

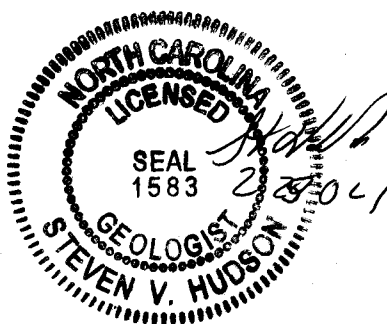
**REMEDIAL ACTION OPTIMIZATION
&
REVISED CORRECTIVE ACTION PLAN**

TT-2477-78

**MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA**

FEBRUARY 24, 2004

**NCDENR Incident No.: 7176
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LIST OF ACRONYMS

2000 Guidelines	Groundwater Section Guidelines for Investigation and Remediation of Soil and Groundwater
2001 Guidelines	Guidelines for Assessment and Corrective Action, North Carolina Underground Storage Tank Section (Effective July 1, 2001)
2L GWQS	NCAC T15A:02L Groundwater Quality Standards
ARO	Asheville Regional Office
AS	Air Sparge
AST	Aboveground Storage Tank
BDL	Below Detection Limit
BN	Base/Neutral (extractables)
BNA	Base/Neutral/Acid (extractables)
BQL	Below Quantitation Limit
BLS	Below Land Surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CAP	Corrective Action Plan
CATLIN	CATLIN Engineers and Scientists (Formerly RC&A)
CFR	Code of Federal Regulations
Cr	Chromium
CSA	Comprehensive Site Assessment
CNP	Carbon Nitrogen Phosphorous
CPT	Cone Penetrometer Test
DEM	Division of Environmental Management
DIPE	Diisopropyl Ether
DO	Dissolved Oxygen
DOD	Department of Defense
DPT	Direct Push Technology
DWQ	Division of Water Quality
DWM	Division of Waste Management
DTW	Depth to Water
EAD	Environmental Affairs Department
EDB	Ethylene di-bromide
EMD	Environmental Management Division
EPA	Environmental Protection Agency
EPH	Extractable Petroleum Hydrocarbons
EQB	Environmental Quality Branch
Fe	Iron
FID	Flame Ionization Detector
FOD	Foreign Object Debris
FRO	Fayetteville Regional Office
FT	Feet
GCL	Gross Contaminant Level
GIS	Geographic Information System
GPS	Global Positioning System

Guidelines Vol. I	Groundwater Section Guidelines for Investigation and Remediation of Soil and Groundwater, Volume I, Sources Other Than Petroleum Underground Storage Tanks (May 1998)
Guidelines Vol. II	Groundwater Section Guidelines for Investigation and Remediation of Soil and Groundwater, Volume II, Petroleum Underground Storage Tanks (January 2, 1998)
HDPE	High Density Polyethylene
I/C	Industrial/Commercial
ID	Identification
I&E	Installations and Environment Department
IGWQS	Interim Groundwater Quality Standards
IPE	Isopropyl Ether
LANTDIV	Atlantic Division
LSA	Limited Site Assessment
LUST	Leaking Underground Storage Tank
m-	meta
m	meter
MADEP	Massachusetts Department of Environmental Protection
MCALF	Marine Corps Auxiliary Landing Field
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MCOLF	Marine Corps Outlying Landing Field
MDL	Method Detection Limit
mg/Kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
MRO	Mooresville Regional Office
MSCC	Maximum Soil Contaminant Concentration
MSL	Mean Sea Level
MTBE	Methyl tertiary butyl ether
µg/Kg	Micrograms per Kilogram
µg/L	Micrograms per Liter
NA	Not Analyzed
N/A	Not Applicable
NC	North Carolina
NCAC	North Carolina Administrative Code
NCDENR	North Carolina Department of Environment and Natural Resources
NCDOC	North Carolina Department of Corrections
NCDOT	North Carolina Department of Transportation
NCSP	North Carolina State Plane
NCSPA	North Carolina State Ports Authority
NE	None Established
NM	Not Measured
NMT	No Measurable Thickness
NS	Not Sampled
o-	ortho
OVA	Organic Vapor Analyzer

p-	para
PAH	Polynuclear Aromatic Hydrocarbons
Pb	Lead
PPB	Parts Per Billion
PPM	Parts Per Million
PID	Photo Ionization Detector
PQL	Practical Quantitation Limit
PVC	Polyvinyl chloride
RBCA	Risk-Based Corrective Action
RCRA	Resource Conservation and Recovery Act
Res	Residential
ROI	Radius of Influence
RRO	Raleigh Regional Office
SOW	Scope of Work
STGW	Soil-to-Groundwater
SVE	Soil Vapor Extraction
SVOC	Semi Volatile Organic Compound
TDHF	Toxicologically Defined Hydrocarbons Fractions
TCLP	Toxicity Characteristic Leaching Procedure
TIC	Tentatively Identified Compound
TKN	Total Kjeldahl Nitrogen
TOC	Top of Casing
TPH	Total Petroleum Hydrocarbons
US	United States
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compounds
VPH	Volatile Petroleum Hydrocarbons
WaRO	Washington Regional Office
WiRO	Wilmington Regional Office
WSRO	Winston-Salem Regional Office

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FEBRUARY 24, 2004

EXECUTIVE SUMMARY

This report is intended to provide information relevant to address and review the effectiveness of current remedial actions being conducted at Buildings TT-2477 and TT-2478 and make revisions to the Corrective Action Plan in order to achieve site closeout. The project site is located at the Tarawa Terrace (TT) Shopping Center in the Tarawa Terrace housing area of Marine Corps Base (MCB), Camp Lejeune.

Building TT-2477 was constructed in the early 1950s as a full service gasoline station. Building TT-2477 was partially demolished and renovated in 1992-1993 and is currently utilized as a chapel. Building TT-2478 was constructed as, and is currently utilized as, a Marine Corps Exchange gas station. Approximately ten (10) assessments of varying degrees have been conducted at Buildings TT-2477 and TT-2478 addressing the petroleum releases associated with the former USTs. During the assessment activities, the highest dissolved concentrations of petroleum constituents were identified in the samples collected from the monitoring wells in the vicinity of Building TT-2478. Free product was measured at up to two feet thick in monitoring wells in the same area during the assessment activities.

Law Engineering and Environmental Services, Inc. (LAW) prepared and submitted a Corrective Action Plan (CAP) for the subject site dated March 20, 1996. Subsequent to the CAP approval, the remediation system, consisting of an Air Sparge/Soil Vapor Extraction (AS/SVE) system was installed in 1997. In September 2000, OHM Remediation Services (OHM), now known as Shaw Environmental and Infrastructure (Shaw), completed an additional investigation. As a result, the existing AS/SVE system was expanded into the area around Building TT-2453.

The remedial goals set forth in the CAP for the site were based on the regulations that were enforced at the time. The cleanup goals for groundwater were the 2L GWQS and for soils were 10 mg/kg TPH - GRO and 40 mg/kg TPH - DRO. Since submittal of the CAP the State regulations have changed. The current applicable remedial requirements for this site are the Risk Based Corrective Action (RBCA) rules for Petroleum Underground Storage Tanks per 15A NCAC 2L .0106 effective date January 2, 1998 and document entitled "*Guidelines for Assessment and Corrective Action*" (2001 Guidelines) as released by the NCDENR Division of Waste Management, UST Section, effective July 1, 2001. The current "clean up" goals for this site are the GCLs for groundwater and the Residential MSCCs for soil.

Review of the analytical data indicates that contaminant levels have been reduced to below current risk based cleanup goals. Therefore, no further remedial efforts appear to be necessary and the active remedial system should be shutdown. Groundwater sampling is proposed for one year on a quarterly basis subsequent to system shutdown to ensure groundwater contaminants do not rebound. Assuming that no rebound occurs, upon completion of four consecutive quarters of post-operational sampling with contaminant levels below current GCLs, a request for No Further Action may be requested with associated Land Use Restrictions. Additionally, a five-year sampling plan may be implemented to verify when contaminant levels are below 2L GWQS. When levels are confirmed to be below these Standards, the Land Use Restrictions may be removed.

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1.0 BACKGROUND

1.1 PURPOSE OF REPORT

The purpose of this report is to provide information relevant to address and review the effectiveness of current remedial actions being conducted at Buildings TT-2477 and TT-2478 located in the Tarawa Terrace residential area of the MCB, Camp Lejeune. Additionally, this report provides revisions to the CAP in order to achieve site closure. This report has been formatted according to the NAVFACENGCOM "Guidance for Optimizing Remedial Action Operation" document prepared by Radian International and dated April 2001 with the ultimate purpose to "achieve environmentally protective site closeout at the least cost."

The work conducted herein was conducted in general accordance with the Workplan titled Remediation System Optimization Plans at the Various Sites, Marine Corps Base, Camp Lejeune, North Carolina dated July 16, 2003. CATLIN was authorized to perform this investigation by the LANTDIV NAVFACENGCOM in accordance with the Order of Supplies Contract Number N62470-01-D-3009, Delivery Order Number 0079.

1.2 SCOPE OF WORK

This Remedial Action Optimization & Revised Corrective Action Plan (RAO & RCAP) was developed in general accordance with the NAVFACENGCOM "Guidance for Optimizing Remedial Action Operation" document dated April 2001 and the 2001 Guidelines. Specific methods utilized to develop the RAO & RCAP included a thorough collection and review of available reports and field data. In addition, a field reconnaissance was conducted to perform on-site inspections of existing site and remedial system conditions and conduct personal interviews with the system operators. Data was then reviewed and the RAO & RCAP was developed.

2.0 SITE HISTORY

(Refer to Table 1, Figures 1, 2, and 3 and Appendix C)

Buildings TT-2477 and TT-2478 are located in the Tarawa Terrace residential area of MCB, Camp Lejeune in Onslow County, North Carolina. The site vicinity is presented on Figure 1. The buildings are located within the Tarawa Terrace Shopping Center at the corner of Iwo Jima Boulevard and Tarawa Boulevard. (See Figure 2)

Building TT-2477 was constructed in the early 1950s as a full service gasoline station. The building included two garage vehicle maintenance bays and one vehicle wash bay with entrances located on the north side of the building. One 10,000-gallon gasoline UST was abandoned in place and one 500-gallon hydraulic fluid/gear oil UST was removed from the site by Jones and Frank on December 12, 1992. A 500-gallon heating oil UST was additionally removed from the site in 1992. No soil was reportedly removed during these closures. Building TT-2477 was partially demolished and renovated in 1992-1993 and is currently utilized as a chapel.

Building TT-2478 is utilized as a Marine Corps Exchange gas station. Four USTs were formerly located north of the pump island. The USTs were reportedly 10,000-gallon capacity and stored unleaded gasoline (three USTs) and diesel (one UST). Engineering and Environmental Science Company (EESC) removed the USTs and associated piping in August and September of 1995. Approximately 578 tons of soil was excavated and disposed off-site during the UST closure.

Approximately ten (10) assessments have been conducted at Buildings TT-2477 and TT-2478 addressing the petroleum releases. A summary of the previous reports is presented on Table 1. Numerous monitoring wells were installed across the area during these assessment activities. A detailed site plan, including monitoring well locations, is presented on Figure 2.

Results from the groundwater sampling conducted during the assessment investigations indicate that deeper portions (greater than 45 feet bls) of the aquifer have not been impacted by petroleum constituents. However, dissolved petroleum constituents were identified in the shallow groundwater. The highest concentrations were identified in the samples collected from the monitoring wells in the vicinity of Building TT-2478. Based on the concentrations, the contaminant plume appeared to originate in the vicinity of the building and extended to the south for at least 800 feet. The total BTEX concentrations from the CAP are shown in Appendix C. Free product was measured up to two feet thick in monitoring wells in the vicinity of Building TT-2478. The free product plume as of the CAP is shown in Appendix C. Additional assessment activities were conducted by OHM/Shaw and indicated that an additional source area existed in the vicinity of Building TT-2453 at the corner of Tarawa Boulevard and Iwo Jima Boulevard. This site was incorporated into the TT-2477-78 project site.

Building TT-2453 was utilized as a Marine Corps Exchange service/gas station until 1987. From 1987 until the building was demolished in 2001, the building was utilized for the

storage, rental, and repair of small engines, yard equipment, and other miscellaneous outdoor and camping equipment. During the demolition activities in 2001, two hydraulic lifts, one waste oil UST, one fuel oil AST, and the former UST dispenser island and associated piping were removed. Six additional USTs were reportedly removed from the site in June 1987 including tanks: TT-2453-1 and TT-2453-2 (each was 6,000-gallon capacity containing gasoline), TT-2453-3 and TT-2453-4 (each was 3,000-gallon with unknown contents), and TT-2453-5 and TT-2453-6 (heating oil tanks).

LAW prepared and submitted a CAP for the subject site dated March 20, 1996. Subsequent to the CAP approval, the remediation system, consisting of an AS/SVE was installed in 1997 and has operated continuously since then with the exception of minor equipment repairs and routine maintenance. In September 2000, an additional investigation was completed by OHM to attempt to delineate the petroleum impacted groundwater in the vicinity of Building TT-2453 and make recommendations for any additional remediation that was deemed necessary. Based on the evaluation of the data generated during the additional assessment activities, OHM recommended expanding the existing AS/SVE system an additional 80 feet south along Iwo Jima Boulevard and 150 feet west along Tarawa Boulevard. This system expansion was completed and brought online by OHM in April 2001.

The current remediation system location is illustrated on Figure 3.

2.1 CONCEPTUAL SITE MODEL (BASED ON 1997 CAP)

2.1.1 Site Geology

The topography of the project site is relatively flat and gently slopes to the south and southwest towards Northeast Creek. Sediment identified during installation of the borings and monitoring wells consisted predominantly of sandy clay to clayey fine sand with fine sand and clay lenses to a depth of six to eight feet BLS. Below this surficial material, sediments were described as relatively clean, fine to medium sand to a depth of approximately 50 feet.

2.1.2 Groundwater Elevation and Flow Direction

As part of the CAP, groundwater flow direction was generally to the south. Shaw has obtained depth to groundwater measurement from selected Type II and Type III monitoring wells during the numerous sampling and gauging events that have been conducted at the subject site. Groundwater elevation contours for the shallow monitoring wells, as interpreted by Shaw from the April and October 2002 and the April 2003 gauging events indicate a general groundwater flow direction to the south.

2.1.3 Potential Receptors

One water supply well (TT-52) was identified within 600 feet of the subject site during a receptor survey conducted by LAW during completion of the *Leaking Underground Storage Tank Site Assessment Report* dated 1994. Additionally, four water supply wells (TT-31, TT-53, TT-54 and TT-67) were identified within 0.5 mile of the subject site. However, all five of these wells were permanently abandoned in January 1987.

A small unnamed tributary of Northeast Creek located approximately 1,000 feet south and a marsh area associated with Northeast Creek located approximately 500 feet south of the site were identified in the same report as potential surface water receptors.

No other receptors were identified in the assessments.

2.1.4 Contaminants of Concern

(Refer to Appendix A)

The list of contaminants identified by LAW during the assessment activities along with the associated action levels established during the March 20, 1996 CAP are presented in Appendix A.

3.0 REMEDIAL ACTION REVIEW

3.1 REMEDIAL SYSTEM OBJECTIVES

As detailed in the CAP prepared by LAW, the remedial objectives set forth in the report dated March 20, 1996, included:

1. Primary Source(s):

Elimination of future releases through closure or upgrading the existing UST system at Building TT-2477-78.

2. Secondary Sources:

- (i) Free Product: Remove free product to less than or equal to 1/8 inch as measured in free product recovery wells and groundwater monitoring wells. Removal of free product will reduce the secondary source and assist in controlling the migration of free product.
- (ii) Vadose Zone Contamination: Reduce TPH in soil to 10 ppm and 40 ppm as quantified by EPA Methods 5030 and 3550, respectively.

3. Dissolved-Phase Groundwater Contamination:

Restore groundwater adversely impacted by petroleum fuel releases to a quality consistent with North Carolina Quality Standards outlined in NCAC, Title 15A, Subchapter 2L or to variances established by NCDENR.

4. Receptor Protection:

Monitor surface waters in Northeast Creek to ensure a quality consistent with North Carolina Surface-Water Quality Standards outlined in NCAC Title 15A, Subchapter 2B.

LAW evaluated three remedial strategies for the site. Based on the results of pilot tests of SVE and AS conducted in the vicinity of the USTs, LAW recommended a combination of technologies to meet the remedial goals established in the previously discussed objectives. These included:

- Installation of skimmer pumps in ten recovery wells to remove free product from the area of the former USTs at Building TT-2477.
- Install two AS/SVE fields that would remove high concentrations of dissolved-phase petroleum constituents and prevent further migration of the plume.

Active remediation was estimated to take approximately 7 years from system installation and activation. LAW recommended that remedial activities continue until confirmatory soil samples indicated achievement of TPH cleanup goals and until four consecutive quarters of groundwater data during and after operation of the system revealed no compounds above the 2L GWQS.

3.2 IMPLEMENTED REMEDIAL SYSTEM (Refer to Figure 3)

Subsequent to CAP approval, the AS/SVE portion of the recommended remedial system was installed by OHM in 1997. Initially, 32 air sparge wells were installed to an approximate depth of 50 feet BLS, and 32 soil vapor extraction wells were installed to an approximate depth of 10 feet BLS. Free product was not identified in appreciable amounts subsequent to CAP approval and prior to system installation; therefore, the proposed 10 recovery wells and skimmer pumps were not installed. System operation began in October 1997 and initially consisted of operating only the SVE portion of the system to remove any remaining free product and reduce the adsorbed petroleum in the vadose soil. Once monitoring results indicated that free phase petroleum had been sufficiently reduced, the air sparge portion of the system was turned on.

Additional assessment activities were conducted by OHM and completed in September 2000. The additional assessment was performed to attempt to delineate the dissolved petroleum constituents in the shallow groundwater to 2L GWQS and make recommendations regarding any additional remediation that may have been required at the site. Results of the additional assessment activities were detailed in the report completed by OHM titled Additional Investigation Report Building TT-2477, MCB, Camp Lejeune, North Carolina, dated January 2001. OHM evaluated the assessment data and concluded that expansion of the existing AS/SVE system was necessary in the area surrounding Building TT-2453. In April 2001, the system was extended by OHM an additional 80 feet south along Iwo Jima Boulevard and 150 feet west along Tarawa Boulevard through the addition of six AS/SVE well pairs constructed to the same details as the initial 32 well pairs. The current remedial system layout is presented on Figure 3.

3.3 REMEDIAL SYSTEM STATUS

As detailed in the Annual Monitoring Report for TT-2477-78 prepared by Shaw dated July 2003, data indicates that since system startup on October 10, 1997, the system has operated at an approximate efficiency of 83 percent. This percentage was calculated by dividing the total number of days since system startup (2,119 days) by the SVE valve hour meter reading of 42,037 hours (approximately 1,753 days). Field reconnaissance conducted by CATLIN personnel in conjunction with Shaw personnel revealed the system to be well maintained and in good working condition. All portions of the system were reported to be operational and functional with the exception of a heat exchange unit and two activated carbon vessels situated inline with the SVE discharge. The heat exchange unit and activated carbon vessels are reportedly no longer utilized.

3.4 MONITORING STATUS

Groundwater sampling and analysis is currently conducted on ten (10) Type II monitoring wells (OB-1, OB-10, MW-14, MWSS100, MW-PVC101, 2478-MW19, 2478-MW20, 2478-MW22, 2478-MW23, and 2478-MW24) and one Type III monitoring well (2478-MW21D) on a semi-annual basis. The groundwater samples are analyzed for Polynuclear Aromatic Hydrocarbons per EPA Method 610 and volatile organic analysis per EPA Method 602. These sampling events are summarized in annual monitoring reports prepared by Shaw and on file in the WiRo.

4.0 REMEDIATION EFFECTIVENESS EVALUATION

According to Shaw's 2002 Annual Monitoring Report, a total of 27,361 pounds of hydrocarbon compounds have been recovered by the system since startup in October 1997. Shaw bases the quantity of recovered hydrocarbon on stack emission calculations performed on a monthly basis. As previously stated, Shaw has reported the system to be continuously operated since the start-up in October 1997, with the exception of minor equipment repairs

and routine maintenance. Based on the review of the historical data, it appears the system has worked as designed.

4.1 FREE PRODUCT (Refer to Appendix C)

Free product spatial extent at the time of CAP preparation is shown on a figure included in Appendix C. No measurable thickness of free product has been identified in any of the monitoring wells at the subject site since approximately 1998. The SVE portion of the remedial system appears to have been successful in eliminating previously identified free product.

4.2 CONTAMINANT CONCENTRATIONS

4.2.1 Soil (Refer to Appendix B and Figure 4)

Soil TPH levels identified in the shallow subsurface in the vicinity of Buildings TT-2477 and TT-2478 identified in the CSA conducted by LAW were measured in November 1992 and ranged from below laboratory detection limits to 23,000 mg/kg. As of the date of this report, this information cannot be substantiated. A summary of the known laboratory analytical results for soil samples obtained as part of the CSA and CAP are presented in Appendix B. After the remedial system had been operating for approximately three years, OHM conducted a soil gas survey in the vicinity of the former Building TT-2453 that consisted of advancing ten (10) temporary sampling points that were screened from 3.5 to 5.0 feet BLS. According to the Additional Investigation Report prepared by OHM (2001), none of the laboratory analytical results of the samples collected from the soil gas probes were in excess of 10 ppm Total BTEX and concluded that no large areas of petroleum impacted vadose zone soils remained to be remediated. A summary of the analytical results is summarized in Appendix B. A summary of the historical laboratory analytical results is presented in Figure 4.

4.2.2 Groundwater (Refer to Table 3, Figures 5 through 10, and Appendices C and D)

Groundwater contamination at the time of CAP preparation is shown as Total BTEX concentrations on a figure included in Appendix C. As can be seen, contamination ran along Iwo Jima Boulevard from the tank basin associated with Building TT-2478 southward approximately 900 feet. The maximum benzene concentrations detected was 8,800 µg/L.

The estimated plume boundaries as presented by Shaw from the October 2002 sampling event are shown for benzene, toluene, ethylbenzene, total

xylenes, naphthalene and MTBE on Figures 5 through 10. As can be seen, the estimated extent of groundwater contamination has been reduced significantly by the active remediation system and only the groundwater in the vicinity of Building TT-2453 remains with contaminant concentration in excess of the 2LGWQS. Currently, based on the latest 2003 data from Shaw, the maximum benzene concentration is 123 µg/L, which is above the 2L GWQS of 1 µg/L. The only other contaminant with a concentration in excess of the applicable 2L GWQS is ethylbenzene at a maximum concentration of 35.9 µg/L (2L GWQS for ethylbenzene is 29 µg/L). The maximum concentrations of dissolved petroleum constituents identified in previous sampling events are presented on Table 3. Historical groundwater analytical data from the Annual Monitoring Reports prepared by Shaw are included in Appendix D.

4.3 SYSTEM SUITABILITY

Based on a review of the system performance, the reduction and subsequent removal of free product, and the reduced levels of groundwater contamination, the remediation system appears to have been applicable for the reduction of the COCs.

5.0 REMEDIATION MODIFICATIONS AND ALTERNATIVES

5.1 REGULATORY FRAMEWORK EVALUATION (Refer to Appendix E)

As previously discussed, the remedial goals for the site were based on the regulations current at the time of the CAP preparation. Current applicable remedial requirements for this site are the Risk Based Corrective Action for Petroleum Underground Storage Tanks (RBCA) per 15A NCAC 2L .0106 which became effective on January 2, 1998 and the requirements in the NCDENR 2001 Guidelines. As such, reclassification of the site based on current risk factors was necessary. A Risk Classification and Land Use Form, as presented in the 2001 Guidelines was completed to present the data necessary to allow NCDENR to assess the site's applicable risk classification.

The completed form is included in Appendix E. Based on the findings of this Risk Classification and Land Use Form, CATLIN concludes that the subject site meets the criteria for classification as a Low Risk and Residential Land Use site. This ranking revises the target cleanup goals for both soil and groundwater (see Section 5.3).

5.2 REVISED CONCEPTUAL SITE MODEL

5.2.1 Groundwater Depth and Flow Direction

The 2003 groundwater gauging data as compared to the historical data presented in the previous reports indicates that the groundwater flow trends at the site have remained relatively consistent with a general flow direction to the south. Therefore, no change to the groundwater flow characteristics is necessary in the revised conceptual model.

5.2.2 Potential Receptors

(Refer to Figure 1 and Appendix E)

The potential receptors have been re-evaluated during the preparation of this RAO & RCAP using the Risk Classification and Land Use Form in Appendix E. Based on the risk characterization, this site appears to be a Low Risk Site and classified as Residential land use. A receptor survey performed as part of this plan identified no additional potential receptors within the area of investigation. All water supply wells previously identified within 1,500 feet of the subject site have been permanently abandoned. An unnamed small tributary of Northeast Creek located approximately 1,000 feet south and a marsh area associated with Northeast Creek located approximately 500 feet south of the site were identified as potential receptors. Due to the distance from the contaminant plume and the low contaminant levels identified, impact to these potential receptors is unlikely. The potential receptors are presented on the Site Location Map on Figure 1.

5.2.3 Contaminant of Concern

The contaminants of concern as established in the CAP are still relevant, except, the 2001 Guidelines for soils require chemical specific testing and cleanup levels.

5.3 ALTERNATIVE REGULATORY MECHANISMS

5.3.1 Revised Target Cleanup Goals

(Refer to Table 3)

Based on the risk characterization study discussed above, it appears that the revised applicable cleanup concentration for soil is based on the Residential MSCCs. Soil contamination data presented in the CAP from this site was based on the TPH-Gasoline and TPH-Diesel Action Levels. No soil samples have been obtained for Risk Based Analysis; however, it appears from an evaluation of previous TPH analyses, that only one area of soil contamination was identified in the vicinity of Building TT-2477. However, soil

contamination associated with the former tank basin at TT-2478 has not been evaluated due to a lack of available data. As such, additional soil sampling for Risk Based Analysis is recommended (see Section 7.1 Implementation Plan). The Revised Target Cleanup Concentrations are shown on Table 3.

Additionally, based on the risk characterization study discussed above, it appears the Revised Target Cleanup Concentrations for groundwater are based on the GCLs. As previously discussed, the only groundwater contaminants currently identified at the site above the 2L GWQS are benzene and ethylbenzene. While the concentrations are above the 2L GWQS, they are well below the applicable GCLs. The maximum groundwater concentrations from the 2003 sampling event as compared to the GCLs are presented on Table 3. No constituents have been identified above GCLs since 1997.

5.3.2 Land Use Restrictions

As required by the NCDENR, a Notice of Residual Petroleum (NRP) must be prepared and recorded where contaminants in groundwater remain at concentrations that exceed the 2L GWQS or soil contaminant concentrations exceed the Residential MSCC. At this site, based on the most recent sampling event, benzene and ethylbenzene concentrations are in excess of the 2L GWQS. Therefore, a NRP is necessary for site closure.

Marine Corps Base, Camp Lejeune is currently in the process of developing a legal document designated as a Land Use Restriction (LUR) that is being designed as an acceptable document to both State and Federal Government agencies to accomplish the intent of the NRP.

5.4 ALTERNATIVE REMEDIAL TECHNOLOGIES

No alternative remedial technologies are necessary to accomplish the ultimate goal of site closure. The implemented remedial system has been effective in reducing the contaminant levels to below the Revised Target Cleanup Concentrations.

5.5 COST EFFICIENCY EVALUATION

A detailed cost efficiency evaluation was not performed for this site. The recommendation for shutdown of the active remediation system is based on a comparative evaluation of the implementation of system shutdown and monitoring procedures versus continuation of system operation to achieve closure based on 2L GWQS criteria. The current plan of system shutdown and quarterly monitoring will be necessary regardless of the chosen method. Therefore, the only benefit of the continued operation of the system would be to attempt to achieve compliance with current 2L GWQS that would allow for system closure without a LUR. The

comparative cost of continued system operation versus preparation of a LUR would be substantially higher resulting in system shutdown as the most economically feasible alternative.

6.0 OPTIMIZATION RECOMMENDATIONS

6.1 SOIL

Based on the Revised Target Cleanup Concentrations discussed within Section 5.3.1 of this report, CATLIN recommends collecting additional soil samples for Risk Based Analysis in the vicinity of the following locations: MW-1, MW-2 adjacent to Building TT-2477 and the four sides of the former tank basin at Building TT-2478. The recommended Risk Based analyses to be performed for each sample are as follows: EPA Method 8260 with IPE and MTBE, EPA Method 8270 plus 10 tics, MADEP VPH and EPH. The results of these soil samples should be presented within a Soil Assessment Report in accordance with the 2001 Guidelines.

6.2 GROUNDWATER

Based on the Revised Target Cleanup Concentrations discussed within Section 5.3.1 of this report, CATLIN recommends shut down of the active groundwater remediation system currently in operation at the site. Upon acceptance of the recommendations by NCDENR, the active remediation system should be shut down and secured to assure that the integrity of the system and well network is not jeopardized.

Groundwater sampling is recommended on a quarterly basis subsequent to system shutdown for a total of four consecutive events to measure for rebound effects from system shutdown. As previously referenced, no constituents have been identified above GCLs since 1997. Therefore, CATLIN recommends sampling all on-site monitoring wells, but only during the first and fourth quarters following system shut down. Selected monitoring wells in the vicinity of the current groundwater contamination plume above the 2L GWQS would be sampled during the second and third quarters. These selected monitoring wells are as follows: 2478-MW-20, 2478-MW-21D, 2478-MW-22, 2478-MW-23, 2478-MW-24, MW-PVC-101, MW-SS-100, OB-1, OB-10 and MW-14. All monitoring wells sampled during this period are recommended to be gauged and sampled for the following Risk Based analyses: EPA Method 602 plus xylenes, EPA Method 625 plus 10 tics, MADEP EPH and VPH. The results of these four quarters of sampling should be presented within a Groundwater Monitoring Report with Site Closure (if applicable) at the conclusion of the fourth quarter of sampling.

Upon receipt of No Further Action with LUR, CATLIN recommends the selected monitoring wells referenced in the previous paragraph be sampled on a frequency of once every five years for the following analyses: EPA Method 602 plus xylenes, EPA

Method 625 plus 10 tics, MADEP EPH and VPH. The results of these sampling events should be compared to the groundwater quality standard applicable at that time, currently the 2L GWQS. At which time the selected monitoring wells meet the applicable groundwater quality standard, the LUR should be requested to be removed from the site and all monitoring wells associated with the site properly abandoned.

7.0 IMPLEMENTATION

7.1 IMPLEMENTATION PLAN

The following is a suggested implementation plan for obtaining site closure:

- Submittal of RAO & RCAP to NCDENR for approval of recommendations.
- Shut down active remediation system.
- Initiate the suggested quarterly groundwater sampling for one year.
- Collection of recommended soil samples.
- Preparation of a Soil Assessment Report. If additional soil contamination is detected then a Soil Cleanup Plan will be required otherwise proceed with site closure activities.
- Preparation of a Groundwater Monitoring Report with Site Closure request (if no rebound or soil contamination is present). Proceed with No Further Action requirements with the intent of the LUR. As previously stated, Marine Corps Base, Camp Lejeune is currently in the process of producing a legal document acceptable to State and Federal Government agencies to accomplish the intent of the NRP that will be designated as a LUR.
- Upon acceptance of NFR, begin a sampling program that will sample select wells every 5-years to determine when 2L GWQS are achieved and LUR may be removed.

7.2 SCHEDULE FOR IMPLEMENTATION

System shutdown is recommended to commence immediately upon plan approval by appropriate State authorities. Upon system shutdown, quarterly groundwater sampling should be conducted at the site for four consecutive events at which time site conditions should be evaluated to determine if a request for site closure is warranted. The upcoming March 2004 sampling event will be an appropriate milestone to begin the quarterly sampling activities.

8.0 LIMITATIONS

The field and groundwater data evaluated as part of this report provide isolated data points and may not represent conditions at every location in the project area. Analyses and conclusions of this report, being based on interpolation between data points at the project area, may not be completely representative of all site conditions. Conclusions and

recommendations from this report are based on the best available data in an effort to comply with current regulatory requirements.

9.0 REFERENCES

- LAW Engineering, Inc., 1994, *Leaking Underground Storage Tank Site Assessment Report. Building TT-2478*. Report dated March 22, 1994.
- LAW Engineering, Inc., 1995, *Leaking UST Site Assessment Report. Building TT-2477*. Report dated April 3, 1995.
- LAW Engineering, Inc., 1996, *Corrective Action Plan for the Recovery of Free Product and the Restoration of Petroleum Contaminated Soil and Groundwater. Building TT-2477/2478*. Report dated March 20, 1996.
- North Carolina Department of Environment and Natural Resources, Groundwater Section, 1998, *Groundwater Section Guidelines for the Investigation and Remediation of Soils and Groundwater, Volume II: Petroleum Underground Storage Tanks*, Raleigh, North Carolina, January 2, 1998.
- Radian International, 2001, *Guidance for Optimizing Remedial Action Operation*. Prepared for Naval Facilities Engineering Service Center, Port Hueneme, California. Report dated April 2001.
- OHM Remediation Services Corporation, 2001, *Additional Investigation Report. Buildings TT-2477/78*. Report dated January 2001.
- North Carolina Department of Environment and Natural Resources, Division of Waste Management, UST Section, 2001, *Guidelines for Assessment and Corrective Action*. Effective July 1, 2001.
- North Carolina Department of Environment and Natural Resources, Division of Water Quality, 2002, *Title 15A Subchapter 2L-Classifications and Water Quality Standards Applicable To The Groundwaters of North Carolina*. April 7, 2002.
- Shaw Environmental, Incorporated, 2003, *2002 Annual Monitoring Report TT-2477/78*. Report dated July 2003.

TABLES

TABLE 1

PREVIOUS REPORTS

**REMEDIAL ACTION OPTIMIZATION
&
REVISED CORRECTIVE ACTION PLAN
TT-2477-78**

MARINE CORPS BASE, CAMP LEJEUNE

DATE	TITLE	AUTHOR
November 24, 1992	UST Site Check UST Numbers TT-2478 - 1,2,3, and 4	ATEC Associates, Inc.
April 1993	Free Product Recovery Report	Geophex, Ltd.
October 14, 1993	Three Well Site Check Report Former UST 2477-3, Building TT-2477	Groundwater Technology Government Services
March 1994	Two Well Site Check UST TT-2477-1	R.E. Wright Associates, Inc.
March 22, 1994	Leaking UST Site Assessment Report Building TT-2478	LAW Engineering, Inc.
January 1995	Remedial Strategy/Pilot Study Recommendation	LAW Engineering, Inc.
April 3, 1995	Report of Leaking UST Site Assessment Report Building TT-2477	LAW Engineering, Inc.
May 1995	Remedial Strategy/Pilot Study Recommendation	LAW Engineering, Inc.
June 1995	5 + 3 Additional Wells Site Check MCB USTs TT2453-5, TT2453-6	R.E. Wright Associates, Inc.
September 22, 1995	Underground Storage Tank Closure Report	Engineering and Environmental Science Company
March 20, 1996	Corrective Action Plan for the Recovery of Free Product and the Restoration of Petroleum Contaminated Soil and Groundwater. Buildings TT-2477/2478	LAW Engineering, Inc.
November 1996	Statement of Work Package for Subsurface Petroleum Remediation Building TT2477/78	LAW Engineering, Inc.
July 1997	Workplan for Construction and Operation of Air Sparging and Soil Vapor Extraction Remediation System at Buildin TT2477/78	OHM Remediation Services Corporation
March 2000	Annual Monitoring Report TT-2477/78	OHM Remediation Services Corporation
January 2001	Additional Investigation Report Buildings TT-2477/78	OHM Remediation Services Corporation
April 2001	2000 Annual Monitoring Report TT-2477/78	OHM Remediation Services Corporation
July 2003	2002 Annual Monitoring Report TT-2477/78	Shaw Environmental, Inc.

TABLE 2

SUMMARY OF HISTORICAL GROUNDWATER CONTAMINANTS OF CONCERN

REMEDIAL ACTION OPTIMIZATION

&

REVISED CORRECTIVE ACTION PLAN

TT-2477-78

MARINE CORPS BASE, CAMP LEJEUNE, NC

COMPOUND	2L GWQS (µg/L)	GCL (µg/L)	MAXIMUM CONCENTRATIONS (µg/L)							
			1996	1997	1998	1999	2000	2001	2002	2003
Benzene	1	5,000	8,800	5,900	2,400	3,390	3,480	3,400	1,550	123
Toluene	1000	257,500	26,000	9,000	25,000	14,700	13,000	5,800	2,030	21.7
Ethylbenzene	29	29,000	2,400	1,200	2,400	2,260	1,800	920	769	35.9
Total Xylenes	530	87,500	17,000	5,300	12,200	14,700	10,000	7,000	3,730	95.6
MTBE	200	200,000	7,540	2,200	5,100	1,680	665	1,200	55.2	7.6
Naphthalene	21	15,500	44	NOT ANALYZED				190	131	6.6
Acenaphthene	80	2,120	15	NOT ANALYZED				7.1	BQL	BQL
Acenaphthylene	210	1,965	3.1	NOT ANALYZED				24	BQL	BQL
Benzo (a) anthracene	0.05	22	1.7	NOT ANALYZED				0.72	BQL	BQL
Pyrene	210	210	1.1	NOT ANALYZED				1.5	BQL	BQL
Fluorene	280	950	0.7	NOT ANALYZED				BQL	BQL	BQL
Anthracene	2100	2100	5.1	NOT ANALYZED				BQL	BQL	BQL
Fluoranthene	280	280	6.4	NOT ANALYZED				1.5	BQL	BQL
Phenanthrene	210	410	3	NOT ANALYZED				BQL	BQL	BQL

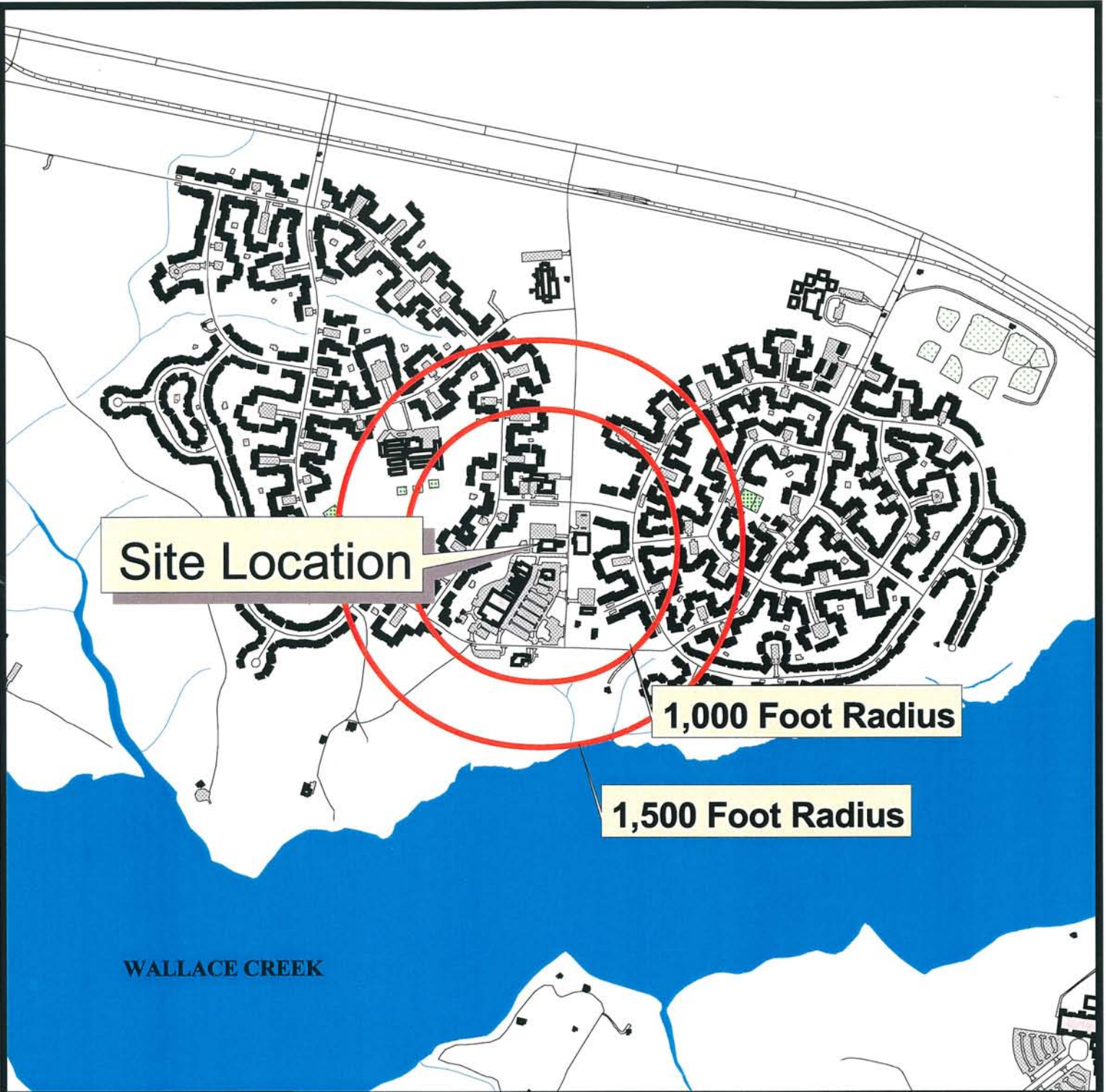
Information obtained from Shaw Environmental, Inc.
1996 data is from the CAP by Law.

TABLE 3
REVISED TARGET CLEANUP CONCENTRATIONS
REMEDIAL ACTION OPTIMIZATION
&
REVISED CORRECTIVE ACTION PLAN
TT-2477-78
MARINE CORPS BASE, CAMP LEJEUNE, NC

MEDIUM	COMPONENT	CURRENT CONDITIONS*	TARGET CLEANUP
Free Product	Gasoline/Diesel	No measureable thickness	<1/8"
Vadose Zone Soil	EPA Method 8260, EPA Method 8270, MADEP VPH/EPH	Unkown	Residential Maximum Soil Contaminant Concentrations
Groundwater	Benzene	123	5,000
	Ethylbenzene	35.9	29,000
	Naphthalene	6.6	15,500
	Acenaphthene	BQL	2,120
	Acenaphthylene	BQL	1,965
	Benzo (a) anthracene	BQL	22
	Pyrene	BQL	210
	Fluorene	BQL	950
	Anthracene	BQL	2,100
	Fluoranthene	BQL	280
	Toluene	21.7	257,500
	Xylenes (Total)	95.6	87,500
	MTBE	7.6	200,000

* Current data obtained from Shaw Environmental, Inc.

FIGURES

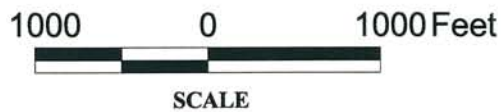


LEGEND

Water Supply Wells

- ACTIVE
- CLOSED
- INACTIVE
- PENDING

- Roads
- Railroads
- Recreational Horse Trail
- Buildings and Structures
- Parking Lots
- Playgrounds
- Driveways
- Athletic Fields
- Athletic Courts
- Surface Water
- Creeks
- Surface Water



SITE LOCATION MAP

DRAWN BY: CHECK BY: APPROVED BY:

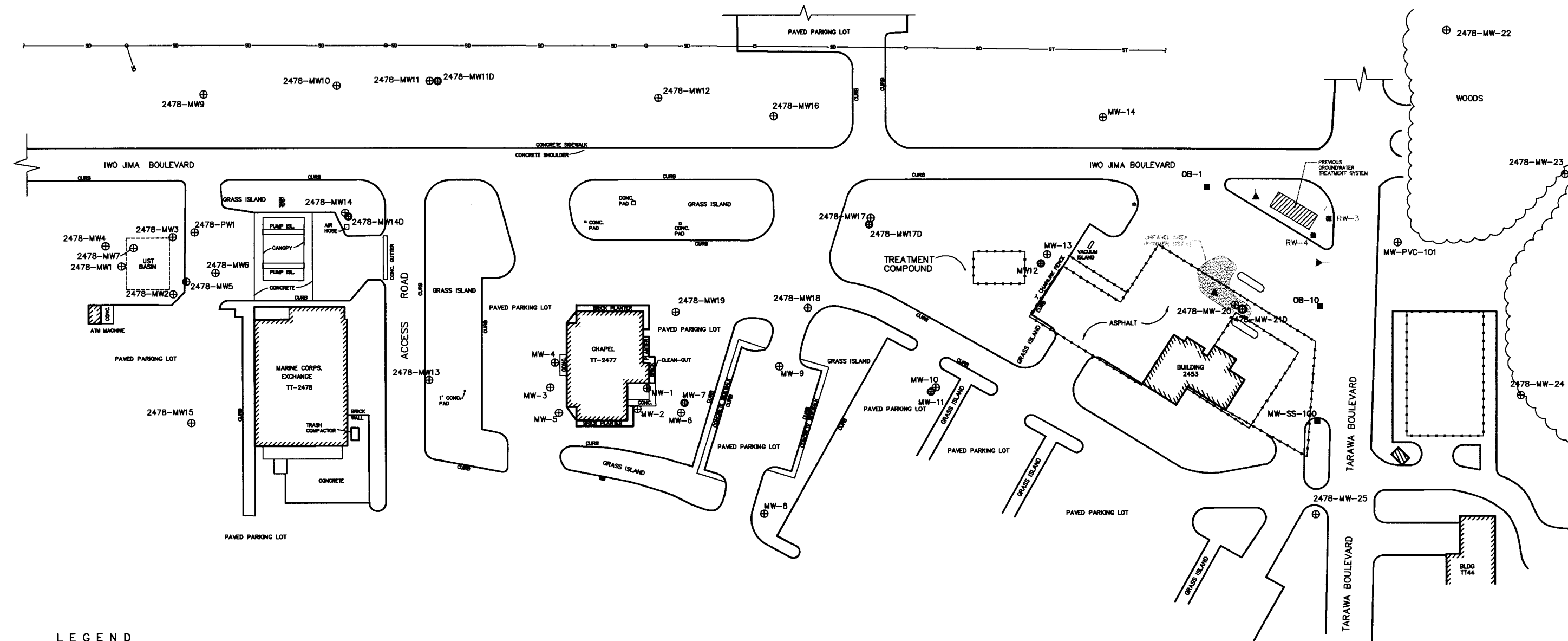
THW SVH

CATLIN PROJECT No.: 203-063

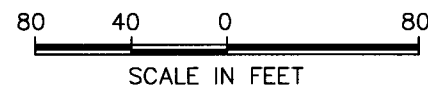
RAO & RCAP
TT-2477-78
CAMP LEJUENE, NC

FIGURE

1



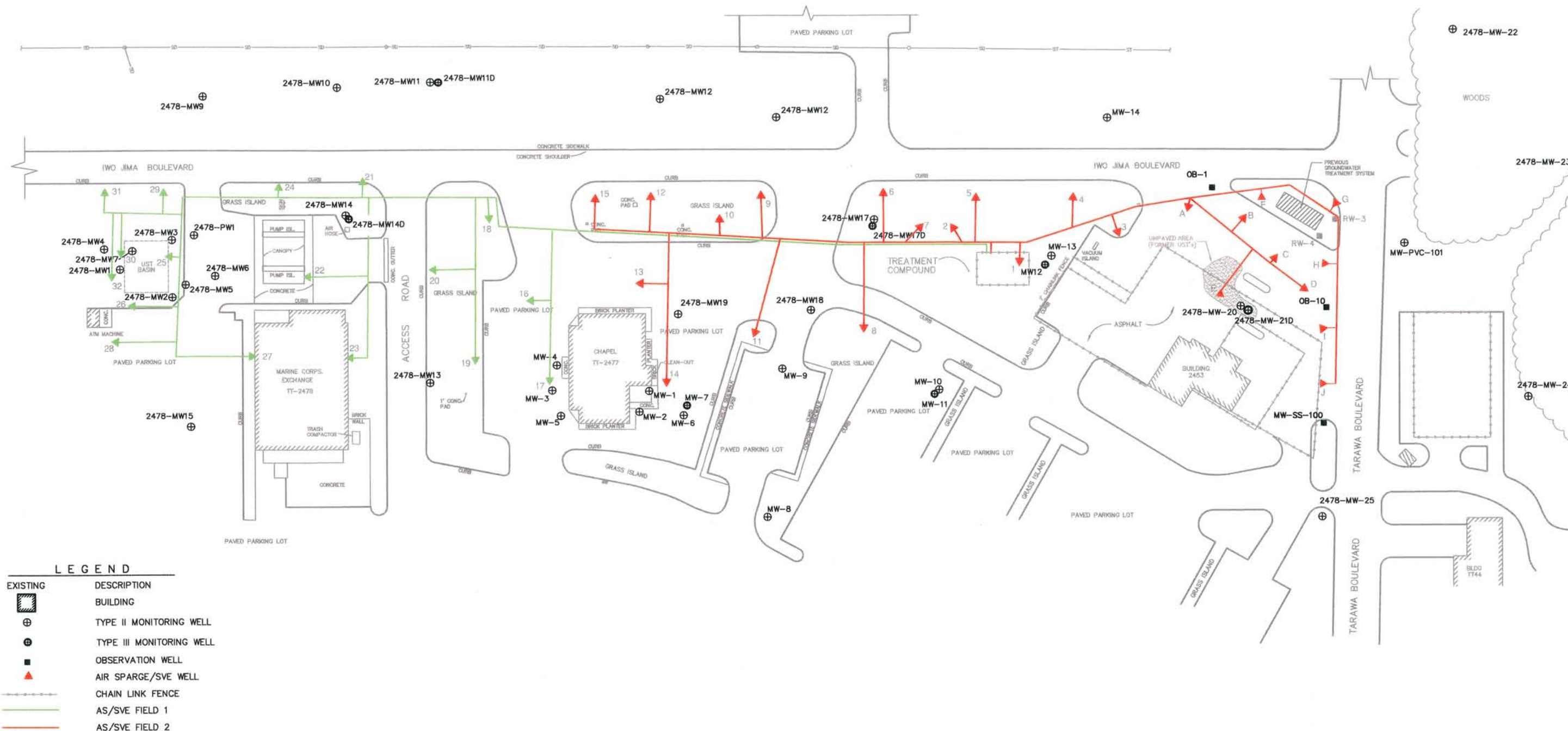
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EXISTING	DESCRIPTION
	BUILDING
	TYPE II MONITORING WELL
	TYPE III MONITORING WELL
	OBSERVATION WELL
	CHAIN LINK FENCE



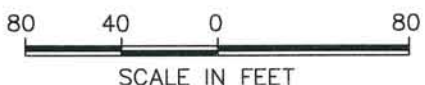
NOTE:
1. MAP ADAPTED FROM SHAW ENVIRONMENTAL, INC.

CATLIN ENGINEERS and SCIENTISTS WILMINGTON, NORTH CAROLINA	PROJECT RAO + RCAP TT-2477-78 MCB CAMP LEJEUNE, NC	TITLE SITE MAP		FIGURE 2
	JOB NO. 203063-10 DATE: NOV 2003	SCALE: 1"=80'	DRAWN BY: HCS CHECKED BY: SVH	

203063-TT2477-78-REV.-02

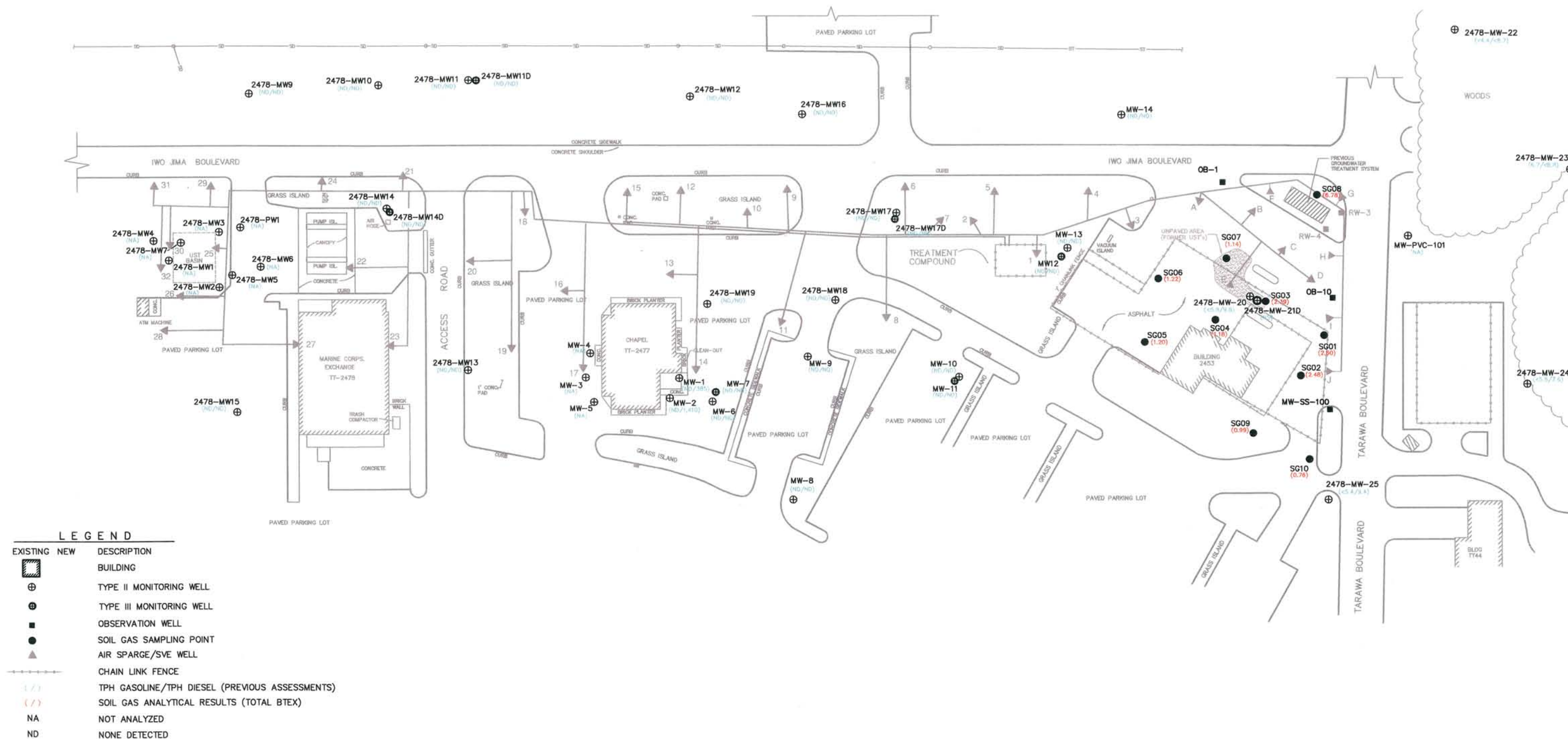


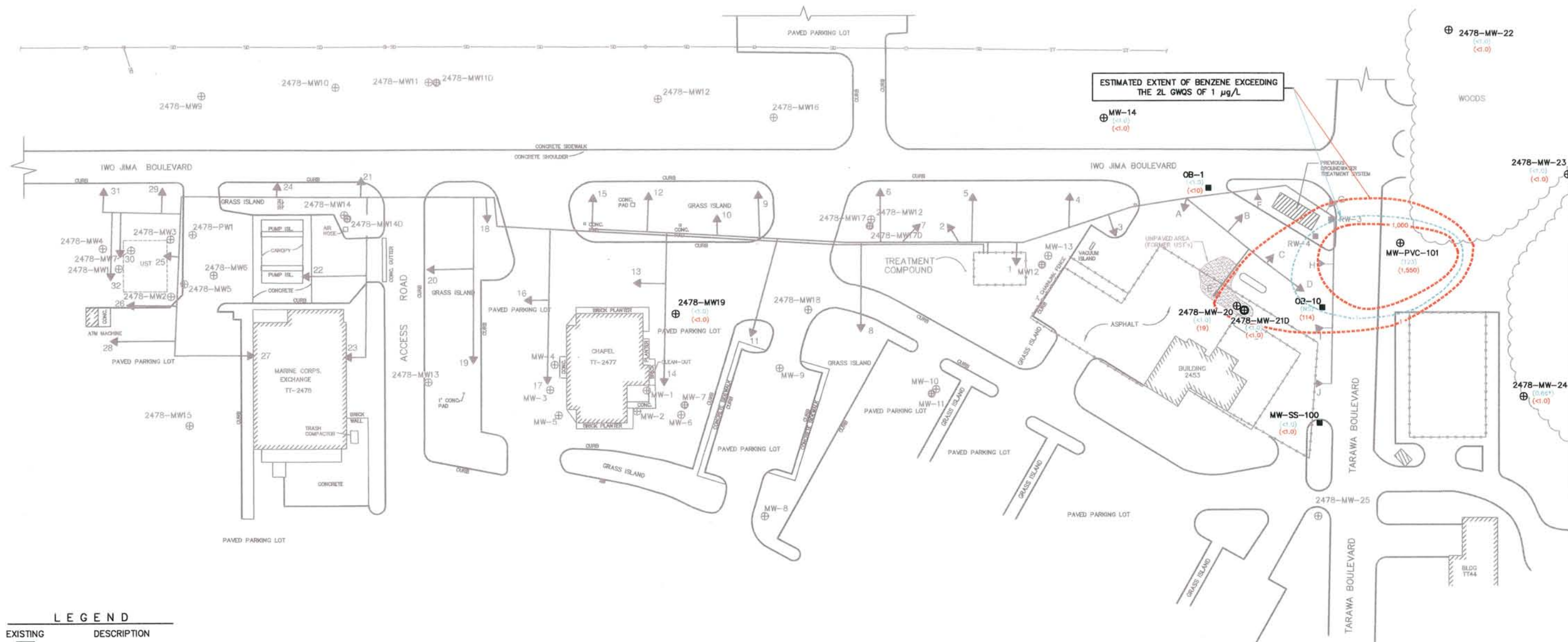
LEGEND	
EXISTING	DESCRIPTION
	BUILDING
	TYPE II MONITORING WELL
	TYPE III MONITORING WELL
	OBSERVATION WELL
	AIR SPARGE/SVE WELL
	CHAIN LINK FENCE
	AS/SVE FIELD 1
	AS/SVE FIELD 2



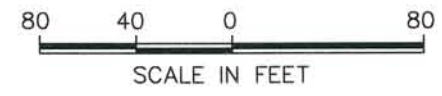
NOTE:
1. MAP ADAPTED FROM SHAW ENVIRONMENTAL, INC.
2. REMEDIATION SYSTEM LAYOUT PROVIDED BY SHAW ENVIRONMENTAL, FINAL 2002 ANNUAL MONITORING REPORT

 WILMINGTON, NORTH CAROLINA	PROJECT RAO + RCAP TT-2477-78 MCB CAMP LEJEUNE, NC	TITLE REMEDATION SYSTEM LAYOUT		FIGURE 3
	JOB NO. 203063-10 DATE: NOV 2003	SCALE: 1"=80'	DRAWN BY: HCS CHECKED BY: SVH	





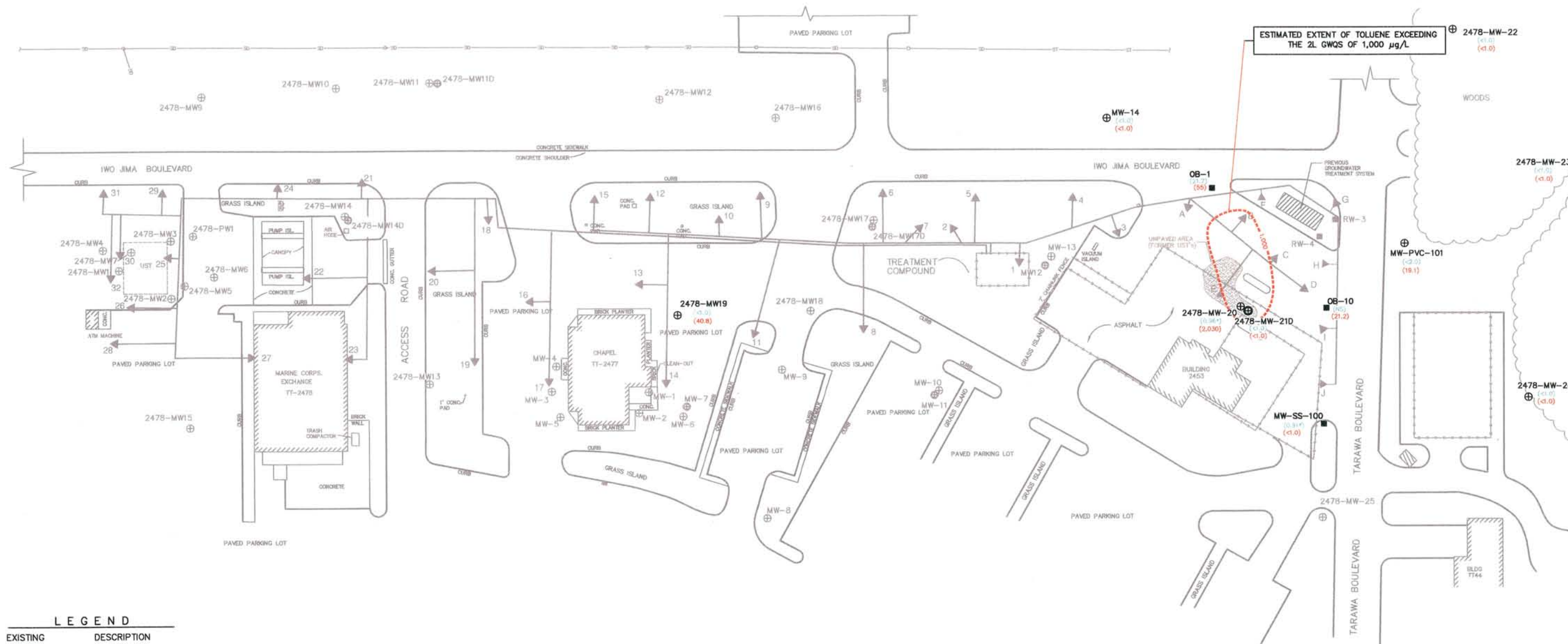
LEGEND	
EXISTING	DESCRIPTION
	BUILDING
	TYPE II MONITORING WELL
	TYPE III MONITORING WELL
	OBSERVATION WELL
	AIR SPARGE/SVE WELL
	CHAIN LINK FENCE
	APRIL 2003 BENZENE CONCENTRATIONS
	OCTOBER 2002 BENZENE CONCENTRATIONS
	NOT SAMPLED
	ESTIMATED



NOTE:
1. MAP ADAPTED FROM SHAW ENVIRONMENTAL, INC.
2. ALL RESULTS IN $\mu\text{g/L}$.
3. 2002 ANALYTICAL DATA PROVIDED BY SHAW ENVIRONMENTAL, FINAL 2002 ANNUAL MONITORING REPORT.

 ENGINEERS and SCIENTISTS WILMINGTON, NORTH CAROLINA	PROJECT RAO + RCAP TT-2477-78 MCB CAMP LEJEUNE, NC	TITLE LABORATORY ANALYTICAL RESULTS - GROUNDWATER - BENZENE AS OF APRIL 2003	FIGURE 5
	JOB NO. 203063-10 DATE: NOV 2003	SCALE: 1"=80'	DRAWN BY: HCS CHECKED BY: SVH

203063-TT2477-78-REV-05



LEGEND

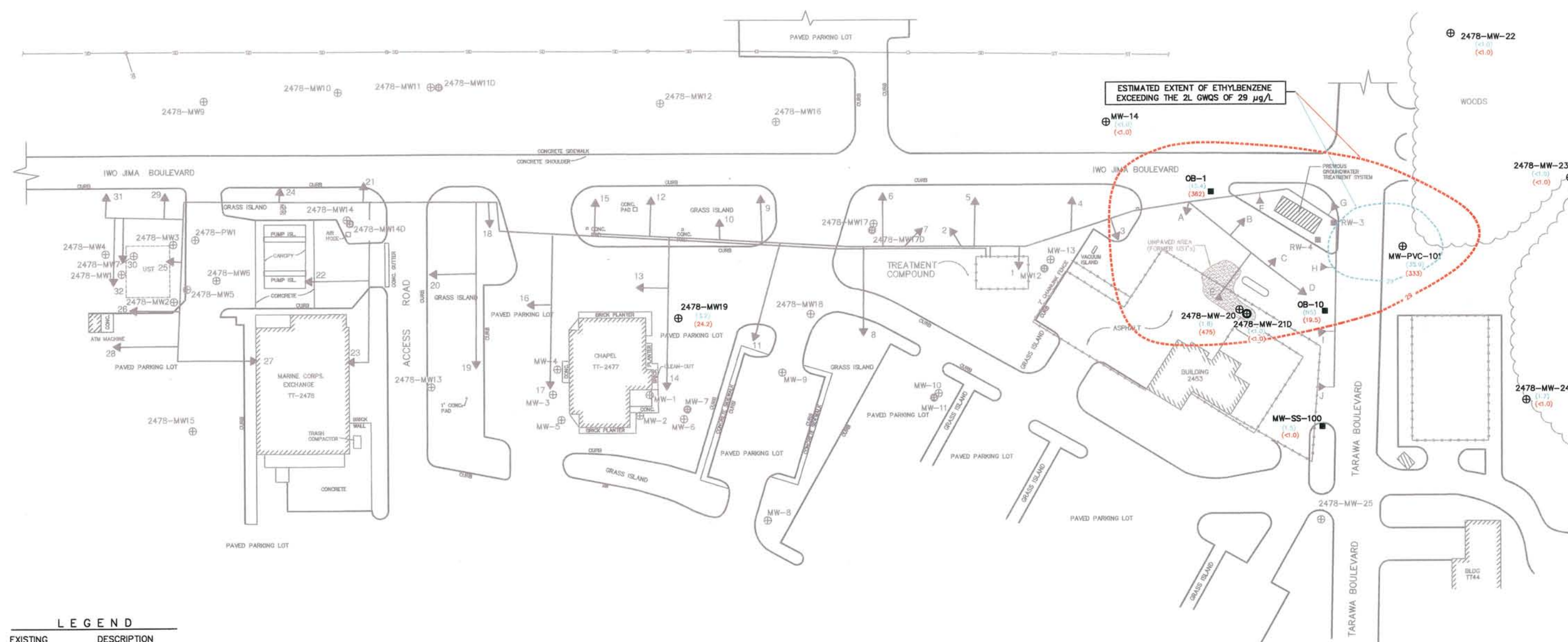
EXISTING	DESCRIPTION
	BUILDING
	TYPE II MONITORING WELL
	TYPE III MONITORING WELL
	OBSERVATION WELL
	AIR SPARGE/SVE WELL
	CHAIN LINK FENCE
	APRIL 2003 TOLUENE CONCENTRATIONS
	OCTOBER 2002 TOLUENE CONCENTRATIONS
NS	NOT SAMPLED
*	ESTIMATED



NOTE:
1. MAP ADAPTED FROM SHAW ENVIRONMENTAL, INC.
2. ALL RESULTS IN µg/L

CAELIN ENGINEERS and SCIENTISTS WILMINGTON, NORTH CAROLINA	PROJECT RAO + RCAP TT-2477-78 MCB CAMP LEJEUNE, NC	TITLE LABORATORY ANALYTICAL RESULTS - GROUNDWATER - TOLUENE AS OF APRIL 2003	FIGURE 6
	JOB NO. 203063-10 DATE NOV 2003	SCALE: 1"=80' DRAWN BY: HCS CHECKED BY: SVH	

203063-TT2477-78-REV-06



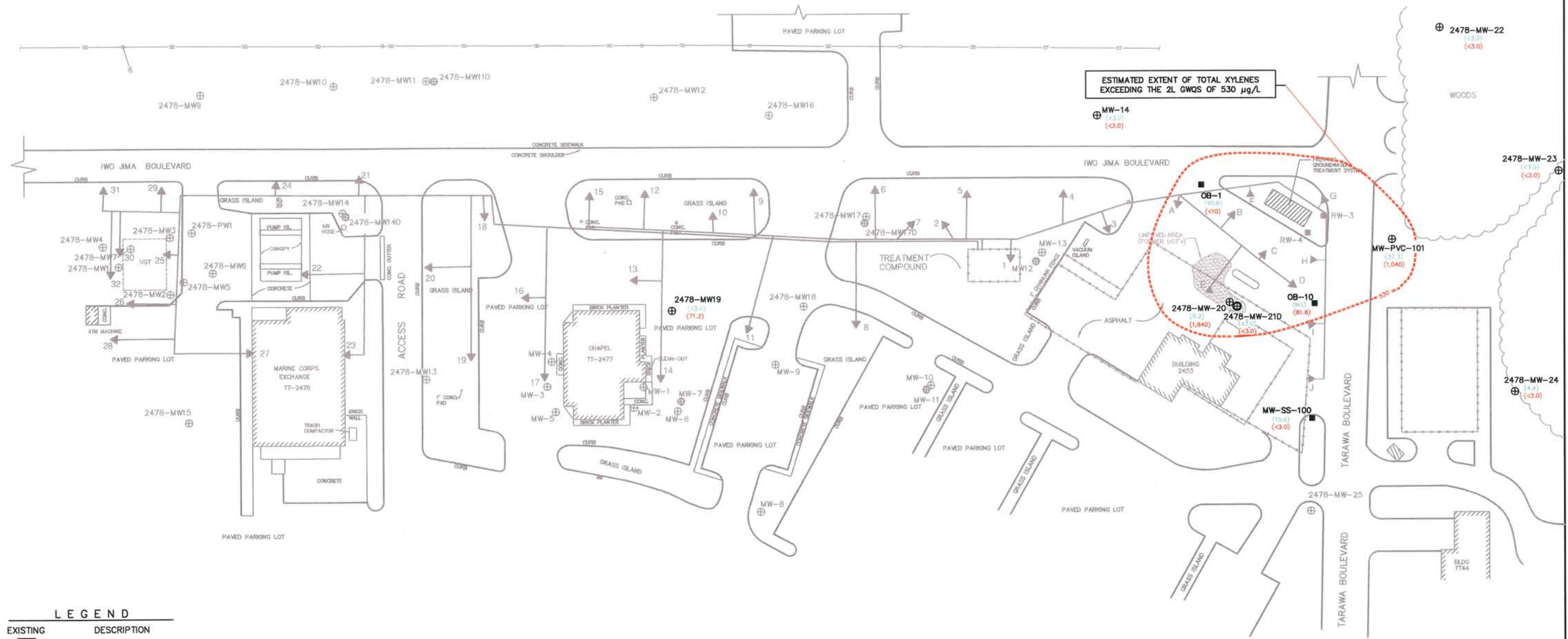
LEGEND	
EXISTING	DESCRIPTION
	BUILDING
	TYPE II MONITORING WELL
	TYPE III MONITORING WELL
	OBSERVATION WELL
	AIR SPARGE/SVE WELL
	CHAIN LINK FENCE
()	APRIL 2003 ETHYLBENZENE CONCENTRATIONS
()	OCTOBER 2002 ETHYLBENZENE CONCENTRATIONS
NS	NOT SAMPLED



NOTE:
1. MAP ADAPTED FROM SHAW ENVIRONMENTAL, INC.
2. ALL RESULTS IN µg/L

 ENGINEERS and SCIENTISTS WILMINGTON, NORTH CAROLINA	PROJECT RAO + RCAP TT-2477-78 MCB CAMP LEJEUNE, NC		TITLE LABORATORY ANALYTICAL RESULTS - GROUNDWATER - ETHYLBENZENE AS OF APRIL 2003		FIGURE 7
	JOB NO. 203063-10	DATE: NOV 2003	SCALE: 1"=80'	DRAWN BY: HCS	CHECKED BY: SVH

203063-TT2477-78-REV-07

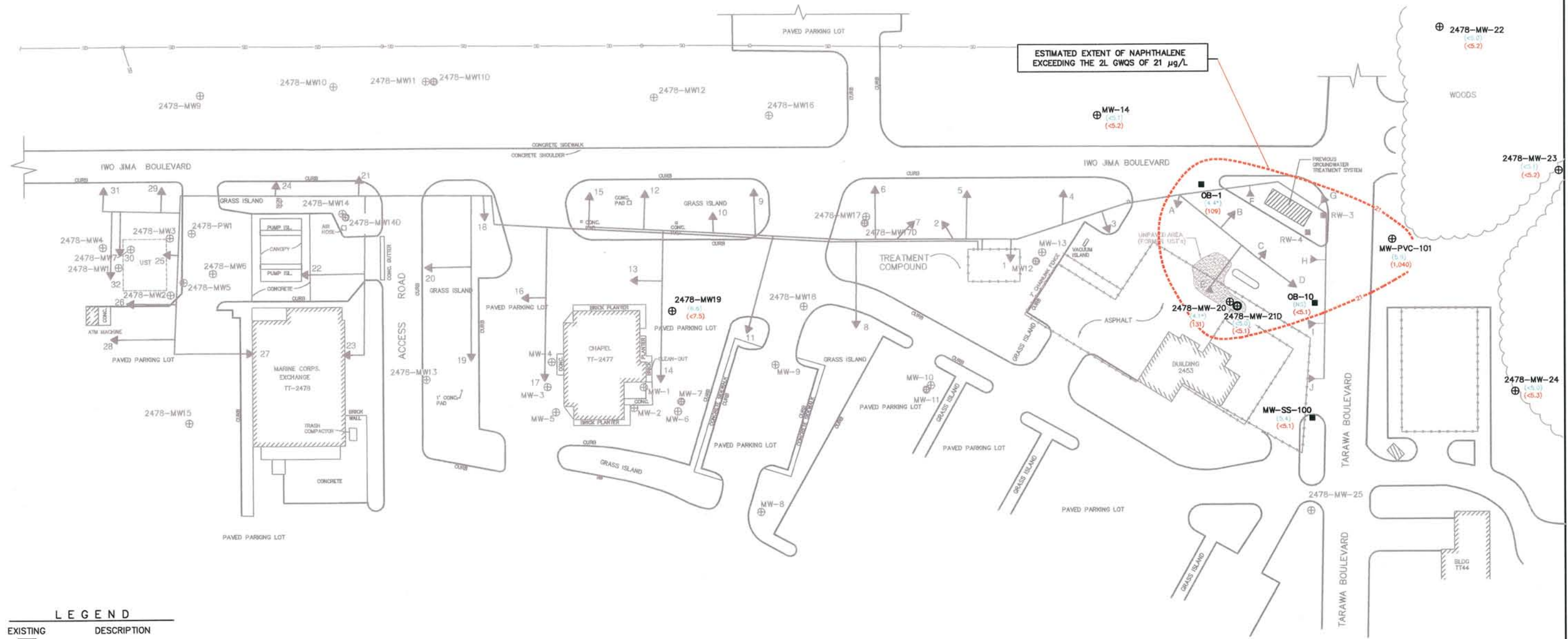


LEGEND	
EXISTING	DESCRIPTION
	BUILDING
	TYPE II MONITORING WELL
	TYPE III MONITORING WELL
	OBSERVATION WELL
	AIR SPARGE/SVE WELL
	CHAIN LINK FENCE
()	APRIL 2003 TOTAL XYLENE CONCENTRATIONS
()	OCTOBER 2002 TOTAL XYLENE CONCENTRATIONS
NS	NOT SAMPLED

NOTE:
1. ALL RESULTS IN µg/L.
2. MAP ADAPTED FROM SHAW ENVIRONMENTAL, INC.
3. ANALYTICAL DATA PROVIDED BY SHAW ENVIRONMENTAL; FINAL 2002 ANNUAL MONITORING REPORT.



 ENGINEERS and SCIENTISTS WILMINGTON, NORTH CAROLINA	PROJECT RAO + RCAP TT-2477-78 MCB CAMP LEJEUNE, NC	TITLE LABORATORY ANALYTICAL RESULTS - GROUNDWATER - TOTAL XYLENES AS OF APRIL 2003	FIGURE 8
	JOB NO. 203063-10 DATE NOV 2003	SCALE: 1"=80' DRAWN BY: HCS CHECKED BY: SVH	203063-TT2477-78-REV-08



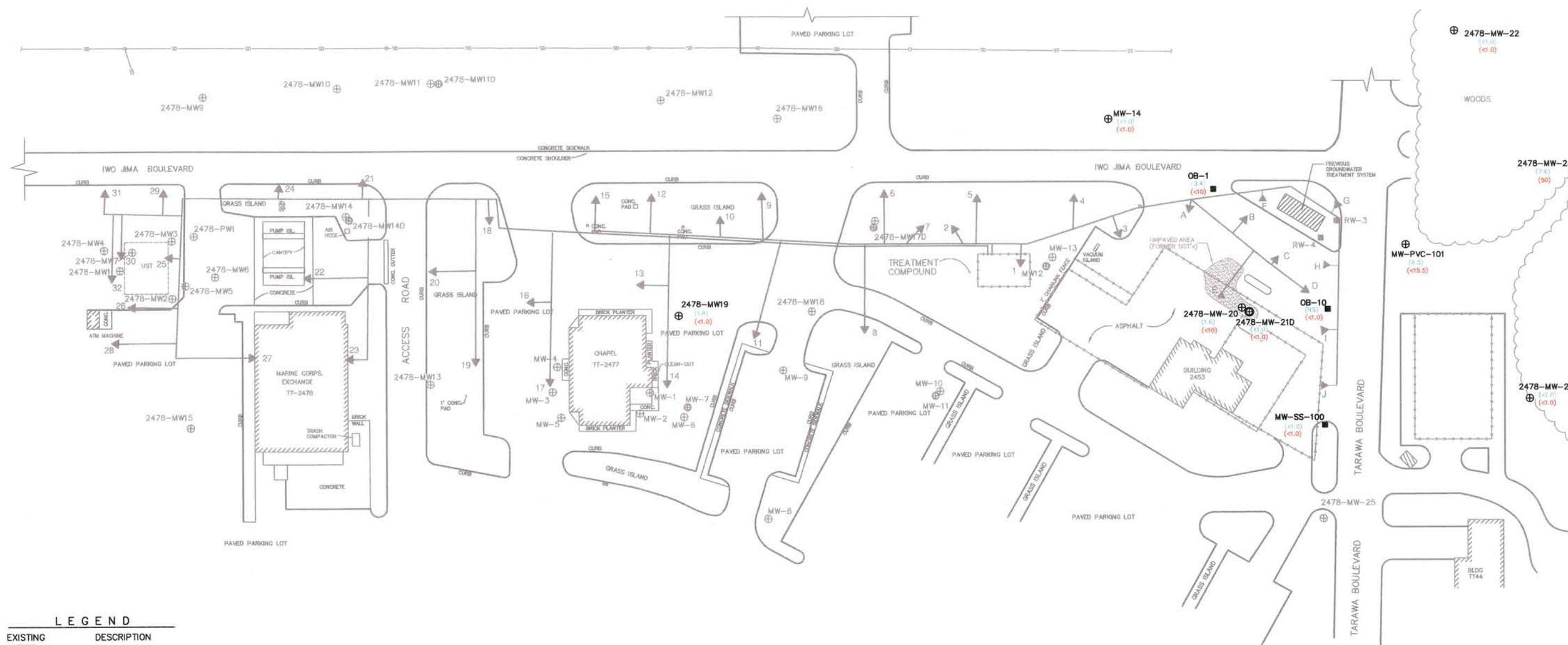
LEGEND

EXISTING	DESCRIPTION
	BUILDING
	TYPE II MONITORING WELL
	TYPE III MONITORING WELL
	OBSERVATION WELL
	AIR SPARGE/SVE WELL
	CHAIN LINK FENCE
	APRIL 2003 NAPHTHALENE CONCENTRATIONS
	OCTOBER 2002 NAPHTHALENE CONCENTRATIONS
	NOT SAMPLED
	ESTIMATED



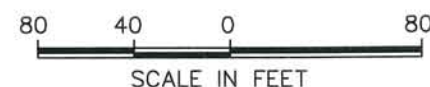
NOTE:
1. ALL RESULTS IN µg/L.
2. MAP ADAPTED FROM SHAW ENVIRONMENTAL, INC.
3. ANALYTICAL DATA PROVIDED BY SHAW ENVIRONMENTAL; FINAL 2002 ANNUAL MONITORING REPORT.

 ENGINEERS and SCIENTISTS WILMINGTON, NORTH CAROLINA	PROJECT RAO + RCAP TT-2477-78 MCB CAMP LEJEUNE, NC	TITLE LABORATORY ANALYTICAL RESULTS - GROUNDWATER - NAPHTHALENE AS OF APRIL 2003	FIGURE 9
	JOB NO. 203063-10 DATE: NOV 2003	SCALE: 1"=80' DRAWN BY: HCS CHECKED BY: SVH	203063-TT2477-78-REV-09



LEGEND

EXISTING	DESCRIPTION
	BUILDING
	TYPE II MONITORING WELL
	TYPE III MONITORING WELL
	OBSERVATION WELL
	AIR SPARGE/SVE WELL
	CHAIN LINK FENCE
	APRIL 2003 MTBE CONCENTRATIONS
	OCTOBER 2002 MTBE CONCENTRATIONS
NS	NOT SAMPLED



NOTE:
1. ALL RESULTS IN $\mu\text{g/L}$
2. MAP ADAPTED FROM SHAW ENVIRONMENTAL, INC.
3. ANALYTICAL DATA PROVIDED BY SHAW ENVIRONMENTAL; FINAL 2002 ANNUAL MONITORING REPORT

 ENGINEERS and SCIENTISTS WILMINGTON, NORTH CAROLINA	PROJECT RAO + RCAP TT-2477-78 MCB CAMP LEJEUNE, NC	TITLE LABORATORY ANALYTICAL RESULTS - GROUNDWATER - MTBE AS OF APRIL 2003		FIGURE 10
	JOB NO. 203063-10 DATE NOV 2003	SCALE: 1"=80'	DRAWN BY: HCS CHECKED BY: SVH	203063-TT2477-78-REV-10

APPENDIX A

TARGET CLEANUP CONCENTRATIONS FROM CAP



e. Target Cleanup Concentrations:

MEDIUM	COMPONENT	EXISTING CONDITIONS	TARGET CLEANUP
Free Product	Gasoline/Diesel	Free product thickness up to 2.0' in monitoring well TT2478-MW-1	≤1/8"
Vadose Zone Soil	TPH 3550/5030	TPH soil contamination was measured in November 1992 at levels that range from < 1 mg/kg to 23,000 mg/kg. The areal extent is estimated to extend 10 feet from the edge of each tank and 10 feet deep.	≤40 mg/kg ≤10 mg/kg
Groundwater	Benzene Ethylbenzene Naphthalene Acenaphthene Acenaphthylene Benzo (a) anthracene Pyrene Fluorene Anthracene Fluoranthene Phenanthrene Toluene Xylenes (Total) MTBE	8800 ug/l 2400 ug/l 44 ug/l 15 ug/l 3.1 ug/l 1.7 ug/l 1.1 ug/l 0.7 ug/l 5.1 ug/l 6.4 ug/l 3.0 ug/l 26000 ug/l 17000 ug/l 7540 ug/l	1 ug/l 29 ug/l 21 ug/l* ** ** ** ** 280* ** ** 210* 1000 530 200

* Interim Groundwater Quality Standard

** Numerical standard has not been established

f. Target Schedule:

- (i) Submittal of Permit Applications:
One month after tentative approval of CAP by NCDEHNR.
- (ii) System Installation/Activation:
Within five months of DEM approval of CAP.
- (iii) System Operation:
Actively remediate 84 months from system installation/activation.

APPENDIX B

SUMMARY OF HISTORICAL SOIL LABORATORY RESULTS

TABLE 4.2
SUMMARY OF LABORATORY ANALYTICAL RESULTS
SOIL SAMPLES
BUILDING TT2477
MARINE CORPS BASE
JACKSONVILLE, NORTH CAROLINA
LAW ENGINEERING JOB NO. 475-10722-01

SAMPLE LOCATION			LABORATORY RESULTS				
BORING IDENTIFICATION	SAMPLE DATE	SAMPLE DEPTH (ft.)	TPH-GASOLINE (mg/Kg)	TPH-DIESEL (mg/Kg)	IGNITABILITY	TOTAL LEAD	pH
MW-6	10/26/94	4-6	ND	ND	--	--	--
		10-12	ND	ND	NONE	0.86	4.7
MW-7	11/01/94	2-4	ND	ND	--	--	--
		6-8	ND	ND	NONE	3.4	5.9
MW-8	11/03/94	2-4	ND	ND	--	--	--
		10-12	ND	ND	--	--	--
MW-9	11/03/94	5-7	ND	ND	--	--	--
		11-13	ND	ND	NONE	--	5.3
MW-10	11/03/94	3-5	ND	ND	--	--	--
		13-15	ND	ND	--	--	--
MW-11		--	--	--	--	--	--
		--	--	--	--	--	--
MW-12	11/08/94	8-10	ND	ND	--	--	--
		10-12	ND	ND	--	--	--
MW-13	11/09/94	11-13	ND	ND	--	--	--
		13-15	ND	ND	--	--	--
MW-14	11/09/94	3.5-5	ND	ND	--	--	--
		6-7.5	ND	ND	--	--	--
		11-12.5	ND	ND	--	--	--

NOTES:

All samples analyzed by off-site lab.

ND - Not detected; see laboratory reports for applicable detection limit.

-- Not analyzed

NC Action Level for:

Low Boiling Point Hydrocarbons (Gasoline) = 10 mg/Kg

Medium Boiling Point Hydrocarbons (Diesel) = 40 mg/Kg

TABLE 4.3 (Page 1 of 3)
SUMMARY OF LABORATORY ANALYTICAL RESULTS
SOIL SAMPLES
LEAKING UNDERGROUND STORAGE TANK
SITE ASSESSMENT REPORT
BUILDING TT 2478
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA
LAW ENGINEERING JOB NO. 475-09083-01

SAMPLE LOCATION	LAB ID NO.	SAMPLE DEPTH (FT.)	LABORATORY RESULTS					
			TPH-GASOLINE (mg/Kg)	TPH-DIESEL (mg/Kg)	FLASH POINT (DEGREES F)	TOTAL LEAD (mg/l)	TCLP METALS (ug/l)	pH
TT2478-MW-8	232	3.5'-5.5'	4.4	ND	--	--	--	--
TT2478-MW-8	233	8.5'-10.5'	ND	ND	--	--	--	--
TT2478-MW-9	234	3.5'-5.5'	ND	ND	--	--	--	--
TT2478-MW-9	235	8.5'-10.5'	ND	ND	--	--	--	--
TT2478-MW-10	236	3.5'-5.5'	ND	ND	--	--	--	--
TT2478-MW-10	237	8.5'-10.5'	ND	ND	--	--	--	--
TT2478-MW-11	247	3.5'-5.5'	ND	ND	--	--	--	--
TT2478-MW-11	248/AA47338	8.5'-10.5'	ND/ND	ND/ND	--	ND	--	4.99
TT2478-MW-12	268/AA47339	3.5'-5.5'	ND/ND	ND/ND	--	11.0	--	4.70
TT2478-MW-12	269/AA47340	8.5'-10.5'	ND/ND	ND/ND	--	--	--	--
TT2478-MW-13	249	3.5'-5.5'	ND	ND	--	--	--	--
TT2478-MW-13	250/AA47341	8.5'-10.5'	ND	ND	--	7.3	--	4.52

* Duplicate sample

-- Not analyzed

ND Not detected; see laboratory reports for applicable detection limit

NF No Flash

Shaded Area = Concentrations detected above NC soil remediation guidelines

3 Digit Lab ID No. refers to on-site Lab ID

Lab ID with AA prefix refers to off-site Lab ID

NC Action Level for:

Low Boiling Point Hydrocarbons (Gasoline) = 10 mg/Kg

Median Boiling Point Hydrocarbons (Diesel) = 40 mg/Kg

NOTE (1) Barium = 300, Chromium = 9, Cadmium = 11

NOTE (2) Barium = 520, Chromium = 37

TABLE 4.3 (Page 2 of 3)
SUMMARY OF LABORATORY ANALYTICAL RESULTS
SOIL SAMPLES
LEAKING UNDERGROUND STORAGE TANK
SITE ASSESSMENT REPORT
BUILDING TT 2478
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA
LAW ENGINEERING JOB NO. 475-09083-01

SAMPLE LOCATION	LAB ID NO.	SAMPLE DEPTH (FT.)	LABORATORY RESULTS					
			TPH-GASOLINE (mg/Kg)	TPH-DIESEL (mg/Kg)	FLASH POINT (DEGREES F)	TOTAL LEAD (mg/l)	TCLP METALS (ug/l)	pH
TT2478-MW-14	251	3.5'-5.5'	ND	ND	--	--	--	--
TT2478-MW-14	252/AA47342	8.5'-10.5'	ND	ND	--	ND	SEE NOTE (1)	4.72
TT2478-MW-15	262	3.5'-5.5'	ND	ND	--	--	--	--
TT2478-MW-15	263/AA47343	8.5'-10.5'	ND	ND	--	9.7	SEE NOTE (2)	4.53
TT2478-MW-16	278/AA47482	3.5'-5.5'	ND/ND	ND/ND	NF	13.0	--	4.94
TT2478-MW-16	279/AA47483	8.5'-10.5'	ND/ND	ND/ND	--	--	--	--
TT2478-MW-17	AA47484	8.5'-10.5'	ND	ND	--	--	--	--
TT2478-MW-17	AA47485	3.5'-5.5'	ND	ND	NF	--	--	--
TT2478-MW-18	AA47486	8.5'-10.5'	ND	ND	--	--	--	--
TT2478-MW-18	AA47487	13.5'-15.5'	ND	ND	--	ND	--	--
TT2478-MW-19	AA47488	8.5'-10.5'	ND	ND	NF	9.2	--	--
TT2478-MW-19	AA47489	13.5'-15.5'	ND	ND	--	--	--	--

* Duplicate sample

-- Not analyzed

ND Not detected; see laboratory reports for applicable detection limit

NF No Flash

Shaded Area = Concentrations detected above NC soil remediation guidelines

3 Digit Lab ID No. refers to on-site Lab ID

Lab ID with AA prefix refers to off-site Lab ID

NC Action Level for:

Low Boiling Point Hydrocarbons (Gasoline) = 10 mg/Kg

Median Boiling Point Hydrocarbons (Diesel) = 40 mg/Kg

NOTE (1) Barium = 300, Chromium = 9, Cadmium = 11

NOTE (2) Barium = 520, Chromium = 37

TABLE 4.3 (Page 3 of 3)
SUMMARY OF LABORATORY ANALYTICAL RESULTS
SOIL SAMPLES
LEAKING UNDERGROUND STORAGE TANK
SITE ASSESSMENT REPORT
BUILDING TT 2478
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA
LAW ENGINEERING JOB NO. 475-09083-01

SAMPLE LOCATION	LAB ID NO.	SAMPLE DEPTH (FT.)	LABORATORY RESULTS					
			TPH-GASOLINE (mg/Kg)	TPH-DIESEL (mg/Kg)	FLASH POINT (DEGREES F)	TOTAL LEAD (mg/l)	TCLP METALS (ug/l)	pH
TT2478-MW-11D	AA48594	5.0'-7.0'	ND	ND	--	--	--	--
TT2478-MW-11D	AA48595	10.0'-12.0'	ND	ND	--	--	--	--
TT2478-MW-14D	AA48596	5.0'-7.0'	ND	ND	--	--	--	--
TT2478-MW-14D	AA48597	10.0'-12.0'	ND	ND	--	--	--	--
TT2478-MW-17D	AA48598	8.5'-10.5'	ND	ND	--	--	--	--
TT2478-MW-17D	AA48599	13.5'-15.5'	ND	ND	--	--	--	--

* Duplicate sample

-- Not analyzed

ND Not detected; see laboratory reports for applicable detection limit

NF No Flash

Shaded Area = Concentrations detected above NC soil remediation guidelines

3 Digit Lab ID No. refers to on-site Lab ID

Lab ID with AA prefix refers to off-site Lab ID

NC Action Level for:

Low Boiling Point Hydrocarbons (Gasoline) = 10 mg/Kg

Median Boiling Point Hydrocarbons (Diesel) = 40 mg/Kg

NOTE (1) Barium = 300, Chromium = 9, Cadmium = 11

NOTE (2) Barium = 520, Chromium = 37

**CAMP LEJEUNE
BUILDING TT-2477/2478
ADDITIONAL INVESTIGATION**

**TABLE 1
SOIL GAS ANALYTICAL RESULTS
ALL RESULTS IN PARTS PER MILLION**

SAMPLE POINT	BENZENE	TOLUENE	ETHYL- BENZENE	XYLENES (total)	TOTAL BTEX
SG01	0.282	0.253	0	2.06	2.595
SG02	0.176	0.209	0	2.094	2.479
SG03	0.143	0.193	0	2.055	2.391
SG04	0.125	0.16	0	0.89	1.175
SG05	0.116	0.154	0	0.934	1.204
SG06	0.111	0.155	0	0.958	1.224
SG07	0.099	0.141	0	0.9	1.14
SG08	1.626	0.66	0	4.495	6.781
SG09	0.089	0.125	0	0.779	0.993
SG10	0.083	0.113	0	0.561	0.757

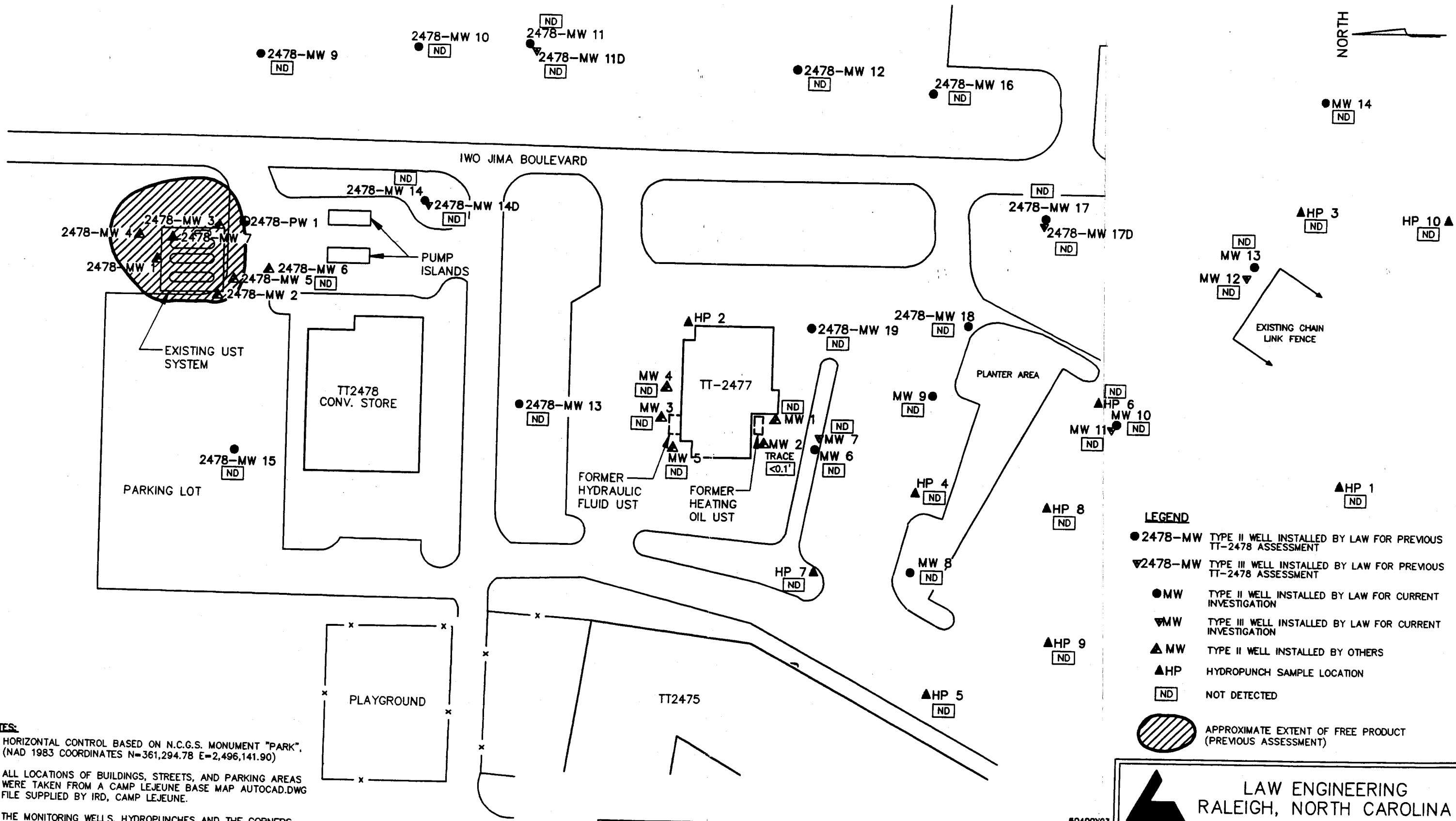
**CAMP LEJEUNE
BUILDING TT-2477/2478
ADDITIONAL INVESTIGATION**

**TABLE 3
SOIL BORING ANALYTICAL RESULTS
ALL RESULTS IN MILLIGRAMS PER KILOGRAM**

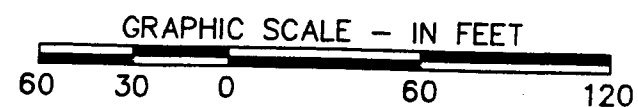
SAMPLE NUMBER	SAMPLE DATE	LOCATION	DEPTH (in feet BLS)	GASOLINE RANGE ORGANICS	DIESEL RANGE ORGANICS
CLJ-33-001-SB	9/13/00	MW-23	16.5-18	6.7	<8.8
CLJ-33-002-SB	9/13/00	MW-24	12.5-14	5.54	7.63
CLJ-33-003-SB	9/13/00	MW-25	12.5-14	<5.4	9.4
CLJ-33-004-SB	9/13/00	MW-22	12-13.5	<4.4	<8.7
CLJ-33-005-SB	9/14/00	MW-20	17-18.5	<5.8	9.8

No samples exceeded the action levels of 10 milligrams per kilogram for GRO and DRO.

APPENDIX C
SELECTED FIGURES FROM CAP



- NOTES:**
1. HORIZONTAL CONTROL BASED ON N.C.G.S. MONUMENT "PARK". (NAD 1983 COORDINATES N=361,294.78 E=2,496,141.90)
 2. ALL LOCATIONS OF BUILDINGS, STREETS, AND PARKING AREAS WERE TAKEN FROM A CAMP LEJEUNE BASE MAP AUTOCAD.DWG FILE SUPPLIED BY IRD, CAMP LEJEUNE.
 3. THE MONITORING WELLS, HYDROPUNCHES AND THE CORNERS OF BUILDING TT2477 AND THE PLANTER AREA WERE THE ONLY POINTS LOCATED IN THE FIELD BY THIS SURVEY. ALL OTHER LOCATIONS WERE TAKEN FROM ABOVE REFERENCED FILE, AND MAY OR MAY NOT BE SHOWN CORRECTLY.



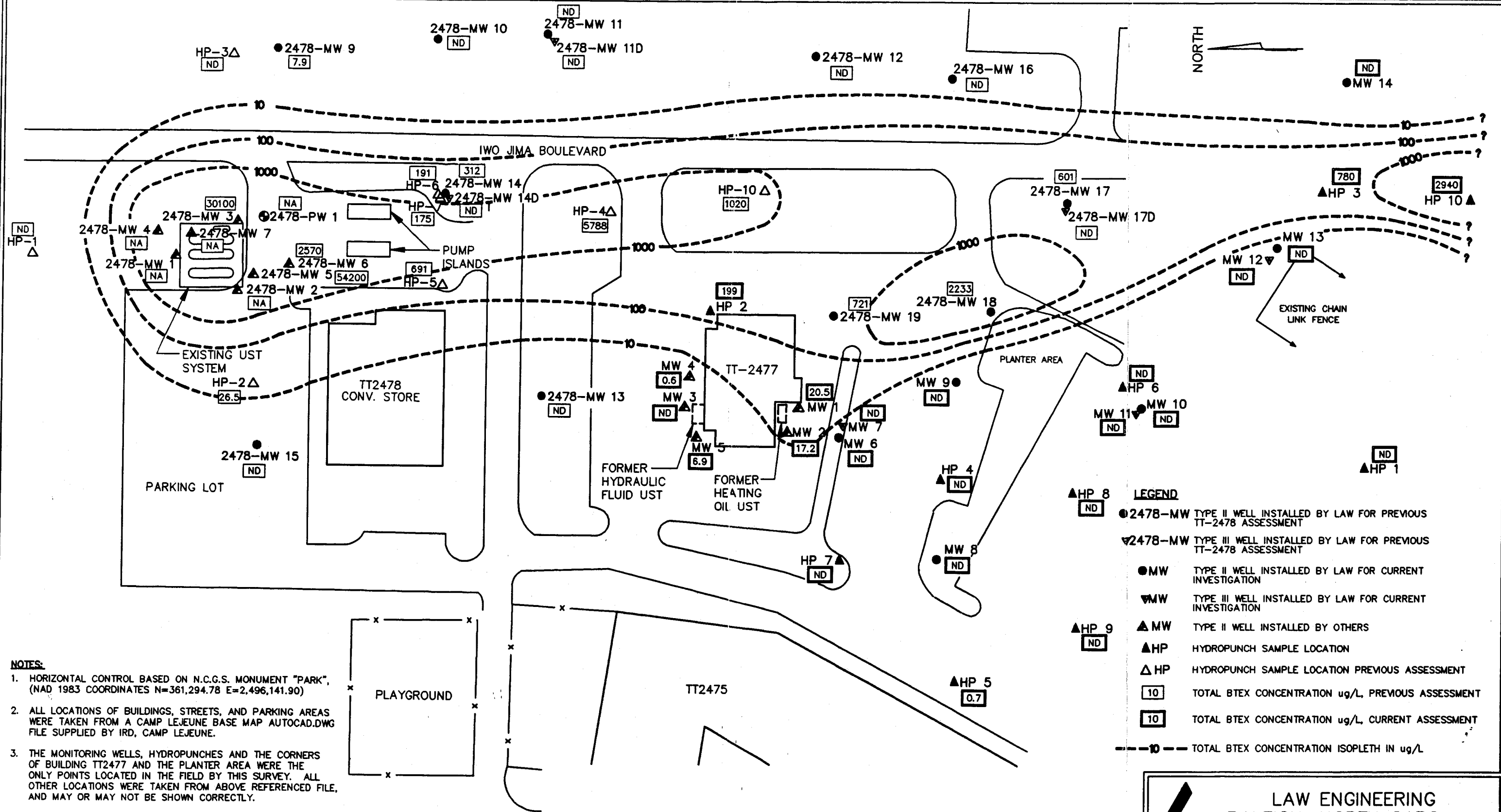
- LEGEND**
- 2478-MW TYPE II WELL INSTALLED BY LAW FOR PREVIOUS TT-2478 ASSESSMENT
 - ▼ 2478-MW TYPE III WELL INSTALLED BY LAW FOR PREVIOUS TT-2478 ASSESSMENT
 - MW TYPE II WELL INSTALLED BY LAW FOR CURRENT INVESTIGATION
 - ▼ MW TYPE III WELL INSTALLED BY LAW FOR CURRENT INVESTIGATION
 - ▲ MW TYPE II WELL INSTALLED BY OTHERS
 - ▲ HP HYDROPUNCH SAMPLE LOCATION
 - [ND] NOT DETECTED
 - [Hatched Circle] APPROXIMATE EXTENT OF FREE PRODUCT (PREVIOUS ASSESSMENT)

LAW ENGINEERING
RALEIGH, NORTH CAROLINA

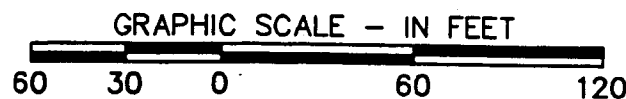
FREE PRODUCT SPATIAL EXTENT MAP
BUILDINGS TT-2477/2478
CAMP LEJEUNE, NORTH CAROLINA
CONTRACT N62470-93-D-4020

DRAWN: <i>gjb</i>	DATE: MAY 1995
DFT CHECK: <i>MJB</i>	SCALE: 1"=60'
ENG CHECK: <i>MW</i>	JOB: 30740-5-0400
APPROVAL: <i>TLL</i>	DWG: 1.3

REFERENCE: SURVEY BY PRESTIGE ENGINEERING AND LAND SURVEYING



- NOTES:**
- HORIZONTAL CONTROL BASED ON N.C.G.S. MONUMENT "PARK", (NAD 1983 COORDINATES N=361,294.78 E=2,496,141.90)
 - ALL LOCATIONS OF BUILDINGS, STREETS, AND PARKING AREAS WERE TAKEN FROM A CAMP LEJEUNE BASE MAP AUTOCAD.DWG FILE SUPPLIED BY IRD, CAMP LEJEUNE.
 - THE MONITORING WELLS, HYDROPUNCHES AND THE CORNERS OF BUILDING TT2477 AND THE PLANTER AREA WERE THE ONLY POINTS LOCATED IN THE FIELD BY THIS SURVEY. ALL OTHER LOCATIONS WERE TAKEN FROM ABOVE REFERENCED FILE, AND MAY OR MAY NOT BE SHOWN CORRECTLY.
 - ND = NOT DETECTED
 - NA = NOT ANALYZED



TOTAL BTEX CONCENTRATIONS-WATER(ug/L) - ISOPLETH MAP
BUILDINGS TT-2477/2478
CAMP LEJEUNE, NORTH CAROLINA
CONTRACT N62470-93-D-4020

REFERENCE: SURVEY BY PRESTIGE ENGINEERING AND LAND SURVEYING

LAW ENGINEERING
RALEIGH, NORTH CAROLINA

50400X06

DRAWN: <i>QBB</i>	DATE: MAY 1995
DFT CHECK: <i>MB</i>	SCALE: 1"=60'
ENG CHECK: <i>W</i>	JOB: 30740-5-0400
APPROVAL: <i>TCL</i>	DWG: 1.6

APPENDIX D

**SUMMARY OF HISTORICAL
GROUNDWATER LABORATORY RESULTS
(POST CAP)**

Analytical Data Summary
Shallow Well: 2478-PW1

Client Sample ID:		143GW016	143GW043	143GW073	143GW144	143GW148	143GW161
Date Sampled:		08/14/97	01/21/98	05/01/98	11/17/98	02/27/99	05/20/99
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result
EPA 602							
1,2-Dichlorobenzene	620	<500	<50	<5	<1	<1	<1
1,3-Dichlorobenzene	620	<380	<38	<3.8	<1	<1	<1
1,4-Dichlorobenzene	75	<750	<75	<7.5	0.79 J	<1	<1
EPA 602							
Benzene	1	5900	77	<2.5	1.6	2.2	1.6
Chlorobenzene	50	<250	<25	<2.5	<1	<1	<1
Methyl tert-butyl ether	200	2200 JP	1700	53	13	7.6	<1
Ethylbenzene	29	1200	13 JP	7.7	0.32 J	1.1	<1
Xylenes (total)	530	5300	6.2 JP	38 JB	8.54 J	3.8	<1
Toluene	1000	9000	<100	55 B	1.5	3.8	3.5
Total BTEX		21400	96.2	100.7	11.96	10.9	5.1
EPA 610							
Naphthalene	21	NA	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA	NA
		Bold type indicates detectable concentrations.					
		Shaded area indicates detectable concentrations above the groundwater quality standards.					

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **2478-PW1**

Client Sample ID:		143GW175	143GW188	143GW215	143GW229	CL-143-GW-253
Date Sampled:		09/11/99	11/10/99	05/10/00	08/26/00	12/18/00
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result
EPA 602						
1,2-Dichlorobenzene	620	<1	<1	<1	<2	<1
1,3-Dichlorobenzene	620	<1	<1	<1	<2	<1
1,4-Dichlorobenzene	75	<1	<1	<1	<2	<1
EPA 602						
Benzene	1	7.2	<1	<1	<1	<1
Chlorobenzene	50	<1	<1	<1	<2	<1
Methyl tert-butyl ether	200	<1	<1	<1	<2	<5
Ethylbenzene	29	<1	<1	<1	<2	<1
Xylenes (total)	530	<1	<3	<3	<6	<1
Toluene	1000	8	<1	<1	<2	<1
Total BTEX		15.2				
EPA 610						
Naphthalene	21	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA
Bold type indicates detectable concentrations.						
Shaded area indicates detectable concentrations above the groundwater quality standards.						

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **2478-MW25**

Client Sample ID:		143GW248				
Date Sampled:		09/19/00				
Analyte (ug/l)	Action Level	Result				
EPA 602						
1,2-Dichlorobenzene	620	<1				
1,3-Dichlorobenzene	620	<1				
1,4-Dichlorobenzene	75	<1				
EPA 602						
Benzene	1	<1				
Chlorobenzene	50	<1				
Methyl tert-butyl ether	200	<1				
Ethylbenzene	29	<1				
Xylenes (total)	530	<3				
Toluene	1000	<1				
Total BTEX						
EPA 610						
Naphthalene	21	NA				
Acenaphthene	80	NA				
Acenaphthylene	210	NA				
Benzo(a)anthracene	0.05	NA				
Pyrene	210	NA				
Fluorene	280	NA				
Anthracene	2100	NA				
Fluoranthene	280	NA				
Phenanthrene	210	NA				
		Bold type indicates detectable concentrations.				
		Shaded area indicates detectable concentrations above the groundwater quality standards.				

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: 2478-MW24

Client Sample ID:		143GW247	CL-143-GW-270	MW24-01C3	UST2477-MW24-02A	UST2477-MW24-02C	USTT2477-MW24
Date Sampled:		09/19/00	05/08/01	09/19/01	04/11/02	10/18/02	04/29/03
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result
EPA 602							
1,2-Dichlorobenzene	620	<1	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	620	<1	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	75	<1	NA	NA	NA	NA	NA
EPA 602							
Benzene	1	<1	<1	<1	<1	<1	0.66 J
Chlorobenzene	50	<1	NA	NA	NA	NA	NA
Methyl tert-butyl ether	200	<1	0.66 J	250	<1	<1	<1
Ethylbenzene	29	<1	<1	<1	<1	<1	1.7
Xylenes (total)	530	<3	<1	<2	<3	<3	4.4
Toluene	1000	<1	0.37 JB	<1	<1	<1	<1
Total BTEX			0.37				6.76
EPA 610							
Naphthalene	21	NA	<2	<2	<5.5	<5.3	<5.0
Acenaphthene	80	NA	<1	<1	<5.5	<5.3	<5.0
Acenaphthylene	210	NA	<1	<1	<5.5	<5.3	<5.0
Benzo(a)anthracene	0.05	NA	<0.1	<0.1	<5.5	<5.3	<5.0
Pyrene	210	NA	<0.1	<0.25	<5.5	<5.3	<5.0
Fluorene	280	NA	<2	<2	<5.5	<5.3	<5.0
Anthracene	2100	NA	<1	<1	<5.5	<5.3	<5.0
Fluoranthene	280	NA	<0.2	<0.25	<5.5	<5.3	<5.0
Phenanthrene	210	NA	<1	<1	<5.5	<5.3	<5.0
Bold type indicates detectable concentrations.							
Shaded area indicates detectable concentrations above the groundwater quality standards							

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **2478-MW23**

Client Sample ID:		143GW246	CL-143-GW-269	MW23-01C3	UST2477-MW23-02A	UST2477-MW23-02C	USTT2477-MW23
Date Sampled:		09/19/00	05/08/01	09/19/01	04/12/02	10/18/02	04/29/03
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result
EPA 602							
1,2-Dichlorobenzene	620	<5	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	620	<5	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	75	<5	NA	NA	NA	NA	NA
EPA 602							
Benzene	1	<5	<2	21	<1	<1	<1
Chlorobenzene	50	<5	NA	NA	NA	NA	NA
Methyl tert-butyl ether	200	497	180	<10	55.2	50	7.6
Ethylbenzene	29	<5	<2	18	<1	<1	<1
Xylenes (total)	530	<15	<2	19	<3	<3	<3
Toluene	1000	<5	1.1 JB	<1	<1	<1	<1
Total BTEX			1.1	58			
EPA 610							
Naphthalene	21	NA	<2	<2	<5.0	<5.2	<5.1
Acenaphthene	80	NA	<1	<1	<5.0	<5.2	<5.1
Acenaphthylene	210	NA	<1	<1	<5.0	<5.2	<5.1
Benzo(a)anthracene	0.05	NA	<0.1	<0.1	<5.0	<5.2	<5.1
Pyrene	210	NA	<0.1	<0.25	<5.0	<5.2	<5.1
Fluorene	280	NA	<2	<2	<5.0	<5.2	<5.1
Anthracene	2100	NA	<1	<1	<5.0	<5.2	<5.1
Fluoranthene	280	NA	<0.2	<0.25	<5.0	<5.2	<5.1
Phenanthrene	210	NA	<1	<1	<5.0	<5.2	<5.1
Bold type indicates detectable concentrations.							
Shaded area indicates detectable concentrations above the groundwater quality standards.							

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **2478-MW22**

Client Sample ID:		143GW245	CL-143-GW-268	MW22-01C3	UST2477-MW22-02A	UST2477-MW22-02C	USTT2477-MW22
Date Sampled:		09/19/00	05/08/01	09/19/01	04/12/02	10/18/02	04/29/03
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result
EPA 602							
1,2-Dichlorobenzene	620	<1	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	620	<1	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	75	<1	NA	NA	NA	NA	NA
EPA 602							
Benzene	1	<1	<1	<1	<1	<1	<1
Chlorobenzene	50	<1	NA	NA	NA	NA	NA
Methyl tert-butyl ether	200	<1	<5	<10	<1	<1	<1
Ethylbenzene	29	3.8	<1	<1	<1	<1	<1
Xylenes (total)	530	16	<1	<2	2.3	<3	<3
Toluene	1000	11.3	0.4 JB	<1	<1	<1	<1
Total BTEX		31.1	0.4		2.3		
EPA 610							
Naphthalene	21	NA	<2	<2	<5.0	<5.2	<5.0
Acenaphthene	80	NA	<1	<1	<5.0	<5.2	<5.0
Acenaphthylene	210	NA	<1	<1	<5.0	<5.2	<5.0
Benzo(a)anthracene	0.05	NA	<0.1	<0.1	<5.0	<5.2	<5.0
Pyrene	210	NA	<0.1	<0.25	<5.0	<5.2	<5.0
Fluorene	280	NA	<2	<2	<5.0	<5.2	<5.0
Anthracene	2100	NA	<1	<1	<5.0	<5.2	<5.0
Fluoranthene	280	NA	<0.2	<0.25	<5.0	<5.2	<5.0
Phenanthrene	210	NA	<1	<1	<5.0	<5.2	<5.0
		Bold type indicates detectable concentrations.					
		Shaded area indicates detectable concentrations above the groundwater quality standards.					

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Deep Well: 2478-MW21D

Client Sample ID:		143GW244	CL-143-GW-279	MW21D-01C3	UST2477-MW21D-02A	UST2477-MW21D-03A	UST2477-MW21D-02C	USTT2477-MW21D
Date Sampled:		09/19/00	05/15/01	09/21/01	04/10/02	07/31/02	10/17/02	04/29/03
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result	Result
EPA 602								
1,2-Dichlorobenzene	620	<1	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	620	<1	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	75	<1	NA	NA	NA	NA	NA	NA
EPA 602								
Benzene	1	<1	<1	1.2	<1	<1	<1	<1
Chlorobenzene	50	<1	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	200	<1	<5	<10	<1	<1	<1	<1
Ethylbenzene	29	<1	1	2.8	<1	<1	<1	<1
Xylenes (total)	530	<3	0.58 J	<2	<3	<3	<3	<3
Toluene	1000	0.62 J	0.41 JB	<1	<1	<1	<1	<1
Total BTEX		0.62	1.99	4				
EPA 610								
Naphthalene	21	NA	<2	<2	<5.0	NA	<5.1	<5.0
Acenaphthene	80	NA	<1	<1	<5.0	NA	<5.1	<5.0
Acenaphthylene	210	NA	<1	<1	<5.0	NA	<5.1	<5.0
Benzo(a)anthracene	0.05	NA	<0.1	<0.1	<5.0	NA	<5.1	<5.0
Pyrene	210	NA	<0.1	<0.25	<5.0	NA	<5.1	<5.0
Fluorene	280	NA	<2	<2	<5.0	NA	<5.1	<5.0
Anthracene	2100	NA	<1	<1	<5.0	NA	<5.1	<5.0
Fluoranthene	280	NA	<0.2	<0.25	<5.0	NA	<5.1	<5.0
Phenanthrene	210	NA	<1	<1	<5.0	NA	<5.1	<5.0
Bold type indicates detectable concentrations.								
Shaded area indicates detectable concentrations above the groundwater quality standards.								

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **2478-MW20**

Client Sample ID:		143GW243	CL-143-GW-278	MW20-01C3	UST2477-MW20-02A	UST2477-MW20-02C	USTT2478-MW20
Date Sampled:		09/19/00	05/15/01	09/24/01	04/10/02	10/17/02	04/30/03
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result
EPA 602							
1,2-Dichlorobenzene	620	<25	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	620	<25	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	75	<25	NA	NA	NA	NA	NA
EPA 602							
Benzene	1	13 J	3.6	<1	10.4	19	<1
Chlorobenzene	50	<25	NA	NA	NA	NA	NA
Methyl tert-butyl ether	200	50.6	<10	310	15.5	<10	1.6
Ethylbenzene	29	896	64	180	769	475	1.8
Xylenes (total)	530	3420	240	660	3350	1840	5.2
Toluene	1000	2580	72 B	250	1950	2030	0.96 J
Total BTEX		6711	379.6	1090	6079.4	4364	7.96
EPA 610							
Naphthalene	21	NA	<2	49	80.1	131	4.1 J
Acenaphthene	80	NA	<1	5.9 P	<5.5	<5.1	<5.2
Acenaphthylene	210	NA	<1	13	<5.5	<5.1	<5.2
Benzo(a)anthracene	0.05	NA	<0.1	<0.1	<5.5	<5.1	<5.2
Pyrene	210	NA	<0.1	<0.25	<5.5	<5.1	<5.2
Fluorene	280	NA	<2	<2	<5.5	<5.1	<5.2
Anthracene	2100	NA	<1	<1	<5.5	<5.1	<5.2
Fluoranthene	280	NA	<0.2	<0.25	<5.5	<5.1	<5.2
Phenanthrene	210	NA	<1	<1	<5.5	<5.1	<5.2
Bold type indicates detectable concentrations.							
Shaded area indicates detectable concentrations above the groundwater quality standards.							

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **2478-MW19**

Client Sample ID:		143GW012	143GW037	143GW068	143GW143	143GW158	143GW171	143GW185
Date Sampled:		08/13/97	01/21/98	05/01/98	11/17/98	03/01/99	05/20/99	09/11/99
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result	Result
EPA 602								
1,2-Dichlorobenzene	620	<20	<1	<20	<1	<1	<1	<1
1,3-Dichlorobenzene	620	<15	<0.8	<15	1.4	<1	<1	<1
1,4-Dichlorobenzene	75	6.3 JP	<1.5	<30	0.97 J	<1	<1	<1
EPA 602								
Benzene	1	5.8 J	1 P	2.4 JP	0.34 J	0.94 J	1.3	19
Chlorobenzene	50	<10	<0.5	<10	<1	<1	<1	<1
Methyl tert-butyl ether	200	<100	<5	<40	<5	<1	<1	<1
Ethylbenzene	29	160	8.5 P	130	2	2.1	12.4	<1
Xylenes (total)	530	76	0.28 JP	132 P	1.42 J	11.6	266	266
Toluene	1000	<40	<2	230 BP	4.7	18.5	50.6	211
Total BTEX		241.8	9.78	494.4	8.56	33.14	330.3	496
EPA 610								
Naphthalene	21	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA	NA	NA
		Bold type indicates detectable concentrations.						
		Shaded area indicates detectable concentrations above the groundwater quality standards.						

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **2478-MW19**

Client Sample ID:		143GW225	143GW236	143GW263	CL-143-GW-277	MW19-01C3	UST2477-MW19-02A	UST2478-MW19-02C	USTT2477-MW19
Date Sampled:		05/10/00	08/26/00	12/18/00	05/15/01	09/21/01	04/11/02	10/17/02	04/29/03
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result	Result	Result
EPA 602									
1,2-Dichlorobenzene	620	<1	<2	<1	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	620	<1	<2	<1	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	75	<1	<2	<1	NA	NA	NA	NA	NA
EPA 602									
Benzene	1	<1	<1	<1	<1	2.1	<1	<1	<1
Chlorobenzene	50	<1	<2	<1	NA	NA	NA	NA	NA
Methyl tert-butyl ether	200	<1	<2	<5	<5	<20	<1	<1	1.8
Ethylbenzene	29	19.1	76.8	81	79	82	145	24.2	3.2
Xylenes (total)	530	<3	<6	3	2.3	<4	7.5	71.2	<3
Toluene	1000	2.2	0.87 J	2.9	3.4 B	3.9	<1	40.8	<1
Total BTEX		21.3	77.67	86.9	84.7	68	152.5	136.2	3.2
EPA 610									
Naphthalene	21	NA	NA	NA	8.7	<2	11.7	7.5	6.6
Acenaphthene	80	NA	NA	NA	<1	3	<5.0	<5.2	<5.0
Acenaphthylene	210	NA	NA	NA	<1	<1	<5.0	<5.2	<5.0
Benzo(a)anthracene	0.05	NA	NA	NA	<0.1	<0.1	<5.0	<5.2	<5.0
Pyrene	210	NA	NA	NA	<0.1	<0.25	<5.0	<5.2	<5.0
Fluorene	280	NA	NA	NA	<2	<2	<5.0	<5.2	<5.0
Anthracene	2100	NA	NA	NA	<1	<1	<5.0	<5.2	<5.0
Fluoranthene	280	NA	NA	NA	<0.2	<0.25	<5.0	<5.2	<5.0
Phenanthrene	210	NA	NA	NA	<1	<1	<5.0	<5.2	<5.0
Bold type indicates detectable concentrations.									
Shaded area indicates detectable concentrations above the groundwater quality standards.									

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: 2478-MW18

Client Sample ID:		143GW013	143GW038	143GW064	143GW142	143GW155	143GW168
Date Sampled:		08/13/97	01/21/98	05/01/98	11/17/98	02/28/99	05/20/99
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result
EPA 602							
1,2-Dichlorobenzene	620	<5	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	620	<3.8	<0.8	<0.8	<1	<1	<1
1,4-Dichlorobenzene	75	<7.5	<1.5	<1.5	0.55 J	<1	<1
EPA 602							
Benzene	1	6.9	1.2	0.12 J	<1	0.96 J	1.4
Chlorobenzene	50	<2.5	<0.05	0.079 J	<1	<1	<1
Methyl tert-butyl ether	200	<25	<5	1.6 J	<5	<1	<1
Ethylbenzene	29	75	8.9 P	0.15 J	<1	7	12.7
Xylenes (total)	530	2.6 JP	<3	0.41 J	<3	56.4	93.8
Toluene	1000	2.6 JP	0.58 JP	0.94 JB	0.46 J	71	101
Total BTEX		87.1	10.68	1.62	0.46	135.36	208.9
EPA 610							
Naphthalene	21	NA	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA	NA
Bold type indicates detectable concentrations.							
Shaded area indicates detectable concentrations above the groundwater quality standards							

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **2478-MW18**

Client Sample ID:		143GW182	143GW199	143GW223	143GW235	CL-143-GW-261
Date Sampled:		09/11/99	11/13/99	05/10/00	08/26/00	12/18/00
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result
EPA 602						
1,2-Dichlorobenzene	620	<1	<1	<1	<2	<1
1,3-Dichlorobenzene	620	<1	<1	<1	<2	<1
1,4-Dichlorobenzene	75	<1	<1	<1	<2	<1
EPA 602						
Benzene	1	28.2	<1	<1	<1	<1
Chlorobenzene	50	<1	<1	<1	<2	<1
Methyl tert-butyl ether	200	<1	<1	<1	<2	<5
Ethylbenzene	29	<1	<1	<1	<2	2.5
Xylenes (total)	530	200	<3	<3	<6	<1
Toluene	1000	258	<1	<1	0.74 J	<1
Total BTEX		486.2			0.74	2.5
EPA 610						
Naphthalene	21	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA
Bold type indicates detectable concentrations.						
Shaded area indicates detectable concentrations above the groundwater quality standards.						

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: 2478-MW17

Client Sample ID:		143GW014	143GW035	143GW063	143GW141	143GW154	143GW167
Date Sampled:		08/13/97	01/21/98	05/01/98	11/17/98	02/28/99	05/20/99
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result
EPA 602							
1,2-Dichlorobenzene	620	<10	<100	<100	<1	<1	<1
1,3-Dichlorobenzene	620	<7.5	<75	<75	<1	<1	<1
1,4-Dichlorobenzene	75	<15	<150	<150	<1	<1	<1
EPA 602							
Benzene	1	55	<50	<50	<1	0.99 J	1.4
Chlorobenzene	50	<5	<50	<50	<1	<1	<1
Methyl tert-butyl ether	200	460 P	5100	3300	47	36.2	28.5
Ethylbenzene	29	<7.5	<75	<75	<1	8.1	15
Xylenes (total)	530	<30	<300	<300	<3	66.7	113
Toluene	1000	<20	<200	73 JBP	0.48 J	87.9	136
Total BTEX		55		73	0.48	163.69	265.4
EPA 610							
Naphthalene	21	NA	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA	NA
		Bold type indicates detectable concentrations.					
		Shaded area indicates detectable concentrations above the groundwater quality standards.					

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **2478-MW17**

Client Sample ID:		143GW181	143GW202	143GW222	143GW239	CL-143-GW-260
Date Sampled:		09/11/99	11/14/99	05/10/00	08/26/00	12/18/00
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result
EPA 602						
1,2-Dichlorobenzene	620	<1	<1	<1	<2	<1
1,3-Dichlorobenzene	620	<1	<1	<1	<2	<1
1,4-Dichlorobenzene	75	<1	<1	<1	<2	<1
EPA 602						
Benzene	1	10.6	<1	<1	<1	<1
Chlorobenzene	50	<1	<1	<1	<2	<1
Methyl tert-butyl ether	200	<1	3.9	3	7.7	<5
Ethylbenzene	29	<1	<1	<1	1	<1
Xylenes (total)	530	135	<3	<3	<6	<1
Toluene	1000	179	<1	<1	<2	<1
Total BTEX		324.6			1	
EPA 610						
Naphthalene	21	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA
Bold type indicates detectable concentrations.						
Shaded area indicates detectable concentrations above the groundwater quality standards.						

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **2478-MW16**

Client Sample ID:		143GW018	143GW036	143GW067	143GW140	143GW153	143GW166
Date Sampled:		08/13/97	01/21/98	05/01/98	11/17/98	02/28/99	05/20/99
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result
EPA 602							
1,2-Dichlorobenzene	620	<1	<2	<25	<1	<1	<1
1,3-Dichlorobenzene	620	<0.8	<1.5	<19	<1	<1	<1
1,4-Dichlorobenzene	75	<1.5	<3	<38	0.78 J	<1	<1
EPA 602							
Benzene	1	2.3 P	<1	2.8 JP	<1	0.87 J	3.4
Chlorobenzene	50	<0.5	<1	<2	<1	<1	<1
Methyl tert-butyl ether	200	34 P	32	<120	16	7.5	7.5
Ethylbenzene	29	<0.8	<1.5	26	<1	9.9	33.3
Xylenes (total)	530	<3	<6	137	<3	82.1	243
Toluene	1000	0.14 JP	<4	280 B	0.39 J	124	401
Total BTEX		2.44		445.8	0.39	216.87	680.7
EPA 610							
Naphthalene	21	NA	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA	NA
Bold type indicates detectable concentrations.							
Shaded area indicates detectable concentrations above the groundwater quality standards							

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **2478-MW16**

Client Sample ID:		143GW180	143GW204	143GW221	143GW238	CL-143-GW-259
Date Sampled:		09/11/99	11/14/99	05/10/00	08/26/00	12/18/00
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result
EPA 602						
1,2-Dichlorobenzene	620	<1	<1	<1	<2	<1
1,3-Dichlorobenzene	620	<1	<1	<1	<2	<1
1,4-Dichlorobenzene	75	<1	<1	<1	<2	<1
EPA 602						
Benzene	1	10	<1	<1	<1	<1
Chlorobenzene	50	<1	<1	<1	<2	<1
Methyl tert-butyl ether	200	<1	2	4.8	2.5	<5
Ethylbenzene	29	<1	<1	<1	1 J	1.5
Xylenes (total)	530	432	<3	<3	<6	<1
Toluene	1000	505	<1	<1	<2	<1
Total BTEX		947			1	1.5
EPA 610						
Naphthalene	21	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA
Bold type indicates detectable concentrations.						
Shaded area indicates detectable concentrations above the groundwater quality standards						

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Printed: 8/27/2003
Samples analyzed by Compuchem, STL, or Accutest

Analytical Data Summary
Shallow Well: 2478-MW14

Client Sample ID:		143GW010	143GW042	143GW072	143GW139	143GW149	143GW162
Date Sampled:		08/13/97	01/21/98	05/01/98	11/17/98	02/28/99	05/20/99
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result
EPA 602							
1,2-Dichlorobenzene	620	<50	<10	<25	<1	<1	<1
1,3-Dichlorobenzene	620	<38	<7.5	<19	<1	<1	<1
1,4-Dichlorobenzene	75	<75	<15	<38	<1	<1	<1
EPA 602							
Benzene	1	68	<5	<12	0.26 J	1.6	3.6
Chlorobenzene	50	<25	<5	<12	<1	<1	<1
Methyl tert-butyl ether	200	960 P	510	800	85	48.7	5.1
Ethylbenzene	29	<38	<7.5	10 J	0.39 J	1.7	1.8
Xylenes (total)	530	<151	<30	16 J	1.16 J	6.6	7.6
Toluene	1000	<100	<20	79 BP	0.79 J	6.2	9
Total BTEX		68		105	2.6	18.1	22
EPA 610							
Naphthalene	21	NA	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA	NA
Bold type indicates detectable concentrations.							
Shaded area indicates detectable concentrations above the groundwater quality standards							

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: 2478-MW14

Client Sample ID:		143GW176	143GW190	143GW217	143GW231	CL-143-GW-255
Date Sampled:		09/11/99	11/10/99	05/10/00	08/26/00	12/18/00
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result
EPA 602						
1,2-Dichlorobenzene	620	<1	<1	<1	<2	<1
1,3-Dichlorobenzene	620	<1	<1	<1	<2	<1
1,4-Dichlorobenzene	75	<1	<1	<1	<2	<1
EPA 602						
Benzene	1	11.2	<1	<1	<1	<1
Chlorobenzene	50	<1	<1	<1	<2	<1
Methyl tert-butyl ether	200	<1	<1	<1	<2	<5
Ethylbenzene	29	<1	<1	<1	<2	<1
Xylenes (total)	530	10.6	<3	<3	<6	<1
Toluene	1000	11.5	<1	<1	1 J	<1
Total BTEX		33.3			1	
EPA 610						
Naphthalene	21	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA
		Bold type indicates detectable concentrations.				
		Shaded area indicates detectable concentrations above the groundwater quality standards.				

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: 2478-MW12

Client Sample ID:		143GW203				
Date Sampled:		11/14/99				
Analyte (ug/l)	Action Level	Result				
EPA 602						
1,2-Dichlorobenzene	620	<1				
1,3-Dichlorobenzene	620	<1				
1,4-Dichlorobenzene	75	<1				
EPA 602						
Benzene	1	<1				
Chlorobenzene	50	<1				
Methyl tert-butyl ether	200	<1				
Ethylbenzene	29	<1				
Xylenes (total)	530	<3				
Toluene	1000	<1				
Total BTEX						
EPA 610						
Naphthalene	21	NA				
Acenaphthene	80	NA				
Acenaphthylene	210	NA				
Benzo(a)anthracene	0.05	NA				
Pyrene	210	NA				
Fluorene	280	NA				
Anthracene	2100	NA				
Fluoranthene	280	NA				
Phenanthrene	210	NA				
		Bold type indicates detectable concentrations.				
		Shaded area indicates detectable concentrations above the groundwater quality standards.				

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: 2478-MW10

Client Sample ID:		143GW191				
Date Sampled:		11/10/99				
Analyte (ug/l)	Action Level	Result				
EPA 602						
1,2-Dichlorobenzene	620	<1				
1,3-Dichlorobenzene	620	<1				
1,4-Dichlorobenzene	75	<1				
EPA 602						
Benzene	1	<1				
Chlorobenzene	50	<1				
Methyl tert-butyl ether	200	<1				
Ethylbenzene	29	<1				
Xylenes (total)	530	<3				
Toluene	1000	<1				
Total BTEX						
EPA 610						
Naphthalene	21	NA				
Acenaphthene	80	NA				
Acenaphthylene	210	NA				
Benzo(a)anthracene	0.05	NA				
Pyrene	210	NA				
Fluorene	280	NA				
Anthracene	2100	NA				
Fluoranthene	280	NA				
Phenanthrene	210	NA				
		Bold type indicates detectable concentrations.				
		Shaded area indicates detectable concentrations above the groundwater quality standards.				

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: 2478-MW9

Client Sample ID:		143GW192				
Date Sampled:		11/10/99				
Analyte (ug/l)	Action Level	Result				
EPA 602						
1,2-Dichlorobenzene	620	<1				
1,3-Dichlorobenzene	620	<1				
1,4-Dichlorobenzene	75	<1				
EPA 602						
Benzene	1	<1				
Chlorobenzene	50	<1				
Methyl tert-butyl ether	200	3.5				
Ethylbenzene	29	<1				
Xylenes (total)	530	<3				
Toluene	1000	<1				
Total BTEX						
EPA 610						
Naphthalene	21	NA				
Acenaphthene	80	NA				
Acenaphthylene	210	NA				
Benzo(a)anthracene	0.05	NA				
Pyrene	210	NA				
Fluorene	280	NA				
Anthracene	2100	NA				
Fluoranthene	280	NA				
Phenanthrene	210	NA				
		Bold type indicates detectable concentrations.				
		Shaded area indicates detectable concentrations above the groundwater quality standards.				

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **2478-MW6**

Client Sample ID:		143GW009	143GW044	143GW074	143GW137	143GW147	143GW160
Date Sampled:		08/13/97	01/21/98	05/01/98	11/17/98	02/27/99	05/20/99
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result
EPA 602							
1,2-Dichlorobenzene	620	<500	<200	<5	<1	<1	<1
1,3-Dichlorobenzene	620	<380	<150	<3.8	<1	<1	<1
1,4-Dichlorobenzene	75	<750	<300	<7.5	<1	<1	<1
EPA 602							
Benzene	1	3400 P	1900	15	<1	4.8	5.6
Chlorobenzene	50	<250	100	<2.5	<1	<1	<1
Methyl tert-butyl ether	200	560 JP	1100	130	29	26.3	2.5
Ethylbenzene	29	1200 P	1200	9.9 P	0.27 J	2.3	2.6
Xylenes (total)	530	2688 JP	1110	41	1.25 J	7	10.7
Toluene	1000	110 JP	<400	54 B	1.5	11.2	12.8
Total BTEX		7398	4210	119.9	3.02	25.3	31.7
EPA 610							
Naphthalene	21	NA	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA	NA
Bold type indicates detectable concentrations.							
Shaded area indicates detectable concentrations above the groundwater quality standards.							

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: 2478-MW6

Client Sample ID:		143GW174	143GW189	143GW216	143GW230	CL-143-GW-254
Date Sampled:		09/11/99	11/10/99	05/10/00	08/26/00	12/18/00
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result
EPA 602						
1,2-Dichlorobenzene	620	<1	<1	<1	<2	<1
1,3-Dichlorobenzene	620	<1	<1	<1	<2	<1
1,4-Dichlorobenzene	75	<1	<1	<1	<2	<1
EPA 602						
Benzene	1	28.6	<1	<1	<1	<1
Chlorobenzene	50	<1	<1	<1	<2	<1
Methyl tert-butyl ether	200	6	<1	<1	<2	<5
Ethylbenzene	29	4.3	<1	<1	<2	<1
Xylenes (total)	530	13.4	<3	<3	<6	<1
Toluene	1000	19.6	<1	<1	1.1 J	<1
Total BTEX		65.9			1.1	
EPA 610						
Naphthalene	21	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA
Bold type indicates detectable concentrations.						
Shaded area indicates detectable concentrations above the groundwater quality standards.						

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **SS-100**

Client Sample ID:		143GW209	143GW252	143GW251	CL-143-GW-276	SS100-01C3	UST2477-MWSS100-02A	UST2478-MW100-02C	USTT2477-MWSS100
Date Sampled:		11/14/99	09/19/00	10/04/00	05/15/01	09/21/01	04/10/02	10/17/02	04/29/03
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result	Result	Result
EPA 602									
1,2-Dichlorobenzene	620	<1	<2	<2	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	620	<1	<2	<2	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	75	<1	<2	<2	NA	NA	NA	NA	NA
EPA 602									
Benzene	1	31.6	<1	<1	<1	1.2	0.69 J	<1	<1
Chlorobenzene	50	<1	<2	<2	NA	NA	NA	NA	NA
Methyl tert-butyl ether	200	<1	<2	<2	<5	<10	<1	<1	<1
Ethylbenzene	29	48.5	<2	<2	1.1	2.2	1.0	<1	1.5
Xylenes (total)	530	247	<6	<6	<1	<2	6.8	<3	10.6
Toluene	1000	460	<2	<2	0.34 JB	<1	3.8	<1	0.91 J
Total BTEX		787.1			1.44	3.4	12.29		13.01
EPA 610									
Naphthalene	21	NA	NA	NA	6.6	<2	<5.5	<5.1	5.4
Acenaphthene	80	NA	NA	NA	<1	<1	<5.5	<5.1	<5.1
Acenaphthylene	210	NA	NA	NA	<1	<1	<5.5	<5.1	<5.1
Benzo(a)anthracene	0.05	NA	NA	NA	<0.1	<0.1	<5.5	<5.1	<5.1
Pyrene	210	NA	NA	NA	<0.1	<0.25	<5.5	<5.1	<5.1
Fluorene	280	NA	NA	NA	<2	<2	<5.5	<5.1	<5.1
Anthracene	2100	NA	NA	NA	<1	<1	<5.5	<5.1	<5.1
Fluoranthene	280	NA	NA	NA	<0.2	<0.25	<5.5	<5.1	<5.1
Phenanthrene	210	NA	NA	NA	<1	<1	<5.5	<5.1	<5.1
Bold type indicates detectable concentrations.									
Shaded area indicates detectable concentrations above the groundwater quality standards.									

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: PVC-101

Client Sample ID:		143GW210	143GW251	143GW252	CL-143-GW-271	MWPVC101-01C3	ST2477-MWPVC101-02A	UST2478-MW101-02C	USTT2477-MWPVC101
Date Sampled:		11/14/99	09/19/00	10/04/00	05/08/01	09/19/01	04/12/02	10/17/02	04/29/03
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result	Result	Result
EPA 602									
1,2-Dichlorobenzene	620	<40	<2	<40	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	620	<40	<2	<40	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	75	<40	<2	<40	NA	NA	NA	NA	NA
EPA 602									
Benzene	1	196	280	496	3400	1500	5.0	1550	123
Chlorobenzene	50	<40	<2	<40	NA	NA	NA	NA	NA
Methyl tert-butyl ether	200	356	82.2	220	1200	<500	21.8	15.5	6.5
Ethylbenzene	29	134	418	268	1200	500	2.2	333	35.9
Xylenes (total)	530	495	38.3	95.9 J	2300	580	<3.0	1040	37.3
Toluene	1000	146	14.5	31.8 J	130 B	<50	0.63 J	19.1	<2.0
Total BTEX		971	750.8	891.7	7030	2580	7.83	2942.1	196.2
EPA 610									
Naphthalene	21	NA	NA	NA	190	76	<5.0	70.6	5.9
Acenaphthene	80	NA	NA	NA	<4	4.3 P	<5.0	<5.1	<5.0
Acenaphthylene	210	NA	NA	NA	<4	13	<5.0	<5.1	<5.0
Benzo(a)anthracene	0.05	NA	NA	NA	<0.4	<0.1	<5.0	<5.1	<5.0
Pyrene	210	NA	NA	NA	<0.4	<0.25	<5.0	<5.1	<5.0
Fluorene	280	NA	NA	NA	<8	<2	<5.0	<5.1	<5.0
Anthracene	2100	NA	NA	NA	<4	<1	<5.0	<5.1	<5.0
Fluoranthene	280	NA	NA	NA	<8	<0.25	<5.0	<5.1	<5.0
Phenanthrene	210	NA	NA	NA	<4	<1	<5.0	<5.1	<5.0
		Bold type indicates detectable concentrations.							
		Shaded area indicates detectable concentrations above the groundwater quality standards.							

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **OB10**

Client Sample ID:		143GW062	143GW066	143GW133	143GW159	143GW172	143GW186	143GW208
Date Sampled:		03/13/98	05/01/98	11/17/98	03/01/99	05/20/99	09/11/99	11/14/99
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result	Result
EPA 602								
1,2-Dichlorobenzene	620	<500	<500	<170	<25	<1	<1	<50
1,3-Dichlorobenzene	620	<380	<380	<170	<25	<1	<1	<50
1,4-Dichlorobenzene	75	<750	<750	<170	<25	<1	<1	<50
EPA 602								
Benzene	1	920	910 P	1000	2420	2650	3390	3380
Chlorobenzene	50	<250	<250	<170	<25	<1	<1	<50
Methyl tert-butyl ether	200	<2500	<1000	<830	60.6	<1	<1	56.5
Ethylbenzene	29	600	890	480	1060	1260	<1	1320
Xylenes (total)	530	2020	3500	2600	5050	5830	5400	5850
Toluene	1000	3800 B	4400 B	1900	5500	6300	7060	6400
Total BTEX		7340	9700	5960	14030	16040	15850	16950
EPA 610								
Naphthalene	21	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA	NA	NA
Bold type indicates detectable concentrations.								
Shaded area indicates detectable concentrations above the groundwater quality standards.								

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **OB10**

Client Sample ID:		143GW227	143GW241	143GW265	CL-143-GW-274	OB10-01C3	UST2477-OB10-02A	UST2478-OB10-02C
Date Sampled:		05/10/00	08/26/00	12/18/00	05/15/01	09/24/01	04/10/02	10/17/02
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result	Result
EPA 602								
1,2-Dichlorobenzene	620	<5	<2	<150	NA	NA	NA	NA
1,3-Dichlorobenzene	620	<5	<2	<150	NA	NA	NA	NA
1,4-Dichlorobenzene	75	<5	<2	<150	NA	NA	NA	NA
EPA 602								
Benzene	1	1970	3480	2200	1700	70	192	114
Chlorobenzene	50	<5	<2	<150	NA	NA	NA	NA
Methyl tert-butyl ether	200	<5	10.2	<750	<250	<10	<1.0	<1.0
Ethylbenzene	29	833	1330	1000	170	25	29.4	19.5
Xylenes (total)	530	3750	5860	4800	2600	110	321	81.8
Toluene	1000	4950	7650	7100	3800 B	120	313	21.2
Total BTEX		11503	18320	15100	8270	325	855.4	236.5
EPA 610								
Naphthalene	21	NA	NA	NA	30	<2	<5.5	<5.1
Acenaphthene	80	NA	NA	NA	<1	<1	<5.5	<5.1
Acenaphthylene	210	NA	NA	NA	<1	<1	<5.5	<5.1
Benzo(a)anthracene	0.05	NA	NA	NA	<0.1	0.72	<5.5	<5.1
Pyrene	210	NA	NA	NA	<0.1	1.5	<5.5	<5.1
Fluorene	280	NA	NA	NA	<2	<2	<5.5	<5.1
Anthracene	2100	NA	NA	NA	<1	<1	<5.5	<5.1
Fluoranthene	280	NA	NA	NA	<0.2	1.5 P	<5.5	<5.1
Phenanthrene	210	NA	NA	NA	<1	<1	<5.5	<5.1
Bold type indicates detectable concentrations.								
Shaded area indicates detectable concentrations above the groundwater quality standards.								

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: OB1

Client Sample ID:		143GW061	143GW065	143GW134	143GW152	143GW165	143GW179	143GW207
Date Sampled:		03/13/98	05/01/98	11/17/98	02/28/99	05/20/99	09/11/99	11/14/99
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result	Result
EPA 602								
1,2-Dichlorobenzene	620	<1000	<2500	<1400	<500	<50	<50	<200
1,3-Dichlorobenzene	620	<750	<1900	<1400	<500	<50	<50	<200
1,4-Dichlorobenzene	75	<1500	<3800	<1400	<500	<50	<50	<200
EPA 602								
Benzene	1	<500	<1200	360 J	<500	35.9	35.2	<200
Chlorobenzene	50	<500	<1200	<1400	<500	<50	<50	<200
Methyl tert-butyl ether	200	<5000	<5000	2200 J	1680	1500	<1	1500
Ethylbenzene	29	1700	2400	2200	1140	1810	2260	819
Xylenes (total)	530	9100 P	12200	11100	9850	12900	14700	5650
Toluene	1000	11000 B	25000 B	13000	14500	14700	13000	5210
Total BTEX		21800	39600	26660	25490	29445.9	29995.2	11679
EPA 610								
Naphthalene	21	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA	NA	NA
Bold type indicates detectable concentrations.								
Shaded area indicates detectable concentrations above the groundwater quality standards.								

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: OB1

Client Sample ID:		143GW220	143GW240	143GW258	CL-143-GW-273	OB1-01C3	UST2477-OB1-02A	UST2478-OB1-02C	USTT2477-OB01
Date Sampled:		05/10/00	08/26/00	12/18/00	05/15/01	09/21/01	04/10/02	10/17/02	04/29/03
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result	Result	Result
EPA 602									
1,2-Dichlorobenzene	620	<50	<2	<1	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	620	<50	<2	<1	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	75	<50	<2	<1	NA	NA	NA	NA	NA
EPA 602									
Benzene	1	<50	20	<200	46 J	<50	0.65	<10	<1
Chlorobenzene	50	<50	<2	<200	NA	NA	NA	NA	NA
Methyl tert-butyl ether	200	665	222	<200	48 J	<500	6.8	<10	3.4
Ethylbenzene	29	1510	1700	1800	920	800	435	362	15.4
Xylenes (total)	530	9550	10000	10000	7000	5208	3730	3490	95.6
Toluene	1000	10700	9770	13000	5800 B	3400	1800	555	21.7
Total BTEX		21760	21490	24800	13766	9400	5765.65	4407	132.7
EPA 610									
Naphthalene	21	NA	NA	NA	130	42	51.5	109	4.4 J
Acenaphthene	80	NA	NA	NA	<2	7.1 P	<20	<21	<5.1
Acenaphthylene	210	NA	NA	NA	<2	24	<20	<21	<5.1
Benzo(a)anthracene	0.05	NA	NA	NA	<0.2	<0.1	<20	<21	<5.1
Pyrene	210	NA	NA	NA	<0.2	<0.25	<20	<21	<5.1
Fluorene	280	NA	NA	NA	<4	<2	<20	<21	<5.1
Anthracene	2100	NA	NA	NA	<2	<1	<20	<21	<5.1
Fluoranthene	280	NA	NA	NA	<0.4	<0.25	<20	<21	<5.1
Phenanthrene	210	NA	NA	NA	<2	<1	<20	<21	<5.1
		Bold type indicates detectable concentrations.							
		Shaded area indicates detectable concentrations above the groundwater quality standards.							

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **MW14**

Client Sample ID:		143GW206	CL-143-GW-275	MW14-01C3	UST2477-MW14-02A	UST2478-MW14-02C	USTT2477-MW14
Date Sampled:		11/14/99	05/15/01	09/21/01	04/11/02	10/17/02	04/29/03
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result
EPA 602							
1,2-Dichlorobenzene	620	<1	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	620	<1	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	75	<1	NA	NA	NA	NA	NA
EPA 602							
Benzene	1	1.9	<1	1.4	<1	<1	<1
Chlorobenzene	50	<1	NA	NA	NA	NA	NA
Methyl tert-butyl ether	200	44.2	3.5 J	<10	2.1	<1	<1
Ethylbenzene	29	<1	1.6	3.8	<1	<1	<1
Xylenes (total)	530	<3	<1	<2	<3	<3	<3
Toluene	1000	<1	0.41 JB	<1	<1	<1	<1
Total BTEX		1.9	2.01	5.2			
EPA 610							
Naphthalene	21	NA	<2	<2	<5.5	<5.2	<5.1
Acenaphthene	80	NA	<1	<1	<5.5	<5.2	<5.1
Acenaphthylene	210	NA	<1	<1	<5.5	<5.2	<5.1
Benzo(a)anthracene	0.05	NA	<0.1	<0.1	<5.5	<5.2	<5.1
Pyrene	210	NA	<0.1	<0.25	<5.5	<5.2	<5.1
Fluorene	280	NA	<2	<2	<5.5	<5.2	<5.1
Anthracene	2100	NA	<1	<1	<5.5	<5.2	<5.1
Fluoranthene	280	NA	<0.2	<0.25	<5.5	<5.2	<5.1
Phenanthrene	210	NA	<1	<1	<5.5	<5.2	<5.1
Bold type indicates detectable concentrations.							
Shaded area indicates detectable concentrations above the groundwater quality standards.							

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **MW13**

Client Sample ID:		143GW015	143GW041	143GW071	143GW138	143GW157	143GW169
Date Sampled:		08/13/97	01/21/98	05/01/98	11/17/98	03/01/99	05/20/99
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result
EPA 602							
1,2-Dichlorobenzene	620	<2	<1	<25	<1	<1	<1
1,3-Dichlorobenzene	620	<1.5	<0.8	<19	<1	<1	<1
1,4-Dichlorobenzene	75	<3	<1.5	<38	0.3 J	<1	<1
EPA 602							
Benzene	1	1.4 P	<0.5	<12	<1	1	8.5
Chlorobenzene	50	<1	<0.5	<12	<1	<1	<1
Methyl tert-butyl ether	200	18 P	<5	<50	45	<1	<1
Ethylbenzene	29	14 P	0.15 JP	20	<1	2.5	58.5
Xylenes (total)	530	<6	0.41 JB	90 JB	0.28 J	18.7	64.2
Toluene	1000	0.28 JP	0.67 JB	160 BP	0.74 J	22.1	<1
Total BTEX		15.68	1.23	270	1.02	44.3	131.2
EPA 610							
Naphthalene	21	NA	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA	NA
Bold type indicates detectable concentrations.							
Shaded area indicates detectable concentrations above the groundwater quality standards.							

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **MW13**

Client Sample ID:		143GW183	143GW193	143GW224	143GW232	CL-143-GW-262
Date Sampled:		09/11/99	11/11/99	05/10/00	08/26/00	12/18/00
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result
EPA 602						
1,2-Dichlorobenzene	620	<1	<1	<1	<2	<1
1,3-Dichlorobenzene	620	<1	<1	<1	<2	<1
1,4-Dichlorobenzene	75	<1	<1	<1	<2	<1
EPA 602						
Benzene	1	5.9	<1	<1	<1	<1
Chlorobenzene	50	<1	<1	<1	<2	<1
Methyl tert-butyl ether	200	<1	1.5	<1	<2	<5
Ethylbenzene	29	<1	1	<1	<2	<1
Xylenes (total)	530	243	<3	<3	<6	<1
Toluene	1000	212	<1	<1	0.8 J	<1
Total BTEX		461.9	1		0.8	
EPA 610						
Naphthalene	21	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA
Bold type indicates detectable concentrations.						
Shaded area indicates detectable concentrations above the groundwater quality standards.						

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Deep Well: MW12

Client Sample ID:		143GW205				
Date Sampled:		11/14/99				
Analyte (ug/l)	Action Level	Result				
EPA 602						
1,2-Dichlorobenzene	620	<1				
1,3-Dichlorobenzene	620	<1				
1,4-Dichlorobenzene	75	<1				
EPA 602						
Benzene	1	<1				
Chlorobenzene	50	<1				
Methyl tert-butyl ether	200	19.6				
Ethylbenzene	29	<1				
Xylenes (total)	530	<3				
Toluene	1000	<1				
Total BTEX						
EPA 610						
Naphthalene	21	NA				
Acenaphthene	80	NA				
Acenaphthylene	210	NA				
Benzo(a)anthracene	0.05	NA				
Pyrene	210	NA				
Fluorene	280	NA				
Anthracene	2100	NA				
Fluoranthene	280	NA				
Phenanthrene	210	NA				
		Bold type indicates detectable concentrations.				
		Shaded area indicates detectable concentrations above the groundwater quality standards.				

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Deep Well: MW11

Client Sample ID:		143GW200				
Date Sampled:		11/13/99				
Analyte (ug/l)	Action Level	Result				
EPA 602						
1,2-Dichlorobenzene	620	<1				
1,3-Dichlorobenzene	620	<1				
1,4-Dichlorobenzene	75	<1				
EPA 602						
Benzene	1	<1				
Chlorobenzene	50	<1				
Methyl tert-butyl ether	200	<1				
Ethylbenzene	29	<1				
Xylenes (total)	530	<3				
Toluene	1000	<1				
Total BTEX						
EPA 610						
Naphthalene	21	NA				
Acenaphthene	80	NA				
Acenaphthylene	210	NA				
Benzo(a)anthracene	0.05	NA				
Pyrene	210	NA				
Fluorene	280	NA				
Anthracene	2100	NA				
Fluoranthene	280	NA				
Phenanthrene	210	NA				
		Bold type indicates detectable concentrations.				
		Shaded area indicates detectable concentrations above the groundwater quality standards.				

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **MW10**

Client Sample ID:		143GW201				
Date Sampled:		11/13/99				
Analyte (ug/l)	Action Level	Result				
EPA 602						
1,2-Dichlorobenzene	620	<1				
1,3-Dichlorobenzene	620	<1				
1,4-Dichlorobenzene	75	<1				
EPA 602						
Benzene	1	<1				
Chlorobenzene	50	<1				
Methyl tert-butyl ether	200	<1				
Ethylbenzene	29	<1				
Xylenes (total)	530	<3				
Toluene	1000	<1				
Total BTEX						
EPA 610						
Naphthalene	21	NA				
Acenaphthene	80	NA				
Acenaphthylene	210	NA				
Benzo(a)anthracene	0.05	NA				
Pyrene	210	NA				
Fluorene	280	NA				
Anthracene	2100	NA				
Fluoranthene	280	NA				
Phenanthrene	210	NA				
		Bold type indicates detectable concentrations.				
		Shaded area indicates detectable concentrations above the groundwater quality standards.				

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **MW6**

Client Sample ID:		143GW196				
Date Sampled:		11/11/99				
Analyte (ug/l)	Action Level	Result				
EPA 602						
1,2-Dichlorobenzene	620	<1				
1,3-Dichlorobenzene	620	<1				
1,4-Dichlorobenzene	75	<1				
EPA 602						
Benzene	1	<1				
Chlorobenzene	50	<1				
Methyl tert-butyl ether	200	<1				
Ethylbenzene	29	<1				
Xylenes (total)	530	<3				
Toluene	1000	<1				
Total BTEX						
EPA 610						
Naphthalene	21	NA				
Acenaphthene	80	NA				
Acenaphthylene	210	NA				
Benzo(a)anthracene	0.05	NA				
Pyrene	210	NA				
Fluorene	280	NA				
Anthracene	2100	NA				
Fluoranthene	280	NA				
Phenanthrene	210	NA				
		Bold type indicates detectable concentrations.				
		Shaded area indicates detectable concentrations above the groundwater quality standards.				

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **MW5**

Client Sample ID:		143GW011	143GW040	143GW070	143GW136	143GW150	143GW163
Date Sampled:		08/13/97	01/21/98	05/01/98	11/17/98	02/28/99	05/20/99
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result
EPA 602							
1,2-Dichlorobenzene	620	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	620	<0.8	<0.8	<0.8	<1	<1	<1
1,4-Dichlorobenzene	75	<1.5	<1.5	<1.5	0.39 J	<1	<1
EPA 602							
Benzene	1	<0.5	1.1 P	<0.5	<1	2.7	2.4
Chlorobenzene	50	<0.5	<0.5	0.062 J	<1	<1	<1
Methyl tert-butyl ether	200	<2	<5	<2	13	<1	<1
Ethylbenzene	29	<0.8	9.6 P	0.26 J	0.26 J	1.3	1.5
Xylenes (total)	530	<3	<3	1.01 J	1.24 J	4.6	6.5
Toluene	1000	<2	<2	1.5 JB	1.4	5.1	6.6
Total BTEX			10.7	2.77	2.9	13.7	17
EPA 610							
Naphthalene	21	NA	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA	NA
		Bold type indicates detectable concentrations.					
		Shaded area indicates detectable concentrations above the groundwater quality standards.					

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **MW1**

Client Sample ID:		143GW017	143GW039	143GW069	143GW151	143GW151	143GW164
Date Sampled:		08/13/97	01/21/98	05/01/98	11/17/98	02/28/99	05/20/99
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result	Result
EPA 602							
1,2-Dichlorobenzene	620	<1	<1	<25	<1	<1	<1
1,3-Dichlorobenzene	620	0.84 P	<0.8	<19	<1	<1	<1
1,4-Dichlorobenzene	75	<1.5	<1.5	<38	<1	<1	<1
EPA 602							
Benzene	1	5.8	0.15 J	4 JP	<1	2.3	1.7
Chlorobenzene	50	<0.5	<0.5	<12	<1	<1	<1
Methyl tert-butyl ether	200	0.38 JP	<5	<120	<5	<1	<1
Ethylbenzene	29	6.6	0.22 J	17 J	<1	1.5	2
Xylenes (total)	530	4	1.45 JB	108	0.6 J	6	8.9
Toluene	1000	0.61 J	1.1 JB	102 B	<1	4.5	9
Total BTEX		17.11	2.92	231	0.6	14.3	23.6
EPA 610							
Naphthalene	21	NA	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA	NA
		Bold type indicates detectable concentrations.					
		Shaded area indicates detectable concentrations above the groundwater quality standards.					

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

Analytical Data Summary
Shallow Well: **MW1**

Client Sample ID:		143GW178	143GW195	143GW219	143GW234	CL-143-GW-267
Date Sampled:		09/11/99	11/11/99	05/10/00	08/26/00	12/18/00
Analyte (ug/l)	Action Level	Result	Result	Result	Result	Result
EPA 602						
1,2-Dichlorobenzene	620	<1	<1	<1	<2	<1
1,3-Dichlorobenzene	620	<1	<1	<1	<2	<1
1,4-Dichlorobenzene	75	<1	<1	<1	<2	<1
EPA 602						
Benzene	1	8.3	<1	<1	<1	<1
Chlorobenzene	50	<1	<1	<1	<2	<1
Methyl tert-butyl ether	200	<1	<1	<1	<2	<5
Ethylbenzene	29	<1	1	<1	<2	<1
Xylenes (total)	530	11.4	7.7	<3	<6	<1
Toluene	1000	9.8	2.6	<1	0.71 J	<1
Total BTEX		29.5	11.3		0.71	
EPA 610						
Naphthalene	21	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA
Acenaphthylene	210	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.05	NA	NA	NA	NA	NA
Pyrene	210	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA
Anthracene	2100	NA	NA	NA	NA	NA
Fluoranthene	280	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA
Bold type indicates detectable concentrations.						
Shaded area indicates detectable concentrations above the groundwater quality standards.						

J= estimated
P= >25% difference between column quantitation
B= detected in blank
NA= not analyzed

APPENDIX E
RISK CLASSIFICATION
AND
LAND USE FORM

A. RISK CHARACTERIZATION

NOTE: *Source area means point of release from a UST system.*

Risk Classification and Land Use Form

Part I - Groundwater/Surface Water/Vapor Impacts

High Risk

1. *Has the release contaminated any water supply well including any used for non-drinking purposes?* YES NO
No wells in the area.
2. *Is a water supply well used for drinking water located within 1,000 feet of the source area of the discharge or release?* YES NO
3. *Is a water supply well not used for drinking water (e.g., irrigation, washing cars, industrial cooling water, filling swimming pools) located within 250 feet of the source area of the release?* YES NO
4. *Does groundwater within 500 feet of the source area of the release have the potential for future use (there is no other source of water supply other than the groundwater)?* YES NO
5. *Do vapors from the release pose a threat of explosion because of accumulation of the vapors in a confined space or pose any other serious threat to public health, public safety or the environment?* YES NO
If YES describe.
6. *Are there any other factors that would cause the discharge or release to pose an imminent danger to public health, public safety, or the environment?* YES NO
If YES describe.

Intermediate Risk

7. *Is a surface water body located within 500 feet of the source area of the discharge or release?* YES NO
If YES, does the maximum groundwater contaminant concentration exceed the surface water quality standards and criteria found in 15A NCAC 2B.0200 by a factor of 10? YES NO

A storm-water drainage ditch is located approximately 600 feet south of the project site. Northeast Creek, a tributary of the New River, is located approximately 1,000 feet south of the subject site.

8. *Is the source area of the discharge or release located within an approved or planned wellhead protection area as defined in 42 USC 300h-7(e)?* YES NO
If YES describe.

MCB, Camp Lejeune has identified proposed wellhead protection areas on the base. The site is not located in an area deemed as a potential wellhead protection area based on the Wellhead Protection Plan Update prepared by AH Environmental Consultants, dated August 2002.

9. *Is the release located in the Coastal Plain physiographic region as designated on a map entitled "Geology of North Carolina" published by the Department in 1985?* YES NO
If YES, is the source area of the release located in an area in which there is recharge to an unconfined or semi-confined deeper aquifer that is being used or may be used as a source of drinking water? YES NO
If YES describe.

Recharge to the lower portions of the aquifer does not appear to occur in the area. Additionally, groundwater samples collected from Type III monitoring wells at the site were found to be BDL for all parameters.

10. *Do the levels of groundwater contamination for any contaminant exceed the gross contamination levels established by the Department?* YES NO

All contaminant levels from the April 2003 sampling event are below current 2L GWQS with the exception of benzene (123 µg/L) and ethylbenzene (35.9 µg/L) identified in the groundwater sample collected from monitoring well MW-PVC101.

Part II - Land Use

Property Containing Source Area of Release

The questions below pertain to the property containing the source area of the release.

1. *Does the property contain one or more primary or secondary residences (permanent or temporary)?* YES **NO**
Describe.

The subject site is composed of an active "strip-mall" consisting of numerous retail and social facilities.

2. *Does the property contain a school, daycare center, hospital, playground, park, recreation area, church, nursing home, or other place of public assembly?* **YES** NO
Describe.

Tarawa Terrace Chapel is located in Building 2477 within the site boundaries.

3. *Does the property contain a commercial (e.g., retail, warehouse, office/business space, etc.) or industrial (e.g., manufacturing, utilities, industrial research and development, chemical/petroleum bulk storage, etc.) enterprise, an inactive commercial or industrial enterprise, or is the land undeveloped?* **YES** NO
Describe.

Numerous retail facilities are located throughout the general vicinity of the site.

4. *Do children visit the property?* **YES** NO
Explain.

Children frequently visit the retail and social facilities located in the general vicinity of the site.

- Is access to the property reliably restricted consistent with its use (e.g., by fences, security personnel or both)?* YES **NO**
Explain.

The site contains an active "strip-mall" type facility.

5. *Do pavement, buildings, or other structures cap the contaminated soil?* **YES** NO
Describe.

The areas of the release are covered with asphalt an/or concrete

If YES, what mechanisms are in place or can be put into place to ensure that the contaminated soil will remain capped in the foreseeable future?

As necessary, appropriate land use restrictions will insure that any potentially impacted soils will remain in place. However, no evidence suggests the continued presence of petroleum impacted soils.

6. *What is the zoning status of the property?*

The MCB, Camp Lejeune is not subject to local or county zoning requirements.

7. *Is the use of the property likely to change in the next 20 years?*
Explain.

YES NO

No. The designated use of the facility on the Base is not likely to change in the foreseeable future.

Property Surrounding Source Area of Release

The questions below pertain to the area within 1500 feet of the source area of the release (excludes property containing source area of the release):

1. *What is the distance from the source area of the release to the **nearest** primary or secondary residence (permanent or temporary)?*

Military residences border the property and are located approximately 300 feet from the release area.

2. *What is the distance from the source area of the release to the **nearest** school, daycare center, hospital, playground, park, recreation area, church, nursing home or other place of public assembly?*

Tarawa Terrace Chapel is located on the subject property in Building 2477.

3. *What is the zoning status of properties in the surrounding area?*

As previously stated, MCB, Camp Lejeune is not subject to local or county zoning requirements. The surrounding property has been developed for military support purposes.

4. *Briefly characterize the use and activities of the land in the surrounding area.*

The surrounding land is used primarily for military housing and associated domestic activities. However, the land located south of the subject site is currently undeveloped.

B. RECEPTOR INFORMATION

1. **Water Supply Wells**
(Refer to Table 3 and Figure 5)

Physical reconnaissance and review of the Wellhead Protection Plan – 2002 Update prepared by AH Environmental indicated that no water supply wells are located within 1,500 feet of the subject site.

2. Public Water Supplies

Are public water supplies available within 1,500 feet of the source area of the release?

YES NO

If YES, where is the location of the nearest public water lines and the source(s) of the public water supply (indicate on map). Describe.

Public water is provided to buildings within 1,500 feet of the subject site by water mains which carry treated potable water. Potable water is supplied to the site and surrounding areas by the MCB water supply system. Potable water for Camp Lejeune is obtained from various water treatment facilities throughout the base. Groundwater obtained from the Castle Hayne Aquifer is the raw water source for the treatment facilities.

3. Surface Water

Identify all surface water bodies (e.g., ditch, pond, stream, lake, river) within 1,500 feet of the source area of the release. This information must be shown on the USGS topographic map.

A storm-water drainage ditch is located approximately 600 feet south of the project site. Northeast Creek, a tributary of the New River, is located approximately 1,000 feet south of the subject site.

4. Wellhead Protection Areas

Identify all planned or approved wellhead protection areas (e.g., ditch, pond, stream, lake, river) within 1,500 feet of the source area of the release. This information must be shown on the USGS topographic map. Wellhead protection areas are defined in 42 USC 300h-7(e).

According to the Wellhead Protection Plan – 2002 Update prepared by AH Environmental Consultants, the site is not located in, or within 1,500 feet of, a wellhead protection area.

5. Deep Aquifers in the Coastal Plain Physiographic Region

(refer to page 19 of the guidelines) NOTE: This requirement only pertains to releases in the Coastal Plain physiographic region as designated on a map entitled "Geology of North Carolina" published by the Department in 1985.

As identified in the Geologic Map of North Carolina (North Carolina Department of Natural Resources and Community Development 1985), the subject site lies within the Coastal Plain physiographic province. Results of the groundwater analysis conducted on samples collected from the Type III monitoring wells indicates that the deeper portions of the aquifer have not been impacted by petroleum constituents.

To some degree seven of the ten aquifers identified to date in the North Carolina Coastal Plain are typically present beneath portions of the MCB. In order of

increasing depth, these aquifers include the Surficial, Castle Hayne, Beaufort, Peedee, Black Creek, and upper and lower Cape Fear aquifers.

Aquifers below the surficial aquifer in the area typically include the Castle Hayne Aquifer, the Beaufort Aquifer, and the Peedee Aquifer, in order of increasing depth. Both the Beaufort and Peedee Aquifers contain saltwater in portions of the MCB and are not generally used for water supply. The Castle Hayne Aquifer contains freshwater and is the principal aquifer used in the area for water supply.

6. Subsurface Structures

Numerous underground utilities are present throughout the site. These utilities are located above the shallow groundwater table and are not considered potential receptors. Additionally, an active groundwater remediation system is currently in operation at the subject site.

7. Property Owners and Occupants
(see Table 6)

The subject site is owned and operated by the Commanding General – Marine Corps Base, Camp Lejeune. Facilities currently operated by the MCB at the project site include: Community Center, Tarawa Terrace Chapel, WIC Program, Fitness Center, Veterinary Clinic, Post Office, Laundromat, and a Religious Center.