McPHAIL ASSOCIATES, INC

Geotechnical Engineers

ADDENDUM TO PHASE IV - REMEDY IMPLEMENTATION PLAN

ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES

1542 COLUMBUS AVENUE

ROXBURY MASSACHUSETTS

Prepared for

Urban Edge Housing Corporation

November 4, 2008

Project No. 4272

McPHAIL ASSOCIATES, INC

Geotechnical Engineers

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Geotechnical Engineers
Urban Edge Housing Corporation
1542 Columbus Avenue, Suite 2
Roxbury, MA 02119

Attention: Mr. Noah Maslan

Reference: 1542 Columbus Avenue; Roxbury, Massachusetts
Addendum to Phase IV Remedy Implementation Report
Analysis of Brownfields Cleanup Alternatives

Ladies and Gentlemen:

The purpose of this report by McPhail Associates, Inc. is to present the results of an Analysis of Brownfields Cleanup Alternatives (ABCA) for the disposal site located at 1542 Columbus Avenue in the Roxbury section of Boston, Massachusetts. A Phase II Comprehensive Site Investigation Report and Phase III Identification, Evaluation, and Selection of Comprehensive Remedial Action Alternatives was submitted to the DEP on July 16, 2007 for the disposal site associated with Release Tracking Number (RTN) 3-21935. This letter is an amendment to the Phase II/III report and is subject to the limitations contained therein. This ABCA has been prepared to address cleanup activities for elevated concentrations of lead and arsenic in soil at the above referenced site.

Introduction

In summary, releases of lead, arsenic, and petroleum hydrocarbons have been documented at the subject property. The elevated lead and arsenic are generally considered to be attributable to the presence of ash and cinders in the fill material across the site. However, the elevated concentrations of lead on the northwestern portion of the subject site, which constitutes a Hot Spot as defined in the Massachusetts Contingency Plan (MCP) 310 CMR 40.0000, are considered most likely to be attributable to the past use of lead paint on the building. In general, with the exception of the northwest portion of the subject site, lead and arsenic concentrations are below the MCP Method 1 S-1/GW-2 standards. The calculated exposure point concentrations (EPC) for lead and arsenic in soil samples from the northwestern portion of the subject site are 1,683 milligrams per kilogram (mg/kg) and 360 mg/kg, respectively. The EPC for arsenic exceeds the Upper Concentration Limit (UCL) as defined in the MCP. It is estimated that approximately 100 cubic yards of fill material has been impacted by elevated concentrations of lead and arsenic.

The elevated concentration of petroleum hydrocarbons detected in the fill material on the southern portion of the subject site is considered to be attributable to the presence of ash and cinders. Based upon explorations and chemical testing conducted by previous consultants as well as by McPhail Associates, the extent of petroleum hydrocarbon impacted soil is limited to the southern portion of the site, which is paved. In addition, the detected concentrations of petroleum hydrocarbons are below the applicable Method 1 S-1/GW-2 standards, which indicates that a condition of No Significant Risk exists and a Permanent Solution has been achieved for the petroleum release.

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Evaluation Criteria

The alternatives for site cleanup were compared utilizing the following four (4) criteria:

1. Effectiveness and Reliability: considers the ability of the alternative to meet the cleanup standards and the long term reliability of the alternative;

2. Feasibility and Ease of Implementation: evaluates the technical feasibility and the availability of services, materials and equipment needed to implement the alternative;
3. Risk Reduction versus Benefit: considers whether the alternative provides adequate protection and describes how risks to human health, public safety, welfare, and the environment posed by site hazards are eliminated, reduced or controlled; and

4. Cost Effectiveness: evaluates the estimated capital, operation and maintenance costs for each alternative;

Evaluation and Comparison of Cleanup Alternatives

The three (3) options evaluated against the criteria described above include conducting no action, soil washing, and excavation and off-site disposal of impacted soil. Given that the contaminants of concern include lead and arsenic in soil, there are relatively few remediation options.

1. Alternative No. 1 - No Action: The no action alternative would leave the site as it currently is. Under this approach, the existing lead and arsenic impacted soil would remain in-place.

   This alternative is not considered to be a viable option due to the concentrations of lead and arsenic detected in soil on the northwestern portion of the subject site, which exceed the UCLs as defined in the MCP. There would be limited or no cost associated with a no action approach. However, this alternative would result in the continuance of potential hazards and risk to public safety and welfare, and provides no future protection of these risks.

2. Alternative No. 2 - Soil Washing: This alternative would involve the excavation of the lead and arsenic impacted soil, sifting the soil to remove large rocks and debris, and placing the sifted soil through a scrubbing unit. The soil in the scrubbing unit would be washed with water, and possibly a detergent, through a series of sieves, mixers and water spays. The silt and fine grained soil is separated from the gravel. The silt and fine grained particles are then analyzed for the contaminants of concern and may require further treatment. The wash water is removed and disposed of off-site at a treatment plant.

   This alternative would likely meet the desired cleanup goals and reduce contaminants of concern to levels which would not pose a threat to human health, public welfare, and the environment. Soil washing would be feasible to implement, however, given the size constraints of the subject site, implementation to the sifting and soil scrubbing operation would be difficult.

   This alternative would likely reduce the levels of the identified contaminants of concern on the subject site. However, during implementation there would be a potential risk to surrounding receptors due to air-borne dust containing elevated concentrations of lead and arsenic. Specifically, the soil would require handling during excavation, sifting, and placement into the soil scrubbing unit. Dust control would be implemented to minimize air-borne dust. Completion of this

alternative would reduce risks to human health, public safety, welfare, and the environment posed by the contaminants of concern.

The cost to implement Alternative No. 2 would include excavation, sifting, soil scrubbing, disposal of wash water, and the potential for retreating and/or off-site disposal of silt and fine grained soil. The estimated cost to implement Alternative No. 2 is broken down as follows:

Task	Estimated Cost
Excavation and sifting approximately 100 Cubic Yards (CY) of lead and arsenic impacted soil.	$2,500
Soil Scrubbing approximately 100 CY of lead and arsenic impacted soil	$18,000
Off-site Disposal of Wash Water	$5,000
Transportation and off-site Disposal of approximately 40 CY of lead and arsenic impacted silt and fined grained soils	$3,400
Backfilling excavation with treated and imported clean fill material	$4,000
TOTAL ALTERNATE NO. 2	**$32,900**

It is estimated that Alternative No. 2 would take approximately 3 to 4 weeks to implement. Implementation of this alternative would include mobilization, concrete removal, excavation and backfilling.

3. Alternative No. 3 - Excavation and Off-Site Disposal: This alternative would involve removal of the existing asphalt pavement, and excavation and off-site disposal of approximately 100 cubic yards of lead and arsenic impacted soil. A potential off-site disposal facility is Waste Managements Turnkey Landfill in Rochester, New Hampshire. However, disposition of the waste will depend on characterization and cost.

   By excavating and disposing of the impacted soil off-site, this alternative would meet the desired cleanup goals and reduce contaminants of concern to levels which would not pose a threat to human health, public welfare, and the environment. Excavation of the impacted soil would be feasible to implement. Given the size limitations of the subject site, a portion of the sidewalk along Columbus Avenue would need to be temporarily closed, which would also be required for Alternative No. 2.

   This alternative would reduce, if not eliminate, the levels of the identified contaminants of concern on the subject site. During implementation there would be a potential risk to surrounding receptors due to air-borne dust containing elevated concentrations of lead and arsenic. However, the soil would be handled once during excavation and direct loading into a truck, therefore, exposure to site occupants and neighbors would be minimal. In addition, dust control measures, as discussed in the Phase IV Remedy Implementation Plan dated October 6, 2008, would be implemented to minimize air-borne dust. Completion of this alternative would reduce risks to human health, public safety, welfare, and the environment posed by the contaminants of concern.

The cost to implement Alternative No. 3 would include excavation, and transportation and off-site disposal of lead and arsenic impacted soil. The estimated cost to implement Alternative No. 3 is broken down as follows:

Task	Estimated Cost
Excavation and sifting approximately 100 Cubic Yards (CY) of lead and arsenic impacted soil.	$2,500
Transportation and Off-site disposal of approximately 100 CY of lead and arsenic impacted soil.	$8,500
Backfilling excavation with imported clean fill material	$4,000
TOTAL ALTERNATE NO. 3	**$15,000**

It is estimated that Alternative No. 3 would take approximately 1 to 2 weeks to implement. Implementation of the alternative would include mobilization, concrete removal, excavation and backfilling.

Recommended Alternative

Based upon a review of the above referenced cleanup alternatives, Alternative No. 3 is recommended. Although Alternative No. 2 and Alternative No. 3 are considered to be effective, reliable, and feasible, the size limitations of the subject site make implementation of Alternative No. 2 difficult. Furthermore, the exposure to contaminants is considered to be limited with Alternative No. 3 due to the reduced handling of the impacted soil. Below is a table summarizing the deciding factors of each cleanup alternative.

Summary of Deciding Factors

Cleanup Alternative	**Criteria No. 1** Effectiveness and Reliability	**Criteria No. 3** Risk Reduction	**Criteria No. 4** Cost Effectiveness
Alternative No. 1 No Action	No	No	Not Viable
Alternative No. 2 Soil Washing	Yes	Yes	$32,900
Alternative No. 3 Excavation and Disposal	Yes	Yes	$15,000

Conclusion

In conclusion, based upon effectiveness and reliability of cleanup method, ease of implementation, reduction of risk and cost effectiveness, Alternative No. 3 (excavation and off-site disposal) is recommended. Alternative No. 1 (no action) is not recommended given that it does not reduce the risk of exposure to the contaminants. Further, Alternative No. 2 is considered to be effective, reliable, and feasible, however, the size limitations of the subject site make implementation of Alternative No. 2 difficult and the cost is estimated to be almost two times that of Alternative No. 3. In addition, the exposure to contaminants is considered to be limited with Alternative No. 3 due to the reduced handling of the impacted soil. Alternative No. 3 is also considered to be economically advantageous to this subject site.

We trust the above is sufficient for your present requirements. Should you wish to discuss this further, please do not hesitate to contact us.

Very truly yours,

McPHAIL ASSOCIATES, INC.

Peter J. DeChaves, L.S.P.

Ambrose J. Donovan, L.S.P. (L.S.P. of record)

Enclosures

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