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May 6, 2004

Commander
Naval Facilities Engineering Command
Atlantic Division
6506 Hampton Blvd., Bldg. A, Room 1124
Norfolk, Virginia 23508

Attention: EV23JC, Mr. John D. Conway, P.G.

Re: **FINAL Remedial Action Optimization & Revised Corrective Action Plan**
LCH-4015
Marine Corps Base
Camp Lejeune, North Carolina

Navy Contract No. N62470-01-D-3009
Delivery Order No. 0079
CATLIN Project No. 203-063

Dear Mr. Conway:

CATLIN Engineers and Scientists (CATLIN) are pleased to submit the FINAL Remedial Action Optimization & Revised Corrective Action Plan for the above referenced site. We have reviewed the comments to the referenced draft report, made the appropriate changes to the Final report and offer the following responses to the comments/concerns offered by Ms. Hall in an April 22, 2004 e-mail correspondence.

2.1.3 - This section only references water supply well, LCH4006. What about LCH4009, which is the active supply well? Also, we need to state that LCH4006 is inactive. I'll determine if an abandonment record exists for this well. Also, 4006 is not shown on the figure. Since we're referencing findings of an old report, I'd like to at least state current conditions.

Section 2.1.3 of this report is based on the information presented within the 1996 CAP. The CAP does not reference potable water supply well LCH-4009, however, we have added a reference to Section 5.2.2 of the report in order to acknowledge the presence of the potable water supply well LCH-4009. Figure 1 is based on the Camp Lejeune GIS database, which does not provide a location for potable water supply well LCH-4006. Therefore, LCH-4006 potable water supply well is not illustrated on Figure 1.

4.1.1 - First paragraph states that Shaw suggested free product was a possible result of parking lot use. Pretty doubtful don't you think? Why don't we delete that reference. Any other possibilities for why it's there? Preferential pathways? I think all the wells in that area are screened at the same interval (pretty shallow), so you'd think more than just one would exhibit product. Could just be an "anomaly."

Acknowledge. The following sentence has been added to the end of Section 4.1.1, "Therefore, it is our opinion that the free-phase product that Shaw noted in MW-11 was an anomaly that appeared to be addressed by the use of the AFVR and passive skimmer technologies."

4.2.1 - Doesn't look like there's enough sampling locations in the area of the old ASTs and former dispenser islands. I see additional sampling is suggested later in the report...may just want to reference here that it is suggested more be done.

Acknowledge. The following sentence has been added to the end of Section 4.2.1, "Additional soil assessment activities have been recommended in Section 6.2 of this report."

4.3.1 - Replace however in second paragraph with therefore.

Acknowledge. Text has been changed as suggested.

4.3.3 - Change to read "a discussion of the shallow and deep conditions..."

Acknowledge. Text has been changed as suggested.

4.3.3.2 - Delete "within the deep conditions" and replace with "at depth."

Acknowledge. Text has been changed as suggested.

5.2.2 - Mention LCH4006 is no longer in use as reported in 2.1.3

Acknowledge. Text has been changed as suggested.

6.1 - How about addressing product in MW-11 area? If not present, state so. Remember to use LCH prefix in front of building numbers.

During a telephone conversation with Ms. Hall on May 3, 2004, it was agreed that based on the modifications presented above for Section 4.1.1 a reference to MW-11 was not needed in Section 6.1. Therefore, the text has not been changed as suggested. Additionally, the LCH prefix has been added to all referenced building numbers.

6.2 - Along product lines and former dispenser areas. Also, 20 foot interval is repeated twice, delete one. Do we know where lines went from former dispenser area to the tanks that supplied them?

Acknowledge the repeat of the 20-foot interval. One of the references has been deleted. A reference to the former product lines associated with the LCH-4015 ASTs has been added to the report text. Additionally, the text has been modified to recommend additional soil samples along the former product lines associated with LCH-4015 ASTs.

6.3.1 - I'm not sure totally deleting wells from being sampled will fly. May be better to sample annually. I'm not sold on this one.

Acknowledge. The following sentence has been added to the end of the first bullet of Section 6.3.1, "These monitoring wells should remain in-place until site closure is achieved."

6.3.2 - Second bullet - affect should be effect. Any specific details needed to meet RBCAs, as outlined in shallow section? In #1, maybe just say "then the data would be used to support a NFA request."

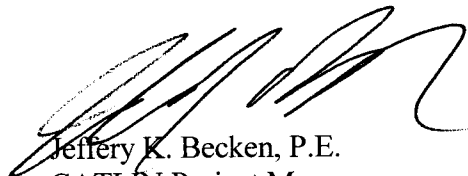
Acknowledge that affect should be effect. The word has been changed as suggested. As discussed during a telephone conversation with Ms. Hall on May 3, 2004, in the event of the presence of deep contamination then the clean-up goal for the site would be the 2L GWQS. Therefore, the text has not been changed as suggested.

CATLIN Engineers and Scientists appreciate the opportunity to continue to provide services to LANTDIV and the MCB on your environmental projects.

Sincerely,



Michael E. Mason, P.E.
CATLIN Program Manager



Jeffery K. Becken, P.E.
CATLIN Project Manager

Attachments: Remedial Action Optimization and Revised Corrective Action Plan

cc: Ms. Pamela Argilan - Code AQ 11B Contracts (correspondence only)
Commanding General, Attn: Director I&E/EMD/EQB (2 copies + 2 CDs)
Mr. Ron Kenyon - Shaw Environmental

**REMEDIAL ACTION OPTIMIZATION
&
REVISED CORRECTIVE ACTION PLAN
*BUILDING LCH-4015***

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

May 6, 2004

Navy Contract No.: N62470-01-D-3009

Delivery Order No.: 0079

CATLIN Project No.: 203-063



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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

**REMEDIAL ACTION OPTIMIZATION
&
REVISED CORRECTIVE ACTION PLAN
BUILDING LCH-4015**

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

CATLIN PROJECT NO. 203-063

MAY 6, 2004

EXECUTIVE SUMMARY

This report is intended to provide information relevant to address and review the effectiveness of current remedial actions being conducted at the Building LCH-4015 project site and to make revisions to the CAP in order to move towards site closeout. The project site is located within the Midway Park Community Center of MCB, Camp Lejeune in Onslow County, North Carolina. The project site consists of the Community Center Building (LCH-4014), former fueling and maintenance area (LCH-4015), Marine Corps Exchange Convenience Store (LCH-4034), and the former fuel tank farm (SLCH-4024).

Various site assessments were conducted in the early 1990's to determine the integrity of the AST system and delineate the extent, if applicable, of free-phase product, soil contamination, and groundwater contamination in the vicinity of Building LCH-4015. In 1990, the tanks at Building LCH-4015 were emptied of product, and three 14,000-gallon ASTs were removed and relocated for use at other locations aboard the Base.

LAW Engineering and Environmental Services, Inc. (LAW) prepared and submitted a CAP for the subject site dated August 27, 1996 that identified the presence of petroleum impact to the soil and shallow groundwater (surficial aquifer). The recommended remediation strategy within the CAP for site restoration was a treatment system consisting of a biosparge system and a SVE system. It is our understanding that J. A. Jones Environmental Services Company (JA Jones) installed the biosparge and horizontal SVE treatment system in 1998 and began operation of the system in November 1998.

In 1992, a UST system replaced an inoperable offloading facility located south of LCH-4034. These USTs were replaced by ASTs that are currently located northwest of LCH-4015. These ASTs currently provide fuel to the Marine Corps Exchange Convenience Store (Building LCH-4034).

Activities associated with the removal of the LCH-4034 USTs were documented in a UST Closure Report dated June 23, 2002. The UST report concluded that based on field observations and analytical results that soil and groundwater had been impacted by petroleum contamination in the vicinity of the former USTs. Also, free-phase product was observed within the excavation area

around the product lines. The UST report recommended investigating the free-phase product plume and expanding the existing remediation system. As of the preparation of this Remedial Action Optimization and Revised Corrective Action Plan (RAO & RCAP), assessment activities have not been completed at the LCH-4034 USTs. Based on the likely intermingling of the contaminant plumes from the LCH-4034 USTs and the LCH-4015 ASTs, the sites have been combined and are now considered the LCH-4015 project site.

Current applicable remedial requirements for the contamination associated with the LCH-4015 ASTs is based on the corrective action requirements per 15A NCAC 2L .0106 which became effective on January 2, 1998 and the document entitled "*Groundwater Section Guidelines for the Investigation and Remediation of Soil and Groundwater*" (2000 Guidelines) as released by the NCDENR Division of Water Quality, Groundwater Section, effective July 2000. The current applicable remedial requirements for the LCH-4034 portion of the site are the Risk Based Corrective Action (RBCA) for Petroleum Underground Storage Tanks per 15A NCAC 2L .0115 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. Per the General Assembly of the North Carolina Session Law 2003-352, House Bill 897 (House Bill 897), "...a mixed plume of contamination that results from releases of petroleum from both an underground storage tank and an aboveground storage tank or other source may be cleaned up under the risk-based cleanup rules applicable to releases from petroleum underground storage tanks..." Therefore, pending determination of the extent of contamination from the LCH-4034 USTs, the regulatory framework for the entire LCH-4015 site may be based on the Risk Based Corrective Actions. As such, reclassification of the site based on current risk factors would be necessary.

In order to effectively evaluate the current remediation system suitability, the recommendations within this report address the evaluation of the potential plume migration, free-phase product, soil contamination, the shallow groundwater contamination, and the deep groundwater contamination, separately. The following is a brief summary of the recommendations; please refer to Section 6.0 of this report for a detailed discussion of the recommendations:

- Initiate the shut down and abandonment of potable water supply well LCH-4009.
- Submittal of RAO & RCAP to the Groundwater and UST Sections of NCDENR for approval of recommendations.
- Continue to operate the biosparge and SVE system.
- Initiate the investigation of free-phase product at the former LCH-4034 USTs.
- Collection of recommended soil samples.
- Preparation of a Report of Findings. This report will include the findings of the additional soil and free-phase product assessment activities. If additional soil contamination is detected, then a Soil Cleanup Plan will be required; otherwise, proceed with site closure activities.
- Pending the findings of the free-phase product and soil assessment reports, request approval for the implementation of the Risk Based Corrective Actions under the UST Section.
- Implementation of the recommended sampling strategy for the shallow groundwater and deep groundwater conditions.
- Preparation of the Annual Groundwater Monitoring Reports.

**REMEDIAL ACTION OPTIMIZATION
&
REVISED CORRECTIVE ACTION PLAN
BUILDING LCH-4015**

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

CATLIN PROJECT NO. 203-063

MAY 6, 2004

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 the Building LCH-4015 project site located in the Midway Park Community Center Complex of the MCB, Camp Lejeune. Additionally, this report revises the CAP and provides recommendation for continuing remediation activities 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 RAO & RCAP was developed in general accordance with the NAVFACENGCOM "Guidance for Optimizing Remedial Action Operation" document dated April 2001 and the 2000 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. Data was then reviewed and the RAO & RCAP was developed.

2.0 SITE HISTORY

The Building LCH-4015 site is located within the Midway Park Community Center of MCB, Camp Lejeune in Onslow County, North Carolina. The site vicinity is presented on Figure 1. The project site consists of the Community Center Building (LCH-4014), former fueling and maintenance area (LCH-4015), Marine Corps Exchange Convenience Store (LCH-4034), and the former fuel tank farm (SLCH-4024). The site is located at the intersection of North Carolina Highway 24 and the entrance to Midway Park (Butler Drive). See Figure 2 for site layout plan.

A former AST system began operation in 1945. The AST system consisted of two 14,000-gallon gasoline tanks that supplied fuel to four gasoline dispensers located on a pump island to the north of Building LCH-4015, one 14,000-gallon diesel tank that supplied fuel to a dispenser located on the north side of Building LCH-4015, and one 3,000-gallon No. 2 fuel oil tank that supplied fuel oil to a boiler contained within Building LCH-4014. A number of smaller storage tanks were also located at the site. Fuel was distributed through a number of underground product piping systems.

Various site assessments were conducted in the early 1990's to determine the integrity of the AST system and delineate the extent, if applicable, of free-phase product, soil contamination and groundwater contamination in the vicinity of Building LCH-4015. The findings of the previous assessments have been summarized in reports submitted to NCDENR, Division of Water Quality, Groundwater Section in the WiRO. The reports from these various site assessments were utilized by LAW to develop a CAP dated August 27, 1996. These site assessment reports were referenced within the CAP. LAW reported that petroleum-impacted soil and groundwater present at the site were suspected to be the result of releases of diesel fuel and gasoline from the former pipeline distribution network previously discussed. In 1990, the ASTs at Building LCH-4015 were emptied of product, and three 14,000-gallon ASTs were removed and relocated for use at other locations on the base.

The CAP identified the presence of soil and shallow groundwater (surficial aquifer) petroleum contamination. The recommended remediation strategy within the CAP for site restoration was a treatment system consisting of a biosparge system and a SVE system for the remediation of the soil and groundwater contamination. It is our understanding that JA Jones installed a biosparge and horizontal soil vapor extraction remediation system in 1998 and began operation of the system in November 1998. The biosparge wells were reportedly installed with a 1.5 to 3.5 feet screen interval ranging from 4.5 to 8.0 feet BLS. The soil vapor extraction wells consist of a 2-inch diameter 0.02-inch slot width PVC horizontal well screen believed to be installed slightly above the shallow groundwater table. JA Jones operated the remediation system from start-up to early 2003. Engineering & Environment, Inc. (E&E) began operation in early 2003 and continues to operate the remediation system. E&E has provided the 2002 and 2003 data referenced within this report. Shaw Environmental, Inc. (Shaw) prepared an Annual Monitoring Reported dated February 2004 that documented JA Jones' activities between August 2000 and August 2001. This report

was based on a draft version of this report prepared by JA Jones and is the most recent Annual Monitoring Report submitted for this site.

In 1992, a UST system replaced an inoperable offloading facility located south of LCH-4034. The UST system, consisting of two 10,000-gallon gasoline USTs and one 2,500-gallon premium gasoline UST was removed in April/May 2002. These former USTs were manufactured of fiberglass and identified as LCH-4034-1, LCH-4034-2, and LCH-4034-3. These USTs were replaced by ASTs that are currently located northwest of LCH-4015 (see Figure 2). These ASTs currently provide fuel to the Marine Corps Exchange Convenience Store (Building LCH-4034).

Activities associated with the removal of the LCH-4034 USTs were documented in a UST Closure Report dated June 23, 2002 prepared by JA Jones. The UST report concluded that based on field observations and analytical results that soil and groundwater had been impacted by petroleum contamination in the vicinity of the former USTs. Also, free-phase product was observed within the excavation area around the product lines. The UST report recommended investigating the free-phase product plume and expanding the existing remediation system. As of the preparation of this RAO & RCAP, assessment activities have not been completed at the LCH-4034 USTs. Based on the likely intermingling of the contaminant plumes from the LCH-4034 USTs and the LCH-4015 ASTs, the sites have been combined and are now considered the LCH-4015 project site. This RAO & RCAP addresses the additional assessment activities required in the vicinity of the LCH-4034 USTs.

Monitoring wells MW-1 to MW-20 were installed across the area prior to preparation of the CAP. Three intermediate depth (31.5 to 32 feet BLS) monitoring wells (MW-21 to MW-23) were installed in June 2001 in response to a request by NCDENR to assess the vertical extent of contamination. A detailed site plan of the LCH-4015 project site, including monitoring well locations and the current remediation system location, are illustrated on Figure 2.

2.1 CONCEPTUAL SITE MODEL (BASED ON 1996 CAP)

This conceptual site model is based on the information utilized in the development of the 1996 CAP.

2.1.1 Site Geology

The topography of the project site is relatively flat. Soils in the vicinity of the site have been documented to be generally silty sands with occasional pockets of clayey sand within the near surface (5 to 10 feet BLS). Below this surficial material, a one to five foot silty clay layer has been noted across the site. Soils beneath the clay layer have been described as gravelly sands, silty sands or clayey sands to a depth of approximately 50 feet BLS.

2.1.2 Groundwater Elevation and Flow Direction

Based on an interpretation of the groundwater elevation contours presented within the CAP, groundwater flow direction was predominately toward the north with flow components to the west and southwest. Groundwater elevations ranged from approximately 25.5 feet to 28.5 feet MSL.

2.1.3 Potential Receptors

LAW identified a tributary to the Northeast Creek located approximately 1,700 feet southwest of the site and a drinking water supply well (LCH-4006) located approximately 700 feet southeast of the subject site as being the potential receptors of greatest risk. Please note that the potential receptors as of the preparation of this RAO and RCAP report are discussed in Section 5.2.2 of this report.

2.1.4 Contaminants of Concern

The list of contaminants identified by LAW during the assessment activities along with the associated target cleanup levels established during the August 27, 1996 CAP are presented in Appendix A.

3.0 REMEDIAL ACTION REVIEW

3.1 REMEDIAL SYSTEM OBJECTIVES

As detailed in the 1996 CAP prepared by LAW, the remedial objectives included:

Primary Source(s):

Underground fuel lines: The lines had closed in place during initial remedial efforts.

Secondary Source(s):

- (i) Reduce concentration of petroleum hydrocarbons in soil to established Action Levels of 40 mg/kg by EPA Method 5030/8015 and 160 mg/kg by EPA Method 3550/8015 (Based on Site Sensitivity Evaluation).

Dissolved-Phase Groundwater Contamination:

Restore groundwater adversely impacted by petroleum fuel releases to a quality consistent with North Carolina Groundwater Quality Standards.

Receptor Protection:

Imminent threat to receptors was not identified as part of the CAP.

3.2 RECOMMENDED REMEDIAL SYSTEM

Based on the results of a biosparge pilot test conducted at the LCH-4015 project site, LAW recommended biosparging groundwater and SVE as the remediation technology to meet the established remedial goals. LAW recommended 35 vertical biosparge wells to be screened over a two and one-half foot interval approximately 6 to 8.5 feet below land surface. The SVE wells were proposed to be horizontal slotted pipes placed within trenches in the location of the groundwater contaminant plume to recover vapors from the vadose zone. The system layout proposed by LAW was based on the historical groundwater data available at the time, which is provided in the attached Appendix D.

Active remediation was estimated to take approximately 16 years from system installation and activation. LAW recommended the collection of groundwater analytical samples on an annual basis. LAW recommended that remedial activities continue until four consecutive quarters of groundwater data during and after operation of the system revealed no compounds above the 2L GWQS.

3.3 IMPLEMENTED REMEDIAL SYSTEM

Subsequent to CAP approval, the biosparge and SVE systems were installed by JA Jones in 1998. JA Jones installed thirty-eight biosparge wells and five horizontal SVE wells. Compressed air is supplied to the biosparge wells by a rotary vane air compressor. Soil vapor is recovered using a positive displacement blower. The current remedial system layout is presented on Figure 2.

3.4 REMEDIAL SYSTEM STATUS

As detailed in the Annual Monitoring Report for Building LCH-4015 prepared by Shaw dated February 2004, data indicates that since system startup in November 1998 the system has operated continuously with the exception of minimal down time for equipment repairs and upgrades. Field reconnaissance conducted by CATLIN personnel in conjunction with MCB Lejeune personnel revealed the system to be well maintained and in generally good working condition.

3.5 MONITORING STATUS

Groundwater sampling and analysis are currently collected at various frequencies ranging from quarterly to annually from the site monitoring wells. MW-1 through MW-12 and MW-14 through MW-18 are Type II monitoring wells installed to a total depth ranging between 11.7 and 14.9 feet BLS. MW-13, MW-19, and MW-20 are

50-foot deep Type III monitoring wells. MW-21, MW-22 and MW-23 are intermediate Type III monitoring wells installed to a total depth ranging from 31.5 to 32 feet BLS. 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 and are on file in the WiRO.

4.0 REMEDIATION EFFECTIVENESS EVALUATION

As previously stated, Shaw has reported the biosparge and SVE system to be continuously operated since the start-up in November 1998, with the exception of minor equipment repairs and routine maintenance.

4.1 CONTAMINANT LEVELS

4.1.1 Free-Phase Product

Free-phase product was not present at the site at the time of CAP preparation. As noted in previously submitted monitoring reports, free-phase product has been observed periodically in monitoring well MW-11. Please note that Shaw reported in the Annual Monitoring Report for August 2000 to August 2001 that free product was present in MW-20. It appears that this is a typographical error that should have been MW-11. JA Jones recovered free-phase product by use of AFVR and passive skimmer technologies from MW-11 on a frequent basis. J.A. Jones installed three temporary monitoring wells (GP-01, GP-02 and GP-03) using direct push methods to assess contamination in the vicinity of MW-11. The actual installation date of these temporary wells was not available as of the preparation of this RAO & RCAP; however, it is assumed that installation activities were completed between August 2000 and August 2001. No free-phase product was observed in any of these temporary wells. No source for the free-phase product in MW-11 has been identified; however, Shaw stated in the Annual Monitoring Report for August 2000 to August 2001 that free-phase product in MW-11 may have been from parking lot use. As of the preparation of this RAO & RCAP, E&E has indicated that free-phase product has not been present at the LCH-4015 site since they began operation of the system in 2003. Therefore, it is our opinion that the free-phase product that Shaw noted in MW-11 was an anomaly that appeared to be addressed by the use of the AFVR and passive skimmer technologies.

As previously stated, JA Jones documented in a UST Closure Report for LCH-4034 USTs that free-phase product was observed during the UST closure activities. As of the preparation of this RAO & RCAP, the spatial extent of free-phase product has not been assessed in the vicinity of the former LCH-4034 USTs. Therefore, current remediation effectiveness for addressing the free-phase product in the vicinity of the former LCH-4034 USTs, if present, cannot be completed at this time. However, it should be noted that the current biosparge and SVE remediation systems are not the

recommended methods for the removal of free-phase product.

4.2 CONTAMINANT CONCENTRATIONS

4.2.1 Soil

According to Shaw's Annual Monitoring Report (2004) for the time period of August 2000 to August 2001, dilution air is added at the air/water separator tank to reduce total system vacuum to minimize entrainment of groundwater by the SVE system. Due to the addition of dilution air to the SVE system effluent, recovered concentration of VOC's may not be detected above the laboratory quantitation limit. Therefore, the system effectiveness based on SVE exhaust emissions is not applicable.

Soil TPH concentrations reported in the CAP were as high as 542 mg/kg for diesel range organics and ranged from non-detect to 4,600 mg/kg for gasoline range organics. No additional soil assessments have been conducted in the areas in which exceedances of the TPH were reported within the CAP. A summary of the historical soil laboratory analytical results have been provided in Appendix B and Figure 3. Additional soil assessment activities have been recommended in Section 6.2 of this report.

4.2.2 Groundwater

Groundwater contamination data at the time of the CAP preparation (May 1995 data) has been provided on the attached Figures 4 to 9. The CAP identified benzene, ethylbenzene, total xylenes, MTBE, naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, and benzo(k)flouranthene as the target contaminants of concern. The maximum concentration of these contaminants, as reported in the CAP, is provided in Appendix A.

The CAP did not distinguish between the shallow conditions and the deep conditions. In order to effectively evaluate the current remediation system, a discussion of the shallow conditions (Type II monitoring wells) and the deep conditions (Type III monitoring wells) is provided in the following sections.

4.2.2.1 Shallow Conditions

The most recent estimated plume boundaries of the shallow groundwater conditions from the November 2003 sampling event along with the plume boundaries from the CAP are shown for BTEX, Naphthalene and MTBE on Figures 4, 6, and 8. As can be seen, the estimated extent of shallow groundwater contamination has been slightly reduced by the active remediation system; however, the shallow groundwater contamination concentrations have significantly

reduced. This reduction is illustrated by the graphical representation of contaminant concentrations in groundwater samples over time from selected monitoring wells provided in the attached Appendix F.

Based on the November 2003 groundwater sampling data, MW-1, MW-2, and MW-3 contaminant concentrations remain in excess of the 2L GWQS. Table 2A summarizes the historical groundwater contaminants of concern for the Type II shallow monitoring wells and Table 4 summarizes the last date an individual monitoring well exhibited groundwater contaminant concentrations above the 2L GWQS.

It is important to note that the shallow groundwater conditions have not been evaluated within the vicinity of the former LCH-4034 USTs and product lines.

4.2.2.2 Deep Conditions

The most recent estimated plume boundaries of the deep conditions from the November 2003 sampling event along with the plume boundaries from the CAP are shown for BTEX, Naphthalene and MTBE on Figures 5, 7, and 9. As can be seen from the data, a slight detection of BTEX was observed from the November 2003 data in one 32-foot deep monitoring well, MW-21. These results are consistent with the historical data collected for the deep conditions. The maximum concentrations of dissolved petroleum constituents identified in groundwater from previous sampling events are presented on Table 2B. Table 4 summarizes the last date that each monitoring well detected a contaminant of concern above the 2L GWQS.

4.3 SYSTEM SUITABILITY

4.3.1 Free-Phase Product

As previously stated, free-phase product has historically been reported present within monitoring well MW-11 by JA Jones. JA Jones utilized AFVR and passive recovery methods to recover accumulated free-phase product. No measurable thickness of free-phase product has been identified in any of the monitoring wells at the subject site since E&E began operation of the system in 2003.

Free-phase product was noted to be present in the vicinity of the former LCH-4034 USTs during UST closure activities in 2002. The presence of free-phase product has not been confirmed since UST closure activities; therefore, additional assessment activities are necessary to address the possibility of

free-phase product at this location. The current remedial system will not be adequate at removing free-phase product if identified.

4.3.2 Soil

As previously stated, no additional soil assessments have been conducted in the areas in which exceedances of the TPH were reported within the CAP. Therefore, the remediation system suitability in the reduction of the soil contamination cannot be determined as of preparation of this RAO & RCAP. The implemented remedial system is a method that has historically been successful in soil restoration.

4.3.3 Groundwater

In order to effectively evaluate the current remediation system suitability in regards to groundwater quality, a discussion of the shallow and deep conditions is provided in the following sections.

4.3.3.1 Shallow Conditions

The shallow groundwater contamination concentrations appear to have been reduced significantly by the active remediation system and only the shallow groundwater in the vicinity of monitoring wells MW-1, MW-2 and MW-3 remain with contaminant concentrations in excess of the 2L GWQS. Based on a review of the system performance and the reduced levels of groundwater contamination, the remediation system appears to have been beneficial to the reduction of the Contaminants of Concern (COCs) established in the CAP. However, the shallow groundwater conditions in the vicinity of the former LCH-4034 USTs has not been evaluated as of the preparation of this RAO & RCAP.

4.3.3.2 Deep Conditions

The contaminant concentrations in the deep groundwater contamination have only been slightly impacted by BTEX. Based on the shallow depth of the biosparge well system, the remediation system is not effective in the reduction of the COCs at depth. However, based on an evaluation of the present levels of contamination the deep contamination appears to be naturally attenuating and degrading.

5.0 REMEDIATION MODIFICATIONS AND ALTERNATIVES

5.1 REGULATORY FRAMEWORK EVALUATION

The remedial goals for the site were based on the regulations current at the time and presented in the CAP. Current applicable remedial requirements for the contamination associated with the LCH-4015 ASTs is based on the corrective action requirements per 15A NCAC 2L .0106 which became effective on January 2, 1998 and the requirements in the NCDENR 2000 Guidelines. Current applicable remedial requirements for contamination associated with the LCH-4034 USTs is based on the corrective action requirements per 15A NCAC 2L.0115 which became effective on January 2, 1998 and the requirements in the NCDENR 2001 Guidelines. Per the General Assembly of the North Carolina Session Law 2003-352, House Bill 897 (House Bill 897), "...a mixed plume of contamination that results from releases of petroleum from both an underground storage tank and an aboveground storage tank or other source may be cleaned up under the risk-based cleanup rules applicable to releases from petroleum underground storage tanks..." Therefore, pending determination of the extent of contamination from the LCH-4034 USTs, the regulatory framework for the entire LCH-4015 site may be based on the Risk Based Corrective Actions. As such, reclassification of the site based on current risk factors would be necessary.

A Risk Classification and Land Use Form, as presented in the 2001 Guidelines was completed as part of this work 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, if the site is regulated under the Risk Based Corrective Actions then CATLIN concludes that the subject site meets the criteria for classification as a Low Risk and Residential Land Use site.

5.2 REVISED CONCEPTUAL SITE MODEL

5.2.1 Groundwater Depth and Flow Direction

JA Jones obtained depth to groundwater measurements from selected Type II (shallow) and Type III (deep) 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 and reported by JA Jones, have historically indicated a general groundwater flow direction toward the north with flow components toward the south and southwest. Therefore, no change to the groundwater flow characteristics is necessary in the revised conceptual model.

5.2.2 Potential Receptors

Potential receptors have been re-evaluated during the preparation of this RAO & RCAP using the Risk Classification and Land Use Form in Appendix E. The receptor survey performed as part of this plan identified the following receptors within 1,500 feet of the site:

- An unnamed creek is located approximately 1,000 feet southeast of the site.
- An additional unnamed creek is located approximately 1,300 feet north of the site.
- A potable water supply well LCH-4009 is located approximately 1,300 feet southeast of the site. Groundwater samples collected from 50 feet deep Type III monitoring wells at the site have historically been reported below detection limits for all parameters analyzed. Well construction information of potable water supply well LCH-4009 was not available as of the preparation of this RAO & RCAP, however, the Well Head Protection Plan Update (2002) stated that the well was installed in 1942 and is 134 feet deep with the pump depth set at 85 feet below ground surface.
- It is important to note that potable water supply well LCH-4006, referenced in Section 2.1.3 of this report, is no longer in service.
- According to the Well Head Protection Plan Update (2002), the site is located within a potential wellhead protection area.
- The closest residence is approximately 150 feet east of the site.
- The LCH-4015 project site contains the following public assembly places: a community center, convenience store with gasoline/diesel dispensers, post office, YMCA, and laundromat.
- Athletic fields are located approximately 1,200 feet north of the site.

Based on information provided by MCB, Camp Lejeune, these potential receptors have not been reported to have been impacted by the potentially contaminated soils and/or groundwater. The potential receptors are presented on the Site Location Map on Figure 1.

5.2.3 Contaminants of Concern

The groundwater COC as established in the CAP are still relevant; however, JA Jones and Shaw have reported additional contaminants since system start-up in their annual monitoring reports above the 2L GWQS. Therefore, the COCs have been expanded to include the additional contaminants reported by JA Jones and Shaw. The revised COCs have been summarized on Table 3.

5.3 ALTERNATIVE REGULATORY MECHANISMS

5.3.1 Revised Target Cleanup Goals

Soil contamination was identified during the CAP in the vicinity of the LCH-4015 ASTs based on TPH-Gasoline and TPH-Diesel Action Levels. The soil contamination associated with the LCH-4015 ASTs will be based on the 2000 Guidelines (TPH action levels).

Soil contamination was not identified during the LCH-4034 UST closure activities. However, soil samples were not collected along the product lines in accordance with the 2001 Guidelines. The soil analysis associated with the LCH-4034 USTs will be based on the Risk Based Corrective Actions (Residential MSCCs).

As such, additional soil sampling is recommended for both areas (see Section 7.1 Implementation Plan). The Revised Target Cleanup Concentrations are shown on Table 3.

If the site is regulated under the Risk Based Corrective Actions, then based on the low risk classification, the revised applicable cleanup concentration for groundwater is the GCLs. Otherwise, the groundwater contamination associated with the LCH-4034 USTs will be based on the Risk Based Corrective Actions (GCLs) and the contamination associated with the LCH-4015 ASTs will be based on the 2000 Guidelines (2L GWQS). Current maximum contaminant levels along with 2L GWQS and GCLs are presented in Table 3.

5.3.2 Notice of Residual Petroleum

A Notice of Residual Petroleum is not required at this time for this site. However, pending the resolution of the LCH-4034 UST site, a Notice of Residual Petroleum (NRP) may be required.

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

As previously stated, the implemented remedial system has been effective in reducing the contaminant levels for the shallow groundwater contamination and potentially the soil contamination. The intermediate deep groundwater has had minimal contaminant levels that have fluctuated. Therefore, the existing remedial approach appears to be effective in achieving the remedial objectives. However, the presence of free-phase product has not been substantiated or delineated in the area of the former LCH-4034 USTs. Therefore, an alternative remedial technology may be necessary to address free-phase product, if present. This alternative remedial technology will be based on the approval and results of the optimization recommendations presented within the Section 6.0 of this report.

5.5 COST EFFICIENCY EVALUATION

A detailed cost efficiency evaluation was not performed for this site based on the recommendations within Section 6.0 of this report. A cost efficiency evaluation will be required in the future if the remediation system requires expansion based on the results from the completion of the recommendations within this report.

6.0 OPTIMIZATION RECOMMENDATIONS

6.1 FREE-PHASE PRODUCT

As previously stated, free-phase product was detected during the LCH-4034 UST removal activities within the trench for the former product lines. CATLIN recommends the following to delineate the free-phase product, if present:

- Install temporary piezometers at 20 feet intervals along the former product line by use of DPT. Temporary piezometers can be installed within the borehole after collection of the soil samples proposed in Section 6.2 of this report.
- Gauge temporary piezometers monthly for three months.
- If free-phase product is observed, then the lateral extent of the free-phase product plume should be delineated and additional groundwater assessment activities should be initiated.
- These additional assessment activities should be utilized to determine if plume co-mingling has occurred between the release from ASTs at Building LCH-4015 and the USTs at Building LCH-4034. If co-mingling has occurred, it is advantageous to recommend corrective actions at the site be completed in accordance with the UST Section Guidelines.

6.2 SOIL

As previously stated, soil contamination within the Building LCH-4015 portion of the project site reported within the CAP has not been re-sampled since start-up of the current remedial system. These soil samples were collected from MW-1, MW-14, MW-19, and MW-20. Therefore, samples should be collected at these locations based on the Revised Target Cleanup Concentration discussed in Section 5.3.1 of this report. The analysis to be performed for each of these samples is as follows: MW-1 and MW-20 should be sampled for TPH-Gasoline, MW-14 should be sampled for TPH-Diesel, and MW-19 should be sampled for TPH-Gasoline and TPH-Diesel.

Additionally, it appears that soil samples were not collected during the abandonment of the former product lines associated with Building LCH-4015 ASTs. Therefore, samples should be collected along the length of the former product lines associated with the LCH-4015 ASTs at a 20-foot interval for TPH- Gasoline and TPH-Diesel analyses.

Based on the Revised Target Cleanup Concentrations discussed within Section 5.3.1 of this report for the Building LCH-4034 portion of the project site, CATLIN recommends collecting additional soil samples for Risk Based Analysis along the length of the former product lines of the LCH-4034 USTs at a 20-foot interval. 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 approximate location of the proposed soil samples is provided on the attached Figure 10. The results of these soil samples (both areas) should be presented within a Soil Assessment Report in general accordance with the 2000 and 2001 Guidelines. Pending the findings of the free-phase product delineation, this report may be required to be submitted to both the Groundwater Section and the UST Section of NCDENR.

6.3 GROUNDWATER

6.3.1 Shallow Conditions

Based on the Remedial Effectiveness Evaluation and the Revised Target Cleanup Concentrations discussed within Sections 4.2.2.1 and 5.3.1, respectively of this report, CATLIN recommends the continued operation of the biosparge/SVE system until the 2L GWQS are met or the site is approved for Risk Based Corrective Actions.

Specific details to meet the 2L GWQS are as follows:

- The following shallow monitoring wells have not indicated the presence of groundwater contamination in excess of the 2L GWQS

for a period greater than one year: MW-4 through MW-12, and MW-14 through MW-17. Therefore, CATLIN recommends that these monitoring wells be eliminated from the periodic monitoring efforts. These monitoring wells should remain in-place until site closure is achieved.

- The remaining shallow monitoring wells (MW-1 through MW-3, and MW-18) should be sampled on a semi-annual basis until groundwater concentrations are below 2L GWQS for one year for the contaminants of concern listed in Table 3 by use of the following methods: EPA Method 602 with xylenes, EPA Method 625 for PAH compounds only and Standard Prep Method 3030C for lead. At the conclusion of this one-year time frame, the biosparge/SVE wells should be shut down in the area of these shallow monitoring wells.
- Upon shut down of the biosparge/SVE system, all of the shallow monitoring wells should be placed on a quarterly closeout-monitoring schedule for one year.
- The groundwater samples collected for lead should be collected using low-flow sampling techniques.
- The results of the sampling should be presented within an Annual Groundwater Monitoring Report. The implemented shut down activities should also be summarized in this report.

Specific details to meet the Risk Based Corrective Action or GCLs are as follows:

- Currently, groundwater contaminant levels are below the GCLs. Therefore, the biosparge/SVE system may be shut down immediately.
- Upon shut down of the biosparge/SVE system, all of the shallow monitoring wells should be placed on a quarterly closeout-monitoring schedule for one year.
- The groundwater samples collected for lead should be collected using low-flow sampling techniques.
- The results of the sampling should be presented within an Annual Groundwater Monitoring Report. The implemented shut down activities should also be summarized in this report.

6.3.2 Deep Conditions

CATLIN recommends the following to address the deep groundwater contamination at the LCH-4015 project site:

- Based on the close proximity and depth of the potable water supply well LCH-4009, identified during the receptor survey (See Section 5.2.2), CATLIN recommends that MCB, Camp Lejeune shut down and abandon this potable water supply well as soon as possible.
- The existing deep monitoring wells should be sampled on a semi-

annual basis for one year for the contaminants of concern listed in Table 3 by use of the following methods: EPA Method 602 with xylenes, EPA Method 625 for PAH compounds only and Standard Prep Method 3030C for lead. The detection limits for all compounds should be below the 2L GWQS. The basis for the one-year time frame is to evaluate the effect of shutting down potable water supply well LCH-4009 on the deep contaminant plume. At the conclusion of this one-year time frame the following scenarios should be evaluated:

1. If the concentrations of the contaminants of concern are below the 2L GWQS, then the monitoring wells should be evaluated for abandonment or the necessity for additional sampling for the same parameters.
2. If the concentrations of the contaminants of concern are above the 2L GWQS, then the active remediation activities should be re-evaluated. This re-evaluation may include a pilot test conducted to design an air sparge system.
 - The groundwater samples collected for lead should be collected using low-flow sampling techniques.
 - The results of the sampling should be presented within an Annual Groundwater Monitoring Report. The implemented shut down activities should also be summarized in this report.

7.0 IMPLEMENTATION

7.1 IMPLEMENTATION PLAN

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

- Initiate the shut down and abandonment of potable water supply well LCH-4009.
- Submittal of RAO & RCAP to the Groundwater and UST Sections of NCDENR for approval of recommendations.
- Continue to operate the biosparge and SVE system.
- Initiate the investigation of free-phase product at the former LCH-4034 USTs.
- Collection of recommended soil samples.
- Preparation of a Report of Findings. This report will include the findings of the additional soil and free-phase product assessment activities. If additional soil contamination is detected, then a Soil Cleanup Plan will be required; otherwise, proceed with site closure activities.
- Pending the findings of the free-phase product and soil assessment reports, request approval for the implementation of the Risk Based Corrective Actions under the UST Section.
- Implementation of the recommended sampling strategy for the shallow

groundwater and deep groundwater conditions.

- Preparation of the Annual Groundwater Monitoring Reports.

7.2 SCHEDULE FOR IMPLEMENTATION

The shutdown and abandonment of the potable water supply well LCH-4009 is recommended to be implemented immediately. Free-phase product delineation, collection of the additional soil samples and implementation of the groundwater sampling strategy are recommended to commence immediately upon plan approval by appropriate State authorities. The semi-annual sampling activities should begin at the time of the next scheduled sampling event. The Annual Monitoring reports should be submitted following the December operation period.

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

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TABLES

TABLE 1						
WELL CONSTRUCTION DATA						
BUILDING LCH-4015 MARINE CORPS BASE CAMP LEJEUNE, NC						
WELL I.D.	DATE CONSTRUCTED	TOP OF CASING (Feet)	DIAMETER (Inches)	TOTAL DEPTH (Feet Below TOC)	CASING INTERVAL (Feet Below TOC)	SCREEN INTERVAL (Feet Below TOC)
TYPE II MONITORING WELLS						
MW-1	11/1/1994	29.78	4	14.9	0.5 - 4.9	4.9 - 14.9
MW-2	11/1/1994	29.24	4	12.3	0.3 - 2.3	2.3 - 12.3
MW-3	11/1/1994	32.02	4	12.1	+2.7 - 2.1	2.1 - 12.1
MW-4	11/1/1994	32.68	4	11.9	+3.1 - 1.9	1.9 - 11.9
MW-5	11/2/1994	29.35	4	11.7	0.4 - 1.7	1.7 - 11.7
MW-6	6/14/1995	29.11	2	12.5	0.18 - 2.5	2.5 - 12.5
MW-7	6/13/1995	29.67	2	12.5	0.27 - 2.5	2.5 - 12.5
MW-8	6/14/1995	28.79	2	12.5	0.14 - 2.5	2.5 - 12.5
MW-9	6/13/1995	28.35	2	12.5	0.26 - 2.5	2.5 - 12.5
MW-10	6/14/1995	28.28	2	12.5	0.34 - 2.5	2.5 - 12.5
MW-11	6/14/1995	29.18	2	12.5	0.0 - 2.5	2.5 - 12.5
MW-12	6/28/1995	29.23	2	12.5	0.7 - 2.5	2.5 - 12.5
MW-14	6/28/1995	29.45	2	12.5	0.28 - 2.5	2.5 - 12.5
MW-15	6/28/1995	29.26	2	12.5	0.28 - 2.5	2.5 - 12.5
MW-16	6/28/1995	29.62	2	12.5	0.37 - 2.5	2.5 - 12.5
MW-17	6/29/1995	29.76	2	12.5	0.32 - 2.5	2.5 - 12.5
MW-18	6/15/1995	29.86	2	12.5	0.37 - 2.5	2.5 - 12.5
TYPE III MONITORING WELLS						
MW-13	6/26/1995	NA	2	50.0	0.35 - 45.0	45.0 - 50.0
MW-19	6/15/1995	29.98	2	50.0	0.26 - 45.0	45.0 - 50.0
MW-20	6/20/1995	29.16	2	50.0	0.25 - 45.0	45.0 - 50.0
MW-21	6/6/2001	29.85	2	31.5	0.5 - 26.5	26.5 - 31.5
MW-22	6/7/2001	29.14	2	32.0	0.5 - 27.0	27.0 - 32.0
MW-23	6/6/2001	29.86	2	32.0	0.5 - 27.0	27.0 - 32.0

1. Casing and screen intervals are assumed to be based on measurements from Ground Surface.

2. Total depth based on maximum depth of screen interval.

3. Top of casing provided by SHAW ENVIRONMENTAL, INC. Annual Monitoring Report, August 2000 to August 2001, dated February 2004.

4. Data for casing and screen intervals obtained from Well Construction Records.

5. NA = Not Available.

6. TOC = Top Of Casing.

7. + indicates "stick-up" casing.

TABLE 2 A

SUMMARY OF HISTORICAL GROUNDWATER CONTAMINANTS OF CONCERN

TYPE II MONITORING WELLS

REMEDIAL ACTION OPTIMIZATION

&

REVISED CORRECTIVE ACTION PLAN

BUILDING LCH-4015

MARINE CORPS BASE, CAMP LEJEUNE, NC

COMPOUND	2L GWQS (µg/L)	GCL (µg/L)	MAXIMUM CONCENTRATIONS (µg/L)						
			CAP DATA	1998	1999	2000	2001	2002	2003
TYPE II MONITORING WELLS									
1,2 Dichlorobenzene	620	72,500	1.5	NA	NA	NA	NA	NA	NA
Benzene	1	5,000	8,850.0	4,500	7,200	760	550	820	297.0
Methyl Tert-Butyl Ether	200	200,000	256.0	760	330	220	53	94	39.2
Ethylbenzene	29	29,000	2,070.0	2,000	2,100	1,100	990	740	420.0
Total Xylenes	530	87,500	9,960.0	6,800	8,100	2,290	1,900	1,080	1,070.0
Toluene	1,000	257,500	256.0	3,900	4,500	320	340	92	95.3
Naphthalene	21	15,500	677.0	460	350	4,400	320	300	170.0
1-Methylnaphthalene	NE	NE	271.0	180	320	13,000	630	410	36.8
2-Methylnaphthalene	28	12,500	345.0	220	140	11,000	320	360	47.0
Acenaphthene	80	2,120	15.2	BQL	14	510	48	49	<20.0
Acenaphthylene	210	1,965	NA	NA	NA	NA	NA	NA	<20.0
Benzo(a)anthracene	0.05	22	NA	NA	NA	NA	NA	NA	<20.0
Benzo(k)fluoranthene	0.47	0.47	9.4	NA	NA	NA	NA	NA	NA
Pyrene	210	210	ND	NA	NA	NA	NA	NA	<20.0
Fluorene	280	950	14.3	BQL	26	1,500	78	65	<40.0
Anthracene	2,100	2,100	10.5	NA	NA	NA	NA	NA	<20.0
Fluoranthene	280	280	ND	NA	NA	NA	NA	NA	<20.0
Phenanthrene	210	410	24.7	BQL	40	2,900	180	180	<20.0
Lead	15	15,000	42.7	NA	NA	NA	NA	NA	NA

NE = Not established. Therefore, the NCGWQS for the constituent is the reporting limit.

ND = Not detected; see laboratory reports for applicable detection limits.

NA= Not Analyzed

J = Estimated concentration less than reporting limit.

BQL = Below Quantitation Limits.

Shading represents concentrations above 2L GWQS.

CAP Data provided by Law Engineering and Environmental Services, Inc.

Historical data obtained from the Shaw Environmental, Inc. Annual Monitoring Report - August 2000 to August 2001, dated February 2004.

2003 Data provided by Engineering & Environment, Inc.

All other compounds analyzed were below laboratory method/quantitation detection limits or historically below 2LGWQS.

TABLE 2 B

**SUMMARY OF HISTORICAL GROUNDWATER CONTAMINANTS OF CONCERN
TYPE III MONITORING WELLS**

**REMEDIAL ACTION OPTIMIZATION
&
REVISED CORRECTIVE ACTION PLAN
BUILDING LCH-4015**

MARINE CORPS BASE, CAMP LEJEUNE, NC

COMPOUND	2L GWQS (µg/L)	GCL (µg/L)	MAXIMUM CONCENTRATIONS (µg/L)						
			CAP DATA	1998	1999	2000	2001	2002	2003
TYPE III MONITORING WELLS									
1,2 Dichlorobenzene	620	72,500	ND	NA	NA	NA	NA	NA	NA
Benzene	1	5,000	0.4	BQL	BQL	BQL	10	2	33.8
Methyl Tert-Butyl Ether	200	200,000	ND	BQL	BQL	BQL	BQL	BQL	3.6
Ethylbenzene	29	29,000	0.5	BQL	BQL	BQL	BQL	1	505.0E
Total Xylenes	530	87,500	1.9	BQL	BQL	BQL	BQL	BQL	16.9
Toluene	1,000	257,500	1.0	BQL	BQL	BQL	BQL	BQL	2.1
Naphthalene	21	15,500	ND	BQL	BQL	BQL	BQL	48	<5.1
1-Methylnaphthalene	NE	NE	3.8	BQL	BQL	BQL	BQL	BQL	<5.1
2-Methylnaphthalene	28	12,500	ND	BQL	BQL	BQL	BQL	BQL	<5.1
Acenaphthene	80	2,120	3.3	BQL	BQL	BQL	BQL	12	8.8
Acenaphthylene	210	1,965	NA	NA	NA	NA	NA	NA	<5.1
Benzo(a)anthracene	0.05	22	NA	NA	NA	NA	NA	NA	<5.1
Benzo(k)fluoranthene	0.47	0.47	ND	NA	NA	NA	NA	NA	NA
Pyrene	210	210	ND	NA	NA	NA	NA	NA	<5.1
Fluorene	280	950	ND	BQL	BQL	BQL	BQL	BQL	<5.1
Anthracene	2,100	2,100	ND	NA	NA	NA	NA	NA	<5.1
Fluoranthene	280	280	ND	NA	NA	NA	NA	NA	<5.1
Phenanthrene	210	410	NA	BQL	BQL	BQL	BQL	BQL	<5.1
Lead	15	15,000	20.6	NA	NA	NA	NA	NA	NA

NE = Not established. Therefore, the NCGWQS for the constituent is the reporting limit.

ND = Not detected; see laboratory reports for applicable detection limits.

NA= Not Analyzed

J = Estimated concentration less than reporting limit.

BQL = Below Quantitation Limits.

E = Estimated concentration above the linear quantitation range.

Shading represents concentrations above 2L GWQS.

CAP Data provided by Law Engineering and Environmental Services, Inc.

2003 Data provided by Engineering & Environment, Inc.

Historical data obtained from the Shaw Environmental, Inc. Annual Monitoring Report - August 2000 to August 2001, dated February 2004.

All other compounds analyzed were below laboratory method/quantitation detection limits or historically below 2LGWQS.

TABLE 3
REVISED TARGET CLEANUP CONCENTRATIONS
REMEDIAL ACTION OPTIMIZATION
&
REVISED CORRECTIVE ACTION PLAN
BUILDING LCH-4015
MARINE CORPS BASE, CAMP LEJEUNE, NC

MEDIUM	COMPONENT	CURRENT CONDITIONS	TARGET CLEANUP	
Free Product	Gasoline/Diesel	No measureable thickness	<1/8"	
Vadose Zone Soil	LCH-4015 Portion of Site			
	TPH - Diesel	Unknown	40	
	TPH - Gasoline	Unknown	10	
	LCH-4034 Portion of Site			
	EPA Method 8260, EPA Method 8270, MADEP VPH/EPH	Unknown	Residential Maximum Soil Contaminant Concentrations	
TYPE II MONITORING WELLS				
GROUNDWATER			GCL	2L GWQS
	1,2 Dichlorobenzene	NA	72,500	620
	Benzene	297.0	5,000	1
	Methyl Tert-Butyl Ether	39.2	200,000	200
	Ethylbenzene	420.0	29,000	29
	Total Xylenes	1,070.0	87,500	530
	Toluene	95.3	257,500	1,000
	Naphthalene	170.0	15,500	21
	1-Methylnaphthalene	36.8	NE	NE
	2-Methylnaphthalene	47.0	12,500	28
	Acenaphthene	<20.0	2,120	80
	Acenaphthylene	<20.0	1,965	210
	Benzo(a)anthracene	<20.0	22	0.05
	Benzo(k)fluoranthene	NA	1	0.047
	Pyrene	<20.0	210	210
	Fluorene	<40.0	950	280
	Anthracene	<20.0	2,100	2,100
	Fluoranthene	<20.0	280	280
	Phenanthrene	<20.0	410	210
	Lead	NA	15,000	15

TABLE 3
REVISED TARGET CLEANUP CONCENTRATIONS
REMEDIAL ACTION OPTIMIZATION
&
REVISED CORRECTIVE ACTION PLAN
BUILDING LCH-4015
MARINE CORPS BASE, CAMP LEJEUNE, NC

MEDIUM	COMPONENT	CURRENT CONDITIONS	TARGET CLEANUP	
TYPE III MONITORING WELLS				
GROUNDWATER			GCL	2L GWQS
	1,2 Dichlorobenzene	NA	72,500	620
	Benzene	33.8	5,000	1
	Methyl Tert-Butyl Ether	3.6	200,000	200
	Ethylbenzene	505.0E	29,000	29
	Total Xylenes	16.9	87,500	530
	Toluene	2.1	257,500	1,000
	1-Methylnaphthalene	<5.1	15,500	21
	2-Methylnaphthalene	<5.1	NE	NE
	Naphthalene	<5.1	12,500	28
	Acenaphthene	<5.1	2,120	80
	Acenaphthylene	<5.1	1,965	210
	Benzo(a)anthracene	<5.1	22	0.05
	Benzo(k)fluoranthene	NA	1	0.047
	Pyrene	<5.1	210	210
	Fluorene	<5.1	950	280
	Anthracene	<5.1	2,100	2,100
	Fluoranthene	<5.1	280	280
	Phenanthrene	<5.1	410	210
	Lead	NA	15,000	15

NE = Not established. Therefore, the NCGWQS for the constituent is the reporting limit.

NA= Not Analyzed

J = Estimated concentration less than reporting limit.

E = Estimated concentration above the linear quantitation range.

2003 Data provided by Engineering & Environment, Inc.

CAP Data provided by Law Engineering and Environmental Services, Inc.

Historical data obtained from the Shaw Environmental, Inc. Annual Monitoring Report - August 2000 to August 2001, dated February 2004.

Soil target cleanup concentrations are in mg/kg.

Groundwater current conditions and target cleanup concentrations are in ug/L.

Groundwater cleanup concentrations are pending evaluation of potentially co-mingled plumes.

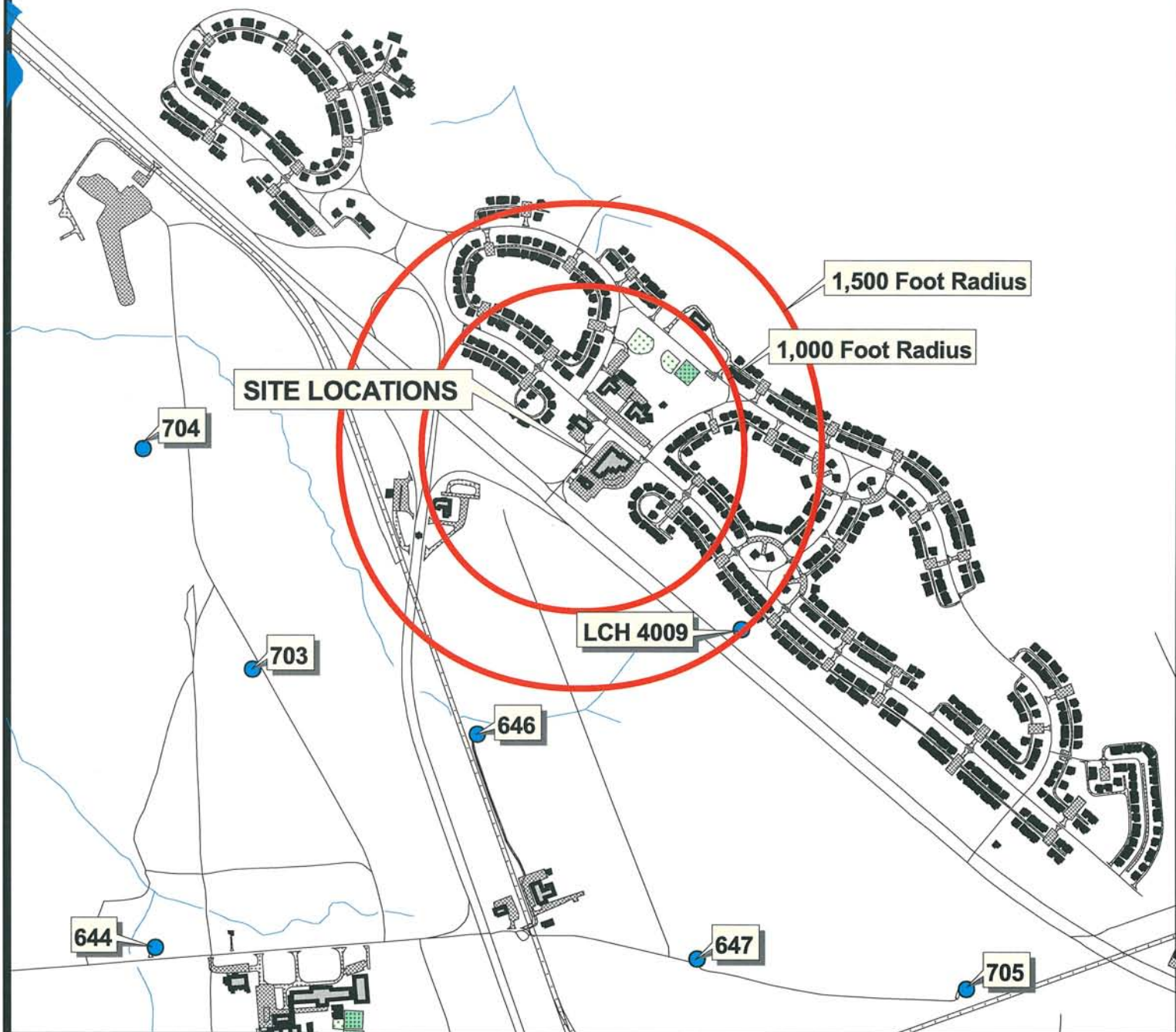
TABLE 4	
STATUS OF MONITORING WELLS COMPARED TO CONTAMINANTS OF CONCERN	
BUILDING LCH-4015 MARINE CORPS BASE CAMP LEJEUNE, NC	
WELL I.D.	LAST DATE ABOVE 2L GWQS
TYPE II MONITORING WELLS	
MW-1	11/19/2003
MW-2	11/18/2003
MW-3	11/18/2003
MW-4	8/19/1999
MW-5	5/22/2002
MW-6	7/6/1995
MW-7	2/22/2000
MW-8	NEVER ABOVE
MW-9	2/21/2002
MW-10	NEVER ABOVE
MW-11	12/11/2003
MW-12	NEVER ABOVE
MW-14	NEVER ABOVE
MW-15	NEVER ABOVE
MW-16	NEVER ABOVE
MW-17	NEVER ABOVE
MW-18	3/17/2003
TYPE III MONITORING WELLS	
MW-13	NEVER ABOVE
MW-19	NEVER ABOVE
MW-20	NEVER ABOVE
MW-21	6/3/2003
MW-22	NEVER ABOVE
MW-23	2/21/2002

Last date above 2L GWQS = The last date in which a contaminant of concern was above the 2L GWQS for each monitoring well.

2003 Data provided by Engineering & Environment, Inc.

Historical data obtained from the Shaw Environmental, Inc. Annual Monitoring Report - August 2000 to August 2001, dated February 2004.

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



DRAWN BY: CHECK BY: APPROVED BY:

THW

SVH

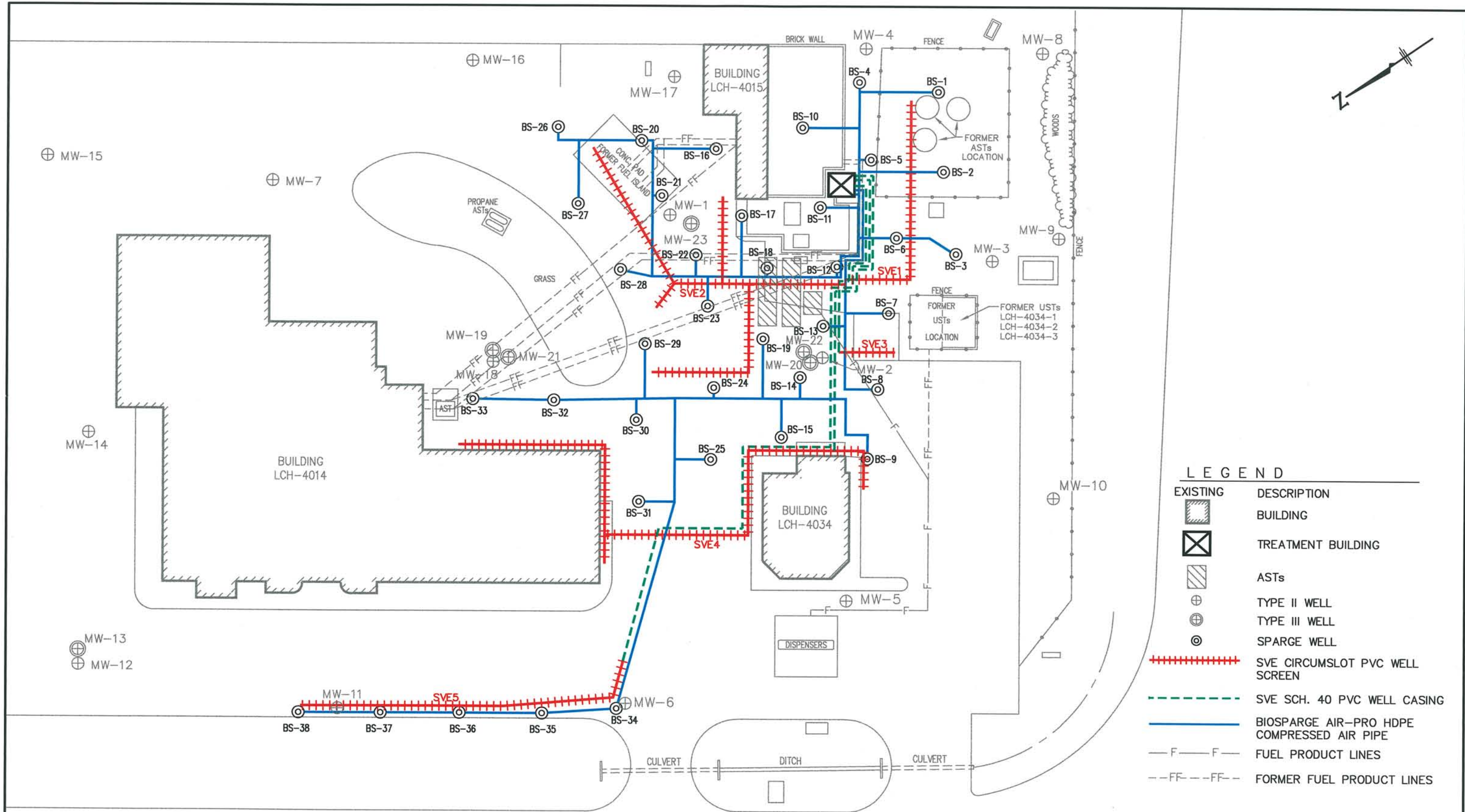
CATLIN PROJECT No.: 203-063

SITE LOCATION MAP

BUILDING LCH-4015

FIGURE

1

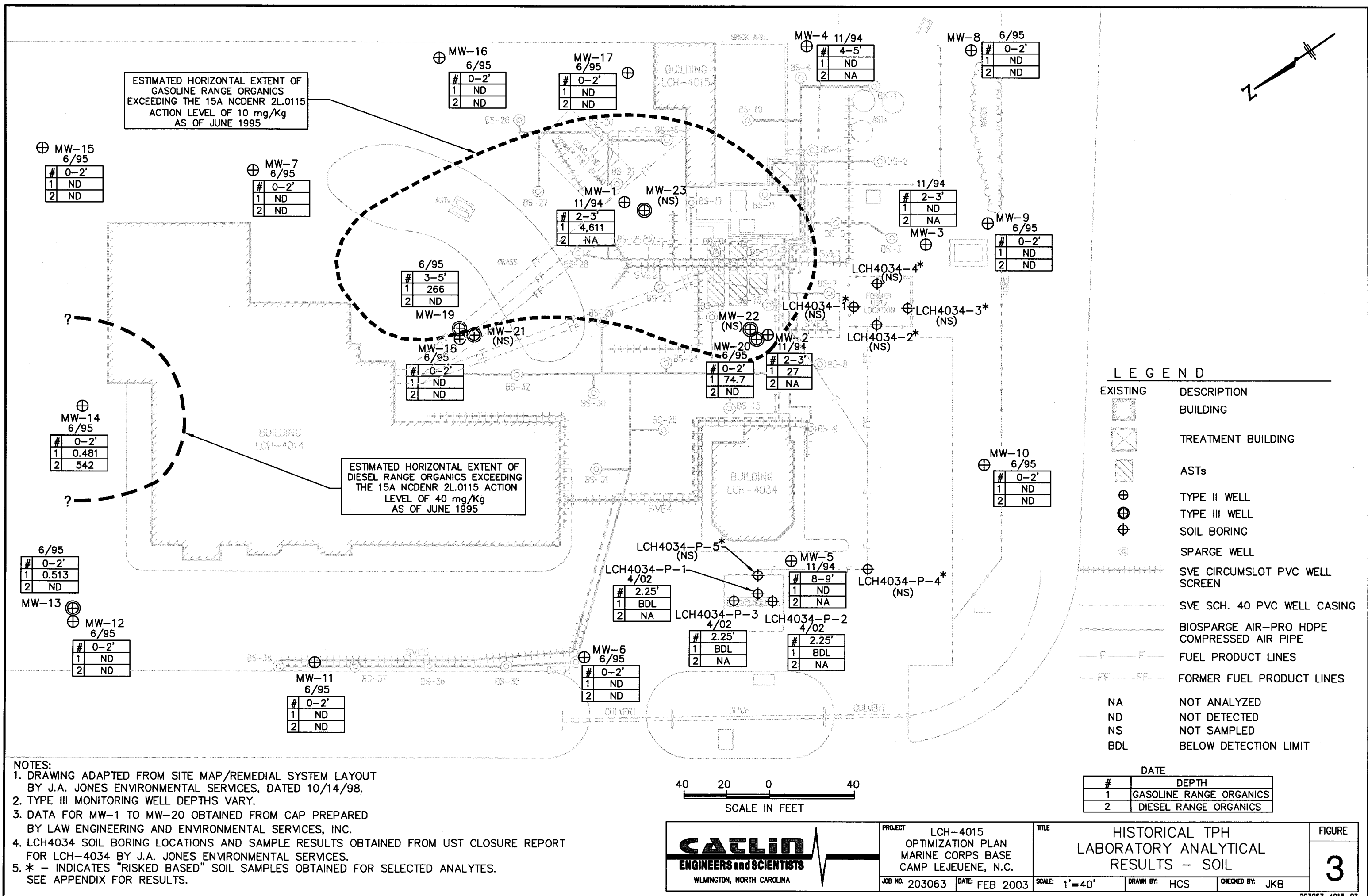


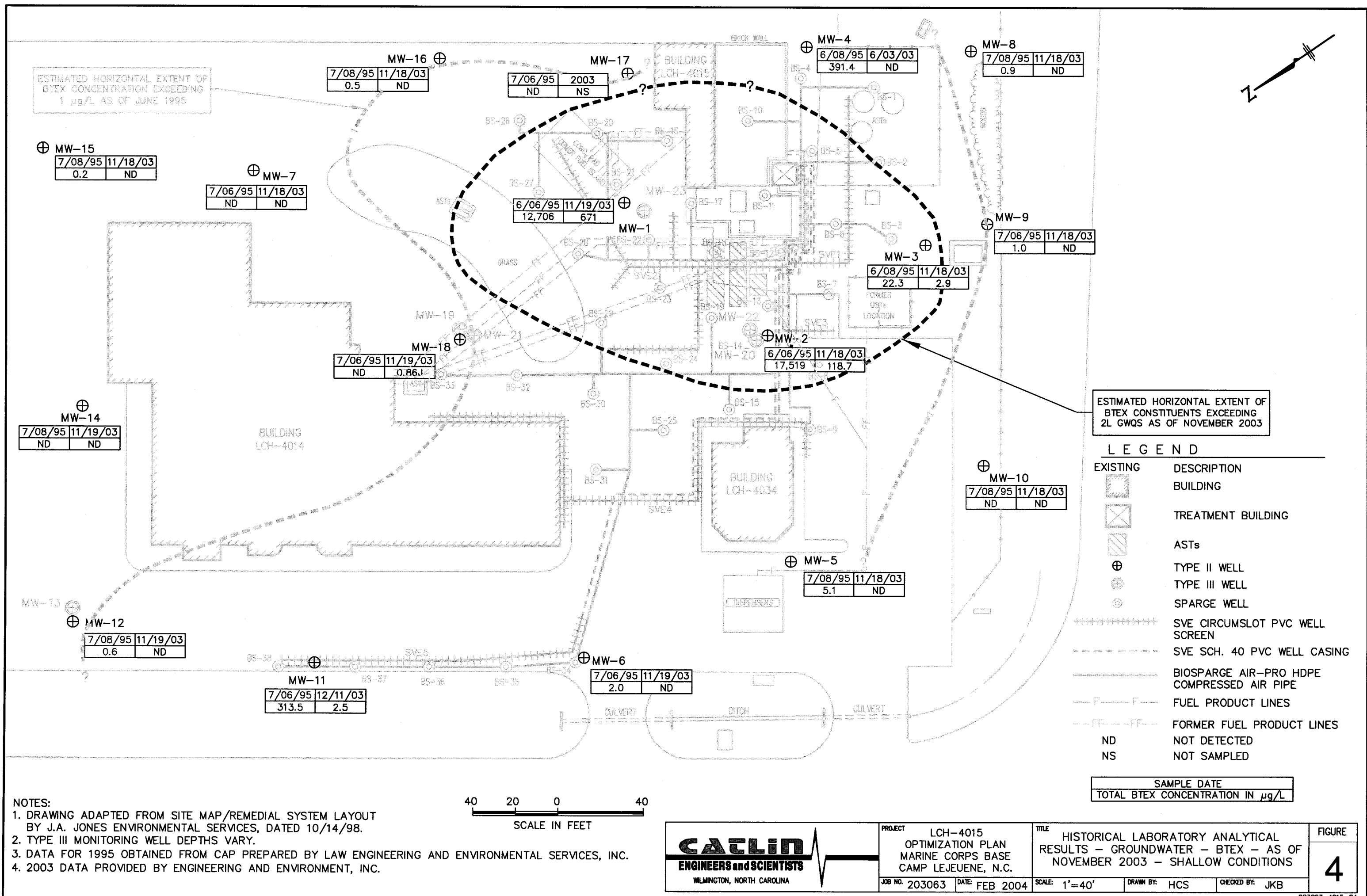
NOTES:

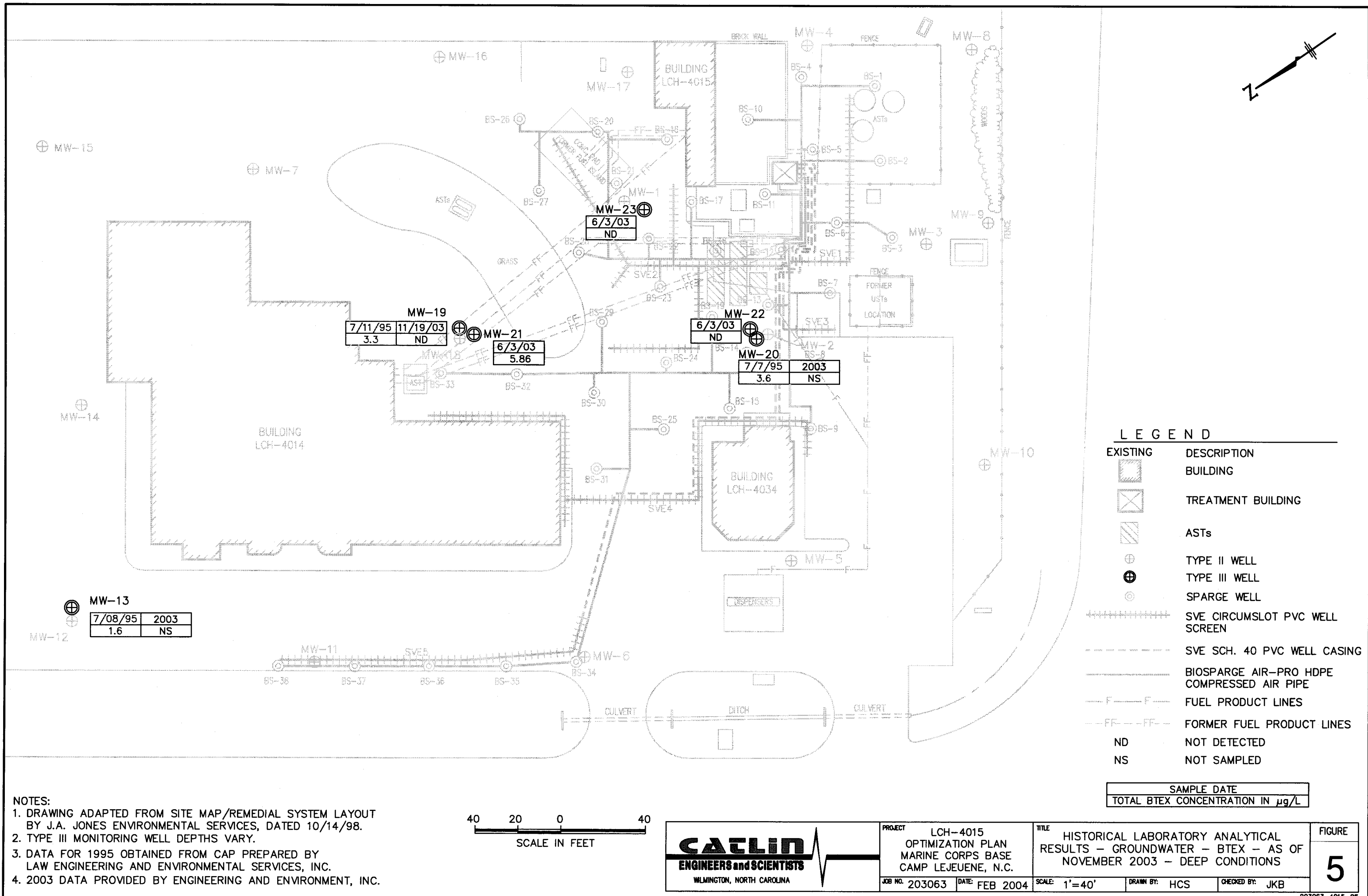
1. DRAWING ADAPTED FROM SITE MAP/REMEDIAL SYSTEM LAYOUT BY J.A. JONES ENVIRONMENTAL SERVICES, DATED 10/14/98.
2. TYPE III MONITORING WELL DEPTHS VARY. SEE WELL CONSTRUCTION DATA TABLE FOR SPECIFIC WELL INFORMATION.
3. FORMER FUEL LINES AT BUILDING LCH-4015 ADAPTED FROM SITE MAP BY LAW ENGINEERING, DATED JUNE 1996.

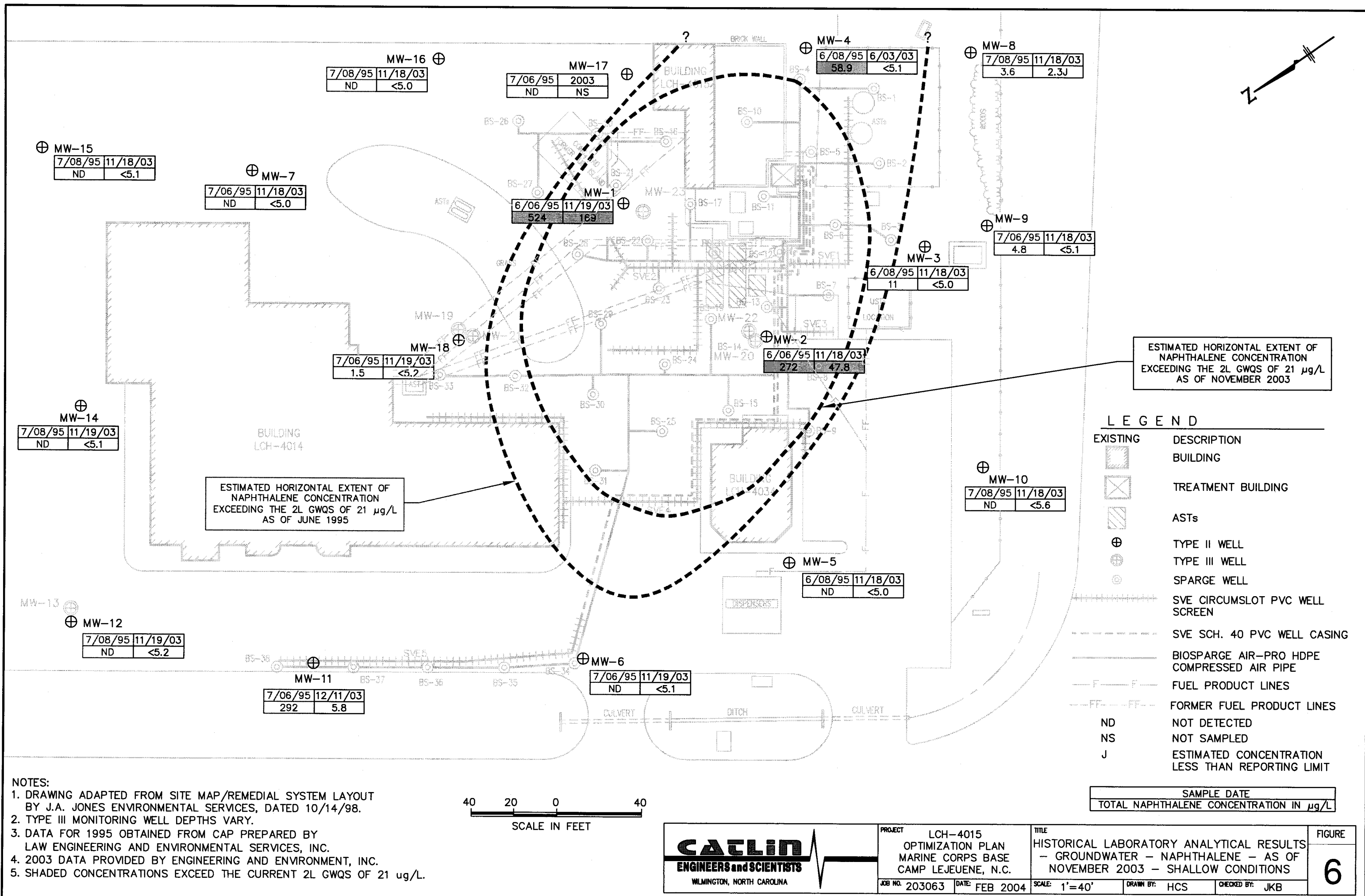
40 20 0 40
SCALE IN FEET

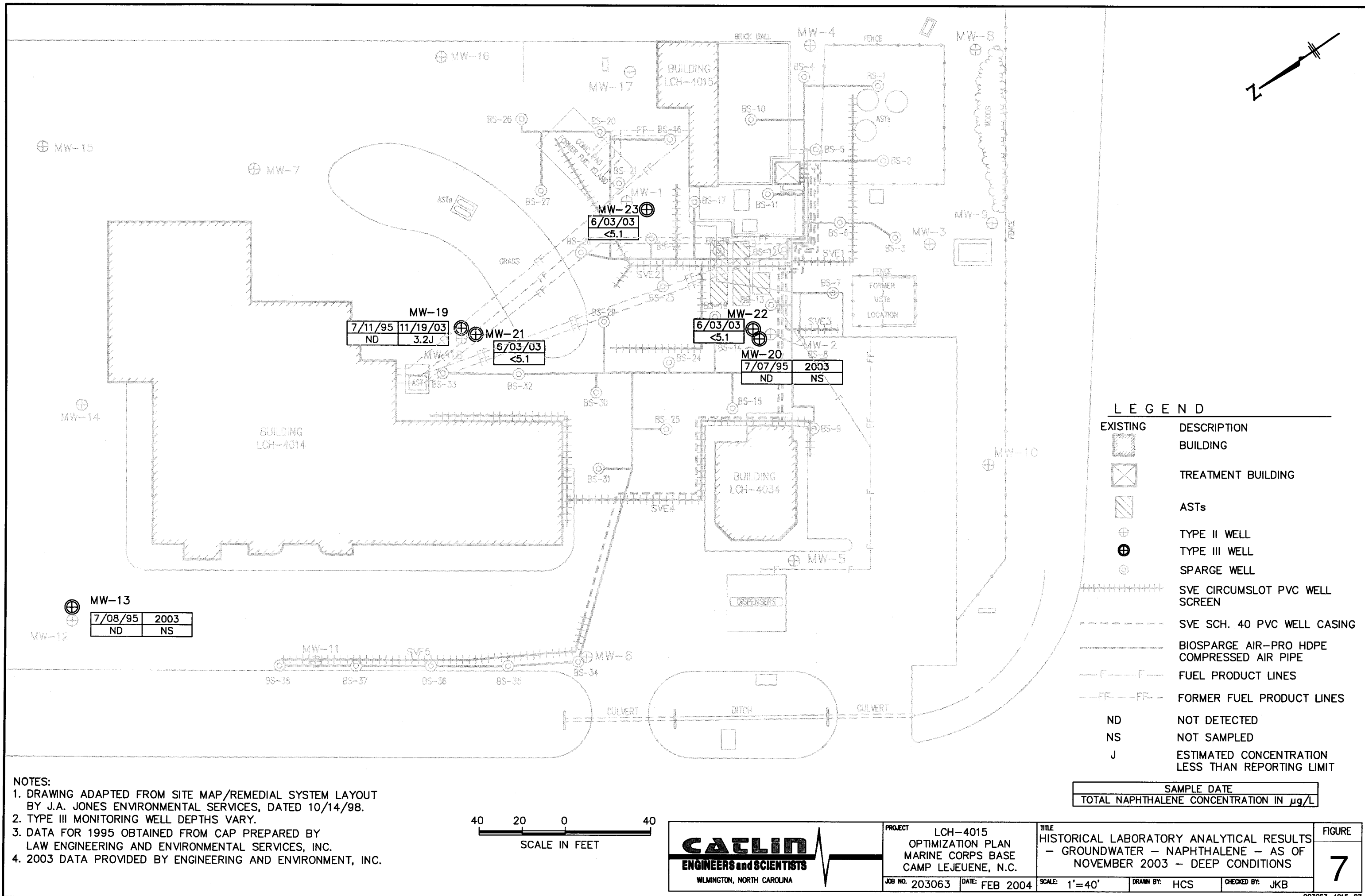
CAELIN ENGINEERS and SCIENTISTS WILMINGTON, NORTH CAROLINA	PROJECT LCH-4015 OPTIMIZATION PLAN MARINE CORPS BASE CAMP LEJEUNE, N.C.		TITLE SITE MAP WITH CURRENT REMEDIAL LAYOUT		FIGURE 2
	JOB NO. 203063	DATE: FEB 2004	SCALE: 1"=40'	DRAWN BY: HCS	CHECKED BY: JKB

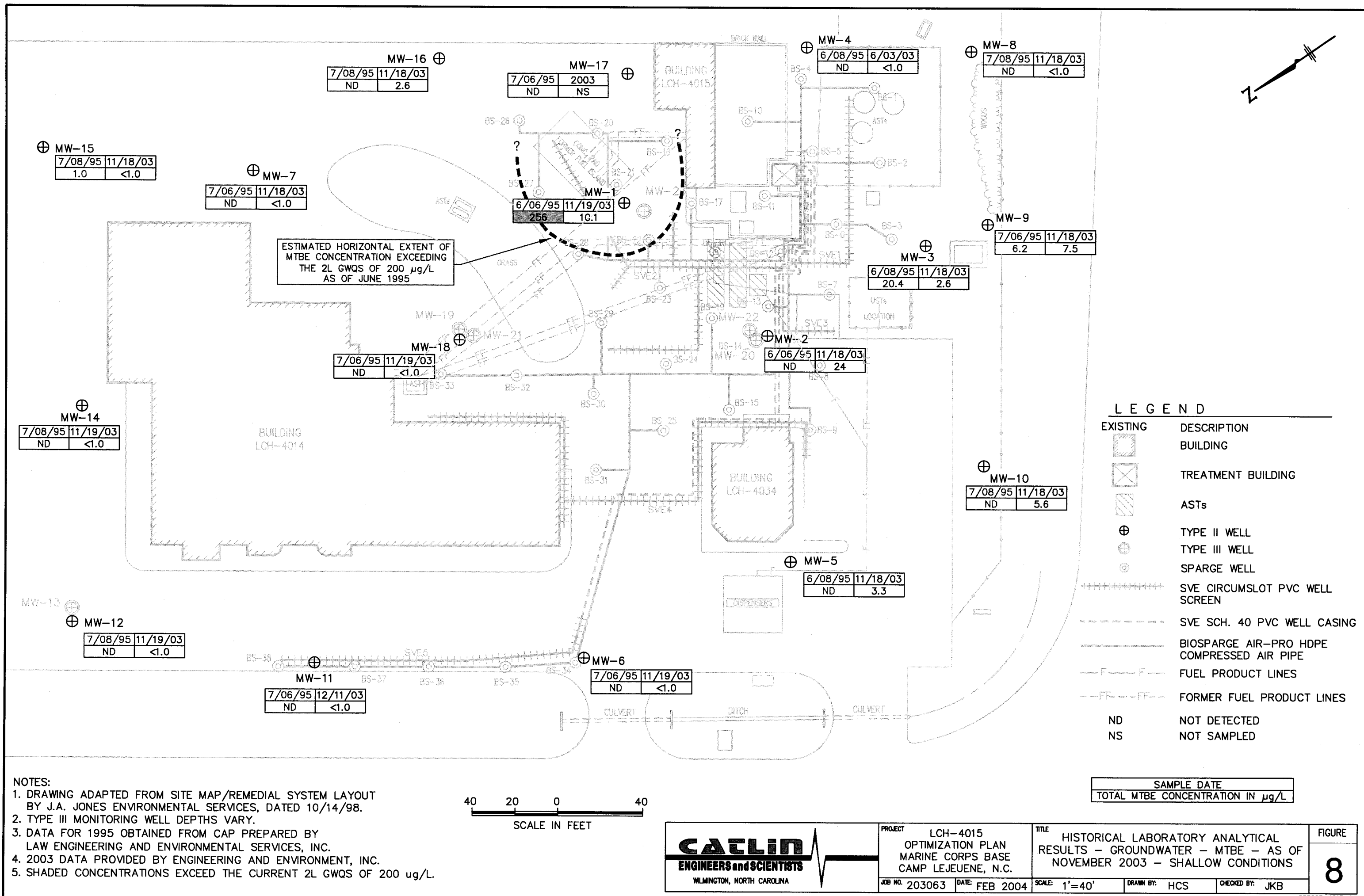


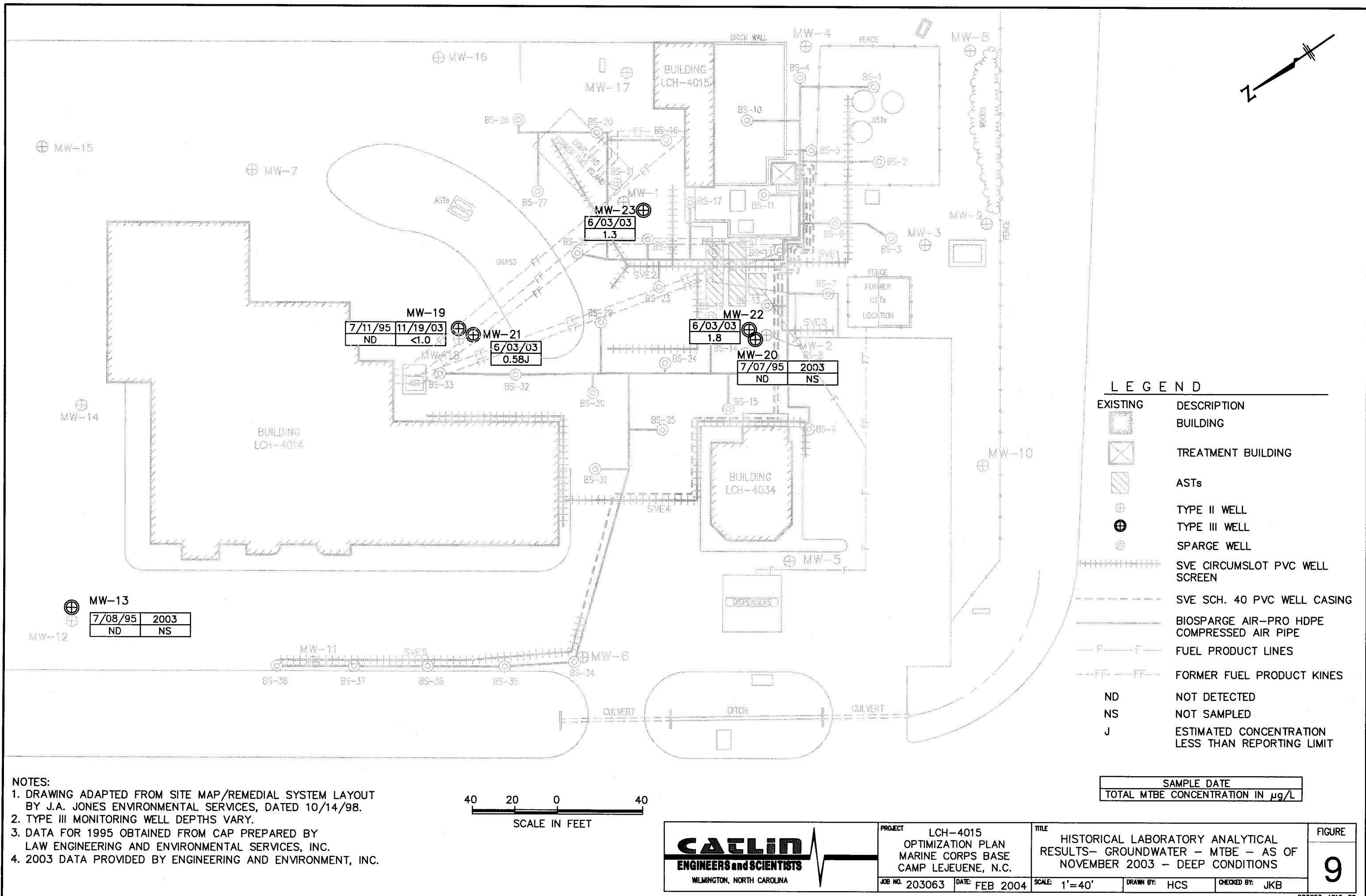


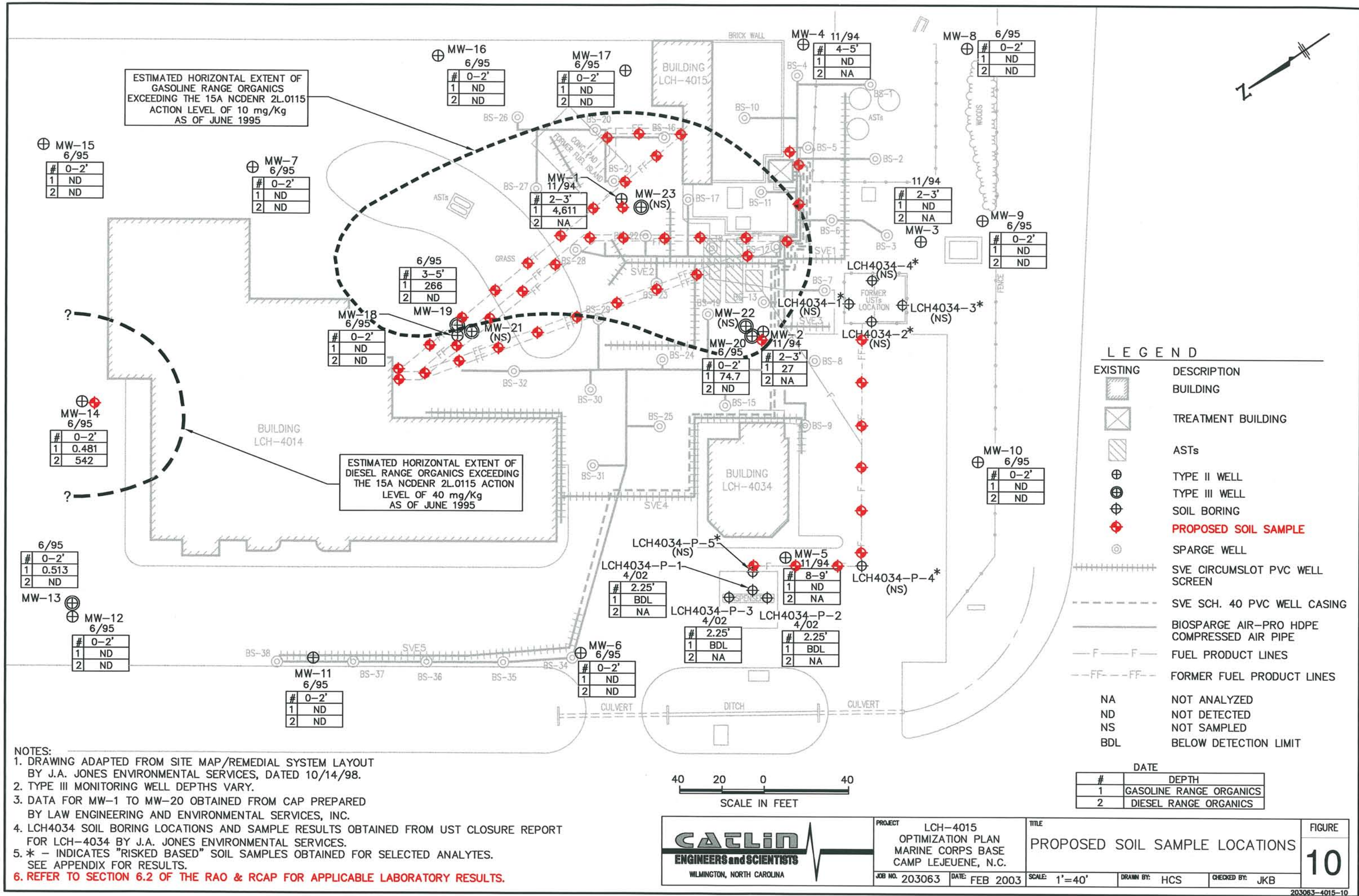












APPENDIX A

TARGET CLEANUP CONCENTRATIONS FROM CAP



- d. Receptor Protection:
 (i) Imminent threat to receptors was not identified.
- e. Target Cleanup Concentrations:

MEDIUM	COMPONENT	EXISTING CONDITIONS (MAXIMUM CONCENTRATIONS)	TARGET CLEANUP
Vadose Zone Soil	TPH 5030/3550	Vadose zone soil contamination was measured at a maximum concentrations 4,611 mg/kg for EPA Method 5030 and 542 mg/kg for EPA Method 3550. The areal extent for high boiling point fuels is estimated to be approximately 24,000 square feet and the depth ranges from 1 to 2 feet bls. The areal extent for low boiling point fuels is limited to a soil sample from monitoring well MW-14.	≤ 40 mg/kg by EPA Method 5030 ≤ 160 mg/kg by EPA Method 3550
Groundwater	Benzene Ethylbenzene Xylenes MTBE Naphthalene 1-Methylnaphthalene 2-Methylnaphthalene Benzo(k)flouranthene	10,600 µg/l 2,960 µg/l 9,960 µg/l 256 µg/l 524 µg/l 271 µg/l 345 µg/l 9.4 µg/l	1 µg/l 29 µg/l 530 µg/l 200 µg/l 21 µg/l * * *

* The Groundwater Quality Standard for these compounds is the laboratory detection limit.

- f. Target Schedule:
- (i) Permit Applications: Permit applications will not be required. However, operation of the biosparge/vapor exhaust system will require written notification to the Air Quality Section of DEM.
- (ii) System Installation/Activation: Nine months after DEM's approval of CAP. See Drawing 2.1 for the CAP schedule.
- (iii) Monitoring: June 1998 through June 2024
- (iv) Project Completion: Lifetime of the biosparge/vapor exhaust system is estimated to be 16 years. However, if laboratory results from four consecutive quarterly sampling events indicate that contaminant concentration levels are less than or equal to target clean up levels, the remediation system will be turned off and monitoring will be terminated upon approval by DEM.

APPENDIX B

SUMMARY OF HISTORICAL SOIL LABORATORY RESULTS

LCH-4034 UST CLOSURE REPORT DATA

TABLES

Table 1

**Summary of Soil Sample Analytical Results
(4/24/02 Sampling Event)**

Sample ID	Date	Depth (ft bls)	TPH-GRO (ppm)
LCH4034-P-1	4/24/02	2.25	BDL
LCH4034-P-2	4/24/02	2.5	BDL
LCH4034-P-3	4/24/02	2.75	BDL

BDL --- Below Detection Limit

Table 2
Summary of Soil Analytical Results
(5/1/02 Sampling Event)

Sample ID	Date	Depth (ft)	COMPOUND CONCENTRATION (in ppm)																	
			C9-C22 Aromatics	C5-C8 Aliphatics	C9-18 Aliphatics	C19-C36 Aliphatics	N-Butylbenzene	Sec-Butylbenzene	Ethylbenzene	Isopropylbenzene	P-Isopropyltoluene	Naphthalene	N-Propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	2-Methylnaphthalene	Toluene	MTBE	Benzene	Total Xylenes
LCH4034-1	5/1/02	5														0.011	0.067		0.023	
LCH4034-2	5/1/02	5	322		360	170	0.42													
LCH4034-3	5/1/02	5																		
LCH4034-P-4	5/1/02	2.5	782	780	1360		61	14	350	30	8.3	180	170	860	300	15	710	15	49	1600
LCH4034-P-5	5/1/02	2.5	2			29								0.011	0.0085			0.029		0.0096
LCH4034-4	5/2/02	5	153	11	214	69	0.82					0.58		0.39						
Residential Soil Cleanup Levels	---		469	939	9386	93860	156	156	1560	1564	n/e	63	156	782	782	63	3200	156	22	32000
Industrial/ Commercial Soil Cleanup Levels	---		12264	24528	245280	#	4088	4088	40000	40880	n/e	1635	4088	20440	20440	1635	82000	4088	200	200000
Soil-to-Water Maximum Contaminant Concentration	---		34	72	3255	##	4	3	0.24	2	n/e	0.58	2	8	7	3	7	0.92	0.0056	5

Notes:

1. Only those compounds whose concentration is above Method Detection Limit are listed
2. A no-entry-cell indicates compound concentration below Method Detection Limit
3. # Health base level >100%
4. ## Considered immobile
5. n/e --- Not established

CAP DATA

TABLE 4.2
SUMMARY OF LABORATORY ANALYTICAL RESULTS
SOIL SAMPLES
COMPREHENSIVE SITE ASSESSMENT REPORT
BUILDING LCH-4015
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA
LAW ENGINEERING JOB NO. 30740-5-0500/PHASE 0096

SAMPLE LOCATION		LABORATORY RESULTS			
BORING IDENTIFICATION	SAMPLE DEPTH (FT.)	TPH GASOLINE (mg/Kg)	TPH DIESEL (mg/Kg)	pH	FLASH POINT <140°F
MW-6	0-2	ND	ND	NA	NA
MW-7	0-2	ND	ND	NA	NA
MW-8	0-2	ND	ND	NA	NA
MW-9	0-2	ND	ND	NA	NA
MW-9	0-2 DUP	ND	ND	NA	NA
MW-10	0-2	ND	ND	5.40	No
MW-11	0-2	ND	ND	NA	NA
MW-12	0-2	ND	ND	NA	NA
MW-13	0-2	0.513	ND	NA	NA
MW-14	0-2	0.481	542	NA	NA
MW-15	0-2	ND	ND	NA	NA
MW-16	0-2	ND	ND	NA	NA
MW-17	0-2	ND	ND	NA	NA
MW-18	0-2	ND	ND	7.01	No
MW-19	3-5	266	ND 1300 ¹	6.16	No
MW-20	0-2	74.7	ND	NA	NA

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

NA Not Analyzed

Shaded Area = Concentration detected above NC soil remediation guidelines

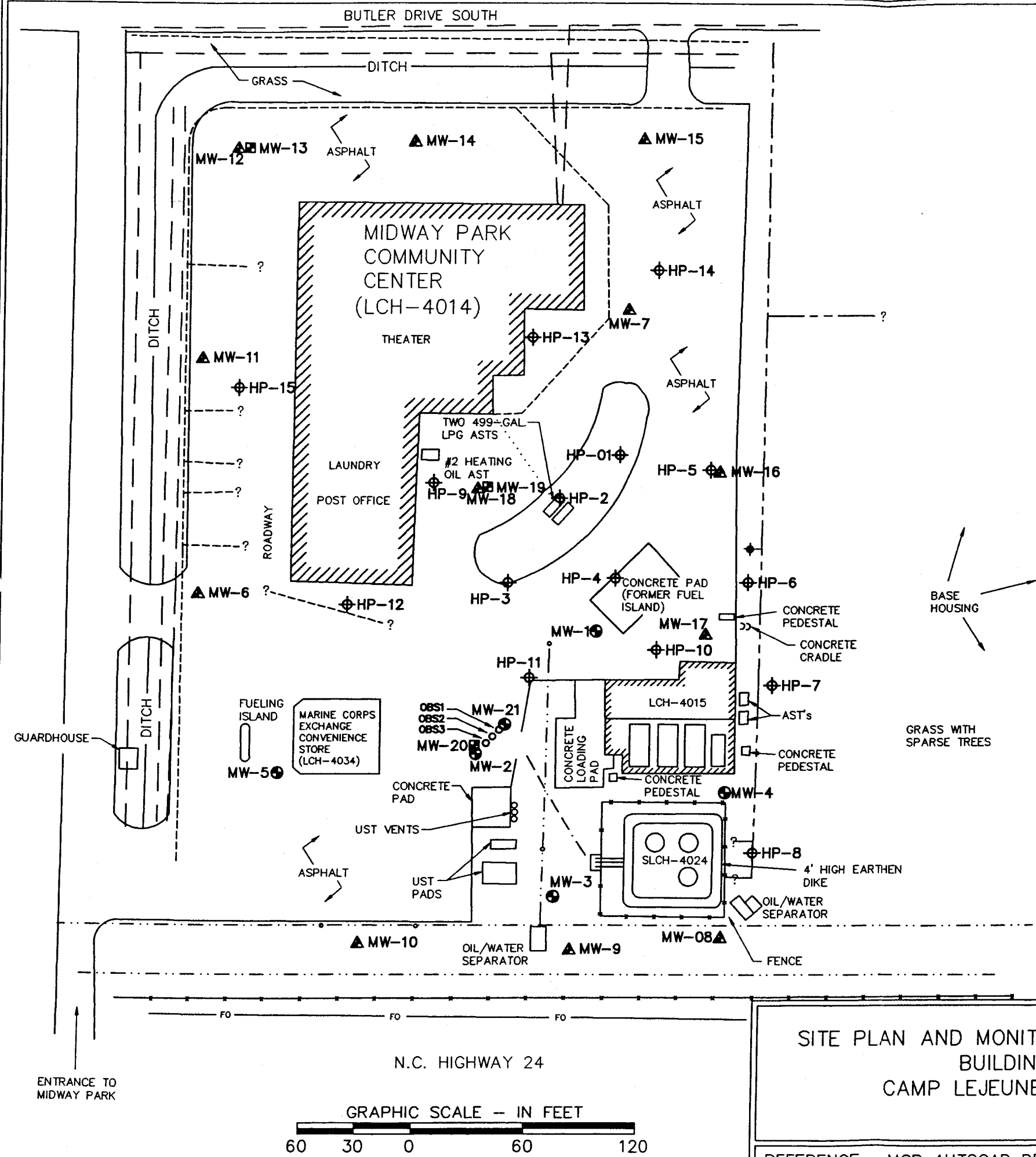
NC Action level for :

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

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

A detection limit of 1300 mg/Kg was necessary for this analysis due to the contaminated sample and matrix effects.

APPENDIX C
SELECTED FIGURES FROM CAP



LEGEND

- ▲ MW-7 LOCATION OF LAW ENGINEERING TYPE II MONITORING WELL
- MW-4 LOCATION OF LAW ENGINEERING TYPE III MONITORING WELL
- MW-3 LOCATION OF R.E. WRIGHT INC. TYPE II MONITORING WELL
- ⊕ HP-1 HYDROPUNCH LOCATION
- OBS1 TEMPORARY BIOSPARGE OBSERVATION WELL
- UNDERGROUND WATER LINES, VALVES
- UNDERGROUND SEWER LINES, MANHOLES
- UNDERGROUND ELECTRICAL LINES, LIGHTPOLES
- O/H — OVERHEAD ELECTRICAL LINES ADJACENT TO N.C. HIGHWAY 24
- UNDERGROUND PHONE LINES, PHONE BOX
- ? LOCATION OF UTILITY NOT KNOWN BY MCB FACILITIES PERSONNEL
- FO — FIBER OPTIC CABLE
- PROPANE FUEL LINE
- ⊗ FIRE HYDRANT
- FENCE

NOTES:

1. LCH-4015 IS THE MCB WELL DESIGNATION THAT PRECEEDS ALL HYDROPUNCH AND WELL LOCATIONS (OMITTED FOR BREVITY).
2. WELLS LCH-4015MW1 THROUGH LCH-4015MW5 INSTALLED BY R.E. WRIGHT AND ASSOCIATES, NOVEMBER 1994.
3. WELLS LCH-4015MW6 THROUGH LCH-4015MW20 INSTALLED BY LAW ENGINEERING, JUNE 1995.
4. WELL LCH-4015MW21 AND TEMPORARY BIOSPARGE OBSERVATION WELLS OBS1, OBS2, AND OBS3 INSTALLED BY LAW ENGINEERING, MAY 1996.
5. HYDROPUNCH GROUNDWATER SAMPLES OBTAINED BY LAW ENGINEERING, JUNE 1995.
6. DRAWING REFERENCED FROM MCB AUTOCAD DRAWING B08.DWG, TAYLOR, WISEMAN, AND TAYLOR DRAWING NO. LCH-4015, AND R.E. WRIGHT AND ASSOCIATES DRAWING NO'S., 94599-002-AA AND 94599-003A.
7. LCH-4015, SLCH-4024, THE MONITORING WELLS, AND THE HYDROPUNCH LOCATIONS WERE THE ONLY POINTS LOCATED IN THE FIELD BY THIS SURVEY. THE LOCATION OF LCH-4015, LCH-4034, THE USTS AND ASTS, DRIVEWAY, ROADWAY BOUNDARIES, COMMUNICATION LINES AND POWER LINES ARE APPROXIMATE. ALL OTHER LOCATIONS WERE OBTAINED FROM THE MCB AUTOCAD DRAWING AND MAY OR MAY NOT BE SHOWN CORRECTLY.

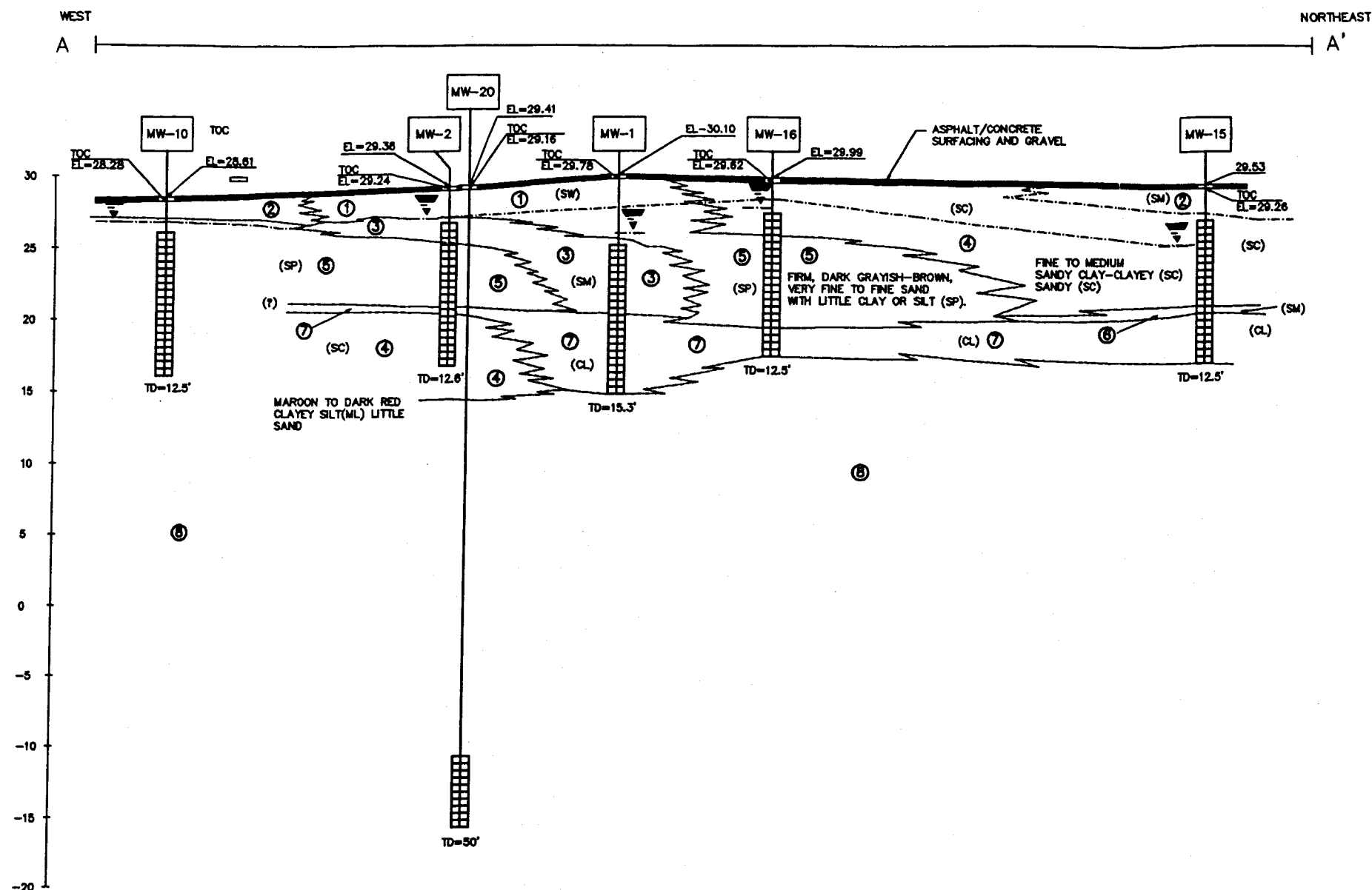
LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.
RALEIGH, NORTH CAROLINA

N0096C01

SITE PLAN AND MONITORING WELL LOCATION MAP
BUILDING LCH-4015
CAMP LEJEUNE, NORTH CAROLINA

DRAWN: <i>[Signature]</i>	DATE: JUNE 1996
DFT CHECK: <i>[Signature]</i>	SCALE: 1"=60'
ENG CHECK: <i>[Signature]</i>	JOB: 30740-5-0500/0135
APPROVAL: <i>[Signature]</i>	DWG: 1.1

REFERENCE: MCB AUTOCAD DRAWING B08.DWG, FIELD MEASUREMENTS.

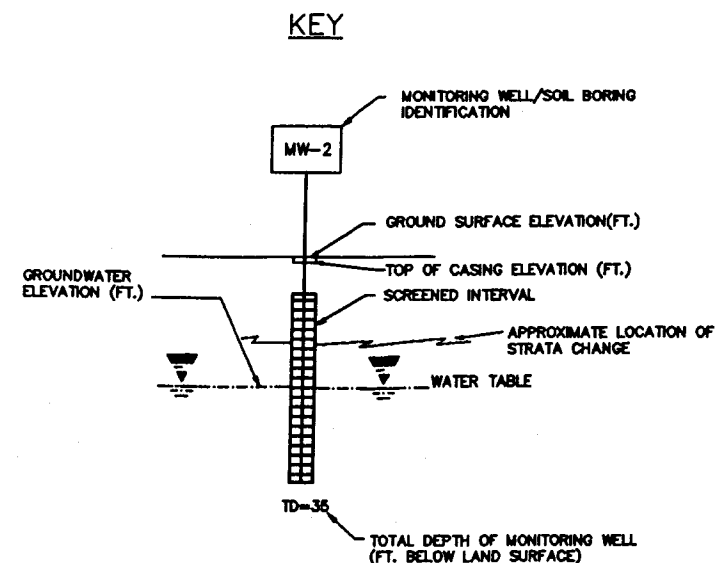


KEY

- 1.) LOOSE, ORGANIC, BROWNISH-BLACK, GRAVELLY, SILTY FINE TO MEDIUM SAND (SW) WITH STRONG ODOR.
- 2.) VERY LOOSE, ORGANIC, DARK BROWNISH-BLACK SILTY FINE TO MEDIUM SAND (SM).
- 3.) LOOSE, LIGHT TO MEDIUM-GRAY SILTY, VERY FINE TO FINE SAND (SM) WITH STRONG ODOR.
- 4.) FIRM, GRAY, FINE TO MEDIUM SANDY CLAY OR FIRM, CLAYEY, VERY FINE TO FINE SAND. (SANDY CLAYEY-CLAYEY SAND MIXTURE, SC).
- 5.) FIRM, DARK GRAYISH-BROWN, VERY FINE TO FINE SAND WITH LITTLE CLAY OR SILT (SP).
- 6.) FIRM, LIGHT TO DARK BROWNISH-BLACK SILTY FINE TO MEDIUM SAND (SM).
- 7.) FIRM TO VERY FIRM, GRAY TO DARK BLUISH-GRAY SILTY CLAY WITH SOME FINE TO MEDIUM SAND (CL).
- 8.) LIGHT GRAY AND GREEN SILTY FINE TO MEDIUM SAND (SM) WITH WEATHERED LIMESTONE FRAGMENTS PRESENT IN ZONES.

NOTES:

1. WELL LCH-4015MW1 IS INSTALLED 2.5 FEET DEEPER THAN OTHER TYPE II WELLS AT THE PROJECT SITE, INTO CLAYER AS A RESULT, THE WATER LEVEL WITHIN THIS WELL IS LOWER THAN THE OTHER TYPE II WELLS, AND NOT TYPICAL OF THE WATER TABLE.
2. LAW INTERPRETED THE SOIL DESCRIPTIONS OBTAINED BY R.E. WRIGHT FOR WELLS LCH-4015MW1 AND LCH-4015MW2 FOR INCLUSION IN THE CROSS SECTION.



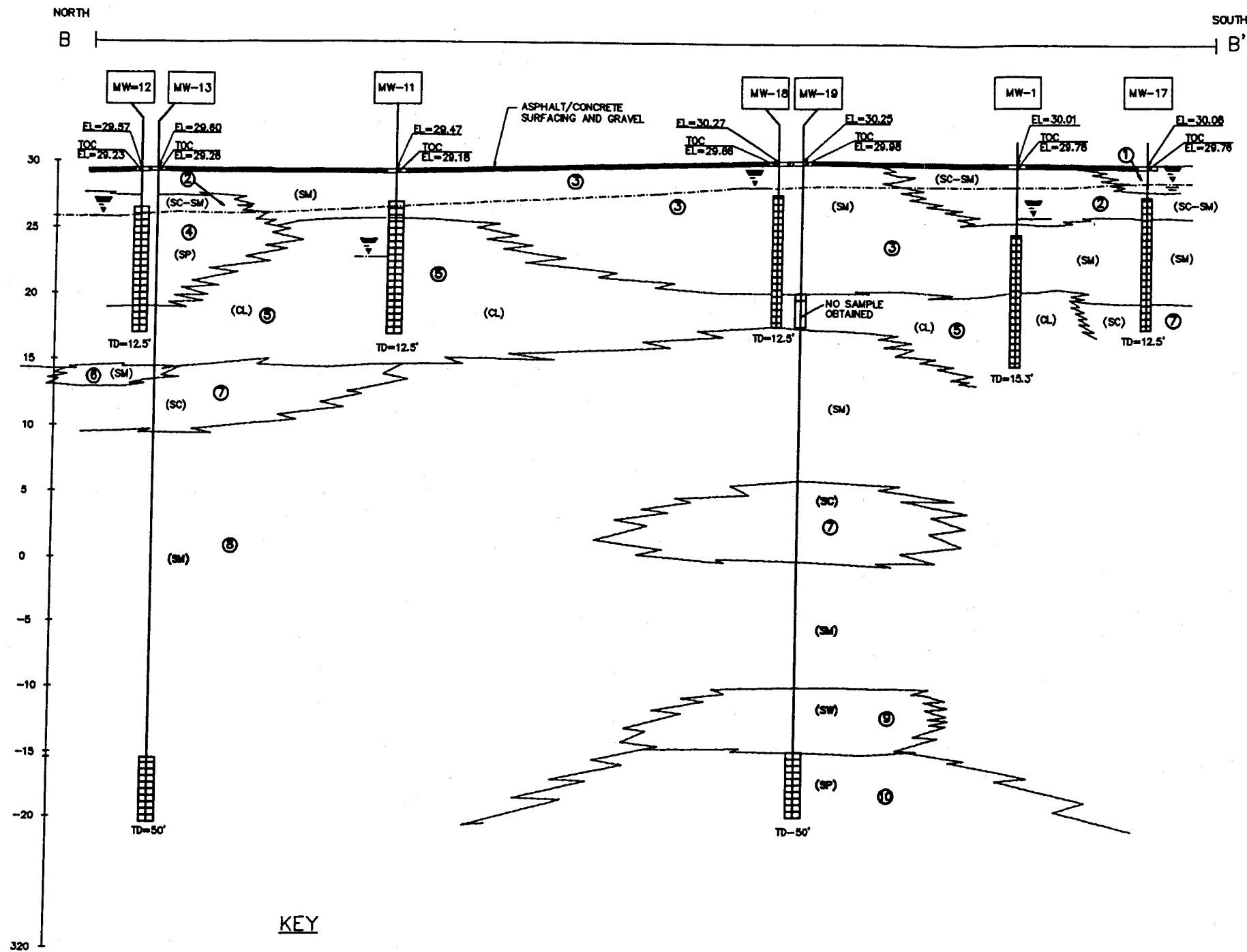
50500F14

LAW ENGINEERING
RALEIGH, NORTH CAROLINA

CROSS-SECTION A-A'
BUILDING LCH-4015
CAMP LEJEUNE, NORTH CAROLINA
CONTRACT N62470-93-D-4020

DRAWN: <i>RIF</i>	DATE: JUNE 1996
DFT CHECK: <i>MB</i>	SCALE: HOR: 1"=60' VER: 1"=10'
ENG CHECK: <i>EST</i>	JOB: 30740-5-0500/0096
APPROVAL: <i>EB</i>	DWG: 4.3

REFERENCE: TAYLOR, WISEMAN & TAYLOR SURVEY DATA, FIELD NOTES

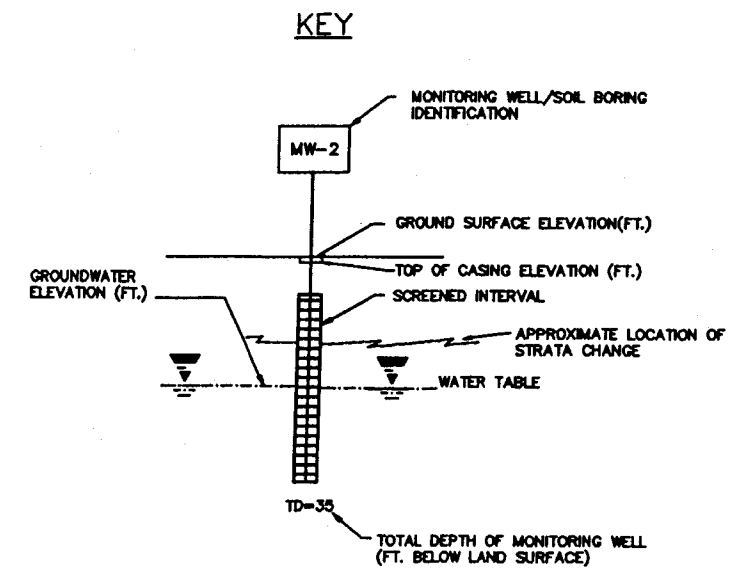


KEY

- 1.) LOOSE, DARK GRAY AND LIGHT BROWNISH-TAN, GRAVELLY, VERY FINE TO FINE SAND (SW).
- 2.) FIRM, LIGHT TO DARK BROWN CLAYEY, OCCASSIONALLY SILTY, FINE TO MEDIUM SAND (SC-SM).
- 3.) LOOSE, BLACK, ORGANIC, SILTY, FINE TO MEDIUM SAND (SM).
- 4.) FIRM, LIGHT TO MEDIUM-GRAY, VERY FINE TO FINE SAND WITH LITTLE SILT (SP).
- 5.) VERY FIRM, DARK GRAY, SILTY, FINE TO MEDIUM CLAY (CL).
- 6.) FIRM, MEDIUM TO DARK GRAY, SILTY, FINE TO MEDIUM SAND (SM).
- 7.) LOOSE, DARK GRAY, CLAYEY, FINE TO MEDIUM SAND OR SANDY CLAY (SC).
- 8.) LOOSE, DARK GRAY, SILTY, VERY FINE TO MEDIUM SAND (SM). WITH WEATHERED LIMESTONE FRAGMENTS BELOW 30 FEET BLS.
- 9.) LOOSE, LIGHT WHITISH-GRAY, GRAVELLY, SILTY, FINE TO MEDIUM SAND (SW) WITH CEMENTED, SHELLY LIMESTONE FRAGMENTS.
- 10.) FIRM, MEDIUM TO DARK GRAY, VERY FINE TO FINE SAND (SP) WITH SMALL AMOUNTS OF LIMESTONE FRAGMENTS.

NOTES:

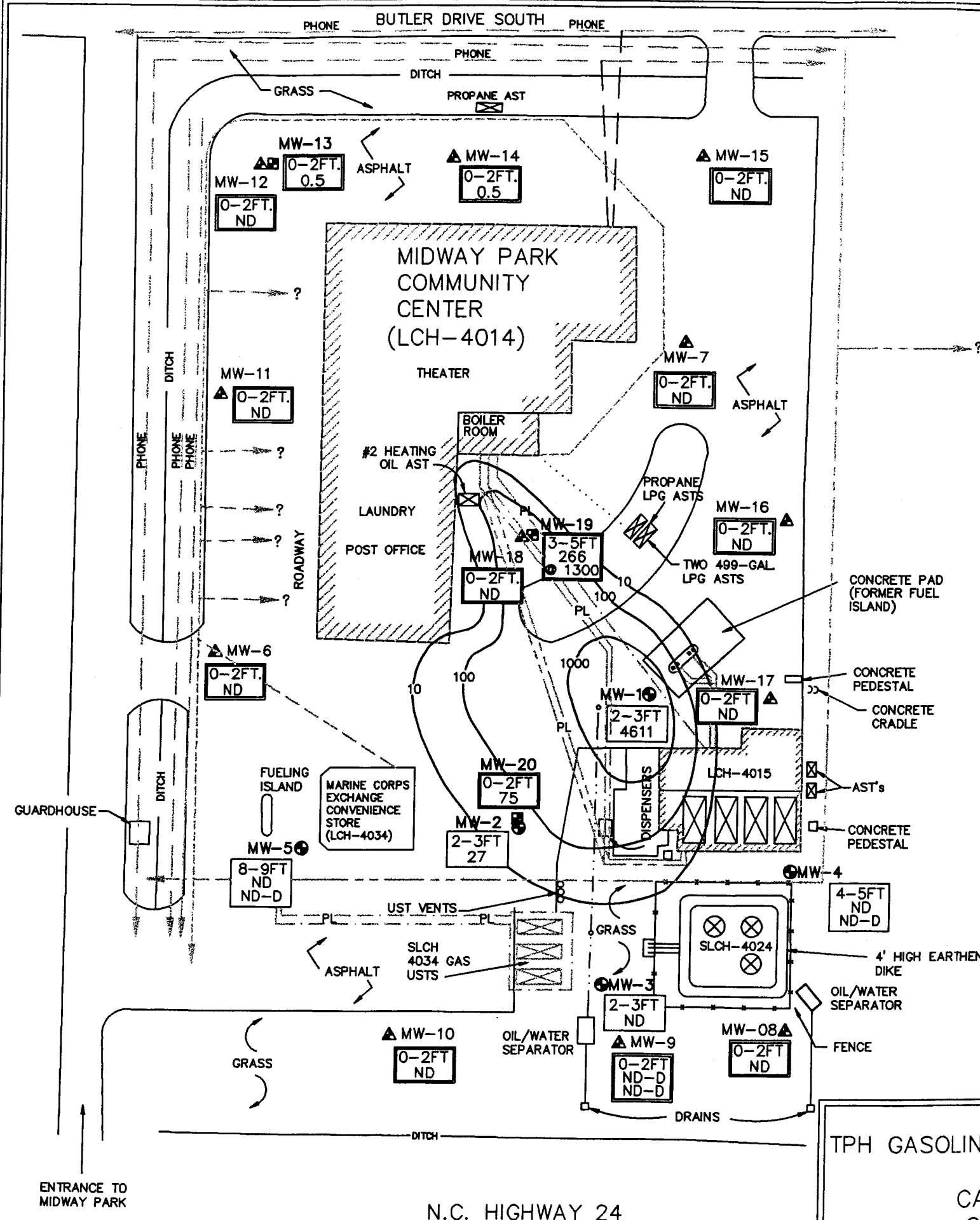
1. WELLS LCH-4015MW1 AND LCH-4015MW2 ARE SCREENED WITHIN GREATER THICKNESSES OF CLAY THAN THE SURROUNDING TYPE II WELLS, WHICH SCREEN SAND AND SILTY SAND. AS SUCH, THE WATER LEVELS IN THESE WELLS ARE LOW AND THE WELLS ARE SLOW TO RECOVER TO STATIC WATER LEVEL. THESE WATER LEVELS ARE NOT CONSIDERED TO BE REPRESENTATIVE OF THE WATER TABLE AT THE SITE.
2. LAW INTERPRETED THE SOIL DESCRIPTIONS OBTAINED BY R.E. WRIGHT FOR WELLS LCH-401MW1 AND LCH-4015MW2 FOR INCLUSION IN THE CROSS SECTION.



CROSS-SECTION B-B'
BUILDING LCH-4015
CAMP LEJEUNE, NORTH CAROLINA
CONTRACT N62470-93-D-4020

REFERENCE: TAYLOR, WISEMAN & TAYLOR SURVEY DATA, FIELD NOTES

 LAW ENGINEERING RALEIGH, NORTH CAROLINA	
N0096F15	
DRAWN: RRF	DATE: JUNE 1996
DFT CHECK: [Signature]	SCALE: HOR: 1"=60' VER: 1"=10'
ENG CHECK: [Signature]	JOB: 30742-5-0500/0096
APPROVAL: [Signature]	DWG: 4.4



TPH GASOLINE CONCENTRATIONS (SOIL)-ISOPLETH MAP
BUILDING LCH-4015
CAMP LEJEUNE, NORTH CAROLINA
CONTRACT N62470-93-D-4020

REFERENCE: SEE NOTES AND NAVFAC DRAWINGS 305105, AND 4183613, AND 4133144.

KEY

TPH GASOLINE ISOPLETHS (MG/KG)

DEPTH (FEET) AND CONCENTRATION
OF DETECTED COMPOUND (LAW), 6/95.

DEPTH (FEET) AND CONCENTRATION
OF DETECTED COMPOUND (R.E. WRIGHT), 11/94.

10/40 CONCENTRATION OF GASOLINE/TPH IDENTIFIED
IN SOIL SAMPLE, MG/KG.

ND NOT DETECTED

NA NOT ANALYZED

D DUPLICATE SAMPLE

▲ MW-7 LOCATION OF LAW ENGINEERING
TYPE II MONITORING WELL

■ MW-4 **LOCATION OF LAW ENGINEERING
TYPE III MONITORING WELL**

GMW-3 LOCATION OF R.E. WRIGHT INC.
TYPE II MONITORING WELL

 EXISTING AND FORMER TANK LOCATIONS

—●— UNDERGROUND WATER LINES, VALVES

-----●----- UNDERGROUND SEWER LINES, MANHOLES

— · — · — · — · — UNDERGROUND ELECTRICAL LINES, LIGHTPOLES

PRODUCT LINES

□ FORMER PUMP LOCATIONS

..... PROPANE FUEL LINE
? LOCATION OF UTILITY NOT KNOWN BY
MCB FACILITIES PERSONNEL

NOTES:

- NOTES:
1. LCH-4015 IS THE MCB WELL DESIGNATION THAT PRECEDES ALL HYDROPUNCH AND WELL LOCATIONS (OMITTED FOR BREVITY).
 2. WELLS LCH-4015MW1 THROUGH LCH-4015MW5 INSTALLED BY R.E. WRIGHT AND ASSOCIATES, NOVEMBER 1994.
 3. WELLS LCH-4015MW6 THROUGH LCH-4015MW20 INSTALLED BY LAW ENGINEERING, JUNE 1995.
 4. DRAWING REFERENCED FROM MCB AUTOCAD DRAWING B08.DWG, TAYLOR, WISEMAN, AND TAYLOR DRAWING NO. LCH-4015, AND R.E. WRIGHT AND ASSOCIATES DRAWING NO'S., 94599-002-AA AND 94599-003A.
 5. LCH-4015, SLCH-4024, THE MONITORING WELLS, AND THE HYDROPUNCH LOCATIONS WERE THE ONLY POINTS LOCATED IN THE FIELD BY THIS SURVEY. THE LOCATION OF LCH-4014, LCH-4034, THE USTS AND ASTS, DRIVEWAY, ROADWAY BOUNDARIES, COMMUNICATION LINES AND POWER LINES ARE APPROXIMATE. ALL OTHER LOCATIONS WERE OBTAINED FROM THE MCB AUTOCAD DRAWING AND MAY OR MAY NOT BE SHOWN CORRECTLY.
 6. NCDEHNR TPH GASOLINE LIMITS FOR SOILS IS 10 MG/KG.



LAW ENGINEERING
RALEIGH, NORTH CAROLINA

DRAWN: RF

DATE: JUNE 1996

DFT CHECK: WBL

SCALE: 1"=60'

ENG CHECK: *ENG*

JOB: 30740-5-0500/0096

APPROVAL: *BAI*

DWG:	4.5
------	-----

BUTLER DRIVE SOUTH

DITCH

25.6

MW-13

▲ -1.65 *

MW-12

25.86

▲ MW-14

25.61

▲ MW-15

25.36

25.6

MIDWAY PARK
COMMUNITY
CENTER
(LCH-4014)

THEATER

MW-7

27.19

▲ MW-11

22.87 +

27.6

#2 HEATING
OIL AST

PL MW-19

-2.04 *

MW-18

26.36

ASPHALT

▲ MW-16

28.49

LAUNDRY

POST OFFICE

PL

MW-10

26.87

MW-6

26.87

26.8

27.2

ASPHALT

27.6

MW-20

-2.4 *

MW-2

27.81

MW-5

27.31

FUELING
ISLAND

MARINE CORPS
EXCHANGE
CONVENIENCE
STORE
(LCH-4034)

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

PL

N.C. HIGHWAY 24

ENTRANCE TO
MIDWAY PARK

DITCH

DITCH

DITCH

DITCH

DITCH

DITCH

DITCH

DITCH

DITCH

DITCH

DITCH

NORTH

KEY

- ← APPARENT GROUNDWATER FLOW DIRECTION
- WATER TABLE ELEVATION CONTOURS (FEET ABOVE MEAN SEA LEVEL)
- 28.49 GROUNDWATER TABLE ELEVATION (FT./MSL.)
- ⊠ EXISTING AND FORMER TANK LOCATIONS
- ▲ MW-7 LOCATION OF LAW ENGINEERING TYPE II MONITORING WELL
- MW-4 LOCATION OF LAW ENGINEERING TYPE III MONITORING WELL
- ⊙ MW-3 LOCATION OF R.E. WRIGHT INC. TYPE II MONITORING WELL
- * WELL SCREENED BELOW WATER TABLE, ELEVATION NOT MAPPED
- + GROUNDWATER TABLE ELEVATIONS NOT MAPPED (NOTE 7.)
- PL PRODUCT LINES
- ⊗ VENTS
- FENCE

NOTES:

- LCH-4015 IS THE MCB WELL DESIGNATION THAT PRECEEDS ALL HYDROPUNCH AND WELL LOCATIONS (OMITTED FOR BREVITY).
- WELLS LCH-4015MW1 THROUGH LCH-4015MW5 INSTALLED BY R.E. WRIGHT AND ASSOCIATES, NOVEMBER 1994.
- WELLS LCH-4015MW6 THROUGH LCH-4015MW20 INSTALLED BY LAW ENGINEERING, JUNE 1995.
- HYDROPUNCH GROUNDWATER SAMPLES OBTAINED BY LAW ENGINEERING, JUNE 1995.
- DRAWING REFERENCED FROM MCB AUTOCAD DRAWING B08.DWG, TAYLOR, WISEMAN, AND TAYLOR DRAWING NO. LCH-4015, AND R.E. WRIGHT AND ASSOCIATES DRAWING NO'S., 94599-002-AA AND 94599-003A.
- LCH-4015, SLCH-4024, THE MONITORING WELLS, AND THE HYDROPUNCH LOCATIONS WERE THE ONLY POINTS LOCATED IN THE FIELD BY THIS SURVEY. THE LOCATION OF LCH-4015, LCH-4034, THE USTS AND ASTS, DRIVEWAY, ROADWAY BOUNDARIES, COMMUNICATION LINES AND POWER LINES ARE APPROXIMATE. ALL OTHER LOCATIONS WERE OBTAINED FROM THE MCB AUTOCAD DRAWING AND MAY OR MAY NOT BE SHOWN CORRECTLY.
- GROUNDWATER TABLE ELEVATIONS FOR TYPE II WELLS LCH-4015MW1 AND LCH-4015MW11 NOT MAPPED DUE TO LOW WATER LEVELS CAUSED BY POOR RECOVERY AND GREATER THICKNESS OF TIGHT CLAY AT THESE WELL LOCATIONS.

BASE
HOUSING

GRASS WITH
SPARSE TREES

GRAPHIC SCALE - IN FEET

60 30 0 60 120

N0096F03

LAW ENGINEERING
RALEIGH, NORTH CAROLINA

WATER TABLE ELEVATION CONTOUR MAP, 7-7-95
BUILDING LCH-4015
CAMP LEJEUNE, NORTH CAROLINA
CONTRACT N62470-93-D-4020

REFERENCE: SEE NOTES AND NAVFAC DRAWINGS 305105, 4183613 AND 4133144.

DRAWN: RF	DATE: JUNE 1996
DFT CHECK: WBL	SCALE: 1"=60'
ENG CHECK: EJA	JOB: 30740-5-0500/0096
APPROVAL: R/B	DWG: 5.1

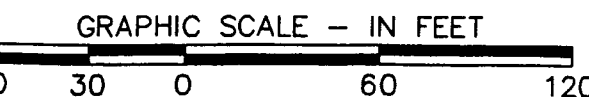
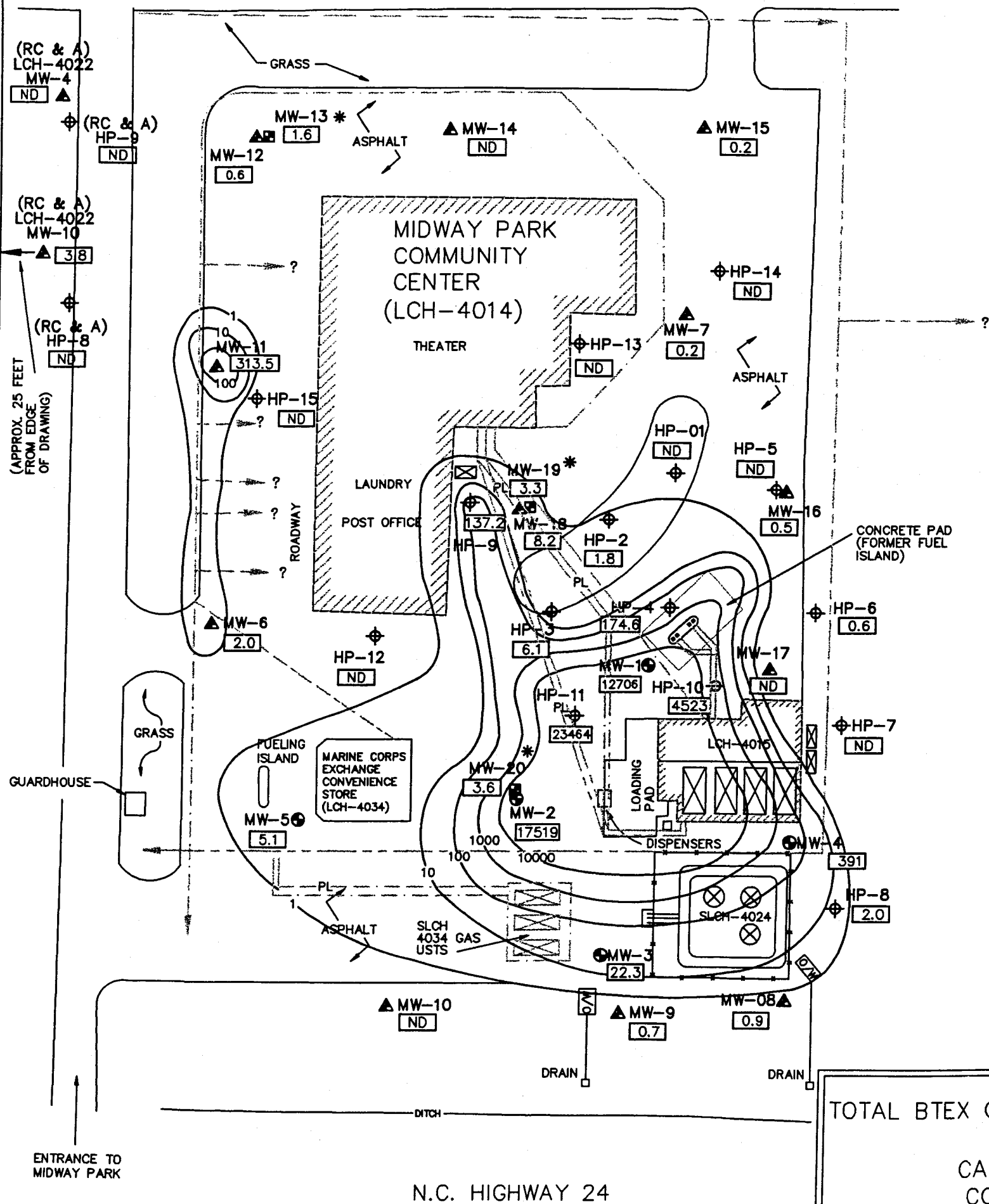
BUTLER DRIVE SOUTH

KEY

- TOTAL BTEX ISOPLETHS, ug/L
- CONCENTRATION OF CONSTITUENT DETECTED IN GROUNDWATER SAMPLE, ug/L
- 1/0.8 DETECTED CONCENTRATIONS IN GROUNDWATER SAMPLE/DUPLICATE SAMPLE
- ND NOT DETECTED ABOVE METHOD DETECTION LIMIT.
- ▲ MW-7 LOCATION OF LAW ENGINEERING TYPE II MONITORING WELL
- MW-4 LOCATION OF LAW ENGINEERING TYPE III MONITORING WELL
- MW-3 LOCATION OF R.E. WRIGHT INC. TYPE II MONITORING WELL
- ⊕ HP-1 HYDROPUNCH LOCATION
- ⊗ APPROXIMATE LOCATION OF FORMER OR EXISTING PETROLEUM USTS/ASTS.
- UNDERGROUND WATER LINES, VALVES
- UNDERGROUND SEWER LINES, MANHOLES
- * TYPE III WELLS SCREENED FROM 45 TO 50 FEET BLS. ONLY TYPE II WELL CONCENTRATIONS ARE MAPPED BECAUSE THEY SCREEN THE WATER TABLE.

NOTES:

1. LCH-4015 IS THE MCB WELL DESIGNATION THAT PRECEEDS ALL HYDROPUNCH AND WELL LOCATIONS (OMITTED FOR BREVITY).
2. WELLS LCH-4015MW1 THROUGH LCH-4015MW5 INSTALLED BY R.E. WRIGHT AND ASSOCIATES, NOVEMBER 1994.
3. WELLS LCH-4015MW6 THROUGH LCH-4015MW20 INSTALLED BY LAW ENGINEERING, JUNE 1995.
4. HYDROPUNCH GROUNDWATER SAMPLES OBTAINED BY LAW ENGINEERING, JUNE 1995.
5. DRAWING REFERENCED FROM MCB AUTOCAD DRAWING B08.DWG, TAYLOR, WISEMAN, AND TAYLOR DRAWING NO. LCH-4015, AND R.E. WRIGHT AND ASSOCIATES DRAWING NO'S., 94599-002-AA AND 94599-003A.
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N0096B08



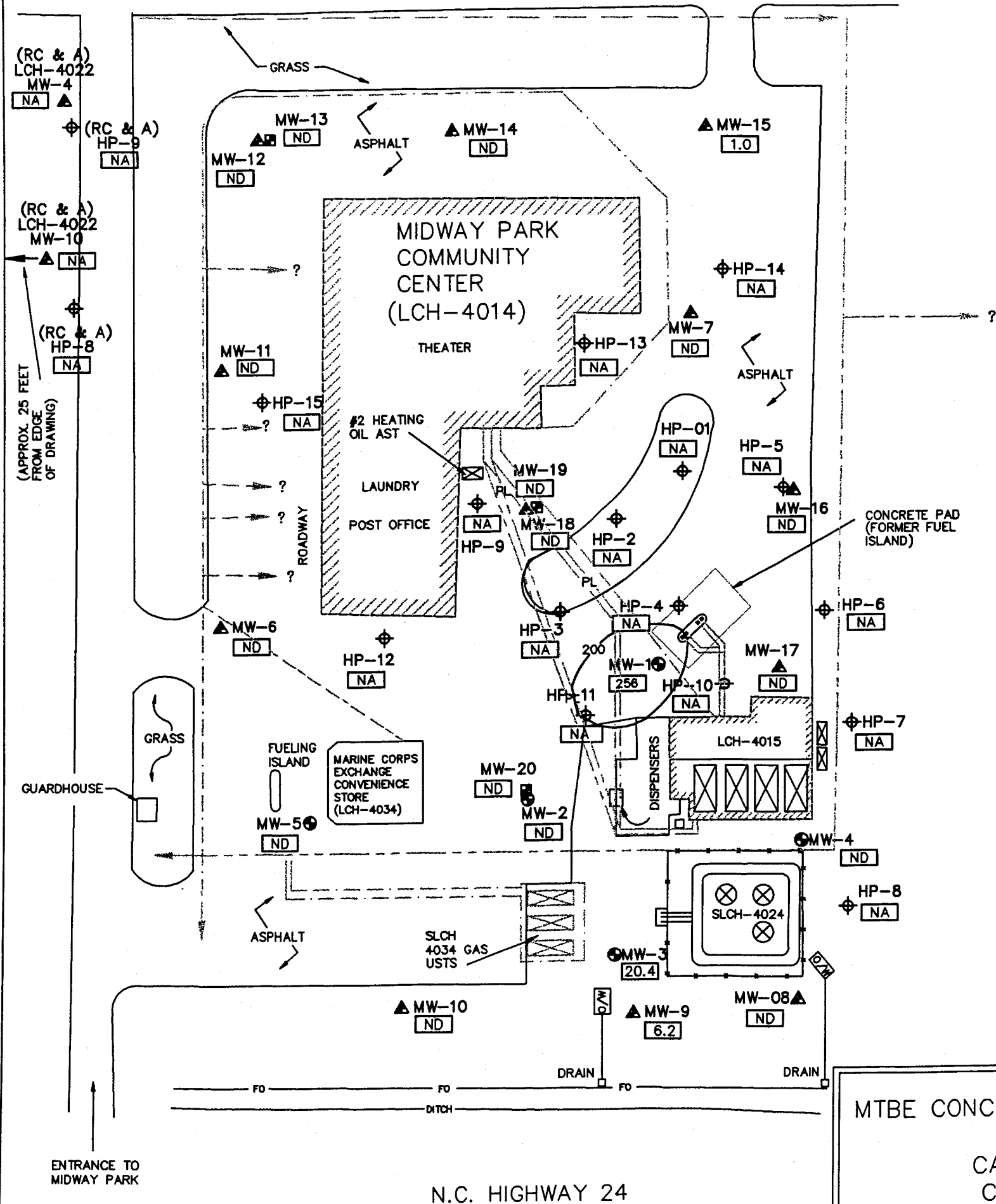
LAW ENGINEERING
RALEIGH, NORTH CAROLINA

TOTAL BTEX CONCENTRATIONS (WATER)-ISOPLETH MAP
BUILDING LCH-4015
CAMP LEJEUNE, NORTH CAROLINA
CONTRACT N62470-93-D-4020

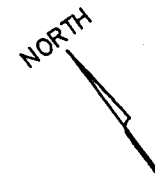
REFERENCE: SEE NOTES AND NAVFAC DRAWINGS 305105, 4183616 AND 4133144.

DRAWN: <i>RF</i>	DATE: JUNE 1996
DFT CHECK: <i>WBJ</i>	SCALE: 1"=60'
ENG CHECK: <i>EPA</i>	JOB: 30740-5-0500/0096
APPROVAL: <i>ZJB</i>	DWG: 5.6

BUTLER DRIVE SOUTH



KEY



- MTBE ISOPLETHS, ug/L
- CONCENTRATION OF CONSTITUENT DETECTED IN GROUNDWATER SAMPLE, ug/L
- 1/0.8 DETECTED CONCENTRATIONS IN GROUNDWATER SAMPLE/DUPLICATE SAMPLE
- ND NOT DETECTED ABOVE METHOD DETECTION LIMIT.
- NA NOT ANALYZED
- ▲ MW-7 LOCATION OF LAW ENGINEERING TYPE II MONITORING WELL
- MW-4 LOCATION OF LAW ENGINEERING TYPE III MONITORING WELL
- MW-3 LOCATION OF R.E. WRIGHT INC. TYPE II MONITORING WELL
- ⊕ HP-1 HYDROPUNCH LOCATION
- ⊗ APPROXIMATE LOCATION OF FORMER OR EXISTING USTS/ASTS.
- PRODUCT LINES

NOTES:

- LCH-4015 IS THE MCB WELL DESIGNATION THAT PRECEEDS ALL HYDROPUNCH AND WELL LOCATIONS (OMITTED FOR BREVITY).
- WELLS LCH-4015MW1 THROUGH LCH-4015MW5 INSTALLED BY R.E. WRIGHT AND ASSOCIATES, NOVEMBER 1994.
- WELLS LCH-4015MW6 THROUGH LCH-4015MW20 INSTALLED BY LAW ENGINEERING, JUNE 1995.
- HYDROPUNCH GROUNDWATER SAMPLES OBTAINED BY LAW ENGINEERING, JUNE 1995.
- DRAWING REFERENCED FROM MCB AUTOCAD DRAWING B08.DWG, TAYLOR, WISEMAN, AND TAYLOR DRAWING NO. LCH-4015, AND R.E. WRIGHT AND ASSOCIATES DRAWING NO'S., 94599-002-AA AND 94599-003A.
- LCH-4015, SLCH-4024, THE MONITORING WELLS, AND THE HYDROPUNCH LOCATIONS WERE THE ONLY POINTS LOCATED IN THE FIELD BY THIS SURVEY. THE LOCATION OF LCH-4014, LCH-4034, THE USTS AND ASTS, DRIVEWAY, ROADWAY BOUNDARIES, COMMUNICATION LINES AND POWER LINES ARE APPROXIMATE. ALL OTHER LOCATIONS WERE OBTAINED FROM THE MCB AUTOCAD DRAWING AND MAY OR MAY NOT BE SHOWN CORRECTLY.
- THE N.C. GROUNDWATER STANDARD FOR MTBE IS 200 ug/L.

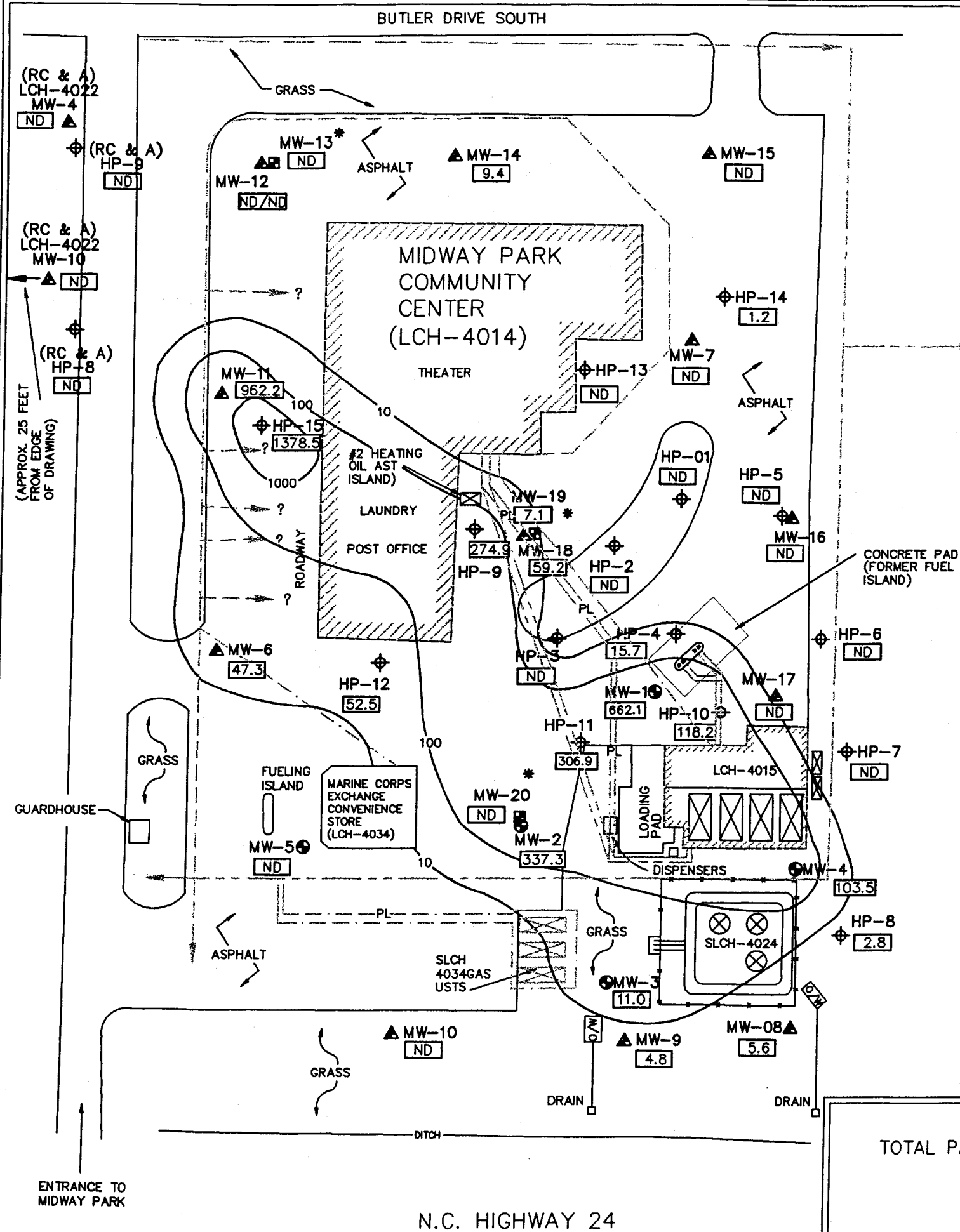


LAW ENGINEERING
RALEIGH, NORTH CAROLINA

DRAWN: <i>RF</i>	DATE: JUNE 1996
DFT CHECK: <i>WJA</i>	SCALE: 1"=60'
ENG CHECK: <i>EJA</i>	JOB: 30740-5-0500/0096
APPROVAL: <i>EJA</i>	DWG: 5.7

MTBE CONCENTRATIONS (WATER)-ISOPLETH MAP
BUILDING LCH-4015
CAMP LEJEUNE, NORTH CAROLINA
CONTRACT N62470-93-D-4020

REFERENCE: SEE NOTES AND NAVFAC DRAWINGS 305105, 4183613 AND 4133144.

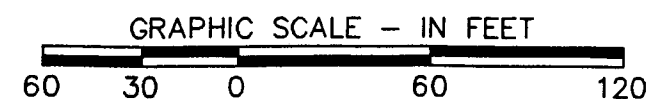


KEY

-  TOTAL EPA METHOD 610 ISOPLETHS, ug/L.
 CONCENTRATION OF CONSTITUENT
 DETECTED IN GROUNDWATER SAMPLE, ug/L.
 1/0.8 DETECTED CONCENTRATIONS IN GROUNDWATER
 SAMPLE/DUPLICATE SAMPLE
 NOT DETECTED ABOVE METHOD
 DETECTION LIMIT.
 ▲ MW-7 LOCATION OF LAW ENGINEERING
 TYPE II MONITORING WELL
 ■ MW-4 LOCATION OF LAW ENGINEERING
 TYPE III MONITORING WELL
 ● MW-3 LOCATION OF R.E. WRIGHT INC.
 TYPE II MONITORING WELL
 ⊕ HP-1 HYDROPUNCH LOCATION
 APPROXIMATE LOCATION OF FORMER OR
 EXISTING PETROLEUM USTS/ASTS.
 UNDERGROUND WATER LINES, VALVES
 UNDERGROUND SEWER LINES, MANHOLES
 * TYPE III WELLS SCREENED FROM 45 TO 50 FEET BLS.
 ONLY TYPE II WELL CONCENTRATIONS ARE MAPPED
 BECAUSE THEY SCREEN THE WATER TABLE.

NOTES:

- NOTES:
1. LCH-4015, IS THE MCB WELL DESIGNATION THAT PRECEDES ALL HYDROPUNCH AND WELL LOCATIONS (OMITTED FOR BREVITY).
 2. WELLS LCH-4015MW1 THROUGH LCH-4015MW5 INSTALLED BY R.E. WRIGHT AND ASSOCIATES, NOVEMBER 1994.
 3. WELLS LCH-4015MW6 THROUGH LCH-4015MW20 INSTALLED BY LAW ENGINEERING, JUNE 1995.
 4. HYDROPUNCH GROUNDWATER SAMPLES OBTAINED BY LAW ENGINEERING, JUNE 1995.
 5. DRAWING REFERENCED FROM MCB AUTOCAD DRAWING B08.DWG, TAYLOR, WISEMAN, AND TAYLOR DRAWING NO. LCH-4015, AND R.E. WRIGHT AND ASSOCIATES DRAWING NO'S., 94599-002-AA AND 94599-003A.
 6. LCH-4015, SLCH-4024, THE MONITORING WELLS, AND THE HYDROPUNCH LOCATIONS WERE THE ONLY POINTS LOCATED IN THE FIELD BY THIS SURVEY. THE LOCATION OF LCH-4014, LCH-4034, THE USTS AND ASTS, DRIVEWAY, ROADWAY BOUNDARIES, COMMUNICATION LINES AND POWER LINES ARE APPROXIMATE. ALL OTHER LOCATIONS WERE OBTAINED FROM THE MCB AUTOCAD DRAWING AND MAY OR MAY NOT BE SHOWN CORRECTLY.



N0096B011

LAW ENGINEERING
RALEIGH, NORTH CAROLINA

DRAWN: RT

DATE: JUNE 1996

DFT CHECK: *99*

SCALE: 1"=60'

ENG CHECK: *FLA*

JOB: 30740-5-0500/0096

APPROVAL: *BAB*

DWG: 5.8

TOTAL PAH CONCENTRATIONS (WATER)—ISOPLETH MAP
BUILDING LCH-4015
CAMP LEJEUNE, NORTH CAROLINA
CONTRACT N62470-93-D-4020

REFERENCE: SEE NOTES

APPENDIX D

**SUMMARY OF HISTORICAL
GROUNDWATER LABORATORY RESULTS**

CAP DATA

TABLE 5 (Page 1 of 3)
SUMMARY OF LABORATORY ANALYTICAL RESULTS
GROUNDWATER SAMPLES (HYDROPUNCH)
COMPREHENSIVE SITE ASSESSMENT REPORT
BUILDING LCH - 4015
CAMP LEJEUNE, NORTH CAROLINA
LAW ENGINEERING JOB NO. 30740-5-0500/0096

PARAMETER	HYDROPUNCH #	HP-1	HP-2	HP-3	HP-4	HP-5	HP-6	HP-7	N.C. GROUNDWATER STANDARDS
	SCREENED INTERVAL (FT. BLS)	6.0' - 9.0'	5.0' - 8.0'	5.0'- 8.0'	6.0' - 9.0'	6.0'- 9.0'	6.0'- 9.0'	6.0' - 9.0'	
	DATE SAMPLED	6/07/95	6/07/95	6/07/95	6/06/95	6/07/95	6/07/95	6/07/95	
EPA METHOD 602									
Benzene		ND	ND	ND	ND	ND	ND	ND	1
Toluene		ND	1.8	ND	ND	ND	0.6	ND	1000
Ethylbenzene		ND	ND	6.1	30.6	ND	ND	ND	29
Xylenes (Total)		ND	ND	ND	144	ND	ND	ND	530
Total BTEX Compounds		ND	1.8	6.1	174.6	ND	0.6	ND	*NA
EPA METHOD 610									
Naphthalene		ND	ND	ND	15.7	ND	ND	ND	21
Phenanthrene		ND	ND	ND	ND	ND	ND	ND	210
Anthracene		ND	ND	ND	ND	ND	ND	ND	**
Fluoranthene		ND	ND	ND	ND	ND	ND	ND	**
Pyrene		ND	ND	ND	ND	ND	ND	ND	**
Benzo(a)anthracene		ND	ND	ND	ND	ND	ND	ND	**
Fluorene		ND	ND	ND	ND	ND	ND	ND	280
Acenaphthene		ND	ND	ND	ND	ND	ND	ND	**
Total EPA 610 Compounds		ND	ND	ND	15.7	ND	ND	ND	*NA

ND Not detected at laboratory method detection limit for test.

BLS Below Land Surface.

** Maximum allowable concentration is the laboratory method detection limit (see laboratory reports).

*NA Not Applicable

Bolded Text & Shaded areas - Concentration is above NC Groundwater Standards.

TABLE 5 (Page 2 of 3)
SUMMARY OF LABORATORY ANALYTICAL RESULTS
GROUNDWATER SAMPLES (HYDROPUNCH)
COMPREHENSIVE SITE ASSESSMENT REPORT
BUILDING LCH - 4015
CAMP LEJEUNE, NORTH CAROLINA
LAW ENGINEERING JOB NO. 30740-5-0500/0096

PARAMETER	HYDROPUNCH #	HP-8	HP-9	HP-10	HP-11	HP-12	HP-13	N.C. GROUNDWATER STANDARDS
	SCREENED INTERVAL (FT.)	5.0' - 8.0'	6.0' - 9.0'	5.0'- 8.0'	5.0' - 8.0'	5.0'- 8.0'	5.0'- 8.0'	
	DATE SAMPLED	6/08/95	6/08/95	6/06/95	6/07/95	6/09/95	6/09/95	
EPA METHOD 602 COMPOUNDS DETECTED								
Benzene		ND	8.9	ND	10,600	ND	ND	1
Toluene		2.0	ND	ND	534	ND	ND	1000
Ethylbenzene		ND	109	843	2,960	ND	ND	29
Xylenes (Total)		ND	19.3	3,680	9,370	ND	ND	530
Total BTEX Compounds		2.0	137.2	4,523	23,464	ND	ND	*NA
EPA METHOD 610 COMPOUNDS DETECTED								
Naphthalene		ND	232+	117+	306+	49.2	ND	21
Phenanthrene		ND	17.0	1.2	0.9	ND	ND	210
Anthracene		1.9	9.9	ND	ND	ND	ND	**
Fluoranthene		ND	1.7	ND	ND	3.3	ND	**
Pyrene		0.9	ND	ND	ND	ND	ND	**
Benzo(a)anthracene		ND	ND	ND	ND	ND	ND	**
Fluorene		ND	14.3	ND	ND	ND	ND	280
Acenaphthene		ND	ND	ND	ND	ND	ND	**
Total EPA Method 610 Compounds		2.8	274.9	118.2	306.9	52.5	ND	*NA

ND Not detected at laboratory method detection limit for test.

BLS Below Land Surface.

** Maximum allowable concentration is the laboratory method detection limit (see laboratory reports).

*NA Not Applicable

Bolded Text & Shaded areas - Concentration is above NC Groundwater Standards.

+ According to GeoChem the sample analyte exceeded calibration curve by >20%. The values reported are considered minimum.

TABLE 5 (Page 3 of 3)
SUMMARY OF LABORATORY ANALYTICAL RESULTS
GROUNDWATER SAMPLES (HYDROPUNCH)
COMPREHENSIVE SITE ASSESSMENT REPORT
BUILDING LCH - 4015
CAMP LEJEUNE, NORTH CAROLINA
LAW ENGINEERING JOB NO. 30740-5-0500/0096

LAW ENGINEERING JOB NO: 50740-3-0300/0070

PARAMETER	HYDROPUNCH #	HP-14	HP-15	LAB BLANK	LAB BLANK	N.C. GROUNDWATER STANDARDS
	SCREENED INTERVAL (FT.)	5.0' - 8.0'	5.0'- 8.0'	-	-	
	DATE SAMPLED	6/09/95	6/09/95	6/09/95	6/09/95	
EPA METHOD 602						
Benzene		ND	ND	ND	ND	1
Toluene		ND	ND	ND	ND	1000
Ethylbenzene		ND	ND	ND	ND	29
Xylenes (Total)		ND	ND	ND	ND	530
Total BTEX Compounds		ND	ND	ND	ND	*NA
EPA METHOD 610						
Naphthalene		ND	434	ND	ND	21
Phenanthrene		1.2	308	ND	ND	210
Anthracene		ND	50.1	ND	ND	**
Fluoranthene		ND	ND	ND	ND	**
Pyrene		ND	ND	ND	ND	**
Benzo(a)anthracene		ND	ND	ND	1.3	**
Fluorene		ND	530	ND	ND	280
Acenaphthene		ND	56.4	ND	ND	**
Total EPA Methods 610 Compounds		1.2	1,378.5	ND	1.3	*NA

ND Not detected at laboratory method detection limit for test.

BLS Below Land Surface.

** Maximum allowable concentration is the laboratory method detection limit (see laboratory reports).

*NA Not Applicable

Bolded Text & Shaded areas - Concentration is above NC Groundwater Standards.

TABLE 5.3 (Page 1 of 2)
SUMMARY OF LABORATORY ANALYTICAL RESULTS (µg/L), GROUNDWATER SAMPLES
COMPREHENSIVE SITE ASSESSMENT REPORT
BUILDING LCH-4015
MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA
LAW ENGINEERING JOB NO. 30740-5-0500/Phase 0096

PARAMETER	WELL #	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13 (Type 3)	MW-14	N.C. GROUNDWATER STANDARDS (µg/L)
	DATE SAMPLED	6/6/95 7/6/95	6/6/95 7/6/95	6/8/95	6/8/95	6/8/95	7/6/95	7/6/95	7/8/95	7/6/95	7/8/95	7/06/95	7/08/95	7/8/95	7/08/95	
EPA METHOD 602 - Volatile Aromatics																
Benzene		8850.0	5310.0	2.9	9.9	0.4	0.2	0.2	0.2	0.2	ND	20.5	0.3	0.2	ND	1
1,2-Dichlorobenzene		1.2	1.5	0.2	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	620
Toluene		256.0	179.0	0.9	3.4	0.4	ND	ND	0.5	0.2	ND	ND	0.3	0.5	ND	1000
Ethylbenzene		1910.0	2070.0	5.8	188.0	0.2	1.4	ND	0.2	ND	ND	114	ND	ND	ND	29
Total Xylenes		1690.0	9960.0	12.7	190.0	4.1	0.3	ND	ND	0.3	ND	179	ND	0.9	ND	530
TOTAL BTEX		12706.0	17519	22.3	391.4	5.1	2.0	ND	0.9	1.0	ND	313.5	0.6	1.6	ND	
Methyl tert-butyl ether		256	ND	20.4	ND	ND	ND	ND	ND	6.2	ND	ND	ND	ND	ND	200
EPA METHOD 610 - Polynuclear Aromatic Compounds																
Naphthalene		524	272	11.0	58.9	ND	ND	ND	3.6	4.8	ND	292.0	ND	ND	ND	21
1-Methylnaphthalene		47.6	27.2	ND	18.8	ND	16.9	ND	2.0	ND	ND	271.0	ND	ND	ND	**
2-Methylnaphthalene		88.4	36.1	ND	13.5	ND	11.7	ND	ND	ND	ND	345.0	ND	ND	ND	**
Phenanthrene		ND	ND	ND	ND	ND	7.1	ND	ND	ND	ND	24.7	ND	ND	ND	210
Anthracene		ND	ND	ND	10.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**
Benzo(k)fluoranthene		2.10	1.96	ND	1.79	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.4	**
Flourene		ND	ND	ND	ND	ND	5.0	ND	ND	ND	ND	14.3	ND	ND	ND	280
Pyrene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**
Acenaphthene		ND	ND	ND	ND	ND	6.57	ND	ND	ND	ND	15.2	ND	ND	ND	**
Fluoranthene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**
Total Method 610 Compounds		662.1	337.3	11.0	103.5	ND	47.3	ND	5.6	4.8	ND	962.2	ND	ND	9.4	
EPA METHOD 625 Semi-volatile Organic Compounds (Base Neutrals Only) – Performed on MW-1, MW-2, and Purge Water Samples only (Only 3 analyses authorized in Delivery Order #55)																
Naphthalene		677	385	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	21
EPA METHOD 239.2 Total Lead																
Lead		18.6	ND	42.7	2.1	ND	2.1	12.7	9.4	2.9	16.9	2.7	10.4	ND	6.87	15

BLS - Below land surface
ND - Not Detected
NA - Not Analyzed

** Maximum allowable concentration is the minimum laboratory detection limit.
Shaded area - Concentration is above N.C. Groundwater Standards.

TABLE Page 2 of 2
SUMMARY OF LABORATORY ANALYTICAL RESULTS (µg/L)
GROUNDWATER SAMPLES
BUILDING LCH-4015
MARINE CORPS BASE, CAMP LEJUNE, NORTH CAROLINA
LAW ENGINEERING JOB NO. 30740-5-0500/Phase 0096

PARAMETER	WELL #	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20	MW-22 (Duplicate Sample from MW12)	MWRB (Rinse Blank 1)	Trip Blank 1	Rinse Blank 2	Trip Blanks 2 & 05008 (after /)	Trip Blanks 04309 & 05063 (after /)	Trip Blanks 05062 & (after /)	PURGE WATER SAMPLE	N.C. GROUNDWATER STANDARDS (µg/L)
	DATE SAMPLED	7/08/95	7/08/95	7/06/95	7/06/95	7/11/95	7/07/95	7/06/95	6/08/95	6/08/95	7/06/95	7/07/95 7/08/95	7/06/95 7/08/95	7/06/95 7/11/95	7/06/95	
EPA METHOD 602 - Volatile Aromatics																
Benzene		0.2	0.3	ND	0.3	ND	0.4	0.2	ND	ND	ND	ND/ND	ND/ND	ND/ND	1410	1
1,2-Dichlorobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND/ND	ND/ND	ND/ND	ND	620
Toluene		ND	0.2	ND	0.2	0.9	1.0	0.3	0.2	0.5 ++	ND	ND/ND	ND/ND	ND/ND	3150	1000
Ethylbenzene		ND	ND	ND	6.7	0.5	0.4	ND	ND	0.2 ++	ND	ND/ND	ND/ND	ND/ND	570	29
Total Xylenes		ND	ND	ND	1.0	1.9	1.8	0.3	ND	ND	ND	ND/ND	ND/ND	ND/ND	2810	530
TOTAL BTEX		0.2	0.5	ND	ND	3.3	3.6	0.8	0.2	0.7 +-	ND	ND/ND	ND/ND	ND/ND	ND	* NA
Methyl tert-butyl ether		1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND/ND	ND/ND	ND/ND	ND	200
EPA METHOD 610 - Polynuclear Aromatic Compounds																
Naphthalene		ND	ND	ND	1.5	ND	ND	ND	ND		ND	NA/ND			NA	21
1-Methylnaphthalene		ND	ND	ND	16.8	3.8	ND	ND	ND		ND	NA/ND			ND	**
2-Methylnaphthalene		ND	ND	ND	17.8	ND	ND	ND	ND		ND	NA/ND			ND	**
Phenanthrene		ND	ND	ND	9.1	ND	ND	ND	ND		ND	NA/ND			ND	210
Anthracene		ND	ND	ND	ND	ND	ND	ND	ND		ND	NA/ND			ND	**
Benzo(k)fluoranthene		ND	ND	ND	ND	ND	ND	ND	ND		ND	NA/ND			9.4	**
Flourene		ND	ND	ND	6.1	ND	ND	ND	ND		ND	NA/ND			ND	280
Pyrene		ND	ND	ND	ND	ND	ND	ND	ND		ND	NA/ND			ND	**
Acenaphthene		ND	ND	ND	7.9	3.3	ND	ND	ND		ND	NA/ND			ND	**
Fluoranthene		ND	ND	ND	ND	ND	ND	ND	ND		ND	NA/ND			ND	**
Total Method 610 Compounds		ND	ND	ND	59.2	7.1	ND	ND	ND		ND	NA/ND			9.4	
EPA METHOD 239.2 Total Lead																
Lead		9.8	11.3	13.2		2.2	20.6	25.0	ND	NA	2.8	3.0	NA	ND	6.87	15

BLS - Below land surface
ND, NA - Not Detected, Not Analyzed

** Maximum allowable concentration is the minimum laboratory detection limit.
Shaded area - Concentration is above N.C. Groundwater Standards.

**ANNUAL MONITORING REPORT DATA
(AUGUST 2000 TO AUGUST 2001)**

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location Sample ID Sample Date	MW-01					
			USTLCH4015-MW01-02D	USTLCH4015-MW01-02C	USTLCH4015-MW01-02B	USTLCH4015-MW01-02A	USTLCH4015-MW01-01D	USTLCH4015-MW01-01C
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>			11/14/2002 #	8/13/2002 *#	5/22/2002 *#	2/21/2002 *#	11/19/2001 #	8/14/2001 *#
Benzene	1		130	230	210	170	360	440
Ethylbenzene	29		330	620	740	480	990	870
Toluene	1000		21	27	41	80	86	69
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		493	590	1,010	1,080	1,570	1,360
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		190	300	280	200	270	320
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		25	31	36	23	29	37
2-Methylnaphthalene	28		45	58	65	41	57	71

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-01					
		Sample ID	USTLCH4015-MW01-01B	USTLCH4015-MW01-01A	USTLCH4015-MW01-00D	USTLCH4015-MW01-00C	USTLCH4015-MW01-00B	USTLCH4015-MW01-00A
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		Sample Date	5/23/2001 *#	2/20/2001 *#	11/27/2000 *#	8/22/2000 *#	5/24/2000 *#	2/22/2000 *#
Benzene	1		340	510	590	690	700	410
Ethylbenzene	29		770	920	1,100	1,000	1,100	650
Toluene	1000		190	340	180	140	210	320
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		1,700	1,900	2,200	1,730	2,290	1,540
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		210	270	250	290	220	160
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		30	37	41	53	48	24
2-Methylnaphthalene	28		54	55	66	77	67	36

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-01					
		Sample ID Sample Date	USTLCH4015-MW01-99D	USTLCH4015-MW01-99C	USTLCH4015-MW01-99B	USTLCH4015-MW01-99A2	USTLCH4015-MW01-99A	USTLCH4015-MW01-98D3
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		11/23/1999	8/19/1999 *#	5/26/1999 *#	2/23/1999 *	1/26/1999 *	12/28/1998	
Benzene	1		590	1,400	1,200	1,900	1,600	2,200
Ethylbenzene	29		970	1,600	1,700	2,100	1,700	1,400
Toluene	1000		440	680	1,600	4,500	3,100	3,600
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		2,040	3,500	5,360	8,100	7,000	6,800
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		220	300	350	160	440	450
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		46	57	75	29	50	50
2-Methylnaphthalene	28		68	95	130	52	80	98

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location Sample ID Sample Date	MW-01	MW-02				
			USTLCH4015-MW01-98C2	USTLCH4015-MW02-02D	USTLCH4015-MW02-02C	USTLCH4015-MW02-02B	USTLCH4015-MW02-02A	USTLCH4015-MW02-01D
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>			8/4/1998	11/14/2002 #	8/13/2002 *#	5/22/2002 *#	2/21/2002 *#	11/19/2001 #
Benzene	1		3,400	87	250	400	820	550
Ethylbenzene	29		2,000	72	110	140	140	150
Toluene	1000		3,800	11	17	BQL	92	19
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		6,600	380	510	440	140	1,100
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		460	160	190	190	95	68
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		60	13	12	16	BQL	BQL
2-Methylnaphthalene	28		64	15	13	16	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-02					
		Sample ID Sample Date	USTLCH4015-MW02-01C	USTLCH4015-MW02-01B	USTLCH4015-MW02-01A	USTLCH4015-MW02-00D	USTLCH4015-MW02-00C	USTLCH4015-MW02-00B
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		8/14/2001 *#	5/23/2001 *#	2/20/2001 *#	11/27/2000 *#	8/23/2000 *#	5/24/2000 *#	
Benzene	1		110	85	26	5	12	36
Ethylbenzene	29		79	7	BQL	2	3	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		540	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		54	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR	Sample Location	MW-02					
		Sample ID	USTLCH4015-MW02-00A	USTLCH4015-MW02-99D	USTLCH4015-MW02-99C	USTLCH4015-MW02-99B	USTLCH4015-MW02-99A2	USTLCH4015-MW02-99A
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>	Regulatory Limit	Sample Date	2/22/2000 *#	11/23/1999	8/19/1999 *#	5/26/1999 *#	2/24/1999 *	1/26/1999 *
Benzene	1		55	130	6,600	7,200	5,400	1,900
Ethylbenzene	29		BQL	14	290	440	360	170
Toluene	1000		BQL	BQL	BQL	BQL	BQL	840
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	330
Total Xylenes	530		BQL	BQL	720	730	580	800
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		BQL	19	190	26	62	110
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	24	BQL	BQL	12
2-Methylnaphthalene	28		BQL	BQL	27	BQL	BQL	14

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-02		MW-03			
		Sample ID Sample Date	USTLCH4015-MW02-98D3 12/28/1998	USTLCH4015-MW02-98C2 8/4/1998	USTLCH4015-MW03-02D 11/14/2002 #	USTLCH4015-MW03-02C 8/13/2002 *#	USTLCH4015-MW03-02B 5/22/2002 *#	USTLCH4015-MW03-02A 2/21/2002 *#
Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L								
Benzene	1		2,600	4,500	7	77	160	210
Ethylbenzene	29		BQL	270	7	23	56	84
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	13	13	BQL	37
Total Xylenes	530		BQL	1,300	BQL	BQL	16	33
Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L								
Naphthalene	21		69	260	BQL	17	40	57
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	25	17	24	26	27
2-Methylnaphthalene	28		BQL	46	16	22	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-03					
		Sample ID Sample Date	USTLCH4015-MW03-01D	USTLCH4015-MW03-01C	USTLCH4015-MW03-01B	USTLCH4015-MW03-01A	USTLCH4015-MW03-00D	USTLCH4015-MW03-00C
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		11/19/2001 #	8/14/2001 *#	5/23/2001 *#	2/20/2001 *#	11/27/2000 *#	8/22/2000 *#	
Benzene	1		220	220	230	520	390	460
Ethylbenzene	29		160	360	410	440	620	590
Toluene	1000		8	BQL	BQL	51	57	55
Methyl-tert-butyl ether	200		35	49	190	BQL	BQL	BQL
Total Xylenes	530		53	130	160	230	220	400
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		66	94	69	85	140	88
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		36	41	32	33	59	33
2-Methylnaphthalene	28		BQL	10	14	14	31	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-03					
		Sample ID Sample Date	USTLCH4015-MW03-00B	USTLCH4015-MW03-00A	USTLCH4015-MW03-99D	USTLCH4015-MW03-99C	USTLCH4015-MW03-99B	USTLCH4015-MW03-99A2
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		5/24/2000 *#	2/22/2000 *#	11/23/1999	8/19/1999 *#	5/26/1999 *#	2/24/1999 *	
Benzene	1		570	760	810	1,300	2,400	1,800
Ethylbenzene	29		430	290	580	700	530	140
Toluene	1000		87	170	100	260	810	570
Methyl-tert-butyl ether	200		62	100	BQL	BQL	BQL	320
Total Xylenes	530		360	390	720	2,200	1,600	530
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		BQL	45	54	58	68	19
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	13	19	21	22	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-03			MW-04		
		Sample ID Sample Date	USTLCH4015-MW03-99A	USTLCH4015-MW03-98D3	USTLCH4015-MW03-98C2	USTLCH4015-MW04-02C	USTLCH4015-MW04-02A	USTLCH4015-MW04-02A
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		1/26/1999 *		12/28/1998	8/4/1998	8/13/2002 *#	2/26/2002 *#	2/21/2002 *#
Benzene	1		1,100	2,200	2,400	BQL	NA	BQL
Ethylbenzene	29		BQL	290	BQL	1	NA	6
Toluene	1000		360	980	3,900	BQL	NA	BQL
Methyl-tert-butyl ether	200		330	BQL	760	BQL	NA	BQL
Total Xylenes	530		200	1,300	BQL	BQL	NA	7
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		30	59	31	BQL	BQL	NA
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	NA
Fluorene	280		BQL	BQL	BQL	BQL	BQL	NA
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	NA
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	NA
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	NA

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NC/DENR Regulatory Limit	Sample Location	MW-04					
		Sample ID Sample Date	USTLCH4015-MW04-01C	USTLCH4015-MW04-01A	USTLCH4015-MW04-00C	USTLCH4015-MW04-00A	USTLCH4015-MW04-99D	USTLCH4015-MW04-99C
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		8/14/2001 *#	2/20/2001 *#	8/22/2000 *#	2/22/2000 *#	11/23/1999	8/19/1999 *#	
Benzene	1	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29	7	2	5	7	7	14	
Toluene	1000	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530	8	2	4	6	8	16	
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21	17	BQL	BQL	BQL	BQL	20	
Acenaphthene	80	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit	BQL	BQL	BQL	BQL	BQL	11	
2-Methylnaphthalene	28	BQL	BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR	Sample Location Sample ID Sample Date	MW-04					MW-05
			USTLCH4015-MW04-99B	USTLCH4015-MW04-99A2	USTLCH4015-MW04-99A	USTLCH4015-MW04-98D3	USTLCH4015-MW04-98C2	USTLCH4015-MW05-02D
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>	Regulatory Limit		5/26/1999 *#	2/23/1999 *	1/26/1999 *	12/28/1998	8/4/1998	11/14/2002 #
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		12	8	11	11	23	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	8
Total Xylenes	530		15	9	12	11	23	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		13	BQL	BQL	BQL	14	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-05					
		Sample ID Sample Date	USTLCH4015-MW05-02C	USTLCH4015-MW05-02B	USTLCH4015-MW05-02A	USTLCH4015-MW05-01D	USTLCH4015-MW05-01C	USTLCH4015-MW05-01B
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		8/13/2002 *#	5/22/2002 *#	2/21/2002 *#	11/19/2001 #	8/14/2001 *#	5/23/2001 *#	
Benzene	1	BQL	20	2	BQL	BQL	BQL	BQL
Ethylbenzene	29	BQL	4	BQL	BQL	BQL	BQL	BQL
Toluene	1000	BQL	66	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200	5	94	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530	BQL	24	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28	BQL	BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-05					
		Sample ID Sample Date	USTLCH4015-MW05-01A 2/20/2001 *#	USTLCH4015-MW05-00D 11/27/2000 *#	USTLCH4015-MW05-00C 8/22/2000 *#	USTLCH4015-MW05-00B 5/24/2000 *#	USTLCH4015-MW05-00A 2/23/2000 #	USTLCH4015-MW05-99D 11/23/1999
Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L								
Benzene	1		7	18	BQL	BQL	2	16
Ethylbenzene	29		2	25	BQL	BQL	27	140
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		8	220	3	13	34	72
Total Xylenes	530		4	223	BQL	BQL	BQL	BQL
Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	13
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-05					
		Sample ID Sample Date	USTLCH4015-MW05-99C	USTLCH4015-MW05-99B	USTLCH4015-MW05-99A2	USTLCH4015-MW05-99A	USTLCH4015-MW05-98D3	USTLCH4015-MW05-98C2
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		8/19/1999 *#	5/26/1999 *#	2/23/1999 *	1/26/1999 *	12/28/1998	8/4/1998	
Benzene	1	BQL	BQL	BQL	2	BQL	130	
Ethylbenzene	29	BQL	BQL	BQL	BQL	BQL	24	
Toluene	1000	BQL	BQL	BQL	BQL	BQL	170	
Methyl-tert-butyl ether	200	BQL	7	24	17	7	79	
Total Xylenes	530	BQL	BQL	BQL	BQL	BQL	49	
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21	BQL	BQL	BQL	BQL	BQL	BQL	
Acenaphthene	80	BQL	BQL	BQL	BQL	BQL	BQL	
Fluorene	280	BQL	BQL	BQL	BQL	BQL	BQL	
Phenanthrene	210	BQL	BQL	BQL	BQL	BQL	BQL	
1-Methylnaphthalene	Detection Limit	BQL	BQL	BQL	BQL	BQL	BQL	
2-Methylnaphthalene	28	BQL	BQL	BQL	BQL	BQL	BQL	

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-06					
		Sample ID	USTLCH4015-MW06-02C	USTLCH4015-MW06-02A	USTLCH4015-MW06-01C	USTLCH4015-MW06-01A	USTLCH4015-MW06-00C	USTLCH4015-MW06-00A
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		Sample Date	8/14/2002 *#	2/21/2002 *#	8/14/2001 *#	2/20/2001 *#	8/23/2000 *#	2/22/2000 *#
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-06					
		Sample ID Sample Date	USTLCH4015-MW06-99D	USTLCH4015-MW06-99C	USTLCH4015-MW06-99B	USTLCH4015-MW06-99A2	USTLCH4015-MW06-99A	USTLCH4015-MW06-98D3
Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L			11/23/1999	8/19/1999 *#	5/26/1999 *#	2/23/1999 *	1/26/1999 *	12/28/1998
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	1	BQL	BQL	BQL
Toluene	1000		BQL	BQL	7	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	9	BQL	BQL	BQL
Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

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verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR	Sample Location	MW-06					MW-07		
		Sample ID	USTLCH4015-MW06-98C2	USTLCH4015-MW07-02C	USTLCH4015-MW07-02A	USTLCH4015-MW07-01C	USTLCH4015-MW07-01A	USTLCH4015-MW07-00C		
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>	Regulatory Limit	Sample Date	8/3/1998	8/14/2002 *#	2/21/2002 *#	8/14/2001 *#	2/20/2001 *#	8/22/2000 *#		
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL		
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL	BQL		
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL		
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL		
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL		
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>										
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL		
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL		
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL		
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL		
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL		
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL		

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-07					
		Sample ID Sample Date	USTLCH4015-MW07-00A	USTLCH4015-MW07-99D	USTLCH4015-MW07-99C	USTLCH4015-MW07-99B	USTLCH4015-MW07-99A	USTLCH4015-MW07-99A
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		2/22/2000 *#		11/23/1999	8/19/1999 *#	5/26/1999 *#	2/23/1999 *	1/26/1999 *
Benzene	1		2	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		1	BQL	BQL	BQL	BQL	BQL
Toluene	1000		1	BQL	BQL	3	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		3	BQL	BQL	3	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-07		MW-08			
		Sample ID Sample Date	USTLCH4015-MW07-98D3	USTLCH4015-MW07-98C2	USTLCH4015-MW08-02C	USTLCH4015-MW08-02A	USTLCH4015-MW08-02A	USTLCH4015-MW08-01C
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>			12/28/1998	8/3/1998	8/13/2002 *#	2/26/2002 *#	2/21/2002 *#	8/14/2001 *#
Benzene	1		BQL	BQL	BQL	NA	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	NA	BQL	BQL
Toluene	1000		BQL	BQL	BQL	NA	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	NA	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	NA	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	NA	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	NA	BQL
Fluorene	280		BQL	BQL	BQL	BQL	NA	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	NA	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	NA	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	NA	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-08					
		Sample ID Sample Date	USTLCH4015-MW08-01A 2/20/2001 *#	USTLCH4015-MW08-00C 8/22/2000 *#	USTLCH4015-MW08-00A 2/22/2000 *#	USTLCH4015-MW08-99D 11/23/1999	USTLCH4015-MW08-99C 8/19/1999 *#	USTLCH4015-MW08-99B 5/26/1999 *#
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>								
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-08				MW-09	
		Sample ID Sample Date	USTLCH4015-MW08-99A2	USTLCH4015-MW08-99A	USTLCH4015-MW08-98D3	USTLCH4015-MW08-98C2	USTLCH4015-MW09-02D	USTLCH4015-MW09-02C
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		2/24/1999 *		1/26/1999 *	12/28/1998	8/4/1998	11/14/2002 #	8/13/2002 *#
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	16	29
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-09					
		Sample ID	USTLCH4015-MW09-02B	USTLCH4015-MW09-02A	USTLCH4015-MW09-01D	USTLCH4015-MW09-01C	USTLCH4015-MW09-01B	USTLCH4015-MW09-01A
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		Sample Date	5/22/2002 *#	2/21/2002 *#	11/19/2001 #	8/14/2001 *#	5/23/2001 *#	2/20/2001 *#
Benzene	1		1	3	16	14	73	18
Ethylbenzene	29		BQL	4	25	14	38	33
Toluene	1000		BQL	BQL	1	BQL	BQL	BQL
Methyl-tert-butyl ether	200		44	24	36	53	37	30
Total Xylenes	530		BQL	BQL	11	3	12	19
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		BQL	BQL	11	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-09					
		Sample ID Sample Date	USTLCH4015-MW09-00D	USTLCH4015-MW09-00C	USTLCH4015-MW09-00B	USTLCH4015-MW09-00A	USTLCH4015-MW09-99D	USTLCH4015-MW09-99C
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		11/27/2000 *#	8/22/2000 *#	5/24/2000 *#	2/22/2000 *#	11/23/1999	8/19/1999 *#	
Benzene	1	18	71	110	98	210	510	
Ethylbenzene	29	44	33	14	19	25	43	
Toluene	1000	BQL	BQL	BQL	BQL	BQL	BQL	
Methyl-tert-butyl ether	200	49	62	82	95	120	150	
Total Xylenes	530	28	44	BQL	BQL	36	100	
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21	BQL	BQL	BQL	BQL	BQL	BQL	
Acenaphthene	80	BQL	BQL	BQL	BQL	BQL	BQL	
Fluorene	280	BQL	BQL	BQL	BQL	BQL	BQL	
Phenanthrene	210	BQL	BQL	BQL	BQL	BQL	BQL	
1-Methylnaphthalene	Detection Limit	BQL	BQL	BQL	BQL	BQL	BQL	
2-Methylnaphthalene	28	BQL	BQL	BQL	BQL	BQL	BQL	

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-09					MW-10
		Sample ID Sample Date	USTLCH4015-MW09-99B 5/26/1999 *#	USTLCH4015-MW09-99A2 2/24/1999 *	USTLCH4015-MW09-99A 1/26/1999 *	USTLCH4015-MW09-98D3 12/28/1998	USTLCH4015-MW09-98C2 8/4/1998	USTLCH4015-MW10-02C 8/13/2002 *#
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>								
Benzene	1		270	540	500	650	230	BQL
Ethylbenzene	29		BQL	BQL	30	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	85	BQL
Methyl-tert-butyl ether	200		150	220	250	200	200	BQL
Total Xylenes	530		BQL	BQL	46	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-10					
		Sample ID Sample Date	USTLCH4015-MW10-02A	USTLCH4015-MW10-01C	USTLCH4015-MW10-01A	USTLCH4015-MW10-00C	USTLCH4015-MW10-00A	USTLCH4015-MW10-99D
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		2/21/2002 *#	8/14/2001 *#	2/20/2001 *#	8/22/2000 *#	2/23/2000 #	11/23/1999	
Benzene	1	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Toluene	1000	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530	BQL	BQL	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28	BQL	BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-10					
		Sample ID Sample Date	USTLCH4015-MW10-99C	USTLCH4015-MW10-99B	USTLCH4015-MW10-99A2	USTLCH4015-MW10-99A	USTLCH4015-MW10-98D3	USTLCH4015-MW10-98C2
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		8/19/1999 *#	5/26/1999 *#	2/24/1999 *	1/26/1999 *	12/28/1998	8/4/1998	
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

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verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-11					
		Sample ID Sample Date	USTLCH4015-MW11-02D	USTLCH4015-MW11-02C	USTLCH4015-MW11-02B	USTLCH4015-MW11-02A	USTLCH4015-MW11-01D	USTLCH4015-MW11-01C
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		11/14/2002 #	8/14/2002 *#	5/22/2002 *#	2/21/2002 *#	11/19/2001 #	8/14/2001 *#	
Benzene	1	BQL	BQL	BQL	3	5	7	
Ethylbenzene	29	25	44	37	28	51	58	
Toluene	1000	BQL	BQL	BQL	1	BQL	3	
Methyl-tert-butyl ether	200	BQL	BQL	BQL	BQL	BQL	BQL	
Total Xylenes	530	BQL	BQL	4	BQL	5	BQL	
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21	20	21	95	130	200	220	
Acenaphthene	80	11	BQL	41	49	48	43	
Fluorene	280	11	BQL	62	65	78	50	
Phenanthrene	210	13	11	110	180	120	110	
1-Methylnaphthalene	Detection Limit	150	150	390	410	630	430	
2-Methylnaphthalene	28	BQL	BQL	130	360	270	320	

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-11					
		Sample ID Sample Date	USTLCH4015-MW11-01B 5/23/2001 *#	USTLCH4015-MW11-01A 2/20/2001 *#	USTLCH4015-MW11-00D 11/27/2000 *#	USTLCH4015-MW11-00C 8/23/2000 *#	USTLCH4015-MW11-00B 5/24/2000 *#	USTLCH4015-MW11-00A 2/22/2000 *#
Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L								
Benzene	1		5	5	5	BQL	2	11
Ethylbenzene	29		51	50	48	68	49	62
Toluene	1000		2	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		10	BQL	BQL	15	5	BQL
Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L								
Naphthalene	21		71	180	120	4,400	350	230
Acenaphthene	80		37	26	24	510	47	BQL
Fluorene	280		76	47	47	1,500	84	12
Phenanthrene	210		180	92	96	2,900	190	15
1-Methylnaphthalene	Detection Limit		400	480	430	13,000	900	220
2-Methylnaphthalene	28		310	170	100	11,000	720	20

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

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BQL = Below Laboratory Quantitation Limit

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verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-11					
		Sample ID Sample Date	USTLCH4015-MW11-99D	USTLCH4015-MW11-99C	USTLCH4015-MW11-99B	USTLCH4015-MW11-99A2	USTLCH4015-MW11-99A	USTLCH4015-MW11-98D3
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		11/23/1999		8/19/1999 *#	5/26/1999 *#	2/23/1999 *	1/26/1999 *	12/28/1998
Benzene	1		BQL	3	7	8	11	8
Ethylbenzene	29		63	55	53	42	65	68
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	9	13	21	16
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		230	190	190	80	100	240
Acenaphthene	80		14	BQL	BQL	BQL	BQL	BQL
Fluorene	280		26	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		40	10	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		320	180	180	92	82	180
2-Methylnaphthalene	28		140	BQL	30	62	91	220

Notes:

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BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NC DENR Regulatory Limit	Sample Location	MW-11	MW-12				
		Sample ID	USTLCH4015-MW11-98C2	USTLCH4015-MW12-02C	USTLCH4015-MW12-02A	USTLCH4015-MW12-01C	USTLCH4015-MW12-01A	USTLCH4015-MW12-00C
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		Sample Date	8/3/1998	8/14/2002 *#	2/21/2002 *#	8/14/2001 *#	2/20/2001 *#	8/23/2000 *#
Benzene	1		8	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		77	BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		12	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		240	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		180	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		150	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-12					
		Sample ID Sample Date	USTLCH4015-MW12-00A	USTLCH4015-MW12-99D	USTLCH4015-MW12-99C	USTLCH4015-MW12-99B	USTLCH4015-MW12-99A2	USTLCH4015-MW12-99A
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		2/22/2000 *#		11/23/1999	8/19/1999 *#	5/26/1999 *#	2/23/1999 *	1/26/1999 *
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-12		MW-13
		Sample ID Sample Date	USTLCH4015-MW12-98D3 12/28/1998	USTLCH4015-MW12-98C2 8/3/1998	USTLCH4015-MW13-98C2 8/3/1998
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>					
Benzene	1		BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625/8270C, ug/L</i>					
Naphthalene	21		BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-14					
		Sample ID	USTLCH4015-MW14-02C	USTLCH4015-MW14-02A	USTLCH4015-MW14-01C	USTLCH4015-MW14-01A	USTLCH4015-MW14-00C	USTLCH4015-MW14-00A
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		Sample Date	8/14/2002 *#	2/21/2002 *#	8/14/2001 *#	2/20/2001 *#	8/23/2000 *#	2/22/2000 *#
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-14					
		Sample ID Sample Date	USTLCH4015-MW14-99D	USTLCH4015-MW14-99C	USTLCH4015-MW14-99B	USTLCH4015-MW14-99A2	USTLCH4015-MW14-99A	USTLCH4015-MW14-98D3
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		11/23/1999		8/19/1999 *#	5/26/1999 *#	2/23/1999 *	1/26/1999 *	12/28/1998
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR	Sample Location	MW-14		MW-15			
		Sample ID	USTLCH4015-MW14-98C2	USTLCH4015-MW15-02C	USTLCH4015-MW15-02A	USTLCH4015-MW15-01C	USTLCH4015-MW15-01A	USTLCH4015-MW15-00C
Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L	Regulatory Limit	Sample Date	8/3/1998	8/14/2002 *#	2/21/2002 *#	8/14/2001 *#	2/20/2001 *#	8/23/2000 *#
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL
Polynuclear Aromatic Hydrocarbons by USEPA method 625, ug/L								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BOL	BOL	BOL	BOL	BOL	BOL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-15					
		Sample ID Sample Date	USTLCH4015-MW15-00A	USTLCH4015-MW15-99D	USTLCH4015-MW15-99C	USTLCH4015-MW15-99B	USTLCH4015-MW15-99A2	USTLCH4015-MW15-99A
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		2/22/2000 *#		11/23/1999	8/19/1999 *#	5/26/1999 *#	2/23/1999 *	1/26/1999 *
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location Sample ID Sample Date	MW-15		MW-16			
			USTLCH4015-MW15-98D3	USTLCH4015-MW15-98C2	USTLCH4015-MW16-02C	USTLCH4015-MW16-02A	USTLCH4015-MW16-01C	USTLCH4015-MW16-01A
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>			12/28/1998	8/3/1998	8/14/2002 *#	2/21/2002 *#	8/14/2001 *#	2/20/2001 *#
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-16					
		Sample ID Sample Date	USTLCH4015-MW16-00C	USTLCH4015-MW16-00A	USTLCH4015-MW16-99D	USTLCH4015-MW16-99C	USTLCH4015-MW16-99B	USTLCH4015-MW16-99A2
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		8/22/2000 *#		2/22/2000 *#	11/23/1999	8/19/1999 *#	5/26/1999 *#	2/23/1999 *
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-16			MW-17		
		Sample ID	USTLCH4015-MW16-99A	USTLCH4015-MW16-98D3	USTLCH4015-MW16-98C2	USTLCH4015-MW17-01C	USTLCH4015-MW17-01A	USTLCH4015-MW17-00C
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		Sample Date	1/26/1999 *	12/28/1998	8/4/1998	8/14/2001 *#	2/20/2001 *#	8/23/2000 *#
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location Sample ID Sample Date	MW-17					
			USTLCH4015-MW17-00A	USTLCH4015-MW17-99D	USTLCH4015-MW17-99C	USTLCH4015-MW17-99B	USTLCH4015-MW17-99A2	USTLCH4015-MW17-99A
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>			2/22/2000 *#	11/23/1999	8/19/1999 *#	5/26/1999 *#	2/23/1999 *	1/26/1999 *
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-17		MW-18			
		Sample ID Sample Date	USTLCH4015-MW17-98D3 12/28/1998	USTLCH4015-MW17-98C2 8/4/1998	USTLCH4015-MW18-02C 8/14/2002 *#	USTLCH4015-MW18-02A 2/21/2002 *#	USTLCH4015-MW18-01C 8/14/2001 *#	USTLCH4015-MW18-01A 2/20/2001 *#
Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L								
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	1	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL
Polynuclear Aromatic Hydrocarbons by USEPA method 625, ug/L								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-18					
		Sample ID Sample Date	USTLCH4015-MW18-00C	USTLCH4015-MW18-00A	USTLCH4015-MW18-99D	USTLCH4015-MW18-99C	USTLCH4015-MW18-99B	USTLCH4015-MW18-99A2
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		8/22/2000 *#	2/22/2000 *#	11/23/1999	8/19/1999 *#	5/26/1999 *#	2/23/1999 *	
Benzene	1	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29	BQL	BQL	7	2	13	10	
Toluene	1000	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530	BQL	BQL	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625, ug/L</i>								
Naphthalene	21	BQL	BQL	BQL	BQL	11	BQL	BQL
Acenaphthene	80	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit	BQL	BQL	BQL	BQL	12	BQL	BQL
2-Methylnaphthalene	28	BQL	BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-18			MW-19		
		Sample ID Sample Date	USTLCH4015-MW18-99A	USTLCH4015-MW18-98D3	USTLCH4015-MW18-98C2	USTLCH4015-MW19-02C	USTLCH4015-MW19-02A	USTLCH4015-MW19-01C
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>			1/26/1999 *	12/28/1998	8/3/1998	8/14/2002 *#	2/21/2002 *#	8/14/2001 *#
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		27	6	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		5	4	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625, ug/L</i>								
Naphthalene	21		31	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		21	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location Sample ID	MW-19					
		Sample Date	USTLCH4015-MW19-01A	USTLCH4015-MW19-00C	USTLCH4015-MW19-00A	USTLCH4015-MW19-99D	USTLCH4015-MW19-99C	USTLCH4015-MW19-99B
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>			2/20/2001 *#	8/22/2000 *#	2/22/2000 *#	11/23/1999	8/19/1999 *#	5/26/1999 *#
Benzene	1		BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-19				MW-20	
		Sample ID Sample Date	USTLCH4015-MW19-99A2	USTLCH4015-MW19-99A	USTLCH4015-MW19-98D3	USTLCH4015-MW19-98C2	USTLCH4015-MW20-02C	USTLCH4015-MW20-02A
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>			2/23/1999 *	1/26/1999 *	12/28/1998	8/3/1998	8/14/2002 *#	2/26/2002 *#
Benzene	1		BQL	BQL	BQL	BQL	BQL	NA
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL	NA
Toluene	1000		BQL	BQL	BQL	BQL	BQL	NA
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL	NA
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	NA
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625, ug/L</i>								
Naphthalene	21		BQL	BQL	BQL	BQL	12	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location Sample ID Sample Date	MW-20			MW-21	
			USTLCH4015-MW20-02A	USTLCH4015-MW20-01C	USTLCH4015-MW20-98C2	USTLCH4015-MW21-02B	USTLCH4015-MW21-02A
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>			2/21/2002 *#	8/14/2001 *#	8/4/1998	8/14/2002 *#	2/26/2002 *#
Benzene	1		BQL	BQL	BQL	2	NA
Ethylbenzene	29		BQL	BQL	BQL	BQL	NA
Toluene	1000		BQL	BQL	BQL	BQL	NA
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	NA
Total Xylenes	530		BQL	BQL	BQL	BQL	NA
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625, ug/L</i>							
Naphthalene	21		NA	BQL	BQL	BQL	48
Acenaphthene	80		NA	BQL	BQL	BQL	12
Fluorene	280		NA	BQL	BQL	BQL	BQL
Phenanthrene	210		NA	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		NA	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		NA	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR	Sample Location Sample ID Sample Date	MW-21			MW-22		
			USTLCH4015-MW21-02A	USTLCH4015-MW21-01	USTLCH4015-MW21-01	USTLCH4015-MW22-02B	USTLCH4015-MW22-02A	USTLCH4015-MW22-01
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>	Regulatory Limit		2/21/2002 *#	8/14/2001 *#	6/11/2001 *#	8/14/2002 *#	2/21/2002 *#	8/14/2001 *#
Benzene	1		2	10	BQL	BQL	BQL	BQL
Ethylbenzene	29		1	BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	2	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625, ug/L</i>								
Naphthalene	21		NA	BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		NA	BQL	BQL	BQL	BQL	BQL
Fluorene	280		NA	BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		NA	BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		NA	BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		NA	BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

Table 3-1 (continued)
Summary of Detected Concentrations
Groundwater Monitoring Well Samples
Building LCH-4015
Camp Lejeune, North Carolina

Parameter	NCDENR Regulatory Limit	Sample Location	MW-22	MW-23			
		Sample ID	USTLCH4015-MW22-01	USTLCH4015-MW23-02B	USTLCH4015-MW23-02A	USTLCH4015-MW23-01	USTLCH4015-MW23-01
<i>Volatile Aromatic Hydrocarbons by USEPA method 602, ug/L</i>		Sample Date	6/11/2001 *#	8/14/2002 *#	2/21/2002 *#	8/14/2001 *#	6/11/2001 *#
Benzene	1		BQL	BQL	2	BQL	BQL
Ethylbenzene	29		BQL	BQL	BQL	BQL	BQL
Toluene	1000		BQL	BQL	BQL	BQL	BQL
Methyl-tert-butyl ether	200		BQL	BQL	BQL	BQL	BQL
Total Xylenes	530		BQL	BQL	BQL	BQL	BQL
<i>Polynuclear Aromatic Hydrocarbons by USEPA method 625, ug/L</i>							
Naphthalene	21		BQL	BQL	BQL	BQL	BQL
Acenaphthene	80		BQL	BQL	BQL	BQL	BQL
Fluorene	280		BQL	BQL	BQL	BQL	BQL
Phenanthrene	210		BQL	BQL	BQL	BQL	BQL
1-Methylnaphthalene	Detection Limit		BQL	BQL	BQL	BQL	BQL
2-Methylnaphthalene	28		BQL	BQL	BQL	BQL	BQL

Notes:

NA indicates the sample was not analyzed for this constituent.

Bold type indicates detected concentrations above laboratory quantitation limits.

Detected concentrations above the regulatory limits are indicated by shading.

BQL = Below Laboratory Quantitation Limit

* verified with laboratory data package

verified with electronic data deliverables

2003 DATA PROVIDED BY E&E

Table 1
Summary of Laboratory Analyses for Groundwater
Building LCH-4015
November 2003

Sample Location	NCGWQS	MW-01	MW-02	MW-03	MW-03D	MW-05	MW-06	MW-07	MW-08	MW-09
Date Sampled		11/19/03	11/18/03	11/18/03	11/18/03	11/18/03	11/19/03	11/18/03	11/18/03	11/18/03
EPA 602 (µg/L)										
Benzene	1	139	22.4	1.3	1.5	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	29	377	31.9	1.3	1.4	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	1000	8.0	1.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes (total)	530	147	62.5	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Methyl Tert Butyl Ether	200	10.1	24.0	2.6	2.7	3.3	<1.0	<1.0	<1.0	7.5
Total BTEX		671	118.7	2.6	2.9	ND	ND	ND	ND	ND
EPA 610 (µg/L)										
Acenaphthene	80	<5.4	<5.4	<5.0	<5.0	<5.0	<5.1	<5.0	<5.1	<5.1
Acenaphthylene	210	<5.4	<5.4	<5.0	<5.0	<5.0	<5.1	<5.0	<5.1	<5.1
Anthracene	2100	<5.4	<5.4	<5.0	<5.0	<5.0	<5.1	<5.0	<5.1	<5.1
Benzo(a)anthracene	0.05	<5.4	<5.4	<5.0	<5.0	<5.0	<5.1	<5.0	<5.1	<5.1
Fluoranthene	280	<5.4	<5.4	<5.0	<5.0	<5.0	<5.1	<5.0	<5.1	<5.1
Fluorene	280	<5.4	<5.4	2.5 J	<5.0	<5.0	<5.1	<5.0	<5.1	<5.1
1-Methylnaphthalene	RL	28.1	5.1 J	<5.0	<5.0	<5.0	<5.1	<5.0	2.9 J	<5.1
2-Methylnaphthalene	14	47.0	2.9 J	<5.0	<5.0	<5.0	<5.1	<5.0	<5.1	<5.1
Naphthalene	21	169	47.8	<5.0	<5.0	<5.0	<5.1	<5.0	2.3 J	<5.1
Phenanthrene	210	<5.4	<5.4	<5.0	<5.0	<5.0	<5.1	<5.0	<5.1	<5.1
Pyrene	210	<5.4	<5.4	<5.0	<5.0	<5.0	<5.1	<5.0	<5.1	<5.1

Sample Location	NCGWQS	MW-10	MW-11	MW-12	MW-14	MW-15	MW-16	MW-18	MW-19
Date Sampled		11/18/03	12/11/03	11/19/03	11/19/03	11/18/03	11/18/03	11/19/03	11/19/03
EPA 602 (µg/L)									
Benzene	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	29	<1.0	2.5	<1.0	<1.0	<1.0	<1.0	0.86 J	<1.0
Toluene	1000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes (total)	530	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Methyl Tert Butyl Ether	200	5.6	<1.0	<1.0	<1.0	<1.0	2.6	<1.0	<1.0
Total BTEX		ND	2.5	ND	ND	ND	ND	0.86	ND
EPA 610 (µg/L)									
Acenaphthene	80	<5.6	3.1 J	<5.2	<5.1	<5.1	<5.0	<5.2	2.4 J
Acenaphthylene	210	<5.6	<5.2	<5.2	<5.1	<5.1	<5.0	<5.2	<5.1
Anthracene	2100	<5.6	<5.2	<5.2	<5.1	<5.1	<5.0	<5.2	<5.1
Benzo(a)anthracene	0.05	<5.6	<5.2	<5.2	<5.1	<5.1	<5.0	<5.2	<5.1
Fluoranthene	280	<5.6	<5.2	<5.2	<5.1	<5.1	<5.0	<5.2	<5.1
Fluorene	280	<5.6	9.0	<5.2	<5.1	<5.1	<5.0	<5.2	<5.1
1-Methylnaphthalene	RL	<5.6	36.8	<5.2	<5.1	<5.1	<5.0	<5.2	<5.1
2-Methylnaphthalene	14	<5.6	6.3	<5.2	<5.1	<5.1	<5.0	<5.2	<5.1
Naphthalene	21	<5.6	5.8	<5.2	<5.1	<5.1	<5.0	<5.2	3.2 J
Phenanthrene	210	<5.6	5.7	<5.2	<5.1	<5.1	<5.0	<5.2	<5.1
Pyrene	210	<5.6	<5.2	<5.2	<5.1	<5.1	<5.0	<5.2	<5.1

MW-03D is a duplicate sample collected at well MW-03

NCGWQS: North Carolina Groundwater Quality Standard

RL: Reporting Limit, no NCGWQS established for the constituent; therefore, the NCGWQS for the constituent is the reporting limit

Total BTEX: Sum of detected concentrations of benzene, toluene, ethylbenzene, and xylene isomers

ND: None detected; no benzene, toluene, ethylbenzene, or xylene isomers were detected

µg/L: micrograms per liter

<#: not detected at the indicated reporting limit

J: estimated concentration less than reporting limit

Bold type indicates detectable concentrations.

Shaded area indicates detectable concentration above the North Carolina Groundwater Quality Standards

Table 1
Summary of Laboratory Analyses for Groundwater
Building LCH-4015
September 2003

Sample Location	NCGWQS	MW-01	MW-01D	MW-02	MW-03	MW-05	MW-09	MW-11
Date Sampled		09/23/03	09/23/03	09/23/03	09/23/03	10/03/03	09/23/03	09/23/03
EPA 602 (µg/L)								
Benzene	1	141	138	60.1	1	<1.0	<1.0	<1.0
Ethylbenzene	29	371	368	62.9	0.8 J	1.9	0.63 J	3.6
Toluene	1000	17.5	14.8	7.2	<1.0	<1.0	0.66 J	<1.0
Xylenes (total)	530	269	226	612	<3.0	6.9	<3.0	<3.0
Methyl Tert Butyl Ether	200	5.8	4.8	7.5	<1.0	3.8	10.7	<1.0
Total BTEX		798.5	746.8	742.2	1.8	8.8	1.29	3.6
EPA 610 (µg/L)								
Acenaphthene	80	<5.0	<5.4	<5.7	<5.2	<5.1	<5.0	<5.1
Acenaphthylene	210	<5.0	<5.4	<5.7	<5.2	<5.1	<5.0	<5.1
Anthracene	2100	<5.0	<5.4	<5.7	<5.2	<5.1	<5.0	<5.1
Benzo(a)anthracene	0.05	<5.0	<5.4	<5.7	<5.2	<5.1	<5.0	<5.1
Fluoranthene	280	<5.0	<5.4	<5.7	<5.2	<5.1	<5.0	<5.1
Fluorene	280	<5.0	<5.4	<5.7	<5.2	<5.1	<5.0	<5.1
1-Methylnaphthalene	RL	29	23.3	7.1	<5.2	<5.1	<5.0	<5.1
2-Methylnaphthalene	14	43.7	36.2	7.6	<5.2	<5.1	<5.0	<5.1
Naphthalene	21	170	138	59.9	<5.2	<5.1	4.2 J	<5.1
Phenanthrene	210	<5.0	<5.4	<5.7	<5.2	<5.1	<5.0	<5.1
Pyrene	210	<5.0	<5.4	<5.7	<5.2	<5.1	<5.0	<5.1

MW-01D is a duplicate sample collected at well MW-01

NCGWQS: North Carolina Groundwater Quality Standard

RL: Reporting Limit, no NCGWQS established for the constituent; therefore, the NCGWQS for the constituent is the reporting limit

Total BTEX: Sum of detected concentrations of benzene, toluene, ethylbenzene, and xylene isomers

ND: None detected; no benzene, toluene, ethylbenzene, or xylene isomers were detected

µg/L: micrograms per liter

<#: not detected at the indicated reporting limit

J: estimated concentration less than reporting limit

Bold type indicates detectable concentrations.

Shaded area indicates detectable concentration above the North Carolina Groundwater Quality Standards

Table 1
Summary of Laboratory Analyses for Groundwater
Building LCH-4015
June 2003

Sample Location	NCGWQS	MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	MW-10
Date Sampled		06/03/03	06/03/03	06/03/03	06/03/03	06/03/03	06/03/03	06/03/03	06/03/03	06/03/03	06/03/03
EPA 602 (µg/L)											
Benzene	1	33.6	297	19.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	29	336	115	19.7	<1.0	1.9	2	1.2	<1.0	<1.0	<1.0
Toluene	1000	30.2	11.4	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes (total)	530	799	645	4.3	<3.0	6.9	6.8	4.3	<3.0	<3.0	<3.0
Methyl Tert Butyl Ether	200	<20	<20	12.5	<1.0	3.8	<1.0	<1.0	<1.0	19.7	1.4
Total BTEX		1198.8	1068.4	44.6	ND	8.8	8.8	5.5	ND	ND	ND
EPA 610 (µg/L)											
Acenaphthene	80	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.3	<5.1
Acenaphthylene	210	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.3	<5.1
Anthracene	2100	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.3	<5.1
Benzo(a)anthracene	0.05	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.3	<5.1
Fluoranthene	280	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.3	<5.1
Fluorene	280	<40	<20	<5.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.3	<5.1
1-Methylnaphthalene	RL	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2-Methylnaphthalene	14	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Naphthalene	21	153	91.6	8.6	<5.1	<5.1	<5.1	<5.2	<5.1	<5.3	<5.1
Phenanthrene	210	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.3	<5.1
Pyrene	210	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.3	<5.1

Sample Location	NCGWQS	MW-11	MW-12	MW-14	MW-15	MW-16	MW-18	MW-19	MW-21	MW-22	MW-23
Date Sampled		06/03/03	06/03/03	06/03/03	06/03/03	06/03/03	06/03/03	06/03/03	06/03/03	06/03/03	06/03/03
EPA 602 (µg/L)											
Benzene	1	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.1	<1.0	<1.0
Ethylbenzene	29	11.2	<1.0	<1.0	<1.0	<1.0	<1.0 J	<1.0	0.76 J	<1.0	<1.0
Toluene	1000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes (total)	530	2.2	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Methyl Tert Butyl Ether	200	<1.0	<1.0	<1.0	<1.0	2.4	<1.0	<1.0	0.58 J	1.8	1.3
Total BTEX		14.6	ND	ND	ND	ND	ND	ND	5.86	ND	ND
EPA 610 (µg/L)											
Acenaphthene	80	<20	<5.0	<5.1	<5.1	<5.1	4.2 J	2.7 J	8.8	<5.1	<5.1
Acenaphthylene	210	<20	<5.0	<5.1	<5.1	<5.1	<5.1	<5.0	<5.1	<5.1	<5.1
Anthracene	2100	<20	<5.0	<5.1	<5.1	<5.1	<5.1	<5.0	<5.1	<5.1	<5.1
Benzo(a)anthracene	0.05	<20	<5.0	<5.1	<5.1	<5.1	<5.1	<5.0	<5.1	<5.1	<5.1
Fluoranthene	280	<20	<5.0	<5.1	<5.1	<5.1	<5.1	<5.0	<5.1	<5.1	<5.1
Fluorene	280	18.4 J	<5.0	<5.1	<5.1	<5.1	5.9	<5.0	4.0 J	<5.1	<5.1
1-Methylnaphthalene	RL	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2-Methylnaphthalene	14	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Naphthalene	21	14.4 J	<5.0	<5.1	<5.1	<5.1	<5.1	<5.0	<5.1	<5.1	<5.1
Phenanthrene	210	11.1 J	<5.0	<5.1	<5.1	<5.1	<5.1	<5.0	<5.1	<5.1	<5.1
Pyrene	210	<20	<5.0	<5.1	<5.1	<5.1	<5.1	<5.0	<5.1	<5.1	<5.1

NR: Not reported; analyte not reported in source document

NCGWQS: North Carolina Groundwater Quality Standard

RL: Reporting Limit, no NCGWQS established for the constituent; therefore, the NCGWQS for the constituent is the reporting limit

Total BTEX: Sum of detected concentrations of benzene, toluene, ethylbenzene, and xylene isomers

ND: None detected; no benzene, toluene, ethylbenzene, or xylene isomers were detected

µg/L: micrograms per liter

<#: not detected at the indicated reporting limit

J: estimated concentration less than reporting limit

Bold type indicates detectable concentrations.

Shaded area indicates detectable concentration above the North Carolina Groundwater Quality Standards

Table 1
Summary of Laboratory Analyses for Groundwater
Building LCH-4015
March 2003

Sample Location	NCGWQS	MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	MW-10
Date Sampled		03/18/03	03/19/03	03/17/03	03/19/03	03/19/03	03/18/03	03/18/03	03/18/03	03/17/03	03/18/03
EPA 602 (µg/L)											
Benzene	1	28.9	100	<1.0	<1.0	0.92 J	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	29	420	30	<1.0	1.1	1.3	<1.0	<1.0	1.0	<1.0	<1.0
Toluene	1000	95.3	4.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes (total)	530	1070	104	<3.0	2.1 J	3.4	<3.0	<3.0	2.4 J	<3.0	<3.0
Methyl Tert Butyl Ether	200	<10	2.6	<1.0	<1.0	2.9	<1.0	<1.0	<1.0	12.9	0.86 J
Total BTEX		1614.2	238.8	ND	3.2	5.62	ND	ND	3.4	ND	ND
EPA 610 (µg/L)											
Acenaphthene	80	<20	<5.1	<5.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.1	<5.1
Acenaphthylene	210	<20	<5.1	<5.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.1	<5.1
Anthracene	2100	<20	<5.1	<5.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.1	<5.1
Benzo(a)anthracene	0.05	<20	<5.1	<5.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.1	<5.1
Fluoranthene	280	<20	<5.1	<5.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.1	<5.1
Fluorene	280	<20	<5.1	<5.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.1	<5.1
1-Methylnaphthalene	RL	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2-Methylnaphthalene	14	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Naphthalene	21	137	31.5	6.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.1	<5.1
Phenanthrene	210	<20	<5.1	<5.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.1	<5.1
Pyrene	210	<20	<5.1	<5.1	<5.1	<5.1	<5.1	<5.2	<5.1	<5.1	<5.1

Sample Location	NCGWQS	MW-11	MW-12	MW-14	MW-15	MW-16	MW-18	MW-19	MW-21	MW-22	MW-23
Date Sampled		03/18/03	03/18/03	03/18/03	03/18/03	03/17/03	03/17/03	03/17/03	03/17/03	03/17/03	03/17/03
EPA 602 (µg/L)											
Benzene	1	0.61 J	<1.0	<1.0	<1.0	<1.0	82.3	<1.0	33.8	<1.0	<1.0
Ethylbenzene	29	6.0	<1.0	<1.0	<1.0	2.5	21.1	<1.0	505 E	<1.0	<1.0
Toluene	1000	0.53 J	<1.0	<1.0	<1.0	<1.0	3.7	<1.0	2.1	<1.0	<1.0
Xylenes (total)	530	6.2	<3.0	<3.0	<3.0	<3.0	27.1	<3.0	16.9	<3.0	<3.0
Methyl Tert Butyl Ether	200	<1.0	<1.0	<1.0	<1.0	3.2	39.2	<1.0	1.8	3.6	2.0
Total BTEX		13.34	ND	ND	ND	2.5	134.2	ND	557.8	ND	ND
EPA 610 (µg/L)											
Acenaphthene	80	<5.0	<5.3	<5.2	<5.1	<5.2	<5.1	2.7 J	<5.1	<5.1	<5.1
Acenaphthylene	210	<5.0	<5.3	<5.2	<5.1	<5.2	<5.1	<5.1	<5.1	<5.1	<5.1
Anthracene	2100	<5.0	<5.3	<5.2	<5.1	<5.2	<5.1	<5.1	<5.1	<5.1	<5.1
Benzo(a)anthracene	0.05	<5.0	<5.3	<5.2	<5.1	<5.2	<5.1	<5.1	<5.1	<5.1	<5.1
Fluoranthene	280	<5.0	<5.3	<5.2	<5.1	<5.2	<5.1	<5.1	<5.1	<5.1	<5.1
Fluorene	280	4.5	<5.3	<5.2	<5.1	<5.2	<5.1	<5.1	<5.1	<5.1	<5.1
1-Methylnaphthalene	RL	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2-Methylnaphthalene	14	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Naphthalene	21	5.2	<5.3	<5.2	<5.1	<5.2	<5.1	2.0 J	<5.1	<5.1	<5.1
Phenanthrene	210	3.3 J	<5.3	<5.2	<5.1	<5.2	<5.1	<5.1	<5.1	<5.1	<5.1
Pyrene	210	<5.0	<5.3	<5.2	<5.1	<5.2	<5.1	<5.1	<5.1	<5.1	<5.1

NR: Not reported; analyte not reported in source document

NCGWQS: North Carolina Groundwater Quality Standard

RL: Reporting Limit, no NCGWQS established for the constituent; therefore, the NCGWQS for the constituent is the reporting limit

Total BTEX: Sum of detected concentrations of benzene, toluene, ethylbenzene, and xylene isomers

ND: None detected; no benzene, toluene, ethylbenzene, or xylene isomers were detected

µg/L: micrograms per liter

<#: not detected at the indicated reporting limit

J: estimated concentration less than reporting limit

E: estimated concentration above the linear quantitation range

Bold type indicates detectable concentrations.

Shaded area indicates detectable concentration above the North Carolina Groundwater Quality Standards

APPENDIX E
RISK CLASSIFICATION
AND
LAND USE FORM

A. RISK CHARACTERIZATION

Submit the following questionnaire in its entirety. Answer all questions completely. Attach additional pages as needed to fully explain answers. Base answers/explanations on information known or required to be obtained during the Limited Site Assessment.

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

Limited Site Assessment 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, according to MCB Camp Lejeune, the closest well is water supply well LCH 4009 (approximately 1,300 feet southeast of site) which does not have known contamination.

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

No, according to water supply well data provided by MCB Camp Lejeune, there are no water supply wells located within 1,000 feet of the subject site.

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

No, wells were not located within 250 feet of the source area of release.

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

No, there are an adequate number of locations for additional water supply wells to be installed on other portions of the base.

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.

No, there is no evidence to suggest an accumulation of vapors and no evidence of accumulation has been reported. The area in the immediate vicinity of the plume is a parking lot and a slab-on-grade building.

6. *Are there any other factors that would cause the discharge or release to pose an* YES NO

imminent danger to public health, public safety, or the environment?
If YES describe.

No. Data collected during this investigation does not provide evidence to suggest other factors that would cause an imminent danger to public health, public safety or the environment.

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

No, surface water bodies have not been located within 500 feet of the subject site. The closest surface water body is an unnamed creek located at approximately 1,000 feet southeast of the site. Please note that a ditch was also located at approximately 500 feet southwest of the site that appears to typically have standing water present.

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.

Wellhead protection areas defined by 42 USC 300h-7(e) have not, as of this report, been designed by NCDENR for MCB, Camp Lejeune. However, MCB Camp Lejeune has identified well protection areas on the base. Based on the most recent Wellhead Protection Plan Update (2002) performed for MCB Camp Lejeune, the site is located within a potential wellhead protection area.

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.

No, recharge to the lower portions of the aquifer does not appear to be significant in the area. Groundwater samples collected from 50 feet deep Type III monitoring wells at the site have historically been reported 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

No, all contaminant levels from the November 2003 sampling event were reported below the Gross Contaminant Levels established by the Department.

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.

No, the property does not contain any primary or secondary residences.

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.

Yes, the property contains a community center, convenience store with gasoline/diesel dispensers, post office, YMCA, and laundromat.

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.

Yes, as mentioned above, the property contains active commercial enterprises. The property also contains three above ground storage tanks, which provide petroleum products to the previously referenced dispensers.

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

Yes, children visit the community center, convenience store, post office, YMCA, and laundromat.

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

No, the property is open to the public with the exception of the AST's and remediation system.

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

Yes, the area that potentially has contaminated soil is capped with either parking lots or buildings.

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 capped.

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

The MCB Camp Lejeune is not subject to local or county zoning requirements. The surrounding properties have been developed for military support purposes.

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

YES NO

No, the designated use of military property is not likely to change within 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)?*

The closest residence is approximately 150 feet from the subject site.

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?*

As previously stated, the community center and YMCA are located on the subject property.

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

As previously mentioned, the MCB Camp Lejeune is not subject to local or county zoning requirements.

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

The subject site is located in a mostly residential area.

B. RECEPTOR INFORMATION

1. Water Supply Wells

Physical reconnaissance and review of the Wellhead Protection Plan – 2002 Update prepared by AH Environmental indicated that there is one water supply well (LCH-4009) 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.

The closest surface water body is an unnamed creek located at approximately 1,000 feet southeast of the site. Please note that a ditch was also located at approximately 500 feet southwest of the site that appears to typically have standing water present.

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 located within 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 50 feet deep Type III monitoring wells indicates that petroleum constituents have not impacted the deeper portions of the aquifer.

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 Camp Lejeune. 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 Camp Lejeune 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.

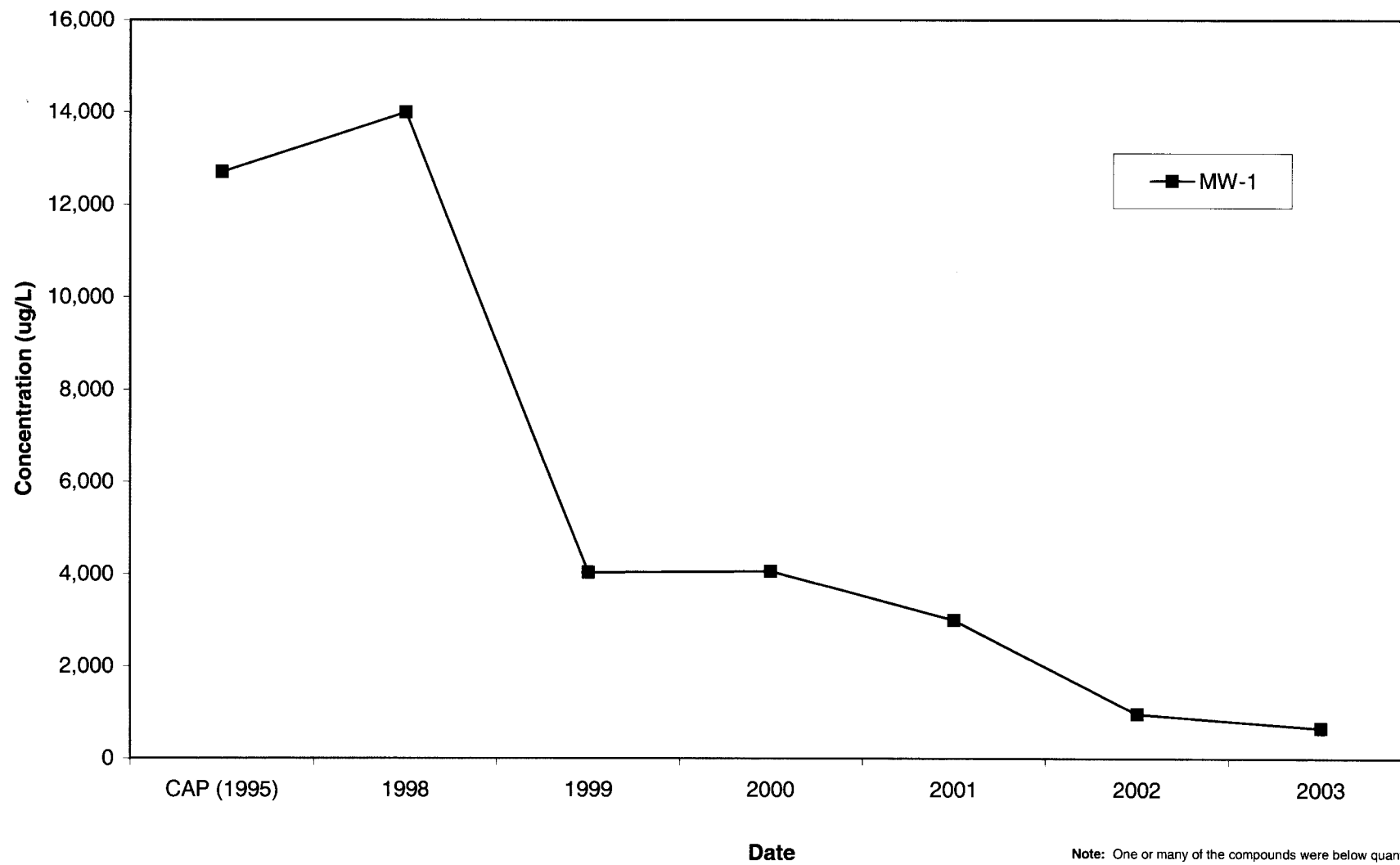
7. Property Owners and Occupants

The subject site is owned and operated by the Commanding General – Marine Corps Base, Camp Lejeune.

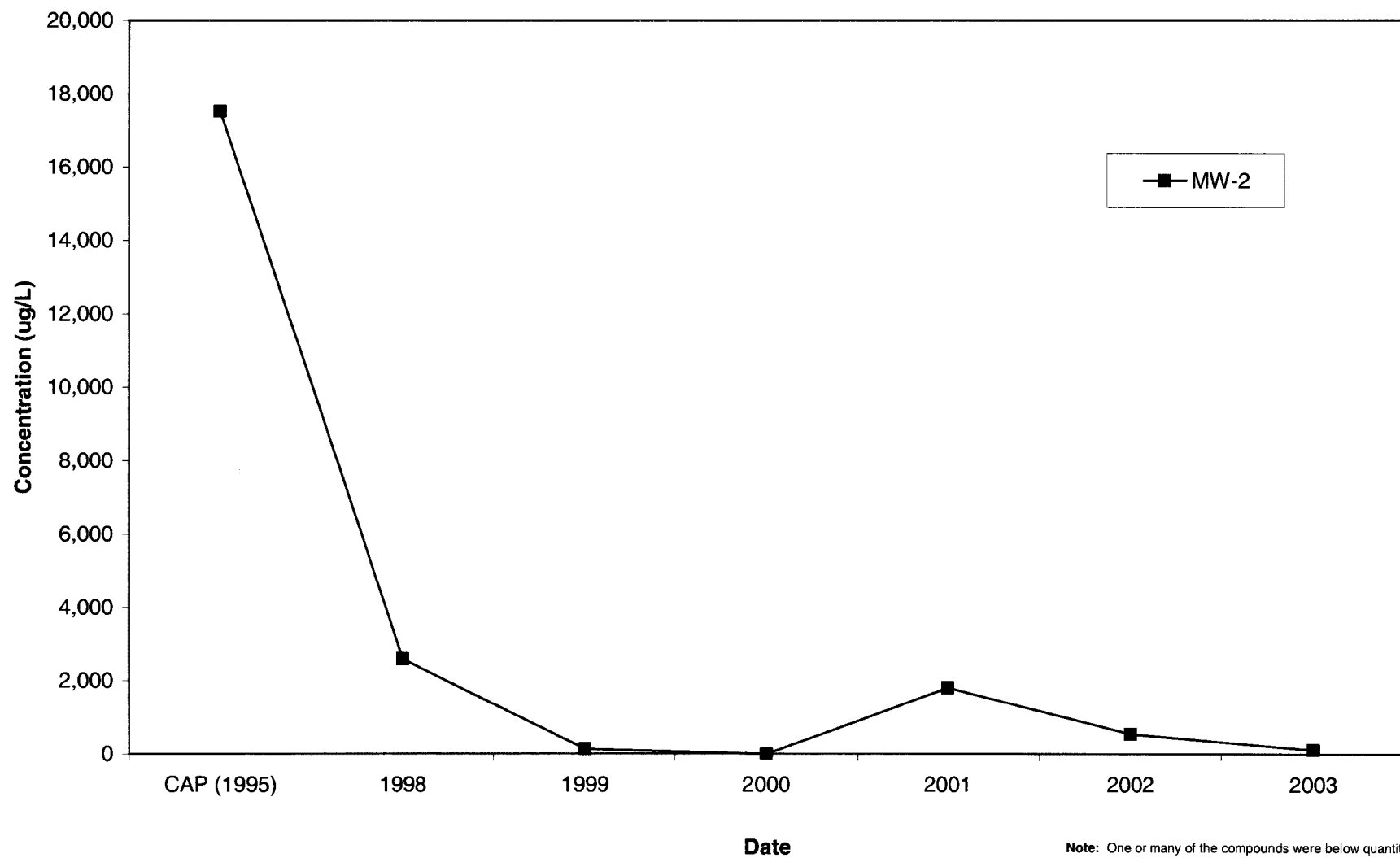
APPENDIX F

TOTAL BTEX TRENDS FOR SELECTED MONITORING WELLS

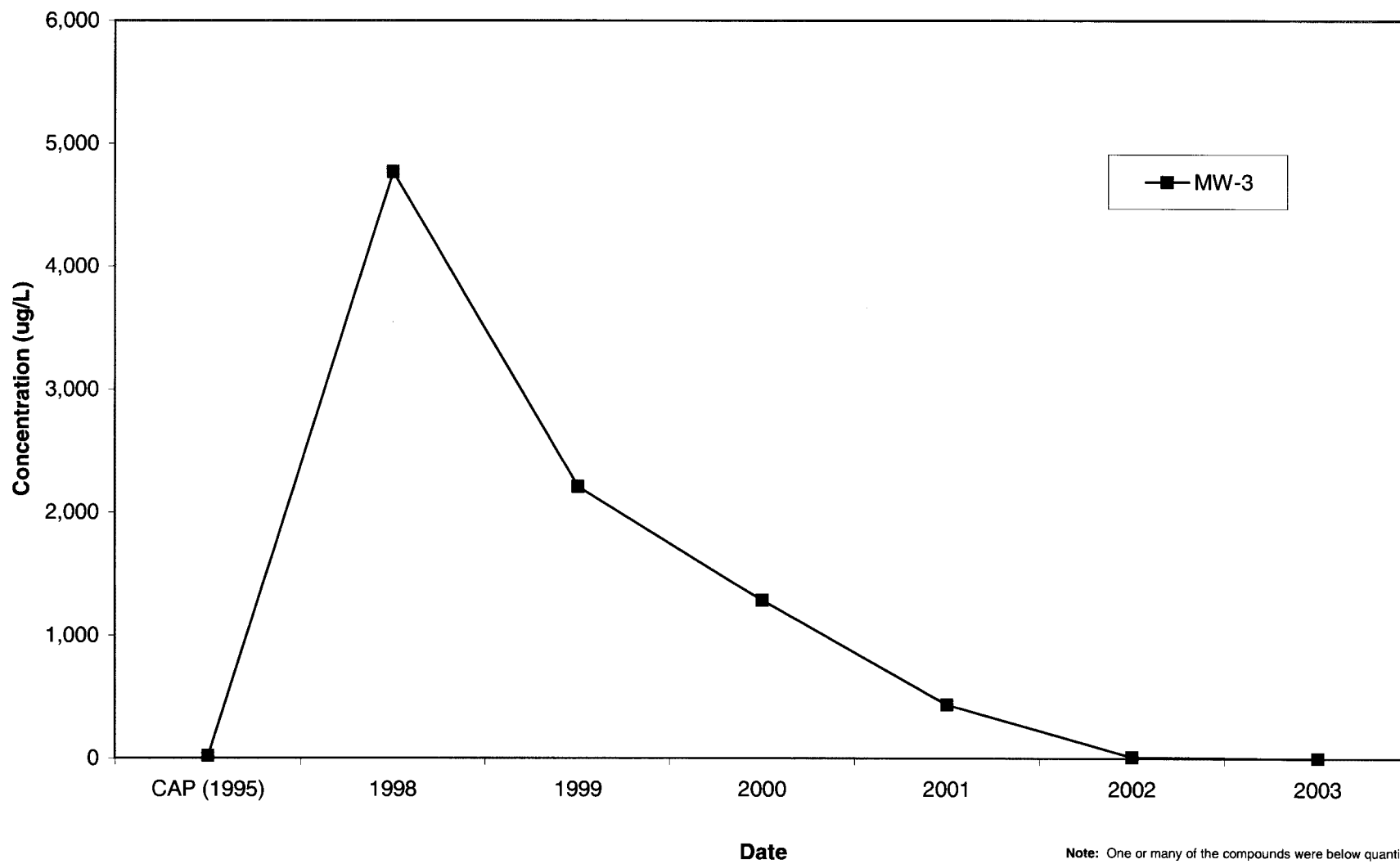
Total BTEX Trends at MW-1 LCH-4015



**Total BTEX Trends at MW-2
LCH-4015**



**Total BTEX Trends at MW-3
LCH-4015**



**Total BTEX Trends at MW-11
LCH-4015**

