REVISED WORK PLAN FOR FURTHER EVALUATION OF GMW-62 LNAPL PLUME

Defense Fuel Support Point Norwalk
15306 Norwalk Boulevard
Norwalk, California 90650

04-NDLA-001

Prepared For:

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1.0 INTRODUCTION

This *Revised Work Plan for Further Evaluation of GMW-62 LNAPL Plume* (Work Plan) was prepared by The Source Group, Inc. (SGI), on behalf of the Defense Logistics Agency - Energy (DLA-Energy). This Work Plan was requested by the Regional Water Quality Control Board (RWQCB) in conjunction with the ongoing assessment and remediation of soil and groundwater at the Defense Fuel Supply Point Norwalk facility (DFSP Norwalk). The RWQCB required that DLA-Energy evaluate the occurrence of light, non-aqueous phase liquid (LNAPL) present in off-site groundwater monitoring well GMW-62. Recent gauging of this well showed that greater than one foot of LNAPL is present. Although, recovery of LNAPL is ongoing, additional investigation of the area to the east of GMW-62 is justified to determine whether recoverable LNAPL is present.

Groundwater monitoring well GMW-62 is located on City of Norwalk-owned property adjacent to the eastern boundary of DFSP Norwalk. GMW-62 is situated within Holifield Park and thus access to the Park and the well must be performed in accordance with the conditions of an access agreement issued by the City.

GMW-62 was installed between a walking path and a baseball field. Based on previously collected assessment data, there is reason to believe that the LNAPL detected in GMW-62 extends further to the east. However, the area east of GMW-62 is nearer to the baseball field. The proximity of the athletic field requires that consideration be given during planning for the placement of additional wells to ensure that such new wells do not pose a safety risk to park and baseball field users.

1.1 Site Location and Vicinity

The DFSP Norwalk facility is a 50-acre facility that formerly included 12 aboveground storage tanks used for storage of Jet Propellant No.4 (JP-4), JP-5, and JP-8. Aviation gasoline was reportedly distributed at the truck rack, but not stored in the aboveground tanks. Santa Fe Pacific Pipeline, L.P. (SFPP), an operating partner of Kinder Morgan Energy Partners, L.P. (KMEP), leases a 2-acre easement along the southern and eastern boundaries of DFSP Norwalk for operation of its pipelines, which convey gasoline, diesel, and jet fuel. Within the southern easement lie three active pipelines, one of which is a 16-inch diameter pipeline, designated LS-1, that bends at the southeastern corner of the facility and continues northward within the eastern easement. An abandoned pipeline, likely owned or formerly operated by Golden West Pipeline, also runs along the eastern boundary of the site. DLA-Energy has decommissioned the site, but SFPP pipelines continue to operate.

1.2 Objective of the Workplan

This Work Plan presents the rationale and investigation methods to further evaluate the subsurface occurrence and potential migration pathways of LNAPL present in the vicinity of GMW-62. The

findings of the proposed investigation will be used to evaluate the need to modify or expand current remediation activities.

1.3 Background

During a meeting in October 2003 between the California Regional Water Quality Control Board, Los Angeles Region, (RWQCB) and DLA-Energy (formerly known as the Defense Energy Supply Center or DESC), the RWQCB requested that additional groundwater monitoring wells be installed along the eastern site boundary to delineate the eastern extent of the shallow aquifer dissolved plume. In April 2004, pursuant to the RWQCB's request, two groundwater monitoring wells, designated GMW-60 and GMW-61 (Figure 2 through Figure 4), were installed along the eastern site boundary. Volatile organic compounds (VOCs) and total petroleum hydrocarbons (TPH) as JP-5 were detected in some soil and groundwater samples from these two wells. Detected VOCs included lighter-end petroleum compounds, including benzene, toluene, ethylbenzene, and xylenes (BTEX), 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene. No methyl tertiary-butyl ether (MTBE) was detected in the groundwater samples from GMW-60 or GMW-61. Tertiary-butyl alcohol (TBA) has been reported in both GMW-60 and GMW-62 at concentrations ranging up to 1,200 micrograms per liter (µg/L; reported in GMW-60 on April 17, 2014) and 210 µg/L (reported in GMW-61 on October 8, 2013). TPH as JP-5 was detected in soil samples collected at 10 and 30 feet below ground surface (bgs) during the installation of GMW-60.

Additional drilling and soil sampling activities were performed west of GMW-60 in the northeastern part of the DFSP Norwalk site in July 2004. No soil impacts were detected during the step-out soil investigation west of GMW-60. However, TPH as gasoline (TPH-G), TPH as free product (TPH-FP), and BTEX were detected in the groundwater samples. In a letter dated February 16, 2005, the RWQCB requested that DLA-Energy and KMEP investigate the eastern boundary area of the subject site to evaluate the extent of affected groundwater in the eastern area and to identify the source of the impact. Consequently, KMEP and DLA-Energy jointly conducted soil and groundwater investigations in the eastern boundary area of the facility in July 2005, and in the eastern boundary area and the adjacent off-site area in the west side of Holifield Park in August 2006. Results from these investigations were presented in the *Eastern Boundary and Eastern Boundary Off-Site Area Soil and Groundwater Preliminary Investigation Report* (Parsons, 2006). No source area of the LNAPL was identified.

As part of the ongoing evaluation of the occurrence of LNAPL in Holifield Park, groundwater well GMW-62 was installed in 2007. Since shortly after installation, this well has consistently shown the presence of LNAPL. Although the source of the LNAPL present in GMW-62 has not been definitively determined, DLA-Energy has assumed the responsibility for the recovery of LNAPL and for conducting the assessment of soil, soil gas, and groundwater conditions as directed by the RWQCB. Groundwater monitoring wells GMW-63, GMW-64, GMW-65 were subsequently

installed between 200 and 500 feet northeast and southeast of GMW-62. Although these wells have contained low concentrations of petroleum hydrocarbons, no LNAPL has been detected.

2.0 SITE GEOLOGY AND HYDROGEOLOGY AND GMW-62 LNAPL

The *Conceptual Site Model and Remedial Action Evaluation for Soil, Groundwater and LNAPL* (Parsons, 2013), provides a detail description of the site geology and hydrogeology. A summary of this information is provided in this section as well as a summary of the occurrence of LNAPL at GMW-62.

2.1 Site Geology

DFSP Norwalk is located between the Montebello Forebay and the Downey Plain in the Central Basin pressure area. Approximately 50 to 60 feet of alluvium (primarily sand, gravel, silt, and clay) cover the underlying Lakewood Formation in this area. Alluvial sediments exposed in the area of the site include mixtures and layers of sand, gravel, silt, and clay. The underlying Lakewood Formation consists of marine and continental gravel, sand, silt, and clay deposits, under which the San Pedro Formation, approximately 300 feet below grade, consists of marine and continental gravel, sandy silt, silt, and clay deposits.

Lithologic logs of borings drilled during previous investigations indicate that sediments beneath the site consist of clayey silt, sandy silt, silty sand, fine- to coarse-grained sand, and deeper coarse-grained sand with granitic cobbles. The top of a clay layer, preliminarily identified as the uppermost sediment layer of the Bellflower Aquitard, was encountered at a depth of approximately 55 to 65 feet during previous investigations.

2.2 Site Hydrogeology

A shallow semiperched aquifer, consisting of silt and fine- to coarse-grained sand, exists in the alluvial sediments underlying the site. Groundwater from this semiperched aquifer was reported between 24 and 34 feet bgs between January and March 2010, and has been decreasing since 2010. The water level data indicate that static groundwater flow direction within this aquifer is generally toward the northwest, but is contained by the active groundwater extraction systems operating at the site. This shallow aquifer is approximately 30 to 35 feet thick, based on the reported presence of a clay layer at approximately 55 to 65 feet below grade. The Exposition Aquifer underlies the Bellflower Aquitard. Groundwater depths within the Exposition Aquifer range between 49 and 56 feet below grade with a reported gradient toward the southeast.

Recent groundwater level declines in the shallow aquifer have resulted in localized increases in LNAPL thicknesses reported at the site.

2.3 GMW-62 Area

Recent liquid level gauging conducted April 15, 2014, indicated a measured LNAPL thickness of 2.69 feet GMW-62. Previous investigations in the vicinity of GMW-62, including soil, soil gas, and

Ultraviolet Optical Screening Tool (UVOST) investigations, did not identify a potential shallow source of the observed GMW-62 LNAPL. Soil matrix samples and soil gas samples contained very low to non-detectable concentrations of petroleum hydrocarbons. Thus, a source area could not be identified. However, groundwater data collected during these investigations provides details as to the distribution of the highest concentrations of hydrocarbons in the shallow, semiperched aquifer.

Appendix A provides a summary map (Figure 5) from Parson's January 25, 2008, work plan entitled *Holifield Park Supplemental Investigation and Groundwater Remediation Work Plan.* As indicated in Parson's Figure 5, direct push boring B-120 contained elevated concentrations of TPH-FP and TPH-G as well as BTEX. Groundwater monitoring well GMW-62 is located within 20 feet of B-120, thus indicating that elevated TPH and BTEX concentrations found in a direct push boring water sample are potentially indicative of the occurrence of LNAPL. This observation was used to select the location of additional groundwater monitoring wells proposed in this work plan.

3.0 PROPOSED INVESTIGATION

This investigation will consist of the installation of three groundwater monitoring wells. The proposed wells will be used to obtain groundwater gradient data, for groundwater sampling, and if present, the recovery of LNAPL. Three predetermined locations for the monitoring wells have been determined through the analysis of data collected from soil borings and cone penetrometer test (CPT) soundings previously completed in Holifield Park.

3.1 Selection of Proposed Monitoring Well Locations

As with previous direct push boring location B-120 (adjacent to the location of GMW-62), direct push borings B-117 and B-118 revealed elevated BTEX levels, and B-118 revealed elevated TPH levels (Appendix A, Figure 5). The concentrations of either TPH or BTEX at these locations were comparable to concentrations found at B-120. Direct push borings located further to the northeast, east, and southeast, including borings B-116, B-41, B-54, B-45, and B-48, did not reveal elevated concentrations of TPH or BTEX, thus providing control as to the lateral eastward distribution of LNAPL present at GMW-62.

Therefore, monitoring wells are proposed to be placed near former direct push borings B-117 and B-118, and a third between B-117 and B-118. Due to the presence of the baseball playing field, the wells will be installed approximately 35 feet west of the north-south line described by B-117 and B-118 (Figure 4). The wellhead completions could pose a risk to ball field users and thus the locations of borings B-117 and B-118 were avoided.

The proposed groundwater monitoring wells will follow the previous numbering scheme: Using GMW-62 as a point of reference, GMW-67 will be installed 100 feet to the northeast, GMW-68 will be installed 68 feet due east, and GMW-69 will be installed 100 feet to the southeast of GMW-62 (Figure 4).

3.2 Scope of Work

The proposed groundwater investigation will include the installation of three groundwater monitoring wells. At each location, the initial borehole will be drilled to a target depth of approximately 45 feet bgs using hollow stem auger with continuous coring to document the site lithology and identify the target lithologic zone for the well screen. The wells will be completed with at-grade wellboxes, developed, surveyed, and included in the site groundwater monitoring program.

3.3 Preparatory Activities

The site- and task-specific health and safety plan (HASP) will be updated prior to field work. SGI and subcontractor personnel will be required to familiarize themselves with the HASP, sign the

HASP prior to working on site, and adhere to the provisions of the HASP during all aspects of field work. The HASP identifies the specific chemical compounds known to exist in the subsurface at the site. In addition, the HASP presents the chemical properties of the identified and typical compounds and identifies task-specific health and safety risks.

Prior to the initiation of field activities, monitoring well installation permits will be obtained from the Los Angeles County Department of Health Services. Additionally, the proposed drilling locations will be pre-marked at the Site. Underground Service Alert (USA) will be notified to identify any potential subsurface utilities, and the drilling locations will be cleared of subsurface utilities and structures using geophysical survey methods. As an added precaution to ensure that no underground utility is disturbed, each drilling location will be cleared manually using a hand auger and/or posthole digger to a minimum of 5 feet bgs).

The RWQCB will be notified a minimum of 48 hours prior to the initiation of field activities.

3.4 Well Drilling

The proposed investigation includes three locations, as shown on Figure 4. At each location, a well will be installed to allow monitoring of groundwater in the shallow semiperched aquifer. SGI will supervise the drilling, installation, and development of the wells. The installation of the groundwater monitoring wells will be performed using a CME-75 or CME-95 hollow-stem-auger (HSA) drill rig (or equivalent) equipped with 10-inch-outside-diameter augers and operated by a California-licensed drilling contractor.

Based on the an assumed depth to groundwater of approximately 25 feet below grade, the soil borings for the wells will be advanced to a total depth of 45 feet bgs. Soil samples will be collected at 5-foot depth intervals and will be visually evaluated. Visual description of soil samples will include the following information:

- percentage of sample recovery,
- grain size classification (USCS; percentages of gravel, sand, silt, and clay),
- color (Munsell color chart),
- density,
- odor,
- degree of moisture, and
- depth to first encountered groundwater,

Soil samples will be screened in the field for VOCs using an organic vapor monitor equipped with a photoionization detector (PID). Approximately 20 grams of saturated or unsaturated soil from every 5-foot interval will be placed in a self-sealing plastic bag to allow VOCs in the pore space to volatilize. The headspace in the plastic bag will then be monitored for VOCs with the PID.

A minimum of three soil samples will be submitted for laboratory analysis from each boring: one sample with the highest PID reading in the vadose zone, one sample from the capillary fringe, and the bottom sample from the boring will be analyzed. The upper two samples will be used to further characterize the vadose zone and the soil/groundwater interface; the deepest soil boring will be used to evaluate the vertical extent of chemicals of concern at the Site. Each soil sample selected for laboratory analysis will be sealed, labeled, and placed on ice in a thermally insulated cooler pending transport to the analytical laboratory. Soil samples will be analyzed for TPH in accordance with Environmental Protection Agency (EPA) Method 8015M and for VOCs (including gasoline-range organics [GRO], oxygenates, and BTEX compounds) using EPA Method 8260B.

The wells will be constructed following the July 1995 CalEPA guidance manual "Monitoring Well Design and Construction for Hydrogeologic Characterization." The general construction of the wells will entail the use of four-inch diameter Schedule 40 polyvinyl chloride (PVC) wells with total depth of 45 feet bgs. The wells will be constructed with machine-milled slotted screen intervals between 15 to 45 feet bgs. The annulus of the borehole will be filled using sand pack from total depth to approximately 2 feet above the top of the screen interval (to approximately 13 feet bgs), a three-foot-thick hydrated bentonite chip seal to approximately 10 feet bgs, and bentonite/cement grout to approximately 1.5 feet bgs. A flush-mounted wellbox will be set in concrete at each wellhead. Both the slot thickness and the sand pack will be sized in accordance with formation material.

Prior to placing the bentonite chips and cement grout, the well will be surged to settle the sand pack. Additional sand will be added as necessary. The well will be completed at the surface with a 12-inch-diameter Emco-Wheaton, or equivalent, traffic-rated wellbox. Inside of the well box, the PVC casings will be cut to within four inches of the top of the wellbox.

All sampling equipment will be cleaned in an aqueous solution of a non-phosphate cleanser, rinsed with tap water, and rinsed a second time with distilled water to prevent cross-contamination between sample intervals. Investigation-derived waste (soil cuttings, development water, and decontamination rinseate) will be placed in lined soil bins and/or United Nations- (UN-approved 55-gallon steel drums that will be sealed, labeled, and stored at the Site pending characterization and disposal. Waste will be handled, transported, and disposed of according to applicable State and Federal regulations.

3.4.1 Well Surveying and Development

Following a 72-hour curing period, each well will be developed to increase well efficiency and to optimize communication between the well and the surrounding water-bearing zone. During development, water quality parameters, including pH, temperature, conductivity, and turbidity, will be monitored. The well will be developed by alternately surging with a rubber surge block and

bailing using a stainless-steel, bottom-loading bailer. Well development will continue until the groundwater is reasonably free of sediment.

During well development, measurements and observations of groundwater pH, electrical conductivity, temperature, and color will be recorded. A minimum of ten casing volumes of water will be removed from the wells during development. Well development field data will be documented on groundwater monitoring well field sampling forms. Following development and prior to groundwater sample collection, each monitoring well will be allowed to recover to within 80 percent of the initial static water level or will be sampled within 24 hours (if groundwater levels fail to recover to 80 percent of the initial level).

Following installation, each well will be surveyed. SGI will coordinate the surveying of the groundwater monitoring wells by a land surveyor licensed in the state of California per the requirements of AB2886. The survey points will document the horizontal location, ground surface elevation, and the top-of-casing elevation of each new groundwater monitoring well.

3.4.2 Well Gauging and Sampling

After well development, each well will be gauged and sampled. Well gauging will be conducted to verify the absence of free-phase hydrocarbons on groundwater, and to measure the piezometric surface of the water table in each well to allow for groundwater gradient determination. Each well will be sampled following initial low-flow purging of the groundwater well.

3.4.3 Well Monitoring and Proposed Quarterly Sampling Frequency

The proposed groundwater monitoring wells will be included in the groundwater monitoring program for the site. Accordingly, the wells will be sampled semi-annually, with the groundwater samples analyzed for TPH and VOCs. If measurable LNAPL occurs in any well, a product recovery schedule will be established and an appropriate LNAPL method will be selected (e.g., thin accumulations of LNAPL will be removed with absorbent materials and greater thicknesses will be removed via in-well passive recovery units or regularly scheduled hand bailing).

3.4.4 Groundwater Level Measurement

Water-level measurements will be taken using an interface-probe well monitoring instrument. The interface probe differentiates between water and hydrocarbons using conductivity measurements. Groundwater (and floating product) levels will be measured to an accuracy of 0.01-foot from the top of each well casing and the readings recorded by the environmental technician on field gauging sheets. Surveyed measuring points (usually on the north side of the casing) will be marked on each well casing for measurement consistency. The probe will be cleaned with a non-phosphatic detergent solution and double-rinsed with distilled water prior to each well measurement.

3.4.5 Groundwater Sampling and Analysis

Prior to sampling, three well volumes will be purged from each well using a submersible pump. It is anticipated that purge rates will range between 1.0 gallons per minute (gpm) and 1.5 gpm. Groundwater temperature, pH, oxidation reduction potential (ORP), dissolved oxygen, and electrical conductivity will be monitored during purging using a YSI Model 556 MPS water quality instrument, and turbidity will be monitored using a Oakton Model T-100 turbidity meter, or equivalent. Calibration records for the field instruments will be maintained. Each well will be purged until groundwater parameters have stabilized and the purged groundwater is "clear" with nephalometric turbidity units (NTU) of less than 11 NTUs.

New low-density polyethylene (LDPE) tubing will be used for each well and discarded after purging/sampling is completed. The pump will be thoroughly decontaminated prior to use at each well by scrubbing the exterior of the pump in a non-phosphate detergent solution and a double-rinse with distilled water. The detergent solution and distilled water will be pumped through the unit to decontaminate and rinse the interior portion of the pump.

Evaluation of groundwater parameter stabilization during purging will be conducted by comparing the change (or percent change) between the final two readings for each groundwater parameter with stabilization criteria published in the *Representative Sampling of Groundwater for Hazardous Substances* (CalEPA/DTSC, February 2008). The stabilization criteria targets will be:

- pH of ± 0.1 pH units.
- electrical conductivity of ± 3 percent.
- Oxygen reduction potential (ORP) of ±10 millivolts (mV).
- Groundwater temperature of ± 3 percent.
- Dissolved oxygen values of ± 3 milligrams per liter (mg/L).

Groundwater samples will be collected immediately after purging. Samples will be collected directly from LDPE tubing connected to the pump outlet and will be collected in laboratory-supplied sample containers. The containers will be sealed, labeled, and stored on ice in a thermally insulated cooler pending transportation to state-certified American Analytics in Chatsworth, California.

Groundwater samples will be submitted for analysis of TPH carbon chain characterization, GRO, fuel oxygenates, and VOCs including BTEX. Groundwater samples will be analyzed in accordance with the following test methods:

- TPH will be analyzed in accordance with Environmental Protection Agency (EPA) Method 8015M, and
- VOCs (including GRO, oxygenates, and BTEX compounds) will be analyzed using EPA Method 8260B.

A laboratory-supplied trip blank will accompany the monitoring well samples during fieldwork and will be analyzed for VOCs (including GRO, oxygenates, and BTEX compounds) in accordance with EPA Method 8260B. For each day of fieldwork, two equipment blank samples will be collected to evaluate the effectiveness of decontamination procedures (one prior to sampling the first well, and one after the last well is sampled).

3.4.6 Waste Management

All decontamination rinse water and purge water will be placed in United Nations-approved 55-gallon drums, labeled, and stored on site pending characterization for off-site disposal. Waste will be profiled in accordance with California Code of Regulations, Title 22, Division 4.5, Chapters 10 through 32, and Federal RCRA regulations. After analytical results have been received and evaluated, the drums will be transported off site under manifest to a permitted recycling/disposal facility.

3.5 Site Survey

All well locations will be surveyed by a California state-licensed land surveyor. Horizontal locations and elevations at each sample location will be determined and will be measured using a datum common with previously surveyed site wells. Elevation will be surveyed relative to mean sea level (MSL). The survey will also capture relevant site features such as pre-existing nearby groundwater monitoring wells, fencelines, curbs, sidewalks, and streets.

3.6 Schedule

The proposed well installation program and initial groundwater monitoring and sampling will be completed and reported within 120 days of RWQCB approval of this work plan. Subsequent groundwater monitoring will be performed and reported on a semi-annual basis.

4.0 DATA INTERPRETATION AND REPORTING

4.1 Data Interpretation

The proposed investigation will provide hydrogeologic and contaminant distribution information in the vicinity of GMW-62. Lithologic data and laboratory results of soil and groundwater samples will be integrated into the existing set of data for the area in the vicinity of GMW-62.

The lithologic data will be interpreted to identify lateral discontinuities or zones of high permeability that may affect LNAPL migration and recovery. The groundwater elevation data from the wells will be incorporated into the set of groundwater gauging data from the DFSP site to provide a depiction of likely LNAPL flow patterns in the shallow groundwater.

The concentrations of benzene and other hydrocarbons and oxygenates will be interpreted within the sitewide groundwater migration framework and will augment the hydrogeologic gradient fate and transport interpretations.

The presence, thickness, and recovery/recharges rates of LNAPL into the proposed groundwater monitoring wells will be used to develop a proposed LNAPL removal program. As described above, depending on LNAPL thickness, down-well absorbent material, passive skimmers, hand-bailing, or vacuum truck removal will be selected and adopted for each well, as warranted.

4.2 Reporting

After completing the above tasks, a technical report presenting the results of the well installation and initial sampling will be submitted to the RWQCB. The report will contain the following items:

- Sample location maps,
- Summary of the procedures and methodologies,
- Tabulated analytical data and interpretative maps,
- Field documentation, including drilling logs and well construction details,
- Laboratory reports, signed waste manifests, and survey reports, and
- Discussion, interpretation, and recommendations.

Included in the report will be an updated conceptual site model (CSM), with specific focus of describing groundwater conditions and LNAPL distribution within the area of GMW-62. The CSM will be based on the most recent site CSM. The updated CSM will serve to augment and further refine the existing CSM.

The report will include cross sections and one or more detailed groundwater gradient map(s) for all wells in the eastern part of the Property. LNAPL thickness, if present, benzene and other relevant VOC concentrations will also be depicted on the cross-sections and groundwater gradient maps.

5.0 LIMITATIONS

This Work Plan was prepared for the exclusive use of Defense Logistics Agency - Energy (DLA-Energy) for the express purpose of complying with regulatory directives for environmental investigation, in accordance with the scope of work, methodologies, and assumptions outlined in SGI's contract with DLA-Energy and as applicable to the location of the proposed investigation. Any re-use of this work product, in whole or in part, for a different purpose, or by others must be approved by SGI and DLA-Energy in writing. If any such unauthorized use occurs, it shall be at the user's sole risk without liability to SGI. To the extent that this plan is based on information provided to SGI by third parties, including DLA-Energy, their direct-contractors, previous workers, and other stakeholders, SGI cannot guarantee the completeness or accuracy of this information, even where efforts were made to verify third-party information. SGI has exercised professional judgment to collect and present a scope of work and opinions of a scientific and technical nature. The opinions expressed are based on the conditions of the site existing at the time of this plan preparation, current regulatory requirements, and any specified assumptions. Findings or conclusions presented in this plan are intended to be taken in their entirety to assist DLA-Energy and regulatory personnel in applying their own professional judgment in making decisions related to the property. SGI cannot provide conclusions on environmental conditions outside the completed scope of work. SGI cannot guarantee that future conditions will not change and affect the validity of the presented scope of work and any conclusions presented. No warranty or guarantee, whether expressed or implied, is made with respect to the data, observations, recommendations, and conclusions.

6.0 REFERENCES

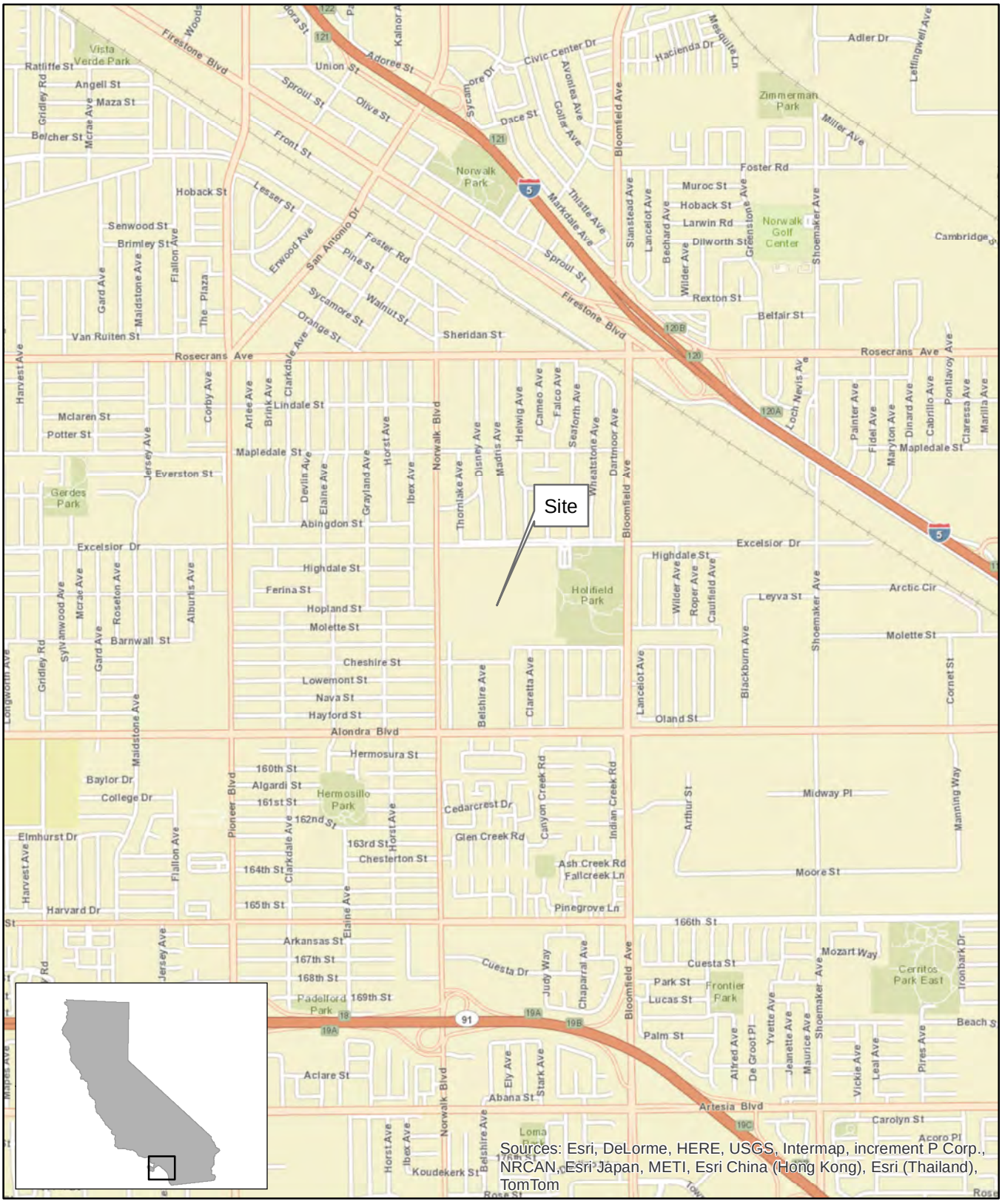
Parsons, 2006, *Eastern Boundary and Eastern Boundary Off-site Area and Groundwater Preliminary Investigation*

Parsons, 2008, *Holifield Park Supplemental Investigation and Groundwater Remediation Work Plan,* January 25

California Environmental Protection Agency, Department of Toxics Substances Control, 2008, *Representative Sampling of Groundwater for Hazardous Substances*, February

Parsons, 2013 *Conceptual Site Model and Remedial Action Evaluation for Soil, Groundwater and LNAPL*. September 30.

FIGURES



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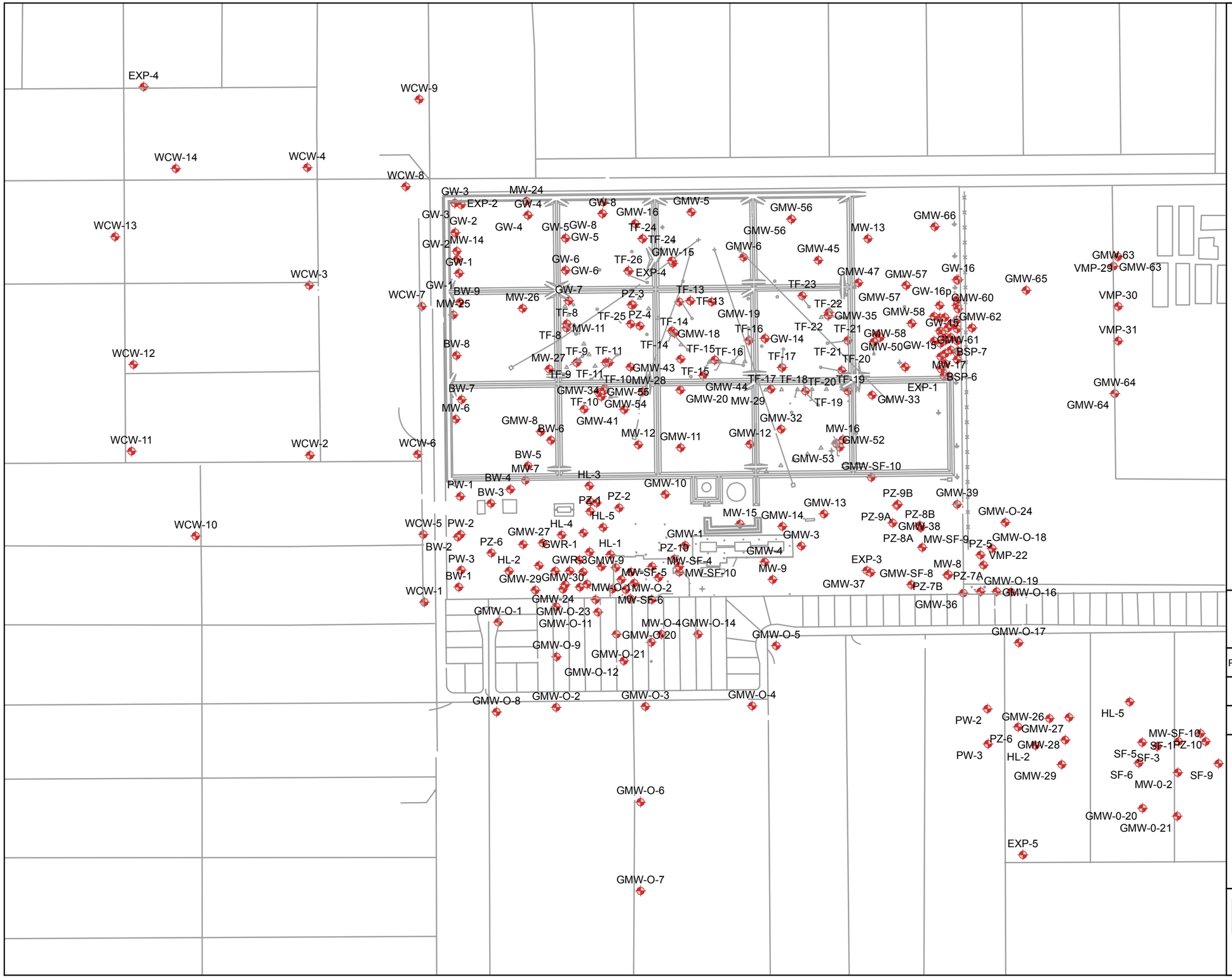
DEFENSE FUEL SUPPORT POINT NORWALK

15306 NORWALK BOULEVARD
NORWALK, CALIFORNIA

SITE LOCATION MAP

FIGURE
1



Legend

- Monitoring Well Location

15306 Norwalk Blvd.
Norwalk, California 90650

PROJECT NO.:	DATE:	DR.BY:	APP. BY:
04-NDLA-003	06/03/2014	J. KURASHIGE	P. PARMENTIER

0 85 170 340 510 680 Feet

SITE PLAN

SGI environmental THE SOURCE GROUP, INC.
1962 Freeman Ave,
Signal Hill, California 90755
(562) 597-1055

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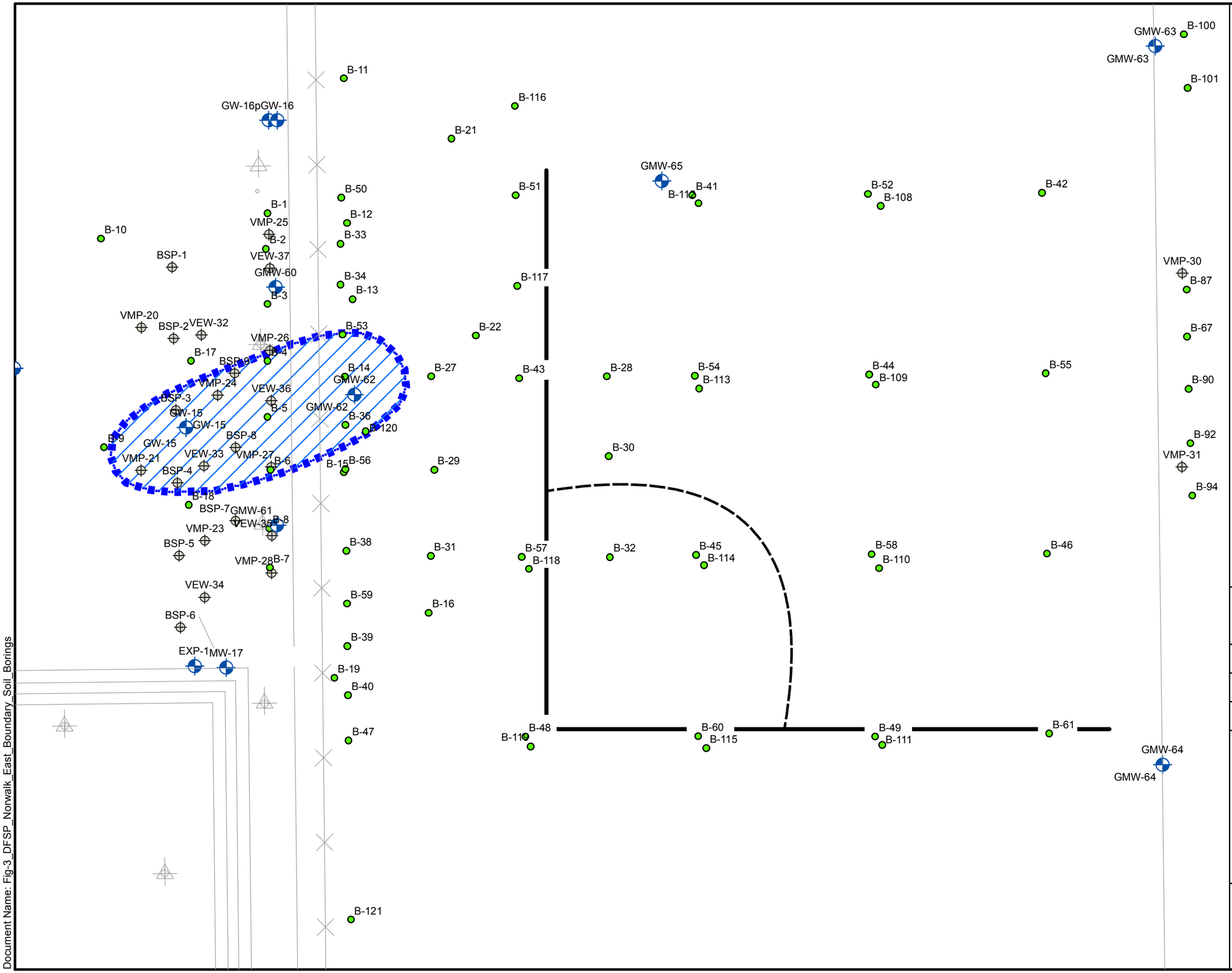
FIGURE 2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GW-16pGW-16
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Monitoring Well Location
Holifield Park Boring Location
Northeast LNAPL Plume
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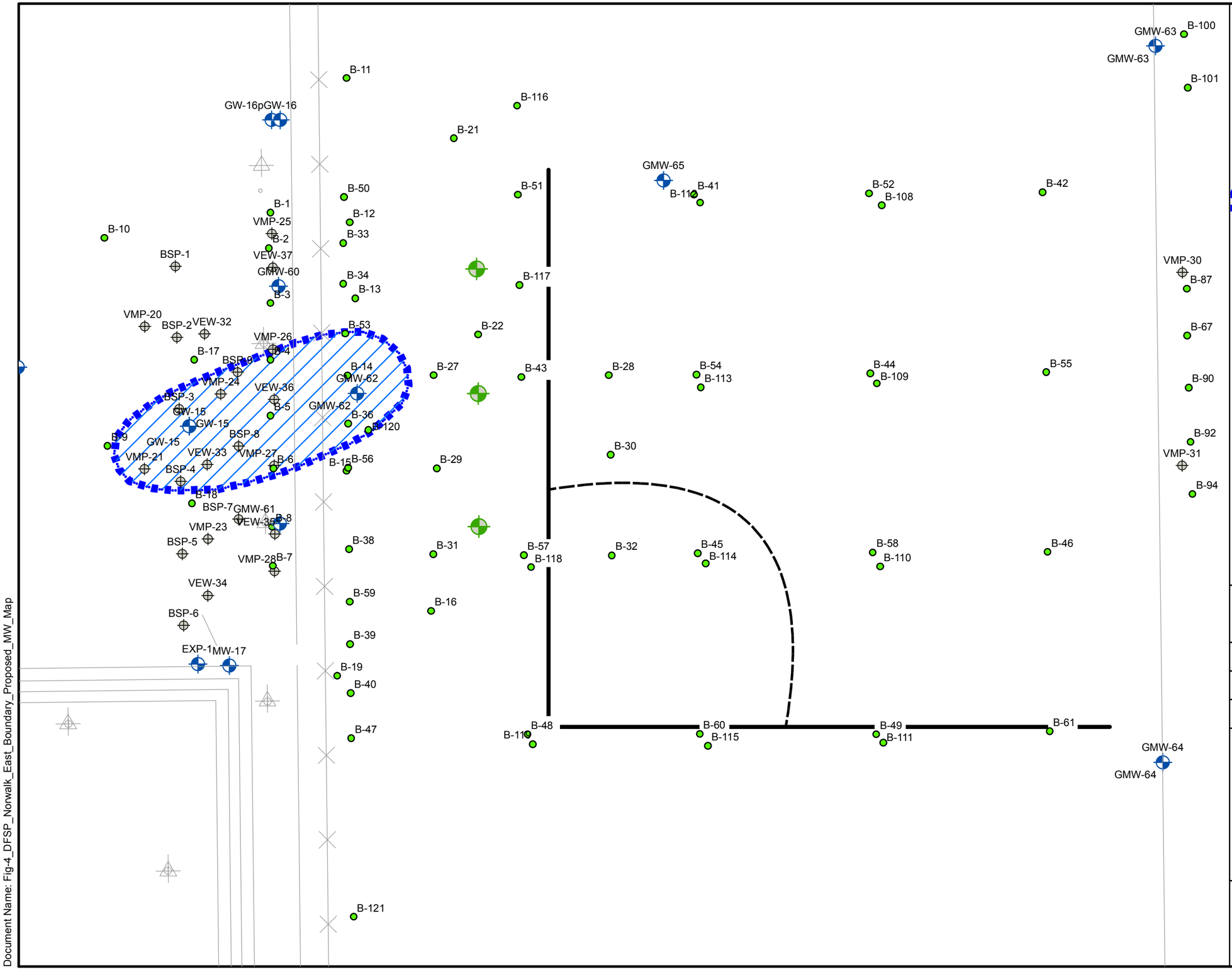
15306 Norwalk Blvd.
Norwalk, California 90650
PROJECT NO.: 04-NDLA-001
DATE: 6/10/2014
DR.BY: C. BAKER
APP. BY: P. PARMENTIER
0 15 30 60 90 120 Feet
DFSP Norwalk-
Northeast Corner Map
THE SOURCE GROUP, INC.
1962 Freeman Ave,
Signal Hill, California 90755
(562) 597-1055
FIGURE
3
Document Name: Fig-3_DFSP_Norwalk_East_Boundary_Soil_Borings



LEGEND

- CPT Location
- Proposed MW Location
- Monitoring Well Location
- Holifield Park Boring Location
- Northeast LNAPL Plume

15306 Norwalk Blvd.
Norwalk, California 90650

PROJECT NO.:	DATE:	DR.BY:	APP. BY:
04-NDLA-001	6/10/2014	C. BAKER	P. PARMENTIER

0 15 30 60 90 120 Feet

Proposed Groundwater Monitoring Well Location Map

SGI environmental THE SOURCE GROUP, INC.
1962 Freeman Ave,
Signal Hill, California 90755
(562) 597-1055

FIGURE 4

Document Name: Fig-4_DFSP_Norwalk_East_Boundary_Proposed_MW_Map

APPENDIX A

SITE BOUNDARY

B-116							
Depth	TPH-FP	TPH-G	B	T	E	X	MTBE
30-35	**120**	ND	ND	ND	ND	ND	ND
36-40	**170**	ND	ND	ND	ND	ND	ND
41-45	**230**	ND	ND	ND	ND	ND	ND

B-117							
Depth	TPH-FP	TPH-G	B	T	E	X	MTBE
30-35	NA	NA	**350**	**21**	**640**	**3520**	ND
36-40	ND	ND	**2.5**	**0.64**	**5.2**	**25.5**	ND
41-45	ND	ND	ND	ND	**0.95**	**4.57**	ND

B-118							
Depth	TPH-FP	TPH-G	B	T	E	X	MTBE
30-35	**25000**	**19000**	ND	**6.7**	**720**	**490**	ND
36-40	**420**	**330**	ND	ND	**1.7**	**1.2**	ND

B-119							
Depth	TPH-FP	TPH-G	B	T	E	X	MTBE
24-28	ND	ND	ND	ND	ND	ND	ND
30-35	ND	ND	ND	ND	ND	ND	ND
36-40	**160**	ND	ND	ND	ND	ND	ND
36-40 (Dup)	**110**	**110**	ND	ND	ND	ND	ND

B-120							
Depth	TPH-FP	TPH-G	B	T	E	X	MTBE
31-36	**30000**	**37000**	**5700**	**11000**	**1500**	**7900**	ND
38-42	**310**	**860**	**130**	**32**	**47**	**81**	ND
38-42 (Dup)	**330**	**850**	**130**	**32**	**54**	**86**	ND
44-48	**1200**	**7600**	**2900**	**28**	**560**	**2080**	ND

B-121							
Depth	TPH-FP	TPH-G	B	T	E	X	MTBE
29-35	ND	ND	**1.7**	**3.3**	**1.5**	**7.6**	**1.3**
36-40	ND	ND	ND	**0.56**	ND	**0.57**	**0.71**
40-44	ND	ND	ND	ND	ND	ND	ND

TANK 80004

TANK 80008

TANK 55004

TF-2

TF-17

TF-

-17

GMW-60

GMW-61

GMW-62

PO-7

B-23 B-116 B-50NORTH B-117 B-120 B-121 B-108 B-109 B-110 B-111 B-112 B-113 B-114 B-115 B-72 B-73 B-96 B-97 B-98 B-99 B-100 B-101 B-87 B-67 B-90 B-92 B-94 B-46 B-61 B-20 B-26

B-108							
Depth	TPH-FP	TPH-G	B	T	E	X	MTBE
26-30	ND	ND	ND	ND	ND	ND	ND
31-35	**480***	ND	ND	ND	ND	ND	ND
36-40	**400***	ND	ND	ND	ND	ND	ND

B-109							
Depth	TPH-FP	TPH-G	B	T	E	X	MTBE
26-30	ND	ND	ND	ND	ND	ND	ND
31-35	ND	ND	ND	ND	ND	ND	ND
36-40	**110***	ND	ND	ND	ND	ND	ND

B-110							
Depth	TPH-FP	TPH-G	B	T	E	X	MTBE
36-40	**200***	ND	ND	ND	ND	ND	ND
31-35	**390**	ND	ND	ND	ND	ND	ND

B-111							
Depth	TPH-FP	TPH-G	B	T	E	X	MTBE
26-30	**380**	ND	ND	ND	ND	ND	ND
31-35	**110***	ND	ND	ND	ND	ND	ND
36-40	**170**	ND	ND	ND	ND	ND	ND

B-112							
Depth	TPH-FP	TPH-G	B	T	E	X	MTBE
31-35	**200**	ND	ND	ND	ND	ND	ND
36-40	ND	ND	ND	ND	ND	ND	ND
36-40 (Dup)	**110**	ND	ND	ND	ND	ND	ND

B-113							
Depth	TPH-FP	TPH-G	B	T	E	X	MTBE
32-35	ND	ND	ND	ND	ND	ND	ND
36-40	ND	ND	**1.0**	ND	**1.1**	ND	ND

B-114							
Depth	TPH-FP	TPH-G	B	T	E	X	MTBE
31-35	**140**	ND	ND	ND	ND	ND	ND
36-40	**170**	ND	ND	ND	ND	ND	ND

B-115							
Depth	TPH-FP	TPH-G	B	T	E	X	MTBE
24-28	**380**	ND	**0.51**	**1.3**	ND	ND	ND
31-35	**100**	ND	ND	ND	ND	ND	ND
36-40	**150**	ND	ND	ND	ND	ND	ND

GMW-62							
Depth	TPH-FP	TPH-G	B	T	E	X	MTBE
	2500	**11000**	**1400**	**1200**	**360**	**1720**	ND

LEGEND

- B-72 — Phase 1 Soil & Soil Gas Sample Locations
- B-50NORTH — Phase 2 Soil Gas Step-Out Sample Locations
- B-108 — Phase 2 DPT Soil/CPT Groundwater Sample Locations
- GMW-60 — Groundwater Monitoring Well Location
- GMW-62 — New Groundwater Monitoring Well Location
- Groundwater Sampling Results

Note:

Base map for Dolland Elementary School and Holifield Park was created from an image obtained from Google Earth.

Depth in feet below ground surface

All concentrations are reported in micrograms per liter (ug/L)

TPH-G - Total Petroleum Hydrocarbons as Gasoline
TPH-FP - Total Petroleum Hydrocarbons as Fuel Product
* TPH-FP result from the silica gel cleanup. Appendix D contains the non-silica gel treated value.
B - Benzene
T - Toluene
E - Ethylbenzene
X - Xylenes, Total
MTBE - Methyl tert-Butyl Ether
NA - Not Analyzed
ND - Not Detected

N

0 65 130 260 Feet

1 inch equals 130 feet

DEFENSE FUEL SUPPORT POINT

15306 Norwalk Boulevard,

NORWALK, CALIFORNIA

FIGURE 5

GROUNDWATER BTEX, MTBE, AND TPH RESULTS (JUNE 2007)

Supplemental Investigation and Groundwater Remediation Work Plan for Holifield Park
Norwalk, California

PARSONS

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