PROPOSED PLAN OF REMEDIAL ACTION
FOR THE
RIVERWALK PHASE V & VI SITE
WILMINGTON, DELAWARE

October, 1999

DNREC Project DE-1164

Prepared by:
Delaware Department of Natural Resources and Environmental Control
Division of Air and Waste Management
Site Investigation and Restoration Branch

TABLE OF CONTENTS

LIST OF FIGURES

I. INTRODUCTION

In May 1999, EA Engineering, Science and Technology, Inc. ("EA") was contracted by Rummel, Klepper, & Kahl, LLP ("RK&K") to conduct a remedial investigation/feasibility study ("RI/FS") during the final design phases of a proposed concrete and brick walkway ("Riverwalk Phase V & VI") to be constructed in conjunction with the on-going redevelopment of the Wilmington, Delaware Christina Riverfront. RK&K was contracted by the Riverfront Development Corporation of Delaware ("RDC") and the Delaware Department of Transportation ("DelDOT") to design the proposed walkway. The proposed walkway extends along the Christina River from the Sardo & Sons property to the location of the current Shipyard Shops.

The DNREC-SIRB conducted a Brownfield Preliminary Assessment II ("BPA II") of this area during the period from June 1–3, 1999. DNREC has validated results of laboratory analyses from that investigation and the sample location map was utilized for use in EA's development of the RI/FS. No additional sampling or testing was performed by EA.

RDC had entered into the DNREC-SIRB Voluntary Cleanup Program ("VCP") for the RI/FS and the potential remediation of the project area. The purposes of the VCP were to identify potential sources of contamination within the limits of construction and develop remedial alternatives for the detected contamination that protect human health, welfare and the environment during and after construction of the pedestrian walkway.

The RI and the FS were completed in September 1999.

II. PURPOSE

This Proposed Plan of Remedial Action ("Proposed Plan") is based on the RI/FS completed by EA, on behalf of RDC and is issued under the provisions of the Delaware Hazardous Substance Cleanup Act, 7 Del.C. Chapter 91, (HSCA") and the Regulations Governing Hazardous Substance Cleanup ("Regulations"). This Proposed Plan presents the Department's assessment of the human health and environmental risk posed by the impacted areas of concern.

The Department will provide public notice and opportunity to comment on the Proposed Plan in accordance with HSCA and Section 12 of the Regulations. At the conclusion of the comment period, the Department, after review and consideration of the comments received, shall issue a Final Plan of Remedial Action ("Final Plan") which will designate the selected procedures and stipulations concerning current and future activities. The Proposed Plan, the comments received from the public, the Department's responses to the comments, and all of the site documents form the basis for the Final Plan.

The contents of this Proposed Plan include a description of the site, the analytical results of the RI and a discussion of the FS for the site.

Site Description and History

The Riverwalk, Phase V & VI project area is located in the South Wilmington area of New Castle County, Delaware. The project is located adjacent to the northwest side of the Christina River and extends from the Big Kahuna Nightclub to the Shipyard Shops (Figure 1). The project area is approximately 0.75 miles south, southwest of downtown Wilmington. The immediate surrounding area is mainly a mix of commercial, industrial, and vacant land. Approximately 2,170 individuals reside within a 0.25 mile radius of the site.

The project area was historically used for local industry, mainly related to building ships and railroad cars. The project area was never known as a residential area, but rather, it was set aside for commercial and industrial purposes. The surrounding land was historically reclaimed marshland that was filled with a variety of materials including slag, rubble and other industrial debris.

In May 1999, EA Engineering, Science and Technology, Inc. ("EA") was contracted by Rummel, Klepper, & Kahl, LLP ("RK&K") to conduct a remedial investigation/feasibility study ("RI/FS") during the final design phases of a proposed concrete and brick walkway ("Riverwalk") to be constructed in conjunction with the on-going redevelopment of the Wilmington, Delaware Christina Riverfront.

III. INVESTIGATION RESULTS

As mentioned in Section I, the DNREC-SIRB conducted a Brownfield Preliminary Assessment II ("BPA II") of this area during the period from June 1 – 3, 1999. DNREC has validated results of laboratory analyses from that investigation and the sample location map was utilized for use in EA's development of the RI/FS. No additional sampling or testing was performed by EA.

DNREC-SIRB collected soil samples from 7 test pits surrounding the proposed Christina Pedestrian Riverwalk within the associated tax parcels owned by Ahmed Amer, Pettinaro, Inc. and Shipyard L.L.C (Figure 2). Sampling was conducted in June 1999 during the BPA II.

DNREC-SIRB conducted field screening of environmental samples in DNREC's mobile field laboratory with a portable gas chromatography/mass spectroscopy ("GC/MS"), x-ray fluorescence ("XRF") and immunoassay techniques. The samples were collected in accordance with procedures described in the approved Workplan of the DNREC-SIRB BPA II of the P&C Roofing, Inc. site. Confirmatory samples were sent to DNREC's laboratory, a Delaware Certified HSCA laboratory, using Standard Operating Procedures for Chemical Analytical Programs (DNREC, 1997) for analyses. A subset of the prepared data was used by EA for the preparation of the RI/FS.

The soil samples were collected within the interior acreage from the test pits placed along the riverfront. This is to be the area of the future pedestrian Riverwalk. Existing foundations are to be removed to accommodate future construction. The resulting data derived from the DNREC-SIRB BPA II are intended to assess disposition options for material to be excavated during the

construction and to assess if subsurface material, if left in place, would pose a threat to human health based on the Delaware Uniform Risk Based Remediation Standards Guidance ("URS").

Total PAH was detected at concentrations ranging from 4.887 mg/kg to 44.19 mg/kg. Five samples exhibited a PAH concentration exceeding the URS for dibenzofuran. In two of the five samples the laboratory detection limit for dibenzofuran exceeded the URS criteria. Two samples exhibited a PAH concentration exceeding the URS for benzo(a)anthracene, three samples exceeded the URS for benzo(b)fluranthene, six samples exceeded the URS for benzo(a)pyrene and one sample exceeded the URS for indeno(1,2,3-cd)pyrene.

Arsenic was detected at concentrations ranging from 5.8 mg/kg to 18.5 mg/kg. Three samples and a duplicate exceeded the carcinogenic arsenic value of 0.4 mg/kg. Lead was detected at concentrations ranging from 4.2 mg/kg to 2,960 mg/kg. Two samples exceeded the lead URS value of 400 mg/kg. Two samples were submitted for Toxicity Characteristic Leaching Procedure ("TCLP") extraction. The TCLP test mimics the conditions found in a municipal landfill, where materials are exposed to acidic leachates. Arsenic, barium, chromium, lead and selenium were detected in one sample (TP-3d) in excess of URS values. None of the analytes detected were in concentrations above RCRA levels.

The site developer is planning to excavate the contaminated soil in the area for constructing the Riverwalk. Hence, the soil sample analytical results were compared to the DNREC Soil Reuse Criteria included in Figure 3 for ultimate disposition.

The soil reuse plan shown in Figure 3 was developed by DNREC to provide guidance for the acceptable reuse of soil such that human health is protected. Category A material is considered acceptable for unlimited contractor reuse and can be replaced by a residential setting. Category B material is moderately impacted material that would be generally acceptable to place in a commercial or industrial setting if the material is covered with a geotextile marker fabric and clean fill placed over the marker fabric. Category C material may be reused onsite if the material is properly contained under an impermeable cap such as asphalt, concrete, or a building foundation. Category Z material may not be reused onsite and requires proper disposal offsite. The soil reuse classifications based on shallow soil sampling along the proposed walkway is included in Figure 4.

According to HSCA regulation 8.4(1) remedial action objectives must be established for all Plans of Remedial Action. The remedial action is evaluated utilizing both the Qualitative and Quantitative Objectives. The following considerations were taken into account in the development of the Qualitative and Quantitative Objectives:

- The site will be developed into a pedestrian walkway, and
- The site is located adjacent to the Christina River.

The Qualitative Objectives for this site are:

- Prevent future site users from directly contacting the existing soil to an extent that would result in unacceptable risk,

- Prevent future construction workers from directly contacting existing soil to an extent that would result in unacceptable risk,

- Dispose offsite material with detected concentrations exceeding the DNREC decision criteria for onsite reuse, and

- Mitigate surface discharge and/or release of soil contaminants to the Christina River.

Based on the qualitative objectives, the quantitative objectives that the DNREC-SIRB determined will meet the qualitative objectives include:

- Dispose offsite excavated material that exhibited PCB concentrations exceeding 8 mg/kg and prevent human contact and stormwater contact to material exceeding 0.5 mg/kg PCB,

- Dispose offsite excavated material that exhibited PAH concentrations exceeding 300 mg/kg and prevent human contact and stormwater contact to material exceeding 1.0 mg/kg PAH,

- Dispose offsite excavated material that exhibiting lead concentrations exceeding 5,000 mg/kg and prevent human contact and stormwater contact to material exceeding 400 mg/kg lead, and:

- Dispose offsite excavated material that exhibiting arsenic concentrations exceeding 500 mg/kg and prevent human contact and stormwater contact to material exceeding 3.0 mg/kg arsenic.

Three remedial alternatives were evaluated to address the RAOs. The alternatives for surface and sub-surface soils are as follows:

Alternative 1: No action. Do not redevelop the property.

Alternative 2: Containment of affected material: Remove exposure routes of residually impacted material. Placement of a deed restriction that prohibits excavation greater than a depth of 1 foot in areas of concern identified on a property map without DNREC-SIRB approval (i.e. under outlying areas of the walkway). Develop an Operations & Maintenance Plan ("O&M") in order to periodically inspect the completed remedy.

Alternative 3: Excavation, removal of soil with detected concentrations exceeding Category A: Excavate and dispose offsite material exceeding the unrestricted reuse classification.

The details of each remedial alternative are conveyed in the EA FS for this project.

IV. PROPOSED PLAN OF REMEDIAL ACTION

Based upon the information and results of the investigation performed at the Riverwalk Phase V & VI property in Wilmington, Delaware, the DNREC-SIRB recommended plan of remedial action is Alternative 2. Alternative 2 meets or exceeds all the criteria utilized in the evaluation of remedial alternatives that is conveyed in Subsection 8.5 of the Regulations and is the most cost effective remedy. Additional information regarding the evaluation of the remedial criteria is contained in the EA FS for the site

V. PUBLIC PARTICIPATION

The Department actively solicits public comments or suggestions on the Proposed Plan of Remedial Action and welcomes opportunities to answer questions. Please direct written comments to:

Department of Natural Resources and Environmental Control
Site Investigation and Restoration Branch
Attn: Paul W. Will
391 Lukens Drive
New Castle, Delaware 19720

Or call (302) 395-2600. The public comment period for this Proposed Plan of Remedial Action begins on October 13, 1999 and closes at the close of business (4:30p.m.) on November 3, 1999. If so requested, a public hearing on the Proposed Plan will be held. The meeting time and place will be announced if said meeting is requested.

DE-1164 II B8
Pww99071.doc

FIGURE 1 SITE LOCATION MAP

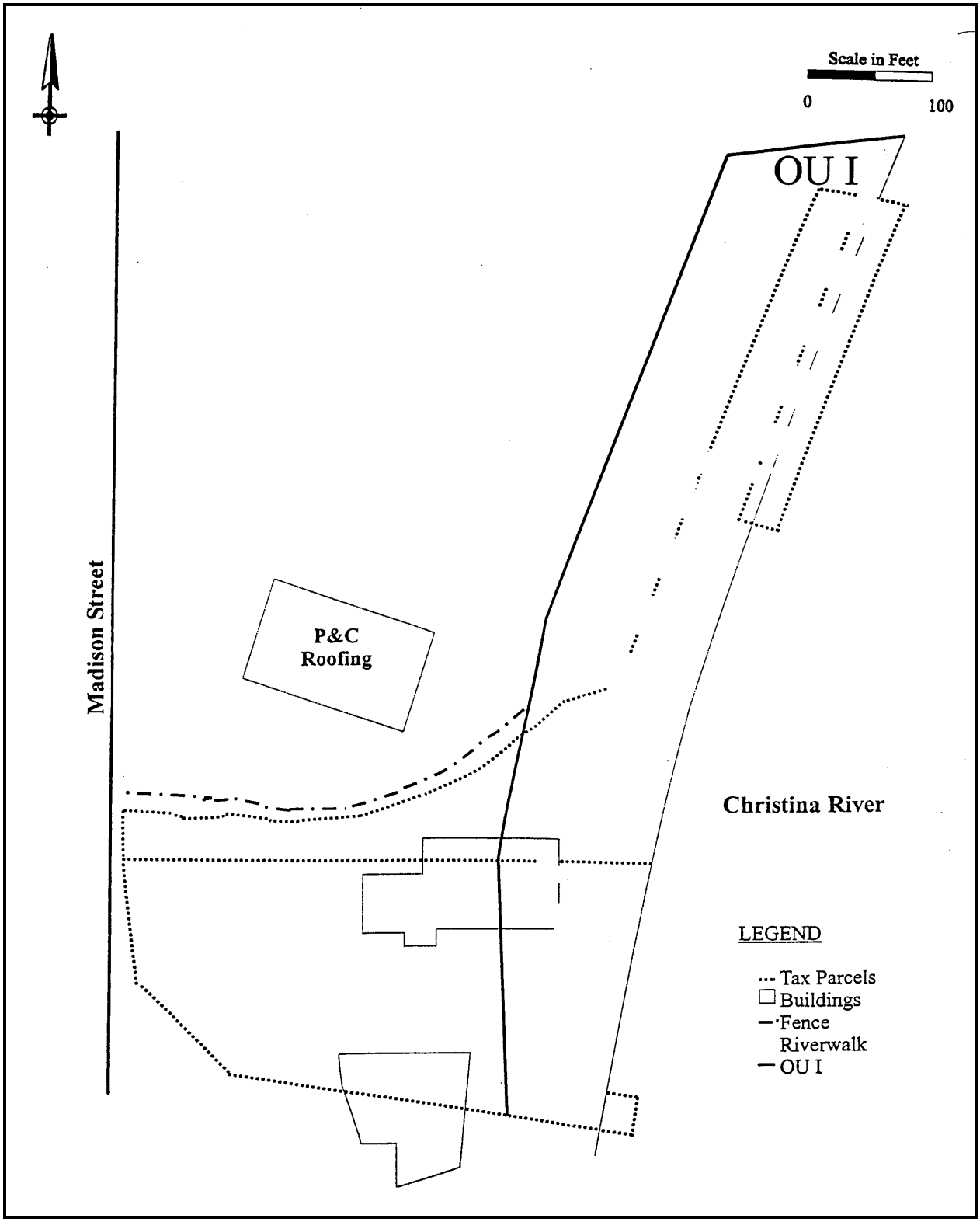

FIGURE 2 SITE LOCATIONS - RIVERWALK

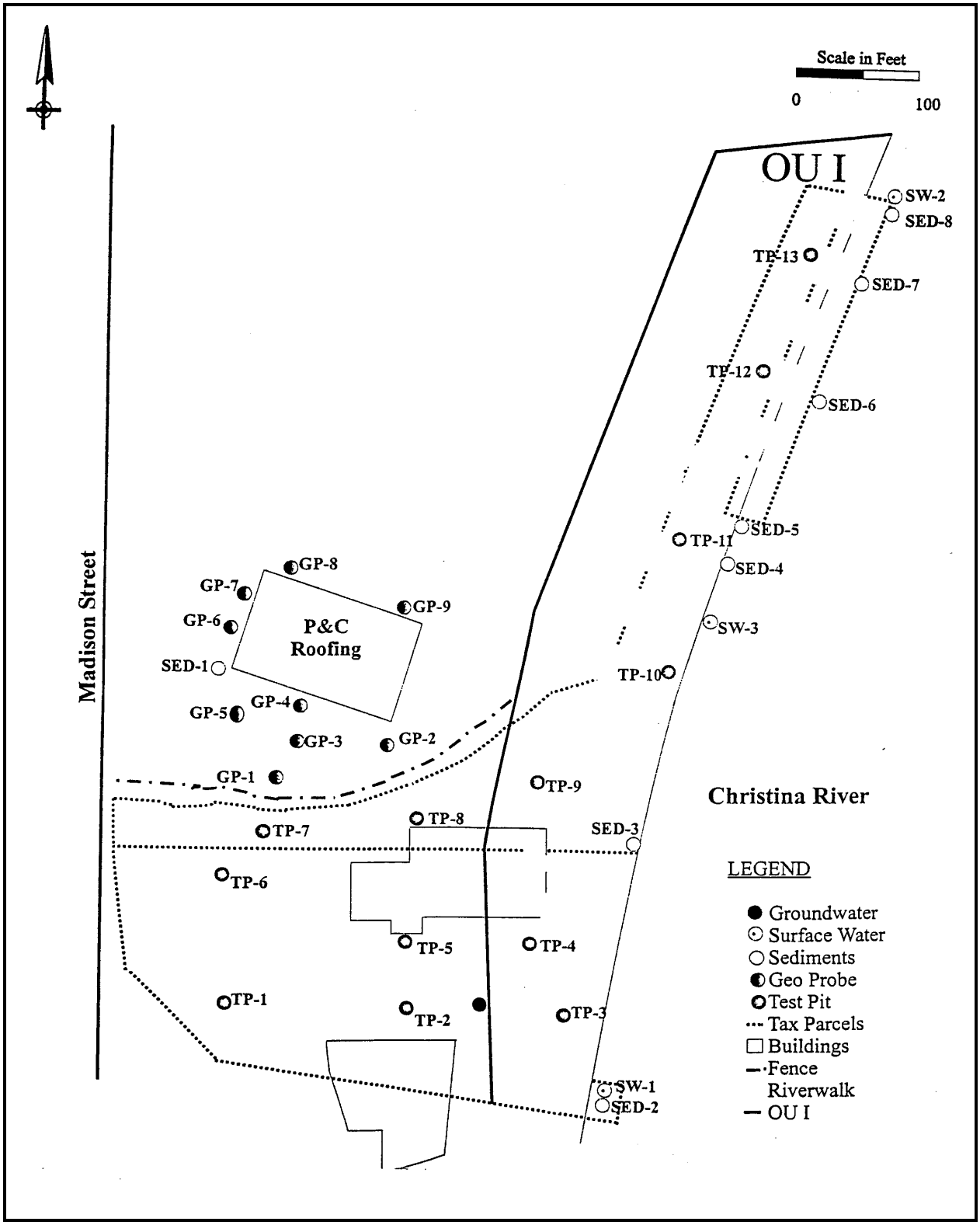

FIGURE 3 SOIL RE-USE LEVELS FOR INTERIM ACTION EXCAVATION MATERIAL MANAGEMENT
Christina River Pedestrian Walkway Phase V and VI – The Big Kahuna to Shipyard Shops, June 1999
(Concentrations in mg/Kg)

Soil Category	A	B*	C	Z
Contaminant of Concern	Unlimited Contractor Re-Use	Construction Re-Use within Project Area	Re-Use Limited to Under Foundations of Building in Project Area	Off-Site Treatment of Disposal
Oily Soil or Free Product	none	None	none	Yes
Petroleum Hydrocarbons				**
C5 through C8 aliphatic hydrocarbons	100	500	500	
C9 through C12 Aliphatic hydrocarbons	1000	2500	2500	
C19 through C18 Aliphatic hydrocarbons	1000	2500	2500	
C19 through C36 Aliphatic hydrocarbons	2500	5000	5000	
C9 through C10 Aromatic hydrocarbons	100	500	500	
BTEX	<10	10 to 25	25 to 100	>100
C PAHs	<1	1 to 25	25 to 300	>300
PCBs	<0.5	0.5 to 3	3 to 8	>8
Arsenic	<3	3 to 100	100 to 500	>500
Lead	<400	400 to 1,500	1,500 to 5,500	>5,000

***Requires a Geotextile marker Fabric of a minimum quality of Amoco ACF 4508 or equivalent as determined by DNREC and a minimum on one foot fill over contaminated soil.**

****Above 5,000 ppm for total TPH in soil.**

FIGURE 4 AREAS OF DNREC-SIRB SOIL RE-USE CLASSIFICATION