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AMENDED PROPOSED PLAN OF REMEDIAL ACTION

207 A Street
Wilmington, DE

DNREC Project No. DE-1247

November 2002

Delaware Department of Natural Resources and Environmental Control
Division of Air and Waste Management
Site Investigation & Restoration Branch
391 Lukens Drive
New Castle, Delaware 19720

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1.0 INTRODUCTION

The 207 A Street (site) is located on the southern bank of the Christina River in Wilmington, Delaware, a portion of which is utilized as parking and outdoor dining by the Christina River Club. It is bounded on the south by A Street, and on the east by the Walnut Street Bridge. In order to determine the potential for environmental liability prior to the purchase of the site, the Riverfront Development Corporation (RDC) entered into the Department of Natural Resources and Environmental Control's (DNREC's) Voluntary Cleanup Program (VCP) under the provisions of the Delaware Hazardous Substance Cleanup Act, 7 Del. C. Chapter 91 (HSCA). Through a VCP Agreement, RDC agreed to investigate the potential risks posed to the public health, welfare, and the environment at the site. RDC contracted EA Engineering, Science and Technology, Inc. (EA) to perform a remedial investigation (RI) of the site.

The purpose of the RI was to: 1) collect additional information from the site to refine site knowledge from previous investigations; 2) delineate and determine the extent of petroleum contamination, and its possible migration and environmental impacts; and 3) determine the level of risk posed by the contaminants, and based upon this analysis, evaluate remedial alternatives.

The proposed plan of remedial action for the 207 A Street site was issued for public comment on Monday, July 22, 2002. The public comment period ended on Monday, August 12, 2002. No comments were received by DNREC. However, in August 2002, RDC approached DNREC with a request to change the proposed development of the property from commercial/industrial to urban residential (i.e., apartment/condominium). Because the owner of the site changed the intended future use of the property after the proposed plan was issued, DNREC determined that it was necessary to issue this amended proposed plan of remedial action (amended proposed plan) to account for this change in use of the site.

The updated risk assessment concluded that elevated risks to human health are posed by soil contamination at the site. DNREC has determined that the initial proposed remedy, which consisted of excavation and removal of "hot spots", containment of residual petroleum-impacted soils underneath structures and a parking lot, would still be protective of human health and the environment provided that no areas of contaminated soil would remain exposed, such as for yards or vegetative buffers.

This document is DNREC's amended proposed plan of remedial action (amended proposed plan) for the site. It is based on the results of the previous investigations performed at the site and the initial proposed plan of remedial action for the site dated July 22, 2002. This amended proposed plan is issued under the provisions of the HSCA and the Regulations Governing Hazardous Substance Cleanup (Regulations). It presents the Department's assessment of the potential health and environmental risks posed by the site.

As described in Section 12 of the Regulations, DNREC will provide notice to the public and an opportunity for the public to comment on the amended proposed plan. At the comment period's conclusion, DNREC will review and consider all of the comments received and then DNREC will issue a final plan of remedial action (final plan). The final plan will designate the selected remedy for the site. All previous investigations of the site, the proposed plan, the amended

proposed plan, the comments received from the public, DNREC's responses to those comments, and the final plan will constitute the remedial decision record for the site.

Section 2.0 presents a summary of the site description and history. Section 3.0 provides a description of the remedial investigation results. Section 4.0 presents a discussion of the remedial action objectives. Section 5.0 presents the amended proposed plan of remedial action. Section 6.0 discusses public participation requirements.

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Setting

The site is located along the southern bank of the Christina River in Wilmington, Delaware (Figures 1 & 2). The site is bordered on the west by the structures and parking lot related to the Christina River Club, on the south by A Street, and to the east by the Walnut Street Bridge. The site is part of a larger property, which consists of three parcels: 201 A Street, 205 A Street, and 207 A Street, which in total encompass 3.58 acres. However, 201 and 205 A Street, which comprise 1.82 acres, were assessed as part of a separate investigation and are not included as part of the site. The remaining parcel (New Castle County tax parcel number 26-050.00.009) constitutes the 207 A Street site, which is approximately 1.76 acres in size. The outdoor dining area for the Christina River Club Restaurant is located on the site. The remainder of the site is utilized as a paved parking lot. The surrounding land use is generally light industrial and commercial.

2.2 Site and Project History

EA, through a review of historical aerial photographs, United States Geologic Survey (USGS) topographic maps, historical Sanborn fire insurance maps and city directories, investigated the historical use of the site. The 1887 and 1893 Sanborn maps indicated that the site was used as a planing mill, for coal storage and as a lumberyard owned by the Cold Spring Ice and Coal Company. By the 1920s, the site was occupied by the American Oil Company, and contained an aboveground storage tank farm, several small buildings and railroad sidings. The American Oil Company continued to operate at the property until the 1980s.

3.0 INVESTIGATION RESULTS

EA conducted a Phase II investigation at the site in October 1999, which consisted of direct push soil and groundwater sampling. Subsurface soil samples were collected from five direct push soil borings at the site. Groundwater samples were collected from temporary monitoring wells constructed in two of the soil boring locations.

Subsequent to the Phase II investigation, a RI was conducted in June and July 2001 by EA, in which soil samples were collected from a total of seven (7) soil borings, with groundwater samples collected from permanent monitoring wells constructed in six (6) of the soil boring locations.

The samples were analyzed for contaminants listed on the Target Analyte List and the Target Compound List (TAL/TCL). The analytical results were first compared to the DNREC Uniform Risk Based Remediation Standards (URS) in a non-critical water resource area, using the unrestricted use risk scenario as a screen in order to determine potential contaminants of concern (COCs). Those chemicals whose concentrations exceeded the unrestricted use URS were selected as COCs and included in a human health risk assessment and ecological risk assessment screening.

Volatile organic compounds (VOCs) detected above the unrestricted use (i.e., residential) URS values included benzene (unrestricted use URS of 800 micrograms/kilogram (μg/kg)) in four Phase II soil boring locations (up to 13,000 μg/kg) and four RI soil boring locations (up to 7,300 μg/kg), and chloroform (up to 390 μg/kg with an unrestricted use URS of 340 μg/kg) in two RI soil boring locations. Subsurface soil samples from five RI soil boring locations contained one or more polynuclear aromatic hydrocarbons (PAHs) at concentrations exceeding their respective unrestricted use URS values, including benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene. The highest concentrations of each of the above compounds were detected in samples collected from soil boring MW-4, located in the approximate center of the property, at a depth of 4-6' below ground surface (bgs). The observed concentrations for benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene also exceeded their respective restricted-use (i.e., commercial or industrial) URS. However, benzo(k)fluoranthene was removed from further consideration as it met the remediation attainment criteria using the 75/10X rule as outlined in the DNREC Remediation Standards Guidance. Complete analytical results from the RI are listed in table format in Appendix A.

Several metals were also identified in subsurface soils at concentrations that exceeded their unrestricted use URS, including aluminum, arsenic, iron, manganese and vanadium. However, all of the inorganic contaminant concentrations except arsenic (up to 41.4 mg/kg) were below the respective restricted use URS values. The background value for arsenic in Delaware is 11 mg/kg. Also, vanadium was removed from further consideration as it met the remediation attainment criteria using the 75/10X rule as outlined in the DNREC Remediation Standards Guidance

Groundwater sampling results from each of the sampling locations from the Phase II investigation and the RI detected benzene at concentrations exceeding its U.S. EPA Maximum Contaminant Level (MCL) for drinking water of 5 μg/L in all but one RI location. Concentrations of benzene ranged from 2 μg/L up to 580 μg/L. Naphthalene was detected above its groundwater URS of 20 μg/L in MW-2 (46 μg/L).

Arsenic was detected above its MCL of 50 μg/L in MW-4 (56.1 μg/L), while iron and manganese exceeded their Secondary MCL (SMCL) in every sample. It should be noted however, that SMCLs represent non-regulatory values that reflect aesthetic qualities such as color and taste, and are not health-based. Further, public water is available in this area, and a Groundwater Management Zone (GMZ) restricting use of groundwater in Wilmington is presently in place, both of which prevent human exposure to site groundwater.

Contaminants identified as COCs and retained for inclusion in the human health risk assessment include: aluminum, iron, manganese, benzene, benzo(b)fluoranthene, benzo(a)pyrene,

dibenz(a,h)anthracene, benzo(a)anthracene, indeno(1,2,3-cd)pyrene, naphthalene and arsenic. The calculations were conducted using the DNREC Site-Specific Calculator for Multiple Analytes (DNREC May 2000 version). The initial risk assessment that was performed assumed a commercial/industrial risk setting, and development of the site into a multi-story office building. It was performed in order to evaluate the cumulative risk associated with the exposure to soil and ingestion of groundwater on the site. The planned future use of the site consists of construction of a multi-story office complex. As such, the completed exposure pathway consisted of incidental soil ingestion, dermal contact, and inhalation of contaminated soils by construction workers. Based upon the assessment, the soil cumulative risk was calculated to be 1.4×10^{-5}, which exceeds the HSCA action level of $1X10^{-5}$, and a hazard index of 0.4, which is below the HSCA action level of 1.0.

Based upon the request to change the proposed development at the site from commercial/industrial to urban residential, a second risk assessment was performed, at DNREC's request, to take into account the proposed change in use. The exposure pathway evaluation determined that the only potential completed pathway is to construction workers. At the present time, there are no completed pathways as the majority of the site is covered by asphalt. After development of the site, exposure pathways will be also be closed as the site will be covered by buildings, hardscape, and paving. In this case, the only potential exposure route was to construction workers exposed to direct contact with subsurface soil during utility maintenance and similar activities.

The cumulative risk calculation (or hazard quotient, HQ) for noncancer risk to the construction worker was 1.3. The ingestion route of exposure accounted for 97% of the total noncancer risk. Consequently the potential for noncancer effects to the construction worker are above the risk cutoff of 1.0.

Noncancer risks are target organ dependent. The three major noncancer risk drivers were manganese (HQ = 0.68), arsenic (HQ = 0.4), and iron (HQ = 0.2). Target organs for these chemicals are the central nervous system and skin/blood for manganese and arsenic, respectively (U.S. EPA 2002b). No target organ has been identified for iron. Because no single target organ has a HI greater than 1.0, noncancer risks to construction workers is acceptable.

The results of the risk calculations show that cancer risks to the construction worker ranged from 3×10^{-8} for benzene to 3×10^{-6} for arsenic. The total cancer risk to the construction worker was 1.4×10^{-5}. Incidental ingestion of soil accounted for 91% of cancer risks. The interpretation of the significance of the cancer risk estimates is based on the appropriate public policy. Delaware Regulations Governing Hazardous Substance Cleanup (DNREC-SIRB 1996) defers to a cleanup and background risk of 1.0×10^{-5}. Based on State regulations the total cancer risk level of 1.4×10^{-5} is above acceptable State risk levels. These risks are being driven by Sample MW-4 (3-5 ft), with a concentration of 41 mg/kg. The next highest arsenic concentration was 17 mg/kg found at MW-6 (4-6 ft). In addition to arsenic, cancer risks are being contributed to by PAH, primarily benzo(a)pyrene, with smaller contributions from dibenz(a,h)anthracene and benzo(b)fluoranthene (Table 5-6). All three of these PAH were found at appreciably higher concentrations in Sample MW-6 (4-6 ft). This is indicative of a potential localized hot spot that may require additional investigation.

Due to the site's location along the Christina River, it was necessary to assess what potential impacts, if any, the site could pose to the environmental health of the river. The site will remain paved ,will be redeveloped, and the existing bulkhead will be maintained, thus precluding erosion of site soils into the river. Groundwater loading values were also calculated to evaluate the possible effects of groundwater discharge into the Christina River. Loading values for all organic and metallic analytes detected in groundwater during both the Phase II and RI investigations were calculated based upon the measured groundwater flow rate at the site and the flow rate of the Christina River. Based upon these calculations, it was determined that there were no exceedences of Delaware's Surface Water Quality Standards (DSWQS) by the discharge of site groundwater into the Christina.

4.0 REMEDIAL ACTION OBJECTIVES

According to Section 8.4 (1) of the Regulations, site-specific remedial action objectives (RAOs) must be established for all plans of remedial action. The Regulations provide that DNREC set objectives for land use, resource use and cleanup levels that are protective of human health and the environment.

Qualitative objectives describe in general terms what the final results of the remedial action, if necessary, should be. The following qualitative objectives are determined to be appropriate for the site:

- Prevent residential exposure to impacted media;
- Prevent future construction worker exposure to elevated concentrations of site contaminants;
- Prevent environmental impacts, specifically to the Christina River, due to impacted media at the site; and
- Continue the use of public water for all purposes to the property and the surrounding community.

These objectives are consistent with the current use of the site as a commercial use in an urban setting, New Castle County zoning policies, state regulations governing water supply and worker health and safety.

Based on the qualitative objectives, the quantitative objectives are:

1. Prevent human exposure to soils and groundwater contaminated by VOCs, PAHs, and metals at concentrations above their respective URS values; and
2. Prevent erosion and discharge of soils contaminated by VOCs, PAHs, and metals into the Christina River.

5.0 PROPOSED PLAN OF REMEDIAL ACTION

Based on DNREC evaluation of the site information and the above remedial action objectives, the recommended remedial actions for the site consist of the following activities as described below:

1. Delineate, excavate and properly dispose off-site, in accordance with a DNREC-approved remedial action workplan and schedule, the soils around MW-6 that contain elevated levels of the following PAH compounds above the $1x10^{-4}$ risk concentration noted in parentheses: benzo(a)anthracene (9,000 μg/kg), benzo(b)fluoranthene (9,000 μg/kg), benzo(a)pyrene (900 μg/kg), and dibenz(a,h)anthracene (900 μg/kg);

2. Cap any impacted soils containing the aforementioned constituents at concentrations between the noted $1x10^{-4}$ levels (above) and the following 1×10^{-5} concentrations noted in parentheses: benzo(a)anthracene (900 μg/kg), benzo(b)fluoranthene (900 μg/kg), benzo(a)pyrene (90 μg/kg), and dibenz(a,h)anthracene (90 μg/kg). The proposed cap would be constructed in accordance with a DNREC-approved remedial action workplan, and in conjunction with development of the property. It would include containment of the soils underneath proposed structures and asphalt parking lots and any clean fill needed to bring the site up to grade. A geotextile fabric will be installed immediately above the residual contaminated soil as a marker boundary to identify the presence of the contaminated layer;

3. Maintain the existing bulkhead along the Christina River, and contain the existing soils at the site so as to prevent their erosion into the Christina River;

4. Placement of a deed restriction on the property: a) prohibiting any digging, drilling, excavating, grading, constructing, earth moving, or any other land disturbing activities on the property (including the bulkhead) without the prior written approval of the DNREC; b) requiring written approval from DNREC prior to any repair, renovation or demolition of the existing structures on the property, or any paved surfaces; and c) prohibiting the installation of any water well on, or use of groundwater at, the site without the prior written approval of DNREC.

5. Inclusion of the site as part of the City of Wilmington Groundwater Management Zone.

Prepare and implement an Operation and Maintenance Plan, in accordance with a DNREC-approved workplan and schedule, to maintain the integrity of the structures and asphalt cap.

6.0 PUBLIC PARTICIPATION

DNREC actively solicits public comments or suggestions on the amended proposed plan of remedial action and welcomes opportunities to answer questions. Please direct written comments to:

DNREC Site Investigation and Restoration Branch
391 Lukens Drive
New Castle, Delaware 19720
Attention: Keith Robertson

The comment period begins, xxxxxxxxxxxxx 2002, and ends at the close of business (4:30 p.m.) xxxxxxxxxxxx 2002. If DNREC receives a request with merit, a public meeting will be held on the amended proposed plan. The meeting time and place will be publicly announced in the same venues as this amended proposed plan.

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John Blevins, Director
Division of Air and Waste Management

11/19/92
Date of Review of Amended Proposed Plan

Figures 1 & 2 from Remedial Investigation Report

Prepared by EA Engineering, Science and Technology, Inc., September 2001.

Figure 1: Site Location/Topographic Map

Figure 2: Sampling Locations

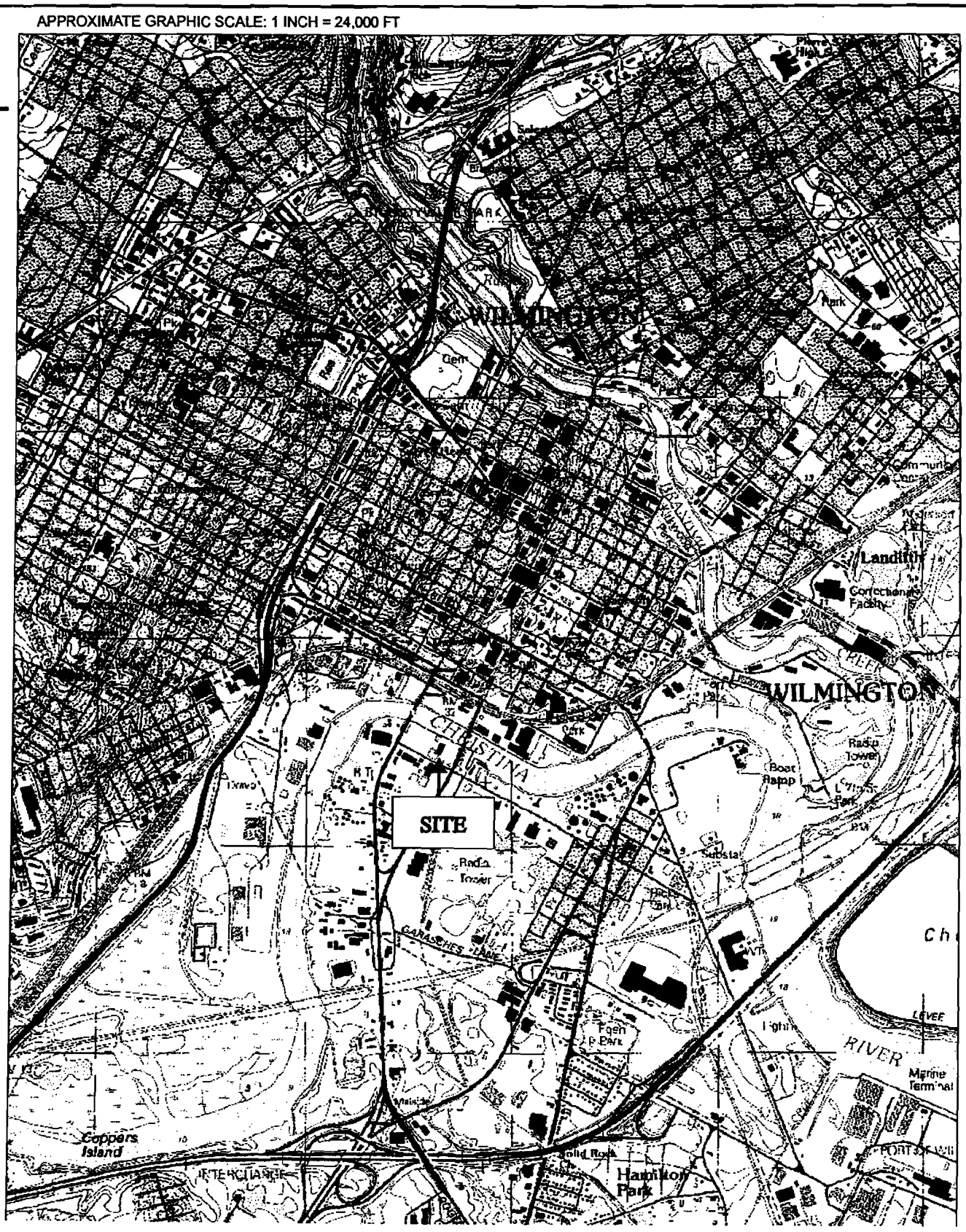
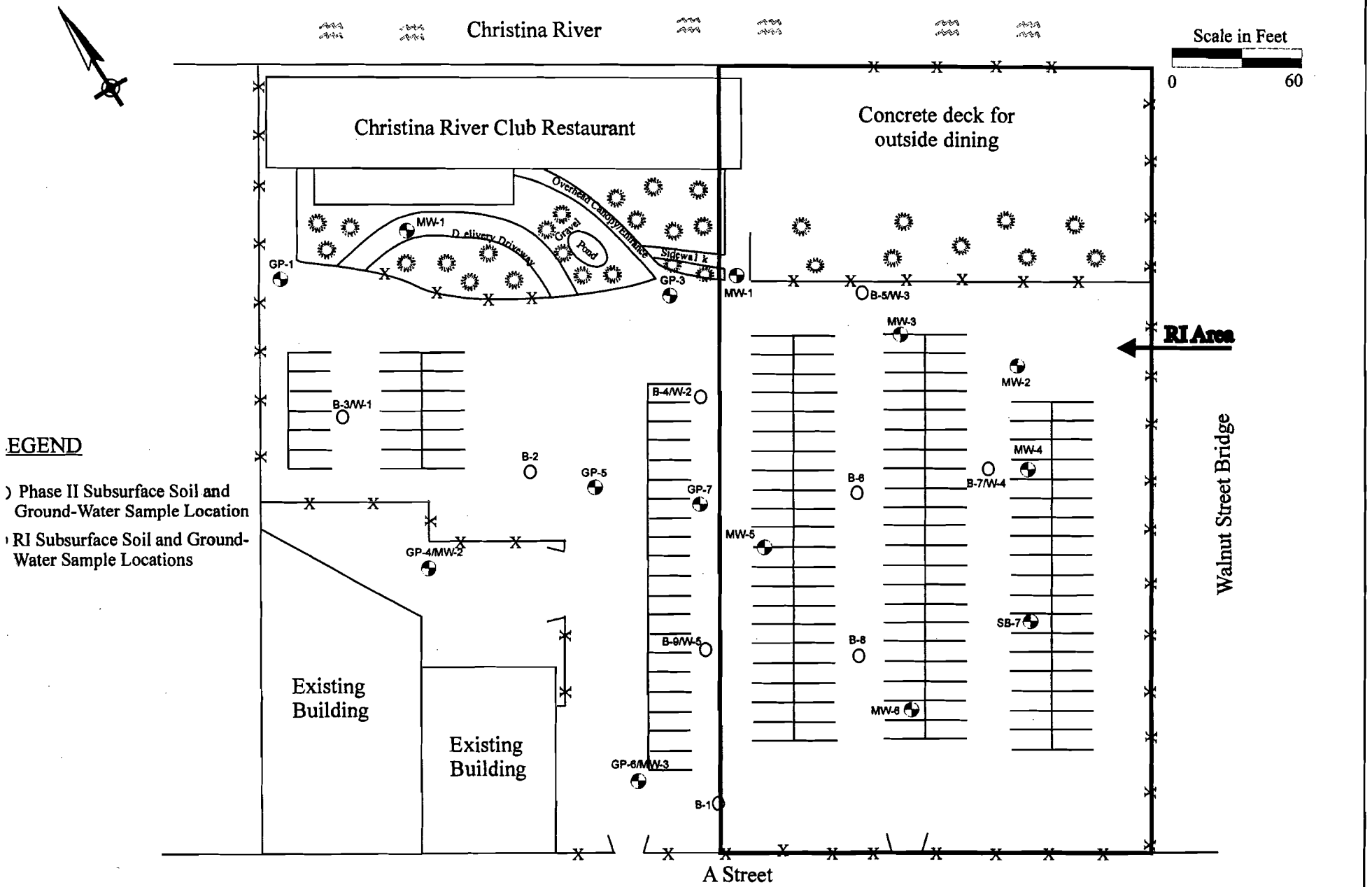


Figure 1-1. Site location map, 207 A Street, Wilmington, Delaware. (Source: USGS 7.5 Minute Series Topographic Map, Wilmington South Quadrangle, DE)



EGEND

) Phase II Subsurface Soil and Ground-Water Sample Location

RI Subsurface Soil and Ground-Water Sample Locations

Figure 1-2. Site sketch of 201, 205, and 207 A Street, Wilmington, DE showing approximate locations of the Phase II sample locations, and the RI sample locations.

APPENDIX A

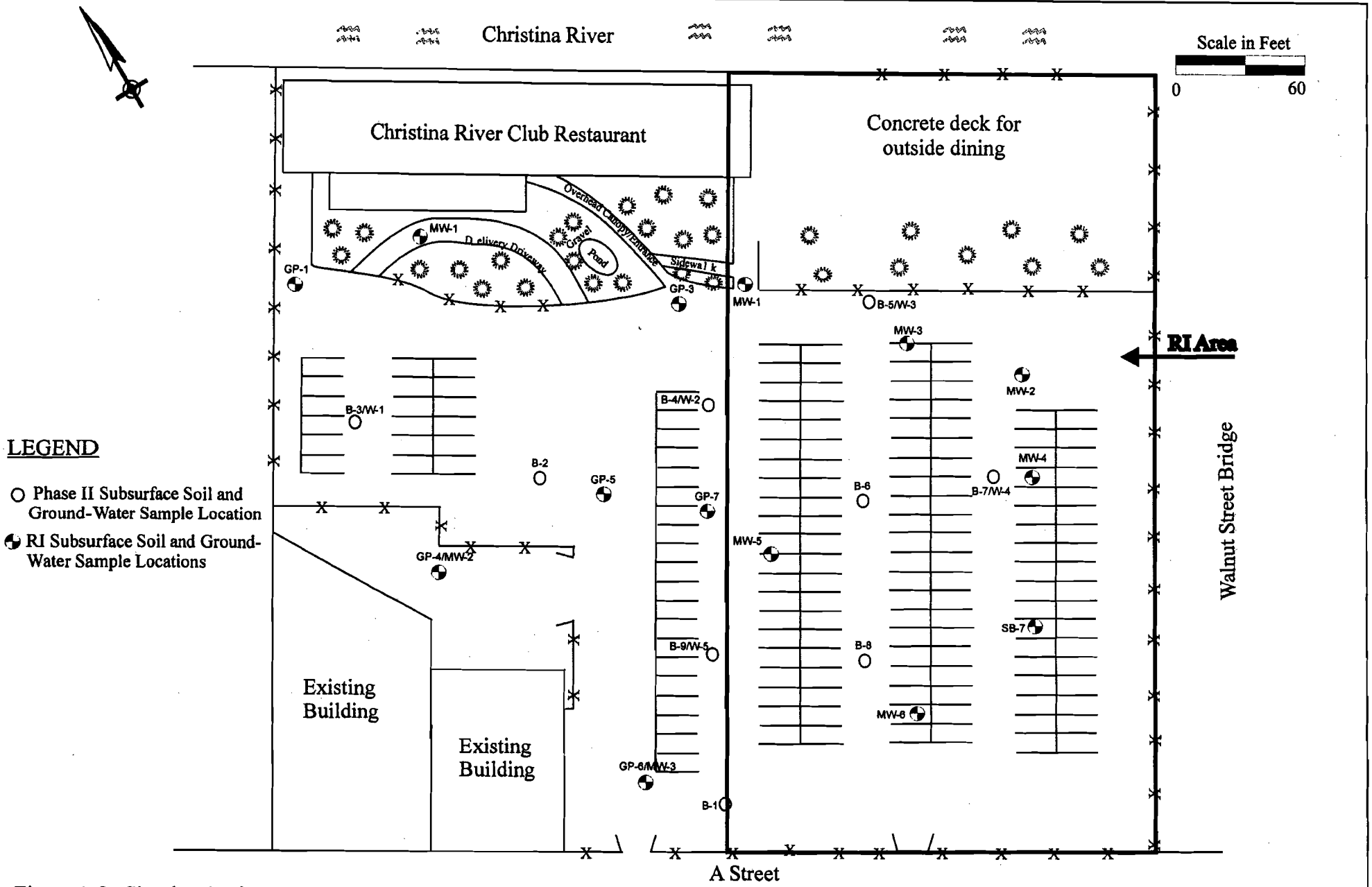


Figure 1-2. Site sketch of 201, 205, and 207 A Street, Wilmington, DE showing approximate locations of the Phase II sample locations, and the RI sample locations.

Subsurface Soil Analytical Results from the 26 October 1999 Phase II Investigation
BTEX and Lead

Concentrations in µg/kg

Sample Number	Depth (ft)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Lead
DNREC-URS		**800**	**650,000**	**400,000**	**420,000**	**400**
B-5	4-6	**<9,400**	<9,400	6,600 J	<18,800	140
B-6	1-3	**3,400**	3,300	640 J	5,090 J	190
B-7	6-8	**<14,000**	6,900 J	<14,000	<24,000	120
B-8	0-2	**13,000 J**	<14,000	<14,000	<27,000	70

< = Not Detected
J = Estimated value, below laboratory detection limit
Delaware Uniform Risk-Based Remediation Standards, URS for Protection of Human Health, Unrestricted Reuse in a Non-Critical Resource Area for Subsurface Soil, December 1999

Concentrations in bold/highlighted exceeded the DNREC URS value

Ground-Water Analytical Results from the 26 October 1999 Phase II Investigation
BTEX and Dissolved Lead

Concentrations in µg/L

Sample Number	Benzene	Toluene	Ethylbenzene	Total Xylenes	Lead
URS	**0.4**	**750**	**700**	**1,200**	**15**
W-3	**76**	11	8	29	<10
W-4	**23**	11	7	31	<10

< = Not detected
Delaware Uniform Risk Based Remediation Standards, URS for Protection of Human Health, Ground-Water, December 1999

Concentrations in bold/highlighted exceeded the DNREC URS value

Subsurface Soil Analytical Results from the 19 June and 12 July 2001 Remedial Investigation
TCL VOC

Concentration, µg/Kg

Acetone	**780,000**	<600	<660	<3400	<680	<590	260 JB	430 J
Chloroform	**300**	<300	<330	<1700	**390**	**320**	<310	<300
Benzene	**800**	440	210 J	**7,300**	**2,100**	**4,800**	**2,400**	<300
Toluene	**650,000**	560	<330	61,000	990	860	730	<300
Ethylbenzene	**400,000**	4,100	220 J	24,000	380	1000	290 J	<300
Total Xylenes	**420,000**	1,330 J	615 J	51,200	2030	2810	1620	68 J

Subsurface Soil Analytical Results from the 19 June and 12 July 2001 Remedial Investigation
Pesticides by EPA Method 8082

Concentration, µg/Kg

alpha-BHC	**100**	<2	<2.2	11	<11	<9.6	<2	<9.8
beta-BHC	**400**	<2	<2.2	2.5	<11	<9.6	<2	<9.8
gamma-BHC (Lindane)	**500**	<2	<2.2	8.8	<11	<9..6	<2	<9.8
Heptachlor epoxide	**70**	<2	<2.2	<2.3	<11	<9.6	51	<9.8
4,4'-DDE	**2,000**	<3.9	<4.2	<4.4	<22	<19	6.3	<19
4,4'-DDD	**3,000**	<3.9	<4.2	<4.4	<22	<19	5.4	<19
4,4'-DDT	**2,000**	<3.9	<4.2	<4.4	<22	<19	5.7	<19
Endrin ketone	**NC**	<3.9	<4.2	10	<22	<19	<3.9	<19

< = Below Laboratory Detection Limit
Delaware Uniform Risk-Based Remediation Standards, URS for Protection of Human Health, Unrestricted Reuse in a Non-Critical Resource Area for Subsurface Soil, February 1998, revised December 1999
Concentrations in bold exceeded the URS value.

Subsurface Soil Analytical Results from the 19 June and 12 July 2001 Remedial Investigation
TAL Metals

Concentration in mg/kg

Aluminum	**7800**	6040	**18300**	2090	**9170**	**13000**	**10300**	7340
Antimony	**3**	0.074 B	0.76	1.9	<0.80	<0.68	0.47 B	<0.69
Arsenic	**0.40**	**4.1**	**6.6**	**23**	**41.4**	**7.3**	**17.3**	**6.9**
Barium	**550**	68	177	57.9	85	51.3	110	65.9
Beryllium	**16**	0.47 B	0.98	0.30 B	0.64 B	0.41 B	0.61	0.46 B
Cadmium	**4**	<0.59	<0.63	1.1	<0.66	<0.57	0.13 B	<0.58
Calcium	**NC**	2770	3170	7560	3810	9330	17500	16300
Chromium	**12000**	14.4	65.2	12.8	25.4	28.4	27.9	19.4
Cobalt	**470**	10.3	32.8	4.8 B	18.8	9	6.6	6.7
Copper	**310**	25.9	64.4	109	34.4	17.7	59.5	15.7
Iron	**2300**	**12000**	**41200**	**12200**	**23800**	**20600**	**20400**	**15100**
Lead	**400**	58.2	102	218	97.3	74.8	75.1	61.1
Magnesium	**NC**	1440	1860	653 B	2210	2790	3940	2530
Manganese	**160**	119	**1460**	72.6	**472**	**249**	**438**	**252**
Mercury	**10**	0.36	0.023 B	0.30	0.21	0.72	0.21	0.094 B
Nickel	**160**	9	39	10.1	14.9	11.5	13.4	10.9
Potassium	**NC**	400 B	601 B	331 B	1070	685	1110	823
Selenium	**39**	1.1	<0.63	1.4	<0.66	<0.57	1.3	<0.57
Silver	**39**	0.79 B	<1.3	<1.3	<1.3	<1.1	<1.2	<1.1
Sodium	**NC**	147 B	312 B	254 B	290 B	186 B	334 B	201 B
Thallium	**18**	<1.2	1.7	<1.3	0.51 B	<1.1	<1.2	<1.1
Vanadium	**55**	27.8	**56.5**	13.3	46.2	30.9	30.1	28.5
Zinc	**2300**	54.6	125	265	111	42.6	87.2	67.6

Subsurface Soil Analytical Results from the 19 June and 12 July 2001 Remedial Investigation
TCL SVOC by EPA Method 8270C
Concentration, µg/Kg

Naphthalene	160,000	180 J	110 J	20,000	290 J	440	10,000	45 J
2-Methylnaphthalene	160,000	170 J	62 J	30,000	230 J	710	5,400	<380
Acenaphthylene	NC	<390	<420	<2200	<440	<370	4,100	77 J
Acenaphthene	470,000	<390	<420	1,000 J	<440	85 J	4,000	<380
Dibenzofuran	31,000	<390	<420	1,300 J	<440	42 J	8,000	<380
Fluorene	310,000	<390	89 J	2,400	<440	140 J	13,000	<380
Phenanthrene	1,000,000	100 J	470	5,800	91 J	460	66,000	300 J
Anthracene	1,000,000	<390	64 J	730 J	<440	67 J	11,000	120 J
Carbazole	32,000	<390	<420	<2200	<440	<370	5,100	<380
Di-n-butyl phthalate	NC	<390	<420	<2200	<440	41 J	<2000	<380
Fluroanthene	310,000	65 J	590	1,900 J	170 J	310 J	61,000	700
Pyrene	230,000	62 J	490	1,900 J	190 J	260 J	63,000	880
Benzo(a)anthracene	900	<390	190 J	720 J	110 J	94 J	22,000	640
Bis(2-Ethylhexyl)phthalate	46,000	<390	<420	<2200	300 J	<370	<2000	<380
Chrysene	87,000	58 J	230 J	1,400 J	150 J	130 J	29,000	640
Benzo(b)fluoranthene	900	53 J	230 J	1,200 J	150 J	80 J	30,000	800
Benzo(k)fluoranthene	9,000	<390	120 J	340 J	120 J	83 J	12,000	710
Benzo(a)pyrene	90	<390	170 J	520 J	140 J	89 J	24,000	840
Indeno(1,2,3-cd)pyrene	900	<390	110 J	470 J	120 J	49 J	16,000	780
Dibenz(a,h)anthracene	90	<390	<420	<2200	<440	<370	4,600	170 J
Benzo(g,h,i)perylene	NC	<390	120 J	520 J	110 J	44 J	14,000	730
TENTATIVELY IDENTIFIED COMPOUNDS								
Unknown hydrocarbons		3,910 J	3,980 J	223,000 J	15,880 J	7170 J		
Octane						1800 JN		
Unknown		12,980 J	4,250 J	168,000 J	5,460 J	6000 J	21,900 J	
Cyclohexane, 1,1,3-trimethyl-						850 JN		
Octane, 3-methyl-					1,200 JN	1600 JN		
Nonane						2100 JN		
Cyclohexane, propyl-					1,200 JN	940 JN		
Nonane, 3-methyl-					1,700 JN	1400 JN		
Unknown C9H12					1,200 J	910 J		
Decane						1500 JN		
Undecane						870 JN		
Sulfur, mol. (S8)					1,100 JN	2000 JN		480 JN
Benzo[e]pyrene								700 JN
Cyclohexane, ethyl-			420 JN					
Unknown C10H14			1,140 J		2,600 J			
Unknown C10H12			1,190 J					
Unknown C11H16			500 J					
Dodecane, 2,6,10-trimethyl-			410 JN					
Dibenzothiophene							7,300 J	
Unknown PAH C15H12							44,900 J	
Unknown dimethylnaphthalene				16,000 J			3,200 J	
Unknown PAH C14H12							3,500 J	
Unknown PAH							41,200 J	
2-Phenylnaphthalene							18,200 J	
Unknown PAH C16H14							8,000 J	
Unknown PAH C16H10							11,000 J	
Unknown PAH C17H12							11,000 J	
o-Terphenyl							3,500 J	
Unknown PAH C19H14							3,800 J	
Unknown PAH C20H12							43,100 J	
Unknown PAH C22H14							4,300 J	
Unknown PAH C22H12							3,000 J	
Unknown substituted benzene		380 J		275,000 J				
Benzene, propyl-				106,000 J				
Pentadecane, 2,6,10,14-tetramethyl-				63,000 J				
Total TICs		17,270 J	11,890 JN	851,000 J	30,340 JN	27,140 JN	227,900 J	1,180 JN
Total PAHs (including TICs)		688 J	3,045 JN	192,260 J	1,871 JN	3,083 JN	613,100 J	8,132 JN

Ground-Water Analytical Results from the 27 July 2001 Remedial Investigation
TAL Metals

Concentration in µg/L

Aluminum	200*	151 B	186 B	122 B	122 B	92.7 B	109 B
Antimony	6	<1.4	2.7 B	1.9 B	<1.4	2.2 B	<1.4
Arsenic	0.5	**15.3**	**16.5**	**7.8 B**	**56.1**	**35.2**	**28.8**
Barium	2000	291	833	369	501	529	332
Beryllium	4	<0.087	0.14 B	<0.087	<0.087	0.15 B	0.17 B
Cadmium	5	<0.54	<0.54	<0.54	<0.54	<0.54	<0.54
Calcium	NC	96200	75700	102000	86700	106000	107000
Chromium	100	1.9 B	2.3 B	1.4 B	1.9 B	1.1 B	1.4 B
Cobalt	220	<4.2	<4.2	<4.2	<4.2	<4.2	<4.2
Copper	1300	<1.4	7.9 B	<1.4	<1.4	<1.4	<1.4
Iron	300*	**50700**	**15300**	**33200**	**45900**	**47300**	**36400**
Lead	15	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Magnesium	NC	18100	103000	21800	39000	28700	21000
Manganese	50*	**1020**	**451**	**638**	**690**	**1320**	**640**
Mercury	2	0.042 B	0.034 B	0.038 B	0.030 B	0.040 B	0.032 B
Nickel	100	<2.4	<2.4	<2.4	<2.4	2.5 B	<2.4
Potassium	NC	16100	14200	13100	12500	31400	15000
Selenium	50	4.7 B	3.8 B	3.6 B	3.1 B	4.3 B	3.9 B
Silver	100	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
Sodium	NC	65000	25600	41100	35300	52500	34800
Thallium	2	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8
Vanadium	26	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4
Zinc	2000	1380	38.6	43	44.1	91.5	28.7

Ground-Water Analytical Results from the 27 July 2001 Remedial Investigation
TCL VOC

Concentration, µg/L

Acetone	**61**	2 J	48	7	28	27	1 J
2-butanone	**NC**	<5	11 J	6	19	8 J	<5
Benzene	**0.4**	**6**	**580**	**160**	**200**	**390**	**2**
Toluene	**750**	0.9 J	150	15	22	30	0.7 J
Ethylbenzene	**700**	2	110	6	8	24	<1
Total Xylenes	**1,200**	2.6 J	234	32	65	53	3

Ground-Water Analytical Results from the 27 July 2001 Remedial Investigation
TCL SVOC by EPA Method 8270C
Concentration, µg/L

Phenol	**4,000**	<10	7 J	5 J	2 J	5 J	1 J
4-Methylphenol	**18**	<10	1 J	<10	<10	<10	2 J
2,4-Dimethylphenol	**73**	<10	<10	<10	<10	<10	2 J
Naphthalene	**20**	<10	**46**	<10	2 J	3 J	**21**
2-Methylnaphthalene	**12**	<10	5 J	<10	<10	3 J	6 J
Acenaphthylene	**NC**	<10	<10	<10	<10	<10	1 J
Acenaphthene	**37**	<10	2 J	<10	<10	1 J	5 J
Dibenzofuran	**2**	<10	<10	<10	<10	<10	**5 J**
Fluorene	**24**	<10	2 J	<10	<10	<10	9 J
Phenanthrene	**120**	<10	4 J	<10	<10	1 J	18
Anthracene	**180**	<10	<10	<10	<10	<10	2 J
Carbazole	**3**	<10	2 J	<10	<10	<10	**6 J**
Fluroanthene	**150**	<10	2 J	<10	<10	<10	3 J
Pyrene	**18**	<10	1 J	<10	<10	<10	2 J
Bis(2-Ethylhexyl)phthalate	**6**	<10	5 J	2 J	3 J	3 J	1 J
Total PAHs (including TICs)			64 J		2 J	8 J	78 J