OPERABLE UNIT 1
FEASIBILITY STUDY

Sunnyside Yard
Queens, New York

April 18, 1997

Prepared for:

National Railroad Passenger Corporation
30th Street Station
4th Floor South
Philadelphia, Pennsylvania 19104

Prepared by:

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1.0 INTRODUCTION

The National Railroad Passenger Corporation (Amtrak) owns a property known as Sunnyside Yard (Yard), located at 39-29 Honeywell Street in Queens County, a borough of New York City, New York (Figure 1). A portion of the Yard has been designated by Amtrak for construction of a new High Speed Trainset Facility (HSTF) Service and Inspection (S&I) Building. The Sunnyside Yard is listed as a Class II Site in the New York State Department of Environmental Conservation's (NYSDEC) Registry of Inactive Hazardous Waste Disposal Sites. As a result of the listing, New Jersey Transit Corporation (NJTC), and the NYSDEC entered into an Order on Consent (OOC) Index #W2-008I-87-06 effective October 1989. In accordance with the OOC, several investigations have been performed at the Yard including Phase Phase II and Phase II Addendum Remedial Investigations as well as a health-based Risk Assessment. Each of these investigations was performed by Roux Associates, Inc. (Roux Associates). As a result of these investigations, areas of the Yard were identified where levels of contamination require remedial efforts. With the NYSDEC's concurrence, to accommodate the HSTF S&I Building construction schedule and still address remedial efforts sitewide in a timely and orderly manner, the Yard has been subdivided into six operable units (Figure 2). The operable units are described as follows:

- Operable Unit 1 (OU-I) designated as the soils above the water table within the footprint of the proposed HSTF S&1 Building;
- Operable Unit 2 (OU-2) designated as the soils above the water table within the footprint of the HSTF S&I Building ancillary structures (i.e., the access road and utilities route, the parking area, the construction easement area which surrounds the building, and the construction lay down area);
- Operable Unit 3 (OU-3) designated as the soils and separate-phase petroleum accumulation above the water table in Area 1 of the Yard, as defined in the Phase I Remedial Investigation (RI) report;
- Operable Unit 4 (OU-4) designated as the soils above the water table in the remainder of the Yard;
- Operable Unit 5 (QU-5) designated as the sewer system including the saturated soil beneath the Yard; and
- Operable Unit 6 (OU-6) designated as the ground water including the saturated soil beneath the Yard.

This document presents the Feasibility Study (FS) to develop and evaluate alternatives to remediate impacted soils within OU-I, which consists of soil above the water table within the HSTF S&I Building footprint.

This document follows a Limited Phase II Environmental Site Assessment (phase II ESA) Report prepared by Roux Associates and submitted to the NYSDEC on December 3, 1996. The results of that investigation are discussed in detail in Section 2.

It is the intention of Amtrak to identify Remedial Action Objectives (RAOs) and implement a remedy which is protective of human health and the environment, accommodates HSTF S&I Building construction, and also permits post-remediation site use for the purpose specified above.

1.1 OU-l Site Description

The OU-I Site is located in the northeastern portion the Yard as shown in Figure 2. The OU-I Site measures approximately 790 feet in length and 60 feet in width, or slightly over one acre in total area. The OU-I Site slopes gently from east to west.

Currently, the OU-I Site operates as a portion of an active lOS-acre rail yard and is occupied by Wheel Track No. 1 and No. 2 and a portion of the Metro Shed and No. 1 Engine House Track. The most readily apparent features of the OU-I Site are the railroad tracks, concrete and asphalt platforms, occasional concrete ruins, overhead electric catenary wires, and the ubiquitous presence of ballast.

Land use immediately adjacent to the Yard is almost exclusively mixed commercial and light industrial with surrounding residential areas located primarily to the south and east.

1.2 OU-l Site History

The OU-l Site and the surrounding Yard were originally owned and used by the Pennsylvania Tunnel and Terminal Company, a subsidiary of the Pennsylvania Railroad (later known as the Penn Central Transportation Company). On April 1, 1976, the Consolidated Rail Corporation (Conrail) acquired the Yard and the same day conveyed it to Amtrak. The Yard originally operated as a storage and maintenance facility for railroad rolling stock and currently functions primarily as a train maintenance and train makeup facility for electric locomotives and railroad cars for Amtrak and NJTC. The OU-l Site formerly housed an inspection pit/repair shed and a portion of a locomotive washer.

1.3 OU-l Site Investigation

A review of the previous investigations at the Yard indicated the need for additional data to adequately characterize the environmental condition (Le., soil quality) of the soil to be encountered during construction activities at the OU-l Site. Therefore, the Phase II ESA investigation was performed.

The Phase II ESA report was submitted to the NYSDEC in December 1996. In a February 20, 1997 letter to Roux Associates (Appendix A), the NYSDEC agreed that the Phase II ESA had characterized soils within the OU-l Site to the water table and had satisfied the requirements of a focused remedial investigation (RI). In a February 25, 1997 letter to Roux Associates (Appendix B), the NYSDEC and the New York State Department of Health (NYSDOH) issued the following NYSDEC-recommended soil cleanup levels for the contaminants of concern at the Yard, including the OU-l Site:

- polychlorinated biphenyls (PCBs) - 25 parts per million (ppm) for both surface and subsurface soils;
- semivolatile organic compounds (SVOCs) - 10 ppm for both surface and subsurface soils for total carcinogenic polycyclic aromatic hydrocarbons (PAHs); and
- lead - 1,000 ppm for both surface and subsurface soils.

The letter further acknowledged that while certain metals were found in soils throughout the Yard above the NYSDEC's Recommended Soil Cleanup Objectives (RSCOs), none (with the exception of lead) were present at levels high enough to require any cleanup. Additionally, the letter did not specify NYSDEC-recommended soil cleanup levels for volatile organic compounds (VOCs) (since none were detected at the Yard above the RSCOs). Finally, the letter stated that these NYSDEC-recommended soil cleanup levels for PCBs, SVOCs and lead are to be used for the entire Yard.

1.4 Objective of the Feasibility Study

Consistent with the conclusions of the Phase II ESA report, the primary objective of this FS for the OU-l Site is to determine the most appropriate alternative for the remediation of soils above the water table impacted by carcinogenic PAHs above the NYSDEC-recommended soil cleanup levels, thereby accommodating the HSTF construction project. In this FS for the OU-l Site, identification and analyses of remedial alternatives will be performed consistent with the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) for the Selection of Remedial Actions at Inactive Hazardous Waste Sites; September 13, 1989, as revised May 15, 1990. This guidance allows for a focused identification and evaluation of remedial alternatives at a site if these alternatives are readily apparent and well proven. Therefore, this FS was conducted using a focused approach and considered a limited number of applicable and well proven remedies. This focused approach was further agreed to during a meeting held with NYSDEC on January 24, 1997.

This FS is being submitted in accordance with the OOC effective October 1989, and was performed in a manner consistent with the procedures for the detailed evaluation of remedial alternatives described by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the National Contingency Plan (NCP) and the United States Environmental Protection Agency (USEPA) guidance document entitled "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA", dated October 1988.

2.0 SUMMARY OF INVESTIGATION

This section summarizes the results of the focused RI, which are fully presented in the Phase II ESA report. The description of the physical characteristics of the OU-1 Site and the surrounding Yard were based on published infonnation and a review of infonnation developed during the Phase I RI and Phase II RI.

2.1 Geology

The geologic deposits at the OU-1 Site and surrounding Yard consist of a thin veneer of fill material (i.e., railroad ballast), which is underlain by glacial ground moraine deposits. Based on the geologic log of Piezometer P-3D (phase IT RI), these Upper Pleistocene unconsolidated deposits are approximately 74 feet thick beneath the OU-1 Site and overlay crystalline bedrock. The ground moraine deposits consist of primarily unstratified, poorly sorted mixtures of fine to coarse sands, silts, clays, gravels, and cobbles.

Surface elevation for the OU-1 Site ranges from approximately 22 feet above mean sea level (MSL) at the eastern end to approximately 18 feet above MSL at the western end. The vertical elevations were determined using the 1988 North American vertical datum (NAVD).

2.2 Hydrogeology

Hydrogeologic data were obtained during the Phase II ESA investigation to characterize ground-water conditions in the area of the OU-1 Site and these data were submitted to the NYSDEC in the Phase IT ESA report. However, since ground-water quality for the entire Yard will be addressed as a separate operable unit, it will not be addressed in this FS. Ground-water elevation data indicate that the water table in the area of the OU-1 Site is relatively flat, with elevations between 15 and 16 feet above MSL, as shown in Figure 3 of the Phase II ESA report. Depth to water from land surface ranges from slightly less than three feet at the eastern end of the OU-1 Site to slightly more than six feet at the western end of the OU-1 Site. Ground-water elevation data collected from Temporary Piezometers TP-6 and TP-7 within the OU-1 Site boundary indicate a horizontal ground-water gradient of 0.0016 feet per foot, which is also indicative of a flat water table. Ground-water flow in the unconsolidated overburden beneath the OU-I Site is in a westerly direction.

2.3 Soil Quality

A total of ten soil borings were completed and 19 soil samples were collected and analyzed during the Phase II ESA investigation of the OU-l Site. Soil samples were analyzed for specific chemical parameters including Target Compound List (TCL) VOCs by USEPA Method TCL SVOCs by USEPA Method PCBs by USEPA Method 8081, and Target Analyte List (TAL) metals by USEPA Methods *601017471.* In addition, three samples were extracted using the Toxicity Characteristic Leaching Procedure (TCLP) and analyzed for pesticides by USEPA Methods 8081 and 8150, and six samples were extracted by TCLP and analyzed for lead using USEPA Method 6010. The types and concentrations of constituents detected are described in detail in the Phase II ESA report.

As previously stated in Section 1.3, the NYSDEC and the NYSDOH established soil cleanup levels for the contaminants of concern at the Yard, which includes the OU-l Site. These NYSDEC-recommended soil cleanup levels were compared to the Phase II ESA soil data to identify exceedances. A review of the Phase II ESA data indicated that only total carcinogenic PAHs from one soil sample (HST-2 [0-2]) exceeded the NYSDEC-recommended soil cleanup levels. Of the eight known carcinogenic PAHs, seven were detected in soil sample HST-2 (0-2) at the concentrations shown below.

Carcinogenic PAH	Concentration in ppm
Benzo (a) anthracene	1.8
Benzo (a) pyrene	2.2
Benzo (b) fluoranthene	5.9
Benzo (g, h, i) perylene	1.3 J
Benzo (Ie) fluoranthene	2.2
Chrysene	2.0
Indeno (1, 2, 3-cd) pyrene	1.1J
Total carcinogenic PAHs	16.5

Note: J - estimated value

The concentration of total carcinogenic PARs in HST-2 was 16.5 ppm, exceeding the NYSDEC-recommended soil cleanup level of 10 ppm. The area requiring remediation was established as half the distance from HST-2 both east and west to the next clean boring (lIST-3 and HST-l, respectively) and within the north and south boundaries of QU-I. Figure 3 shows the approximate boundary of the area requiring remediation (i.e., proposed limit of excavation).

Depth to water from land surface in the area requiring remediation is less than three feet. Therefore, in accordance with guidelines established for QU-l (i.e., soils above the water table within the footprint of the proposed HSTF S&I Building), soil will be excavated to the water table (approximately three feet below land surface) within the boundary shown in Figure 3. Following remediation activities, confirmatory composite samples will be collected from all four sidewalls of the excavation. These samples will be analyzed for PAHs to confirm that the NYSDEC-recommended soil cleanup level has been satisfied.

3.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

Applicable or relevant and appropriate requirements (ARARs) must be considered in developing RAOs. OU-l Site-specific ARARs are presented in Section 3.1. RAOs for the OU-l Site are developed in Section 3.2, based on the results of the Phase IT ESA and ARARs (Section 3.1). General response actions to meet the RAOs are outlined in Section 3.3.

3.1 Applicable or Relevant and Appropriate Requirements

Applicable requirements are defined as:

> "those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations, promulgated under federal or state environmental facility listing laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances found at a CERCLA site."

40 CFR Section 300.5 at 55 Fed. Reg. 8814, USEPA 1990a.

Relevant and appropriate requirements are defined as:

> "those cleanup standards, standards of control, and other substantive re9uirements, criteria, or limitations promulgated under federal, or state environmental or facility listing laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate."

40 CFR Section 300.5 at 55 Fed. Reg. 8817, USEPA 1990a.

Under the Superfund Amendments and Reauthorization Act (SARA), remedial actions must comply with ARARs unless one or more of six conditions are met (CERCLA section 121 [d] [4] [A] - [Fl).

1. Interim Measures - The remedial action selected is only part of a total remedial action that will attain such level of standard or control when completed.

2. Greater Risk to Health and the Environment - Compliance with such requirement at the facility will result in greater risk to human health and the environment than alternative options.

3. Technical Impracticability - Compliance with such requirement is technically impractical.

4. Equivalent Standard of Performance - The remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method of approach.

5. Inconsistent Application of State Requirements - With respect to a state standard, requirement, criteria, or limitation, the State has not consistently applied the standard, requirement, criteria, or limitation in similar circumstances at other remedial actions.

6. Fund Balancing - Applies to remedial actions to be undertaken solely under Section 104 using the Fund.

The NYSDEC Division of Hazardous Waste Remediation uses New York State Standards, Criteria and Guidelines (SCGs) as ARARs in its evaluation and selection of remedial actions (TAGM: Selection of Remedial Actions at Inactive Hazardous Waste Sites - May 15, 1990).

In addition to ARARs, to-be-considered material (TBCs) are to be evaluated as part of the FS process. TBCs are non-promulgated advisories or guidance issued by federal or state government that are not legally binding and do not have the status of ARARs.

The three different types of ARARs are defined below.

1. <u>Ambient- or chemical-specific ARARs</u> are health- or risk-based numerical values or methodologies. Chemical-specific ARARs establish the amount or concentration of a chemical that may be found in, or discharged to, the environment.

2. <u>Action-specific ARARs</u> are usually technology- or activity-based requirements or limitations on actions taken with respect to hazardous wastes.

3. <u>Location-specific ARARs</u> set restrictions on activities based on the characteristics of special locations.

Each of these three types of ARARs and any associated TBCs relevant to this OU-1 Site are discussed in the following sections.

3.1.1 Chemical-Specific *ARARs/SCGs* and TBCs

As stated in Section 2.3, the soil quality results of the completed investigation for the OU-l Site indicate that only SVOCs, specifically total carcinogenic PAHs, were detected in soils above the NYSDEC-recommended soil cleanup levels. Based on these findings, the following potential chemical-specific ARARsISCGs and TBCs have been identified for the soils in OU-l.

NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels (HWR-94-1994), January 24, 1994 - Provides RSCOs based on protection to human health and the environment.

Agency for Toxic Substances and Disease Registry Draft Toxicological Profile of Polycyclic Aromatic Hydrocarbons, 1993 - Provides background concentrations of PAHs for rural, agricultural and urban soils.

USEPA Soil Screening Guidance: User's Guide, April 1996 - Provides risk-based concentrations derived from standardized equations combining exposure assumptions for residential land used with USEPA toxicity data.

Identification of Hazardous Waste (6 NYCRR Part 371) - Provides regulatory action levels for 39 toxicity characteristic analytes to determine whether the soil is a characteristic hazardous waste. In conjunction with this regulation, the NYSDEC issued a May 27, 1993 memorandum which provides for the use of "total constituents" to determine if the material is a hazardous waste without performing a TCLP analysis. This memorandum is considered a TBC.

Based on an evaluation of the above-listed documents and their applicability to a rail yard, the NYSDEC and NYSDOH recommended the following soil cleanup levels for the contaminants of concern at the Yard.

- SVOCs - 10 ppm for both surface and subsurface soils for total carcinogenic PAHs.
- Lead - 1,000 ppm for both surface and subsurface soils.
- PCBs - 25 ppm for both surface and subsurface soils.

The specific numerical concentration of constituents detected above these NYSDEC-recommended soil cleanup levels is as follows.

Chemical of Concern	Detected Concentration (ppm)	NYSDEC-Recommended Soil Cleanup Level (ppm)	Location of Exceedance
Total carcinogenic PARs	16.5	10	HST-2 (0-2)

3.1.2 Action-Specific ARARs/SCGs and TBCs

Action-specific ARARs/SCGs and TBCs have been identified based on possible remedial alternatives. These alternatives, as described in Section 5.0, include action", soil excavation and off-site soil disposal, and soil excavation, solid-phase biological treatment and on-site soil disposal. These potential ARARs/SCGs and TBCs are presented in Table 1.

3.1.3 Location-Specific ARARs/SCGs and TBCs

One location-specific ARARISCG has been identified based upon the Yard's location, its physical characteristics and proximity to wildlife habitats. This potential ARARISCG is provided below.

Location	Requirement	Prerequisite (or Applicability	Citation
Within lOO-year floodplain	Minimize potential harm, restore and preserve beneficial value of the floodplain.	Remedial action alternative will occur in a floodplain	Executive Order 1198, 40 CFR Part 6, Appendix A

3.2 Development of Remedial Action Objectives

Remedial Action Objectives are medium-specific goals for protecting human health and the environment. RAOs were developed based on the investigation's results used in combination with the ARARs/SCGs and TBCs. For soils, the RAO is to remove or remediate the source of PARs in the soil, and to reduce the potential for erosion and transport of contaminated surface soil to downgradient receptors.

3.3 General Response Actions

General response actions consist of measures which can be undertaken to achieve the RAOs. The following general response actions have been identified.

No Action - The no action response measure provides a baseline assessment for comparison with other response measures consisting of greater levels of response. When a response measure may cause a greater environmental or health danger than a no action response. the no action response measure may be considered as an appropriate remedial measure for a site. The no action response is evaluated and carried through the FS as required by 40 CPR Part 300.430[e][iii]. The no action response may consist of no action whatsoever on the site. or some limited measure. such as periodic monitoring or access restrictions to the Yard or specific area of the Yard.

Institutional Controls - Institutional controls restrict access to impacted media by means other than physical barriers or removal. For example. deed restrictions may be used to limit future use of the property to activities that do not cause potentially hazardous levels of exposure.

Containment - Containment is a general type of source control measure in which the chemical constituents of concern exceeding specified NYSDEC-recommended soil cleanup levels are isolated from the remaining area of the OU-I Site. Containment measures provide isolation of the impacted thereby minimizing the potential for direct exposure to. or migration of, chemical constituents of concern. Containment technologies usually consist of impermeable or low permeability caps. which may be constructed as a surface feature. Containment can also include hydraulic containment or vertical or horizontal barriers at depth.

Removalffreatment Actions - Removal response actions consist of the removal of media containing chemical constituents of with concentrations exceeding specified NYSDEC-recommended soil cleanup levels. from their existing place via pumping. or other extraction techniques. Removal of impacted media requires appropriate treatment and/or disposal in accordance with applicable regulations. For soil. OU-I Site conditions must be restored by replacement with clean soil.

Treatment technologies for soil and sediment may consist of physical, thermal, chemical, or biological methods. Impacted media are treated to levels which attain the defined NYSDEC-recommended soil cleanup levels for the chemical constituents of concern. Any off-site treatment options allow for potential exposure to affected media of workers and the surrounding community during transport and handling activities.

Removal/Disposal Actions - These response actions consist of removal as described above, and subsequent disposal. Disposal options consist of on-site or off-site disposal in an appropriately designed and permitted facility. Off-site disposal requires proper analyses to classify the material as hazardous or nonhazardous, and transport to the appropriate properly permitted landfill. On-site disposal requires the construction of a landfill in accordance with state and federal siting and construction requirements.

In-Situ Treatment - In-situ response actions involve the treatment of impacted media without disturbing the media (i.e., treatment in place) using physical, chemical or biological methods. As with other types of treatment technologies, the objective of in-situ treatment is to attain the specified NYSDEC-recommended soil cleanup levels.

4.0 DEVELOPMENT OF TECHNOLOGIES

This section identifies, evaluates and screens applicable remedial technologies which may be employed at the OU-l Site to achieve the RAOs described in Section 3.2. The remedial technologies to be evaluated in this section have been chosen based on their successful remediation of PAHs in soil, and are separated by "technology type", and specific "process option" associated with each technology type. For example, the technology type bioremediation may be associated with process options such as solid-phase biological treatment, slurry-phase biological treatment, and in-situ biological treatment.

The objective of screening the technology types and process options is to narrow the field of available technologies, eliminating those which cannot be implemented, or those associated with a high cost but not a substantial increase in performance in relation to other options. After screening, the remaining remedial technologies will be combined into a variety of remedial alternatives which will undergo a more detailed evaluation in Section 5.0.

The technology types and associated process options in this section have been identified through a review of relevant literature, experience with similar types of environmental problems, and engineering judgment. All of the options will be evaluated on the basis of:

- effectiveness;
- implementability; and
- cost.

The criteria for effectiveness considers whether the technology type and process option can decrease the concentrations of PAHs in the affected media to meet the RAOs. Also considered are potential impacts to human health and the environment, and whether the technology has proven reliable for the conditions at the OU-l Site.

The criteria for implementability focuses on institutional aspects of remedial technologies with factors such as time schedules, and the availability of services, equipment and trained personnel being considered as part of the evaluation. Since construction of the HSTF is scheduled to commence within twelve months after approval of this FS, only technologies which are appropriate for use within this time frame will be retained. Another constraint at the OU-I Site is the presence of widespread underground utilities, therefore, any remedial technology or process option which is performed in-situ will include as part of its evaluation, consideration of this constraint.

The criteria for cost addresses only the relative costs of identified technology types and process options. The purpose of these initial cost estimates is to simply judge whether the costs associated with one technology or process option which provide similar levels of effectiveness and implementability are considered as high, moderate, or low relative to one another.

Five technology types with potential applicability to the remediation of PAHs in soil above the water table have been identified. Associated with the technology type "bioremediation", are three process options. The technology types and associated process options are described in detail in the remainder of this section, and include:

1. Bioremediation

   Process Options:

   - Solid-Phase Biological Treatment
   - Slurry-Phase Biological Treatment
   - In-Situ Biological Treatment

2. Soil Washing
3. Soil Excavation
4. Off-Site Soil Disposal
5. On-Site Soil Disposal

4.1 Bioremediation

Bioremediation is a technology type that consists of maintaining a microbial population to metabolize a target organic contaminant. At the OU-I Site, the target contaminants are PAHs. The contaminants serve as a source of carbon which the microbes utilize for growth and maintenance, and also as a source of energy. Microbial degradation alters the molecular structure of the organic compounds to the point of complete mineralization, which consists of the transformation of the compounds into cellular mass, carbon dioxide, water, and inert inorganic residuals. The following treatment systems are available for the biological treatment of PAH-contaminated soils and have been selected as applicable bioremediation process options.

- Solid-Phase Biological Treatment
- Slurry-Phase Biological Treatment
- In-Situ Biological Treatment

4.1.1 Solid-Phase Biological Treatment

Solid-phase biological treatment is a process option that consists of the placement of an impermeable liner on the ground surface; the placement, over the liner, of contaminated soil and an aeration system; and a means to collect leachate, if generated. The aeration system consists of piping and a blower to deliver oxygen to the soil. This system will also be used to deliver a liquid bioblend throughout the soil, which consists of a microbial/nutrient mixture combined with water. The pile may be covered with an impermeable liner to eliminate excess precipitation from falling onto the pile. Heating systems may also be added, if needed. Treatment can consist of soil application depths ranging from one foot to eight feet.

The operation is monitored for pH, nutrient balance, oxygen content and moisture content, with adjustments made as necessary. If leachate is generated, leachate collection is performed by sloping the liner in a way that leachate flows to, and is collected at, a low point. This leachate may either be re-introduced into the soil pile to satisfy the moisture requirements, be discharged to the sanitary sewer system, or be disposed.

4.1.1.1 Effectiveness

In documented experiments, successful biodegradation of total PAHs has occurred in solid-phase biological treatment units that include nutrient, microbe, and water additions, along with soil heating and aeration. Removal rates are shown in various studies to be as high as 98 percent. Although evidence and available data from full and pilot scale studies suggest that solid-phase biological treatment of PAHs is effective, further investigation and bench or pilot scale studies would need to be performed to determine if the current type and concentration of PAHs on the OU-I Site could be decreased below NYSDEC-recommended soil cleanup levels. As long as proper construction and maintenance of the liner is provided, there is no risk of contaminant exposure to humans or the environment.

4.1.1.2 Implementability

Further research into this technology would need to be performed to determine if the PAHs found on the OU-I Site could be bioremediated to the NYSDEC-recommended soil cleanup levels within the time frame of one year. A time consideration that must be taken into account is that any future investigations and bench or pilot scale studies performed would increase the time needed to implement this solid-phase biological treatment option. By providing heat to the unit, it is anticipated that this option will be implemented throughout the winter months.

Based on information mentioned above, solid-phase biological treatment unit heights range from one foot to eight feet. Assuming a soil placement depth of 5 feet, an area of approximately 85 feet by 45 feet would be needed to construct the treatment unit at the Yard. It is anticipated that an area in the southern portion of the Yard, adjacent to the REA Building, is available for the placement of this unit. This area would be fenced to provide access control.

Solid-phase biological treatment systems are relatively simple systems to design, construct, operate and maintain, and the services of solid-phase biological treatment vendors are available to aid in the design, construction and operation of these types of units.

4.1.1.3 Cost

The cost is assumed to be low compared to the other bioremediation technologies (slurry-phase biological treatment and in-situ biological treatment), since solid-phase biological treatment units are neither initially nor operationally cost-intensive. Construction is simple, and operation activities such as aeration of the soil, and water and nutrient addition can be performed by relatively unskilled personnel.

4.1.1.4 Conclusions

Solid-phase biological treatment is both more effective and lower in cost when comparing it to the other bioremediation process options (slurry-phase biological treatment and in-situ biological treatment). Further investigation and pilot or bench scale testing will be needed to determine if this technology can be implemented to treat the current type and concentration of PARs at the OU-I Site to the NYSDEC-recommended soil cleanup levels within the allotted time frame of one year. Despite the need for pilot studies, solid-phase biological treatment will be retained for further evaluation.

4.1.2 Slurry-Phase Biological Treatment

In this method, contaminated soil is suspended with water in a mixing reactor to form a slurry, with aeration provided by a blower. Heat may be added through the blower to operate the treatment system during winter months. Nutrients and microbes are added to the reactor through a feed system. The reactor homogenizes the slurry, causes breakdown of solid particles, aids in desorption of the contaminants from the surfaces of the soil, and increases the contact of the microbes with the contaminants.

Treatment is performed in batches, and the important parameter that must be evaluated is the required retention time of the soil in the reactor to degrade the PARs. Following treatment, solids are separated from the slurry in a dewatering unit, and the liquids produced are fed back into the reactor, discharged to the sanitary sewer system, or disposed. The operation is monitored for pH, nutrient balance, oxygen content and moisture content, with adjustments made as necessary, as well as close monitoring of mechanical system components.

4.1.2.1 Effectiveness

Numerous full scale studies have shown that, in slurry-phase biological treatment units, degradation of PAHs has been successful, ranging from 70 percent to 95 percent reduction rates. Although this evidence suggests that slurry-phase biological treatment of PAHs is effective, further investigation and bench or pilot scale studies would need to be performed to determine if the current type and concentration of PAHs on the OU-I Site could be decreased below NYSDEC-recommended soil cleanup levels. As long as proper reactor containment is constructed and maintained, there is no risk of contaminant exposure to humans or the environment.

4.1.2.2 Implementability

Further research into this technology would need to be performed to determine if the PAHs found on the OU-I Site could be bioremediated to the NYSDEC-recommended soil cleanup levels within the time frame of one year. A time consideration that must be taken into account is that any future investigations and bench or pilot scale studies performed would increase the time needed to implement this slurry-phase biological treatment option. By providing heat to the unit, it is anticipated that this option will be implemented throughout the winter months.

It is anticipated that a slightly larger area will be needed for this unit than for the solid-phase biological treatment unit; however, it would also be feasible to locate the slurry-phase unit in the southern portion of the Yard, adjacent to the REA Building. The slurry-phase biological treatment unit is comprised of the reactor, blower, dewatering unit, associated feed lines and pumps, plus a staging area for soil prior to treatment. The area surrounding the unit would be fenced to provide access control.

Although this system is considered complex, the services of slurry-phase biological treatment vendors are available to aid in the design, construction and operation of these types of units.

4.1.2.3 Cost

Costs for slurry-phase biological treatment are expected to be high in comparison to the other bioremediation alternatives (solid-phase biological treatment and in-situ biological treatment) due to the high engineering costs to design the system and provision of personnel to closely monitor the mechanical operation of the system.

4.1.2.4 Conclusions

Slurry-phase biological treatment has been shown to be comparable in effectiveness to solid-phase biological treatment, however, the costs associated with this process option are higher. Therefore, slurry-phase biological treatment will not be evaluated further.

4.1.3 In-Situ Biological Treatment

In-situ biological treatment is the method of treating subsurface contaminants without excavating the overlying soil and depends on the successful delivery of amendments such as water, oxygen and nutrients to the subsurface. The process is performed by stimulating indigenous microbes to consume the target organic contaminants. Previous studies have demonstrated that the injection of exogenous microorganisms to the subsurface is not a successful procedure, since hydraulic obstacles interfere with addition of large microbial populations.

Water enriched with an oxygen source (such as hydrogen peroxide) and nutrients is percolated through the vadose zone by the use of an infiltration basin on the surface, with placement of recovery wells downgradient to extract the water once it has passed through the contaminated soil. The recovered water would be reintroduced to the infiltration basin. The operation is monitored for pH, nutrient balance, oxygen content and moisture content, with adjustments made as necessary. Recovery well performance will also be monitored.

4.1.3.1 Effectiveness

Generally, sites with subsurface materials exhibiting hydraulic conductivities greater than }0^{-4} centimeters per second (ern/sec) are capable of being treated with in-situ biological treatment. From previous investigations, the subsurface soils at the OU-l Site have been shown to have a hydraulic conductivity as high as 1.63 x 10-^{1} ern/sec, therefore making these materials amenable to in-situ bioremediation. However, based on previous studies, it has been shown that the use of in-situ bioremediation to treat subsurface soils may not be effective in all areas of the subsurface, since preferential pathways in the soil can prohibit the water from reaching some areas. In addition, system performance will not be as reliable as either the solid-phase or slurry-phase biological treatment units since contaminant-specific exogenous microbes cannot be used for in-situ biological treatment.

At the OU-} Site, application below the ground surface is unpredictable due to the presence of underground utilities, with the construction of recovery wells below the surface interfering with these utilities. Any underground obstructions will cause hindered or uneven levels of treatment, since delivery and recovery of water will be difficult.

Further investigation and pilot scale studies would need to be performed to determine if the current type and concentration of PAHs on the OU-} Site could be decreased below NYSDEC-recommended soil cleanup levels. It would also be determined if the process can be successful during performance in the winter months. As long as the nutrients added to the water in the infiltration basin do not cause contamination of the subsurface area, specifically leading to ground-water contamination, there is no risk of contaminant exposure to humans or the environment.

4.1.3.2 Implementability

Further research into this technology would need to be performed to determine if the PAHs found on the OU-I Site could be bioremediated to the NYSDEC-recommended soil cleanup levels within the time frame of one year. A time consideration that must be taken into account is that any future investigations and pilot scale studies performed would increase the time needed to assess both the hydraulic control and level of treatment issues prior to implementing this in-situ biological treatment option.

In-situ biological treatment systems are simple to construct; however monitoring of the subsurface is expected to be labor-intensive. The services of in-situ biological treatment vendors are available to aid in the design, construction and operation of this type of system.

4.1.3.3 Cost

The cost associated with in-situ biological treatment is moderate in comparison with the other bioremediation technologies (solid-phase biological treatment and slurry-phase biological treatment) since installation of the system is expected to be inexpensively priced. however. the monitoring of subsurface conditions is expected to be labor-intensive.

4.1.3.4 Conclusions

In-situ biological treatment has shown to be more expensive than solid-phase biological treatment. and is not as effective since preferential pathways in subsurface soils and underground utility obstructions would cause uneven treatment of the soil. Therefore. in-situ biological treatment will not be evaluated further.

4.2 Soil Washing

Soil washing is an ex-situ treatment method based on the assumption that most of the contaminants in the soil are associated with fine silts. clay. and soil organic matter. and removal of these fine particles leaves the rest of the material (mostly sand) relatively uncontaminated. When performing soil washing. excavated soils are screened to remove debris. followed by the mixing of the soil with water to form a slurry. Through physical separation processes, the washed sand is then separated from the slurry mixture containing the fine materials and associated contaminants.

The slurry mixture must then be treated by another process in order to perform complete treatment.

4.2.1 Effectiveness

The process is effective in separating the contaminated fine materials from the sand, decreasing the amount of material that would be treated or disposed and, could be implemented at the OU-I Site. However, this treatment is not effective in reducing the concentration of PAHs in the soil, and would need to be employed along with another technology, as part of a complete treatment train. There is no risk of contaminant exposure to humans or the environment since the soil washing process takes place in a fully enclosed container, and containment procedures would be implemented to minimize leakage.

4.2.2 Implementability

Based on typical treatment rates of the soil washer, it is estimated that the PAH-contaminated soil at the OU-I Site could be treated in one year, and services of soil washing vendors are available to aid in the design, construction and operation of these systems.

The amount of room needed for implementation of this soil washing system is expected to be similar to that of both the solid-phase biological treatment unit and slurry-phase biological treatment unit, and would be placed in the same location, in the southern portion of the Yard, adjacent to the REA Building.

4.2.3 Cost

The cost associated with soil washing is expected to be moderate in relation to the bioremediation technologies, however the cost relating to soil washing is not a cost for complete treatment to NYSDEC-recommended soil cleanup levels.

4.2.4 Conclusions

Soil washing is effective in separating fine particles and the associated adhered contaminants from uncontaminated sand particles in order to decrease the amount of material that would need to be treated or disposed. However, soil washing is not effective in reducing the concentration of PAHs in soil. It could be used with another treatment technology such as bioremediation, but would not be cost effective. Therefore, soil washing will not be evaluated further.

4.3 Soil Excavation

The contaminated soil will be excavated to the depths and areal extent as described in Section 2.3. Generally, soil excavation is performed with the use of mechanical excavation equipment; however, the presence of underground utilities in the subsurface warrants the use of hand excavation techniques. The hand excavation work will be performed by personnel using shovels.

4.3.1 Effectiveness

The use of this technology would not reduce the volume or toxicity of the PAH-contaminated soils, but would prevent skin contact and ingestion exposure pathways through physical removal. Excavation can be used at the OU-I Site to remove all of the contaminated soil exhibiting PAH concentrations above the NYSDEC-recommended soil cleanup levels. Contaminant exposure risk to workers is possible during excavation, however, with proper health and safety controls, this risk is minimized.

4.3.2 Implementability

The amount of time needed for soil excavation is expected to be approximately one month. Hand excavation work is simple to perform, and the services of experienced contractors, personnel and necessary equipment are readily available.

4.3.3 Cost

The cost associated with excavation is expected to be low in comparison to the in-situ treatment method evaluated (in-situ biological treatment).

4.3.4 Conclusions

Excavation is effective in removing all of the PAH-contaminated soils above the NYSDEC-recommended soil cleanup levels, and is implementable at the OU-l Site. The cost associated with this technology is low in comparison with in-situ biological treatment; however, excavated material would need to be remediated by another method such as bioremediation or disposed at an off-site landfill to achieve NYSDEC-recommended soil cleanup levels, and must be evaluated in conjunction with these other technologies. Therefore, excavation will be retained for further evaluation.

4.4 Off-Site Soil Disposal

Excavated soil would be transported to a properly permitted off-site disposal facility. Based on previous waste classification analysis performed on the OU-l Site, the soil has been classified as nonhazardous and would therefore be disposed at a Resource Conservation and Recovery Act (RCRA) Subtitle D-permitted (nonhazardous) waste facility. Landfill permit requirements would mandate any required testing.

4.4.1 Effectiveness

Off-site disposal at a facility is a proven and reliable method to dispose soils. Although this method would remove the contamination problem at the OU-l Site, the concentrations of PAHs in the soils would remain. During transportation activities, risk of exposure would exist to humans and the environment; however, contingency measures such as covering of transport vehicles and use of leakproof vehicles would minimize this exposure.

4.4.2 Implementability

It is estimated that off-site disposal of the soil would take approximately three weeks and is feasible since transportation personnel and equipment, and landfill capacity are available for implementation of this option.

4.4.3 Cost

The cost associated with soil disposal is likely to be high in comparison to on-site soil disposal due to costs incurred for transportation to the landfill and disposal of the soil in the landfill.

4.4.4 Conclusions

Off-site disposal is an effective and implementable way to dispose soils once they are excavated. Costs are high in comparison to on-site disposal, however, off-site disposal does not require treatment. Therefore, off-site disposal will be retained for further evaluation.

4.5 On-Site Soil Disposal

As a beneficial reuse of the treated soil, any soil that meets the NYSDEC-recommended soil cleanup levels may be disposed (reused) in another part of the Yard. This technology would consist of storing the treated soil to reuse it as fill material at appropriate locations throughout the Yard.

4.5.1 Effectiveness

On-site disposal is not a technology that would attain the NYSDEC-recommended soil cleanup levels, however, it is a reliable method to reuse soils, provided that they have been treated first. There is no risk of contaminant exposure to humans or the environment associated with on-site disposal of treated soil as long as the soils have been treated to meet the NYSDEC-recommended soil cleanup levels.

4.5.2 Implementability

On-site soil disposal is estimated to be completed in approximately one day. The placement of treated soils on the Yard is feasible, since an area in the southern portion of the Yard adjacent to the REA Building is available for the placement of the treated soil, and there are contractors available to perform this work.

4.5.3 Cost

The cost associated with on-site soil disposal is low in comparison to off-site soil disposal, since the cost is based only on the transportation of the soil to the location of the Yard where it would be placed.

4.5.4 Conclusions

On-site soil disposal is an effective and implementable way to dispose treated soils. Costs are low in comparison to off-site soil disposal; however, on-site soil disposal would also require treatment, such as bioremediation, and must be evaluated in conjunction with that technology. Therefore, on-site soil disposal will be retained for further evaluation.

4.6 Applicable Technologies

The following technologies have been determined to be applicable to treat PAHs at the OU-l Site and have been retained for further evaluation in Section 5.0:

- Solid-Phase Biological Treatment
- Soil Excavation
- Off-Site Soil Disposal
- On-Site Soil Disposal

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5.0 DEVELOPMENT AND EVALUATION OF ALTERNATIVES

Section 4.0 identified technology types and related process options that can be used to reduce the potential risks posed by the chemicals of concern found in soil at the OU-I Site. This section assembles those technologies evaluated and retained in Section 4.0 into the following three remedial action alternatives for the OU-I Site:

- Alternative I No Action
- Alternative II Soil Excavation, Solid-Phase Biological Treatment, and On-Site Soil Disposal
- Alternative III Soil Excavation and Off-Site Soil Disposal

The development and evaluation of alternatives consists of the evaluation and presentation of the relevant information needed to select a remedy for the OU-I Site. During the analysis, each alternative is assessed against the "eight criteria" described in Section 5.1. The results of this assessment are used to comparatively evaluate the alternatives in Section 6.0 to determine which of the alternatives is most appropriate for implementation. This approach to evaluating alternatives is designed to adequately compare the alternatives, select an appropriate remedy for the OU-I Site, and demonstrate satisfaction of the CERCLA remedy selection requirements in the Record of Decision (ROD).

The specific statutory requirements for remedial actions that must be addressed in the ROD and supported by the FS report are listed below.

Remedial actions must:

- be protective of human health and the environment;
- attain ARARs (or provide grounds for invoking a waiver);
- be cost-effective;
- utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and
- satisfy the preference for treatment that reduces toxicity, mobility, or volume as a principal element or provide an explanation in the ROD as to why it does not.

In addition, CERCLA places an emphasis on evaluating long-tenn effectiveness and related considerations for each of the alternative remedial actions. These statutory considerations include:

A) the long-tenn uncertainties associated with land disposal;

B) the goals, objectives, and requirements of the Solid Waste Disposal Act;

C) the persistence, toxicity, and mobility of hazardous substances and their constituents, and their propensity to bioaccumulate;

D) short- and long-tenn potential for adverse health effects from human exposure;

E) long-tenn maintenance costs;

F) the potential for future remedial actions costs if the alternative remedial action in question were to fail; and

G) the potential threat to human health and the environment associated with excavation, transportation, and redisposal, or containment.

5.1 Evaluation Criteria

In accordance with the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, and the Inactive Hazardous Waste Disposal Site Remedial Program, the alternatives presented above will be evaluated in the following sections for the following eight criteria.

1. Compliance with ARARsISCGs - describes how the alternative complies with identified chemical-specific, action-specific and location-specific ARARs. The assessment includes infonnation from advisories, criteria, and guidance that agencies have agreed is necessary and appropriate.

2. Overall Protection of Human Health and the Environment - describes how the alternative, as a whole, protects and maintains protection of human health and the environment.

3. Short-Tenn Effectiveness - examines the effectiveness of the alternative in protecting the community, workers and the environment during the specified construction and implementation period until response objectives have been met.

4. Long-Term Effectiveness and Permanence - evaluates the effectiveness of the alternative in protecting human health and the environment after response objectives have been met and are measured in terms of the magnitude of residual risk and the adequacy and reliability of any controls that are used.

5. Reduction of Toxicity, Mobility, or Volume Through Treatment - evaluates the anticipated performance of the specific alternative in terms of treatment process used and materials treated; amount of hazardous materials destroyed or treated; degree of expected reductions in toxicity, mobility and volume; degree to which treatment is irreversible; and the type and quantity of residuals remaining after treatment.

6. Implementability - evaluates the feasibility of the alternative in terms of the ability to construct and operate the technology; reliability of the technology; ease of undertaking additional remedial actions, if necessary; ability to monitor effectiveness of remedy; availability of off-site disposal services and availability of prospective technologies.

7. Cost - evaluates the capital, operation and maintenance, and present worth costs of the alternative.

8. Community Acceptance - preliminarily assesses the community's apparent preferences or concerns about the alternative. This criterion will be fully assessed in the ROD for the OU-I Site.

Assessments of the first two criteria (Compliance with ARARsISCGs and Overall Protection of Human Health and the Environment) relate directly to statutory findings that must be made in the ROD for the OU-l Site. The evaluation of the two criteria involves describing whether each alternative does or does not meet these criteria.

The next five criteria (Short-Term Effectiveness; Long-Term Effectiveness and Permanence; Reduction of Toxicity, Mobility or Volume Through Treatment; Implementability; and Cost) represent the primary criteria upon which selection of an alternative is based. The analysis for these five criteria must be conducted in sufficient detail such that the significant aspects of each alternative and any associated uncertainties are understood.

The last criteria (Community Acceptance) is evaluated to the extent possible in the FS on the basis of infonnation available at the time of the detailed analysis. Due to the fact that available infonnation is usually limited at this time, since the public comment period has not yet occurred, this criteria is not evaluated thoroughly until a proposed remedial alternative has been identified and the ROD is being prepared.

5.2 Detailed Description of Alternatives

The following sections describe in detail the three feasible remedial action alternatives for the OU-I Site. Prior to presenting specific descriptions of the alternatives, actions common to Alternatives II and ill are described in detail so that cost estimates for these elements of the work can be developed.

5.2.1 Common Remedial Actions

There are two remedial actions which are logical steps leading to the implementation of Alternatives II and ill, but are not included as components of Alternative I - No Action. These remedial steps must occur during the course of implementing any active remedial alternative and are consistent from one alternative to another (i.e., they require the same elements and are the same cost). These consistent elements of Alternatives II and ill are referred to as Common Remedial Actions and include:

- trackwork (provided by Amtrak personnel); and
- removal and off-site disposal of concrete.

5.2.1.1 Trackwork (provided by Amtrak Personnel)

Prior to commencement of remediation, certain activities that must be conducted by Amtrak personnel will be perfonned. This includes removal of Wheel Track Nos. 1 and 2 which run through the OU-l area. Relocation of any overhead electrical catenary lines and poles which pose a safety hazard to workers when large pieces of construction equipment are used will also be removed prior to field activities. During all activities perfonned on Amtrak property, a track foreman, flagman and electrical supervisor employed by Amtrak will also be needed.

The time needed to perform track removal activities is estimated to be less than one week; however, Amtrak personnel including the track foreman, flagman and electrical supervisor will be needed for a total of 45 days for both Alternative II and Alternative III.

5.2.1.2 Concrete Removal and Disposal

Within the area of contaminated soil at the OU-l Site, approximately 3,990 square feet of concrete can be found on the surface. In order to access the underlying soil, this concrete must first be removed.

Over most of this area of concrete, a thin asphalt covering estimated to be three inches thick is present. According to available information, the concrete and asphalt can be removed and disposed in the same manner, and the asphalt will, therefore, be included in the concrete volume. Based on field investigation, it is estimated that the concrete is one foot deep and it is also anticipated that substantial concrete foundations will not be encountered beneath this slab. The concrete and asphalt make up a volume of approximately 148 cubic yards.

During work activities, the concrete and asphalt will be sawcut at the limits of the OU-l Site, broken up with power equipment, removed with an excavator and stockpiled as necessary prior to off-site disposal. Excess soil adhering to the surface of the concrete and asphalt will be brushed off. It is expected that the duration of removal activities will be approximately one week.

After the material is removed. it will be sampled in accordance with disposal facility requirements and loaded onto transport vehicles and disposed at a properly permitted off-site recycling facility. Since any soil adhering to the concrete will be brushed off, and it is assumed that the concrete and asphalt is inherently nonhazardous, it will be disposed at a concrete recycling facility where it will be crushed and reused by others.

Based on the assumption that each truck can carry 45,000 pounds without exceeding road weight limits, approximately 12 cubic yards of concrete can be transported per truckload, based on a density of 144 pounds per cubic foot for concrete. The 148 cubic yards of concrete at the OU-I Site should be transported from the OU-I Site in twelve to thirteen truckloads. Assuming that three truckloads per day leave the OU-l Site, the material will be disposed within one week, following the one week period for concrete removal activities.

5.3 Development of Remedial Alternatives

Utilizing the technologies remaining after the evaluation in Section 4.0, the three alternatives identified above have been developed. These alternatives are described in detail in the following sections.

5.3.1 Alternative I - No Action

The No Action alternative is evaluated as a procedural requirement to provide a baseline for comparison of cost-effectiveness of active alternatives. Evaluation of this alternative identifies the potential risks posed by the OU-l Site if no remedial actions are implemented. This No Action alternative consists of access control to allow only authorized visitors on the property and includes Yard perimeter fencing and patrol by a police force employed by Amtrak. If the No Action alternative is implemented, all contaminated soil would remain in place, thus allowing continued exposure to contaminants in excess of the NYSDEC-recommended soil cleanup levels.

Since future construction of the HSTF will be performed as part of ongoing Yard redevelopment, even if the soil is not remediated to the NYSDEC-recommended soil cleanup levels, exposure of the PAH-contaminated soil will occur for the HSTF construction workers during excavation activities. To further restrict access, a fence could be placed around the OU-l Site, however, when the HSTF S&1 Building is being constructed, this fence would be removed, and workers would again be exposed to the PAHs in the soil.

5.3.2 Alternative II - Excavation, Solid-Phase Biological Treatment and On-Site Soil Disposal

Alternative II involves hand excavation, solid-phase biological treatment of PAH-contaminated soils and on-site disposal (reuse) of the treated soil on the Yard. Figure 4 provides the Alternative II flowchart and projected task durations. This alternative consists of the following components, which are discussed in detail in the following sections. The major elements of Alternative II include:

- trackwork (provided by Amtrak personnel);
- concrete removal and disposal;
- soil excavation;
- backfill of excavation with clean fill;
- construction of solid-phase biological treatment unit;
- operation of solid-phase biological treatment unit;
- decommissioning and removal of solid-phase biological treatment unit; and
- on-site soil disposal (reuse).

During the excavation of soils within the area of contamination, and during any loading activities, dust generation may pose inhalation threats to personnel in the work area. To provide for the adequate health and safety protection of workers during the activities performed, active air monitoring will be performed in the work area by trained health and safety personnel in accordance with the TAGM-Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites (October 27, 1989), and, as necessary, dust suppression engineering controls will be implemented.

Since work is to take place on an active rail yard, dangers related to passing trains and electrical lines exist. Although Wheel Track Nos. 1 and 2, and all overhead electrical catenary wires and poles within the area of contamination will be removed prior to commencement of remedial activities, certain precautions must be taken for all workers present on the Yard. In addition to adherence to Occupational Safety and"Health Administration (OSHA) regulations, personnel who will be working on the Amtrak property must be Amtrak safety trained with special emphasis on the specific hazards posed by work at the Yard. A track flagman will be stationed in the work area at all times when remediation activities are being performed.

Following remediation, post-excavation samples will be collected from all four sidewalls of the excavation to confirm that the NYSDEC-recommended soil cleanup levels have been met. Since this FS addresses only soil remediation above the water table, post-excavation samples will not be collected from the floor of the excavation, since that soil will be saturated. Ground-water monitoring will not be performed as a component of this FS, since Yard-wide ground-water remediation will be addressed in a future operable unit FS. The remediation discussed in this FS only addresses PAH contamination in soils above the water table in the OU-I area.

5.3.2.1 Trackwork (provided by Amtrak Personnel)

The details associated with this Common Remedial Action have been discussed previously in Section 5.2.1.1.

5.3.2.2 Concrete Removal and Disposal

The details associated with this Common Remedial Action have been discussed previously in Section 5.2.1.2.

5.3.2.3 Soil Excavation

All contaminated soil within the area of concern will be excavated to the water table, which is at an approximate depth of three feet below land surface. It is estimated that 485 cubic yards of soil will be excavated.

Due to the presence of suspected underground utilities, hand excavation is required throughout the depth of the excavation. Hand excavation is necessary due to the Amtrak policy that requires that, throughout the Yard, any intrusive work to a depth of three feet must be performed in this manner. It is anticipated that the duration for hand excavation work at the OU-l Site will be approximately one month.

Any necessary protection and support for underground utilities encountered is included as part of this work. As excavation progresses, the soil will be stockpiled next to the excavation area, and loaded onto 15 cubic yard dump trucks which will transport the soil to the location of the solid-phase biological treatment unit.

5.3.2.4 Backfill of Excavation with Clean Fill

After soil removal is completed, the excavation will be backfilled to original grade with a clean, structural fill material, similar to that currently found at the OU-l Site. This will be accomplished while minimizing disturbance to the utilities in the excavated area. Structural fill will be compacted to the soil's original density to limit settling. Although tracks will not be placed over this area following remediation, it is possible that in the future heavy trucks and other equipment will be used during work on other operable unit remediations or during HSTF construction work, and will use the OU-l Site to access those areas, therefore a high degree of compaction is necessary.

Based on the total volume of soil and concrete removed, plus extra material (estimated at 20 percent of removed volume) to account for compaction, approximately 760 cubic yards of structural fill will be backfilled. It is anticipated that the amount of time that will be needed to backfill the excavation will be two days.

5.3.2.5 Construction of Solid-Phase Biological Treatment Unit

A solid-phase biological treatment unit would consist of the following elements:

- impermeable liner;
- perforated polyvinyl chloride (PVC) piping network;
- regenerative blower;
- storage and pumping equipment for nutrient, microbe and moisture additions;
- impermeable cover; and
- perimeter haybales and fencing around the treatment area.

During the initial phase of construction of the treatment unit, a lO-mil high density polyethylene liner will be placed at a location on the southern portion of the Yard, adjacent to the REA Building. This liner will act as an impenneable barrier under the solid-phase biological treatment unit. Following liner placement, an aeration system consisting of a perforated PVC piping network connected to a regenerative blower that will provide air and heat, will be installed. Generally, biodegradation will occur at temperatures above 50°F.

Due to limited land area available on the Yard for placement of the solid-phase biological treatment unit, it has been determined that the soil will be piled to a height of five feet. In this case, the estimated amount of land needed to construct this unit is an area approximately 85 feet by 45 feet.

According to available design information, placement of the perforated piping should be one layer of perforated piping for every 2.5 feet throughout the height of the pile. Based on the total soil placement height offive feet in the unit for aU-l soils, two layers ofpiping will be installed. The amount of air required to treat the soil in this solid-phase biological treatment unit is approximately 20 cubic feet per minute (cfm).

The blower and perforated piping network will also be used to deliver a liquid bioblend throughout the soil. This bioblend is a microbiaVnutrient mixture containing the required amount of water to facilitate treatment within the unit. Water added to the bioblend will not exceed the moisture requirement of the microbial population; therefore leachate will not be generated. The microbial population to be used is PAH-degrading bacteria and the nutrients used generally are nitrogen and phosphorus. Containers will be kept in the vicinity of the unit, which will be used for mixing and storing the bioblend.

After installation of equipment and placement of the excavated material, the soil pile will be covered with a 10-mil impenneable liner to prevent precipitation from entering the pile, thus eliminating the generation ofleachate and thus the need for a leachate collection system. Haybales will be placed around the perimeter of the unit as a berm for erosion protection, and the top of the liner will be covered with sandbags or weights to protect it from wind. A temporary 6-foot high chain link fence will be installed around the haybales to control access to the treatment area.

5.3.2.6 Operation of Solid-Phase Biological Treatment Unit

Operation of the solid-phase biological treatment unit is very simple and consists of the monitoring of the unit for nutrients, oxygen levels, pH, and moisture content, with any supplements being made by a technician. Any additions, such as water, nutrients, pH adjustments or microbes that need to be made will be circulated throughout the soil pile by the perforated piping and blower system. It is expected that the technician will monitor and supplement the system once every week. The daily cost of operation includes supplying electricity to the blower.

Operation of the system will continue until the PAH level in the soil reaches the NYSDEC-recommended soil cleanup levels. It has been estimated that the time for remediation using the solid-phase biological treatment system will be eight months.

5.3.2.7 Decommissioning and Removal of Solid-Phase Biological Treatment Unit

After treatment has been completed in the solid-phase biological treatment unit, the treatment unit equipment will be removed from the soil pile. Demobilization will consist of the dismantling of the solid-phase biological treatment unit liner, cover and piping and disposal of this material at an appropriate facility. Hay bales may be left in the Yard and fencing will be removed from the treatment site.

5.3.2.8 On-Site Soil Disposal (Reuse)

Once the equipment has been removed from the treatment unit, the soil will be re-utilized throughout the Yard as fill. The proposed location for on-site storage of soil is the same location as the solid-phase biological treatment unit. Any work associated with formation of the storage pile will take approximately one day.

5.3.3 Alternative III - Excavation and Off-Site Soil Disposal

Alternative III consists of hand excavation, loadout and off-site disposal of PAH-contaminated soils. Figure 5 provides the Alternative III flowchart and projected task durations. This alternative includes the following specific components, which are discussed in detail in the following sections. The major elements of Alternative III include:

- trackwork (provided by Amtrak personnel);
- concrete removal and disposal;
- soil excavation;
- off-site soil disposal; and
- backfill of excavation with clean fill.

During the excavation of soils within the area of contamination, and during any loading activities, dust generation may pose inhalation threats to personnel in the work area. To provide for the adequate health and safety protection of workers during the activities performed, active air monitoring will be performed in the work area by trained health and safety personnel in accordance with the TAGM-Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites (October 27, 1989), and, as necessary, dust suppression engineering controls will be implemented.

Since work is to take place on an active rail yard, dangers related to passing trains and electrical lines exist. Although Wheel Track Nos. 1 and 2, and all overhead electrical catenary wires and poles within the area of contamination will be removed prior to commencement of remedial activities, certain precautions must be taken for all workers present on the Yard. In addition to adherence to OSHA regulations, personnel who will be working on the Amtrak property must be Amtrak safety trained with special emphasis on the specific hazards posed by work at the Yard. A track flagman will be stationed in the work area at all times when remediation activities are being performed.

Following remediation, post-excavation samples will be collected from all four sidewalls of the excavation to confirm that the NYSDEC-recommended soil cleanup levels have been met. Since this FS addresses only soil remediation above the water table, post-excavation samples will not be collected from the floor of the excavation, since that soil will be saturated. Ground-water monitoring will not be performed as a component of this FS, since Yard-wide ground-water remediation will be addressed in a future operable unit FS. The remediation discussed in this FS only addresses PAlI contamination in soils above the water table in the OU-l area.

5.3.3.1 Trackwork (provided by Amtrak Personnel)

The details associated with this Common Remedial Action have been discussed previously in Section 5.2.1.1.

5.3.3.2 Concrete Removal and Disposal

The details associated with this Common Remedial Action have been discussed previously in Section 5.2.1.2.

5.3.3.3 Soil Excavation

As described in Alternative II, all contaminated soil within the area of concern will be excavated to the water table, which is at an approximate depth of three feet below land surface. It is estimated that 485 cubic yards of soil will be excavated.

Due to the presence of suspected underground utilities, hand excavation is required throughout the depth of the excavation. Hand excavation is necessary due to the Amtrak policy that requires that, throughout the Yard, any intrusive work to a depth of three feet must be performed in this manner. As with Alternative II, it is anticipated that hand excavation work will take approximately one month.

In this alternative, the soil will be stockpiled next to the excavation and loaded into rolloff containers with a front-end loader. Once the rolloff container is full, it will transport the soil for off-site disposal. Any necessary protection and support of underground utilities encountered, as necessary, would also be included as part of this work.

5.3.3.4 OfT-Site Soil Disposal

Off-site disposal of soil consists of the sampling, loading into transport vehicles and off-site disposal of soil at a properly permitted RCRA Subtitle D (nonhazardous) landfill. Solidification agents may be added to the soils in order to minimize the presence of free liquids. It is assumed that the use of a solidification agent such as kiln dust, in conjunction with the excess water held in the soils, will increase the weight of the excavated soil by approximately 20 percent.

Based on a commonly used soil density of 110 pounds per cubic foot, the soil that will be excavated will weigh approximately 721 tons. However, with the assumed increase of 20 percent in weight, the total weight of soil to be disposed will increase to 865 tons. Assuming that the road weight limit for trucks is 80,000 pounds, approximately 13 cubic yards of soil can be transported from the OU-l Site in a typical 30 cubic yard truck without exceeding the weight limit. The 485 cubic yards of soil at the OU-l Site would be transported off the OU-l Site in 37 to 38 truckloads, and assuming that three truckloads per day leave the OU-l Site, the soil will be disposed within three weeks.

5.3.3.5 Backfill of Excavation with Clean Fill

After soil removal is completed, the excavation will be backfilled to original grade with a clean, structural fill material, similar to that found at the OU-l Site. This will be accomplished while minimizing disturbance to the utilities in the excavated area. Structural fill will be compacted to the soil's original density to limit settling. Although tracks will not be placed over this area following remediation, it is possible that, in the future, heavy trucks and other equipment will be used during other operable unit remediations or during HSTF construction work, therefore a high degree of compaction is necessary.

Based on the total volume of soil and concrete removed, plus extra material (20 percent of removed volume) to account for compaction, approximately 760 cubic yards of structural fill will be backfilled. It is anticipated that the amount of time that will be needed to backfill the excavation will be two days.

5.4 Evaluation of Alternatives

In the following sections, each of the three alternatives developed above are evaluated with respect to the eight criteria presented in Section 5.1. A summary of the evaluation of alternatives is represented in Table 2.

5.4.1 Evaluation of Alternative I - No Action

In this section, Alternative I is evaluated with respect to the eight criteria identified in Section 5.1.

5.4.1.1 Compliance With ARARs/SCGs

The No Action alternative would not comply with chemical-specific mcs of 10 ppm total carcinogenic PAHs in soil. There are no action-specific or location-specific ARARsISCGs for this alternative because no action would be taken.

5.4.1.2 Overall Protection of Human Health and the Environment

Under this alternative, the OU-l Site would continue to pose a potential risk to Yard workers during construction of the HSTF. The No Action alternative would not provide an adequate level of protection for human health and the environment since the continued presence of PAHs in soil at concentrations exceeding the NYSDEC-recommended soil cleanup levels would result in unacceptable potential human health exposures.

5.4.1.3 Short-Term Effectiveness

Since there are no actions proposed for this alternative, there is no associated construction and implementation period, and therefore are no associated short-term effects to human health and the environment.

5.4.1.4 Long-Term Effectiveness and Permanence

This No Action alternative neither possesses long-tenn effectiveness nor pennanence since the NYSDEC-recommended soil cleanup levels will not be met. The evaluation criteria for long-tenn effectiveness and pennanence are based on the amount of residual risk of contamination left on the OU-l Site after the alternative has been implemented. If the No Action alternative is implemented, the current level of risk associated with PAH contamination in soils above the NYSDEC-recommended soil cleanup levels will remain, and the alternative would therefore not be protective of human health and the environment.

5.4.1.5 Reduction of Toxicity, Mobility, or Volume Through Treatment

This alternative would not have an effect on the toxicity, mobility or volume of the contaminated soil on-site. Some PAIls in soil may degrade over time due to natural processes without the addition of biodegradation enhancers such as nutrients, air, water and microbes. However, despite the fact that the process is able to occur under natural conditions, it has been shown to be a very slow process, and generally does not completely degrade the contaminant. Therefore, it is not expected that the toxicity will decrease significantly, particularly to the NYSDEC-recommended soil cleanup levels, if the No Action alternative is chosen.

5.4.1.6 Irnplementability

Implementability concerns posed by this alternative do not exist since there would not be any action taken. Since current practice at the OU-l Site consists of access control, including Yard perimeter fencing and police patrol, it has been shown that the required resources are available. However, additional remedial actions would need to be taken since soils at the OU-l Site would contain PAHs above the NYSDEC-recommended soil cleanup levels.

5.4.1.7 Cost

The cost associated with this alternative is equal to the current cost of property access control. This is assumed to be a no cost item since the services are currently being implemented in all areas of the Yard, not only for controlling access to the OU-l Site.

5.4.1.8 Community Acceptance

It is not anticipated that the community will accept this alternative since it does not meet the NYSDEC-recommended soil cleanup levels chosen to protect human health and the environment.

5.4.2 Evaluation of Alternative II - Excavation, Solid-Phase Biological Treatment, and On-Site Soil Disposal

In this section, Alternative II is evaluated with respect to the eight criteria identified in Section 5.1.

5.4.2.1 Compliance with *ARARs/SCGs*

Implementation of Alternative II should achieve compliance with the chemical-specific THC of 10 ppm total carcinogenic PAHs in soil.

Because the Yard is located within a 100-year floodplain, remediation activities will be performed to minimize potential harm and to preserve the beneficial value of the floodplain. This alternative will comply with this location-specific ARAR/SCG.

The action-specific *ARARs/SCGs* pertinent to this alternative are provided in Table 3. The requirements identified for hazardous waste are not considered applicable as no hazardous waste has been identified, but are considered relevant and appropriate and are therefore included. This alternative will comply with the action-specific ARARs.

5.4.2.2 Overall Protection of Human Health and the Environment

The solid-phase biological treatment unit will be effective in permanently degrading PAHs to the NYSDEC-recommended soil cleanup level, and it will therefore be safe to dispose the biologically-treated soil on the Yard. This alternative will be protective of human health, and of the surrounding environment since the risks due to PAH exposure have been minimized by treatment. There are risks associated with exposure to dust during soil excavation activities; however, as previously mentioned, this risk will be minimized through proper air monitoring and provision of engineering controls. Movement of heavy machinery also poses risks to personnel in the work area, but this risk will be minimized through compliance with OSHA regulations such as wearing hard hats and safety boots, and daily briefings to personnel warning them of physical hazards.

5.4.2.3 Short-Term Effectiveness

The time needed to complete Alternative II is approximately nine months, which is within Amtrak's allotted timeframe of one year. During excavation activities, there is a potential for generation of dust which may cause inhalation hazards to personnel in the work area, and the surrounding community; however, with proper air monitoring precautions and the use of engineering controls, the risk is minimal. There are no associated risks to the surrounding community, personnel in the work area, or environment during construction and operation of the solid-phase biological treatment unit. During treatment of the soil, an impermeable liner will be placed beneath the soil to avoid contamination of the underlying ground surface, and an impermeable cover will be placed on top of the pile, which will minimize dust generated from the pile. The cover will also prevent precipitation from entering the pile, thus eliminating the generation of leachate. Proper inspection and maintenance of the liner and cover will maximize the control of soils in the unit. Perimeter fence will be installed around the unit to control access, thus eliminating exposure to personnel.

5.4.2.4 Long-Term Effectiveness and Permanence

Bioremediation in the solid-phase biological treatment unit will permanently degrade PAHs found in the soil, thus making it safe to dispose the soil on the Yard once the NYSDEC-recommended soil cleanup levels have been met. Therefore, this alternative will affect a long-term and permanent solution.

5.4.2.5 Reduction of Toxicity, Mobility, or Volume Through Treatment

Bioremediation of the soil will reduce the toxicity of the soil to the NYSDEC-recommended soil cleanup levels in the solid-phase biological treatment unit. As a result, the mobility of PAHs would not be a concern. The volume of the contaminated soil would decrease since there would not be any contaminated soil following solid-phase biological treatment and, therefore, the treated soil may be reused on the Yard.

5.4.2.6 Implementability

Currently, the area needed to implement this alternative is available at the southern portion of the Yard, adjacent to the REA Building. There are solid-phase biological treatment contractors available to perform the bioremediation work, as well as remediation contractors to perform excavation activities and soil movement activities throughout the Yard. Although anticipated that the PAHs will be degraded within eight months, there does exist the possibility that the process may take longer, even to the point of exceeding Amtrak's allotted timeframe of one year. It is considered unlikely that implementation will surpass nine months and highly unlikely that it will exceed one year. Therefore, this alternative is considered to be implementable.

5.4.2.7 Cost

The total cost for Alternative n is $343,100. Table 4 provides the breakdown of costs associated with this alternative.

5.4.2.8 Community Acceptance

Air monitoring will be performed in the vicinity of the solid-phase biological treatment unit, as necessary, to verify that emissions from the soil pile are not exceeding safe levels. It is possible that the community may be concerned with on-site disposal of soil, however this alternative should be accepted if it can be demonstrated that the soil will be cleaned to the NYSDEC-recommended soil cleanup levels and the contaminants are permanently treated through degradation.

5.4.3 Evaluation of Alternative ill - Excavation and OtT-Site Soil Disposal

In this section, Alternative ill is evaluated with respect to the eight criteria identified in Section 5.1.

5.4.3.1 Compliance with *ARARsISCGs*

Implementation of Alternative ill would provide compliance with the chemical-specific TBC of 10 ppm total carcinogenic PAHs in soil. If hazardous wastes are identified from sampling and analysis prior to disposal, the regulatory levels provided in 6 NYCRR Part 371 regarding identification of hazardous waste will be applicable.

As stated in Section 5.4.2.1, the Yard is located within a lOO-year floodplain; therefore, remediation activities must be performed to minimize potential harm. Alternative ill will comply with this location-specific ARARISCG.

The action-specific ARARs/SCGs pertinent to Alternative ill are identified in Table 3. Although no hazardous wastes have been identified, the requirements for hazardous waste are considered relevant and appropriate and have been addressed. Alternative ill will comply with these requirements.

5.4.3.2 Overall Protection of Human Health and the Environment

This alternative provides protection of human health and the environment by removing any soil from the QU-l Site that is in excess of the NYSDEC-recommended soil cleanup levels, thus reducing the risks related to exposure to PAHs. There are risks associated with exposure to dust during soil excavation activities; however, as mentioned previously, this risk will be minimized through proper air monitoring and provision of engineering controls. Movement of heavy machinery also poses risks to personnel in the work area; however, this risk will be minimized through compliance with OSHA regulations such as wearing hard hats and safety boots, and daily briefings to personnel warning them of physical hazards.

5.4.3.3 Short-Term Effectiveness

The time needed to complete Alternative III is approximately 2.5 months, which is within Amtrak's allotted timeframe of one year. During excavation activities, there is a potential for generation of dust which may cause inhalation hazards to personnel in the work area, and the surrounding community; however, with proper air monitoring precautions and the use of engineering controls, the risk is minimal. Risk of off-site human and environmental exposure could potentially exist during off-site transportation activities. However, contingency measures such as covering and lining of the vehicles, and the use of leakproof vehicles will minimize any potential exposure. In the event of an off-site spill of the soil, transportation contractors are trained to cleanup any spills that do occur.

5.4.3.4 Long-Term Effectiveness and Permanence

Since off-site disposal of contaminated soil does not treat the contaminants, long-term effectiveness or permanence is not achieved with regard to treatment; however, permanence on the OU-l Site is achieved since the contaminated soil is completely removed. Off-site disposal is effective in the sense that it is contained in a secure system, however, this alternative's effectiveness is limited to the life of the landfill in which the soil is placed.

5.4.3.5 Reduction of Toxicity, Mobility, or Volume Through Treatment

Although Alternative III does not treat the soil, the mobility of the contaminants in the soil is reduced by moving the soil from the unsecured area to a secured, properly permitted disposal facility. However, the toxicity of the PAHs in the soil and the volume of soil exceeding NYSDEC-recommended soil cleanup levels will remain unchanged.

5.4.3.6 Implementability

The services of contractors to perform the excavation work, as well as landfill facilities needed to dispose of the soil, are available to receive the soil from the OU-I Site. Therefore, this alternative is considered to be highly implementable.

5.4.3.7 Cost

The total cost for Alternative ill IS $270,700. Table 5 provides the breakdown of costs associated with this alternative.

5.4.3.8 Community Acceptance

The community generally accepts off-site disposal as a remedial option since it removes the contaminated soil from their areas. Truck traffic through the area may not be looked upon favorably by some communities; however, since the area surrounding the Yard is mainly an industrial area, the traffic resulting from remediation at the OU-l Site will not cause any noticeable increase in overall truck traffic.

6.0 COMPARISON OF ALTERNATIVES AND SELECTION OF PREFERRED ALTERNATIVE

This section comparatively evaluates Alternatives I, II and III as presented in Section 5.0 with respect to each other. The comparative analysis is conducted for the eight evaluation criteria described in Section 5.1, in order to identify the advantages and disadvantages of each alternative so that tradeoffs between them can be identified.

The two criteria, Overall Protection of Human Health and the Environment, and Compliance with *ARARsISCGs*, will generally serve as threshold determinations in that they must be met by any alternative in order for it to be eligible for selection as the preferred alternative.

The five criteria, Long-Term Effectiveness and Permanence; Reduction of Toxicity, Mobility, or Volume Through Treatment; Short-Term Effectiveness; Implementability; and Cost, will be responsible for identifying the major tradeoffs among alternatives, thus allowing comparisons to be made.

Community Acceptance is preliminarily addressed in this section and finalized in the ROD once formal comments on the FS have been received and a final remedy selection has been made.

6.1 Comparison of Alternatives

The comparison of alternatives describes the strengths and weaknesses of the alternatives relative to one another with respect to each of the eight criterion.

6.1.1 Compliance with ARARs/SCGs

This threshold criterion determines whether an alternative satisfies chemical-specific ARARs, location-specific ARARs, action-specific ARARs, and other criteria, advisories and guidance.

Alternative I will not comply with the chemical-specific TBC of 10 ppm total carcinogenic PAHs since no action will be taken to remediate the OU-I soils. There are no location-specific or action-specific ARARs for Alternative I since no action would be taken.

Both Alternative II and Alternative ill will comply with all of their respective chemical-specific, location-specific and action-specific ARARs.

Since only Alternatives II and ill comply with their respective ARARs, they are preferred to Alternative I.

6.1.2 Overall Protection of Human Health and the Environment

This threshold criterion determines whether an alternative protects against potential human health and environmental risks associated with contaminants at the OU-I Site.

Alternative I will not provide overall protection of human health and the environment since PAHs in the soil will remain above the NYSDEC-recommended soil cleanup level because no action will be taken.

Alternative II will provide overall protection of human health and the environment since treatment of the soil in the solid-phase biological treatment unit will permanently degrade the PAHs in the soil to the NYSDEC-recommended soil cleanup level, thus reducing the risks associated with PAHs in soil to acceptable levels.

Alternative ill will provide overall protection of human health and the environment since physical removal of the PAR-contaminated soil above the NYSDEC-recommended soil cleanup level from the OU-I Site will reduce the risks associated with PARs in soil to acceptable levels.

Since only Alternatives n and ill provide overall protection of human health and the environment, they are preferred over Alternative I.

6.1.3 Short-Term Effectiveness

Short-term effectiveness examines the effectiveness of an alternative in protecting the community, workers and the environment during the construction and implementation period until response objectives have been met.

Alternative I does not pose any short-term effects during its implementation period since no action will be and there is no associated implementation period.

During implementation of Alternative short-term effects to workers due to dust generation in the work areas will be minimal with use of proper air monitoring procedures and engineering controls. There are no short-term effects to humans or the environment when construction and operation of the solid-phase biological treatment unit is performed. The associated implementation period for this alternative is expected to be nine months.

During implementation of Alternative III, dust generation in the work area exists, as well as risks associated with off-site transportation such as dust generation, and spills from the vehicles. However, with proper air monitoring and engineering controls in the work and contingency measures implemented during transportation, any short-term effects to humans and the environment will be minimal. The associated implementation period for this alternative is expected to be 2.5 months.

Alternative I is preferred to Alternatives II and ill since it provides the greatest degree of protection against any short-term effects to humans and the environment; however, this preference is due only to the fact that there is no work being performed. Alternatives II and III both contain potential risks, but with proper precautions, both will provide significant protection against short-term effects during the implementation period. However, since Alternative ill can be implemented in a shorter time period than Alternative II, Alternative III is preferred to Alternative II. A shorter implementation period would reduce the PAHs to their NYSDEC-recommended soil cleanup levels faster, causing less exposure of the contaminated soil until the time when response objectives have been met.

6.1.4 Long-Tenn Effectiveness and Permanence

Long-term effectiveness and permanence examines the effectiveness of an alternative in protecting human health and the environment after response objectives have been met, and are measured in terms of the magnitude of residual risk at the OU-I Site.

If Alternative I is implemented, the current level of risk associated with PAHs in the soil above the NYSDEC-recommended soil cleanup level will remain since no action will be taken. Therefore, it is not effective in the long term.

Implementation of the solid-phase biological treatment unit in Alternative II will permanently degrade PAHs in soil to the NYSDEC-recommended soil cleanup level, allowing reuse of the treated soil on the Yard, thus creating a permanent solution to the contamination at the OU-I Site. The magnitude of residual risk at the OU-I Site after implementation of Alternative II will be protective of human health and the environment.

Implementation of Alternative III will provide long-term effectiveness through the physical removal and placement of the PAH-contaminated soil in a secure landfill. The magnitude of residual risk at the OU-I Site after implementation of Alternative III will be protective of human health and the environment. However, at the disposal facility the effectiveness is limited to the life of the landfill.

While Alternative I will not be effective or permanent long term, both Alternatives II and ill provide long-term effectiveness and permanence, with Alternative II providing a greater degree of long-term effectiveness and permanence than Alternative III, since degradation of PAHs in the solid-phase biological treatment unit is permanent.

6.1.5 Reduction of Toxicity, Mobility or Volume Through Treatment

This criterion evaluates the anticipated perfonnance of a specific alternative in tenns of the treatment process used and materials tested; the amount of hazardous materials destroyed or treated; the degree of expected reductions in toxicity. mobility and volume; the degree to which treatment is irreversible; and the type and quantity of residuals remaining after treatment.

Alternative I would have no effect on the toxicity. mobility or volume of the PAH-contaminated soil since no action would be taken, and thus there would not be treatment performed. The amount of residuals that will remain will be equal to the current amount ofPAH-contaminated soil found on the OU-l Site.

Implementation of the Alternative n solid-phase biological treatment unit would decrease the toxicity of the PAHs since the treatment process would degrade the PAHs to the NYSDEC-recommended soil cleanup level. thus also reducing the mobility of the PAHs. The volume of the PAH-contaminated soil would decrease since there would not be any contaminated soil following treatment and. therefore. the treated soil could be used as fill on the Yard. Implementation of Alternative n does not create any residuals which would remain on the OU-l Site or require treatment.

Although there are no treatmeQt technologies included in Alternative m. this alternative will reduce the mobility of PAHs in the soil at the OU-l Site by physically removing the soil and placing it in a secure landfill. However. the toxicity of the PAHs in the soil and the volume of the soil exceeding the NYSDEC-recommended soil cleanup level will remain unchanged. Residual risk on the OU-l Site would not exist. however. residual risk at the disposal facility would be directly related to the life and the quality of operation of the landfill.

With respect to this criteria, Alternative n is preferred over Alternative m since it is able to reduce toxicity. mobility and volume. while Alternative ill only reduces the mobility of the PAHs. Alternative I is not effective since it does not reduce toxicity. mobility or volume.

6.1.6 Implementability

Implementability evaluates the feasibility of an alternative based on the ability to construct and operate the technology; reliability of the technology; ease of undertaking additional remedial actions, if necessary; ability to monitor effectiveness of the remedy; and availability of services and equipment.

It is possible to apply Alternative I since it entails current practices at the OU-l Site which consist of Yard perimeter fencing and police patrol to control access. However, because it would be necessary to undertake additional remedial actions at the OU-l Site since PAHs would exist in the soil above the NYSDEC-recommended soil cleanup levels, Alternative I is not considered to be implementable.

Alternative IT is considered to be implementable due to the fact that the area needed to place the solid-phase biological treatment unit is currently available and is expected to be available at the time of implementation, and contractors who are capable of constructing the unit and performing the work are available. Although anticipated that the PAHs will be degraded within eight months (causing implementation of Alternative II to take nine months), there does exist the small possibility that the process may take longer, even to the point of Alternative II implementation exceeding Amtrak's allotted timeframe of one year. Since delay of construction of the HSTF will have major financial implications to Amtrak, it is of critical importance that remediation of the OU-l Site is not extended past Amtrak's allotted timeframe.

Alternative ill is considered to be highly implementable since it will be completed within a 2.5 month timeframe, and the services of contractors and disposal facilities are available to perform the work and receive the contaminated soil.

Alternative III is considered to be the most implementable since there is certainty that it will be able to be performed within the Amtrak allotted timeframe of one year. Alternative II is also considered to be implementable, however, there are some concerns regarding schedule delays. Alternative I is not considered to be implementable.

6.1.7 Cost

Cost is used to evaluate the capital, operation and maintenance, and present worth costs of an alternative. Since implementation of the alternatives will be within one year, present worth costs of operation and maintenance are included in the capital cost.

There is no cost associated with implementation of Alternative I since it consists of current Yard practices. The cost associated with Alternative II is $343,100. The cost associated with Alternative III is $270,700.

6.1.8 Community Acceptance

Community acceptance preliminarily assesses the community's preference of an alternative, and will be finalized in the ROD.

It is anticipated that Alternative I will not be accepted by the community since it does not meet the NYSDEC-recommended soil cleanup levels chosen to protect human health and the environment since no action would be taken.

With regard to Alternative II, it is possible that the community may be concerned with the on-site disposal of soil; however, it is anticipated that Alternative II would be accepted if it can be shown that the soil will meet the NYSDEC-recommended soil cleanup levels through treatment, prior to on-site disposal.

Alternative III is anticipated to be accepted by the community since off-site disposal removes the PAH-contaminated soil from their surrounding area.

Both Alternative II and ill are expected to be accepted by the community, with Alternative I being the least accepted alternative.

6.2 Selection of Preferred Alternative

Since Overall Protection of Human Health and the Environment, and Compliance with ARARs/SCGs will generally serve as threshold determinations in that they must be met by any alternative in order for it to be eligible for selection, Alternative I will not be eligible for selection since neither of these two criteria are met by its implementation. Alternatives II and III will therefore be comparatively evaluated in order to select a preferred alternative.

Both Alternatives IT and ill possess similar Community Acceptance levels. Alternative IT is marginally preferred over Alternative III for Long-Term Effectiveness and Permanence and, in addition, is preferred for its greater performance with respect to Reduction of Toxicity, Mobility or Volume Through Treatment. Finally, Alternative ill is preferred by a wide margin over Alternative II for its level of Short-Term Effectiveness and Implementability. Alternative ill is preferred due to its smaller cost.

Although Alternative II is preferred over Alternative III for Long-Term Effectiveness and Permanence; and Reduction of Toxicity, Mobility or Volume Through Treatment, in order for any criteria to be effective, an alternative must first be implementable. This is especially important when considering the implications of the potential for delay in HSTF construction which would be associated with the need for additional treatment time in Alternative II. Therefore, Alternative III is preferred overall to Alternative II since Alternative III is considered to be highly implementable at the OU-I Site and the impact of scheduling would result in such extreme cost penalties to Amtrak that a more certain timeframe for remediation is the overriding factor.

Respectfully Submitted,

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Table 1. Potential Action-Specific Applicable or Relevant and Appropriate Requirements/Standards, Criteria and Guidance, and To-Be-Considered Material			
Action	Requirements	Prerequisite for Applicability	Citation
Generation of Hazardous Waste	Establishes standards for generators who treat, store or dispose of waste in excess of 100 per month.	Remedial action alternative involves off-site transportation of soil for treatment or disposal.	40 CFR Part 262 6 NYCRRPart 372
Transportation of Hazardous Waste	Establishes standards for the transport of hazardous waste which are generated, stored or disposed.	Remedial action alternative involves transportation of soil offsite for treatment or disposal.	40 CFR Part 263 6 NYCRR Part 364
Inactive Hazardous Waste Disposal Site Remedial Program	Establishes requirements for cleanup or restoration to any area where hazardous waste was disposed.	Remedial action alternative involves an inactive hazardous waste disposal site.	6 NYCRR Part 375
Beneficial Use Determination	Establishes requirements for excavated soils to be reused as backfill for excavations with same contaminants.	Remedial action alternative involves excavation of soils which are below recommended cleanup level.	6 NYCRR Part 360.1-15
NYC Local Laws and Ordinances	Establishes requirements for noise, transport, fire codes, etc.	Remedial action alternative involves construction activities.	Rules of the City of New York Title I, 13, IS, 16, 34
Land Disposal Restrictions	Establishes requirements for restricting certain listed or characteristic waste from being placed or disposed on land without treatment	Remedial action alternative includes placement in a landfill, excavation, etc.	6 NYCRR Part 376
Standards for Owners or Operators of Hazardous Waste Treatment or Disposal Facilities			
Hazardous Waste Container Storage (Subpart 1)	Establishes design standards and operating requirements for the treatment and storage of hazardous waste in tanks.	Remedial action alternative requires storage of a Resource Conservation and Recovery Act (RCRA) hazardous waste held for greater than 90 days.	40 CFR Part 264.190 6 NYCRR Part 373-3.9
Land Treatment (Subpart M)	Establishes requirements for hazardous waste placed in a land treatment facility if waste can be degraded, transformed or immobilized within a treatment zone.	Remedial action alternative results in placement ofRCRA hazardous waste in a land treatment facility.	40 CFR Part 264.270-.280 6 NYCRR Part 373-3.13
Landfills (Subpart N)	Establishes minimum standards that define the acceptable management of hazardous ,vaste landfills including capping with waste in place.	Remedial action alternative includes capping, or disposal in landfills.	40 CFR Part 264.300 6 NYCRR Part 373-3.14

Table 1. Potential Action-Spedfic Applicable or Relevant and Appropriate Requirements/Standards, Criteria and Guidance, and To-Be-Considered Material

Action	Requirements	Prerequisite for Applicability	Citation
Landfills	Establishes standards that define acceptable management of solid waste landfills.	Remedial action alternatives include disposal of nonhazardous waste in landfills.	6 NYCRR Part 360
Transportation of Hazardous Materials	Establishes criteria for packaging, labeling, marking, and placarding of hazardous waste.	Remedial action alternative includes transport of hazardous wastes.	49 CFRParl 107,171-179
Occupational Safety and Health	Establishes requirements for workers employed in on-site field activities.	Remedial action alternative includes construction. and potential exposure to hazardous materials.	29 CFR Part 1926
To Be Considered Documents			
Silicate Technology Corporation's Solidification/Stabilization Technology for Organic and Inorganic Contaminants in Soils	Provides an evaluation of solidification/ stabilization treatment processes including the advantages, disadvantages, limitations and cost.	Remedial action alternative includes stabilization/solidification.	OSWER Directive EP*N540/G-88/003*
Stabilization Technologies for RCRA Corrective Action Handbook	Provides an evaluation of technologies available for stabilizing contaminant sources for corrective action sites.	Remedial action alternative includes stabilization.	EP*N625/6-91/026*
Methods for Evaluating the Attainment of Cleanup Standards. Volume 1. Soils and Solid Media	Provides an evaluation of whether soil remediation effort has been successful relative to a cleanup standard or ARARs.	Remedial action alternative includes soil remediation.	EP*N230/02-89/042*
Bioremediation	Provides guidance on how and where bioremediation may be used in conjunction with other treatment technologies or alone.	Remedial action alternative includes bioremediation.	EPN600/A-93/004
Handbook for Stabilization/ Solidification of Hazardous Waste	Provides information on reagents and design requirements and concept development for stabilization/solidification treatment	Remedial action alternative includes solidification/stabilization.	EPN54012-86/00 1
Guidance on Land Use in the CERCLA Remedy Selection Process	Focuses on developing practicable and cost effective remedial alternatives consistent with reasonably anticipated future land use.	Remedial action alternatives include future land use by a rail yard.	OSWER Directive 9355.704
Citizen Participation in New York's Waste Site Remediation Program: A Guidebook	Provides guidance for planning and conducting citizen participation programs during the investigation and remediation of hazardous waste sites.	Remedial actions will require a citizen participation plan.	NYSDEC Division of Environmental Remediation. 1996

Table 2: Summary of Evaluation of Alternatives

C· .	Alternative I No A, ,.	Alternative II Soil Excavation, Solid-Phase Biological Treatment and On-Site Soil Disoosal	Alternative ill Soil Excavation and Off-Site Soil Disoosal
Compliance with ARARsISCGs Chemical - Specific ARARs	Would not comply with the chemical-specific TBCs of 10 ppm total carcinogenic PAHs in soil.	Would achieve compliance with the chemical-specific TBC of 10 ppm total carcinogenic PAHs in soil.	Would achieve compliance with the chemical-specific TBC of 10 ppm total carcinogenic PAHs in soil. If hazardous wastes are detected, 6 NYCRR Part 371 would be applicable.
Location Specific ARARs	There are no location -specific ARARsISCGs since no action would be taken.	Would comply with the location-specific ARARJSCG. Remediation activities must be performed to minimize potential harm and to preserve the beneficial value of the floodplain.	Would comply with the location-specific ARARJSCG. Remediation activities must be performed to minimize potential harm and to preserve the beneficial value of the floodplain.
Action Specific ARARs	There are no action specific ARARsISCGs since no action would be taken.	Refer to Table 3.	Refer to Table 3.
Overall Protection of Human and Environment	Would not provide an adequate level of human health protection due to the continued presence of PAHs in the soil.	PAHs would be permanently degraded to NYSDEC-recommended soil cleanup level. Dust generation risk will be minimized through monitoring controls. Risks due to movement of heavy machinery would be minimized through OSHA regulations.	Removing the soil reduces the risks related to exposure to PARs at the OU-l Site. Risks due to dust during excavation will be minimized through monitoring controls. Risks due to movement of heavy machinery would be minimized through OSHA regulations.
Short - Term Effectiveness	There is no associated construction and implementation period, therefore no associated short-tenn effects.	The time required is approximately nine months, which is within the allotted timefrarne. Potential for dust generation posing inhalation No associated risks to surrounding community during construction and operation. Maintenance and inspection of liner system should ensure protection.	The time required is approximately 2.5 months, which is within the allotted timeframe. Potential for dust generation posing inhalation Risk of exposure may exist during off-site transportation activities, though contingency measures will minimize exposure and the contractors are trained to cleanup spills.

Table 2: Summary of Evaluation of Alternatives

	Alternative I	Alternative II Soil Excavation, Solid-Phase Biological	Alternative III Off-
Long-Term Effectiveness and Permanence	Since the cleanup objectives would not be met, the current level of risk associated with PAHs would remain. Therefore, long-term effectiveness or permanence does not exist.	PAHs would permanently degrade, thus making it safe to dispose the soil on-site.	Disposal does not achieve long-term effectiveness and permanence with respect to treatment. Permanence is achieved on-site since soil is removed. Off-site soil disposal is effective for the life of the landfill in which it is placed.
Reduction of Toxicity, Mobility, or Volume Through Treatment	Would not have any effect on the toxicity, mobility, or volume of the contaminated soil.	Would reduce the toxicity of the soil to NYSDEC-recommended soil cleanup levels. Mobility would not be a concem The volume of the contaminated soil would decrease to zero since the resulting soil will meet NYSDEC-recommended soil cleanup levels.	Mobility is reduced by moving the soil from an unsecured area to a secured, permitted facility. The toxicity of the PAHs and the volume of soil exceeding NYSDEC-recommended soil cleanup levels will remain unchanged.
Implementability	Would not be relevant since there is not action taken. Perimeter fencing and police patrol are shown to be implementable and the required resources are available.	The area required is available at the southern portion of the Yard. Contractors are available to perform the work. There is a possibility that PAH degradation will exceed the allotted timeframe of one year. However, the exceedance of one year is considered unlikely.	The services of contractors and landfill facilities are available to receive the soil from the aU-I Site.
Cost	The cost is equal to the current cost of property access control and is assumed to be a no cost item since the services are currently implemented.	Refer to Table 4	Refer to Table 5
Community Acceptance	It is not anticipated that the community will accept this alternative since the NYSDEC-recommended soil cleanup levels will not be met.	May cause concern with on-site disposal of soil. However, it should be accepted if demonstrated that all NYSDEC-recommended soil cleanup levels are met and are permanently treated.	Off-site soil disposal is generally accepted, Truck traffic may be seen as unfavorable yet should not cause an increase in overall truck traffic since the area is an industrial area.

Table 3: Action-Specific

Action	Alternative I No Action	Alternative II Soil Excavation, Solid-Phase Biological Treatment, On-Site Soil Disoosal	Alternative III Soil Excavation and Off-Site Soil Disposal
Generation of Hazardous Waste (6 NYCRR Part 372)	Does not apply	Treatment of contaminated waste will be performed; no hazardous waste has been identified.	Disposal of contaminated waste will be performed; no hazardous waste has been identified.
Transportation of Hazardous Waste (6 NYCRRPart 364)	Does not apply	Does not apply	Contaminated waste will be transported from the Yard to a permitted facility by a licensed hauler. No hazardous waste has been identified.
Inactive Hazardous Waste Disposal Site Remedial Program (6 NYCRR Part 375)	Does not meet the requirements for cleanup or restoration	Will meet requirements for cleanup	Will meet requirements for cleanup
Beneficial Use Determination (6 NYCRR Part 360-1.15)	Does not apply	Will meet requirements for reuse	Does not apply
NYC Local Laws and Ordinances (Rules of the City of New York, Titles 1, 13, IS, 16,34)	Will meet these requirements	Will meet requirements during remediation activities	Will meet requirements during remediation activities
Hazardous Waste Container Storage (6 NYCRR Part 373-3.9)	Does not apply	Does not apply	Will meet requirements if hazardous waste is stored in containers prior to removal. No hazardous waste has been identified.
Land Treatment (6 NYCRR Part 373-3.13)	Does not apply	Will meet requirements	Does not apply

Table 3: Action-Specific

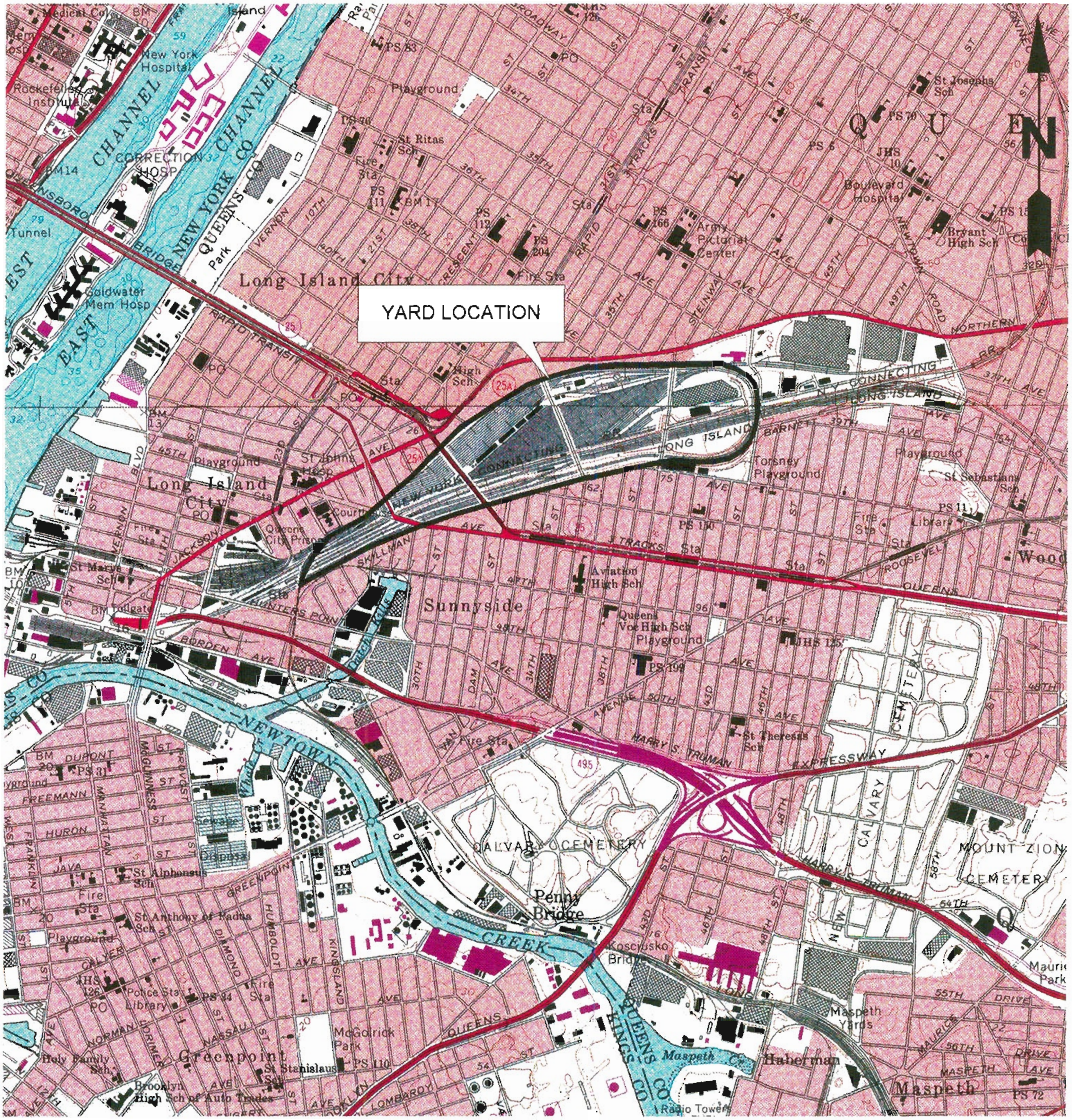
Action	Alternative I No Action	Alternative II Soil Excavation, Solid-Phase Biological On-Site Soil Disoosal	Alternative III Soil Excavation and Off-Site Soil Disposal
Landfills (6 NYCRR Part 360)	Does not apply	Does not apply	The landfill chosen for disposal of contaminated waste, and noncontaminated construction and demolition debris will meet these requirements. No hazardous waste has been identified.
Landfills (6NYCRRPart 373-3.14)	Does not apply	Does not apply	The landfill chosen for disposal of hazardous waste, if any, will meet these requirements. No hazardous waste has been identified.
Land Disposal Restrictions (6 NYCRR Part 376)	Does not apply	Does not apply as no hazardous waste will be treated	Will meet requirements if hazardous waste is identified during remediation activities
Transportation of Materials (49 CFRPart 107 171-179)	Does not apply	Does not apply	Will meet requirements
Occupational Safety and Health (29 CFR 1926)	Does not apply	Will meet requirements	Will meet requirements

Table 4. Alternative n Cost Analysis

	Total Price
Air Monitoring	
Task Subtotal	$ 3,900
Trackwork	
Task Subtotal	$ 60,900
Concrete Removal, Transport and Disposal	
Task Subtotal	$ 23,900
Soil Excavation	
Task Subtotal	$ 34,400
Backfill of Excavation	
Task Subtotal	$ 7,600
Solid-Phase Biological Treatment Unit	
Task Subtotal	$ 60,100
On-Site Disposal of Soil	
Task Subtotal	$ 4,900
Contractor MoblDemob and Work Area Setup	$ 10,000
Contractor PermitslTraining	$ 2,000
Subtotal	**$ 207,700**
Report Preparation	$ 20,000
Engineering Costs Prior to Contractor Mobilization	$ 41,500
Construction Oversight Costs	$ 42,700
Contingency	$ 31,200
Alternative n Total	**$ 343,100**

Table 5. Alternative ill Cost Analysis

	Total Price
Air Monitoring	
Task Subtotal	$ 4,900
Trackwork	
Task Subtotal	$ 60900
Concrete Removal, Transport and Disposal	
Task Subtotal	$ 23,900
Soil Excavation	
Task Subtotal	$ 20,500
Transport and Off-Site Disposal of Soil	
Task Subtotal	$ 49,600
Backfill of Excavation	
Task Subtotal	$ 7,600
Contractor MoblDemob and Work Area Setup	$ 6,000
Contractor PermitslTraining	$ 2,000
Subtotal	$ 175,400
Report Preparation	$ 20,000
Engineering Costs Prior to Contractor Mobilization	$ 26,300
Construction Oversight Costs	$ 31,500
Contingency	$ 17,500
Alternative ill Total	$ 270,700



SOURCE:
CENTRAL PARK AND BROOKLYN, NEW YORK
QUADRANGLE 7.5 MINUTE SERIES (TOPOGRAPHIC)

Title:

YARD LOCATION MAP

SUNNYSIDE YARD QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX ASSOCIATES INC Environmental Consulting & Management	Compiled by: D.L.	Date: 4/97	FIGURE
	Prepared by: R.R.	Scale: 1"=2,000'	1
	Project Mgr: D.L.	Status: Final	
	File No: 52119001	Project: 05552E03	

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400' 0 400'

EXPLANATION

- LOCATION OF RAILROAD TRACK
- DIRECTION OF SEWER FLOW
- APPROXIMATE LOCATION OF SEWER
- GRATE COVER CATCH BASIN LOCATION
- SOLID COVER MANHOLE LOCATION
- GRATE COVER MANHOLE LOCATION
- A-2 LOCATION AND DESIGNATION OF PREVIOUSLY DETERMINED AREA OF CONCERN
- APPROXIMATE PROPERTY BOUNDARY

- OU-1
- OU-2
- OU-3
- OU-4
- OU-5

NOTES:

1. LOCATIONS AND DIAMETERS OF SEWER COMPONENTS BASED UPON A REVIEW OF AMTRAK-SUPPLIED ENGINEERING DIAGRAMS AND LIMITED FIELD SURVEY.
2. OU-6, GROUND WATER BENEATH THE YARD, IS NOT SHOWN.

Title:

LOCATION OF OPERABLE UNITS

SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For: AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: H.G.	Date: 4/97	FIGURE
Prepared by: R.K.	Scale: AS SHOWN	2
Project Mgr: H.G.	Status: FINAL	
File No: 52119005	Project: 05552Y03	

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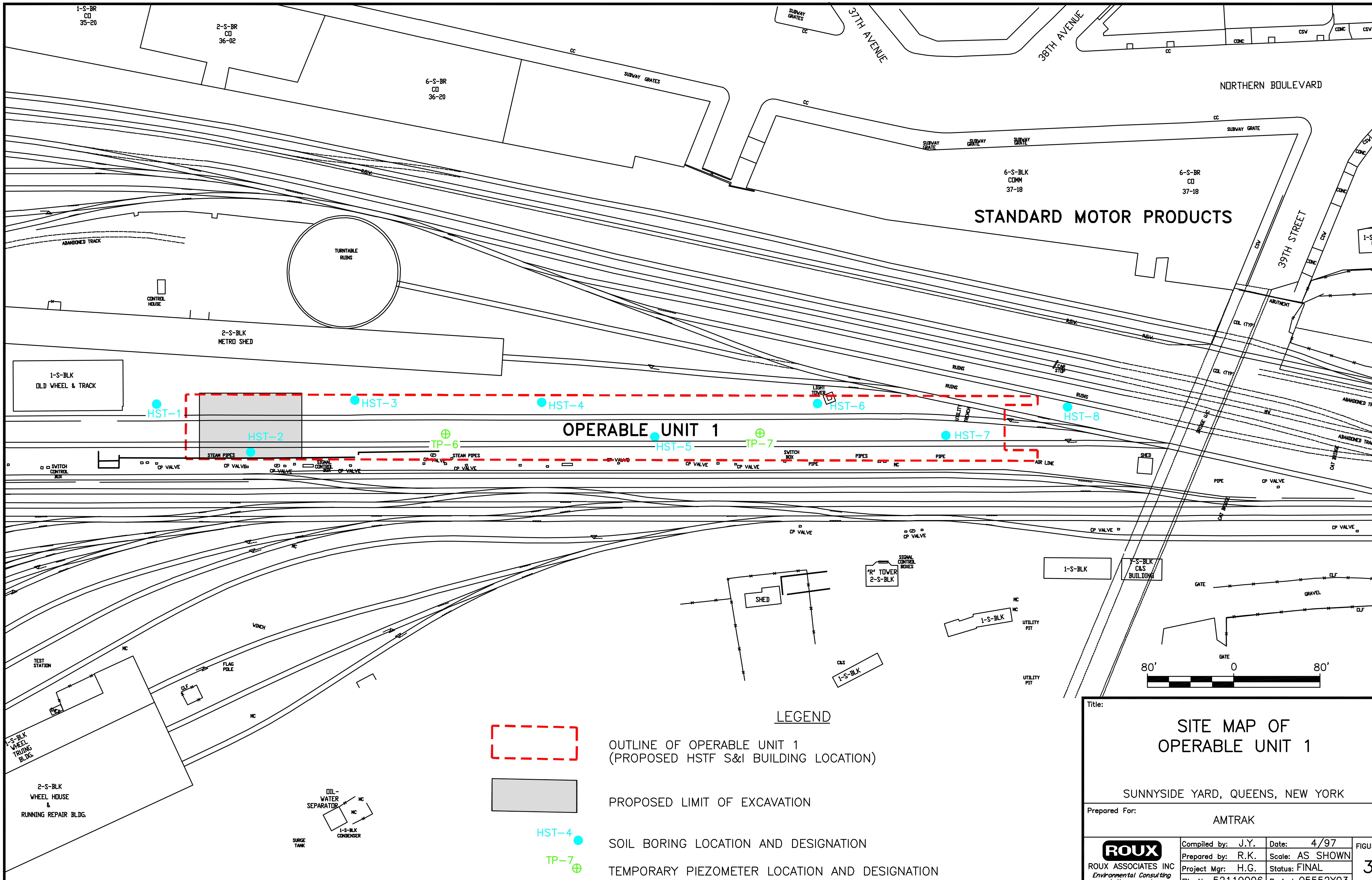

Title:

SITE MAP OF
OPERABLE UNIT 1

SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: J.Y.	Date: 4/97	FIGURE
Prepared by: R.K.	Scale: AS SHOWN	3
Project Mgr: H.G.	Status: FINAL	
File No: 52119006	Project: 05552Y03	

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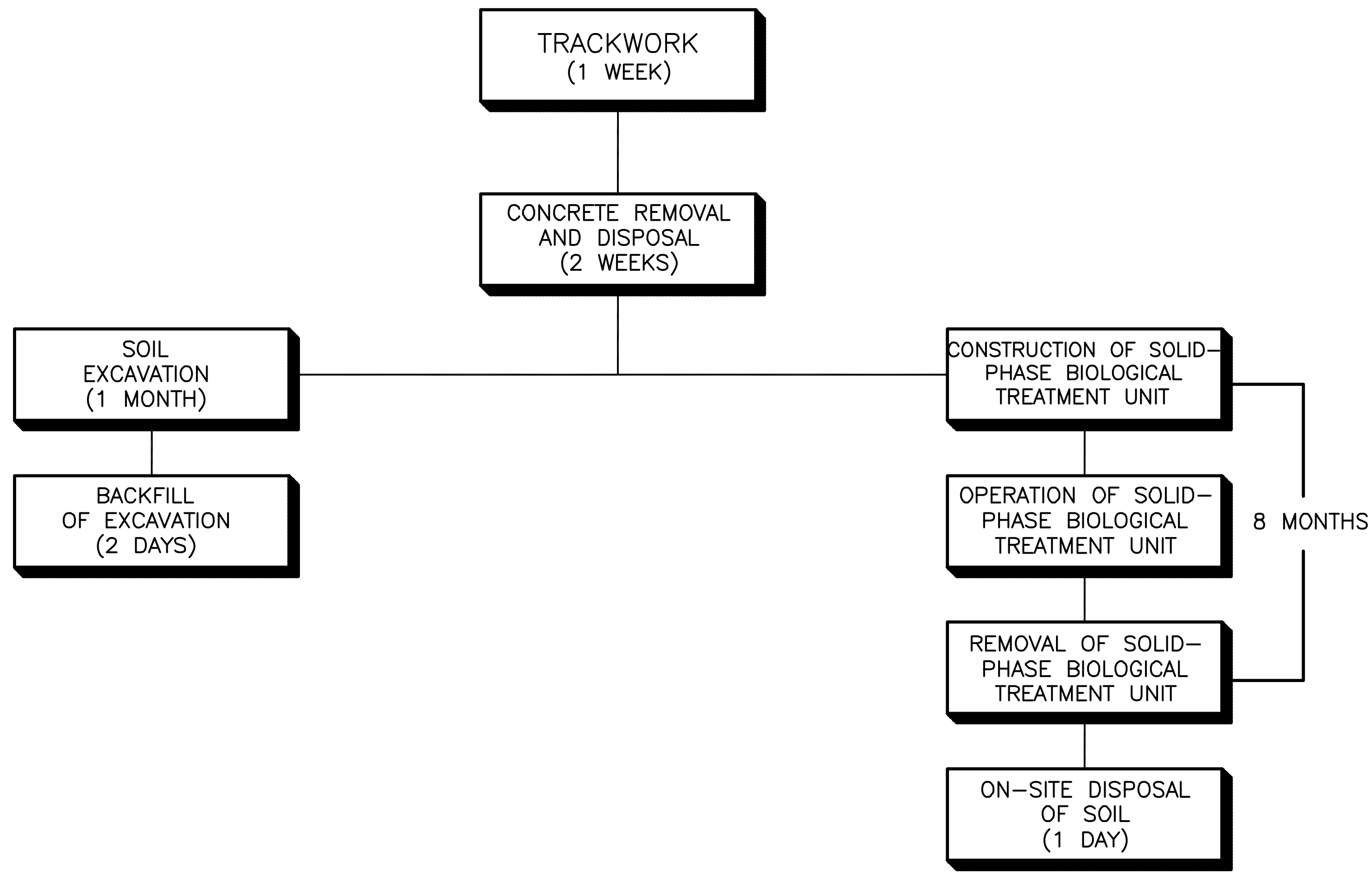

Title:

ALTERNATIVE II FLOWCHART AND PROJECTED TASK DURATIONS

SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by:	D.L.	Date:	4/97	FIGURE	4
Prepared by:	W.G.	Scale:	N.T.S.		
Project Mgr:	D.L.	Status:	FINAL		
File No:	52119004	Project:	05552Y		

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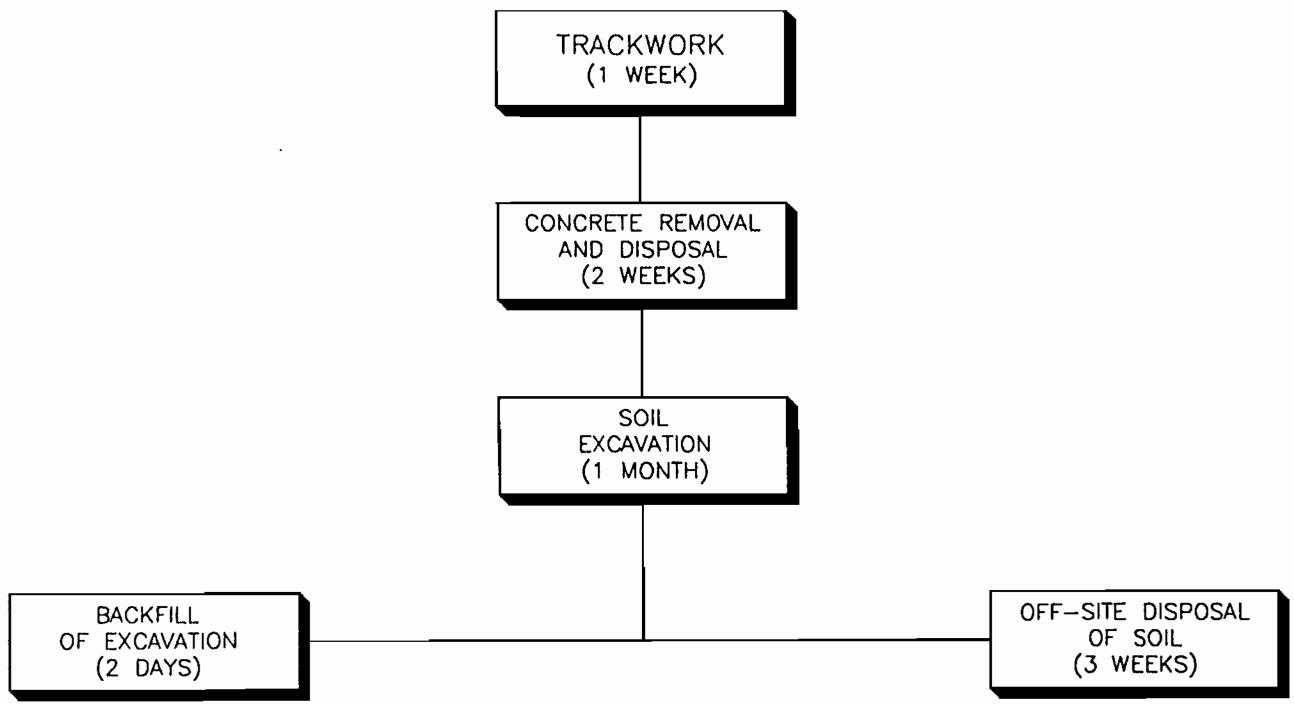

Title:

ALTERNATIVE III FLOWCHART AND PROJECTED TASK DURATIONS

SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: D.L.	Date: 4/97	FIGURE 5
Prepared by: W.G.	Scale: N.T.S.	
Project Mgr: D.L.	Status: FINAL	
File No: 52119003	Project: 05552Y	

APPENDIX A

NYSDEC Letter to Roux Associates,
February 20, 1997

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 2
47-40 21st Street, Long Island City, NY 11101
(718) 482-4995, Fax (718) 482-4954

John P. Cahill
Acting Commissioner

February 20, 1997

Joseph Duminuco
Roux Associates
1377 Motor Parkway
Islandia, New York 11788

Dear Mr. Duminuco:

Re: Amtrak Sunnyside Yard, Site Code 241006
High Speed Rail Link Project -Limited Phase II ESA Report

As discussed at our January 24 meeting, the Department wants to cooperate with Amtrak their plans to construct a Service and Inspection Building as a part of their High Speed Rail Link project. In this vein, The Department proposed to divide investigation of the Sunnyside Yard into several Operable units. In this manner, the small portion of the site where the proposed building is to construct, designated as Operable Unit 1, can be cleared for construction through a Record of Decision based upon a focussed Remedial Investigation and a Feasibility Study (RIfFS). A Remedial Investigation (RI) for the entire Yard, currently underway to a great extent, can be divided into other Operable units, and proceed simultaneously, yet independent of the Operable Unit 1.

This letter deals with Operable Unit 1. The Department has reviewed your Limited Phase II Environmental Assessment Report for the High Speed Trainset Facility (HSTF). The limited investigation has characterized soil quality down to water table. The saturated soil or groundwater quality within the footprint of the building is not known. However, since the groundwater contamination sitewide will be addressed as a separate operable unit, this limited investigation will satisfy the requirement of a focussed RI, except that any soils removed below the water table must be further delineated. The sewer traversing the footprint of the building should be relocated.

You may proceed to complete your focussed feasibility study for OU 1. The remedial goals for this au are as follows:

- Reduce, control, or eliminate the contamination present within the on-site soils and sediments.
- Eliminate the threat to surface waters by remediating any contaminated sediments and soils on site.
- Mitigate continuing impacts to contaminated groundwater.

The preliminary remedial alternatives as identified in the January 31, 1997 letter from your affliate engineering firm are acceptable. The eight point criteria must be satisfied. As we discussed, it is not necessary to treat OU 1 as an IRM.

If you have any questions or concerns, please call me at 718 - 482-4909.

Sincerely,

Hari O. Agrawal, P.E.
Environmental Engineer

cc:
Rich Gardineer
Jim Harrington and Sal Ervolina, DER, Albany 7010
Steve Bates, NYSDOH, Albany

APPENDIXB

NYSDEC and NYSDOH Letter to Roux Associates,
February 25, 1997

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 2
21st Street, Long Island City, NY 11101
(718) Fax (718)

John P. Cahill
Acting Commissioner

February 25, 1997

Joseph Duminuco
Roux Associates
1377 Motor Parkway
Islandia, New York 11788

Dear Mr. Duminuco:

Re: Amtrak Sunnyside Yard, Site Code 241006, Site Cleanup Levels

The Department has carefully reviewed your letter of January 22 evaluating Alternative Cleanup Levels for metals and semi-volatiles, and your September 1995 submittal on proposed cleanup levels for PCBs. To accomplish the goal of protection of human health and the environment, the Department is in agreement with the New York State Department of Health (NYSDOH) and recommends the following soil clean up levels for the main contaminants of concern:

PCBs	25 ppm for surface and subsurface soils, consistent with the direction given in the attached letter dated February 25, 1997 from the NYSDOH
Semi-volatiles	10 ppm for both surface and subsurface soils for total carcinogenic PAHs
Lead	1,000 ppm both surface and subsurface soils.

The surface is defined as the top 1 foot of ground. The above recommended cleanup levels are based on review of the contamination data and the site's present and future use as a rail yard; they are consistent with numbers used elsewhere in the State for similar sites. Cleanup numbers are not specified for Volatile Organic Compounds (VOCs), as none were detected in soils above the Department's Recommended Soil Cleanup Objectives (RSCOs). Certain metals were found in soils above the RSCOs. However, none, except lead, appear to be present at levels high enough to require any cleanup. This recommendation is not an endorsement or acceptance of EPA Region 3's Risk Based Cleanup levels or any of the other referenced criteria except TAGM 4046. The TAGM 4046 approach continues to be the accepted approach for hazardous waste sites in New York.

In closing, the Department will propose these numbers for the entire Sunnyside yard, which will be finalized through the Record of Decision process for the individual operable units. You may proceed on this basis to complete your feasibility study for Operable units 1 and 2 which are of immediate concern. If you have any questions or concerns, please call me at 718 - 482-4909.

Sincerely,

J. Hari O. Agrawal, P.E.
Environmental Engineer

CC: ~~NYSDOH (w/attach)~~

DOH STATE OF NEW YORK
DEPARTMENT OF HEALTH

Office of Public Health II University Place Albany, New York 12203-3399

Barbara A. DeBuono, M.D.• M.P.H.
Commissioner

Executive Deputy Commissioner

February 25, 1997

Mr. Richard Gardineer, P.E.
Regional Hazardous Waste Engineer
DEC - Region II
1 Hunters Point Plaza
Long Island City, New York 11101

RE: Amtrak, Sunnyside Yard
Site 10# 241006
Queens County

Dear Mr. Gardineer:

The Department of Health has reviewed Amtrak's request to use a soil cleanup level of 25 ppm for both surface and subsurface soils at the Sunnyside Yard. The Department's primary concern In establishing a cleanup level is the potential for employees to be exposed to PCBs in materials on the surface, and to a extent subsurface materials during work reqUiring excavations.

The Department concurs with Amtrak's proposal to use a 25 ppm soil cleanup criteria based on the follOWing conditions that are specific to the site: .

- Access is restricted to employees by means of a fence surrounding the rallyard.

  The facility will continue to be operated as a railyard.

- Following cleanup of materials with PCBs greater than 25 ppm, average surficial levels of PCBs remaining will be SUbstantially less than 25 ppm.

- The majority of the railyard is covered with ballast, minimiZing the potential for surficial ruooff transporting PCBs off-site ahd the tracking of PCB contaminated soils into bUildings or off-site by employees or vehicles.

February 25, 1997
Mr. Richard Gardineer
RE: Amtrak, Sunnyside Yard

The Department recommends that stone, asphalt or other suitable covering be placed in areas where all of the following conditions *afe* met:

- PCB levels approach 25 ppm In surface soils.
- Employees or vehicles frequent the area.
- Surface soil conditions are such that soils could be transported via tracking.

If you have any questions, please call me at (518) 458-6305.

Sincerely,

Steven M. Bates, P.E.
Chief, Southern Section
Bureau of Environmental Exposure Investigation

cc: Dr. N. Kim
Dr. A. Carlson

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