TECHNICAL MEMORANDUM

Field Site Investigations for Area I Fuel Facilities

Buildings 53, 73, 103 and 154

For
Environmental Investigation at the Formerly Used Defense Site (FUDS)
At the Benicia Arsenal
Benicia, California

FUDS Site Number: J09CA075600

Prepared for:

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Technical Memorandum
for
Field Site Investigations for Area I Fuel Facilities
Buildings 53, 73, 103 and 154

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bgs	below ground surface
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
DCE	dichloroethene
DIPE	diisopropyl ether
DoD	Department of Defense
DQO	data quality objectives
DRO	diesel range organics
ETBE	ethyl tertiary butyl ether
FA/BC	Forsgren Associates/Brown and Caldwell
FSIP	field site investigation plan
FUDS	formerly used defense site
GPR	ground penetrating radar
GRO	gasoline range organics
IDW	investigation derived waste
MCL	maximum contaminant level
MDL	method detection limit
mg/kg	milligrams per kilogram
msl	mean sea level
MTBE	methyl tertiary butyl ether
PAHs	polyaromatic hydrocarbons
PID	photoionization detector
ppm	parts per million
PQL	practical quantitation limit
PRG	preliminary remedial goal
QAPP	quality assurance project plan
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RRO	residual range organics
RRR	records research report
SVOCs	semi-volatile organic compounds
TAME	tert-amyl methyl ether
TBA	tertiary butyl alcohol
TCE	trichloroethene
TIC	tentatively identified compound
TM	technical memorandum
TPH	total petroleum hydrocarbon
TTLC	total threshold limit concentration
ug/L	microgram per liter
USACE	US Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOCs	volatile organic compounds

TECHNICAL MEMORANDUM
Field Site Investigations For Area I Fuel Facilities For Buildings 53, 73, 103, and 154

SECTION 1.0
INTRODUCTION AND BACKGROUND

This Technical Memorandum (TM) presents data from investigations conducted at Buildings 53, 73, 103 and 154 for fuel-related storage activities in Area I at the former Benicia Arsenal, Benicia, California. Forsgren Associates/Brown and Caldwell (FA/BC) conducted these investigations in accordance with the Field Site Investigation Plans (FSIPs) for Area I Fuel Storage Facilities at Building 53, 73, 103 and 154 and the Arsenal-Wide Quality Assurance Project Plan (QAPP) (BC, 1999a). These FSIPs are included in the Arsenal-Wide Investigation Workplan (BC, 1999b). This TM was prepared for use in reporting Formerly Used Defense Sites (FUDS) program investigation activities at the Benicia Arsenal. Data and results contained herein are to be used together with the Workplan and the QAPP. This document complies with both Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) requirements, as appropriate, for hazardous and toxic waste cleanup actions, and the latest FUDS and US Army

Corps of Engineers (USACE) guidance documents in order to promote consistency and comparability of all activities.

The scope of field activities at Buildings 53, 73, 103 and 154 were conducted at the same time, because these buildings are all associated as potential underground storage tank (UST) locations.

Buildings 53, 73, 103 and 154 have separate FSIPs, but the techniques and the data collected are similar. As such, the results from these investigations are included in this TM.

This TM for Buildings 53, 73, 103 and 154 is organized into seven sections. Section 1.0 presents background information. Section 2.0 describes the field investigations at each building and summarizes quality control (QC) activities. Section 3 presents investigation results at each building, including a summary of the analytical results, geology, hydrogeology, and investigation derived waste (IDW). A discussion of investigation data quality objectives (DQOs) is included in Section 4.0. Section 5.0 discusses the risk analysis for this investigation. A summary of finding and recommendations is presented in Section 6.0, and references are included as Section 7.0.

1.1 Problem Definition and Scope

There is no information in the records researched for the Records Research Report (RRR) (Jacobs, 1999), indicating whether the USTs associated with each building have been removed. Our task was to determine the existence of USTs and associated piping, and verify whether past Department of Defense (DoD) activities at each building caused soil or groundwater contamination by petroleum hydrocarbons and/or lead. Data collected from these investigations will be used to determine if no further action under FUDS is warranted, or if additional investigation or remedial action is necessary.

1.2 Site Location and Description

Buildings 53, 73, 103 and 154 are located in the central portion of Area I. These buildings surround a central complex of 11 interconnected buildings, named the 50 Series Complex (Figure ITM1-1). Building 53 is currently a machine shop, located at

the northwest corner of Lincoln and Polk Streets. Former Building 73 is assumed to be under the southwest corner of Building 98. Unico Services operates a machine shop inside Building 98. Building 103 was the former motor pool and functioned as a gasoline service station with a truck scale. Building 103 is located at 900 Jackson Street and is occupied by a construction company. Building 154 is located on Lincoln Street, approximately 400 feet west of Building 53, and is vacant. All of these buildings are owned by Mr. Gordon Potter.

Although the DoD use of these buildings included a variety of industrial processes, the focus of this investigation was fuel storage facilities that could be located and assessed for eventual removal and closure.

1.3 Site History and Historical Use

Historical use of each building is summarized in Table ITM1-1. Details about the usage and history for each fuel-related storage activity at each building is described in each corresponding FSIP.

1.4 Previous Investigations

No previous investigations relating to fuel storage activities have been conducted at any of these buildings.

SECTION 2.0 INVESTIGATION DESCRIPTION

This section describes the activities performed at Buildings 53, 73, 103 and 154 for each corresponding FSIP. There is no information in the records regarding the disposition of the USTs and associated piping at each building. As part of each FSIP, records were reviewed and local agencies were contacted, to determine if any additional records were available. No additional information was available.

Based on the RRR, there are a total of nine suspected USTs at Buildings 53, 73, 103 and 154: three at Building 53; one at former Building 73; two at Building 103; and three at Building 154. The investigations to find these USTs (and associated piping) included geophysical and subsurface investigations at each building. The purpose of the geophysical surveys was to assess the shallow subsurface for potential USTs and associated piping and to clear test pit locations for potential subsurface utilities. Based on the results of the geophysical surveys, the test pit investigation focused on the areas identified by the surveys and locations proposed in the FSIP. The purpose of the test pits was to determine the presence, absence, nature and location of USTs and related piping. Appendix A contains lithologic logs of the test pits. Details about these investigations are as follows:

- Geophysical investigations were performed by NORCAL Geophysical Consultants (NORCAL) of Petaluma, California at Buildings 53, 73 and 154 on March 15 and 16, 1999. Equipment and supplies (metallic fencing) stored in the leased space of Building 103 delayed the geophysical survey of Building 103 until the lessee evacuated the space. Building 103 geophysical survey was conducted on May 6, 1999. NORCAL used electromagnetic terrain conductivity, ground penetrating radar, and electromagnetic line locating methods for each survey. Appendices B and C contain letter reports by NORCAL, dated April 2 and May 21, 1999, respectively, which contain additional details about these geophysical surveys.

- Nielson Construction of Napa, California excavated the test pits with a backhoe on June 7 through June 10, 1999.

- Chaudhary & Associates of Napa, California surveyed the test pit locations on August 5, 1999. FA/BC

personnel were on-site to oversee operations of each subcontractor and to help coordinate access from the landowner at each building. All subcontractors were under contract, briefed on scope of work, given project documentation, and verified current health and safety requirements as appropriate for each task by FA/BC prior to start of work.

2.1 Building 53 Description

Tasks performed at Building 53 included a geophysical survey and the excavation of two test pits.

2.1.1 Geophysical Survey. The purpose of this survey was to assess the presence of a 4,000-gallon UST near the edge of a steeply sloped area, locate a set of USTs (1,000 and 10,000 gallon) beneath the southeast corner of Building 56A, and assess the presence of associated piping (Figure ITM1-1). The geophysical survey at Building 53 was conducted from the west side of Building 53 to the east side of Building 56A, bounded by a sloped area to the north. The survey continued along the south side of Building 56A to focus on the identification of a potential piping corridor from the Building 53 tank system to the Building 154 tank system and to clear two soil borings (B053SB001 and B053SB002) for utilities. An interior survey was conducted to assess the presence of the two USTs beneath the floor of Building 56A. Limitations were expected for the interior survey, because the floor is concrete and elevated a height of approximately 3.5 feet. Based on the RRR, the USTs were installed before construction of Building 56A. If present, the USTs are potentially 7 to 8 feet below the floor and parabolic signatures representing USTs are difficult to detect at these depths. Ground penetrating radar (GPR) is the only geophysical method not influenced by above ground metallic objects (i.e., reinforced concrete) and was used exclusively during the interior survey.

Figure ITM1-2 shows the limits of the geophysical survey at Building 53.

The results from the survey located one geophysical anomaly in the steeply sloped area near Building 53. Numerous utility lines were located within the survey area and marked. Figure ITM1-3 shows the location of the anomaly and the utility lines. The interior geophysical survey was inconclusive, probably due to the elevated floor. Based on the results of the geophysical survey, borings B053SB001 and B053SB002 were placed to assess the geophysical anomaly in the steeply sloped area, and each location was cleared for utilities.

Photo B053TR001e. Looking toward the north.

2.1.2 Subsurface Investigation. Building 53 subsurface investigation included the excavation of two test pits (B053TR001 and B053TR002). On June 7, 1999, a concrete slab, a steel UST, and three 1.5 to 2-inch-diameter steel pipes were uncovered in B053TR001 (Photo B053TR001e). The top of the UST was partially uncovered at a depth of 5.8 feet below grade and the piping was at 3 feet below grade. As shown in photo B053TR001e, a concrete slab overlies the UST (only a small corner of the UST is exposed) with piping between the slab and the UST. The UST was uncovered so the field crew could further approximate the volume of the UST, which is estimated to be 4,000-gallons. A trench was extended from the UST to Building 53 to trace the piping. The pipes ended at the western wall of Building 53.

The UST was located in a cavity encased in fine sand with sandstone bedrock walls. Beginning at 4 feet below grade and extending to bottom of the excavation (approximately 8 feet bgs), the bedrock was stained green and had a strong hydrocarbon odor. Analytical samples were collected from the impacted fill sand and bedrock. Groundwater entering the excavation had an obvious sheen and was also sampled. Table ITM1-2 lists the samples and analyses conducted for Building 53 field activities.

A second test pit (B053TR002) was excavated to trace the piping from the Building 53 UST. Photo B053TR002a shows the same three pipes at approximately 2.5 feet below grade. These pipes trend toward Building 56A, an alignment and location that corresponds with the geophysical survey (Figure ITM1-3).

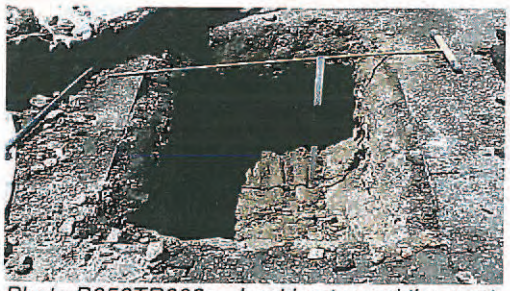

Photo B053TR002a. Looking toward the west. (yard stick in test pit colored every foot).

In summary, a 4,000-gallon UST and associated piping were uncovered. The location of the UST corresponds to results from the geophysical survey and historical records reviewed in the RRR. A set of three pipes was traced from the UST to the western wall of Building 53, where the piping ended. These pipes were then located southwest of the UST, which turned toward the southeast corner of Building 56A. It is unknown if these pipes are connected to another set of USTs beneath Building 56A or once directly connected to the Building 154 tank system.

2.1.3 Variances. The following changes in field activities occurred during the Building 53 field investigation:

- Test pit location B053TR001 lengthened and moved to correspond to the geophysical anomaly located at the southeast corner of Building 53 and likely subsurface piping.
- Three proposed test pits to identify piping were reduced to two. Test pit B053TR001 replaced one of the piping test pits by lengthening the excavation to correspond to a geophysical anomaly.
- Sample depths in test pit B053TR001 were changed from 6 and 11 feet bgs, to 2 and 6 feet bgs due to shallow groundwater.
- VOC analyses was not conducted for the 6-foot sample collected from B053TR002, because the material was lithified and required crushing.
- Soil borings B053SB001 and B053SB002 related to potential USTs below Building 56A were delayed and were completed during the drilling program for the 50 Series Complex.

2.2 Former Building 73 Description

Tasks performed at former Building 73 included a geophysical survey and the excavation of two test pits. The results of the geophysical survey and test pit excavations are presented below.

2.2.1 Geophysical Survey. The purpose of the geophysical survey was to assess the possible presence of a 1,000-gallon UST and associated piping. The approximate footprint of former Building 73 underlies the interior and exterior portions of the southwest corner of Building 98 (Figure ITM1-1). Large, heavy equipment is

currently stored in the interior portion of the survey and could not be moved to provide a path for the survey equipment. In addition, the floor is elevated approximately 4 feet in this area, which indicates the USTs are, if present, probably 8 to 9 feet below the floor (or 2 to 3 feet bgs). As a result, the geophysical survey was not conducted in the interior of the building due to the limited space and the elevated floor. Two sets of railroad tracks are included in the survey area. These tracks limited the use of geophysical equipment to only GPR. Figure ITM1-2 shows the limits of the geophysical survey.

Subtle reflections were identified in the survey area (Figure ITM1-3). However, the reflections were not confirmed, since the other geophysical methods could not be used in this area due to the railroad tracks. There was no evidence of piping in the survey area.

2.2.2 Subsurface Investigation. The subsurface investigation at former Building 73 was conducted on June 10, 1999 and included the excavation of one test pit (B073TR001) to a depth of approximately 6 feet bgs. Ballast rock from railroad tracks was encountered below the asphalt to 1.5

Photo B073TR001a. Looking toward the northeast.

feet. 3.5 feet of fill underlies the ballast rock. Sandstone bedrock was encountered beneath the fill from 5 feet to the bottom of the excavation. No evidence of metal was observed to explain the anomalous readings from the geophysical survey. The subtle reflections may be due to different soil types encountered in the test pit. Groundwater with an obvious hydrocarbon sheen filled the excavation to approximately 5 feet below grade (Photo B073TR001a). One set of soil samples and one grab groundwater sample were collected for analysis (Table ITM1-3).

In summary, no UST or piping was found in the test pit at former Building 73. The subtle reflections from the geophysical survey may have been due to different soil types in the area next to the railroad tracks.

2.2.3 Variances. The following field activity changes occurred during the former Building 73 field investigation:

- One of two proposed test pit excavations was eliminated. The geophysical survey identified only one small anomaly in the Building 73 area. Test pit B073TR001 targeted the identified anomaly.
- Soil samples were collected from 4 feet and 5 feet bgs because groundwater was encountered at 5 feet bgs.

2.3 Building 103 Description

Tasks performed at Building 103 included a geophysical survey and the excavation of three test pits. The results of the geophysical survey and test pit excavations are presented below.

2.3.1 Geophysical Survey. The purpose of this geophysical survey was to locate a 15,000-gallon and a 3,000-gallon UST and associated piping. Figure ITM1-2 shows the limits of the geophysical survey.

Three anomalous areas were identified from the geophysical survey. Figure ITM1-3 shows the location of the three anomalies and piping at Building 103. The first anomalous area coincides with the historical location of the 15,000-gallon UST and associated piping. The second area is

adjacent to the south side of the former truck scale. The third area is at the northwest corner of Building 103, which contains a concrete slab with a pipe stubbed through the center (Figure ITM1-3). According to the RRR, the most likely location of the 3,000-gallon UST is along the west side of Building 103. However, the geophysical survey did not reveal any evidence of a subsurface anomaly in this area. FA/BC examined the Records Research Report (RRR) prepared by Jacobs Engineering, and has determined that the UST reported for Building 103 may have been installed at Building 161, which is situated to the west of Building 103 (see Figure 2-7 of the RRR). A 3,000-gallon kerosene UST is reported to be located at Building 161 (see Reference 609 of Appendix C-1 of the RRR). This UST is not listed in the fuel storage tank inventory for Building 161 but is listed for Building 103 (Reference 167 – Appendix D). Therefore, it is likely that the UST that is reported for Building 103 is actually the same UST

Photo B103TR001. Looking toward the southeast.

reported for Building 161.

2.3.2 Subsurface Investigation. The Building 103 subsurface investigation included the excavation of three test pits (B103TR001 through B103TR003) on June 10, 1999. B103TR001 was dug in the area of the anomaly associated with the pipe stub. A set of three pipes (one 3-inch diameter and two 2-inch-diameter steel) were uncovered at approximately 1-foot below grade, and trend parallel to west side of the building (Photo B103TR001). The 3-inch pipe was connected to the stub-up. The photo shows another 3-inch pipe on the north side of the stub-up. It appears that the stub-up was added at a later date and is probably the fill port for the 15,000-gallon UST. The other two 2-inch pipes are probably product lines that appear to connect with two former dispensers on the northern pump island. On the west side of these pipes, the excavation was deepened to 3 feet bgs. Concrete was found at 3 feet bgs in the southern portion of the test pit. The excavation of B103TR001 was not deepened because the concrete that was uncovered probably accounts for the anomaly in this area.

Based on the RRR, a test pit (B103TR002) was dug in the area of the suspected location of the 3,000-gallon UST along the west side of Building 103, even though the geophysical survey did not support investigation in this area. Test pit B103TR002 was excavated to determine if the 3,000-gallon UST that is reported to be located at Building 103 was actually installed there. Test pit B103TR002 was excavated to a depth of 5.5 feet bgs, until a 48-inch diameter storm drain pipe was uncovered. The excavation was extended to the west to uncover the same set of three pipes that were uncovered in B103TR001. Exploration of the UST stopped, since the UST would be greater than 9.5 feet deep (5.5 feet plus 48-inches). This scenario is unlikely because other USTs at the Arsenal have all been near surface (less than 6 feet below grade).

The second anomalous area, south of the former truck scale, was investigated in combination with the UST anomaly. A fragmented metal plate is located on the ground in this area. This plate is approximately the size of the anomaly identified in the geophysical survey. Based on the evidence, a test pit was excavated for this debris in combination with test pit B103TR003. The northern portion of test pit B103TR003 corresponds to the southern portion of the second anomaly. It is

probable that the fragmented metal plate was the cause of the anomaly.

Photo B103TR003a. Looking toward the east.

The set of three pipes (3-inch product line to UST and two 2-inch product lines from the UST to the dispensers) was uncovered in B103TR003 (Photo B103TR003a). After uncovering the product lines, the test pit was extended to the east. The north side of the UST was uncovered (Photo B103TR003c). The top of the UST is approximately 1-foot below grade. Soil below 6 feet bgs is stained green and has a strong hydrocarbon odor (Photo B103TR003d). The excavation was

Photo B103TR003c. Looking toward the south.

deepened to 11 feet bgs to the bottom of the UST. Soil samples were collected at 6 feet bgs and at the bottom of the excavation. Table ITM1-4 summarizes the samples and analyses for Building 103.

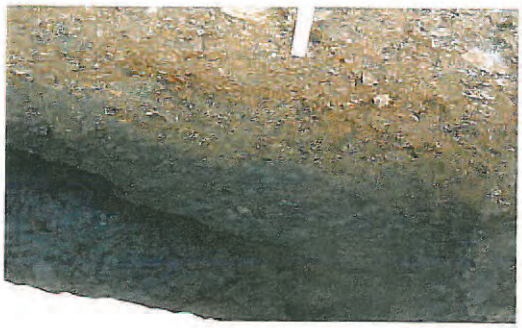

Photo B103TR003d. Looking toward the north.

In summary, a 15,000-gallon UST and associated piping were uncovered. The location of the UST corresponds to results from the geophysical survey and the RRR. A set of three pipes was traced from the UST to a fillport at the northwest corner of Building 103. Two of three pipes were traced from the fillport in a northerly direction toward a pump island that once had two dispensers. The 3,000-gallon UST and associated piping were not found during this investigation. Soil encountered during the excavation of the test pits at Building 103 included approximately 3 to 6 feet of fill overlying sandy clay.

2.3.3 Variances. The following changes in field activities occurred in the Building 103 field investigation:

- One test pit was added to the investigation to address a third subsurface geophysical anomaly.
- Soil samples were collected from test pit B103TR003 at 6 and 11 feet bgs. No soil samples were collected from test pits B103TR001 and B103TR002 because no subsurface features were observed, and no signs of contamination identified.
- No groundwater was encountered in Building 103 test pits, therefore no groundwater samples were collected.

2.4 Building 154 Description

Tasks performed at Building 154 included a geophysical survey and the excavation of seven test pits. The results of the geophysical survey and test pit excavations are presented below.

2.4.1 Geophysical Survey. The purpose of this geophysical survey was to evaluate the presence or absence of a 10,000-gallon, a 7,000-gallon UST, a 1,400-gallon UST, and associated piping. Figure ITM1-2 shows the limits of the geophysical survey.

The geophysical survey identified three anomalous areas, as well as numerous utility alignments. The anomalous areas coincide with the historical locations of the 10,000-gallon, 7,000-gallon, and 1,400-gallon UST, which are presented in the RRR. The anomaly in the area of the suspected 1,400-gallon UST also contains several utility alignments. The geophysical report indicates these alignments are focused in the anomalous area that may coincide with the 1,400-gallon UST. Figure ITM1-3 shows the location of the anomalies, utilities, and piping associated with the USTs.

2.4.2 Subsurface Investigation. The Building 154 subsurface investigation included the excavation of seven pits (B154TR001 through B154TR007) on June 8 and June 9, 1999. Two USTs, associated piping, and utilities were uncovered during this investigation. Figure ITM1-3 shows the locations of these test pits, USTs, associated piping, and utility lines.

The purpose of test pits B154TR001, B154TR006, and B154TR007 was to locate a 1,400-gallon UST and its associated piping. The UST was not uncovered in any of the three test pits. The geophysical survey indicated the possibility of numerous utility alignments in this area. Three utility pipes were uncovered in B154TR001: a 6-inch clay pipe for sewer, a 12-inch water pipe, and a 6-inch water pipe at 2 feet below grade. None of these pipes was related to the USTs. B154TR001 was excavated to a total depth of 4 feet bgs. Concrete was uncovered in B154TR006 and B154TR007. The concrete sloped downward from 3 feet to 4 feet bgs in a northwest direction in B154TR006. Concrete was encountered in B154TR007 at 4.5 feet bgs and sloped in the same northwest direction. Digging was discontinued because the backhoe could not break through the concrete. Two cables were uncovered at 2 feet bgs along the northern and southern walls, which coincide with the geophysical survey. The subsurface concrete and interference due to the cables are probably the reason for this anomaly. Total depths of these test pits were 4 to 4.5 feet.

Soil samples were collected in B154TR006 and B154TR007 in areas of discolored soil and elevated organic vapor readings. Soil was discolored dark green below 2 feet bgs in both pits (Photo B154TR006l). Readings from an organic vapor analyzer ranged from 200 ppm in B154TR006 to 3200 ppm in B154TR007. Table ITM1-5 summarizes the samples and analyses for Building 154.

Photo B154TR006l. Looking toward the southwest.

The excavation of test pit B154TR002 uncovered the eastern end of a 10,000-gallon UST, a fillport and associated piping (Photo B154TR002f). The UST was approximately 3.5 feet below grade. The fillport was unobstructed, so a measuring tape was inserted to the bottom. A diameter of 7 feet was measured. The UST was nearly filled with water. No product was observed in the UST. Water in the

excavation was approximately 4 feet below grade. Photo B154TR002f shows a 0.5-inch-diameter electrical conduit pipe and a junction of 1.5-inch product lines. It

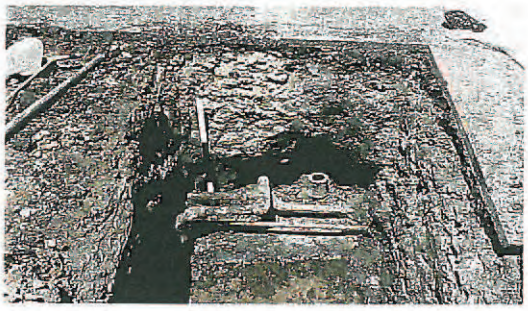

Photo B154TR002f. Looking toward the north.

appears that the product line coming from the east may be from the Building 53 tank system. This pipe splits into northerly, westerly, and southwesterly directions. The northerly direction may be toward the 1,400-gallon UST. The westerly direction may be to the "pump slab" (Jacobs, 1999) and the southwesterly direction to the 7,000-gallon UST. Based on the RRR, the 1,400-gallon UST was separate from the 7,000-and 10,000-gallon gasoline tank system. The purpose of the piping in the northern direction from the UST is unknown. The direction of the other product lines is consistent with the findings reported in the RRR. Soil and groundwater samples were collected from B154TR002 (Table ITM1-5).

Test pit B154TR003 was excavated to 5 feet bgs. A 1.5-inch product line was uncovered at approximately 40 inches below grade. This pipe trends in a southwesterly direction and is assumed to be the same pipe found in B154TR002. Test pit B154TR005 was expanded to the southwest. The northeastern end of a 7,000-gallon UST was uncovered at 53 inches below grade and the continuation of the product line. Elevated soil vapor readings (1000 to 1600 parts per million [ppm]) were measured and the soil was discolored a dark greenish gray.

B154TR003 was deepened to 6 feet to allow groundwater to percolate into the test pit. Soil and groundwater samples were collected from B154TR003 (Table ITM1-5).

Test pit B154TR004 was excavated to a depth of 3 feet below grade. B154TR004 was located in an area of a known natural gas line and an unknown utility alignment. The utility alignment was marked during the geophysical survey and may represent product lines connecting the Building 154 tank system to the Building 53 tank system. A 4-inch natural gas line was uncovered along the southern portion of the excavation. However, no other pipes were found during the excavation.

In summary, three anomalous areas were identified during the geophysical survey at Building 154. Two of three locations corresponded to the locations of a 10,000-gallon and a 7,000-gallon UST. Piping was uncovered leading from the 7,000-gallon UST to the 10,000-gallon UST. This piping branches off the 10,000-gallon UST to the north and east. The eastern branch was probably connected to the Building 53 tank system, because the trace of the lines was not found in test pit B154TR004. The trace of the northern branch is unknown. The geophysical survey does not indicate a utility alignment in this direction. The 1,400-gallon UST identified in the RRR was not located and may not have been installed. The anomalous area in the suspected location of the 1,400-gallon UST was probably attributed to subsurface concrete and interference from numerous utility alignments in the area. Soil types encountered during the excavation test pits at Building 154 included 2 to 3 feet of fill overlaying a silty clay.

2.4.3 Variances. The following changes in field activities occurred during the Building 154 field investigation.

- Three test pits were proposed in the FSIP to investigate potential USTs. A total of seven test pits were

actually excavated to confirm the absence or presence of the USTs and associated piping.

- Soil sampling in test pits B154TR002 and B154TR003 was reduced from two samples at 6 and 11 feet bgs to one at 4 feet bgs, due to the presence of shallow groundwater at 4 to 6 feet bgs.

- Although no USTs or piping were identified in test pits B154TR006 and B154TR007, shallow soil samples were collected due to elevated field PID readings.

- No groundwater was encountered in test pits B154TR006 and B154TR007 because the excavations encountered refusal (concrete) prior to reaching groundwater.

- Test pits to identify piping were limited in number due to subsurface obstructions and utilities. As a result, FA/BC relocated several test pits to confirm piping near USTs.

2.5 Quality Control

QC samples are used to quantitatively assess the quality of data generated during the sampling event. Since the sampling activities for Buildings 53, 73, 103 and 154 were conducted as one sampling event, the number of quality control samples was based on the number of samples collected for the sampling event and not by each FSIP. Quality Assurance/Quality Control (QA/QC) sampling protocols were in accordance with the QAPP. Table ITM1-6 is a summary of the number of QA/QC samples collected and analyses conducted for this investigation. QA splits were submitted to the QA laboratory, but not analyzed per direction of USACE.

SECTION 3.0 RESULTS

This section presents the results of investigation activities at Buildings 53, 73, 103 and 154. The local geology and hydrogeology from the lithological descriptions recorded for each test pit is described in Sections 3.1 and 3.2. A summary of analytical data quality is presented in Section 3.2. Analytical results of samples collected from soil and groundwater are presented and discussed in Sections 3.4 and 3.5. A summary of IDW is presented in Section 3.6.

As previously discussed in Section 2, the geophysical surveys and test pit excavations found four of the nine suspected USTs (one 4,000-gallon UST at Building 53, one 15,000-gallon UST at Building 103, and two [10,000-gallon and 7,000-gallon] USTs at Building 154). Associated piping was also identified for each of the USTs. Samples to evaluate the presence of contamination from USTs were collected from test pits where a UST was identified. Samples were also collected in test pits when field conditions indicated petroleum hydrocarbons had impacted soil or groundwater. A total of eleven soil and four groundwater samples were collected for this investigation. In addition to the sampling, field water quality parameters (pH, electrical conductance, temperature) was measured and depth to groundwater was recorded, if groundwater was encountered. Water quality field measurements are summarized in Table ITM1-7.

3.1 Geology

The area surrounding Buildings 53, 73, 103 and 154 includes a low-lying hill formed by a small outcropping of bedrock that can be observed in the steeply sloping area between Buildings 56A and 53. Bedrock consists of southwesterly steeply dipping beds of massive sandstone, siltstone, and shale from the Martinez Formation. These

beds account for the rise in elevation described previously. The Martinez Formation includes marine-derived sandstone interbedded with thin fossiliferous shale. Alluvial material overlies bedrock in most low-lying areas, and may range from a few feet to more than 80 feet thick. Low lying areas to the south and west of Buildings 53 and 154 were previously marshlands that were filled in during development of the Arsenal.

Soil encountered in most test pits at buildings included fill overlying silty clay and clay. The fill material consists of gravelly silt, low to medium plasticity clay, and silty sand. The thickness of the fill averaged 2 to 3 feet in all of the test pits, except B073TR001, where it was at least 6 feet thick (the total depth of the test pit). The characteristics of the silty clay to clay are low to medium plasticity, low to moderate toughness and dilatancy, moist to dry, blocky, soft to firm, and low estimated permeability. Color ranged from medium brown to greenish gray. Petroleum hydrocarbon odors were especially evident in the clay when the color changed to greenish gray.

Sandstone was encountered in test pit B053TR001 at 2.5 feet and test pit B073TR001 at 5 feet. Overlying the sandstone in B053TR001 was a mixture of decomposed sandstone material and silt, while gravelly silty clay fill material covered the sandstone in B073TR001. The sandstone appeared yellowish brown to dark greenish gray (near the UST at B053TR001), very fine grained, massive, siliceous and moderately cemented, moderately fractured, and low to medium estimated permeability.

3.2 Hydrogeology

Groundwater was encountered in the alluvial/fill material in six test pits (B053TR001, B073TR001, B154TR001, B154TR002, B154TR003 and B154TR005). Depth to water ranged from 4 to 6 feet bgs. The approximate elevation of groundwater at Buildings 53 and 154 is 7 feet above mean seal level (msl), while the groundwater elevation at former Building 73 is approximately 15 feet above msl. Based on the geology in this area, the groundwater encountered near Building 73 is probably perched on top of the sandstone, corresponding to the rise in elevation of the groundwater at former Building 73. These groundwater elevation data are approximate and should only be used for comparison purposes.

Water quality parameters measured from the test pits at Buildings 53, 73 and 154 indicate that the water is fresh. Electrical conductivity values are lower at Building 53 (790 mhos/cm) and Building 73 (620 mhos/cm) than Building 154 (1230 to 1400 mhos/cm) and may indicate an increase in total dissolved solids, but not enough to classify the water as brackish. Total dissolved solids (TDS) was measured at Building 73 (495 mg/L), which is within the range of 0 to 1,000 mg/L TDS for fresh water (Driscoll, 1986). Additionally, measured values for pH (6.88 to 7.10) are corrected for temperature and typical for fresh water, whereas saltwater pH is around 8.3 (Driscoll, 1986). Water quality parameters measured in the field are shown in Table ITM1-7 and analytical results for TDS in Table ITM1-13.

3.3 Data Quality Assessment

Samples collected during the investigations at Buildings 53, 73, 103 and 154 were shipped to EMAX Laboratories (EMAX) in Torrance, California in four work orders: 99F051, 99F058, 99F065 and 99F079. Results from the analyses were received in both electronic and hard copy version. Work Order 99F079 received full validation for all elements identified in the third column of Table 4-1 of the Benicia Arsenal-Wide QAPP (BC, 1999a), against the requirements of the QAPP, and subsequent revisions summarized in the September 1999 Amendment. The remaining three

Work Orders were verified for the subset of elements defined in column 2 of Table 4-1 of the QAPP.

A summary of the data validation and assessment is presented in Appendix D. The data validation and assessment resulted in qualification of analytical results in the form of "flags" according to flagging conventions described in Appendix E of the QAPP (BC, 1999a). A complete summary of analytical results, including flags and reason codes, is presented in Appendices E (soil) and F (groundwater). Appendix G is a legend for the analytical result tables.

In addition to data qualified as part of validation activities, data presented in this TM are also qualified when the results are reported below the practical quantitation limit (PQL) that is specified in Appendix A of the QAPP. As specified in the QAPP, data that are reported below the PQL, but above the laboratory's MDL are qualified with a "J" flag and are considered to be estimated values.

In general, with the exception of polyaromatic hydrocarbon (PAH) data in soil samples, analytical data received from EMAX met requirements of the respective analytical methods and requirements specified in the Benicia Arsenal-Wide QAPP. PAH data in soil samples did not meet method requirements or requirements of the QAPP and were, therefore, flagged with "R" and rejected for use in project decision-making. Although PAH data were rejected, positive PAH results, while not quantitative, are indicators of minimum concentrations of PAHs in the respective soil samples and may, therefore, be used to indicate the presence of PAH compounds. All other data are considered useable for project decision-making purposes.

3.4 Soil Analytical Results

Soil analytes greater than method detection limits (MDLs) are shown in Tables ITM1-8, ITM1-9 and ITM1-10. Appendix D contains all soil results for the field activities at Buildings 53, 73, 103 and 154. Soil samples were analyzed for Methods 3050B/6010A, 5030B/8015B (gasoline range organics [GRO]), 3550B/3630C/8015B (diesel range organics/residual range organics [DRO/RRO]), 5035/8260B (volatile organic compounds [VOCs]) with oxygenates, 3550B/8270C (semivolatile organic compounds [SVOCs]), and 3550B/8310 (PAHs). A summary of soil and analytical results according to method is presented below.

3.4.1 Method 6010 (Metals). Ten soil samples were analyzed for total lead by Method 6010B. Lead analyses were conducted to evaluate potential impacts from leaded gasoline used during DoD operations at the Arsenal. In addition, one soil sample was analyzed for lead, cadmium, total chromium, nickel and zinc. These additional metals analyses are required by Solano County when waste oil contamination is possible, as indicated for Building 103.

Lead is detected in every soil sample collected. Two results exceed the California-modified residential preliminary remediation goal (PRG) of 130 mg/Kg but are less than the industrial PRG of 1,000 mg/Kg. Lead concentrations are detected at 189 mg/Kg (2.25 to 2.75 feet bgs: B053TR001-S03) and 285 mg/Kg (6.25-6.75 feet bgs: B053TR001-S06). Concentrations of the waste oil metals are not reported above any of their respective residential PRGs. Figure ITM1-4 shows the metals results in soil for Method 6010. Table ITM1-8 presents the data.

3.4.2 Method 8015 (GRO/DRO/RRO). Eleven soil samples were analyzed for TPH by Method 8015B. For this analysis, ranges of petroleum hydrocarbons are reported as GRO (C4 to C12), DRO (between C10 and C24), and RRO (between C20 and C40). As a result of these quantification ranges, there is some overlap of GRO/DRO and

DRO/RRO. In order to identify the probable source of the contaminant, chromatographs were studied to determine the primary signature represented for that sample. Soil results of Method 8015B are shown on Figure ITM1-5, and presented in Table ITM1-9.

In general, petroleum hydrocarbons are detected in soil samples at each building, except for former Building 73. Petroleum hydrocarbon concentrations range from less than MDLs to a high of 5790 mg/Kg in test pit B154TR003 at 4 to 4.25 feet bgs. Concentrations range from below MDLs to 7,400 mg/Kg at Buildings 103 and from below MDLs to 5,790 mg/Kg at Building154. Concentrations at Building 53 range from below MDLs to 560 mg/Kg.

Chromatographs for soil samples at Building 53 indicate the presence of gasoline and motor oil range hydrocarbons. Portions of the DRO detected from Building 53 appear more representative of motor oil and lighter components, like kerosene.

The vertical extent of petroleum hydrocarbons was determined in test pit B103TR003 at Building 103. Soil samples at 6 to 6.5 feet bgs range from 1900 mg/Kg DRO to 7,400 mg/Kg RRO. Petroleum hydrocarbons are not detected at 11 feet bgs, which represents the bottom of the UST. Soil in the area of the fillport and the piping uncovered in test pits do not appear impacted. Therefore, petroleum hydrocarbon-impacted soil at test pit B103TR003 may be from leaking product lines. Building 103 chromatographs indicate gasoline, motor oil, and lighter than diesel range constituents.

Building 154 chromatographs indicate gasoline, diesel, light motor oil, and lighter than diesel range constituents. In summary, it appears that gasoline and lighter fractions of diesel appear in soil at Buildings 53, 103 and 154. In addition to these contaminants, diesel is also found at Building 154.

Overall, the lateral extent of petroleum hydrocarbons has not been defined at Buildings 53, 103, and 154. Concentrations exceed assessment criteria of 250 mg/Kg for GRO and 500 mg/Kg for DRO/RRO at test pits B053TR001, B103TR003, B154TR002, B154TR003, B154TR006, and B154TR007.

3.4.3 Method 8260 (VOCs). Eleven soil samples were analyzed for VOCs and oxygenated compounds during the investigation of Buildings 53, 73, 103, and 154. Oxygenates (methyl tertiary butyl ether, diisopropyl ether, ethyl tertiary butyl either, tert0amyl methyl ether, and tertiary butyl alcohol) are gasoline additives. These additives were introduced into gasoline around the early 1980s, after the Army left the Arsenal. These analytes were specifically added to the Method 8260 analyte list in order to distinguish possible post-Army gasoline releases. Oxygenates were not detected in any of the soil samples above MDLs.

VOC concentrations in soil consist primarily of hydrocarbon related compounds (for example, xylenes) and range less than MDLs to 24 mg/Kg of napthalene in test pit B154TR003 at 4 to 4.25 feet bgs. Chlorinated hydrocarbons are detected in various concentrations in all of the test pits (max = 0.022 mg/Kg trichloroethene [TCE] in B073TR001). Otherwise, hydrocarbon-related compounds are detected in all test pits at slightly higher concentrations. The distribution of detected VOCs are similar in all test pits, except B073TR001, where no petroleum hydrocarbon VOCs were detected. This is consistent with the total petroleum hydrocarbon (TPH) results for samples collected from this test pit and analyzed by Method 8015. TCE is the only chlorinated VOC reported at B073TR001 at 0.022 mg/Kg (4 feet bgs). Soil results by Method 8260 are shown on Figure ITM1-1, and presented in Table ITM1-10.

3.4.4 Method 8270 (SVOCs). One soil sample was analyzed by Method 8270. All soil results are less than MDLs.

3.4.5 Method 8310 (PAHs). Soil data for Method 8310 were rejected and can not be used quantitatively. Details are included in Section 3.3, Data Quality Assessment. However, the data were reviewed to see if concentrations were generally low or high.

3.4.6 TICS in Soil. Tentatively identified compounds (TICs) were reported for Methods 8260 and 8270 in accordance with the QAPP. Criteria for TICs is based on a response factor against hexane. All chemicals having a match quality greater than 80 percent were reported by the laboratory and are shown in Table ITM1-11. All results are included in Appendix H.

The majority of the TICs appear to be fuel-related hydrocarbons. Other TICs, such as methy-isobutyl-ketone is solvent-related and the indene group of chemicals are PAHs. TIC concentrations are similar in value to target list of components.

TIC results were evaluated so that any TIC reported consistently in samples may be added to the method analyte list for subsequent investigation phases. Due to the proximity of Buildings 53, 73, 103 and 154 to the 50 Series Complex and possible overlap of soil and groundwater contamination, the addition of TICs to the target analyte list will be addressed as part of the 50 Series TM.

3.5 Groundwater Analytical Results

Groundwater contaminants greater than MDLs are shown in Tables ITM1-12, ITM1-13, ITM1-14 and ITM1-15. Appendix E contains all groundwater results for the field activities at Buildings 53, 73, 103 and 154. Groundwater samples were analyzed for Methods 3010A/6010B, 5030B/8015B (GRO), 3520C/3630C/8015B (DRO/RRO), 5030B/8260B (VOCs) with oxygenates, 3520C/8270C (SVOCs), and 3520C/3630C/8310 (PAHs).

3.5.1 Method 6010 (Metals). Four groundwater samples were analyzed by Method 6010. Lead and selective metals (cadmium, total chromium, nickel and zinc) were analyzed in groundwater. No metals are detected above MDLs. Table ITM1-12 presents the results.

3.5.2 Method 8015 (GRO/DRO/RRO). Four groundwater samples were analyzed by Method 8015. The explanation of the carbon ranges for GRO/DRO/RRO is included in Section 3.3.2 Method 6010 (Metals) for soil results. GRO and DRO were detected in all groundwater samples. RRO is only detected in test pit B154TR003 (4100 ug/L). Detectable concentrations of petroleum hydrocarbons are significantly higher and similar in magnitude at Buildings 154 and 53 than former Building 73. GRO/DDO/RRO concentrations range from 1300 ug/L to 24300 ug/L at Buildings 53 and 154. Former Building 73 concentrations range from 160 to 1370 ug/L. At Building 53 the highest concentrations were detected for DRO (1300 ug/L GRO compared to 3500 ug/L DRO). The results of groundwater for Method 8015 are shown in Figure ITM1-7 and presented in Table ITM1-13. At Buildings 73 and 154, the highest hydrocarbon concentrations were detected for GRO.

As noted above for Method 8015 and 8260 soil results, soil samples from former Building 73 indicate little or no petroleum hydrocarbons in soil. Therefore, the impact on groundwater by petroleum hydrocarbons is probably from another source. However, soil is impacted at Buildings 53, 103 and 154. This may signify that groundwater was impacted from the UST or associated piping at each building.

3.5.3 Method 8260 (VOCs). Four groundwater samples were analyzed by Method 8260. Oxygenates are not detected in groundwater at Buildings 53, 73, 103 or

154. This is consistent with the soil results for oxygenates. This indicates that the source of the impacted groundwater identified by these samples is likely from former DoD activities at the Arsenal.

VOCs reported are predominantly derived from petroleum hydrocarbons. However, other VOCs reported include cis 1,2-dichloroethene, trans-1,2-dichlorethene, and TCE. All samples reported contain at least two of these chlorinated VOCs. All chlorinated hydrocarbon values reported exceed their respective MCLs. VOCs in groundwater at Buildings 53, 73, and 154 are shown on Figure ITM1-8 and presented in Table ITM1-14.

3.5.4 Method 8270 (SVOCs). One groundwater sample was analyzed by Method 8270. Groundwater from test pit B073TR001 was analyzed for SVOCs, because of the possibility of waste oils. All results are detected below MDLs.

3.5.5 Method 8310 (PAHs). Four groundwater samples were analyzed by Method 8310. PAHs are detected in all groundwater samples. Benzo(a)pyrene is the only PAH reported that has an established MCL of 0.2 ug/L. This compound is reported in B053TR001 (0.09 ug/L) and B154TR002 (6.1 ug/L), which exceeds its MCL. PAHs in groundwater at Buildings 53, 73 and 154 are shown on Figure ITM1-9 and presented in Table ITM1-15.

3.5.6 TICs in Groundwater. Criteria for TICs is discussed in Section 3.4.6, TICs in Soil. TIC results in groundwater are shown in Table ITM1-16. Complete results for TICs are also included in Appendix H.

The majority of TICs in groundwater appear to be fuel-related with the minority being solvent related or PAHs. These results are comparable to the TICs identified in soil. TIC concentrations detected are similar in value to target list compounds.

Due to possible overlap of soil and groundwater contamination, the addition of TICs to the target analyte list will be conducted as part of the 50 Series TM.

3.6 Investigation Derived Waste

Approximately 13 drums were filled with soil from B073TR001, B154TR002 and B154TR003 during this investigation. Groundwater was less than 6 feet deep in these test pits and returning soil to the excavation was not an option. As a result, approximately 26 yards of clean gravel was used to fill the test pits to slightly above the water table. With a base of gravel, the pits were then backfilled and compacted with some of the excavated soil. This procedure left a surplus of excavated soil. Based on analytical results, soil from B073TR001 has no detectable levels of petroleum hydrocarbons and low concentrations of chlorinated hydrocarbons (max TCE = 0.002 mg/Kg). Soil from B154TR002 contains petroleum hydrocarbons (max = 1,100 mg/Kg DRO) and no detectable levels of chlorinated hydrocarbons. Soil from B154TR003 contains petroleum hydrocarbons (max = 5,790 mg/Kg GRO), but no chlorinated hydrocarbons. Metals results for all soil samples were below TTLC levels. Therefore, the IDW is primarily impacted with petroleum hydrocarbons and can probably be disposed of at a Class II landfill.

SECTION 4.0
DATA QUALITY OBJECTIVES

The DQOs for this field investigation are shown on Table ITM1-17. These objectives are from the FSIPs for Buildings 53, 73, 103 and 154.

SECTION 5.0
RISK ANALYSIS

A risk-based approach to formalize assessment criteria has not been established for this project. The proximity of

the 50 Series Complex and Buildings 53, 73, 103 and 154 provides the opportunity to develop a conceptual risk model for this area, because potential exposure pathways and receptors are likely to be similar. A risk analysis for these buildings will be included in the TM for the 50 Series Complex.

SECTION 6.0
SUMMARY AND RECOMMENDATIONS

The following section summarizes the results of this investigation at Building 53, 73, 103 and 154. Based on these conclusions, several recommendations are made.

6.1 Summary

A total of four of the nine suspected USTs and associated piping were confirmed during this investigation (one 4,000-gallon UST at Building 53, one 15,000-gallon UST at Building 103, and 7,000-and 10,000-gallon USTs at Building 154). The USTs not found were: a set of 1,000-and 10,000-gallon USTs reported to be beneath the southeast corner of Building 56A (associated with Building 53); a 1,000-gallon UST at former Building 73; a 3,000-gallon UST at Building 103; and a 1,400-gallon UST at Building 154.

Based on the geophysical survey, the confirmation of the two USTs beneath Building 56A was inconclusive because of limitations in geophysical techniques through an elevated concrete floor. Additional possible evidence of contamination from these two potential USTs will be identified from soil samples collected from two borings in this area during an investigation conducted at the 50 Series Complex. The soil sample results from these borings are not included in this report, but will be included in a future TM for the 50 Series Complex.

The UST at Building 73 and the 3,000-gallon UST at Building 103 were not found in test pits. It is possible that the UST at Building 73 was removed when the building was demolished for the construction of Building 98. During this investigation, there were no geophysical anomalies detected in the suspected location of the 3,000-gallon UST at Building 103. Additionally, there was no piping associated with the suspected location of the 3,000-gallon UST, and no signs of contamination. Therefore, we conclude that the 3,000-gallon UST was never installed at Building 103, and may actually be the UST located at Building 161. The reported UST at Building 161 will be investigated in the future.

Three test pits were dug in the area of the 1,400-gallon UST at Building 154. No evidence of piping or the UST was found. A geophysical anomaly in this area is probably due to subsurface concrete and interference from utility alignments.

Analytical results indicate the presence of petroleum hydrocarbons in soil at Buildings 53, 103 and 154, while petroleum hydrocarbons and chlorinated hydrocarbons were identified in groundwater at Buildings 53, 73 and 154. The lack of petroleum hydrocarbons identified in soil at Building 73 may indicate that the groundwater impacted by chlorinated VOCs, is not from former fuel storage activities at Building 73, but another unidentified source. Additionally, the geophysical survey did not indicate the presence of an UST at Building 73. Therefore, no further action is warranted to address USTs at Building 73.

Isomers of DCE were reported in groundwater. These are likely degradation products of the parent product of TCE. Based on the presence of these isomers and the parent compound, it is likely that TCE is undergoing some kind of natural degradation.

6.2 Recommendations

The following recommendations are based on the evidence gathered during this field investigation:

- Determine the source of the impacted groundwater at Building 73.
- Determine the source and extent of the impacted soil and groundwater at Building 154.
- Remove or close the USTs and associated piping at Buildings 53, 103 and 154 in compliance with state and county requirements.
- No further action under FUDS is recommended to address the reported 1,000-gallon UST at Building 73, the reported 3,000-gallon UST at Building 103, and the reported 1,400-gallon UST at Building 154.
- Recommendations to address the potential 1,000-gallon and 10,000-gallon USTs below Building 56A and associated with Building 53 will be finalized when data are evaluated from the 50 Series Complex investigation.
- Evaluate the possible mechanisms of natural attenuation present in this area in conjunction with the 50 Series Complex data.
- Conduct recommended work in conjunction with further investigation of Area I Fuel Only facilities.

SECTION 7.0 REFERENCES

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Table ITM1-1
Site History and Historical Use for Fuel-related Storage Activities at Buildings 53, 73, 103 and 154

Building name	Date of activity	Fuel-related equipment (type and size)	Potential chemicals of concern	Current status (Based on 1999 field investigation)
53	~1943 – 1964	➢ 4,000-gallon UST	petroleum hydrocarbons and lead	present
	unknown It is unclear whether the 1,000 and 10,000-gallon USTs were ever installed.	1,000-gallon diesel and 10,000-gallon high octane gasoline UST. The 1,000-and 10,000-gallon USTs were reportedly beneath the southeast corner of Building 56A.		unknown
	~1943 – 1964	associated piping		present from 4,000-gallon UST to Building 56A
73	~1920 – ~1932	1,000-gallon UST	waste oil, petroleum hydrocarbons and lead	not found; assumed removed, date unknown
		battery of three pumps and tanks for oils		
		5-gallon gasoline pump		
		15-ton truck scale		
		associated piping		
103	~1943 – present	15,000-gallon UST	petroleum hydrocarbons and lead	present
	~1943 – unknown	3,000-gallon kerosene UST		unknown
	~1943 – 1964	truck scale		not found; assumed removed, date unknown
	~1943 – present	two fueling islands		present, foundations only
	~1943 – present	associated piping		present from pump islands to 15,000-gallon UST
154	~1944 – 1964	10,000-gallon high octane gasoline (red) UST	petroleum hydrocarbons and lead	present
		7,000-gallon 80 octane gasoline UST		present
		1,400-gallon white gasoline UST		not found; assumed removed, date unknown
		associated piping		present, near the USTs only

UST – underground storage tank

Table ITM1-2
Sample and Analysis Summary for Building 53

Building	Trench	Sample ID	Soil/ water	Depth (feet)	VOCs	Lead	TPH-DRO/RRO	TPH-GRO	SVOCs	PAHs
53	TR001	B53TR001-S01	S	6.0	X					
		B53TR001-S02	S	6.0				X		
		B53TR001-S03	S	6.25		X	X			X
		B53TR001-S04	S	2.0	X					
		B53TR001-S05	S	2.0				X		
		B53TR001-S06	S	2.25		X	X			X
		B53TR001-S07	S	4.0		X	X			X
		B53TR001-W01	GW	6.5	X	X	X	X		X
	TR002	Per FSIP, Trench to confirm piping. No samples planned; no samples collected.								
Total No. of Analyses			S	--	2	3	3	2	0	3
			GW	--	1	1	1	1	0	1

VOCs = volatile organic compounds by 8260/5035 (soil)/5030B (water)
TPH-DRO/RRO = total petroleum hydrocarbons - diesel range organics/residual range organics by 8015M/3510C
TPH-GRO = total petroleum hydrocarbons - gasoline range organics by 8015M/5030B
PAHs = polynuclear aromatic hydrocarbons by 8310/3510C
SVOCs = semi-volatile organic compounds by 8270/3550C
GW = groundwater
S = soil

Table ITM1-3
Sample and Analysis Summary for Building 73

Building	Trench	Sample ID	Soil/ water	Depth (feet)	VOCs	Metals*	TPH-DRO/RRO	TPH-GRO	SVOCs	PAHs	TDS
73	TR001	B73TR001-S01	S	4.0	X						
		B73TR001-S02	S	4.0				X			
		B73TR001-S03	S	4.0		X	X			X	
		B73TR001-W01	GW	5.0	X	X	X	X	X	X	X
Total No. of Analyses			S	--	1	1	1	1	0	1	0
			GW	--	1	1	1	1	1	1	1

VOCs = volatile organic compounds by 8260/5035 (soil)/5030B (water)
TPH-DRO/RRO = total petroleum hydrocarbons - diesel range organics/residual range organics by 8015M/3510C
TPH-GRO = total petroleum hydrocarbons - gasoline range organics by 8015M/5030B
PAHs = polynuclear aromatic hydrocarbons by 8310/3510C
SVOCs = semi-volatile organic compounds by 8270/3550C
TDS = total dissolved solids
GW = groundwater
S = soil
* cadmium, chromium, lead, nickel, and zinc

Table ITM1-4
Sample and Analysis Summary for Building 103

Building	Trench	Sample ID	Soil/ water	Depth (feet)	VOCs	Lead	TPH-DRO/RRO	TPH-GRO	SVOCs	PAHs
103	TR001	No tank or feature encountered; no samples collected								
	TR002	No tank or feature encountered; no samples collected								
	TR003	B103TR003-S01	S	6.0	X					
		B103TR003-S02	S	6.0				X		
		B103TR003-S03	S	6.0		X	X			X
		B103TR003-S04	S	11.0	X					
		B103TR003-S05	S	11.0				X		
		B103TR003-S06	S	11.0		X	X			X
		B103TR003-S07	S	11.0	X					
		B103TR003-S08	S	11.0				X		
		B103TR003-S09	S	11.0		X	X			X
Total No. of Analyses			S	--	3	3	3	3	0	3
			GW	--	0	0	0	0	0	0

VOCs = volatile organic compounds by 8260/5035 (soil)/5030B (water)
TPH-DRO/RRO = total petroleum hydrocarbons - diesel range organics/residual range organics by 8015M/3510C
TPH-GRO = total petroleum hydrocarbons - gasoline range organics by 8015M/5030B
PAHs = polynuclear aromatic hydrocarbons by 8310/3510C
SVOCs = Semi- volatile organic compounds by 8270/3550C
GW = groundwater
S = soil

Table ITM1-5
Sample and Analysis Summary for Building 154

Building	Trench	Sample ID	Soil/ water	Depth (feet)	VOCs	Lead	TPH-DRO/RRO	TPH-GRO	SVOCs	PAHs
154	TR001	No tank or feature identified, no samples taken								
	TR002	B154TR002-S01	S	3.8	X					
		B154TR002-S02	S	3.8				X		
		B154TR002-S03	S	3.8		X	X			X
		B154TR002-W01	GW	4.0	X	X	X	X		X
	TR003	B154TR003-S01	S	4.0	X					
		B154TR003-S02	S	4.0				X		
		B154TR003-S03	S	4.0		X	X			X
		B154TR003-W01	GW	6.0	X	X	X	X		X
	TR004	Per FSIP, trench excavated to identify piping; no samples planned; no samples collected								
	TR005	Tank identified, samples collected from adjacent trench TR003								
	TR006	B154TR006-S01	S	3.5	X					
		B154TR006-S02	S	3.5				X		
		B154TR006-S03	S	3.5		X	X			X
	TR007	B154TR007-S01	S	5.0	X					
		B154TR007-S02	S	5.0				X		
		B154TR007-S03	S	4.8		X	X			X
Total No. of Analyses			S	--	4	4	4	4	0	4
			GW	--	2	2	2	2	0	2

VOCs = volatile organic compounds by 8260/5035 (soil)/5030B (water)
TPH-DRO/RRO = total petroleum hydrocarbons diesel range organics/residual range organics by 8015M/3510C)
TPH-GRO = total petroleum hydrocarbons - gasoline range organics by 8015M/5030B
PAHs = polynuclear aromatic hydrocarbons by 8310/3510C
SVOCs = semi-volatile organic compounds by 8270/3550C
GW = groundwater
S = soil

Table ITM1-6
Quality Assurance/Quality Control Sample Summary

Sample ID	Matrix	Sample type	VOCs	TPHg	TPHd	PAHs	Metals	SVOCs	TDS
B053TR001-W02	W	Trip blank	X						
B073TR001-W01	GW	MS/MSD	X	X	X	X	X	X	
B073TR001-W02	W	Source	X	X	X	X	X		
B073TR001-W03	W	Filter blank					X		
B103TR003-S04	S	MS/MSD	X						
B103TR003-S05	S	MS/MSD		X					
B103TR003-S06	S	MS/MSD			X	X	X		
B103TR003-S07	S	QA split	X						
B103TR003-S08	S	QA split		X					
B103TR003-S09	S	QA split			X	X	X		
B103TR003-W01	W	Trip Blank	X						
B103TR003-W02	W	Trip blank	X						
B154TR002-W02	W	Trip blank	X						
B154TR003-W02	W	Filter blank					X		
B154TR003-W03	W	Trip blank	X						
B154TR007-S04	S	Duplicate	X						
B154TR007-S05	S	Duplicate		X					
B154TR007-S06	S	Duplicate			X	X	X		
B154TR007-W01	W	Trip blank	X						

GW = groundwater sample
MS/MSD = matrix spike/matrix spike duplicate
PAHs = polynuclear aromatic hydrocarbons
QA = quality assurance
S = soil sample
SVOCs = semi-volatile organic compounds
TDS = total dissolved solids
TPHg = total petroleum hydrocarbons - gasoline
TPHd = total petroleum hydrocarbons - diesel
W = water sample

Note: QA split samples were submitted to QA laboratory, but not analyzed per direction by USACE.

Table ITM1-7
Water Quality Field Measurements for Buildings 53, 73, 103 and 154

Trench	pH	Electrical conductivity (mhos/cm)	Temperature (°C)	Odor
B053TR001	7.10	790	14.2	moderate hydrocarbon
B073TR001	7.01	620	21.7	slight hydrocarbon
B154TR002	7.02	1400	25.6	moderate to strong hydrocarbon
B154TR003	6.88	1230	23.7	strong hydrocarbon

cm = centimeter
°C = degrees celcius

Table ITM1- 8

Analytical Results for Metals Detected in Soil at Buildings 53, 73, 103, and 154

Building 053:

Sample ID	Sample Date	Depth (feet)	Cd	Cr	Ni	Pb	Zn
B053TR001-S03	6/7/1999	6.25-6.75	-	-	-	285	-
B053TR001-S06	6/7/1999	2.25-2.75	-	-	-	189	-
B053TR001-S07	6/7/1999	4-4.25	-	-	-	5.51	-

Building 073:

Sample ID	Sample Date	Depth (feet)	Cd	Cr	Ni	Pb	Zn
B073TR001-S03	6/10/1999	4-4.5	0.28 J	31	25 J	9	58

Building 103:

Sample ID	Sample Date	Depth (feet)	Cd	Cr	Ni	Pb	Zn
B103TR003-S03	6/10/1999	6-6.5	-	-	-	11	-
B103TR003-S06	6/10/1999	11	-	-	-	13	-

Building 154:

Sample ID	Sample Date	Depth (feet)	Cd	Cr	Ni	Pb	Zn
B154TR002-S03	6/8/1999	3.8-4.3	-	-	-	17.5	-
B154TR003-S03	6/8/1999	4-4.5	-	-	-	18.2	-
B154TR006-S03	6/9/1999	3.5	-	-	-	14.4	-
B154TR007-S03	6/9/1999	4.8	-	-	-	9.81	-
B154TR007-S06*	6/9/1999	5	-	-	-	8.59	-

All soil results are reported on a dry weight basis.

' * ' = Duplicate of proceeding sample. See Appendix G for complete legend.

Table ITM1- 9

Analytical Results for TPH and Miscellaneous Constituents Detected in Soil at Buildings 53, 73, 103, and 154

Building 053:

Sample ID	Sample Date	Depth (feet)	GRO (mg/kg)	DRO (mg/kg)	RRO (mg/kg)	MOIST (%)
B053TR001-S01	6/7/1999	6-6.25	-	-	-	13.7
B053TR001-S02	6/7/1999	6-6.25	24	-	-	13.7
B053TR001-S03	6/7/1999	6.25-6.75	-	52 N	220	13.7
B053TR001-S04	6/7/1999	2-2.25	-	-	-	11.1
B053TR001-S05	6/7/1999	2-2.25	<0.87 UJ	-	-	11.1
B053TR001-S06	6/7/1999	2.25-2.75	-	74 N	560	11.1
B053TR001-S07	6/7/1999	4-4.25	-	<2 UJ	<18 UJ	-

Building 073:

Sample ID	Sample Date	Depth (feet)	GRO (mg/kg)	DRO (mg/kg)	RRO (mg/kg)	MOIST (%)
B073TR001-S01	6/10/1999	4	-	-	-	17
B073TR001-S02	6/10/1999	4	<1.01 UJ	-	-	17
B073TR001-S03	6/10/1999	4-4.5	-	<2.4 UJ	<22 UJ	17

Building 103:

Sample ID	Sample Date	Depth (feet)	GRO (mg/kg)	DRO (mg/kg)	RRO (mg/kg)	MOIST (%)
B103TR003-S01	6/10/1999	6	-	-	-	20.1
B103TR003-S02	6/10/1999	6	2230	-	-	20.1
B103TR003-S03	6/10/1999	6-6.5	-	1900 J	7400 J	20.1
B103TR003-S04	6/10/1999	11	-	-	-	21.1
B103TR003-S05	6/10/1999	11	1.33 J	-	-	21.1

All soil results are reported on a dry weight basis.

' * ' = Duplicate of proceeding sample. See Appendix G for complete legend.

Table ITM1- 9, continued

Analytical Results for TPH and Miscellaneous Constituents Detected in Soil at Buildings 53, 73, 103, and 154

Building 103:

Sample ID	Sample Date	Depth (feet)	GRO (mg/kg)	DRO (mg/kg)	RRO (mg/kg)	MOIST (%)
B103TR003-S06	6/10/1999	11	-	<2.5 UJ	<23 UJ	21.1

Building 154:

Sample ID	Sample Date	Depth (feet)	GRO (mg/kg)	DRO (mg/kg)	RRO (mg/kg)	MOIST (%)
B154TR002-S01	6/8/1999	3.8-4	-	-	-	16.9
B154TR002-S02	6/8/1999	3.8-4	82 J	-	-	16.9
B154TR002-S03	6/8/1999	3.8-4.3	-	1100	280	16.9
B154TR003-S01	6/8/1999	4-4.25	-	-	-	17.1
B154TR003-S02	6/8/1999	4-4.25	5790	-	-	17.1
B154TR003-S03	6/8/1999	4-4.5	-	390 J	540 J	17.1
B154TR006-S01	6/9/1999	3.5	-	-	-	21.1
B154TR006-S02	6/9/1999	3.5	1.21 J	-	-	21.1
B154TR006-S03	6/9/1999	3.5	-	700 J	260 J	21.1
B154TR007-S01	6/9/1999	5	-	-	-	15.9
B154TR007-S04*	6/9/1999	4.8	-	-	-	13.8
B154TR007-S02	6/9/1999	5	1150	-	-	15.9
B154TR007-S05*	6/9/1999	5	2140	-	-	13.8
B154TR007-S03	6/9/1999	4.8	-	<2.4 UJ	<21 UJ	15.9
B154TR007-S06*	6/9/1999	5	-	25	<21 UJ	13.8

All soil results are reported on a dry weight basis.

' * ' = Duplicate of proceeding sample. See Appendix G for complete legend.

Table ITM1- 10

Analytical Results for VOCs Detected in Soil at Buildings 53, 73, 103, and 154 (mg/kg)

Building 053:

Sample ID	Sample Date	Depth (feet)	ACE	BTBZN	BTBZS	BTBZT	BZME	CYMP	DCE12C	EBZ
B053TR001-S01	6/7/1999	6-6.25	<0.22 UJ	0.97	0.4	<0.018 UJ	<0.017 UJ	0.13 J	<0.016 UJ	0.34
B053TR001-S04	6/7/1999	2-2.25	0.052 J	<0.0004 UJ	<0.0003 UJ	<0.0003 UJ	0.0022 J	<0.0012 UJ	0.001 J	0.0024 J

Building 073:

Sample ID	Sample Date	Depth (feet)	ACE	BTBZN	BTBZS	BTBZT	BZME	CYMP	DCE12C	EBZ
B073TR001-S01	6/10/1999	4	<0.0047 UJ	<0.0005 UJ	<0.0003 UJ	<0.0004 UJ	<0.0004 UJ	<0.0015 UJ	<0.0003 UJ	<0.0005 UJ

Building 103:

Sample ID	Sample Date	Depth (feet)	ACE	BTBZN	BTBZS	BTBZT	BZME	CYMP	DCE12C	EBZ
B103TR003-S01	6/10/1999	6	<4.6 UJ	<0.45 UJ	<0.32 UJ	<0.38 UJ	<0.35 UJ	<1.5 UJ	<0.33 UJ	<0.44 UJ
B103TR003-S04	6/10/1999	11	<0.0048 UJ	<0.0005 UJ	0.0021 J	<0.0004 UJ	<0.0004 UJ	0.0065	<0.0003 UJ	0.0093

Building 154:

Sample ID	Sample Date	Depth (feet)	ACE	BTBZN	BTBZS	BTBZT	BZME	CYMP	DCE12C	EBZ
B154TR002-S01	6/8/1999	3.8-4	<0.21 UJ	<0.021 UJ	0.062 J	<0.017 UJ	<0.016 UJ	<0.067 UJ	<0.015 UJ	0.02 J
B154TR003-S01	6/8/1999	4-4.25	<4.6 UJ	4 J	1.7 J	<0.38 UJ	<0.35 UJ	6.6	<0.33 UJ	21
B154TR006-S01	6/9/1999	3.5	0.17 J	<0.0005 UJ	<0.0004 UJ	<0.0004 UJ	<0.0004 UJ	<0.0016 UJ	<0.0004 UJ	0.0037 J
B154TR007-S01	6/9/1999	5	<2.2 UJ	0.88 J	1.7 J	0.4 J	<0.17 UJ	<0.71 UJ	<0.16 UJ	0.33 J
B154TR007-S04*	6/9/1999	4.8	<4.2 UJ	<0.41 UJ	<0.29 UJ	<0.35 UJ	<0.32 UJ	<1.3 UJ	<0.3 UJ	<0.4 UJ

All soil results are reported on a dry weight basis.

' * ' = Duplicate of proceeding sample. See Appendix G for complete legend.

Table ITM1- 10, continued

Analytical Results for VOCs Detected in Soil at Buildings 53, 73, 103, and 154 (mg/kg)

Building 053:

Sample ID	Sample Date	Depth (feet)	HCBU	IPBZ	MTLNCL	NAPH	PBZN	STY	TCB123	TCB124
B053TR001-S01	6/7/1999	6-6.25	<0.021 UJ	0.89	<0.022 UJ	0.17 J	3.2	<0.024 UJ	<0.014 UJ	<0.023 UJ
B053TR001-S04	6/7/1999	2-2.25	<0.0004 UJ	<0.0003 UJ	0.0027 J	<0.0004 UJ	<0.0004 UJ	<0.0004 UJ	<0.0002 UJ	<0.0004 UJ

Building 073:

Sample ID	Sample Date	Depth (feet)	HCBU	IPBZ	MTLNCL	NAPH	PBZN	STY	TCB123	TCB124
B073TR001-S01	6/10/1999	4	<0.0005 UJ	<0.0003 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0003 UJ	<0.0005 UJ

Building 103:

Sample ID	Sample Date	Depth (feet)	HCBU	IPBZ	MTLNCL	NAPH	PBZN	STY	TCB123	TCB124
B103TR003-S01	6/10/1999	6	<0.44 UJ	<0.31 UJ	<0.46 UJ	<0.45 UJ	<0.44 UJ	<0.5 UJ	<0.29 UJ	<0.48 UJ
B103TR003-S04	6/10/1999	11	<0.0005 UJ	0.0056 J	<0.0005 UJ	0.011 J	0.0065	<0.0005 UJ	<0.0003 UJ	<0.0005 UJ

Building 154:

Sample ID	Sample Date	Depth (feet)	HCBU	IPBZ	MTLNCL	NAPH	PBZN	STY	TCB123	TCB124
B154TR002-S01	6/8/1999	3.8-4	<0.02 UJ	<0.014 UJ	<0.021 UJ	0.41 J	<0.02 UJ	<0.022 UJ	<0.013 UJ	<0.022 UJ
B154TR003-S01	6/8/1999	4-4.25	<0.44 UJ	5.7	<0.46 UJ	26	7.7	<0.49 UJ	<0.28 UJ	<0.47 UJ
B154TR006-S01	6/9/1999	3.5	<0.0005 UJ	<0.0003 UJ	0.0082 J	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0003 UJ	<0.0005 UJ
B154TR007-S01	6/9/1999	5	1.5 J	0.6 J	<0.22 UJ	4.3 J	1.4 J	0.58 J	2.9 J	2.8 J
B154TR007-S04*	6/9/1999	4.8	<0.4 UJ	<0.28 UJ	<0.42 UJ	<0.41 UJ	<0.4 UJ	<0.45 UJ	<0.26 UJ	<0.43 UJ

All soil results are reported on a dry weight basis.

' * ' = Duplicate of proceeding sample. See Appendix G for complete legend.

Table ITM1 - 10, continued

Analytical Results for VOCs Detected in Soil at Buildings 53, 73, 103, and 154 (mg/kg)

Building 053:

Sample ID	Sample Date	Depth (feet)	TCE	TMB124	TMB135	XYLMP	XYLO
B053TR001-S01	6/7/1999	6-6.25	<0.014 UJ	<0.021 UJ	0.055 J	0.079 J	0.065 J
B053TR001-S04	6/7/1999	2-2.25	0.017 J	<0.0004 UJ	<0.0004 UJ	0.0008 J	<0.0003 UJ

Building 073:

Sample ID	Sample Date	Depth (feet)	TCE	TMB124	TMB135	XYLMP	XYLO
B073TR001-S01	6/10/1999	4	0.022 J	<0.0005 UJ	<0.0005 UJ	<0.0009 UJ	<0.0004 UJ

Building 103:

Sample ID	Sample Date	Depth (feet)	TCE	TMB124	TMB135	XYLMP	XYLO
B103TR003-S01	6/10/1999	6	<0.29 UJ	<0.45 UJ	<0.5 UJ	<0.85 UJ	<0.38 UJ
B103TR003-S04	6/10/1999	11	<0.0003 UJ	0.0094	0.0028 J	0.0086 J	<0.0004 UJ

Building 154:

Sample ID	Sample Date	Depth (feet)	TCE	TMB124	TMB135	XYLMP	XYLO
B154TR002-S01	6/8/1999	3.8-4	<0.013 UJ	0.032 J	<0.023 UJ	<0.038 UJ	<0.017 UJ
B154TR003-S01	6/8/1999	4-4.25	<0.29 UJ	11	4.5 J	7 J	1.2 J
B154TR006-S01	6/9/1999	3.5	<0.0003 UJ	<0.0005 UJ	<0.0006 UJ	0.018 J	0.005 J
B154TR007-S01	6/9/1999	5	<0.14 UJ	<0.21 UJ	<0.24 UJ	0.48 J	0.44 J
B154TR007-S04*	6/9/1999	4.8	<0.26 UJ	<0.4 UJ	<0.46 UJ	<0.77 UJ	<0.35 UJ

All soil results are reported on a dry weight basis.

' * ' = Duplicate of proceeding sample. See Appendix G for complete legend.

Table ITM1-11

Summary of TICs in Soil at Buildings 53, 73, 103 and 154

Field Sample ID	Sample Date	Depth Top	Depth Bot	Prep Method	Method	Analyte ID	Result	Units
B053TR001-S01	07-Jun-99	6.00	6.25	SW5035	SW8260	1234PMBZ	0.87	MG/KG
B053TR001-S01	07-Jun-99	6.00	6.25	SW5035	SW8260	17057-82-8	0.54	MG/KG
B053TR001-S01	07-Jun-99	6.00	6.25	SW5035	SW8260	1758-88-9	2.2	MG/KG
B053TR001-S01	07-Jun-99	6.00	6.25	SW5035	SW8260	19037-72-0	0.71	MG/KG
B053TR001-S01	07-Jun-99	6.00	6.25	SW5035	SW8260	2ETOL	0.49	MG/KG
B053TR001-S01	07-Jun-99	6.00	6.25	SW5035	SW8260	4175-53-5	0.87	MG/KG
B053TR001-S01	07-Jun-99	6.00	6.25	SW5035	SW8260	MCYCHXA	2	MG/KG
B053TR001-S01	07-Jun-99	6.00	6.25	SW5035	SW8260	MLIND	1.2	MG/KG
B073TR001-S03	10-Jun-99	4.00	4.50	SW3550	SW8270	141-79-7	1.1	MG/KG
B073TR001-S03	10-Jun-99	4.00	4.50	SW3550	SW8270	IPBZ	0.5	MG/KG
B103TR003-S01	10-Jun-99	6.00	6.00	SW5035	SW8260	MCYCHXA	18	MG/KG
B103TR003-S04	10-Jun-99	11.00	11.00	SW5035	SW8260	112227	0.038	MG/KG
B103TR003-S04	10-Jun-99	11.00	11.00	SW5035	SW8260	113TMCYCHXA	0.25	MG/KG
B103TR003-S04	10-Jun-99	11.00	11.00	SW5035	SW8260	15890-40-1	0.029	MG/KG
B103TR003-S04	10-Jun-99	11.00	11.00	SW5035	SW8260	622-96-8	0.019	MG/KG
B103TR003-S04	10-Jun-99	11.00	11.00	SW5035	SW8260	MCYCHXA	0.13	MG/KG
B154TR003-S01	08-Jun-99	4.00	4.25	SW5035	SW8260	25DMHEX	0.059	MG/KG
B154TR003-S01	08-Jun-99	4.00	4.25	SW5035	SW8260	MCYCHXA	0.16	MG/KG
B154TR007-S01	09-Jun-99	5.00	5.00	SW5035	SW8260	MDHYDIND	5.4	MG/KG

See Appendix G for list of analyte names, flagging terns, and other notations.

Table ITM1- 12

Analytical Results for Metals Detected in Groundwater at Buildings 53, 73, 103, and 154 (mg/l)

Building 053:

Sample ID	Sample Date	Depth (feet)	Pb
B053TR001-W01	6/7/1999	6.5	0.0022 J

Building 073:

Sample ID	Sample Date	Depth (feet)	Pb
B073TR001-W01	6/10/1999	5	<0.0014 UJ

Building 154:

Sample ID	Sample Date	Depth (feet)	Pb
B154TR002-W01	6/8/1999	4	0.0036 J
B154TR003-W01	6/8/1999	6-6.5	0.0035 J

' * ' = Duplicate of proceeding sample. See Appendix G for complete legend.

Table ITM1- 13

Analytical Results for TPH and Miscellaneous Constituents Detected in Groundwater at Buildings 53, 73, 103, and 154

Building 053:

Sample ID	Sample Date	Depth (feet)	GRO (ug/l)	DRO (ug/l)	RRO (ug/l)	TDS (ug/l)
B053TR001-W01	6/7/1999	6.5	1300	3500	<240 UJ	-

Building 073:

Sample ID	Sample Date	Depth (feet)	GRO (ug/l)	DRO (ug/l)	RRO (ug/l)	TDS (ug/l)
B073TR001-W01	6/10/1999	5	1370	160 J	<230 UJ	495

Building 154:

Sample ID	Sample Date	Depth (feet)	GRO (ug/l)	DRO (ug/l)	RRO (ug/l)	TDS (ug/l)
B154TR002-W01	6/8/1999	4	16200	3900	<1100 UJ	-
B154TR003-W01	6/8/1999	6-6.5	24300 J	3300 J	4100 J	-

' * ' = Duplicate of proceeding sample. See Appendix G for complete legend.

Table ITM1- 14

Analytical Results for VOCs Detected in Groundwater at Buildings 53, 73, 103, and 154 (ug/l)

Building 053:

Sample ID	Sample Date	Depth (feet)	BTBZN	BTBZS	BZ	BZME	CYMP	DCE12C	DCE12T	EBZ
B053TR001-W01	6/7/1999	6.5	50	13 J	8.1 J	<3.8 UJ	<6.1 UJ	14 J	<5.5 UJ	170

Building 073:

Sample ID	Sample Date	Depth (feet)	BTBZN	BTBZS	BZ	BZME	CYMP	DCE12C	DCE12T	EBZ
B073TR001-W01	6/10/1999	5	<1.5 UJ	<1.6 UJ	<0.85 UJ	<0.76 UJ	<1.2 UJ	160	10	<0.94 UJ

Building 154:

Sample ID	Sample Date	Depth (feet)	BTBZN	BTBZS	BZ	BZME	CYMP	DCE12C	DCE12T	EBZ
B154TR002-W01	6/8/1999	4	18 J	<16 UJ	<8.4 UJ	<7.5 UJ	<12 UJ	200	62	12 J
B154TR003-W01	6/8/1999	6-6.5	16 J	<16 UJ	120	21 J	30 J	57	19 J	240

' * ' = Duplicate of proceeding sample. See Appendix G for complete legend.

Table ITM1- 14, continued

Analytical Results for VOCs Detected in Groundwater at Buildings 53, 73, 103, and 154 (ug/l)

Building 053:

Sample ID	Sample Date	Depth (feet)	IPBZ	NAPH	PBZN	TCE	TMB124	TMB135	XYLMP	XYLO
B053TR001-W01	6/7/1999	6.5	44	390	130	15 J	36	81	43	<4.9 UJ

Building 073:

Sample ID	Sample Date	Depth (feet)	IPBZ	NAPH	PBZN	TCE	TMB124	TMB135	XYLMP	XYLO
B073TR001-W01	6/10/1999	5	<1.4 UJ	<1.5 UJ	<1.1 UJ	180 J	<1 UJ	<1.3 UJ	<1.9 UJ	<0.99 UJ

Building 154:

Sample ID	Sample Date	Depth (feet)	IPBZ	NAPH	PBZN	TCE	TMB124	TMB135	XYLMP	XYLO
B154TR002-W01	6/8/1999	4	<14 UJ	27 J	<11 UJ	17 J	16 J	<13 UJ	<19 UJ	<9.9 UJ
B154TR003-W01	6/8/1999	6-6.5	65	120	54	<8.6 UJ	16 J	55	110	15 J

' * ' = Duplicate of proceeding sample. See Appendix G for complete legend.

Table ITM1- 15

Analytical Results for PAHs Detected in Groundwater at Buildings 53, 73, 103, and 154 (ug/l)

Building 053:

Sample ID	Sample Date	Depth (feet)	ACNP	ACNPY	ANTH	BZAA	BZAP	BZBF	BZGHIP	BZKF
B053TR001-W01	6/7/1999	6.5	1000 J	120	<0.06 UJ	<0.08 UJ	0.09 J	<0.19 UJ	0.72	<0.08 UJ

Building 073:

Sample ID	Sample Date	Depth (feet)	ACNP	ACNPY	ANTH	BZAA	BZAP	BZBF	BZGHIP	BZKF
B073TR001-W01	6/10/1999	5	30 J	<1.38 UJ	<0.04 UJ	<0.08 UJ	<0.09 UJ	<0.19 UJ	<0.14 UJ	<0.08 UJ

Building 154:

Sample ID	Sample Date	Depth (feet)	ACNP	ACNPY	ANTH	BZAA	BZAP	BZBF	BZGHIP	BZKF
B154TR002-W01	6/8/1999	4	<7.92 UJ	56 N	1.6 J	8.9	6.1	6.2	<1.48 UJ	7.2 J
B154TR003-W01	6/8/1999	6-6.5	340 J	120 N	<0.6 UJ	<0.84 UJ	<0.97 UJ	<1.95 UJ	<1.48 UJ	<0.66 UJ

' * ' = Duplicate of proceeding sample. See Appendix G for complete legend.

Table ITM1- 15, continued

Analytical Results for PAHs Detected in Groundwater at Buildings 53, 73, 103, and 154 (ug/l)

Building 053:

Sample ID	Sample Date	Depth (feet)	CHRYSENE	FL	FLA	INP123	NAPH	PHAN	PYR
B053TR001-W01	6/7/1999	6.5	<0.08 UJ	50 J	<0.13 UJ	0.29 J	220	0.57	<0.16 UJ

Building 073:

Sample ID	Sample Date	Depth (feet)	CHRYSENE	FL	FLA	INP123	NAPH	PHAN	PYR
B073TR001-W01	6/10/1999	5	<0.09 UJ	<0.17 UJ	<0.12 UJ	<0.08 UJ	<0.65 UJ	<0.07 UJ	<0.16 UJ

Building 154:

Sample ID	Sample Date	Depth (feet)	CHRYSENE	FL	FLA	INP123	NAPH	PHAN	PYR
B154TR002-W01	6/8/1999	4	15 J	<1.74 UJ	21	<0.82 UJ	8.9 J	1.9 J	24
B154TR003-W01	6/8/1999	6-6.5	<0.9 UJ	<1.74 UJ	<1.38 UJ	<0.82 UJ	34 J	1.8 J	2.9 J

' * ' = Duplicate of proceeding sample. See Appendix G for complete legend.

Table ITM1-16
Summary of TICs in Groundwater at Buildings 53, 73, and 154

Field Sample ID	Sample Date	Depth Top	Depth Bot	Prep Method	Method	Analyte ID	Result	Units
B053TR001-W01	07-Jun-99	6.50	6.50	SW5030	SW8260	1234PMBZ	120	UG/L
B053TR001-W01	07-Jun-99	6.50	6.50	SW5030	SW8260	17057-82-8	100	UG/L
B053TR001-W01	07-Jun-99	6.50	6.50	SW5030	SW8260	1758-88-9	420	UG/L
B053TR001-W01	07-Jun-99	6.50	6.50	SW5030	SW8260	2ETOL	50	UG/L
B053TR001-W01	07-Jun-99	6.50	6.50	SW5030	SW8260	3ETOL	200	UG/L
B053TR001-W01	07-Jun-99	6.50	6.50	SW5030	SW8260	IPBZ	25	UG/L
B053TR001-W01	07-Jun-99	6.50	6.50	SW5030	SW8260	IPTOL	50	UG/L
B053TR001-W01	07-Jun-99	6.50	6.50	SW5030	SW8260	MCYM	25	UG/L
B053TR001-W01	07-Jun-99	6.50	6.50	SW5030	SW8260	MDHYDIND	200	UG/L
B073TR001-W01	10-Jun-99	5.00	5.00	SW5030	SW8260	2MPNTA	25	UG/L
B073TR001-W01	10-Jun-99	5.00	5.00	SW5030	SW8260	3MNONA	220	UG/L
B073TR001-W01	10-Jun-99	5.00	5.00	SW5030	SW8260	4MNONA	140	UG/L
B073TR001-W01	10-Jun-99	5.00	5.00	SW3520	SW8270	81983-71-3	6.86	UG/L
B154TR002-W01	08-Jun-99	4.00	4.00	SW5030	SW8260	124TMCYCPNTE	300	UG/L
B154TR002-W01	08-Jun-99	4.00	4.00	SW5030	SW8260	CTT124TMCYC	450	UG/L
B154TR003-W01	08-Jun-99	6.00	6.50	SW5030	SW8260	1MCYCPNTE	50	UG/L
B154TR003-W01	08-Jun-99	6.00	6.50	SW5030	SW8260	2ETOL	100	UG/L
B154TR003-W01	08-Jun-99	6.00	6.50	SW5030	SW8260	5M14HEXD	100	UG/L
B154TR003-W01	08-Jun-99	6.00	6.50	SW5030	SW8260	ECPNTA	50	UG/L
B154TR003-W01	08-Jun-99	6.00	6.50	SW5030	SW8260	MCYCHXA	450	UG/L
B154TR003-W01	08-Jun-99	6.00	6.50	SW5030	SW8260	MDHYDIND	100	UG/L
B154TR003-W01	08-Jun-99	6.00	6.50	SW5030	SW8260	MLIND	150	UG/L

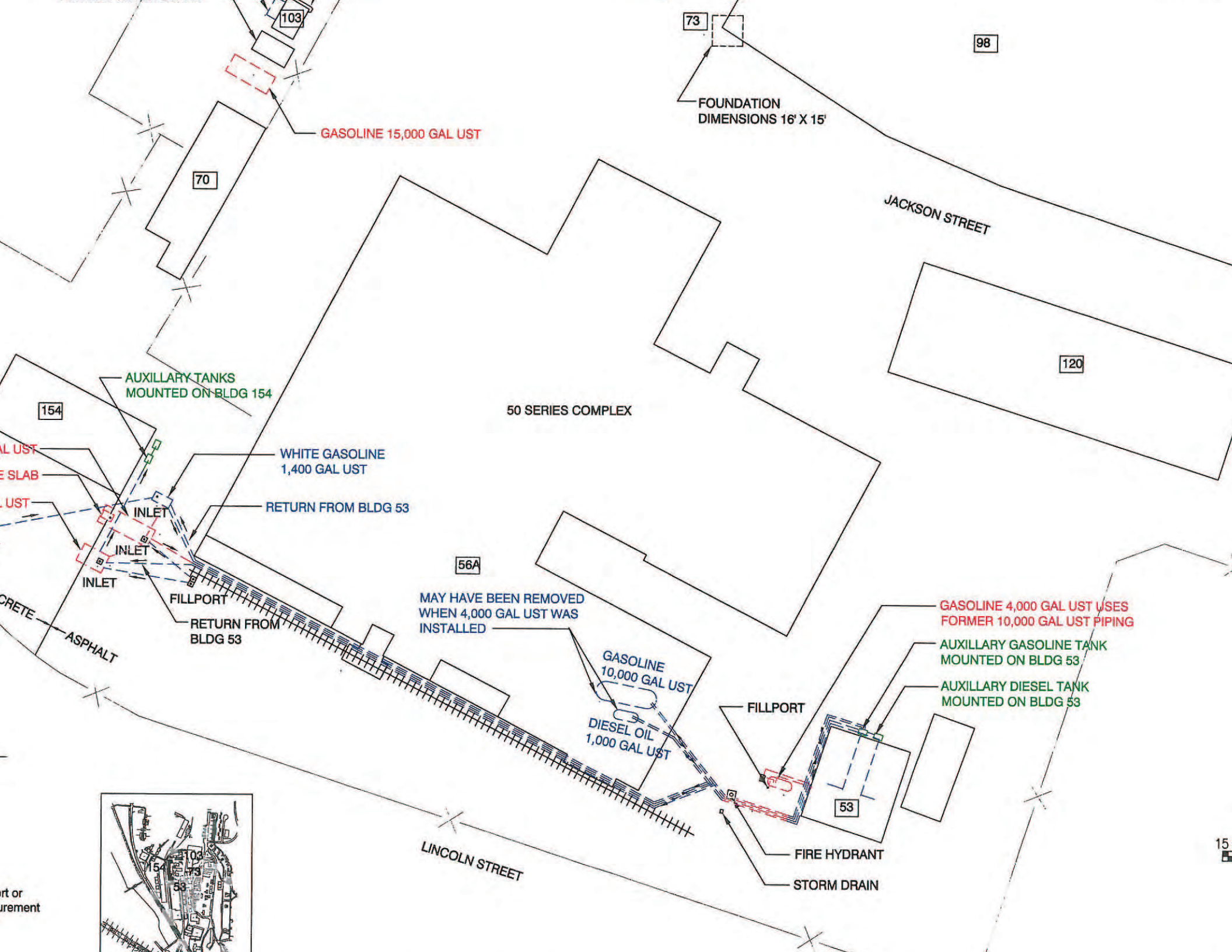
See Appendix G for list of analyte names, flagging terms, and other notations.

Table ITM1-17
Data Quality Objectives for Buildings 53, 73, 103 and 154

Data Quality Objective	DQO Met? (yes/no)	Explanation
Building 53		
Confirm the existence of fuel storage facilities at Building 53 (two USTs [underground storage tank] beneath the southeast corner of Building 56A and one UST near the west wall of Building 53)	Partial	One 1,400-gallon UST and associated piping confirmed. Absence or presence of potential USTs located beneath Building 56A not confirmed.
Determine the presence of petroleum hydrocarbons and lead in soil and/or groundwater associated with fuel storage activities at this Department of Defense (DoD) facility	Yes	The presence of GRO and DRO hydrocarbons confirmed in soil and groundwater. Lead confirmed in soil above residential PRG concentrations less than industrial PRGs.
Determine if concentrations exceed assessment criteria, which may require additional data collection, risk analysis or remediation	Yes	Formal assessment criteria have not been approved. However, presence of contaminants will probably require additional data to assess the vertical and lateral extent of impacts from lead and RRO in soil and petroleum hydrocarbons, VOCs, and PAHs in groundwater.
Determine if USTs found require removal or closure	Yes	One UST and associated piping confirmed. Close in accordance with Solano County requirements.
Former Building 73		
Confirm the existence of fuel storage facilities at former Building 73 (one fuel UST and oils tanks [possible USTs] beneath the southwest corner of Building 98	Yes	File review, geological survey, and subsurface investigation did not identify a UST related to the former Building 73.
Determine the presence of petroleum hydrocarbons, oils, polyaromatic hydrocarbons (PAHs) and lead in soil and/or groundwater associated with fuel and oil storage activities at this Department of Defense (DoD) facility	Yes	See Section 3.3 Soil Results and Section 3.4 Groundwater Results. Hydrocarbons are not reported in soil samples from the test pit excavated at former Building 73. Hydrocarbons and chlorinated VOCs are reported in groundwater.
Determine if concentrations exceed assessment criteria, which may require additional data collection, risk analysis or remediation	Yes	Due to the lack of a UST or hydrocarbon contamination in soil, no further action is warranted to address USTs at former Building 73. Additional characterization data will probably be warranted to assess groundwater contamination in conjunction to other possible source areas (50 Series Complex, for example). Further definition is required to determine the source and lateral extent of petroleum hydrocarbons, VOCs, and PAHs in groundwater.
Determine if USTs found require removal or closure.	Yes	No UST or associated piping located during this investigation. Soil results do not indicate the presence of a leaking UST in the area. No further action under FUDS is recommended for the reported UST at former Building 73.

Table ITM1-17 (continued)
Data Quality Objectives for Building 53, 73, 103 and 154

Data Quality Objective	DQO Met? (yes/no)	Explanation
Building 103		
Confirm the existence of fuel storage facilities at Building 103 (one gasoline USTs south of Building 103, one kerosene UST near the western wall of Building 103, and two pump islands)	Yes	One 15,000 gallon UST and associated piping identified.
Determine the presence of petroleum hydrocarbons and lead in soil and/or groundwater associated with fuel storage activities at this DoD facility	Yes	The presence of hydrocarbons in soil confirmed. Lead concentrations in soil do not exceed applicable regulatory concentrations. Groundwater was not encountered.
Determine if concentrations exceed assessment criteria, which may require additional data collection, risk analysis or remediation	Yes	Although assessment criteria have not been formalized, further definition is probably necessary to assess lateral extent of petroleum hydrocarbons in soil near UST and to assess the presence of petroleum hydrocarbons, VOCs, and PAHs in groundwater.
Determine if USTs found require removal or closure	Yes	One UST and associated piping confirmed. Close in accordance with Solano County requirements.
Building 154		
Confirm the existence of fuel storage facilities at Building 154 (two gasoline USTs south of Building 154, one diesel UST between Building 56A and Building 154, and a "pump slab")	Yes	Two USTs and associated piping confirmed.
Determine the presence of petroleum hydrocarbons and lead in soil and/or groundwater associated with fuel storage activities at this Department of Defense (DoD) facility	Yes	The presence of hydrocarbons in soil and chlorinated VOCs and hydrocarbons in groundwater was confirmed. Lead concentrations in soil and groundwater do not exceed applicable regulatory concentrations.
Determine if concentrations exceed assessment criteria, which may require additional data collection, risk analysis or remediation	Yes	Although assessment criteria have not been formalized, further definition is probably necessary to assess lateral extent of petroleum hydrocarbons in soil and to assess petroleum hydrocarbons and VOCs in groundwater.
Determine if USTs found require removal or closure	Yes	Two USTs and associated piping confirmed. Close in accordance with Solano County requirements.
Investigation-wide decisions:		
Assess the impact of soil type and stratigraphy on the mobility and distribution of chemicals of potential concern (COPC)	Partially	Shallow groundwater and bedrock topography were identified to impact the mobility and distribution of COPCs.
Assess if COPC are present in soil and/or groundwater and if concentrations exceed assessment criteria and may require additional data collection, risk analysis or remediation	Partially	Hydrocarbons reported in soil and groundwater, and chlorinated VOCs reported in groundwater. Concentrations reported for these COPCs indicate some additional characterization is probably warranted to assess vertical and lateral extent of impacts.


103
73
98
GASOLINE 15,000 GAL UST
FOUNDATION
DIMENSIONS 16' X 15'
70
JACKSON STREET
120
AUXILLARY TANKS
MOUNTED ON BLDG 154
154
50 SERIES COMPLEX
WHITE GASOLINE
1,400 GAL UST
RETURN FROM BLDG 53
INLET
INLET
INLET
FILLPORT
RETURN FROM
BLDG 53
56A
MAY HAVE BEEN REMOVED
WHEN 4,000 GAL UST WAS
INSTALLED
GASOLINE
10,000 GAL UST
DIESEL OIL
1,000 GAL UST
GASOLINE 4,000 GAL UST USES
FORMER 10,000 GAL UST PIPING
AUXILLARY GASOLINE TANK
MOUNTED ON BLDG 53
AUXILLARY DIESEL TANK
MOUNTED ON BLDG 53
FILLPORT
53
FIRE HYDRANT
STORM DRAIN
LINCOLN STREET
ASPHALT
154
103
73
53

SURVEY AREAS

(C)

(AC)

103

FORMER TRUCK SCALE

(AC)

(AC) GRAVEL)

CONCRETE FOOTING

70

(RC)

(AC)

(RC)

73

DIMENSIONS 16' X 15'

98

(AC)

(AC)

JACKSON STREET

120

50 SERIES COMPLEX

154

(AC)

(C)

(C)

(AC)

56A

BUILDING 154 SURVEY AREA

(AC)

BUILDING 56A SURVEY AREA

BUILDING 53 SURVEY AREA

PLANTER

STEEP SLOPE

(AC)

(RC)

53

(AC)

FIRE HYDRANT

STORM DRAIN

LINCOLN STREET

(AC)

15

103

BUILDING 103
SURVEY AREAS

CONCRETE
FOOTING

FORMER TRUCK
SCALE

73

98

70

JACKSON STREET

120

154

50 SERIES COMPLEX

56A

BUILDING 154
SURVEY AREA

BUILDING 53
SURVEY AREA

ible UST

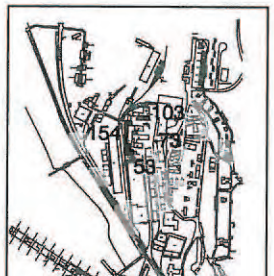
BUILDING 56A
SURVEY AREA

53

LINCOLN STREET

FIRE HYDRANT

STORM DRAIN



15

B073TR001-S03	4-4.5	10-Jun-99	Nickel	25 mg/Kg	(J)
B073TR001-S03	4-4.5	10-Jun-99	Zinc	58 mg/Kg	

B103TR002

103

B073TR001

73

98

B103TR003

	Depth (ft bgs)	Sample Date	Analyte	Concentration
B103TR003-S03	6-6.5	10-Jun-99	Lead	11 mg/Kg
B103TR003-S06	11	10-Jun-99	Lead	13 mg/Kg

70

JACKSON STREET

	Depth (ft bgs)	Sample Date	Analyte	Concentration
B154TR007-S03	4.8	09-Jun-99	Lead	9.81 mg/Kg
B154TR007-S06 (S03 Dup)	5	09-Jun-99	Lead	8.59 mg/Kg

120

50 SERIES COMPLEX

154

	Depth (ft bgs)	Sample Date	Analyte	Concentration
B154TR006-S03	3.5	09-Jun-99	Lead	14.4 mg/Kg

B154TR007

B154TR006

B154TR001

B154TR003

B154TR002

B154TR005

56A

	Depth (ft bgs)	Sample Date	Analyte	Concentration
B154TR002-S03	3.8-4.3	08-Jun-99	Lead	17.5 mg/Kg

B154TR004

	Depth (ft bgs)	Sample Date	Analyte	Concentration
B154TR003-S03	3.8-4.3	08-Jun-99	Lead	18.2 mg/Kg

	Depth (ft bgs)	Sample Date	Analyte	Concentration
B053TR001-S06	2.25-2.75	07-Jun-99	Lead	189 mg/Kg
B053TR001-S07 (sandstone)	4-4.25	07-Jun-99	Lead	5.51 mg/Kg
B053TR001-S03	6.25-6.75	07-Jun-99	Lead	285 mg/Kg

53

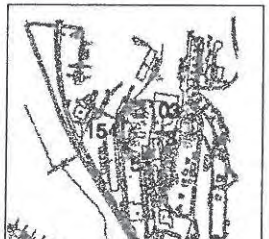
B053TR001

B053TR002

FIRE HYDRANT

STORM DRAIN

LINCOLN STREET



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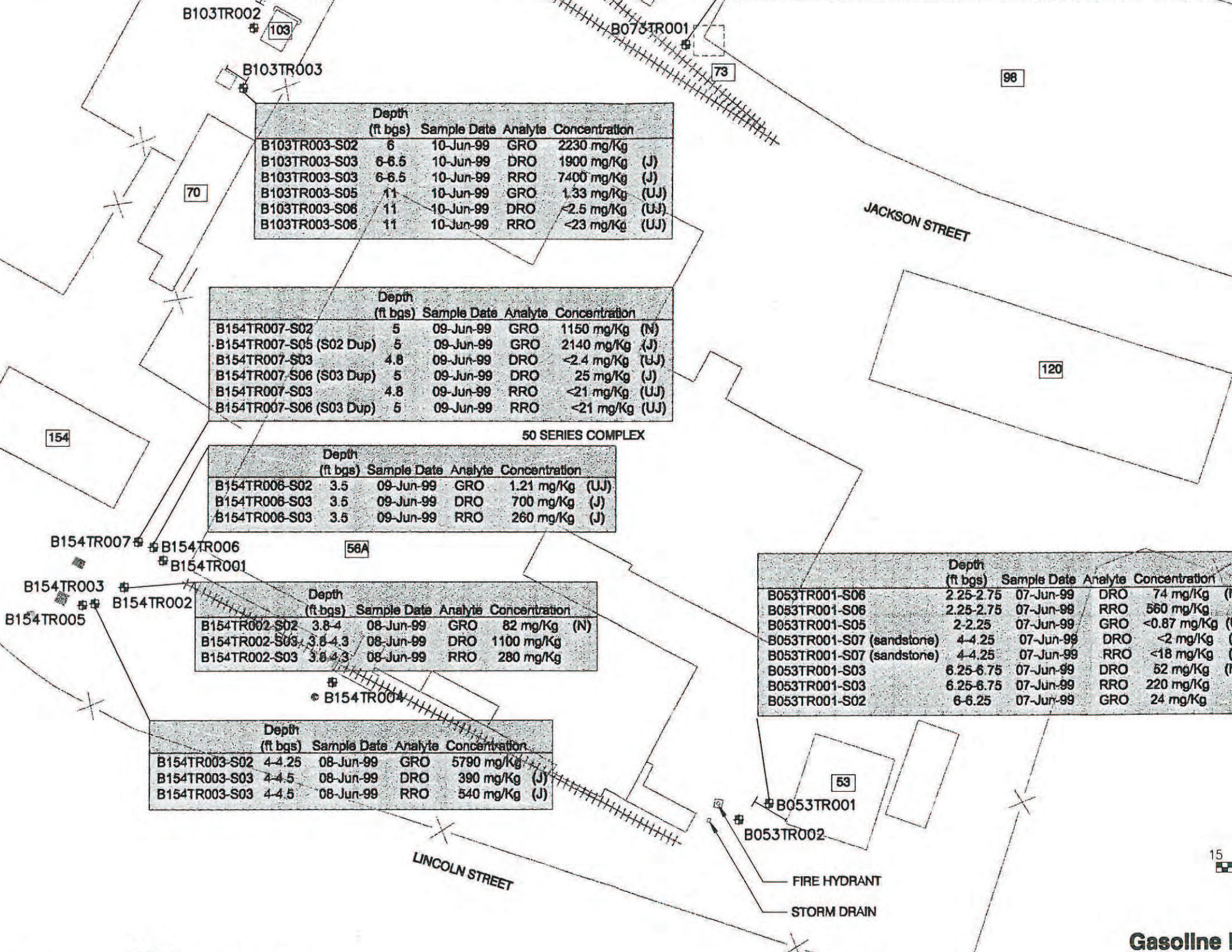


	Depth (ft bgs)	Sample Date	Analyte	Concentration	
B103TR003-S02	6	10-Jun-99	GRO	2230 mg/Kg	
B103TR003-S03	6-6.5	10-Jun-99	DRO	1900 mg/Kg	(J)
B103TR003-S03	6-6.5	10-Jun-99	RRO	7400 mg/Kg	(J)
B103TR003-S05	11	10-Jun-99	GRO	1.33 mg/Kg	(UJ)
B103TR003-S06	11	10-Jun-99	DRO	<2.5 mg/Kg	(UJ)
B103TR003-S06	11	10-Jun-99	RRO	<23 mg/Kg	(UJ)

	Depth (ft bgs)	Sample Date	Analyte	Concentration	
B154TR007-S02	5	09-Jun-99	GRO	1150 mg/Kg	(N)
B154TR007-S05 (S02 Dup)	5	09-Jun-99	GRO	2140 mg/Kg	(J)
B154TR007-S03	4.8	09-Jun-99	DRO	<2.4 mg/Kg	(UJ)
B154TR007-S06 (S03 Dup)	5	09-Jun-99	DRO	25 mg/Kg	(J)
B154TR007-S03	4.8	09-Jun-99	RRO	<21 mg/Kg	(UJ)
B154TR007-S06 (S03 Dup)	5	09-Jun-99	RRO	<21 mg/Kg	(UJ)

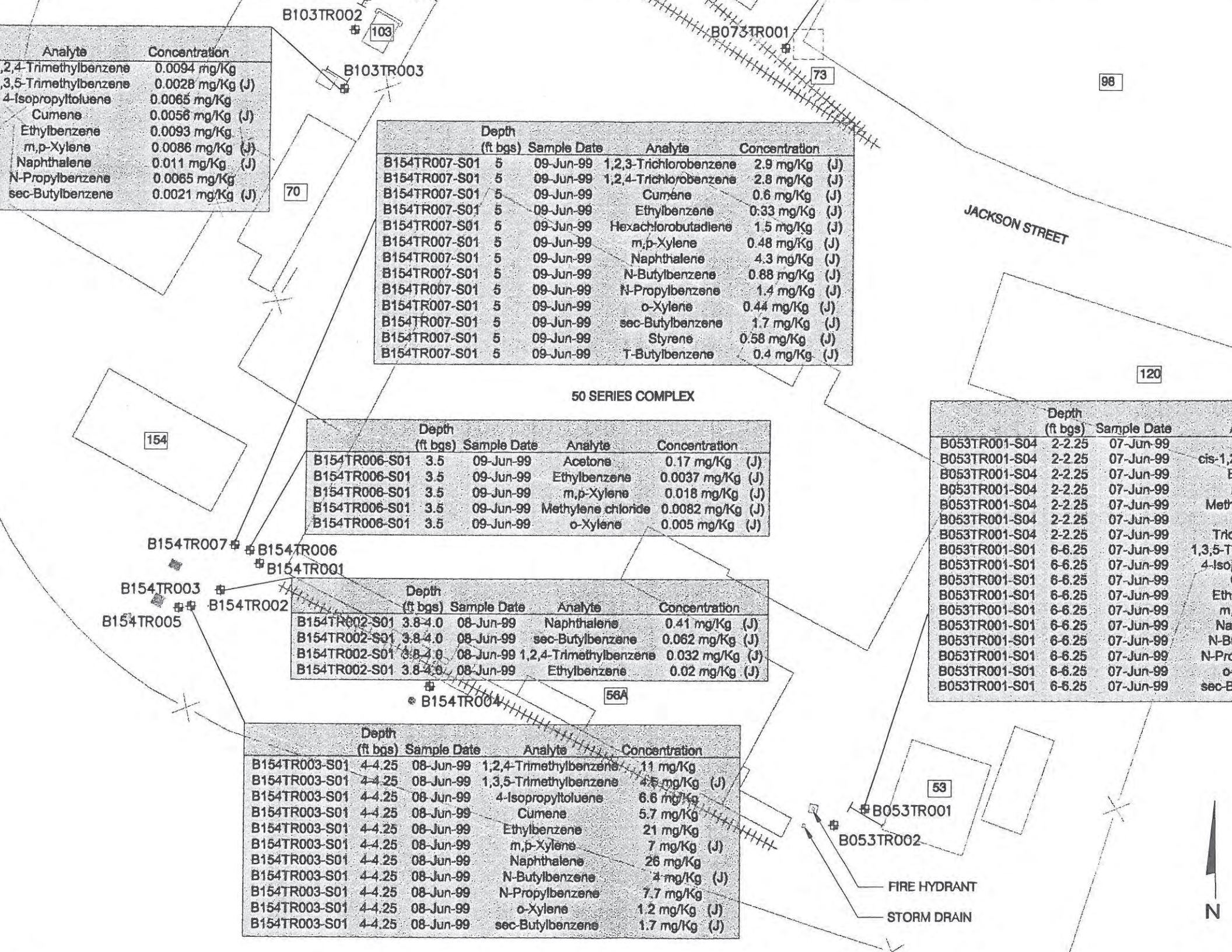
	Depth (ft bgs)	Sample Date	Analyte	Concentration	
B154TR006-S02	3.5	09-Jun-99	GRO	1.21 mg/Kg	(UJ)
B154TR006-S03	3.5	09-Jun-99	DRO	700 mg/Kg	(J)
B154TR006-S03	3.5	09-Jun-99	RRO	260 mg/Kg	(J)

	Depth (ft bgs)	Sample Date	Analyte	Concentration	
B154TR002-S02	3.8-4	08-Jun-99	GRO	82 mg/Kg	(N)
B154TR002-S03	3.8-4.3	08-Jun-99	DRO	1100 mg/Kg	
B154TR002-S03	3.8-4.3	08-Jun-99	RRO	280 mg/Kg	

	Depth (ft bgs)	Sample Date	Analyte	Concentration	
B154TR003-S02	4-4.25	08-Jun-99	GRO	5790 mg/Kg	
B154TR003-S03	4-4.5	08-Jun-99	DRO	390 mg/Kg	(J)
B154TR003-S03	4-4.5	08-Jun-99	RRO	540 mg/Kg	(J)

	Depth (ft bgs)	Sample Date	Analyte	Concentration	
B053TR001-S06	2.25-2.75	07-Jun-99	DRO	74 mg/Kg	(I
B053TR001-S06	2.25-2.75	07-Jun-99	RRO	560 mg/Kg	
B053TR001-S05	2-2.25	07-Jun-99	GRO	<0.87 mg/Kg	(I
B053TR001-S07 (sandstone)	4-4.25	07-Jun-99	DRO	<2 mg/Kg	(
B053TR001-S07 (sandstone)	4-4.25	07-Jun-99	RRO	<18 mg/Kg	(
B053TR001-S03	6.25-6.75	07-Jun-99	DRO	52 mg/Kg	(I
B053TR001-S03	6.25-6.75	07-Jun-99	RRO	220 mg/Kg	
B053TR001-S02	6-6.25	07-Jun-99	GRO	24 mg/Kg	

Gasoline



Analyte	Concentration
,2,4-Trimethylbenzene	0.0094 mg/Kg
,3,5-Trimethylbenzene	0.0028 mg/Kg (J)
4-Isopropyltoluene	0.0065 mg/Kg
Cumene	0.0056 mg/Kg (J)
Ethylbenzene	0.0093 mg/Kg
m,p-Xylene	0.0086 mg/Kg (J)
Naphthalene	0.011 mg/Kg (J)
N-Propylbenzene	0.0065 mg/Kg
sec-Butylbenzene	0.0021 mg/Kg (J)

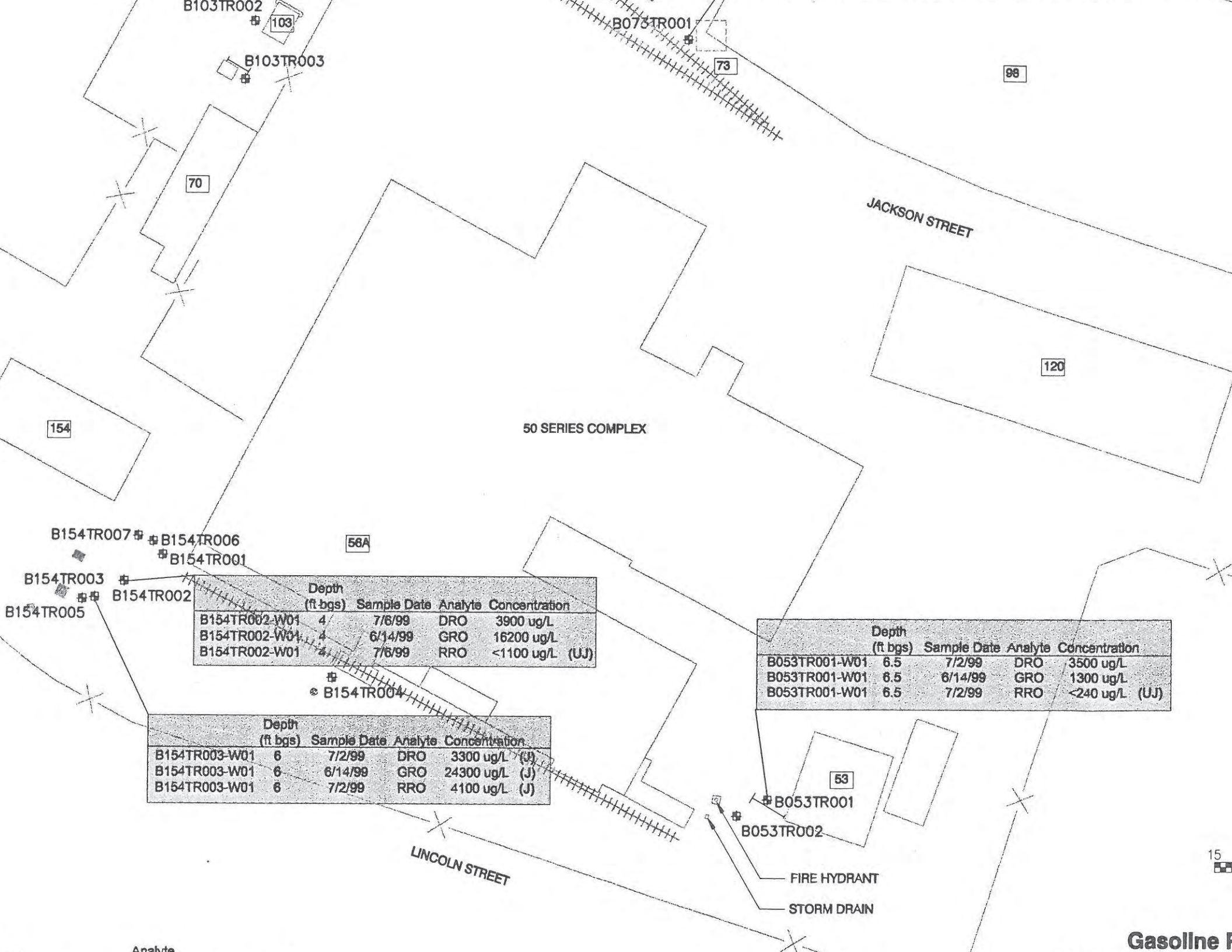
	Depth (ft bgs)	Sample Date	Analyte	Concentration
B154TR007-S01	5	09-Jun-99	1,2,3-Trichlorobenzene	2.9 mg/Kg (J)
B154TR007-S01	5	09-Jun-99	1,2,4-Trichlorobenzene	2.8 mg/Kg (J)
B154TR007-S01	5	09-Jun-99	Cumene	0.6 mg/Kg (J)
B154TR007-S01	5	09-Jun-99	Ethylbenzene	0.33 mg/Kg (J)
B154TR007-S01	5	09-Jun-99	Hexachlorobutadiene	1.5 mg/Kg (J)
B154TR007-S01	5	09-Jun-99	m,p-Xylene	0.48 mg/Kg (J)
B154TR007-S01	5	09-Jun-99	Naphthalene	4.3 mg/Kg (J)
B154TR007-S01	5	09-Jun-99	N-Butylbenzene	0.88 mg/Kg (J)
B154TR007-S01	5	09-Jun-99	N-Propylbenzene	1.4 mg/Kg (J)
B154TR007-S01	5	09-Jun-99	o-Xylene	0.44 mg/Kg (J)
B154TR007-S01	5	09-Jun-99	sec-Butylbenzene	1.7 mg/Kg (J)
B154TR007-S01	5	09-Jun-99	Styrene	0.58 mg/Kg (J)
B154TR007-S01	5	09-Jun-99	T-Butylbenzene	0.4 mg/Kg (J)

	Depth (ft bgs)	Sample Date	Analyte	Concentration
B154TR006-S01	3.5	09-Jun-99	Acetone	0.17 mg/Kg (J)
B154TR006-S01	3.5	09-Jun-99	Ethylbenzene	0.0037 mg/Kg (J)
B154TR006-S01	3.5	09-Jun-99	m,p-Xylene	0.018 mg/Kg (J)
B154TR006-S01	3.5	09-Jun-99	Methylene chloride	0.0082 mg/Kg (J)
B154TR006-S01	3.5	09-Jun-99	o-Xylene	0.005 mg/Kg (J)

	Depth (ft bgs)	Sample Date	Analyte	Concentration
B154TR002-S01	3.8-4.0	08-Jun-99	Naphthalene	0.41 mg/Kg (J)
B154TR002-S01	3.8-4.0	08-Jun-99	sec-Butylbenzene	0.062 mg/Kg (J)
B154TR002-S01	3.8-4.0	08-Jun-99	1,2,4-Trimethylbenzene	0.032 mg/Kg (J)
B154TR002-S01	3.8-4.0	08-Jun-99	Ethylbenzene	0.02 mg/Kg (J)

	Depth (ft bgs)	Sample Date	Analyte	Concentration
B154TR003-S01	4-4.25	08-Jun-99	1,2,4-Trimethylbenzene	11 mg/Kg
B154TR003-S01	4-4.25	08-Jun-99	1,3,5-Trimethylbenzene	4.5 mg/Kg (J)
B154TR003-S01	4-4.25	08-Jun-99	4-Isopropyltoluene	6.6 mg/Kg
B154TR003-S01	4-4.25	08-Jun-99	Cumene	5.7 mg/Kg
B154TR003-S01	4-4.25	08-Jun-99	Ethylbenzene	21 mg/Kg
B154TR003-S01	4-4.25	08-Jun-99	m,p-Xylene	7 mg/Kg (J)
B154TR003-S01	4-4.25	08-Jun-99	Naphthalene	26 mg/Kg
B154TR003-S01	4-4.25	08-Jun-99	N-Butylbenzene	4 mg/Kg (J)
B154TR003-S01	4-4.25	08-Jun-99	N-Propylbenzene	7.7 mg/Kg
B154TR003-S01	4-4.25	08-Jun-99	o-Xylene	1.2 mg/Kg (J)
B154TR003-S01	4-4.25	08-Jun-99	sec-Butylbenzene	1.7 mg/Kg (J)

	Depth (ft bgs)	Sample Date	A
B053TR001-S04	2-2.25	07-Jun-99	
B053TR001-S04	2-2.25	07-Jun-99	cis-1,2
B053TR001-S04	2-2.25	07-Jun-99	E
B053TR001-S04	2-2.25	07-Jun-99	
B053TR001-S04	2-2.25	07-Jun-99	Meth
B053TR001-S04	2-2.25	07-Jun-99	
B053TR001-S04	2-2.25	07-Jun-99	Trich
B053TR001-S01	6-6.25	07-Jun-99	1,3,5-T
B053TR001-S01	6-6.25	07-Jun-99	4-Isop
B053TR001-S01	6-6.25	07-Jun-99	
B053TR001-S01	6-6.25	07-Jun-99	Eth
B053TR001-S01	6-6.25	07-Jun-99	m,p
B053TR001-S01	6-6.25	07-Jun-99	Na
B053TR001-S01	6-6.25	07-Jun-99	N-B
B053TR001-S01	6-6.25	07-Jun-99	N-Pro
B053TR001-S01	6-6.25	07-Jun-99	o-
B053TR001-S01	6-6.25	07-Jun-99	sec-B



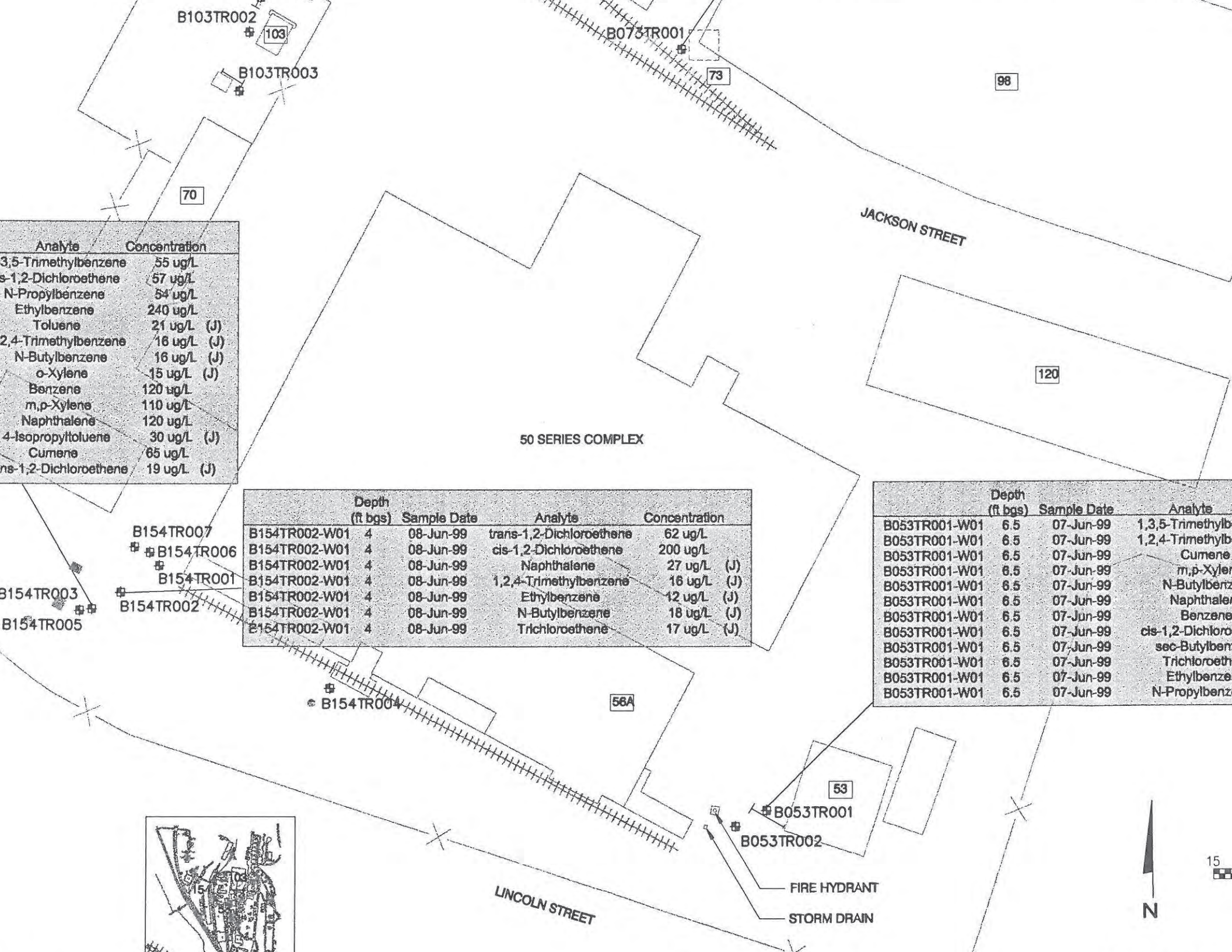
	Depth (ft bgs)	Sample Date	Analyte	Concentration	
B154TR002-W01	4	7/6/99	DRO	3900 ug/L	
B154TR002-W01	4	6/14/99	GRO	16200 ug/L	
B154TR002-W01	4	7/6/99	RRO	<1100 ug/L	(UJ)

	Depth (ft bgs)	Sample Date	Analyte	Concentration	
B154TR003-W01	6	7/2/99	DRO	3300 ug/L	(J)
B154TR003-W01	6	6/14/99	GRO	24300 ug/L	(J)
B154TR003-W01	6	7/2/99	RRO	4100 ug/L	(J)

	Depth (ft bgs)	Sample Date	Analyte	Concentration	
B053TR001-W01	6.5	7/2/99	DRO	3500 ug/L	
B053TR001-W01	6.5	6/14/99	GRO	1300 ug/L	
B053TR001-W01	6.5	7/2/99	RRO	<240 ug/L	(UJ)

Analyte

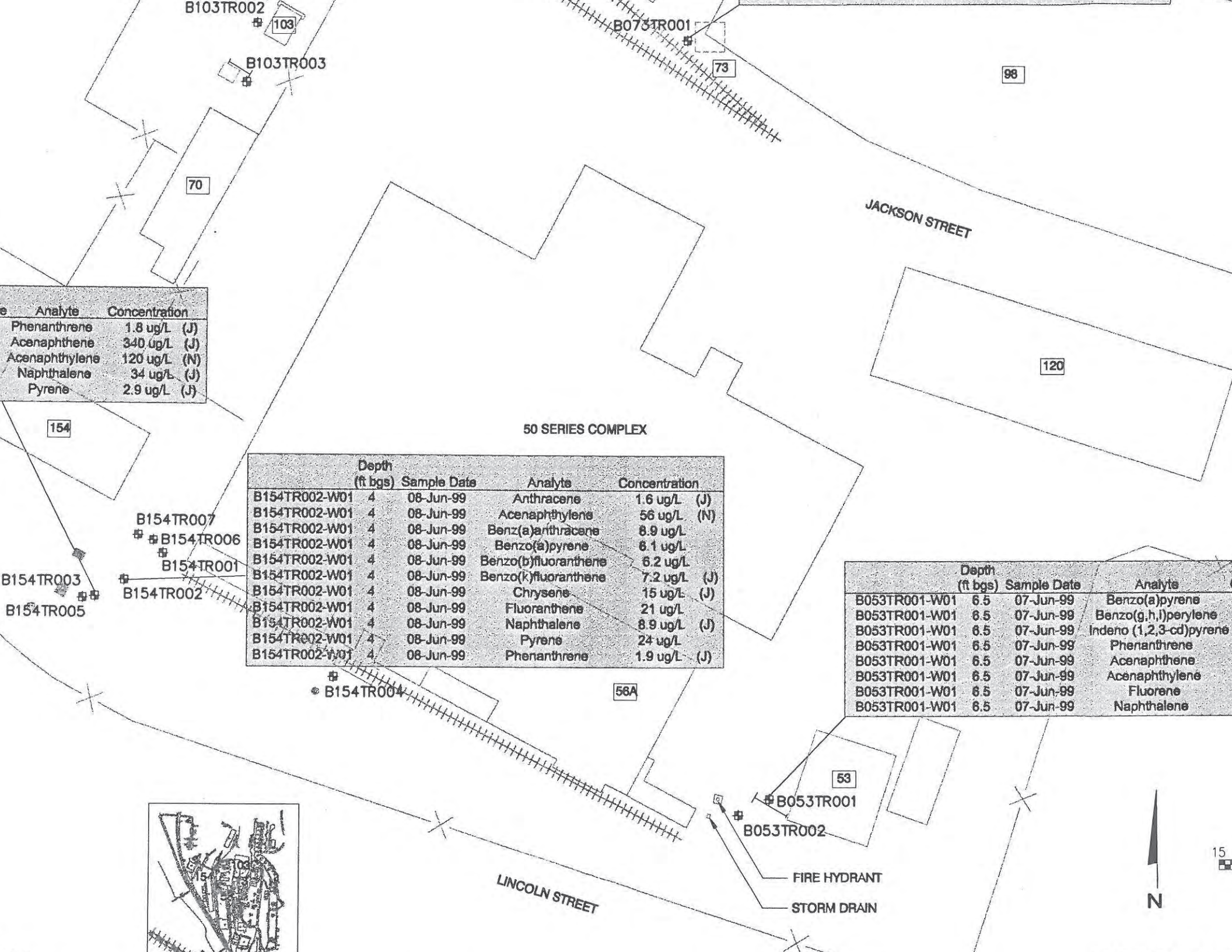
Gasoline



Analyte	Concentration	
3,5-Trimethylbenzene	55 ug/L	
s-1,2-Dichloroethene	57 ug/L	
N-Propylbenzene	54 ug/L	
Ethylbenzene	240 ug/L	
Toluene	21 ug/L	(J)
2,4-Trimethylbenzene	16 ug/L	(J)
N-Butylbenzene	16 ug/L	(J)
o-Xylene	15 ug/L	(J)
Benzene	120 ug/L	
m,p-Xylene	110 ug/L	
Naphthalene	120 ug/L	
4-Isopropyltoluene	30 ug/L	(J)
Cumene	65 ug/L	
ns-1,2-Dichloroethene	19 ug/L	(J)

	Depth (ft bgs)	Sample Date	Analyte	Concentration	
B154TR002-W01	4	08-Jun-99	trans-1,2-Dichloroethene	62 ug/L	
B154TR002-W01	4	08-Jun-99	cis-1,2-Dichloroethene	200 ug/L	
B154TR002-W01	4	08-Jun-99	Naphthalene	27 ug/L	(J)
B154TR002-W01	4	08-Jun-99	1,2,4-Trimethylbenzene	16 ug/L	(J)
B154TR002-W01	4	08-Jun-99	Ethylbenzene	12 ug/L	(J)
B154TR002-W01	4	08-Jun-99	N-Butylbenzene	18 ug/L	(J)
B154TR002-W01	4	08-Jun-99	Trichloroethene	17 ug/L	(J)

	Depth (ft bgs)	Sample Date	Analyte
B053TR001-W01	6.5	07-Jun-99	1,3,5-Trimethylb
B053TR001-W01	6.5	07-Jun-99	1,2,4-Trimethylb
B053TR001-W01	6.5	07-Jun-99	Cumene
B053TR001-W01	6.5	07-Jun-99	m,p-Xyler
B053TR001-W01	6.5	07-Jun-99	N-Butylbenz
B053TR001-W01	6.5	07-Jun-99	Naphthaler
B053TR001-W01	6.5	07-Jun-99	Benzene
B053TR001-W01	6.5	07-Jun-99	cis-1,2-Dichloro
B053TR001-W01	6.5	07-Jun-99	sec-Butylben
B053TR001-W01	6.5	07-Jun-99	Trichloroeth
B053TR001-W01	6.5	07-Jun-99	Ethylbenze
B053TR001-W01	6.5	07-Jun-99	N-Propylbenz



e	Analyte	Concentration	
	Phenanthrene	1.8 ug/L	(J)
	Acenaphthene	340 ug/L	(J)
	Acenaphthylene	120 ug/L	(N)
	Naphthalene	34 ug/L	(J)
	Pyrene	2.9 ug/L	(J)

	Depth (ft bgs)	Sample Date	Analyte	Concentration	
B154TR002-W01	4	08-Jun-99	Anthracene	1.6 ug/L	(J)
B154TR002-W01	4	08-Jun-99	Acenaphthylene	56 ug/L	(N)
B154TR002-W01	4	08-Jun-99	Benz(a)anthracene	8.9 ug/L	
B154TR002-W01	4	08-Jun-99	Benzo(a)pyrene	6.1 ug/L	
B154TR002-W01	4	08-Jun-99	Benzo(b)fluoranthene	6.2 ug/L	
B154TR002-W01	4	08-Jun-99	Benzo(k)fluoranthene	7.2 ug/L	(J)
B154TR002-W01	4	08-Jun-99	Chrysene	15 ug/L	(J)
B154TR002-W01	4	08-Jun-99	Fluoranthene	21 ug/L	
B154TR002-W01	4	08-Jun-99	Naphthalene	8.9 ug/L	(J)
B154TR002-W01	4	08-Jun-99	Pyrene	24 ug/L	
B154TR002-W01	4	08-Jun-99	Phenanthrene	1.9 ug/L	(J)

	Depth (ft bgs)	Sample Date	Analyte
B053TR001-W01	6.5	07-Jun-99	Benzo(a)pyrene
B053TR001-W01	6.5	07-Jun-99	Benzo(g,h,i)perylene
B053TR001-W01	6.5	07-Jun-99	Indeno (1,2,3-cd)pyrene
B053TR001-W01	6.5	07-Jun-99	Phenanthrene
B053TR001-W01	6.5	07-Jun-99	Acenaphthene
B053TR001-W01	6.5	07-Jun-99	Acenaphthylene
B053TR001-W01	6.5	07-Jun-99	Fluorene
B053TR001-W01	6.5	07-Jun-99	Naphthalene