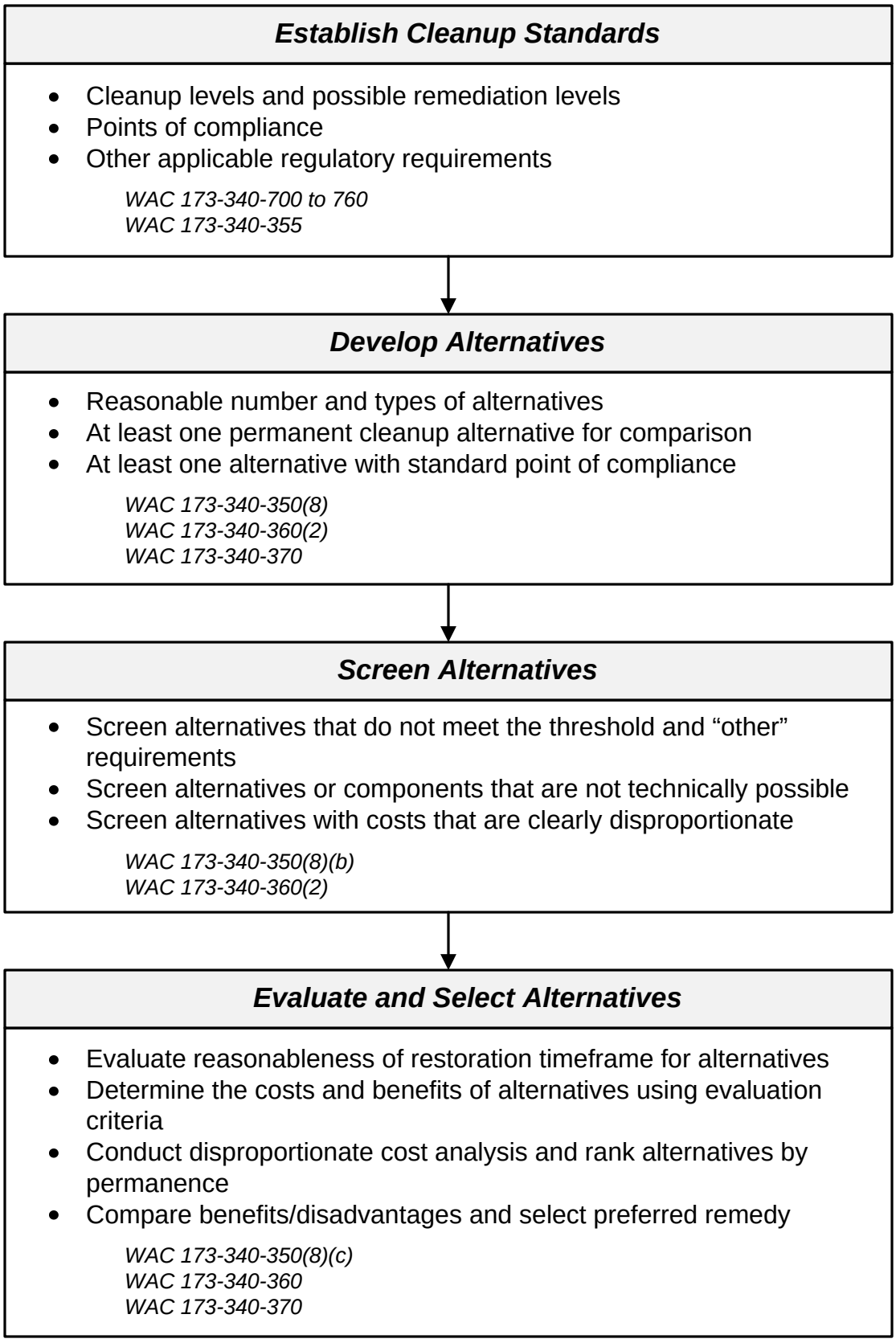

Modified from Ecology 2011b

Figure 9-1. Feasibility Study Process