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Addendum No. 2 to  
Master Field Sampling Plan for Chemical Data Gap  
Investigation  
Phase 3 Soil Chemical Sampling at Area IV  
Santa Susana Field Laboratory  
Ventura County, California

Subarea 5B

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CDM Smith Task Order DE-AT30-08CC60021/ET17

June 2012

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"I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete."

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Attachment 1 – Draft Subarea 5B Phase 3 Data Gap Analysis Technical Memorandum, Santa Susana Field Laboratory, Ventura County, California (MWH Americas, Inc.)

Tables within Attachment 1 Relevant to the Field Sampling Plan Addendum

Table 1 – Subarea 5B Phase 3 Proposed Soil Sample Locations

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Figure 1 – Subarea 5B South Phase 3 Proposed Soil Matrix Sampling Locations and Previous Data Summary

Figure 2 – Subarea 5B North Phase 3 Proposed Soil Matrix Sampling Locations and Previous Data Summary



## Introduction

This document supports implementation of the soil sampling program described in the *Master Field Sampling Plan for Chemical Data Gap Investigation, Phase 3 Soil Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California* (Master FSP, CDM Smith 2012a). The Master FSP addresses soil sampling within Area IV of the Santa Susana Field Laboratory (SSFL) as required under the *Administrative Order on Consent for Remedial Action* (Docket Number HSA-CO 10/11-037) (AOC) signed by the California Department of Toxic Substances Control (DTSC) and the Department of Energy (DOE). The Master FSP includes field Standard Operating Procedures (SOPs) describing the details of sampling activities and sample management. For all samples collected at locations within Subarea 5B, the Master FSP and the SOPs dictate the procedures pertaining to:

- locating and verifying sampling points
- surface soil sampling techniques
- subsurface soil sampling techniques using a direct push technology (DPT) rig and a hand auger and slide hammer for those locations not accessible by the DPT rig
- sampling of trenches and test pits
- sample handling and shipping
- analytical, quality control, and data review
- instrument calibration and maintenance

The AOC between DTSC and DOE was signed on December 6, 2010. The AOC is a legally binding order that describes the characterization of Area IV and Northern Buffer Zone soils/sediments and further defines DOE's obligations in relation to radiologic and chemical cleanup of soils within these areas. It stipulates that during Phase 1 of the chemical investigation activities, DOE was to analyze a soil sample for chemical constituents at locations where EPA collected a sample for radiological analysis. Phase 1 Co-located sampling with EPA in Subarea 5B was completed in April 2011. Phase 2, which was random co-located sampling with EPA in the Northern Buffer Zone was also completed in April 2011.

Phase 3 of the AOC is the data gap investigation, which includes an assessment of data adequacy using the data collected under the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) program, the results of co-located soil samples collected during Phase 1 of the AOC, and multiple lines of evidence as described in the *Work Plan for Chemical Data Gap Investigation, Phase 3 Soil Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California* (CDM 2010b) (Phase 3 Work Plan). The purpose of the data gap investigation is to identify



additional soil chemical data needed to support the Soil Remedial Action Implementation Plan for Area IV. The sampling that will be performed under this FSP Addendum is based on the results of the data gap investigation.

The Phase 3 sampling within Subarea 5B is governed by the Phase 3 Work Plan and its elements including the Master FSP, Phase 3 Quality Assurance Project Plan (CDM Smith 2012c) (QAPP), Worker Health and Safety Plan (CDM Smith 2012d), and the Phase 3 SOPs (attachments to the Master FSP and QAPP). These documents are incorporated into this FSP Addendum by reference.

## Purpose of FSP Addendum

This FSP Addendum addresses Phase 3 sampling in Subarea 5B. Figure 1 of the Subarea 5B FSP Addendum illustrates the location of Subarea 5B within Area IV of SSFL. The rationale for sample location and chemical analytes is provided in the document *Subarea 5B Phase 3 Data Gap Analysis Technical Memorandum, Santa Susana Field Laboratory, Ventura County, California* (MWH 2012<sup>1</sup>) (*Subarea 5B Data Gap TM*). The *Subarea 5B Data Gap TM* is included as an attachment to this FSP Addendum. It illustrates the proposed sample locations and includes a table providing the sampling rationale for each location. Figure 1 of the *Subarea 5B Data Gap TM* (MWH 2012) provides soil sample locations in the northern portion of Subarea 5B that were identified through the data gap investigation; Figure 2 shows the soil sample locations in the southern portion of Subarea 5B. Table 1 of the *Subarea 5B Data Gap TM* provides the sampling rationale.

For Subarea 5B, surface, subsurface, and trench/test pit soil samples will be collected. For surface soil samples, only the top 6-inches of soil (surface soil) will be collected. The majority of sample locations will involve collection of subsurface samples. A direct push technology (DPT) rig will be used to sample subsurface soil at all locations except those inaccessible due to terrain constraints. Areas inaccessible to the DPT rig will be sampled using a hand auger and slide hammer as described in the SOPs.

CDM Smith will be responsible for all aspects of the field sampling program under Phase 3 of the AOC. This includes locating in the field the sample locations selected during the data gap investigation and that were initially generated and displayed electronically using Geographic Information System (GIS) coordinates. The GIS coordinates are downloaded into a Geographic Position System (GPS) unit for physically locating the samples in the field. Standard Operating Procedure (SOP) 1 provides the process for verifying that the sample locations initially identified by GIS review reflect the targeted feature described in Table 1 and are consistent with the GPS coordinates generated in the field. If necessary the sample location will be adjusted in the field so the targeted feature is sampled. Adjusted and all final sample

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<sup>1</sup> MWH prepared this Technical Memorandum under contract with The Boeing Company, which is under direct contract with DOE. Through this contractual relationship and under the regulatory oversight of DTSC, MWH has represented DOE in conducting the Chemical Data Gap Analysis and in the preparation of this Technical Memorandum.

location coordinates will be provided back to the GIS managers so that the GIS database can be updated.

CDM Smith will be responsible for the physical collection of all samples per the procedures and controls specified in the Master Field Sampling Plan. CDM Smith personnel will be responsible for the sample container preparation, sample handling and documentation, sample shipment, laboratory coordination, chemical analyses of the samples, and chemical data review. Soil samples collected by CDM Smith will be analyzed for chemical analytes identified in Table 1 of the *Subarea 5B Data Gap TM* (MWH 2012). Analytical methods and quality control criteria to be used are stipulated in Table 8-3 (Quality Control Objectives for Analytical Methods) of the QAPP (CDM Smith 2012c) and Table 6-1 (Analytical Methods, Containers, Preservatives, and Holding Times) of the Master FSP (CDM Smith 2012a).

Table 1 of the *Subarea 5B Data Gap TM* also identifies proposed target depths for sample collection. Samples will also be collected from depth intervals (until refusal) that exhibit evidence of staining, odor, debris, or photoionization detector (PID) readings above background.

This FSP Addendum only addresses the collection of surface soil and subsurface soil to the bedrock interface. The sampling of soil gas or other media will be addressed in a future sampling plan.

## **Sample Analytes**

Table 1 of the *Subarea 5B Data Gap TM* (MWH 2012) provides the chemical analyses (analytes) for each sample proposed for collection under this FSP Addendum and the respective rationale for sample location and chemical analyses. The chemical analyses by location were identified through the data gap investigation process.

## **Field Locating Soil Sample Locations**

CDM Smith will be responsible for determining the precise position of soil sample locations in the field in accordance with SSFL SOP 1. At the same time, each sample location will also be cleared for buried utilities, and assessing the presence of cultural and biological resources for their protection.

## **Surface Soil Sampling**

Surface soil samples will be collected at each location as proposed in Table 1. Surface soil samples will be collected in accordance with SSFL SOP 2. A slide hammer with stainless steel sleeve will be used to collect the soil sample to be analyzed for semi-volatile organic compounds and polychlorinated biphenyls. Volatile organic compounds and total petroleum hydrocarbon samples will be collected using Encore samplers. Soil for all other sample analytes will be placed in one or more glass jars.



## Subsurface Soil Sampling

Subsurface soil samples will be primarily collected through the use of a DPT rig. SSFL SOP 4 describes the DPT sampling procedures. Sampling will be conducted through use of 5-foot long acetate sleeves placed within the DPT sampling tool. All cores will be screened using a PID instrument for volatiles and via a Micro R gamma detection instrument and a dual phosphor alpha/beta detection instrument (SOPs 6 and 7, respectively). Soil samples will be collected at the depths specified in Table 1 of the *Subarea 5B Data Gap TM* (MWH 2012) and/or at locations where instrument readings, soil staining, or evidence of debris is observed.

To determine depth of contamination at locations where prior data indicates contamination at the surface but depth has not been defined, the core will be divided into one-foot long samples and prepared for shipment to the laboratory. The laboratory will be requested to analyze the shallowest interval first (e.g., 1 to 2 foot interval) and provide results in an expedited turnaround time. If chemicals are detected above the interim screening levels, the lab will be instructed to analyze the next interval (e.g., 2 to 3 foot interval) and provide results under expedited analytical turnaround time. This process may be repeated depending on results. To address holding time concerns, the lab may be instructed to extract each interval and hold the extract until the prior interval results are available. Table 1 identifies the locations where the depth analysis process is proposed.

There are proposed sampling locations that the DPT rig will not be able to access. At those locations, subsurface samples will be collected using a hand auger to access the sample depth and a slide hammer sampler with stainless steel sleeve to collect the actual sample. SSFL SOP 3 describes the hand auger sampling procedure.

The soil logging of all samples, surface and subsurface, will be conducted following SOP 9.

## Trenching and Test Pit Sampling

The investigation of Subarea 5B will include the characterization of debris and fill areas through backhoe trenching. Figures 1 and 2 of the *Subarea 5B Data Gap TM* identify the trench locations. The primary purpose of the trenches will be to visually characterize fill material and to sample subsurface soil within the trench.

Prior to any trenching, geophysical surveys of the trenching locations will be conducted to identify potential buried debris and to assist in targeting trench locations. The geophysical surveys will include ground penetrating radar, electromagnetic surveys, and soil density surveys. Procedures for the geophysical surveys are described in SSFL SOP 14. The firm selected to perform the surveys will prepare a detailed plan of their procedures for DTSC review prior to conducting the surveys.



Where sampling can be performed safely, soil samples will be collected from the side wall of the trench/pit to 5 feet below ground surface (bgs) using an impact sampler with extended rod. Soil samples deeper than 5 feet below ground surface (or when samples cannot be collected safely at 5 feet bgs) will be collected directly from the backhoe bucket using the impact sampler. SSFL SOP 5 describes the test pit sampling procedure.

## **Sampling of Locations with Sustained Instrument Readings, Odor, or Staining**

For any locations where PID instrument readings remain above measured background readings, there is an odor, or the soil appears to be stained with hydrocarbons, samples will be collected at the sample depth interval and analyzed for VOCs, 1,4-dioxane, and total petroleum hydrocarbons-gasoline range organics (TPH-GRO) using Encore samplers, in addition to the target analytes specified in Table 1 of the *Subarea 5B Data Gap TM*. Any sustained instrument readings above background (PID, Micro R gamma detection and dual phosphor alpha/beta detection instruments) will be immediately reported to DOE by the CDM Smith Field Team Leader and DOE will contact Boeing with this information in accordance with the Worker Health and Safety Plan requirements. The monitoring instruments will be operated per SSFL SOPs 6 (volatile organics) and 7 (radiation).

## **Decontamination of Sampling Equipment**

Equipment that comes in contact with sample material will be decontaminated per SSFL SOP 12. Investigation derived waste will be handled per SSFL SOP 13.

## **Sample Handling, Recording, and Shipment**

SSFL SOPs 10 and 11 describe the sample custody, handling, information recording, preservation, and shipping procedures. Photographic documentation of sampling activities will be performed per SOP 15.

## **Instrument Calibration and Maintenance**

All instruments used to screen samples for volatile organics and radioactivity will be calibrated and maintained per SSFL SOP 16.

## **Laboratory Sample Preparation (Homogenization)**

Soil samples intended for chemical analyses of non-volatile and non-semivolatile constituents (e.g. metals, PCBs, and dioxins) will be homogenized by the analytical laboratory in the laboratory in accordance with SOP 17.

## Schedule

Soil sampling activities under this FSP Addendum will mostly likely start the week of June 11, 2012, following DTSC approval of the 5B Subarea FSP Addendum, with the locating and staking of proposed sample locations. Utility clearance of the sample locations will occur the week of June 18. Surface soil sampling will start the week of June 25, followed by shallow soil borings to be drilled by hand auger. Subsurface sampling by DPT rig is expected to start mid-July 2012. It is anticipated that 40 surface samples, 32 shallow hand auger samples, and 32 DPT boring samples will be collected each week. As a budget saving measure, geophysical surveys, test pits, and trenching for Subareas 5C, 5B, and 5A will be performed at one time. Therefore test pits and trenching will not occur until after completion of the Subarea 5A addendum, anticipated for August 2012. A geophysical survey plan for conducting the surveys will be provided to DTSC in the August timeframe. Each trench/test pit will take one day to dig, describe, sample, and backfill.

## References

- CDM Smith. 2012a. *Master Field Sampling Plan for Chemical Data Gap Investigation, Phase 3 Soil Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California*. April.
- CDM Smith. 2012b. *Work Plan for Chemical Data Gap Investigation, Phase 3 Soil Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California*. April.
- CDM Smith. 2012c. *Quality Assurance Project Plan for Chemical Data Gap Investigation, Phase 3 Soil Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California*. April.
- CDM Smith. 2012d. *Worker Health and Safety Plan for Chemical Data Gap Investigation, Phase 3 Soil Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California*. April.
- MWH 2012. *Subarea 5B Phase 3 Data Gap Analysis Technical Memorandum Santa Susana Field Laboratory, Ventura County, California*. May.



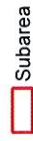
Santa Susana Field Laboratory Site  
Ventura County, California

**Figure 1**  
**Area IV and Northern Buffer Zone**  
**Subarea Designation**  
**Santa Susana Field Laboratory**



**EPA Region 9**

**Legend**



Subarea



Area IV & Northern Buffer Zones

Aerial Source: Bing Maps, (c) 2010 Microsoft Corporation  
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**Attachment 1**  
***Subarea 5B Phase 3 Data Gap Analysis***  
***Technical Memorandum, Santa Susana***  
***Field Laboratory, Ventura County,***  
***(MWH 2012)***

**SUBAREA 5B PHASE 3 DATA GAP ANALYSIS  
TECHNICAL MEMORANDUM  
SANTA SUSANA FIELD LABORATORY  
VENTURA COUNTY, CALIFORNIA**

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**Prepared For:**

**THE UNITED STATES DEPARTMENT OF ENERGY**

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**June 2012**

"I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete."



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## ACRONYMS AND ABBREVIATIONS

AOC	Administrative Order on Consent
bgs	below ground surface
DOE	Department of Energy
DQO	Data Quality Objective
DTSC	Department of Toxic Substances Control
EEL	Environmental Effects Laboratory
EPA	Environmental Protection Agency
GIS	Graphical Information System
HMSA	Hazardous Material Storage Area
HSA	Historical Site Assessment
ISL	Interim Screening Level
MFSP	Master Field Sampling Plan
NDMA	n-Nitrosodimethylamine
NBZ	Northern Buffer Zone
PAH	polyaromatic hydrocarbon
PCB	polycyclic biphenyls
SSFL	Santa Susana Field Laboratory
TIC	tentatively identified compound
TM	Technical Memorandum
VOC	Volatile Organic Compound

## 1.0 INTRODUCTION

This technical memorandum (TM) has been prepared to describe the chemical data gap analysis performed by MWH Americas, Inc. (MWH) for the U.S. Department of Energy (DOE) for Subarea 5B within Area IV and the Northern Buffer Zone (NBZ) at the Santa Susana Field Laboratory (SSFL). The chemical data gap analysis was performed in compliance with the Administrative Order on Consent (AOC) for Remedial Action (AOC; Docket No. HSA-CO 10/11 - 037), and serves as the basis for the Phase 3 data gap investigation in Subarea 5B being performed by DOE in Area IV and implemented by CDM Smith, a contractor to DOE. This Data Gap TM is included as an appendix to the Master Field Sampling Plan (MFSP) Addendum for Subarea 5B prepared by CDM Smith for review and approval by the California Environmental Protection Agency Department of Toxic Substances Control (DTSC).

The focus of this Data Gap TM is Subarea 5B. Information is provided to describe the overall background and approach for the chemical data gap analysis and investigation, followed by a description of specific application of the data gap analysis approach or unique circumstances within Subarea 5B.

## 2.0 DATA GAP ANALYSIS PROCESS

The AOC requires a chemical data gap investigation to identify locations within Area IV, the NBZ, or contiguous areas where additional chemical investigation is necessary. Per the AOC (Section 2.5.3.2):

“In determining the scope, DOE and DTSC shall evaluate the results from the Phase 1 Co-Located sampling effort, the results from the Phase 2 Co-Located sampling effort<sup>1</sup>, the results of the U.S. EPA’s radiological survey and characterization efforts, the data and information presented in the previous RFI reports and RFI work plans, and any available historical Site data. This scoping effort shall be used to determine the locations at the Site where insufficient chemical data exists and additional chemical investigation is necessary.”

This Data Gap TM describes the data evaluation process that has been used to identify chemical data gaps. Data gaps exist where more information is needed for DTSC and DOE to make remedial planning decisions, (i.e., whether soil contamination exists, and if so, to what extent). The data gap analysis approach was developed using the U.S. Environmental Protection Agency’s (EPA’s) seven-step Data Quality Objective (DQO) process that presents a systematic approach to identify chemical sampling needs, address existing data gaps, and obtain environmental data and information required for future remedial planning. The Phase 3 chemical

<sup>1</sup> According to the AOC, the Phase 2 random sampling is to be conducted with EPA. EPA has recently completed random sampling within the NBZ. The data gap analysis will use the results from Phase 2 sampling within the NBZ to assess additional sampling for that area.



data gap investigation DQOs are the framework for the analysis described in this TM and are presented in Section 4.0 of the MFSP (CDM Smith, 2012b).

The Phase 3 data gap analysis described in this TM will be an iterative process. At this time in the data gap analysis process, data are compared with the interim screening levels (ISLs) developed for evaluation of available data (see Master Phase 3 Work Plan Table 2-1, CDM Smith 2012a). The ISLs were developed jointly by DTSC and DOE, and reflect the 2005 background soil concentrations for metals and dioxins, and analytical reporting limits for chemicals not having a background value. In the future, background values will be updated based on the ongoing DTSC soil chemical background study and evaluation of the precision and accuracy requirements for reporting limits. Ultimately, all available previous data, including EPA radionuclide data, will be evaluated based on the final soil cleanup values (Look-up Table values) per the AOC. Therefore, a final data gap analysis will be required incorporating data collected as described in this TM and the Master Phase 3 Work Plan (CDM Smith, 2012a), prior chemical data, and EPA radionuclide results.

The data gap analysis described in this TM is based on available results from EPA's radiological investigation activities (e.g., gamma surveys, geophysical surveys, aerial photograph interpretations), prior RFI results, the Phase 1 co-located sample results, and historical information on activities within Area IV. Since recent radiological data have not been completely published by EPA, this data gap analysis used available EPA summaries of these results for planning purposes.

The data gap analysis identifies where additional information is needed for remedial planning by:

- Comparing existing soil sampling results to ISL criteria to identify additional sample locations needed to define the extent of contamination (based on criteria exceedance) and/or gradients in chemical concentrations away from a potential source;
- Evaluating migration pathways to ensure that samples are collected where contamination may have migrated via natural or anthropogenic processes; and
- Evaluating historical documents and site survey information to identify potential release areas that may not have been adequately characterized.

Each of these evaluation steps are described below.

## **2.1 COMPARISON OF PREVIOUS SAMPLING DATA TO SCREENING CRITERIA**

To determine future chemical sampling needs (to be implemented under the Master Phase 3 Work Plan and MFSP), validated soil chemistry results are compared with ISL criteria. The

ISLs reflect either existing 2005 soil background concentrations for metals and dioxins<sup>2</sup> or analytical reporting limits for chemicals that do not have 2005 background concentrations. Table 2-1 in the Master Phase 3 Work Plan (CDM, 2012a) lists the ISL values currently being used for the data gap analysis.

This data comparison is conducted to answer several questions:

- Are the data adequate to define the extent of soil contamination (i.e., What is the areal extent? How deep does contamination go?)
- Where are additional data needed to address areal and depth extent?
- What types of chemical data are needed at each location?

The soil chemical results within the analytical database are “filterable,” meaning each individual soil chemical result can be selectively evaluated or results can be collectively reviewed for each prior sample point. The analytical database incorporates data files for soil chemical data collected under the RFI and co-located sampling programs. A geographic information system (GIS) is used to spatially display the sampling results. To display the data, the sampling results are compared with the ISL values for all chemicals analyzed at each sample location using a computer algorithm. The algorithm calculates the ratio of the soil concentration to the ISL value. The GIS is then used to display the maximum comparison value (i.e., ‘ratio’) at a sampling location, so that the highest result relative to the ISL is displayed. The GIS uses a color-coded system to display the soil concentration relative to the ISL value. For example, soil concentrations that are at or below the ISL value are displayed as a blue symbol. Locations where the soil concentration exceeds the ISL are displayed as yellow, orange, magenta, or red, depending on the degree of exceedance of the ISL value. Maps displaying the sampling results as color-coded symbols are included in this Data Gap TM (Figures 1, 2, and 3) to help display this evaluation step in the context of proposed sampling locations.

The data gap evaluation includes review of sampling results for combined chemicals, individual chemical groups (e.g. volatile organic compounds [VOCs], polyaromatic hydrocarbons [PAHs], polycyclic biphenyls [PCBs], etc.), and individual chemicals (e.g., barium, perchlorate). Sampling results in the database are ‘filtered’ to determine which chemicals are above ISLs, their depth of occurrence, and which chemicals are co-located. This allows for effective evaluation and selection of step-out sample locations and analytical suites for assessing the extent and/or distribution of chemicals that exceed their respective ISLs. In some cases where detected chemical concentrations may only slightly exceed ISL values, Phase 3 step-out sampling is not proposed in this Data Gap TM, but will be subject to an additional data gap review once the final

<sup>2</sup> DTSC is in the process of completing a new soil background study that includes additional chemicals not analyzed in the 2005 study. When the new background values are available they will replace and add to the existing background values and will be used for subsequent data gap analyses.



AOC look-up table values are made available. Similarly, sampling to address elevated reporting limits in historical data is not proposed in all areas of Subarea 5B in this Data Gap TM. In areas where other data gaps have been identified, sampling for elevated reporting limits is also proposed as needed. In other areas, data gap evaluation for elevated reporting limits in historical data will be addressed after final Lookup Table values are established and in the context of recent sampling results.

The GIS display of the ISL-compared sampling results is used to evaluate potential sampling locations. In areas where detected concentrations exceed ISLs, previous sampling data are evaluated to determine if the lateral or vertical extent of the exceedance is limited by other sampling results below ISLs or other features at the site (e.g., bedrock). If not, then additional sampling is proposed in that area. Conversely, in some areas existing sampling results are adequate to support remedial planning or cleanup decisions. A review of the distribution of results along with other lines of evidence (described below) is used to identify where additional sampling is needed.

Some locations with significant exceedances of ISL values have been identified by DOE and DTSC as soil “clearly contaminated areas.” These are areas most likely requiring remediation based on the existing elevated sampling results, and are displayed in GIS and on maps in this TM with pink shading. The data gap analysis for these areas considers whether sufficient information is available to determine the lateral and vertical extent of contamination. In many cases, more data are needed to determine a volume of soil to be removed for use in remedial planning, and additional sampling is proposed in these areas.

## 2.2 EVALUATION OF MIGRATION PATHWAYS

Migration pathways are the means by which chemicals can move in the environment, including surface water transport, downward movement to subsurface soil, or air/wind dispersion. Migration pathways are evaluated to answer several questions:

- Where could potentially contaminated soil migrate via surface water flow?
- Where could contaminants migrate in subsurface soils? Could groundwater be affected by the soil contamination?
- Were chemicals potentially released into the air, dispersed by wind and deposited in surrounding areas at concentrations exceeding ISLs?

The topographic and surface water flow data in the GIS is used to identify surface water pathways from potential contamination sources. Prior data for those pathways will be evaluated as to adequacy for addressing contaminant migration. If additional data are needed to define the



extent of chemicals moved by surface water, downward migration in the subsurface, or to assess air dispersion, sampling locations are proposed for the migration pathways.

This data gap analysis identifies previous soil sampling locations or features where there may be outstanding groundwater investigation program data needs. At these features, the data gap analysis is evaluating the adequacy of existing soil sampling results to assess potential migration of contaminants to groundwater, and proposing additional soil sampling to the top of bedrock if gaps are identified.

### **2.3 HISTORIC AND SITE SURVEY INFORMATION REVIEWS**

The data gap analysis also addresses potential sources of contamination not covered by prior sampling events. Historical survey and site operational information for Area IV is represented in GIS and viewed in context of previous sampling results. Historical and site survey information will be used to answer two questions:

- Are there any potential chemical use/release features that have not been sampled?
- If a potential chemical use area has already been sampled (but not for all chemicals potentially used), are additional samples/analyses needed to complete characterization?

A checklist has been developed that is reviewed along with the chemical data to ensure that features not covered by RFI or Phase 1 co-located sampling are addressed. The checklist includes the results of the historical site assessment (HSA) conducted by Sapere (2005), recent site operational and aerial photographic information compiled for the RFI, and the recent HSA completed by EPA (HGL, 2012). The “lines of evidence” reviewed as part of the checklist are published in the Master Phase 3 Work Plan Table 2-2, and provided herein (Table 4) for how they were applied in Subarea 5B.

Site information includes various site features or survey information that is displayed in GIS using a common coordinate system (similar to latitude and longitude). Tanks, buildings, leach fields, geophysical survey results, historical aerial photos, storage areas, debris/disposal areas, identified chemical use areas, and surface water flow paths are examples of site information/features used to identify potential data gaps and proposed sampling locations. Site information is shown as layers in GIS that can be displayed individually or combined with sampling results. The site information features, compiled from historical documents, aerial photo review, and site surveys are evaluated using existing data to assess the completeness of characterization. If gaps are identified (e.g., a storage area not previously sampled), sampling is proposed with the analytical suites developed based on surrounding site operational uses and existing sample result exceedances.

In addition to site historical use or survey information, soil borings and trench logs are reviewed to identify relevant soil conditions (e.g., debris, staining, bedrock depth) since unique soil characteristics may also guide proposed sampling intervals. For example, sampling may be proposed both within and below stained horizons, or in another case, both within fill materials and below fill materials in underlying native soils. In both of these cases, sampling is needed below a potential contamination zone to identify how far contamination has migrated downward.

Data gaps associated with some historical operational use features are not addressed in this Data Gap TM but will be included in future documents. Historical operational use features not addressed in this plan include the Area IV sewer system, the natural gas pipelines within Area IV, and features within existing Area IV buildings. Data gaps associated with the sewer system and natural gas pipelines are being evaluated for these systems as a whole, and will be addressed in a separate Data Gap TM. Where applicable, sampling is proposed in this TM where sewer pipelines leave former or existing buildings since these are considered site-specific sampling features. Data gaps associated with existing buildings are being evaluated as part of this process, but sampling requirements within or below existing buildings will be detailed in forthcoming demolition plans since that work will proceed under a different schedule and process.

## **2.4 DATA GAP ANALYSIS PROCESS SUMMARY**

Using the evaluation components discussed in Sections 2.1 through 2.3 above, a systematic process is being used during data gap analysis to ensure available information from multiple sources is considered during data gap review. Thus, combining data gap recommendations from the three evaluation components (data screening evaluations, migration pathway evaluations, and historical document/site survey reviews), sampling is proposed for the evaluated subarea.

The outcome of the data gap analysis process is the identification of soil sampling requirements for Phase 3, including rationale for Phase 3 samples, their locations, depths, and proposed analytical suites. Both soil and soil vapor sampling for chemicals in Phase 3 are proposed in this TM ('soil' sampling is often referred to as 'soil matrix' sampling to distinguish it from soil vapor sampling). Soil matrix and soil vapor media provide different types of chemical data for remedial planning purposes. Soil vapor sampling is preferred to assess the potential release of solvents, which contain VOCs. Since VOCs are highly volatile, they are best evaluated in soil vapor samples, not soil matrix. Therefore, soil vapor sampling is proposed in this TM to evaluate locations where solvents may have been used, stored, or released, or to step-out around previous detections of VOCs above ISLs. Soil vapor sampling is also proposed to provide VOC data over larger areas to evaluate potential solvent release locations when historical operations are uncertain (e.g., large storage areas), or to assess vapor transport from an underlying groundwater plume.



The analytical parameters proposed for step-out or step-down sampling locations are based both on what the prior data indicate are chemicals of potential concern for the location, in conjunction with data needs identified based on review of migration pathways and other lines of evidence. Proposed sample spacing is based on the types of operations and releases, the magnitude and gradients of nearby sampling results, and site conditions (e.g., depth of soil, proximity of bedrock outcrops). Generally, samples are located with a 25 to 100 foot spacing laterally, and at 0.5-, 5-, and 10-foot depth intervals vertically. In many cases the deepest samples will be placed on 'hold' by the laboratory, and analyzed if elevated results are detected in the shallower samples. In special cases, sampling is proposed at shallower depths (e.g., 2 feet) to assess potentially more limited downward migration of large organic molecules like PCBs, dioxins, or PAHs.

The data gap analysis also identifies additional investigation techniques for some areas to aid in selection of sampling locations. The additional investigation techniques can include trenching or test pit excavation to observe soil conditions prior to sampling, or geophysical surveying of areas to identify targeted features, such as pipelines, underground storage tanks, or fill areas. In some cases, field reconnaissance or mapping is needed to refine proposed sampling locations, such as along drainages. The sampling rationales included in this Data Gap TM specify these additional investigative techniques where applicable.

The data gap analysis can identify future sampling locations outside of the subarea being evaluated. These future locations are displayed with pink '+' symbols on Figures 1 and 2. In some cases, the samples are located outside of Area IV and will require additional surveys and coordination prior to sampling. In other cases, the proposed samples are within another subarea, and will be included in the corresponding Data Gap TM.

The information presented in this Data Gap TM, along with supporting GIS and analytical information, is reviewed with DTSC during the data gap process and with interested stakeholders at the end of the data gap process. Input received from DTSC during review and from the public during meetings is incorporated into the proposed sampling included in this Data Gap TM.

### **3.0 SUBAREA 5B DATA GAP ANALYSIS**

The data gap analysis for Subarea 5B was performed following the process outlined above and using the DQOs presented in Section 4 of the MFSP (CDM, 2012b). The proposed sampling for this subarea is presented in Tables 1 (Soil Matrix), 2 (Soil Vapor), and 3 (Future), and Figures 1 (5B North), 2 (5B South), 3 (Soil Vapor), and 4 (Geophysical Survey Areas). Table 4 presents the lines of evidence evaluation summary for this subarea, with checkmarks indicating what information resulted in proposed data gap samples.



As part of the Subarea 5B data gap analysis, some areas were identified where the DQOs were uniquely applied, or where specific sampling approaches have been recommended. These are briefly described below. More detailed, sample-specific rationales for these (and all) areas are provided in Tables 1 through 3.

- Within and west of the Building 4010 Clearly Contaminated Area, sampling locations are proposed around the clearly contaminated area to define its lateral extent, and three locations are proposed within the area to complete definition of the vertical extent of contamination. To the west of the clearly contaminated area, representative sampling of a fill area (identified by boring log information and coincident with EPA geophysical anomalies) is proposed to characterize the fill material and define the extent of chemical concentrations previously detected above ISLs in this area. Trenching is also proposed to investigate soil conditions at the former B4010 Leach Field and tank pit locations.
- At the Sodium Component Test Installation and Kalina Complex Areas, proposed sample analysis includes corrosion inhibitor chemicals since these areas were used for steam power generation with numerous locations or facilities that used or stored cooling water. Potential corrosion inhibitor chemicals include hexavalent chromium, arsenic, hydrazine, and morpholine. Since hydrazine breaks down rapidly in the environment, sample analysis for the breakdown products n-Nitrosodimethylamine (NDMA) and formaldehyde are included in the analysis plan. Morpholine is not a typical laboratory analyte and will be identified if present as a tentatively identified compound (TIC). Additionally, trenching is proposed to assess potential liquid collection and conveyance features in each of these areas (i.e., 5B\_DG-597, 5B\_DG-598, 5B\_DG-616).
- At the Hazardous Materials Storage Area (HMSA) Building 4457 former sump locations, sampling is proposed to address elevated reporting limits in previous PCB results and to complete characterization of the soil beneath these features for metals and chemicals used as corrosion inhibitors. As described below, VOC analysis is also proposed at the top of bedrock and in soil vapor at the former sumps to evaluate the potential of these features serving as input location for groundwater contamination.
- At the Building 4005/4006 and Building 4011 Leach Fields, sufficient previous sampling was conducted within the leach fields to characterize soil conditions to the top of bedrock, so no additional sampling is proposed within the footprints of these features. However, lateral sampling is proposed around each of the former leach fields. At the Building 4011 Leach Field, sampling is proposed to delineate the extent of the clearly contaminated area, including that potentially associated with surrounding fill soil (see below). At the Building 4005/4006 Leach Field, sampling is proposed around the south of the leach field to assess the potential lateral migration of leachate.

- At Buildings 4007 and 4008, soil vapor sampling is not proposed since previous trenching/sampling in the area indicates that the soils are less than 5 feet thick (the minimum required for soil vapor sampling). VOCs are included in the soil matrix sampling analytical suite to assess potential solvent releases at these buildings.
- At representative geophysical terrain conductivity anomaly locations, investigation using test pits are proposed to evaluate potential subsurface features associated with each anomaly and to inspect soil conditions prior to collecting a soil sample (e.g., 5B\_DG-628, 5B\_DG-693, 5B\_DG-695).
- Within and adjacent to the 17<sup>th</sup> Street Pond and Drainage Clearly Contaminated Area, lateral step-out sampling is proposed to define the extent of contamination surrounding the former pond. Deeper sampling in the upstream drainages of the contamination area is proposed to determine the depth of impacts; deeper samples in the pond area are not proposed since previous sampling information is sufficient to assess vertical extent of soil contamination. Future sampling is proposed south of the contamination area within Area III to assess downslope contamination (5B\_DG-793, 5B\_DG-795, and 5B\_DG-798).
- West of the 17<sup>th</sup> Street Pond and Drainage Clearly Contaminated Area, a fill area was identified by EPA and additional sampling is proposed to characterize its extent south of G Street and toward the Environmental Effects Laboratory (EEL) and coincident with the B4011 Leach Field clearly contaminated area. Trenching is proposed to observe soil conditions and fill depth in the area (e.g., 5B\_DG-739, 5B\_DG-741, and 5B\_DG-810).
- At the EEL Area, sampling is proposed within the former building footprint and at site features including former tanks, a transformer, and chemical storage area. Future sampling is also proposed in Area III south and downslope of the chemical storage pad to characterize potential chemical release (5B\_DG-814).
- Historical drainages in Subarea 5B are proposed for sampling based on aerial photograph review. These unlined drainage ditches occur along G Street, F Street, and 17<sup>th</sup> Street (adjacent to B4007 and B4008), and along 20<sup>th</sup> Street (at the western boundary of Subarea 5B).
- Sampling to address potential impacts to groundwater is proposed at several locations (listed below and shown on Figure 3). Proposed sampling at these locations includes vertical sampling to top of bedrock (including VOC analysis in the deepest samples collected) and soil vapor sampling. In addition, further evaluation by the groundwater team is recommended for mobile chemicals detected in soil, including VOCs, perchlorate, hexavalent chromium, nitrate, and NDMA in the vicinity of these features. Since some of these mobile chemicals are being evaluated as part of the DTSC background study, characterization of these constituents may be completed after



background is established. The identified potential groundwater input features/locations identified in Subarea 5B are:

- Building 4019 Reactor Pit and Holdup Tank
- Building 4010 Leach Field
- Building 4010 Subsurface Reactor Features (including reactor pit, secondary equipment pit, and drain system sump)
- Building 4356 Below-Grade Tanks
- HMSA Building 4457 Sumps
- Potentially Saturated Area south of the Kalina Complex
- Building 4005/4006 Leach Field
- Building 4011 Leach Field
- 17<sup>th</sup> Street Pond and Drainage

#### **4.0 REFERENCES**

- CDM Smith. 2012a. Work Plan for Chemical Data Gap Investigation, Phase 3 Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California. April.
- CDM Smith. 2012b. Master Field Sampling Plan for Chemical Data Gap Investigation Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California. April.
- Hydrogeologic, Inc. (HGL) 2012. Draft Final Historic Site Assessment Santa Susana Field Laboratory Site Area IV Radiological Study, Ventura County, California.

## TABLES



Table 1  
Subarea 5B Phase 3 Proposed Soil Sample Locations  
(1 of 19)

Location ID <sup>1</sup>		Area	Location Description	Sample Type	Depth (ft bgs)	Analytical Method															Data Cap Checklist <sup>2</sup>	Rationale / Comments <sup>3</sup>
						PAHs (EPA Method 8270C (ISM))	PCBs / PCBs (EPA Method 8082)	Diorganochlorines (EPA Method 1631)	Metals (EPA Methods 6010B,6010C (9091/6010A/7171A/7171B))	Mercury (EPA Method 771A)	Cu/Pb (EPA Method 7196A)	Chromium (EPA Method 8015B)	Aluminum (EPA Method 8015B)	Emergent (EPA Method 8330A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Formaldehyde (EPA Method 815A)	VOCs (SV) (EPA Method 8260B)	VOCs (NM) (EPA Method 8260B)	Morpholine (EPA Method 8260 TIC)		
5B_DG-501A	B4019 Area	Transformer 4719 North of Building 4019	Soil Boring	0.5	N																Previous sample was a composite of four discrete samples with ND result. Transformation in Area IV with previous ND results are being resampled with discrete samples. Recollect samples at four former discrete locations and analyze each sample for PCBs, hold deep sample pending shallow results	
5B_DG-501B	B4019 Area	Transformer 4719 North of Building 4019	Soil Boring	0.5	X	H																
5B_DG-501C	B4019 Area	Transformer 4719 North of Building 4019	Soil Boring	0.5	X																	
5B_DG-501D	B4019 Area	Transformer 4719 North of Building 4019	Soil Boring	0.5	X																	
5B_DG-502	B4019 Area	Waste Holding Tank South of Building 4019	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Target waste holding tank associated with B4019 sanitary sewer line (identified in EPA USAS). Analyze all samples due to potential release at depth, collect deepest sample just above bedrock and analyze for full suite plan VOCs (SV) to evaluate potential migration to groundwater.	
5B_DG-505	B4019 Area	Around Northwest of Building 4013	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Location targets sanitary with unknown operations (1977 assets). Analyze for formaldehyde based on detection in the area. Hold 10 foot sample pending shallow results.	
5B_DG-506	B4019 Area	Northeast of Building 4019	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Representative location for open storage and also targets the roll up area on the northern side of B4019. Analyze for formaldehyde based on detection in the area. Hold 10 foot sample pending shallow results.	
5B_DG-507	B4019 Area	West of Building 4019	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Representative of operational area adjacent to B4019 (USAS recommended additional characterization in area) for formaldehyde analyzed since detected in area. Hold 10 ft. sample pending shallow results since, assessing potential surface release.	
5B_DG-508	B4019 Area	East of Building 4019	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Representative of operational area adjacent to B4019 (USAS recommended additional characterization in area) Also a report for TPH at SL-2411-S-53B. Formaldehyde analyzed since detected in area. Hold 10 ft. sample pending shallow results since assessing potential surface release.	
5B_DG-509	B4019 Area	South of Building 4019	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Stepout to delineate impact of PAHs and TPH in SL-204-S-53B and TPH in area of SL-204-S-53B to SL-2411-S-53B. Analyze at depth based on elevated TPH (-) in SL-204-S-53B at depth in adjacent samples.	
5B_DG-510	B4019 Area	Sewer Line East West Side of Building 4013	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Target sewer line cut from building, analyze 5 foot sample and hold 10 foot sample. Analyze for morpholine and formaldehyde to characterize area for potential releases from 25-gallon USTs that do not have documented locations in Sluiceway Tank X1.	
5B_DG-511	B4019 Area	Tank Northwest of Building 4013	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Target open storage area near unknown tank. Hold 10' sample pending surface and 5' sample results. Analyze for formaldehyde based on detection in the area.	
5B_DG-515A	B4019 Area	North of B4013	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Previous sample was a composite of four discrete samples with ND result. Transformation in Area IV with previous ND results are being resampled with discrete samples. Recollect samples at four former discrete locations and analyze each sample for PCBs, hold deep sample pending shallow results.	
5B_DG-515B	B4019 Area	North of B4013	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
5B_DG-515C	B4019 Area	North of B4013	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
5B_DG-515D	B4019 Area	North of B4013	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
5B_DG-516	B4019 Area	West side of B4010	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Collect sample at SL-204-S-53B to confirm previous perchlorate detection at 0.5 feet. Hold deeper sample pending shallow results.	
5B_DG-517	B4019 Area	South of B4010	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Collect sample at SL-204-S-53B to confirm previous perchlorate detection at 0.5 feet. Hold deeper sample pending shallow results.	
5B_DG-519	B4019 Area	Building 4013	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Target former building to complete representative sampling based on previous sample spacing, elevated TPH and PAHs, low level (-) ISL + PCBs. Analyze for morpholine and formaldehyde to characterize area for potential releases from 25-gallon USTs that do not have documented locations in Sluiceway Tank X1.	
5B_DG-520	B4019 Area	Building 4013	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Same as 5B_DG-519	
5B_DG-521	B4019 Area	Southern Ramp on East Side of Building 4013	Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Location target southern ramp along east side of B4013. Hold 10 foot sample pending shallow results.	





Table 1  
Subarea 5B Phase 3 Proposed Soil Sample Locations  
(3 of 19)

Location ID <sup>1</sup>		Area	Location Description	Sample Type	Depth (ft. bgs)	Analytical Method																	Remarks / Comments <sup>2</sup>				
						PALIS (EPA Method 8270C (SAM))	PCRB / PCBs (EPA Method 8082)	Polynuclear Aromatics (EPA Method 8163)	Metals (EPA Methods 6010B/6010C / 6020/6030/7471A/7471B)	Mercury (EPA Method 771A)	Cr(VI) (EPA Method 7196A)	Cyanide (EPA Method 8015B)	Alcohols (EPA Method 8015B)	Organics (EPA Method 8310A)	Perchlorate (EPA Method 6850/6900)	TPII (EPA Method 8015B)	Formaldehyde (EPA Method 815A)	VOCs (SV) (EPA Method 8260B)	VOCs (GM) (EPA Method 8260B)	Morpholine (EPA Method 8260 TIC)	Perchlorates (EPA Method 8081)	Herbicides (EPA Method 815A)	HL (EPA Method 9045C)	Soil Moisture (ASTM D2216 / EPA Method 1603)	Data Gap Checklist <sup>3</sup>		
5B_D05-533	B4010 Area	B4012		Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Same as 5B_D05-536		
5B_D05-534	B4010 Area	East of Building 4012		Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Same as 5B_D05-536 defining fill potential contamination to northeast.		
				Soil Boring	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
5B_D05-535	B4010 Area	B4012		Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Same as 5B_D05-536. Also defines northern extent of fill contamination.		
5B_D05-536	B4010 Area	Storage Area North of Building 4012		Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Location target open storage area and provide a deposit for PCBs at 5B-D05-536. Hold 1/4 sample pending shallow results to assess potential surface release. Formaldehyde and morpholine analyzed based on nearby formaldehyde detection and cooling tower operations (all Cr +6 - NSLs in B4010 B4012 area).		
5B_D05-537	B4010 Area	Northeast of Building 4012		Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Location target wetland area. Hold 10 foot sample pending shallow results to assess potential surface release. Formaldehyde and morpholine analyzed based on nearby formaldehyde detection and cooling tower operations (all Cr +6 - NSLs in B4010 B4012 area).		
5B_D05-538	B4010 Area	Unidentified Structure Northwest of Building 4710		Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Location target industrial structure observed in 1988, 1990, and 1995 aerial photographs. Hold 10 foot sample pending shallow results to assess potential surface release. Formaldehyde and morpholine analyzed based on nearby formaldehyde detection and cooling tower operations (all Cr +6 - NSLs in B4010 B4012 area).		
5B_D05-539	B4010 Area	Tank Northwest of Building 4710		Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Target operations and possible storage near AST (hydrochloric acid). Hold 10 foot sample pending shallow results to assess potential surface release. If evidence of fill encountered, analyze 10 foot sample. Formaldehyde and morpholine analyzed based on nearby formaldehyde detection and cooling tower operations (all Cr +6 - NSLs in B4010 B4012 area).		
5B_D05-540	B4010 Area	Building 4710		Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Stepout to delineate identified contamination area for PAFs, PCBs, dioxins, metals, TPII and corrosion inhibitor suite. Analyze at depth due to detections in adjacent fill contaminated area.		
5B_D05-541	B4010 Area	B4012		Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Stepout to delineate fill presence between two fill areas and delineate dioxins. TPII and metals at 5B-D05-539. Analyze at depth due to detections in adjacent fill contaminated area. Results to be used to determine if there is a need for nearby formaldehyde detection and cooling tower operations (all Cr +6 - NSLs in B4010 B4012 area).		
5B_D05-542	B4010 Area	Building 4710		Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Stepout to delineate PAFs, PCBs, dioxins, metals, TPII at depth (0.250-538) analyzed at 0.5 ft. only) and the western extent of the identified contamination area (evaluates fill presence and contamination between the two fill areas). Analyze at depth due to detections in adjacent sample along mapped septic line and potential for soil movement and former presence of deep features (e.g., vaults).		
5B_D05-543	B4010 Area	Building 4710		Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Stepdown to delineate depth of identified contamination. Targets below most elevated dioxin for full chemical suite, low level perchlorate analyzer to confirm precision detection. 10-foot sample targets native soil beneath fill and fill native soil above bedrock, to evaluate depth partitioning and maximum impacts above bedrock.		
5B_D05-544	B4010 Area	South of Building 4710		Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Stepout to delineate identified contamination area for PAFs, PCBs, dioxins, metals, TPII and corrosion inhibitor suite. Analyze at depth due to detections in adjacent fill contaminated area.		
5B_D05-545	B4010 Area	Southeast of Building 4710		Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Stepout to delineate identified contamination area for PAFs, PCBs, dioxins, metals, TPII and corrosion inhibitor suite. Analyze at depth due to detections in adjacent fill contaminated area.		
5B_D05-546	B4010 Area	Transformer southeast of Building 4710		Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Stepout to delineate identified contamination area for PAFs, PCBs, dioxins, metals, TPII and corrosion inhibitor suite. Analyze at depth due to detections in adjacent fill contaminated area.		
5B_D05-547	B4010 Area	Transformer southeast of Building 4710		Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Address previous ND result in transformer composite sample. Recollect sample at former discrete location and analyze for PCBs, hold deep sample pending shallow results. Fill not anticipated based on nearby shallow result (1.5 ft. bgs).		
5B_D05-548	B4010 Area	Transformer southeast of Building 4710		Soil Boring	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Stepout for PCB detections - NSLs at 5B-D05-548. Fill not anticipated based on nearby shallow result (1.5 ft. bgs).		

Table 1  
Subarea 5B Phase 3 Proposed Soil Sample Locations  
(4 of 19)

Location ID <sup>1</sup>		Area	Location Description	Sample Type	Depth (ft. bgs)	Analytical Method																Data Gap Checklist <sup>2</sup>	Remarks / Comments <sup>4</sup>		
						PAHs (EPA Method 8700 (ISM))	PCBs / PCBs (EPA Method 8082)	BTEX (EPA Method 1631)	Mercury (EPA Methods 6010/6010C/6020/6020A/7171A/7171B)	COT/D (EPA Method 7196A)	Chloride (EPA Method 8015B)	Nitrate (EPA Method 8015B)	Perchlorate (EPA Method 8330A)	Feedwater (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Formaldehyde (EPA Method 8315A)	VOCs (SV) (EPA Method 8260B)	VOCs (SM) (EPA Method 8260B)	Morpholine (EPA Method 8360 TIC)	Phenols (EPA Method 8081)	Herbicides (EPA Method 8151A)	Oil (EPA Method 9045C)	Sub Micron (ASTM D2120/EPA Method 1603)		
5B_DJ4549	B4010 Area		East Building 4710	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Stepout to delineate identified contamination area for PAHs, PCBs, dioxins, metals, TPH and corrosion inhibitor suite. Analyze at depth due to detections in adjacent fill contaminated area.	
5B_DJ4550	B4010 Area		Waste Holding Tank East of B4010	Soil Boring	10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Stepdown to delineate depth of identified contamination area. Specifically targets former Waste Holding Tank however representative of deep impact in excavation fill area. 10 and 15 foot samples target native soil beneath fill and fill native soil above bedrock, to evaluate depth penetration and maximum impacts above bedrock.	
5B_DJ4551	B4010 Area		Building 4710	Soil Boring	15	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Stepdown to delineate depth of identified contamination area. Specifically targets former UST however representative of deep impact in excavation fill area. 10 and 15 foot samples target native soil beneath fill and fill native soil above bedrock, to evaluate depth penetration and maximum impacts above bedrock.	
5B_DJ4552	B4010 Area		East of Building 4710	Soil Boring	15	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Stepout to delineate identified contamination area for PAHs, PCBs, dioxins, metals, TPH and corrosion inhibitor suite. Analyze at depth due to detections in adjacent fill contaminated area.	
5B_DJ4553	B4010 Area		East Building 4710	Soil Boring	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	<b>Note: sample located outside of Subarea 5B boundary (to the north) and in Subarea 7. Included since defining identified Contamination Area in Subarea 5B.</b>	
5B_DJ4554	B4010 Area		East Building 4710	Soil Boring	10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Stepout to delineate identified contamination area for PAHs, PCBs, dioxins, metals, TPH and corrosion inhibitor suite. Analyze at depth due to detection in adjacent fill contaminated area.	
5B_DJ4554	B4010 Area		Rollup Door North of B4025	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Targets driveway at B4025 and linear geophysical anomaly.	✓
5B_DJ4555	B4010 Area		Yard North of Building 4025	Soil Boring	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Targets fence line where open storage was observed in aerial photos. Hold 10 foot sample pending shallow results.	✓
5B_DJ4556	B4010 Area		Yard North of Building 4025	Soil Boring	10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Same as 5B_DJ4555.	✓
5B_DJ4557	B4010 Area		Building 4025	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Targets driveway at B4025 and serves as stepout to delineate PAHs and dioxins in SI-228-SX510. Hold 10 foot sample pending shallow results.	✓
5B_DJ4558	B4010 Area		Yard North of Building 4025	Soil Boring	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Stepout to delineate PAHs and dioxins at SI-228-SX510 and targets driveway to and from B4025. Hold 10 foot sample pending shallow results.	✓
5B_DJ4559	B4010 Area		Building 4025	Soil Boring	10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Stepout for SI-228-SX510 and addresses general operations within former B4025. Hold 10 foot sample pending shallow results.	✓
5B_DJ4560	B4010 Area		UST at Building 4926	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Location targets a Storage Area UST, a support for PAH and dioxins detected at SI-228-SX510, and addresses building operations. Analyze all depths for TPH and hold 10' samples for other chemicals pending shallow results since evaluating potential surface release.	✓
5B_DJ4561	B4010 Area		Building 4025	Soil Boring	10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Targets B4025 equipment pad and open storage identified in aerial photographs (1978, 1980, 1988, 1990). Hold 10 foot sample pending shallow results.	✓
5B_DJ4562	B4010 Area		Southwest Building 4025	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Stepout for Zn detection at US851123. Hold 10 foot pending shallow results.	
5B_DJ4563	B4010 Area		Drainage Swale South of Building 4025	Soil Boring	10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Targets catch basin along north side of R Street that receives surface water from RMHP catch basin. B4025 operations, and potential release dumping from south-side driveway. Hold 10 foot sample pending shallow results since addressing potential surface release.	✓
5B_DJ4564	18NSA		North of Building 4615	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Stepout in drainage to delineate PCBs, PAHs, metals, and dioxins at SI-238-SX510 and overall characterization of potential collective feature for nearby operations. Hold 10 foot sample pending shallow results.	✓
5B_DJ4565	18NSA		East of Building 4478	Soil Boring	10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Location targets open storage observed in aerial photos. Hold 10 foot sample pending shallow results since evaluating potential surface release.	✓
5B_DJ4566	18NSA		East of Building 4478	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Location targets open storage observed in aerial photos, also serves as a support to delineate PAHs and dioxins in SI-407-SX510. Hold 10 foot sample pending shallow results since evaluating potential surface release.	✓





**Table 1**  
**Subarea 5B Phase 3 Proposed Soil Sample Locations**  
**(6 of 19)**

[illegible]





Table 1  
Subarea 5B Phase 3 Proposed Soil Sample Locations  
(8 of 15)

Location ID	Area	Location Description	Sample Type	Depth (ft. bgs)	PAHs (EPA Method 8230C (SM))	PCBs / PCBs (EPA Method 8082)	Dioxin/Furans (EPA Method 1631)	Metals (EPA Methods 6010/6100/6200/7471A/7471B)	Mercury (EPA Method 7471A)	Cyanide (EPA Method 7196A)	Chlorides (EPA Method 8015D)	Microb (EPA Method 8015D)	Enrichment (EPA Method 830A)	Pesticides (EPA Method 6850/6860)	TPH (EPA Method 8015D)	Formaldehyde (EPA Method 815A)	VOCs (SV) (EPA Method 8260B)	VOCs (SV) (EPA Method 8260B)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 815A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 1603)	Data Gap Checklist		Rationale / Comments*
5B_DG-618	Kalina Complex	Yard Southeast of Building 4352	Soil Boring	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	Targeted potential surface release associated with storage in fenced area adjacent to B4352 and unidentified feature. Samples associated with existing lower operations since associated with SCTL Kalina Complex. Hold 10 foot sample pending shallow results.		
5B_DG-619	Kalina Complex	Southwest of Building 4352	Soil Boring	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	Representative sampling in operational area (RFI chemical use area) include chemicals associated with existing lower operations. Also serve as support for PAHs and dioxin/furans at SI-105-5/5B. Hold 10 foot sample pending shallow results.		
5B_DG-620	Kalina Complex	Storage Area North of B4355	Soil Boring	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	Same as 5B_DG-615, also targets alcohol tanks.		
5B_DG-621	Kalina Complex	South of Building 4355	Soil Boring	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	Same as 5B_DG-622 and within RFI chemical use area.		
5B_DG-622	Kalina Complex	Southwest of Building 4355	Soil Boring	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	Support of PAHs and dioxin at SI-245-5/5B, delineates southern extent of storage area, and characterization of operational area. Hold 10 foot sample pending shallow results.		
5B_DG-623	Kalina Complex	Tank South of Building 4355	Soil Boring	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	Location addresses general area operations (within RFI chemical use area) and is adjacent to ammonia tank. Hold 10 foot sample pending shallow results.		
5B_DG-624	Kalina Complex	Southwest of Building 4354	Soil Boring	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	Representative sampling of operational area and support for dioxin at SI-240-5/5B. Analyze for general site and existing lower chemicals. Hold 10 foot sample pending shallow results since addressing potential for surface release.		
5B_DG-625	Kalina Complex	Southwest of Building 4354	Soil Boring	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	Same as 5B_DG-624.		
5B_DG-626	Kalina Complex	Southwest of Building 4354	Soil Boring	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	Same as 5B_DG-624 and within RFI chemical use area.		
5B_DG-627	Kalina Complex	Lab Oil Tank within Building 4354	Soil Boring	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	Location targets an F799/Blue ANI container T531 site, Oil (water cell). Analyze sample at 0.5 and 5 feet due to potential for substantial surface release. Hold 10 foot sample pending shallow results.		
5B_DG-628	Kalina Complex	Building 4354	Test Pit	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	Representative characterization of operational area (RFI chemical use area) and area of geophysical anomalies. Analyze for pit to investigate geophysical anomalies (signs of fill, piping, etc.). Analyze for general and existing lower sites. Hold 10 foot sample pending shallow results since addressing potential surface release.		
5B_DG-629	Kalina Complex	Building 4354	Soil Boring	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	Representative characterization of operational area (RFI chemical use area). Analyze for general and existing lower sites. Hold 10 foot sample pending shallow results since addressing potential surface release.		
5B_DG-630	Kalina Complex	Building 4354	Soil Boring	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	Same as 5B_DG-629.		
5B_DG-631	SCTL	Tank Southwest of Building 4352	Soil Boring	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	Targeted unknown ANI and linear bottom conductivity anomaly. Hold 10 foot sample pending shallow results.		
5B_DG-632	SCTL	South of B4326	Trench	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	Soil having targeted intersection of two linear bottom conductivity anomalies. Hold 10 foot sample pending shallow results. Excavate trench approximately 20 feet to the southeast to investigate potential dump location. Collected sample of fill, sludge, or other impacts observed.		
5B_DG-633	SCTL	Yard East of Building 4352	Soil Boring	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	Targeted potential surface release associated with storage in fenced area east of B4352. Analyze for chemicals associated with existing lower operations since associated with SCTL Kalina Complex. Hold 10 foot sample pending shallow results.		
5B_DG-634	SCTL	Building 4356	Soil Boring	0.5 5 10	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	One of eight representative locations for B4356 fill area (see description for 5B_DG-641).		









**Table 1**  
**Subarea 5B Phase 3 Proposed Soil Sample Locations**  
**(11 of 19)**

Location ID <sup>1</sup>	Area	Location Description	Sample Type	Depth (ft deep)	Analytical Method																	Data Gap Checklist <sup>2</sup>	Narrative / Comments <sup>4</sup>
					PAHs (EPA Method 8210C (SM))	PCBs / PCTs (EPA Method 8082)	Disinfectants (EPA Method 1615)	Metals (EPA Methods 6010B/6010C / 6020/6030/4713/4717B)	Cyanide (EPA Method 7196A)	Glycine (EPA Method 8015B)	Acetone (EPA Method 8015B)	Kinetics (EPA Method 833A)	Pesticides (EPA Method 8260)	Terrestrial (EPA Method 8015B)	VOCs (SV) (EPA Method 8260B)	VOCs (SW) (EPA Method 8260B)	Morpholine (EPA Method 8260 TTC)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	TEH (EPA Method 9045C)	Soil Moisture (ASTM D2216 EPA Method 160.3)		
5H_DJ-671	SC-TL	"Premixed Slump" West of Building 4006	Soil Boring	10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Stepdown for TPH and metals at depth as SI-J04-S55SH based on previous detection at 8 feet. Collect and analyze sample at 10 feet, 15 foot sample target just above bedrock.			
5H_DJ-672	SC-TL	Slump East from SW Building 4006	Soil Boring	10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Target vector line east from building, analyze 5 foot sample and hold 10 foot sample			
5H_DJ-673A	SC-TL	Substation 4067	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Previous sample was a composite of four discrete samples with detect - ISI - A. Recombine with discrete samples; re-collect samples at four former discrete locations and analyze each sample for PCBs, hold deep samples pending shallow results			
5H_DJ-673B	SC-TL	Substation 4067	Soil Boring	3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5H_DJ-673 also serves as a stepout for TPH and metals at PUHS1066. Analyze 3 foot sample at this location.			
5H_DJ-673C	SC-TL	Substation 4067	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5H_DJ-676 also serves as a stepout for metals and disocent at SI-J04-S55SB. Analyze 3 foot sample at this location.			
5H_DJ-673D	SC-TL	Substation 4067	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Stepout PCBs, disocent, PAHs, and metals at SI-J04-S55SH. Also representative of operational area. Hold 10 foot sample pending shallow results			
5H_DJ-677	SC-TL	West of Building 4816	Soil Boring	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Stepout PCBs, disocent, PAHs, and metals at SI-J04-S55SH. Hold deep samples pending shallow results since no detects at depth above ISI at adjacent samples.			
5H_DJ-678	SC-TL	West of Building 4816	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Stepout for disocent at SI-J04-S55SH and PCBs, PAHs, and metals and disocent at SI-J04-S55SH; also targets former cooling tower. Hold deep samples pending shallow results since no detects above ISI at depth at adjacent samples.			
5H_DJ-679	SC-TL	West of Building 4816	Soil Boring	10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Target J074 identified as the PowerPak Interconnecting facility. Also stepout for PUHS1029. Analyze for corrosion inhibitors since associated with cooling tower operations. Hold deep pending shallow results to evaluate potential for surface release. Note: Feature was identified during previous investigation as a potential source of contamination, but no further investigation was conducted due to the fact that the feature was not a discrete. PCBs included in analysis to address uncertainty.			
5H_DJ-680	SC-TL	Building 4714	Test Pit	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Stepout to delineate disocent at SI-J04-S55SH. Also targets former cooling tower and representative of general operation area. Hold 10 foot sample pending shallow results.			
5H_DJ-681	SC-TL	Building 4616	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Stepout to delineate disocent at SI-J04-S55SH. Also targets former cooling tower and representative of general operation area. Hold 10 foot sample pending shallow results.			
5H_DJ-682	SC-TL	Building 4402	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Target J14402 (MHD Equipment Building). Cooling tower site added based on surrounding operations.			
5H_DJ-683	SC-TL	Building 4607	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Target H4077 which was also identified as "Sodium Lab Instrument Building" and later used for storage. Location also addresses potential storage tank identified during JPA18NA, as well as general operations in yard. Cooling tower site added based on surrounding operations.			
5H_DJ-684	SC-TL	Operational Area East of B4016 (South of Building 4006)	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Same as 5H_DJ-685. Location also targets steam identified in EPA18NA.			
5H_DJ-685	SC-TL	Operational Area East of B4016 (South of Building 4006)	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	One of four representative samples in operational area east of B4016, also serves as a stepout for metals at PUHS104. Cooling tower (corrosion inhibitor) site added based on surrounding operations. Hold 10 foot samples pending shallow results.			
5H_DJ-686	SC-TL	East of Building 4006	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Location targets a 1000-gallon diesel TST and provides representative characterization at surface. Collect samples in bedrock due to tank size; hold samples deeper than 10 feet pending shallow results or analyze if impacts noted above bedrock.			
5H_DJ-687	SC-TL	Operational Area East of B4016 (South of Building 4006)	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Same as 5H_DJ-685			
5H_DJ-688	SC-TL	Operational Area East of B4016 (South of Building 4006)	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Same as 5H_DJ-685, also delineates northwestern extent of identified contamination area at 17th Street Drainage			
5H_DJ-689	SC-TL	17th Street Drainage	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Stepdown to characterize change at depth (previous samples shallow)			
5H_DJ-690	HMSA	South of B4357	Test Pit	10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Exploratory test pit targets linear terrain conductivity by anomaly, adjust sample depths based on field observations.			

Table 1  
Subarea 5B Phase 3 Proposed Soil Sample Locations  
(12 of 19)

Location ID	Area	Location Description	Sample Type	Depth (ft. bgs)	Analytical Method															Data Gap Checklist	Reference / Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
					Ratio (EPA Method 8210C (SM))	IRB / PCBs (EPA Method 8082)	Polynuclear Aromatics (EPA Method 8163)	Metals (EPA Methods 6010/6010C / 6020/6020A/711A/741B)	Mercury (EPA Method 771A)	Cyanide (EPA Method 719A)	Chloride (EPA Method 8015B)	Asbestos (EPA Method 8015B)	Enrichment (EPA Method 8300A)	Pesticides (EPA Method 8300B)	Formaldehyde (EPA Method 8315A)	VOCs (SV) (EPA Method 8360B)	VOCs (GB) (EPA Method 8360B)	Morpholine (EPA Method 8360B)	Pesticides (EPA Method 8081)			Herbicides (EPA Method 8151A)	Soil Moisture (KISTM D2116/ EPA Method 1603)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
5B_DJ-001	B4011 Area	Open Area South of 20th Street, PowerPak Interconnecting Facility	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Same as 5B_DJ-043																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
5B_DJ-002	B4011 Area	South of B4026	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N





Table 1  
Subarea 5B Phase 2 Prepared Soil Sample Locations  
(14 of 19)

Location ID <sup>1</sup>	Area	Location Description	Sample Type	Depth (ft. bgs)	PAHs (EPA Method 8700; ISM1)	Pb, Bi, Cr, Ni	Asbestos (EPA Method 1631)	Metals (EPA Methods 6010/6010C/6020/6020A/71A/71B)	Mercury (EPA Method 7471A)	Cyanide (EPA Method 7196A)	Chloride (EPA Method 8015B)	Methanol (EPA Method 8015B)	Formaldehyde (EPA Method 8330A)	Perchlorate (EPA Method 8850/8860)	TTH (EPA Method 8015B)	Formaldehyde (EPA Method 8315A)	VOCs (SV) (EPA Method 8260B)	VOCs (SV) (EPA Method 8260B)	Methylene Chloride (EPA Method 8260 11C)	Pesticides (EPA Method 8081)	Inhalables (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216; EPA Method 1603)	Data Gap Checklist <sup>2</sup>	Rationale / Comments <sup>3</sup>
5B_D6270	B4011 Area	Open Storage West of B4011	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Same as 5B_D6279
5B_D6271	B4011 Area	20th Street Drainage West of B4011 Storage Yard	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Sample in drainage west of storage yard. Analyze for existing lower unit, since down drainage of SCTL operations and all depths since drainage unlined. Collect deepest sample just above bedrock (shallow soils anticipated).
5B_D6272	B4011 Area	Open Storage West of B4011	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Same as 5B_D6273
5B_D6273	B4011 Area	Storage Area southeast of B4011	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Location targets open storage area
5B_D6274	B4011 Area	B4011 Leach Field Area Along G Street	Soil Boring	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Target area south of G Street, drainage, and adjacent (down) fill area for south for SCTL, down drainage of PCH, down drainage, metals, PAHs. Lead at 128S1002 detected at 60 mg/kg. Field 10 foot samples (if collected, refilled likely) as shallow as 5.5 feet bgs (128S1002) pending shallow results or if fill encountered.
5B_D6275	B4011 Area	B4011 Leach Field Area Along G Street	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Same as 5B_D6274
5B_D6276	B4011 Area	Fill Area F-A-11 West of B4011 Leach Field	Soil Boring	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Target fill area identified in EPA ISX and defines extent of identified contamination area at B4011 Leach Field. Analyze all depths for full chemical suite based on PAHs, dioxins, PCBs and metals detected in fill and unknown source of material. Depth to refilled variable between 6 and 10 feet bgs; collect sample in underlying native soil of discernible and deepest sample just above bedrock.
5B_D6277	B4011 Area	West of Identified Contamination Area (East of B4015 Field)	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Support to west of contaminated area and dioxins at 5B-D6276.
5B_D6278	B4011 Area	Drainage West of B4011	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Location targets drainage within fill area and downsteam of identified contaminated area. Analyze all depths.
5B_D6279	B4011 Area	Fill Area F-A-11 West of B4011 Leach Field	Trench	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Target fill area identified in EPA ISX and defines extent of identified contamination area at B4011 Leach Field. Analyze all depths for full chemical suite based on PAHs, dioxins, PCBs and metals detected in fill and unknown source of material. Depth to refilled variable between 6 and 10 feet bgs; collect sample in underlying native soil of discernible and deepest sample just above bedrock.
5B_D62740	B4011 Area	Fill Area F-A-11 Southeast of B4011 Leach Field	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Target fill and southeast of identified contamination area at B4011 Leach Field as per 5B_D6276.
5B_D62741	B4011 Area	Fill Area F-A-11 East of B4011 Leach Field	Trench	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Same as 5B_D62740
5B_D62742	B4011 Area	Fill Area F-A-11 East of B4011 Leach Field	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Target fill soil east of identified contamination area at B4011 Leach Field as per 5B_D62736.
5B_D62743	B4011 Area	Open Area South of SCTL PowerPak Interconnecting Facility	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Support to delineate dioxins and pesticides detected to the west. Location also provides characterization in open area. Field deep samples pending surface results. Shallow bedrock observed in surrounding samples, collect deepest sample just above bedrock.
5B_D62744	B4011 Area	Open Space South of SCTL PowerPak Interconnecting Facility	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Same as 5B_D62743
5B_D62745	B4011 Area	Open Space South of SCTL PowerPak Interconnecting Facility	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Target open area similar to 5B_D62743.
5B_D62746	B4011 Area	B4014 Transformer Substation	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Collected discrete samples around substation. Analyze full suite since location adjacent to substation support structures, and banded Identified Contamination Area. Analyze sample just above bedrock at depth. Shallow soils anticipated.
5B_D62747	B4011 Area	B4014 Transformer Substation	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Same as 5B_D62746
5B_D62748	B4011 Area	B4014 Transformer Substation	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Collect discrete samples around substation. Field deep samples pending shallow results. Analyze dioxins due to dioxins in adjacent area.
5B_D62749	B4011 Area	B4014 Transformer Substation	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	✓	Same as 5B_D62746



**Table 1**  
**Subarea 5B Phase 3 Proposed Soil Sample Locations**  
**(15 of 19)**

[illegible]

Table 1  
Sahara 5B Phase 3 Proposed Soil Sample Locations  
(16 of 17)

Location ID	Area	Location Description	Sample Type	Depth (ft. lbs)	Analysis Method	Remarks / Comments
5B_D02771	R4007 Area	Storage Area South of Building 4008	Soil Boring	0.5	PAHs (EPA Method 8210C, ESM) / PCBs / PCBs (EPA Method 8082) / BTEX / BTEX (EPA Method 8015B) / Metals (EPA Method 6010B, 6010B-IC, 6020, 6020A, 717A, 717B) / Mercury (EPA Method 7471A) / Cr(VI) (EPA Method 7196A) / Greases (EPA Method 8015B) / Alcohols (EPA Method 8015B) / Pesticides (EPA Method 8200A) / Preservatives (EPA Method 8200A) / TPAH (EPA Method 8015B) / Formaldehyde (EPA Method 8215A) / VOCs (SV) (EPA Method 8260B) / VOCs (SV) (EPA Method 8260B) / Morpholine (EPA Method 8260B) / Pesticides (EPA Method 8081) / Herbicides (EPA Method 8151A) / pH (EPA Method 9045C) / Soil Moisture (ASTM D2216, EPA Method 1603)	Same as 5B_D02769
5B_D02772	R4007 Area	G Street Drainage West of 17th Street	Soil Boring	0.5		Locations target drainage along G Street. Analyze for all chemicals noted at R4007 since location is down-drainage. Deeper sample targets just above bedrock. Analyze all depths since historical drainage was utilized.
5B_D02773	R4007 Area	G Street Drainage West of 17th Street	Soil Boring	10		Same as 5B_D02772
5B_D02774	17th St. Pond	North of Hill Area Along G Street	Soil Boring	0.5		Sample on slope along G Street
5B_D02775	17th St. Pond	North of Hill Area Along G Street	Soil Boring	10		Sample on slope along G Street
5B_D02776	17th St. Pond	North of Hill Area Along G Street	Soil Boring	0.5		Location targets "barrel" feature observed in 1960 aerial photograph and linear and magnetic geophysical anomalies to characterize and for potential pipeline or buried metal
5B_D02777	17th St. Pond	North of 17th Street Pond	Soil Boring	0.5		Location targets "barrel" feature south of G Street observed in 1960 aerial photo (note: photo analysis indicates actual photo date is 1959)
5B_D02778	17th St. Pond	Undefined object south of G Street	Soil Boring	0.5		Stepout on west side of 17th Street Pond Identified Contamination Area drainage (diameter 120 x 50 L and slope below G Street. Refined in bedrock between 2.5 and 5' in nearby borings.
5B_D02779	17th St. Pond	West of 17th St. Pond Identified Contamination Area Drainage South	Soil Boring	0.5		Same as 5B_D02782, west of 17th Street Drainage.
5B_D02780	17th St. Pond	Northwest of 17th St. Pond Identified Contamination Area	Soil Boring	0.5		Stepout representative sample location to characterize open area northeast of Identified Contamination Area (define extent) and stepout for SI-21-5-53H PCBs, dioxins, metals. Analyze all depths. Shallow soil anticipated based on previous sampling.
5B_D02781	17th St. Pond	Northeast of 17th St. Pond Identified Contamination Area	Soil Boring	0.5		Stepout representative sample location to characterize open area northeast of Identified Contamination Area. Shallow soil anticipated based on previous sampling.
5B_D02782	17th St. Pond	Northeast of 17th St. Pond Identified Contamination Area	Soil Boring	0.5		Stepout representative sample location to characterize open area northeast of Identified Contamination Area (define extent), and stepout for SI-21-5-53H P, H, PCB, metal, and dioxin leachates. Analyze all depths. Shallow soil anticipated based on previous sampling.
5B_D02783	17th St. Pond	Northeast of 17th St. Pond Identified Contamination Area	Soil Boring	0.5		Stepout representative sample location to characterize open area northeast of Identified Contamination Area (define extent). Analyze all depths. Shallow soil anticipated based on previous sampling.
5B_D02784	17th St. Pond	Northeast of 17th St. Pond Identified Contamination Area	Soil Boring	0.5		Stepout representative sample location to characterize open area northeast of Identified Contamination Area (define extent) and stepout for SI-21-5-53H PAHs, PCBs, and dioxins. Analyze all depths. Shallow soil anticipated based on previous sampling.
5B_D02785	17th St. Pond	Northeast of 17th St. Pond Identified Contamination Area	Soil Boring	0.5		Stepout representative sample location to characterize open area northeast of Identified Contamination Area (define extent). Analyze all depths. Shallow soil anticipated based on previous sampling.
5B_D02786	17th St. Pond	Area southeast of 17th St. Pond Identified Contamination Area	Soil Boring	0.5		Stepout representative sample location to characterize open area southeast of Identified Contamination Area (define extent) and stepout for dioxins metals both to east and west. Analyze all depths. Shallow soil anticipated based on previous sampling.
5B_D02787	17th St. Pond	Area southeast of 17th St. Pond Identified Contamination Area	Soil Boring	0.5		Same as 5B_D02786
5B_D02788	17th St. Pond	Area southeast of 17th St. Pond Identified Contamination Area	Soil Boring	0.5		Same as 5B_D02786
5B_D02789	17th St. Pond	Area southeast of 17th St. Pond Identified Contamination Area	Soil Boring	0.5		Same as 5B_D02786





Table 1  
Squares 2B Phase 3 Proposed Soil Sample Locations  
(18 of 19)

Location ID <sup>1</sup>	Area	Location Description	Sample Type	Depth (ft. bgs)	PAHs (EPA Method 8700) (SM1)	PCBs / PCBs (EPA Method 8082)	Mercury (EPA Method 7731A)	Cr(VI) (EPA Method 7196A)	Cobalt (EPA Method 8015B)	Aluminum (EPA Method 8015B)	Energy (EPA Method 830A)	Pesticides (EPA Method 6820.6860)	Formaldehyde (EPA Method 8015B)	NOCs (SV) (EPA Method 8315A)	NOCs (SV) (EPA Method 8260B)	Mercury (EPA Method 8260B)	Perchlorate (EPA Method 8260B)	Isobutylbenzene (EPA Method 8081)	Phenols (EPA Method 8151A)	PAHs (EPA Method 9045C)	Soil Moisture (ASTM D2216/EPA Method 1603)	Data Gap Checklist <sup>2</sup>	Remarks / Comments <sup>3</sup>
5B_DG-809A	EEL	Transformer Pad East of Building 2271	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Two samples previously collected at southwest (elevated detector) and northeast (SD with elevated RL) corners of this pad. No samples collected at this location for Area 3. Investigate and define for remedial planning. Hold deep sample pending shallow results.
5B_DG-809B	EEL	Transformer Pad East of Building 2271	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		
5B_DG-809C	EEL	Transformer Pad East of Building 2271	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		
5B_DG-809D	EEL	Transformer Pad East of Building 2271	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		
5B_DG-810	17th St. Road	Fill area West of Identified Contamination Area	Soil Boring	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Stepdown at elevated down location (SL-125555) target fill top of native soil and soil above bedrock as appropriate based on field conditions observed. Deepest sample at 5 feet bgs in previous boring.
5B_DG-811	EEL	East of Building 2271	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Stepdown to characterize potential impacts outside of operational area (chem storage and PCPs at transformer). delineate surficial impacts of PCPs at ELBS16 and assess potential impacts from adjacent reclaimed water spillfields. Refrain depths at surrounding borings range from 3.2 to 7; collect and hold sample at 10' if soil is present.
5B_DG-812	EEL	East of EEL in Reclaimed Water Spillfield	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Target reclaimed water spillfield. Tricouvalent chromium, formaldehyde and perchlorate added for potential presence in reclaimed water. Analyze 5 foot sample since targeting linear geophysical anomaly (potential pipeline). Hold 10 foot sample pending shallow results.
5B_DG-813	EEL	Horizontal Materials Storage Area East of Building 2271	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Horizontal Materials Storage Area, including location observed at 1906-1902 aerial photograph, and potential impacts from reclaimed water spill field. Bedrock in area approximately 7 feet bgs; target deepest sample just above bedrock due to assess potential fluid release and migration along bedrock from HBSA.
5B_DG-815	EEL	Horizontal Materials Storage Area East of Building 2271	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Same as 5B_DG-813.
5B_DG-816	EEL	Horizontal Materials Storage Area East of Building 2271	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Same as 5B_DG-813.
5B_DG-817	EEL	East of Building 2271	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Stepdown to delineate surficial impacts of PCPs at ELBS16, assess EEL operational area and potential impacts from adjacent reclaimed water spillfields. Refrain depth at surrounding borings range from 3.5 to 6.5; collect and hold sample at 10' if soil is present.
5B_DG-818	EEL	Transformer Pad East of Building 2271	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Stepdown sample to characterize potential vertical migration at location of detected PCPs at ELBS16.
5B_DG-819	17th St. Road	Fill Area F-A-11 East of B4011 Leach Field	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Collect sample at SL-187555SB to confirm previous perchlorate detection at 5 feet. Hold 10 foot sample pending shallow results.
5B_DG-820	17th St. Road	Fill Area F-A-11 East of B4011 Leach Field	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Collect sample at SL-190655SB to confirm previous perchlorate detection at 5 feet. Hold 10 foot sample pending shallow results.
5B_DG-821	EEL	East of Building 2271	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Same as 5B_DG-817.
5B_DG-822	EEL	North Wall of B3271	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Target location of compressors and other operational equipment along north wall of B3271.
5B_DG-823	EEL	Operational Area north of Building 2271	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Location impacts operational area north of B3271 and south (downslope) of storage. Analyze fill storage units, since downslope of tanks with unknown contents. Hold deep samples pending shallow results or warranted based on field observations. Nearby borings ELBS1009 and ELBS1030 encountered refilled on bedrock at 3' and 1.5', respectively.
5B_DG-824	EEL	Unknown tank north of B3271	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Location targets an NST with unknown contents. Analyze for fill storage units to address uncertainties of tank contents. Hold deep samples pending shallow results to characterize potential surface impacts from NST. Shallow bedrock anticipated based on ELBS1041.
5B_DG-825	EEL	Fill Area F-A-11 North of EEL Storage	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Stepdown to define boundary of fill area as described below for SB_DG-823.
5B_DG-826	EEL	Storage Area on Slope North of Building 2271	Soil Boring	0.5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Location targets storage area observed in aerial photographs; hold deep samples pending shallow results. Shallow work anticipated. 10 foot sample should target just above bedrock.



Table 1  
Subarea 5B Phase 3 Proposed Soil Sample Locations  
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Location ID <sup>1</sup>	Area	Location Description	Sample Type	Depth (ft. bgs)	Analytical Method												Data Gap Checklist <sup>2</sup>		Rationale / Comments <sup>4</sup>
					Pb/Cd	PCBs	Mercury	CVCs	Chlorides	Metals	Mercury	CVCs	PCBs	PCBs	PCBs	PCBs	PCBs	PCBs	
5B_DG427	PEL	Storage Area on Slope North of Building 2271	Soil	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Location targets development of storage area observed in aerial photographs; hold deep sample pending shallow results. If foot sample should target just above bedrock.
5B_DG428	PEL	Unknown tank #4241-12 Southwest of B3271	Soil	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Location targets storage area sample. If B32492 development or ASU 1-4241-12 with unknown contents. Previous sample for TPH (detected) at 10 ft. bgs. If foot sample should target just above bedrock. If foot sample should target just above bedrock. Bedrock refuted was 7.5 ft. bgs. If B32492, 10 ft. sample should target immediately above bedrock for potential migration along bedrock surface. (Note: tank is represented in miscellaneous liner layer in GIS).
5B_DG429	PEL	North Wall of B3271	Soil	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Target: location of compressors and other operational equipment along north wall of B3271.
5B_DG430	PEL	North Wall of B3271	Soil	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Target: location of compressors and other operational equipment along north wall of B3271.
5B_DG431	PEL	Undefined lotline North of B3271	Soil	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Target: previous sample location ENBS1406, analyzed for metals only at 1 foot bgs only, to assess undisturbed features observed in 1967 aerial photo.
5B_DG432	PEL	Storage Area and Fill Boundary on Slope North of Building 2271	Soil	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Location targets western portion of storage area observed in aerial photographs and defines fill boundary as described below (at 5' bgs): J32493, sample and analyze as described above.
5B_DG433	PEL	Fill Area F-A-11 Northwest of Building 2271	Soil	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Support to define boundary of fill area and F-A-11, PCBs, and discuss at SI-47665338. If fill observed collect sample in fill, native soil, just above bedrock as soil conditions warrant, otherwise sample at 0.5, 5, and just above bedrock (refuted anticipated - 10 ft. bgs).
5B_DG434	PEL	West of E31 (Subarea 5C)	Soil	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Support in drainage to west of discuss in SI-47665338. Location also targets reclaimed water spillfield, hexachlorocyclopentadiene, formaldehyde and polychlorinated aromatic hydrocarbons (PAHs) in reclaimed water. Analyze all depths due to natural (mineral) drainage and deposition over time.
5B_DG435	PEL	Fill Area F-A-11 West of B3271	Soil	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Note: 5B_DG434 located east of Subarea 5B boundary in Subarea 5C.
				10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Support to define boundary of fill area as described above for 5B_DG433.

Footnotes:  
1. The following Location IDs were omitted or deleted during the data gap analysis process and are not included in this table: 5B\_DG403, 5B\_DG404, 5B\_DG405, 5B\_DG406, 5B\_DG407, 5B\_DG408, 5B\_DG409, 5B\_DG410, 5B\_DG411, 5B\_DG412, 5B\_DG413, 5B\_DG414, 5B\_DG415, 5B\_DG416, 5B\_DG417, 5B\_DG418, 5B\_DG419, 5B\_DG420, 5B\_DG421, 5B\_DG422, 5B\_DG423, 5B\_DG424, 5B\_DG425, 5B\_DG426, 5B\_DG427, 5B\_DG428, 5B\_DG429, 5B\_DG430, 5B\_DG431, 5B\_DG432, 5B\_DG433, 5B\_DG434, 5B\_DG435, 5B\_DG436, 5B\_DG437, 5B\_DG438, 5B\_DG439, 5B\_DG440, 5B\_DG441, 5B\_DG442, 5B\_DG443, 5B\_DG444, 5B\_DG445, 5B\_DG446, 5B\_DG447, 5B\_DG448, 5B\_DG449, 5B\_DG450, 5B\_DG451, 5B\_DG452, 5B\_DG453, 5B\_DG454, 5B\_DG455, 5B\_DG456, 5B\_DG457, 5B\_DG458, 5B\_DG459, 5B\_DG460, 5B\_DG461, 5B\_DG462, 5B\_DG463, 5B\_DG464, 5B\_DG465, 5B\_DG466, 5B\_DG467, 5B\_DG468, 5B\_DG469, 5B\_DG470, 5B\_DG471, 5B\_DG472, 5B\_DG473, 5B\_DG474, 5B\_DG475, 5B\_DG476, 5B\_DG477, 5B\_DG478, 5B\_DG479, 5B\_DG480, 5B\_DG481, 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**Table 2**  
**Subarea 5B Phase 3 Proposed Soil Vapor Sample Locations**  
**(1 of 4)**

Location ID	Area	Location Description	Depth (ft bgs) <sup>1</sup>	Data Gap Checklist <sup>2</sup>	Rationale / Comments
5BSV_DG-501	B4019 Area	North of B4019	5 10	✓	Representative sample location in storage yard north of B4019.
5BSV_DG-502	B4019 Area	Sewer South of B4019	5 10	✓	Location targets sanitary sewer junction at exit from B4019 and sewer main on B Street.
5BSV_DG-503	B4019 Area	East of B4019	5 10		Representative location in B4019 operational area east.
5BSV_DG-504	B4019 Area	B4013	5 10	✓	Location targets diesel AST (T-EMG1) and characterizes operational area at B4013.
5BSV_DG-505	B4019 Area	North of B4013	5 10	✓	Location targets storage north of B4013 identified in EPA HSA.
5BSV_DG-506	B4019 Area	North of B4013	5 10		Representative location in B4013 operational area.
5BSV_DG-507	B4019 Area	B4013	5 10		Same as 5BSV_DG-506.
5BSV_DG-508	B4010 Area	Northwest of B4012/4228	5 10	✓	Location targets storage northwest of B4228 identified in EPA HSA.
5BSV_DG-509	B4010 Area	North of B4010	5 10	✓	Location targets potential waste disposal area identified in EPA HSA.
5BSV_DG-510	B4010 Area	B4228	5 10	✓	Location targets reactor room in B4012 and two fuel oil ASTs (EMGEN and T-L01) in north portion of B4228. Collect samples at 5 foot intervals with deepest sample just above bedrock.
5BSV_DG-511	B4010 Area	B4228	5 10	✓	Location targets fuel oil AST (EMSTG) in south portion of B4228.
5BSV_DG-512	B4010 Area	Potential Leach Field South of B4228	5 10	✓	Location targets potential leach field identified in EPA HSA and AST with unknown contents. Collect samples at 5 foot intervals with deepest sample just above bedrock.
5BSV_DG-513	B4010 Area	South of B4010	5 10	✓	Location defines southwestern extent of identified contamination area at B4010; also targets potential storage tank identified in EPA HSA. Collect samples at 5 foot intervals to bedrock, with deepest sample just above bedrock.
5BSV_DG-514	B4010 Area	Northwest of B4010	5 10		Representative location in operational area northwest of B4010.
5BSV_DG-515	B4010 Area	East of B4010	5 10		Delineates eastern extent of identified contamination area at B4010.
5BSV_DG-516	B4010 Area	East of B4010	5 10 15 20	✓	Location targets former reactor vault and UST in B4010; also addresses elevated RLs in previous sampling (L1SV1000). Collect samples at 5 foot intervals to bedrock, with deepest sample just above bedrock to evaluate potential input location to groundwater.
5BSV_DG-517	B4010 Area	Southeast of B4010	5		Representative location in operational area southeast of B4010. Sample depth based on refusal in nearby locations.
5BSV_DG-518	B4010 Area	Storage Yard North of B4025	5 10	✓	Location targets storage observed along the fence line north of B4025 in aerial photos.
5BSV_DG-519	B4010 Area	B4025	5		Representative location in B4025 operational area and addresses elevated RLs in previous sampling (U5SV1106). Sample depth based on nearby locations.
5BSV_DG-520	B4010 Area	UST East of B4025	5	✓	Location targets UST, equipment pad, and open storage observed in aerial photos east of B4025. Sample depth based on nearby locations.
5BSV_DG-521	B4010 Area	Slope south of B4025	5 10	✓	Location targets drainage along road and surface water pathway downslope of B4025 operations / south-side doorway. Shallow refusal in area; collect deeper samples if soil present.
5BSV_DG-522	HMSA	North of B4457	5 10		Representative location in operational area north of B4457.
5BSV_DG-523	HMSA	East of B4457	5 10	✓	Targets open storage observed in aerial photos.
5BSV_DG-524	HMSA	East of B4457	5 10	✓	Location characterizes area with two features identified in EPA HSA as "dark toned material" within general open storage area.
5BSV_DG-525	HMSA	Sump 2 at B4457	5 10	✓	Location targets Sump 2. Collect samples at 5 foot intervals with deepest sample just above bedrock to evaluate feature as potential input location to groundwater.
5BSV_DG-526	HMSA	Sump 1 at B4457	5 10	✓	Location targets Sump 1. Collect samples at 5 foot intervals with deepest sample just above bedrock to evaluate feature as potential input location to groundwater.
5BSV_DG-527	HMSA	North of B4457	5 10		Same as 5BSV_DG-522.
5BSV_DG-528	HMSA	South of B4457	5 10		Representative location in operational area south of B4457.
5BSV_DG-529	HMSA	West of Sump 1 at B4457	5 10	✓	Same as 5BSV_DG-527.
5BSV_DG-530	SCTI	B4356	5 10	✓	Same as 5BSV_DG-532. One of four representative locations which provide overall characterization of fill material within deep excavation area around former Building 4356; based on previous sporadic elevated detects, fill material observed in borings to south, and geophysical anomalies (magnetic and terrain conductivity anomalies present).
5BSV_DG-531	SCTI	B4356	5 10	✓	Same as 5BSV_DG-533. Location targets secondary containment trench in SCTI water treatment area. The location is also one of four representative locations which provide overall characterization of fill material within deep excavation area around former Building 4356; based on previous sporadic elevated detects, fill material observed in borings to south, and geophysical anomalies (magnetic and terrain conductivity anomalies present). Collect samples at 5 foot intervals with deepest sample just above bedrock.
5BSV_DG-532	SCTI	North of B4356	5 10	✓	Same as 5BSV_DG-530.
5BSV_DG-533	SCTI	Water Treatment Area West of B4356	5 10	✓	Same as 5BSV_DG-531.
5BSV_DG-534	SCTI	Water Treatment Area West of B4356	5 10	✓	Location targets secondary containment trench and pit in SCTI water treatment area.
5BSV_DG-535	SCTI	Water Treatment Area West of B4356	5 10	✓	Location characterizes ASTs associated with SCTI water treatment area. The location is also one of five representative locations which provide overall characterization of fill material within deep excavation area around former Building 4356; based on previous sporadic elevated detects, fill material observed in borings to south, and geophysical anomalies (magnetic and terrain conductivity anomalies present).
5BSV_DG-536	SCTI	Northwest Corner of SCTI	5	✓	Location targets chemical storage area. Shallow refusal in area; collect deeper samples if soil present.
5BSV_DG-537	SCTI	Cooling Tower Southwest of B4356	5 10	✓	Location targets cooling tower (B4656).



**Table 2**  
**Subarea 5B Phase 3 Proposed Soil Vapor Sample Locations**  
**(2 of 4)**

Location ID	Area	Location Description	Depth (ft bgs) <sup>1</sup>	Data Gap Checklist <sup>2</sup>	Rationale / Comments
5BSV_DG-538	Kalina Complex	South of B4355	5 10	✓	Targets open storage identified in EPA aerial photograph review.
5BSV_DG-539	Kalina Complex	South of B4355	5 10		Representative sample location in Kalina Complex operational area.
5BSV_DG-540	Kalina Complex	B4334	5 10	✓	Targets fuel oil AST (KR-102).
5BSV_DG-541	SCTL	Southwest of B4026	5 10		Representative location in operational area southwest of B4026.
5BSV_DG-542	SCTL	Southwest of B4026	5 10	✓	Targets former sump and open storage south of B4226.
5BSV_DG-543	SCTL	B4358	5 10	✓	Targets "potentially saturated area" identified in EPA aerial photograph review. Collect deepest sample just above bedrock.
5BSV_DG-544	SCTL	B4026	5 10		Same as 5BSV_DG-546. Representative location in B4026 operational area.
5BSV_DG-545	SCTL	Catch Basin North of B4359	5 10	✓	Targets catch basin and "probable leakage" identified in EPA HSA.
5BSV_DG-546	SCTL	B4026	5 10		Same as 5BSV_DG-544.
5BSV_DG-547	SCTL	B4026	5 10	✓	Targets fuel oil AST (T-15).
5BSV_DG-548	SCTL	B4826	5 10	✓	Targets sodium tank pits in B4826.
5BSV_DG-549	SCTL	East of B4026	5 10		Same as 5BSV_DG-550; also addresses elevated RLs in previous sampling (HSSV05).
5BSV_DG-550	SCTL	North of B4026	5 10		Representative location in operational area north/northeast of B4026.
5BSV_DG-551	SCTL	Northeast of B4006	5 10		Representative of operational area at on northeast side of B4006.
5BSV_DG-552	SCTL	Tank East of B4006	5 10	✓	Targets fuel oil UST (UT-02).
5BSV_DG-553	SCTL	Septic Tank Southwest of B4006	5 10	✓	Targets "presumable former septic tank" identified in EPA aerial photograph review.
5BSV_DG-554	SCTL	Southeast of B4026	5 10	✓	Targets structure observed in aerial photographs (see 1980 aerial photo) and operational area southeast of B4026 - potentially B4354 (Control Element Test Structure); also addresses storage observed to the southwest.
5BSV_DG-555	SCTL	Southeast of B4026	5 10	✓	Location targets the SCTL Interconnecting PowerPak Facility and a debris area identified in EPA aerial photograph review.
5BSV_DG-556	SCTL	East of B4816	5 10	✓	Characterizes "stain" and horizontal tank identified in EPA aerial photograph review; also addresses elevated RLs in previous sampling (HSSV09).
5BSV_DG-557	SCTL	Southeast of B4816	5 10	✓	Targets drainage along 17th Street and open storage area identified in EPA aerial photo review.
5BSV_DG-558	SCTL	Southeast of B4816	5 10		Representative sample in operational area southeast of B4816/B4006.
5BSV_DG-559	B4011 Area	Northeast of B4005/4006 Leach Field	5 10	✓	Targets northern terminus of pipeline leading for fuel oil tank to the south.
5BSV_DG-560	B4011 Area	North of B4005/4006 Leach Field	5 10	✓	Same as 5BSV_DG-543.
5BSV_DG-562	B4011 Area	North of B4005/4006 Leach Field	5 10	✓	Same as 5BSV_DG-543.
5BSV_DG-561	B4011 Area	Northeast of B4005/4006 Leach Field	5 10	✓	Location targets B4005/4006 leach field. Collect deepest sample just above bedrock to evaluate leach field as potential input location to groundwater.
5BSV_DG-563	B4011 Area	Southwest of B4005/4006 Leach Field	5 10		Location targets drainage along 20th Street.
5BSV_DG-564	B4011 Area	South of B4005/4006 Leach Field	5 10		Representative location south of leach field.
5BSV_DG-565	B4011 Area	East of B4005/4006 Leach Field	5 10		Representative location east of leach field.
5BSV_DG-567	B4011 Area	South of B4005/4006 Leach Field	5 10		Same as 5BSV_DG-564.
5BSV_DG-566	B4011 Area	South of B4005/4006 Leach Field	5 10		Same as 5BSV_DG-564; also targets fuel pipeline and linear geophysical anomaly.
5BSV_DG-568	B4011 Area	South of B4005/4006 Leach Field	5 10		Same as 5BSV_DG-564.
5BSV_DG-569	B4011 Area	Culvert at 20th and F Street	5 10		Targets drainage and culvert.
5BSV_DG-570	B4011 Area	East of B4639	5 10		Targets drainage along F Street and defining western edge of identified contamination area.
5BSV_DG-571	B4011 Area	North of B4011	5 10		Representative location in operational area north of B4011.
5BSV_DG-572	B4011 Area	West of B4011	5 10	✓	One of five samples targeting open storage area; also targets former septic tank and addresses elevated RLs in previous sampling (L2SV02, L2SV1008).
5BSV_DG-573	B4011 Area	West of B4011	5 10	✓	One of five samples targeting open storage area west of B4011; also targets "probable horizontal tank" identified in EPA HSA.
5BSV_DG-574	B4011 Area	West of B4011	5 10	✓	One of five samples targeting open storage area; also targets historical unlined drainage observed in 1967 aerial photograph.
5BSV_DG-575	B4011 Area	West of B4011	5 10	✓	One of five samples targeting open storage area.

**Table 2**  
**Subarea 5B Phase 3 Proposed Soil Vapor Sample Locations**  
**(3 of 4)**

Location ID	Area	Location Description	Depth (ft bgs) <sup>1</sup>	Data Gap Checklist <sup>2</sup>	Rationale / Comments
5BSV_DG-576	B4011 Area	West of B4011	5 10	✓	Location targets open storage.
5BSV_DG-577	B4011 Area	Southwest of B4011	5 10	✓	One of five samples targeting open storage area; also targets drainage along G Street.
5BSV_DG-578	B4011 Area	Southwest of B4011 Leach Field	5 10	✓	One of six representative locations characterizing fill area (FA-11) identified in EPA aerial photograph review.
5BSV_DG-579	B4011 Area	South of B4011 Leach Field	5 10	✓	Same as 5BSV_DG-578. Location also characterizes potential impacts from reclaimed water spray field.
5BSV_DG-580	EEL	Northwest of B3271	5 10	✓	Same as 5BSV_DG-578.
5BSV_DG-581	B4007 Area	East of B4005/4006 Leach Field	5 10		Representative location east of leach field.
5BSV_DG-582	B4011 Area	South of B4005/4006 Leach Field	5 10	✓	Targets fuel oil AST (T-735).
5BSV_DG-583	B4011 Area	F Street Drainage	5 10		Targets F Street Drainage. Collect deepest sample just above bedrock to evaluate potential recharge to groundwater.
5BSV_DG-584	B4007 Area	South of Transformer	5 10	✓	Representative of area south of the transformer.
5BSV_DG-585	B4007 Area	East of B4011	5 10	✓	Same as 5BSV_DG-576.
5BSV_DG-586	B4007 Area	South of B4007	5 10		Location targets drainage and culvert leading to 17th Street Pond.
5BSV_DG-587	B4007 Area	East of B4500	5 10	✓	Location targets drainage along G Street.
5BSV_DG-588	17th Street Pond	Northwest of 17th Street Pond	5 10	✓	Representative location to characterize open area northwest of Identified Contamination Area. Location also targets a ground scar observe during EPA HSA.
5BSV_DG-589	17th Street Pond	Northwest of 17th Street Pond	5 10		Representative location to characterize open area northwest of Identified Contamination Area.
5BSV_DG-590	17th Street Pond	Northeast of 17th Street Pond	5 10		One of six representative sample locations characterizing open area east of Identified Contamination Area.
5BSV_DG-591	17th Street Pond	Northeast of 17th Street Pond	5 10		Same as 5BSV_DG-590.
5BSV_DG-592	17th Street Pond	Northeast of 17th Street Pond	5 10		Same as 5BSV_DG-590.
5BSV_DG-593	17th Street Pond	17th Street Pond	Approx. 6 (see rationale)		Targets the 17th Street Pond. Depth to bedrock anticipated to be approximately 6 feet based on surrounding samples. Collect deepest sample just above bedrock to evaluate potential input/migration pathway to groundwater contamination. If total depth greater than 7 feet, collect first sample at 5 feet and second sample just above bedrock to evaluate potential gradient.
5BSV_DG-594	17th Street Pond	East of 17 Street Pond	Approx. 6 (see rationale)		Targets the 17th Street Pond. Depth to bedrock anticipated to be approximately 5 feet based on surrounding samples. Collect deepest sample just above bedrock to evaluate potential input/migration pathway to groundwater contamination. If total depth greater than 7 feet, collect first sample at 5 feet and second sample just above bedrock to evaluate potential gradient.
5BSV_DG-595	17th Street Pond	East of 17th Street Pond	5 10		Same as 5BSV_DG-590.
5BSV_DG-596	17th Street Pond	Southeast of 17th Street Pond	5 10		Same as 5BSV_DG-590.
5BSV_DG-597	17th Street Pond	Southeast of 17th Street Pond	5 10		Same as 5BSV_DG-590.
5BSV_DG-598	17th Street Pond	South of 17 Street Pond	5 10		Same as 5BSV_DG-594.
5BSV_DG-599	17th Street Pond	B3271	5 10	✓	Targets drainage in southern portion of 17th Street Pond Identified Contamination Area.
5BSV_DG-600	17th Street Pond	17th Street Pond	5		Same as 5BSV_DG-593.
5BSV_DG-601	17th Street Pond	Fill Area West of 17th Street Pond	5 10	✓	One of six representative locations characterizing fill area (FA-11) identified in EPA aerial photograph review.
5BSV_DG-602	17th Street Pond	Fill Area West of 17th Street Pond	5 10	✓	Same as 5BSV_DG-578.
5BSV_DG-603	17th Street Pond	Fill Area West of 17th Street Pond	5 10	✓	Same as 5BSV_DG-578. Location also characterizes potential impacts from reclaimed water spray field.
5BSV_DG-604	EEL	B3271	5 10	✓	Location characterizes potential impacts from reclaimed water spray field.
5BSV_DG-605	EEL	B3271	5 10	✓	Same as 5BSV_DG-604.
5BSV_DG-606	17th Street Pond	B3271	5 10	✓	Same as 5BSV_DG-604.
5BSV_DG-607	EEL	B3271	5 10	✓	Targets concrete pad for Hazardous Materials Storage Area, undefined feature observed in 1960-1963 aerial photograph, and potential impacts from reclaimed water spray field. Bedrock in area approximately 7 feet bgs; target deepest sample just above bedrock due to assess potential fluid release and migration along bedrock from HMSA.
5BSV_DG-608	EEL	North of B3271	5 10	✓	Representative location in operational area north of B3271; also addresses elevated RLs in previous sampling (ELSV09).



**Table 2**  
**Subarea 5B Phase 3 Proposed Soil Vapor Sample Locations**  
**(4 of 4)**

Location ID	Area	Location Description	Depth (ft bgs) <sup>1</sup>	Data Gap Checklist <sup>2</sup>	Rationale / Comments
5BSV_DG-609	EEL	B3271	5 10	✓	Targets B3271.
5BSV_DG-610	EEL	West of B3271	5 10	✓	Same as 5BSV_DG-578.
5BSV_DG-612	17th Street Pond	South of 17th Street Pond	5 10	✓	Location targets repair location along sanitary sewer line. Collect deepest sample just above bedrock to evaluate potential migration pathway to groundwater.

**Footnotes**

1. Soil vapor sampling field protocols still being defined; proposed sampling included in table to be implemented after DTSC approval of Soil Vapor SOP. It is anticipated that soil vapor samples will be collected at 5-foot intervals to a depth of 20 feet bgs, and at 10-foot intervals thereafter to bedrock. All soil vapor samples will be collected and analyzed in accordance with approved procedures in a Soil Vapor SOP. In areas where soils are not deep enough for soil vapor analysis, soil matrix samples will be collected for VOC analysis using EPA Method 8260B if soils are more than 2 feet thick.
2. Checkmark in column indicates sample was proposed based on review of information source indicated in Table 4 for the area listed in "Location Description" (GIS or aerial photo review layers).

**Acronyms**

ASTM = American Society for Testing and Materials  
bgs = below ground surface  
DTSC = California Department of Toxic Substances Control  
EEL = Environmental Effects Laboratory  
EPA = Environmental Protection Agency  
ft = foot/feet  
GIS = geographic information system  
HSA = Historical Site Assessment  
HMSA = Hazardous Material Storage Area  
ISL = interim screening level  
LF = leach field  
RL = reporting limit  
SCTI = Sodium Component Test Installation  
SCTL = Sodium Component Test Loop  
SOP = standard operating procedure  
VOC = volatile organic compound

Table 3  
Subarea 5B Phase 2 Proposed Sample Locations for Future Collection  
(1 of 1)

Location ID	Area	Location Description	Sample Type	Depth (feet bgs)	Analytical Method																Data Gap Checklist		Rationale / Comments				
					PAHs (EPA Method 8270C-ISM)	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals (EPA Methods 6010B/6010C/6020/6020A/V-7471/V-7471B)	Mercury (EPA Method 7471A)	Cd/Pb (EPA Method 7196A)	Chromium (EPA Method 8015B)	Methods (EPA Method 8015B)	Emergents (EPA Method 8330A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Formaldehyde (EPA Method 8151A)	VOCs (SV) (EPA Method 8260B)	VOCs (GSD) (EPA Method 8260B)	Morpholine (EPA Method 8260 TIC)	Pesticides (EPA Method 8081)				Herbicides (EPA Method 8151A)	PH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)	
5B_DG-793	17th St. Pond	Southeast of 17th Street Identified Contamination Area Area III	Soil Boring	0.5	X	X	X	X	X												X	X	Future Location. Stopout for silver (and potentially PCBs) impacts in sample P21857 as described for 5B_DG-794.				
				5	X	X	X	X	X																	X	X
				10	X	X	X	X	X																		X
5B_DG-795	17th Street Pond	South of 17th St. Pond Clearly Contaminated Area	Soil Boring	0.5	X	X	X	X	X												X	X	Future Location. Stopout to delineate elevated silver in sample P21856. Analyze for diverts since it is found throughout the 17th Street Pond Clearly Contaminated Area. Deep samples on hold pending shallow results since no detections above ISLs at depth. Depth to refuel unknown.				
				5	X	X	X	X	X																	X	X
				10	X	X	X	X	X																		X
5B_DG-796	Area III South of 17th St. Pond	Drainage South of Area III IV Boundary	Soil Boring	0.5	X	X	X	X	X												X	X	Future Location. Stopout to delineate down drainage extent of PAH, PCB, diverts, and metals impacts from sample SI -284-SV51B. Hold deeper samples pending stepdown sample results at SI -284-SV51B.	A			
				5.0	X	X	X	X	X																	X	X
				10	X	X	X	X	X																		X
5B_DG-814	H4011 Area	Hazardous Materials Storage Area East of Building 3271	Soil Boring	0.5	X	X	X	X	X												X	X	Future Location. Characterize soil immediately adjacent to concrete pad for Hazardous Materials Storage Area, undefined feature observed in 1960s-1990s aerial photograph, and potential impacts from reclaimed water spray field floodlock in area approximately 7 feet bgs, target deepest sample just above floodlock due to assess potential fluid release and migration along floodlock from H4011.	A			
				5.0	X	X	X	X	X																	X	X
				10	X	X	X	X	X																		X

Notes:  
1. Standard metal analysis includes silver and mercury, but does not include hexavalent chromium. Individual analyses for silver and mercury included for selected locations.  
2. Checkmark in column indicates sample was proposed based on review of information source indicated in Table 4 for the area listed in "Location Description" (GIS or aerial photo review layers).

- Abbreviations:  
H4011 - Hazardous Materials Storage Area  
H4011 - Hazardous Materials Storage Area  
ISL - interim screening level  
PAH - polycyclic aromatic hydrocarbons  
PCB - polychlorinated biphenyls  
SM - soil matrix  
SV - soil vapor  
VOC - volatile organic compound



Table 4  
Subarea 5B Data Gap Checklist  
(Page 1 of 2)

[illegible]

Table 4  
Subarea 5B Data Gap Checklist  
(Page 2 of 2)

INFORMATION SOURCE	5B Data Gap Evaluation Areas <sup>1</sup>									
	B4019 Area	B4010 Area	SCTI	HMSA	Kalina Complex	SCTL	EEL	B4011 Area	B4007 Area	17th St Pond
Groundwater Impacts / Potential Inputs to Groundwater Evaluated <sup>4</sup>	V	V	V	V	V	V	V	V	V	V
Site-wide Tank Inventory Table for unlocated tanks (viewed with Tanks Base Map layer)	V	V	V	V	V	V	V	V	V	V
EPA Area IV radiological sampling results <sup>5</sup>	V	V	V	V	V	V	V	V	V	V
Uncollected EPA Phase 1 sample locations <sup>6</sup>	V	V	V	V	V	V	V	V	V	V
Notes	V	V	V	V	V	V	V	V	V	V
	V	V	V	V	V	V	V	V	V	V
	--	--	--	--	--	--	--	--	--	--
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

#### Notes

1. Data gap evaluations were performed over smaller footprints within each subarea. For Subarea 5B: B4019 Area includes B4013, B4019, and the area surrounding these buildings; B4010/4102 Area includes B4010, B4012, B4025, B4710, B4228, and the area surrounding these buildings; SCTI includes B4355, B4356, cooling tower (B4656), condenser, water treatment area, and surrounding areas; HMSA includes B4457, B4357, B4478, three containment sumps, and areas surrounding these buildings/features; Kalina Complex includes B4334, B4335, B4392, and areas surrounding these buildings; and SCTL area includes B4359, B4226, B4026, B4826, B4006, B4816, B4354, and surrounding buildings and features; EEL includes B3271 and areas to the north and northeast; B4011 Area includes B4011, B4171, B4172, B4611, B4612, and surrounding areas; B4007 Area includes B4007, B4008, B4500, and surrounding areas; and the 17th Street Pond includes the pond and surrounding areas.

2. Evaluation of air dispersion migration pathways was performed using existing sampling results, or proposing additional sampling as warranted along predominant wind directions (NW-SE), and/or in adjacent drainages. For Subarea 5B, three air dispersion sources were evaluated: stacks at B4010, B4012, and B4019. Additional future sampling is recommended in Subarea 7 and the NBZ to assess this pathway, but existing data along with newly proposed Phase 3 locations is considered sufficient to assess potential contamination with Subarea 5B from this pathway.

3. Other notes and resources used in the data gap process included data dotmaps, a co-located sampling boring log summary table (including analytical and sample depth info), boring and trench logs from the RFI, EPA boring logs from co-located sampling, filterable dataset, and the EPA HSA document. Previous RFI Group reports were used as a reference on an as-needed basis in evaluation of selected features (e.g. building use descriptions).

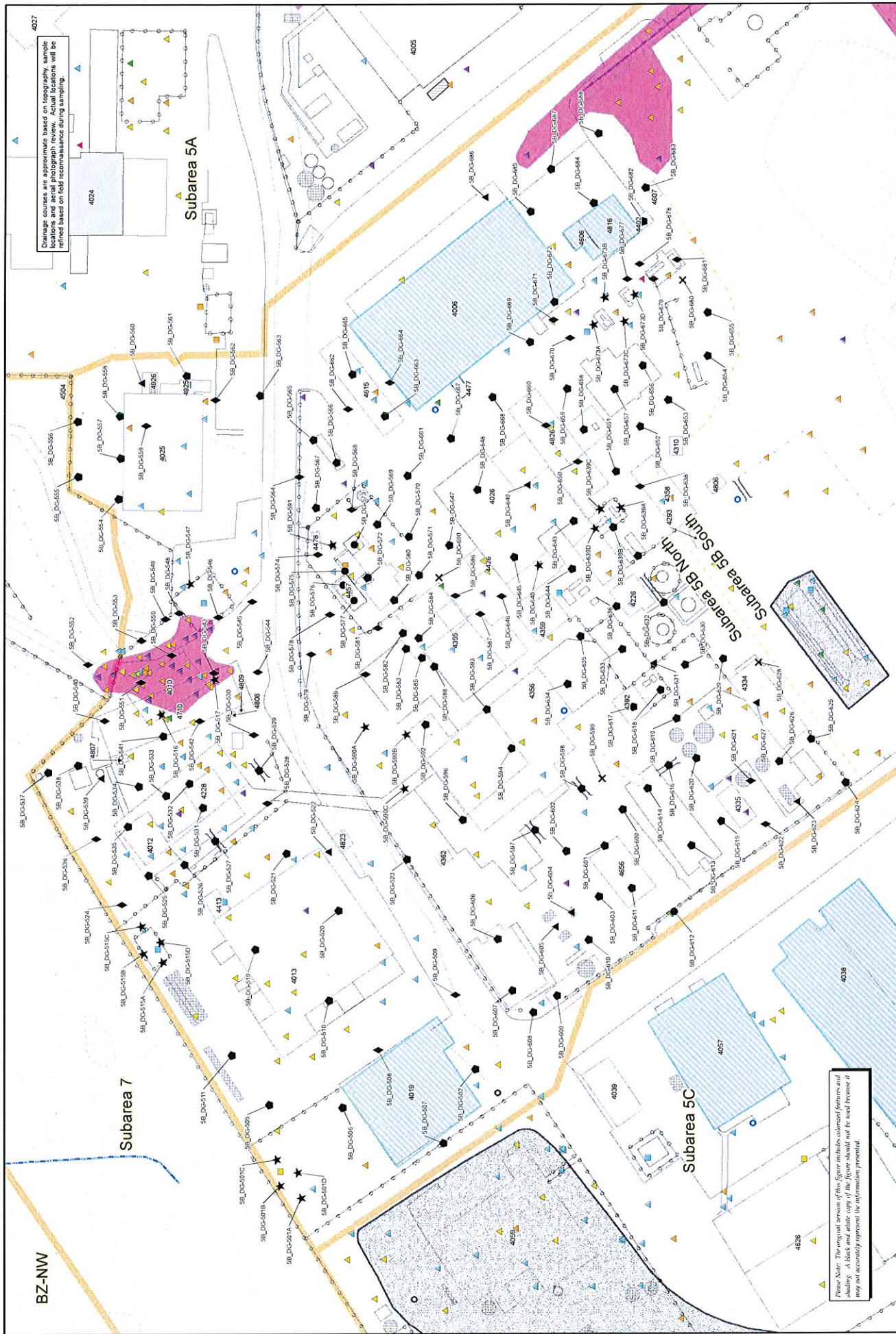
4. Feature/area identified that may warrant further consideration of groundwater input sources and threat to groundwater sampling requirements by DTSC and SSFL groundwater teams. Identification based on type of feature (typically, a liquid waste disposal or storage feature), and soil detections of mobile chemicals (e.g., VOCs, NDMA, perchlorate, 1,4-dioxane), and/or multiple chemical detections significantly above ISLs.

5. EPA radiological sampling results summaries included as part of chemical data gap evaluation process; validated data from EPA will be reviewed when available. For Subarea 5B, no chemical data gaps indicated based only on radiological sampling results although chemical sampling proposed at 2 areas with radiological trigger level exceedances (B4010 and 17th Street Pond / Drainage Areas).

6. Proposed Phase 1 sampling locations where no radiological sample was collected by EPA (due to refusal, safety concerns, etc.) were evaluated to determine if a chemical data gap still existed, with additional sampling proposed in Phase 3 if a gap was identified.



## FIGURES



BZ-NW

Subarea 7

Subarea 5A

Subarea 5C

Subarea 5B North  
Subarea 5B South

Drainage courses are approximate based on topography, sample locations and aerial photograph review. Actual locations will be refined based on field reconnaissance during sampling.

Please Note: The original version of this figure includes colored features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

**Base Map Legend**

- Administrative Area Boundary
- Area IV HSA Subarea
- Clearly Contaminated Areas
- Existing Building or Structure
- Removed Building or Structure
- Ponds
- Excavated Area
- Barren/Excavated Area
- Pipe

**Groundwater Wells**

- Near Surface
- Chalkworth
- Trenches
- Proposed

**Leach Field**

- Drainage
- Concrete Lined Drainage
- Surface Water Divide
- Rock Outcrop
- Drift Road
- AC Paving
- Elevation Contour

**Proposed Area IV Data Gap Locations**

- Future Sample Location
- Add to Analytical Suite at Sample Location
- Re-analyse Sample Location (RLA)
- Other Targeted Sample Location
- Tank Sample Location
- Stepout/Stopdown Sample Location
- Test Pit Location
- Post Remediation Sampling Area

**Combined Detect / LDC Combined Detect / ISL Combined ND / ISL**

< 1x ISL	< 1x LDC	< 1x ISL	< 1x ISL
1x ISL to 2x ISL	1x to 2x ISL	1x to 2x ISL	1x ISL to 2x ISL
2x ISL to 10x ISL	2x to 10x ISL	2x to 10x ISL	2x ISL to 10x ISL
10x ISL to 100x ISL	10x to 100x ISL	10x to 100x ISL	10x ISL to 100x ISL
> 100x ISL	> 100x ISL	> 100x ISL	> 100x ISL

**Scale**

1 inch = 50 feet

0 50 100

**Figure 1**

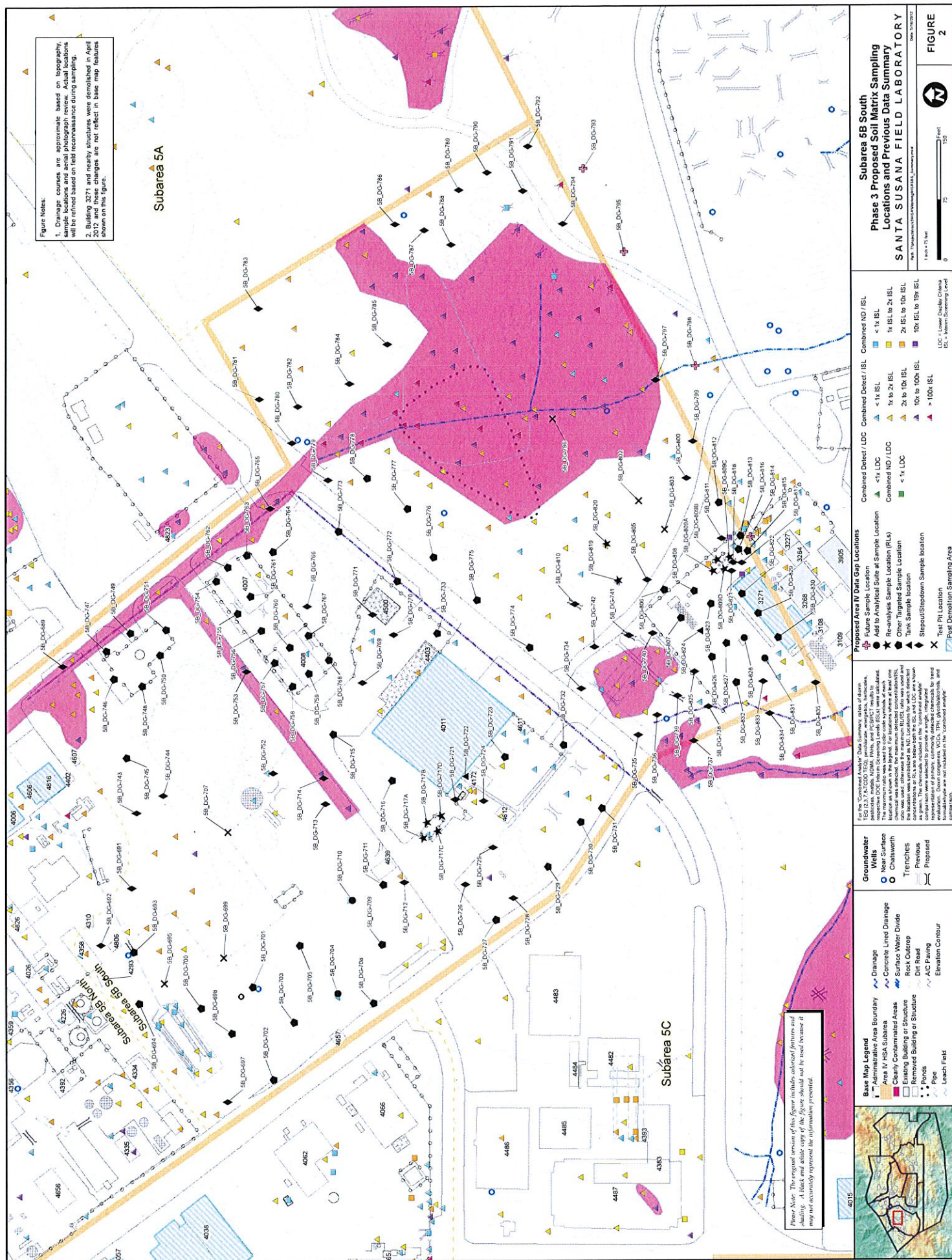
**Santa Susana Field Laboratory**

**Phase 3 Proposed Soil Matrix Sampling Locations and Previous Data Summary**

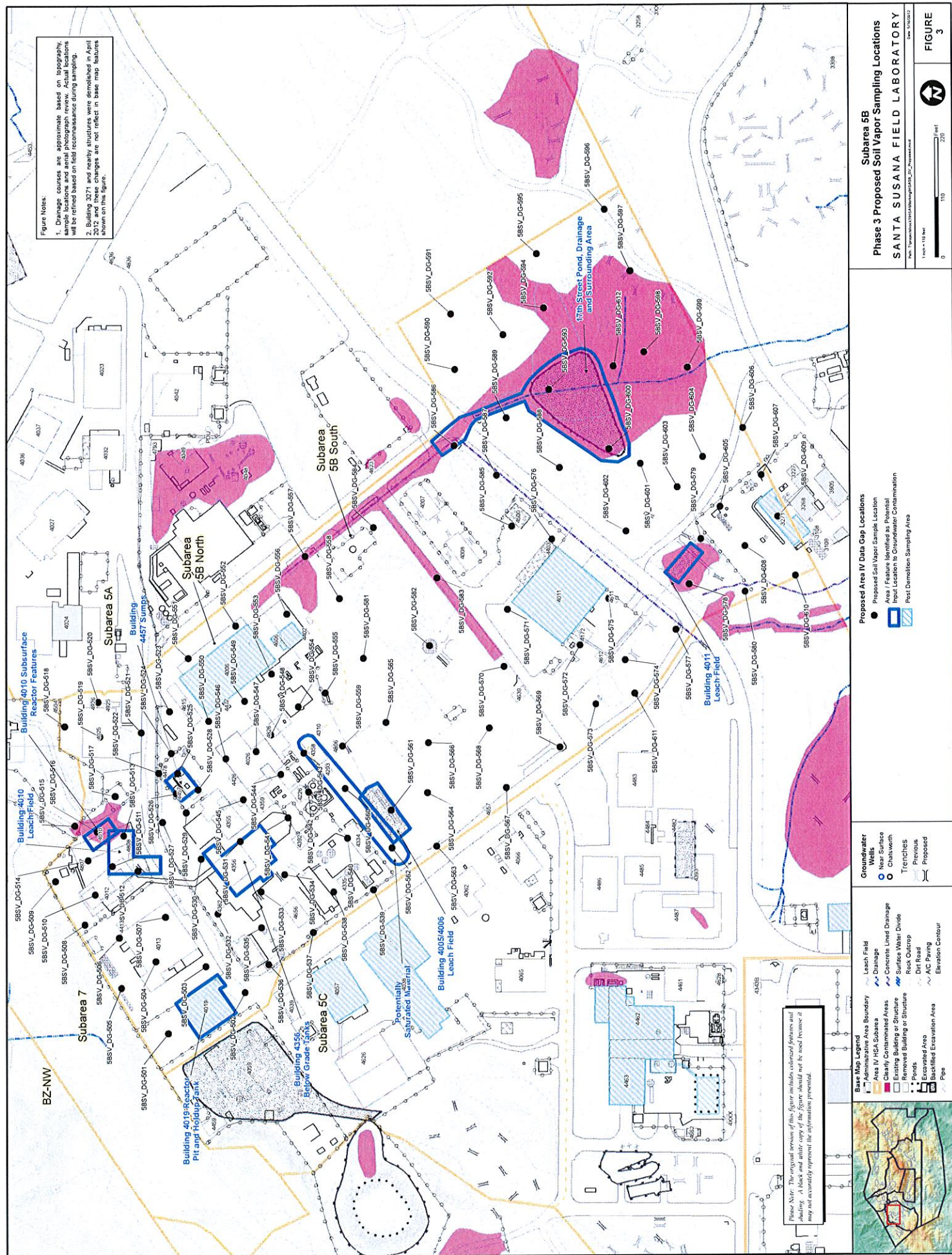
**Subarea 5B North**

North: True North, Magnetic North, and Grid North

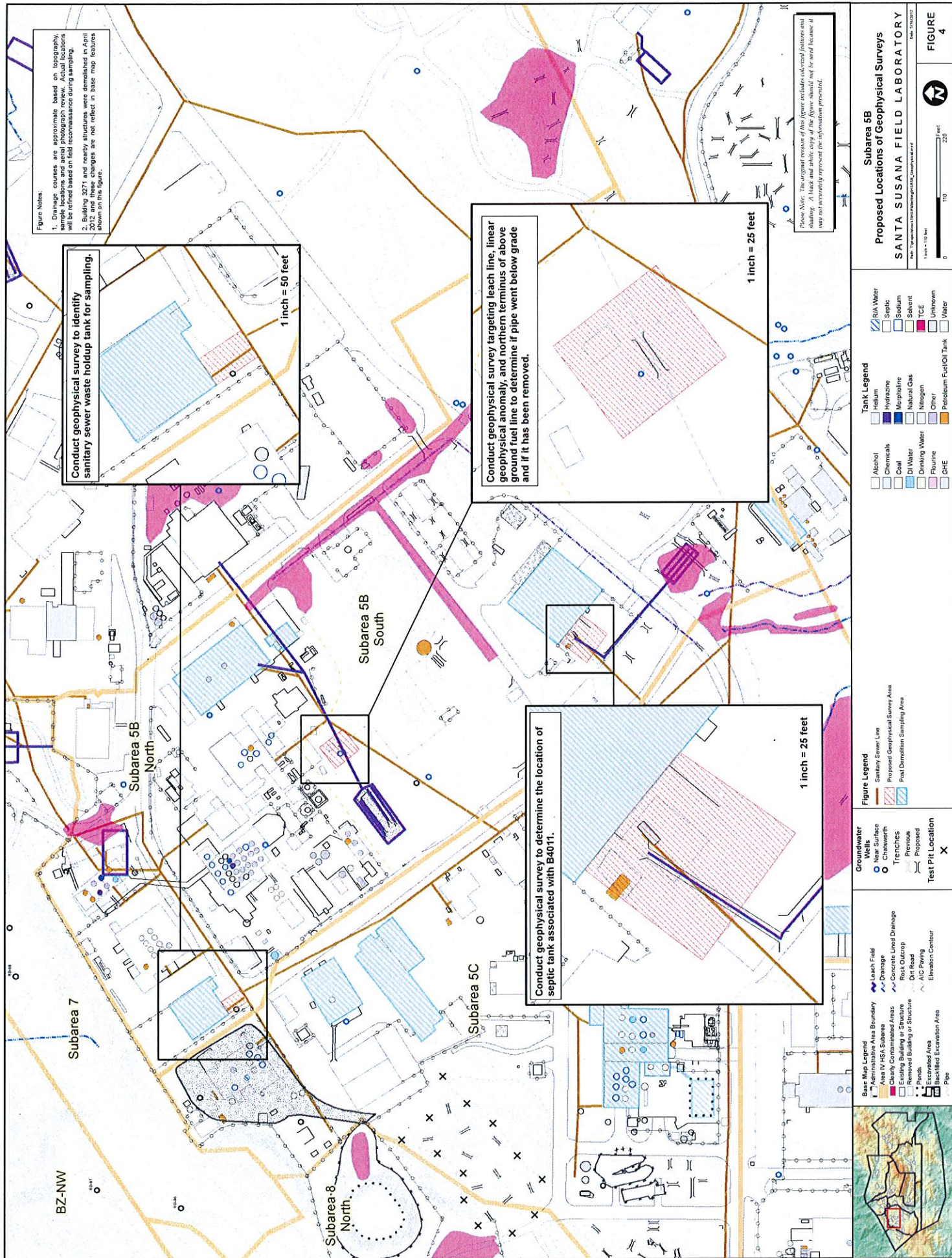












# Subarea 5B

Proposed Locations of Geophysical Surveys

SANTA SUSANA FIELD LABORATORY

Date: 12/10/2012

Project: 17-00000000-00000000-00000000-00000000-00000000

1 inch = 100 feet

FIGURE 4