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# 3. OU1- CHARLES RIVER PARK-ZONE 5

Charles River Park is bounded between North Beacon Street to the north, the Charles River to the south, Commonwealth of Massachusetts property to the west, and the North Beacon Street/Charles River Road intersection to the east (WESTON 1999). Remediation locations, as defined in the September 1996 ROD, include Areas M, N, O, P, and Q. Area M is located within the property occupied by the Watertown Yacht Club. The reuse alternative selected for Charles River Park was public/open space access. In Areas M, N, O, P, and Q, soil cleanup goals were established for PAHs based on human health risk and pesticides based on ecological risk.

## 3.1 REMEDY SELECTION

The selected remedy was soil excavation and off-site disposal/reuse (Alternative S6) (WESTON September 1996). This remedy included the following:

- Excavation of areas with contaminated soils that were above cleanup goals.
- Confirmatory soil sampling within excavations after contaminated soil removal.
- Off-site landfill disposal or reuse of the excavated soil.
- Backfilling of clean fill soils into the excavations.
- Institutional controls with 5-year site reviews.

Institutional controls for this portion of the site will include restrictions to prevent the use of the area for residential-related activities, as well as to limit activities related to potentially contaminated soils under buildings, and to ensure that at least two feet of clean fill remains in place in areas remediated. To the extent required by law, USEPA and the U.S. Army will review the site at least once every 5 years after the initiation of remedial action at the site for the areas where any hazardous contaminants remain to ensure that the restrictions continue to protect human health and the environment. Specifically, the reviews will be performed to determine if restrictions are effective and that the remedy remains protective of human health and environment.

## 3.2 REMEDY IMPLEMENTATION

It was agreed upon by USEPA and Army on 10 June 1997 that the maximum excavation depth for excavation in Charles River Park would be 4 ft bgs. This maximum excavation depth was established because

1) Potential future building in Charles River Park is expected to be limited due to open space future use.
2) Groundwater is located at a shallow depth (generally around 4 ft bgs).
3) Groundwater was not a CERCLA media of concern.
4) The 4 ft depth provides a definitive limit.
5) The 4 ft depth is protective of human health and the environment for the intended reuse. In June 2001, an ESD was signed revising the depth of the excavation for Areas M, P, and Q. Details of this ESD are provided below.

## 3.3 REMEDIAL ACTIONS

WESTON conducted the initial phase of the remedial action in River Park. Upon completion of the soil removal at each area, the excavated area was filled with an equal volume of clean fill brought in from an outside source. The landscaping in the excavated area and other areas affected by excavation activities were restored to pre-excavation conditions. Trees were replaced as agreed upon in the 24 April 1997 meeting between CENAE, WESTON, the Watertown Conservation Commission (WCC), MTL Staff, MDC, and the WYC. Sidewalks, roadways, and parking areas were also restored to pre-excavation conditions.

Certain excavations were suspended pending re-evaluation of the ROD.

An Explanation of Significant Difference (ESD) for the Charles River Park was signed by the Army and the EPA in June 2001. The MDEP provided a letter of concurrence on this ESD. The ESD established construction worker cleanup values for PAHs to be used at depths greater than two-feet bgs. The construction worker values were the same as those developed for use on the former MTL parcels of the site.

Foster Wheeler Environmental Corporation completed the second phase of the remedial action on Areas M, P/Q and the Riverbank Areas in the Fall of 2001 in accordance with the June 2001 ESD.

### 3.3.1 Area M

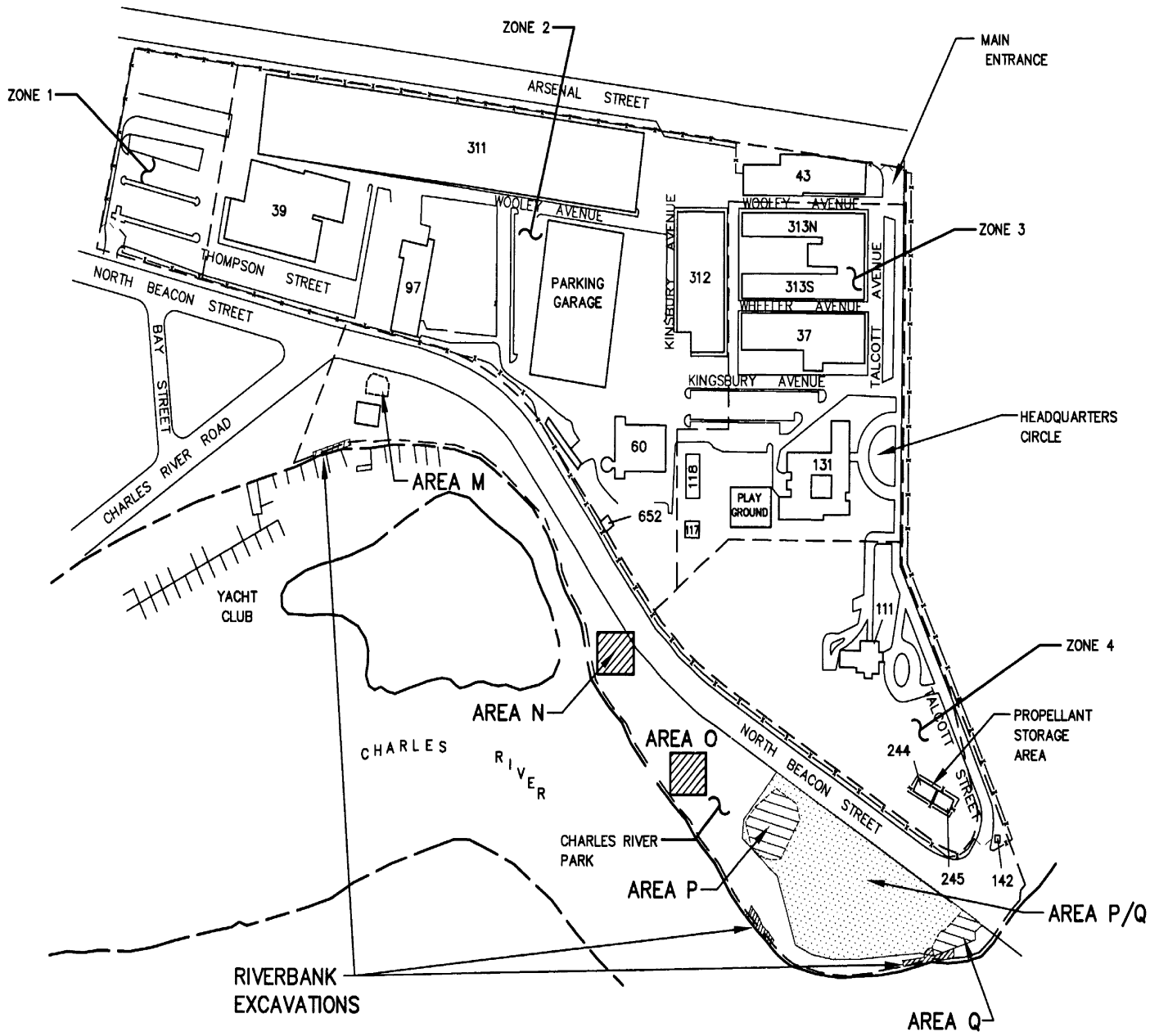
Area M was initially excavated around soil boring GRSB-11 to dimensions of 25 ft x 25 ft x 3 ft (L x W x D) to remove PAH-, pesticide-, and lead-contaminated soils. Excavation at Area M occurred between 12 May and 12 June 1997, see Figure 3-1. Some of the soil sample results from the excavation bottom (3 ft bgs) following the final expansion exceeded applicable PAH cleanup goals. As a result, it was decided by Army that the entire excavation footprint should be excavated to 4-ft bgs prior to backfill. This excavation was completed on 12 June 1997.

During the excavations at Area M, several samples from the excavation sidewalls exceeded PAH cleanup goals. As a result, a program of soil borings was initiated in lieu of continued excavation in an attempt to define the contaminated area(s). Soil borings were performed at Area M in an attempt to define the contaminated area without performing substantial physical disturbance to the WYC operations. These 24 soil boring locations were performed on 10 June and 13 June 1997. Laboratory analytical results generally showed PAHs in excess of soil cleanup goals approximately 75 to 100 ft from the excavation sidewalls, with the exception of the North Beacon Street embankment to the north, which was below the PAH cleanup goals.

Three expansions were performed at Area M and approximately 382 tons of soil was removed. The final excavation depth at Area M was 4-ft bgs and it was trapezoidal-shaped with maximum length and width of 55 ft and 40 ft, respectively.

Based on these findings, work at Area M was suspended pending re-evaluation of the ROD.

Foster-Wheeler Environmental Corporation resumed remedial activities in July 2001 at Area M (interview with Robert Donati of Foster 2-ft bgs. The area was then backfilled and covered with a layer of asphalt.




* NOTE: (GREYSCALE) IS CONCEPTUAL AND NOT TO SCALE

WESTON
MANAGERS DESIGNERS/CONSULTANTS
MANCHESTER, NEW HAMPSHIRE

OUTDOOR SOIL REMOVAL
ARMY MATERIALS TECHNOLOGY LABORATORY
WATERTOWN, MASSACHUSETTS

CURRENT
CHARLES RIVER PARK
SITE MAP

| DRAWN | BEG | DATE | NOV 2001 | FIGURE NO. |
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### 3.3.2 Area N

Area N was initially excavated around soil boring GRSB-19 to dimensions of 10 ft x 10 ft x 3 ft (L x W x D) to remove pesticide-contaminated soils. Excavation at Area N occurred between 14 May and 30 June 1997. During the excavations at Area N, one large oak tree was removed from the excavation area.

Two excavation expansions were performed at Area N and approximately 133 tons of soil was removed. The final excavation dimensions at Area N were 30 ft x 33 ft x 3 ft (L x W x D). The northeast corner of the excavation was excavated to 4-ft bgs. All confirmation soil sample concentrations were below the pesticide cleanup goals. No further remediation was required.

Area N restoration was performed on 30 June and 1 July 1997 using common borrow material as a base under 0.5 ft of loam. Trees were planted in June 1998 according to the plan agreed upon between CENAE and the WCC.

### 3.3.3 Area O

Area O was initially excavated around soil sample 17SUB02 to dimensions of 10 ft x 10 ft x 3 ft (L x W x D) to remove PAH-contaminated soils. Excavation at Area O occurred between 14 May and 11 June 1997. During the excavations at Area O, one red oak tree was removed from the excavation area.

Two excavation expansions were performed at Area O and approximately 86 tons of soil were removed. The final excavation dimensions at Area O were 23 ft x 10 ft x 3 ft (L x W x D). All confirmation soil sample concentrations were below PAH cleanup goals. No further remediation was required. Area O restoration was performed on 30 June and 1 July 1997 using common borrow material as a base under 0.5 ft of loam. Three-quarter inch diameter stone was placed around the outFall of a drain pipe located just to the north of the excavation area. This stone was placed to prevent erosion during heavy drainage events. Trees were planted in June 1998 according to the plan agreed upon by the CENAE and the WCC.

### 3.3.4 Area P

Area P was initially excavated around soil boring 17SB-2 to dimensions of 25 ft x 25 ft x 3 ft (L x W x D) to remove PAH-contaminated soils, see Figure 3-1. Excavation at Area P occurred between 1 May and 18 July 1997.

Three excavation expansions were performed at Area P and approximately 2,730 tons of soil were removed. Final dimensions of the Area P excavation at its longest and widest points were 135 ft and 115 ft, respectively. The final excavation depth at Area P ranged from 3 to 4 ft bgs. Some confirmation sample results from the Area P excavation sidewalls still exceeded the PAH cleanup goals established in the September 1996 ROD. Work at Area P was temporarily suspended at this time. Remedial activities recommenced at Area P in September 2000.

Because of the prehistorical significance of the Charles River Park parcel, during the initial phase of remedial work WESTON arranged for archaeological oversight of the excavation activities in Area P. Excavation activities at Area P were monitored and documented by The Public Archaeology Laboratory, Inc. (PAL) of Pawtucket, Rhode Island. No items of prehistorical significance were found during excavation activities in Area P.

Area P restoration was performed between 15 August and 9 September 1997 using common borrow material as a base under 0.5 ft of loam. The construction fence surrounding the Area P excavation area remained in-place until 23 October 1997 when the new grass was deemed established. No replacement of trees was required in Area P.

### 3.3.5 Area P/Q

Area P/Q was designated as the area between the Area P and Area Q excavations. A total of 7,556 $yd^3$ of soil was removed from Area P/Q during September through November 2000 by Foster Wheeler Environmental Corporation (interview with Robert Donati of Foster Wheeler Environmental Corporation on 13 June 2001).

For the Charles River Park Parcel, the ROD PAH cleanup levels applied to soils in the 0 to 2 foot depth interval. For soils below 2 ft, the June 2001 ESD PAH cleanup levels governed.

The excavation of Area P/Q was completed in a continuous fashion, starting at the western end and proceeding to the east, see Figure 3-1 (Foster Wheeler, 2001). Once the excavation reached a depth of 2 ft, confirmatory soil samples were collected from the excavation bottom and exterior sidewalls. A total of 100 samples were collected from this area (66 floor samples and 34 sidewall samples).

The laboratory analytical results were compared to the appropriate cleanup goals to determine if further excavation was required. All 100 confirmatory soil sample results were below the established criteria; therefore, additional excavation was not necessary.

Upon completion of the soil removal, the excavated area was filled with an equal volume of clean fill brought in from an outside source and was restored to pre-excavation conditions. The fence remains in place to protect the new grass and riverbank plantings.

### 3.3.6 Area Q

Area Q was initially excavated around soil boring 17SB-3 to dimensions of 25 ft x 25 ft x 3 ft (L x W x D) to remove PAH- and pesticide-contaminated soils. Excavation at Area Q occurred between 14 May and 30 June 1997, see Figure 3-1.

Two expansions were performed at Area Q and approximately 1,030 tons of non-RCRA soil and 117 tons of RCRA soil were removed. Final dimensions of the Area Q excavation at its longest and widest points were 125 ft and 66 ft, respectively. The final excavation depth at Area Q was 4-ft bgs. Confirmation sample results from the Area Q excavation sidewalls still exceeded the PAH cleanup goals established in the September 1996 ROD. Work in Area Q was temporarily suspended in June 1997. As stated in Subsection 3.3.5 above, remaining contamination associated with Area Q was excavated between September and November 2000.

Because of the prehistorical significance of the Charles River Park parcel, WESTON arranged for archaeological oversight of the excavation activities in Area Q. Excavation activities at Area Q were monitored and documented by PAL. No items of prehistorical significance were found during excavation activities in Area Q.

Area Q restoration was performed on between 30 July and 9 September 1997 using common borrow material as a base under 0.5 ft of loam. The fence surrounding the Area Q excavation area remained in-place until 23 October 1997 when the new grass was deemed established. During the excavation at Area Q, several trees including four small pines, one large pine and two small boxwood trees were removed from the excavation area. No replacement of trees was required in Area Q.

## 3.4 CHARLES RIVER RIVERBANK EXCAVATIONS

The following information is taken from interviews with and information from Mr. Robert Donati of Foster Wheeler Environmental Corporation.

In support of the riverbank remediation in Area P/Q that occurred in the Fall of 2000 and in Area M began in July 2001, Foster Wheeler completed two separate riverbank sampling programs in Areas P/Q and M. The first sampling event was conducted between 31 July and 3 August 2000 in accordance with the USEPA-approved *Final Sampling and Analysis Plan Addendum*, dated August 2000. This event involved the collection of soil samples at ten sampling locations along the 10 ft wide riverbank strip in Area P/Q (samples RB1-S01 through RB1-S10) and from two locations in the riverbank area at the west end of Area M (samples RB1-S11 and RB1-S12). All of the samples were collected from 0 to 2 ft (bgs) and were analyzed for PAHs and pesticides.

The second riverbank sampling event occurred in January 2001 in order to supplement the original August 2000 riverbank data. The sampling was conducted between 3 and 4 of January 2001 in accordance with the USEPA-approved *Sampling and Analysis Plan Addendum*, dated December 2000. This event involved the collection of soil samples at twenty sampling locations along the 10 ft wide riverbank strip in Area P/Q from depths between 0 to 2 ft bgs and 2 to 4 ft bgs. Samples were collected from 2 to 4 ft bgs at the same ten locations as the August sampling event (RB-B1 through RB-B10) as well as from multiple depths at ten new locations (RB-B11 through RB-B20). The samples collected from 0 to 2 ft (bgs) were analyzed for PAHs and pesticides, while the samples from 2 to 4 ft (bgs) were analyzed for PAHs only. The results of both of these sampling events were used as the basis for determining the extent of riverbank excavation required.

The results for Area M riverbank, showed that the ROD cleanup levels for some PAH compounds were exceeded in the upper two ft of soil in two locations (RB1-S11 and RB1-S12) at the west end of Area M riverbank. In Area P riverbank, the ROD cleanup level for one pesticide compound (4,4'-DDT) was exceeded in the upper two feet of soil in two locations (RB-B19 and RB-B20). In Area Q riverbank, ROD cleanup levels for some PAH compounds were exceeded in two locations (RB-B10 and RB-B11). No exceedances of ESD criteria were identified in any of the riverbank samples.

The above analytical results were used to determine the extent of excavation required at each area. Since no ESD criteria were exceeded, all riverbank excavations will be terminated at 2 ft bgs followed by confirmatory sampling. The horizontal extent between a clean sampling location and one that exceeded ROD criteria was assumed to be half the distance between the two locations. Based on the sampling results, the following riverbank areas will require excavation:

- Area M Riverbank - The entire 100 ft section of riverbank in Area M to a depth of 2 feet bgs.
- Area P Riverbank - An approximate 90 ft section of riverbank adjacent to Area P between B19, B20, B4, and B5 to a depth of 2 ft bgs.
- Area Q Riverbank - An approximate 150 ft section of riverbank adjacent to Area Q between B10 and B11 to a depth of 2 ft bgs.

The Areas P, Q, and M riverbank excavations can be seen in Figure 3-1. Volume estimates in cubic yards for each area were calculated based on these boundaries and assuming a consistent 2-ft excavation depth and a 15% soil expansion factor. To convert from cubic yards to tons, a conversion factor of 1.50 was assumed based on previous results at the Charles River Park.

Following completion of the excavation in each area, confirmatory soil samples were collected from the excavation bottom and exterior sidewalls of any excavation that was not backfilled with two feet of cover.

### 3.4.1 Area M Riverbank

The estimated riverbank area that required excavation was approximately 1,100 square feet ($ft^2$). The Area M Riverbank was limited by the Charles River along the southern edge, the existing

parking lot to the north (Area M), the U.S. Army property boundary to the west, and the boat ramp to the east. Excavation to the north was terminated at the edge of the existing pavement, as the paved area was remediated as part of Area M excavation in July 2001. A 2 ft excavation depth was reached and 75 $yd^3$ of soil (112 tons) was removed. Excavation along the Area M Riverbank was performed using a small backhoe and by hand in places to avoid damage or impacts to existing utilities. The electrical lines servicing the docks in this area were de-energized prior to the start of work. Since the excavations are to be only 2 ft deep, the slope of this excavation was not shored. The excavation sides were sloped as necessary to prevent sidewall collapse.

### 3.4.2 Areas P and Q Riverbank

For the Area P Riverbank, the estimated area that required excavation was approximately 1,400 $ft^2$. Using sample locations B-19 and B-20, the area was defined by the existing fence to the north (Area P/Q), half the distance between B-19/B-20 and B-4 to the south, half the distance between B-19 and B-18 to the west, and half the distance between B-20 and B-5 to the east. The southern extent of the excavation remained in the upland portion of the riverbank. A 2 ft excavation depth was reached and 140 $yd^3$ of soil (210 tons) were removed.

For the Area Q Riverbank, the estimated area that required excavation was approximately 1,820 $ft^2$. Using sample locations B-10 and B-11, the area was defined by the existing fence to the north (Area P/Q), the Charles River to the south, half the distance between B-10 and B-9 to the west, and half the distance between B-11 and B-12 to the east. The original excavation length of this riverbank was 150 ft, but after field review, excavation was stopped prior to the root system of one large tree along the riverbank. The final length of excavation was 120 ft. A 2-ft excavation depth was reached and 127 $yd^3$ of soil (191 tons) were removed.

### 3.4.3 Current Status

Remediation of the riverbank areas and Area M was completed in October 2001. Institutional controls for the Charles River Park parcel will be established as required by the ROD and the ESD. These will consist of use restrictions, specific soil handling protocols for any soils excavated from depths greater than 2 ft bgs, and will likely require maintenance of a 2-ft cover of clean soil. It is expected that the appropriate controls will be incorporated into a Grant of

Environmental Restriction and Easement, and that a related Memorandum of Agreement (MOA) will be signed between the U.S. Army, USEPA, and the MDEP. All necessary institutional controls will be in place prior to the remedial action for the Charles River Park parcel being deemed complete, and prior to any transfer of the property.

# 4. OU2- CHARLES RIVER

## 4.1 INTRODUCTION

The Charles River is included in the Charles River OU2.

## 4.2 FUTURE WORK

Operable Unit 2 is made up of the Charles River in the area adjacent to the MTL Superfund site. This operable unit is in the remedial investigation/ feasibility study phase of the process. No remedy has been selected or implemented for this operable unit at this time. Based on information provided in the remedial investigation there is no unacceptable risk to human health as a result of OU2 (WESTON 1994 and Plexus Scientific Corp 1998). Relative to the CERCLA process, CENAE is currently following the iterative Eight-step Ecological Risk Assessment Process for Superfund in *Ecological Risk Assessment (ERA) for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (June 1997; EPA 540-R-97-006).

The Charles River OU of the MTL has been the subject of a number of environmental investigations conducted during the past two decades. The U.S. Army, including CENAE, conducted the majority of these studies. The results of these historic studies have generally indicated that there are contaminants present in the Charles River surface water and sediment adjacent to, upstream, and downstream of the MTL installation, and that there are numerous potential current and historic sources of environmental contaminants to this urban riverine system. The most comprehensive review of the historic studies of the Charles River adjacent to the MTL is presented in the following two documents:

- U.S. Army Materials Technology Lab Supplemental Phase 2 Remediation Investigation Charles River report completed in March 1998 (Plexus Scientific Corporation [Plexus], 1998).
- Draft Charles River OU Screening Level Ecological Risk Assessment report (ENSR, June 2001).

These two reports present an evaluation of sediment quality data from the Charles River, and provide a detailed description of the condition of those portions of the Charles River that might

be affected by the release of contaminants from MTL. The draft Screening Level Ecological Risk Assessment (SERA) is currently being revised in response to regulatory and natural resource trustee comments. The SERA was designed to serve as Steps 1 and 2 of USEPA's eight-step ecological risk assessment process As was decided in the 30 October 2001 meeting between the Army, USEPA and the MDEP, work will continue to follow the aforementioned eight-step process. Accordingly, the Problem Formulation Statement will be prepared as Step 3 and distributed along with the Revised SERA to the appropriate public stakeholders.

# 5. OU3 - AREA I

Work at Area I of MTL was performed under a separate ROD signed 28 June 1996 and was completed in the Fall of 1996 (WESTON 1996). Area I is located northeast of Building 131 at the intersection of Talcott Street and Kingsbury Avenue.

## 5.1 CONTAMINANTS

As part of Remedial Investigation (RI) field activities in 1992, WESTON installed soil borings throughout the site. A soil sample collected at a depth of 0-2 ft below the bgs from soil boring GRSB-15 located between Buildings 131 and 37 exhibited levels of PAH and pesticides above MTL Zone 3 cleanup goals. Laboratory analysis of a second soil sample collected from a depth of 32 ft bgs at this location did not indicate contaminant concentrations above clean up goals. In addition, samples collected at depths of 0.5, 4, 22, and 32 ft bgs from soil boring 11SB-3, approximately 60 ft northwest of boring GRSB15, did not exceed cleanup goals. The area surrounding boring GRSB15 was designated Area I as an area to be remediated.

## 5.2 REMEDY SELECTION

The selected remedy was soil excavation and off-site disposal/reuse (Alternative S6) (WESTON June 1996). This remedy includes the following:

- Excavation of areas with contaminated soils that were above cleanup goals.
- Confirmatory soil sampling within excavations after contaminated soil removal.
- Off-site landfill disposal or reuse of the excavated soil.
- Backfilling of clean fill soils into the excavations.

There are no institutional controls in place that are applicable to Area I.

## 5.3 REMEDIAL ACTIONS

WESTON conducted the remedial action at Area I under contract to CENAE. Contaminated soil removal activities began on 8 August 1996 for Area I.

Surface materials associated with Area I were removed in order to begin the remediation of the 50 ft X 50 ft excavation area. A 5 ft wide concrete sidewalk approximately 4 inches thick and extending along the north and east sides of the excavation was removed prior to excavation. The sidewalk material was transported for offsite recycling. The 60 linear ft of granite curbing which was the interface between the sidewalk and bituminous concrete on Kingsbury Avenue was peeled up, removed, and segregated into a stockpile for reuse during site restoration. Approximately 134 $yd^2$ of 2-inch thick bituminous concrete was peeled up from the existing parking lot, broken up into transportable sizes of 3 ft or less, and placed into a stockpile for offsite recycling. These materials went to an off-site aggregate facility as required under Massachusetts State Solid Waste Title D Regulations.

The confirmations sample results for all soil samples were below the established MTL Zone 3 soil cleanup criteria; therefore no additional soil excavation was performed.

Area I was backfilled with off-site processed gravel. Granular fill material was imported from an off-site source and backfilled and restored to existing condition.

The stockpiled contaminated soils were sampled and meet the acceptance criteria for reuse as landfill cover material at lined facilities in Massachusetts.

## 5.4 LAND USE CONTROLS AND RESTRICTIONS

The 7 August 1998 Grant of Environmental Restriction and Easement for MTL site redesignated areas into lots for property transfer from the U.S. Army (Interview with Bruce Hoskins on 8 May 2001). Areas in Zones 1, 2, and 3 were redesignated Lot 1. Areas in Zone 4 were redesignated Lot 2. Lot 1 was sold to the WADC and then to the CRBCA in 1998. CRBCA sold the property to President and Fellows of Harvard College in May 2001. Lot 2 remains Town of Watertown property.

## 5.5 CURRENT STATUS

OU3 was deleted from the NPL on 22 November 1999. Area I is included in Zone 3 and is still protective of human health and environment (see Subsection 6.9 for protectiveness statement).

# 6. FIVE-YEAR REVIEW FINDINGS

## 6.1 INTERVIEWS

A formal interview was conducted with the developer, CRBCA's Licensed Site Professional (LSP) of Record, Mr. Bruce Hoskins P.E., L.S.P. of URS Corporation on 8 May 2001. See interview record in Appendix A.

A telephone interview was conducted with Bob Chase, BRAC Environmental Coordinator, by Pam Hoskins P.E., L.S.P. on 20 April 2001.

A telephone interview was conducted with Mark Boyle, WADC Representative on 16 May 2001 to discuss Excavation Area "L4".

A formal interview and site inspection was conducted with the developer, CRBCA's Ms. Lynn Kramer on 18 May 2001. See interview record in Appendix A.

A conference call was conducted with Mr. Robert Donati from Foster and Wheeler Environmental Corporation on 13 June 2001 about the Charles River Park Excavations. See interview record in Appendix A.

## 6.2 SITE INSPECTION

A site inspection was conducted by WESTON personnel on 30 May 2001 at the MTL property. During this site inspection, benchmarks were missing at several Excavation Areas. At Excavation Area "E" all benchmarks are missing, at Excavation Area "G" several benchmarks were missing, and at Excavation Area "L4" there was one missing benchmark. The Site Inspection Checklist in Appendix A summarizes observations made during the inspection, as well as during interviews and file review.

## 6.3 CHANGES IN STANDARDS AND TO BE CONSIDERED

No Changes to Applicable Relevant and Appropriate Requirement(s) (ARARS) or To Be Considered (TBCs) since remedy implementation.

## 6.4 CHANGES IN EXPOSURE PATHWAYS, TOXICITY AND OTHER CONTAMINANT CHARACTERISTICS

Excavation Areas B, E, and G were cleaned up to construction worker risk-based cleanup goals and are designated as commercial zones with restrictions in the Grant of Environmental Restriction and Easement. Excavation Area L4 was cleaned up to construction worker risk-based cleanup goals and is designated as open space use.

Application for the First Grant Amendment of the Grant of Environmental Restriction and Easement at the Building 39 Area, Building 229 Area, and Building 656 Area, and Excavation Area B at the Former Army Materials Technology Laboratory Watertown, Massachusetts was requested on 22 January 1999. This First Grant Amendment was approved on 5 February 1999, for the Building 39 Area, Building 229 Area, and Building 656 Area, and was approved for Excavation of Area B upon submittal of a closeout report. The Amendment was requested to remove all subsurface restrictions in order demolish Buildings 229 and 656 and to add an approximately 25-ft high single story structure to the north end of Building 39. Soil samples were collected and a risk analysis was conducted for this Amendment. This Amendment also included excavation and a permanent reduction in grade of Excavation Area B. According to the approval letter, this part of the amendment would not be executed until construction activities and a closeout report was completed. The Fourth Grant Amendment summarized the Excavation Area B construction activities and the closeout report and was submitted in January 2000. The Fourth Grant Amendment was approved on 2 August 2000 and recorded on 3 August 2000.

A Second Grant Amendment was requested on 15 April 1999 to remove all subsurface restrictions in order to demolish Buildings 146, 147, 241, 243, and 246 and to renovate and reuse Buildings 131 and 311 for commercial use. Soil samples were collected and a risk analysis was conducted for this Amendment. The Second Grant Amendment was approved in a letter dated 16 April 1999.

A Third Grant Amendment was requested on 1 June 1999 to remove all subsurface restrictions in order to demolish Buildings 36, 292, and 313C and to modify the Permitted Uses and Activities (paragraph 3 of the Grant) to allow construction and renovation activities impacting the subsurface restrictions in order to renovate and reuse Buildings 97, 117, 118, 312 and 313 for

commercial and/or residential use that is consistent with the use restrictions imposed by the Grant. Soil samples were collected and a risk analysis was conducted for this Amendment. The restrictions were not removed for Buildings 97 and 312 due to PAHs detected above ROD cleanup goals, but they were removed for Buildings 36, 37, 117, 118, 292, and 313. The Third Amendment was approved on 8 June 1999 and was recorded on 10 June 1999.

A Fourth Grant Amendment which was requested in order to complete the First Grant Amendment for the excavation in Area B was submitted on 17 January 2000. The Fourth Grant Amendment was approved on 2 August 2000 and recorded on 3 August 2000. See Subsection 2.2.2.4 for discussion on Excavation Area B.

New exposure pathways and risks are the same as or less than those resulting from ROD and ESD remedial actions.

## 6.5 DATA REVIEW

Application for the First Grant Amendment of the Grant of Environmental Restriction and Easement at the Building 39 Area, Building 229 Area, and Building 656 Area, and Excavation Area B was to remove restrictions in order to add an approximately 25-ft high single-story structure to the north end of Building 39, demolish Buildings 229 and 656, and excavate Area B for extension on Building 39. Soil samples were collected and a risk analysis was conducted by TRC (January 1999) for this Amendment. Soil samples were analyzed for PAHs, pesticides/PCBs, metals, cyanide, and nitrate/nitrite. PCBs and pesticides were not detected. Cyanide was not detected. Nitrate was detected around Building 39. Metals were detected within site background concentrations. The First Grant Amendment was approved on 5 February 1999.

A Second Grant Amendment was requested on 15 April 1999 to remove all subsurface restrictions to demolish Buildings 146, 147, 241, 243, and 246 and to renovate and reuse Buildings 131 and 311 for commercial use. Soil samples were collected and a risk analysis was conducted by TRC (April 1999) for this Amendment. Soil samples were analyzed for PAHs, pesticides/PCBs, metals, cyanide, and nitrate/nitrite. PCBs were not detected in the samples. PAHs were detected in samples from Buildings 147, 241, 243, 246 however, these concentrations did not exceed ROD cleanup goals. Pesticides (DDT and chlordane) were

detected in low concentrations in samples from Building 246. Metals were detected within site background concentrations. The Second Grant Amendment was approved on 16 April 1999.

A Third Grant Amendment was requested on 1 June 1999 to remove all subsurface restrictions to demolish Buildings 36, 37 and 292, and to modify the Permitted Uses and Activities (paragraph 3 of the Grant) to allow construction and renovation activities impacting the subsurface restrictions in order to renovate and reuse Buildings 97, 117, 118, 312 and 313 for commercial and/or residential use that is consistent with the use restrictions imposed by the Grant. Soil samples were collected and a risk analysis was conducted for this Amendment. Soil samples were analyzed for PAHs, pesticides/PCBs, metals, cyanide, and nitrate/nitrite. PCBs were not detected in the samples. PAHs were detected in samples from Buildings 36, 118, 292 and 313; however, these concentrations did not exceed ROD cleanup goals. PAH ROD cleanup goals were exceeded in soil samples collected beneath Buildings 97 and 312. Pesticides (DDT and endrin aldehyde) were detected in samples from Building 97. Pesticides (DDT and DDE) were detected in low concentrations in samples collected from Building 117. Pesticides (lindane, DDD, DDE and DDT) were detected in samples from Building 118. The pesticide DDT was detected in a sample from Building 292. Metals were detected within site background concentrations. The Grant restrictions were not removed for Buildings 97 and 312 due to PAHs detected above ROD cleanup goals. The Third Grant Amendment was approved on 8 June 1999.

A Fourth Grant Amendment which was requested in order to complete the First Grant Amendment for the excavation in Area B was submitted on 17 January 2000. The Fourth Grant Amendment was approved on 2 August 2000 and recorded on 3 August 2000. See Subsection 2.2.2.4 for discussion on Excavation Area B.

## 6.6 ASSESSMENT

Assumptions in the ROD addressed long-term residential and commercial exposure to contaminated soil. The remedies selected were to eliminate the source of the contamination and reduce the potential risk to future users at MTL. The land reuse expectation for clean up and current status is shown in Table 6-1.

**Table 6-1**
**MTL Pre-Excavation Areas and Current Status Table**
**Materials Technology Laboratory**
**Watertown, Massachusetts**

| Zone | Site Area | Samples | Contaminants | Clean up Goals (mg/kg) | Clean up Goals Achieved | Land Reuse Expectation | Land Reuse, Current | Notes |
|---|---|---|---|---|---|---|---|---|
| 1 and 2 | A<br>(Subareas A1, A2, A3) | Boring GRSB-2<br>Surface Soil 01SS-1<br>Surface Soil 02SS-1 | Indeno (1,2,3-cd) pyrene<br>Benzo(a)pyrene | 3.0<br><br>2.0 | Yes to ROD Cleanup Goals | Commercial[2] | Area is Commercial | Lot 1 under Grant, Commercial reuse |
| 2 | B<br>(Subareas B1, B2) | Surface Soil 05SS-1<br>Surface Soil 05SS-2 | Benzo(a)anthracene<br>Benzo(a)pyrene<br>Benzo(b)fluoranthene<br>Benzo(k)flouranthene<br>Indeno(1,2,3-cd)pyrene | 8.5<br>2.0<br>7.9<br>6.2<br>3.0 | Yes- to Construction worker risk based cleanup goals and ROD cleanup goals to a depth of 1'bgs | Commercial with deed restrictions[3] | Area is Zoned Commercial with deed restrictions; is currently a paved driveway | Lot 1 under Grant, was re-excavated by O'Neill |
| 2 | C | Boring GRSB-6 | Benzo(a)pyrene | 2.0 | Yes to ROD Cleanup Goals | Commercial[2] | Commercial | Lot 1 under Grant |
| 2 | D | Boring 06SB-1 | Indeno (1,2,3-cd) pyrene<br>Benzo(a)pyrene | 3.0<br>2.0 | Yes to ROD Cleanup Goals | Commercial[2] | Commercial | Lot 1 under Grant |
| 2 | E | Boring 06SB-5 | Indeno (1,2,3-cd) pyrene<br>Benzo(a)pyrene | 3.0<br>2.0 | Yes- to Construction worker risk based cleanup goals and ROD cleanup goals to a depth of 1'bgs | Commercial with deed restrictions[3] | Commercial with deed restrictions | Lot 1 under Grant, Grant violations have occurred at Area E |
| 2 | **Metals Hot Spot Areas** | Surface Soil 14SS-3<br>Subsurface Soil 14SUB01<br>Subsurface Soil 14SUB02 | Chromium<br>Nickel<br>Nickel<br>Zinc<br>Chromium<br>Nickel | Ecological Risk Reduction greater than 25% | Yes to ROD Cleanup Goals | Commercial[2] | Commercial | Lot 1 under Grant |
| 2 | **Lead Hot Spots Areas** | Surface Soil 02SS-2<br>Surface Soil 03SS-2<br>Boring 05SB-2 | Lead<br>Lead<br>Lead | 1,000<br>1,000<br>1,000 | Yes to ROD Cleanup Goals | Commercial[2] | Commercial | Lot 1 under Grant |
| 3 | F<br>(Subareas F1, F2) | Surface Soil 13SS-1<br>Surface Soil 13SS-2 | Indeno (1,2,3-cd) pyrene<br>Benzo(a)pyrene<br>Chlorodane<br>DDE<br>DDT | 3.0<br>2.0<br>1.4<br>0.14<br>0.17 | Yes to ROD Cleanup Goals | Unrestricted | Commercial | Lot 1 under Grant |
| 3 | G | Boring GRSB-9 | Indeno (1,2,3-cd) pyrene<br>Benzo(a)pyrene | 3.0<br>2.0 | Yes- to Construction worker risk based cleanup goals and ROD cleanup goals to a depth of 1'bgs | Commercial with deed restrictions[3] | Area is Zoned Commercial with deed restrictions; is currently under asphalt paving | Lot 1 under Grant, out of compliance with Grant due to permanent reduction in grade |
| 3 | H | Boring 11SB-4 | Benzo(a)pyrene<br>Dibenz(a,h)anthracene | 2.0<br>0.27 | Yes to ROD Cleanup Goals | Unrestricted | Commercial | Lot 1 under Grant |

**Table 6-1**
**MTL Pre-Excavation Areas and Current Status Table**
**Materials Technology Laboratory**
**Watertown, Massachusetts**

| Zone | Site Area | Samples | Contaminants | Clean up Goals (mg/kg) | Clean up Goals Achieved | Land Reuse Expectation | Land Reuse, Current | Notes |
|---|---|---|---|---|---|---|---|---|
| 3 | I | Boring GRSB-15 | Benzo(a)anthracene<br>Benzo(a)pyrene<br>Benzo(b)fluoranthene<br>Benzo(k)flouranthene<br>Chrysene<br>Indeno(1,2,3-cd) pyrene<br>Chlorodane<br>DDD<br>DDE<br>DDT<br>Dieldrin | 8.5<br>2.0<br>7.9<br>6.2<br>11.1<br>3<br>1.5<br>0.25<br>0.39<br>0.6<br>0.056 | Yes to ROD Cleanup Goals | Unrestricted | Commercial | Lot 1 under Grant |
| 4 | J<br>(Subareas J1, J2) | Boring 13SB-1<br>Surface Soil 13SS-5 | Chlordane<br>DDE<br>DDT<br>Aroclor 1260 | 1.4<br>0.14<br>0.17<br>1 | Yes to ROD Cleanup Goals | Open Space[4] | Open Space | Lot 2 under Grant |
| 4 | K<br>(Subareas K1, K2, K3) | Boring GRSB-21<br>Surface Soil 13SS-8<br>Boring 15SB-2<br>Surface Soil 15SOL01 | Chlordane<br>DDE<br>DDT<br>Arsenic<br>Lead<br>Nickel | 1.4<br>0.14<br>0.17<br>16.9<br>291<br>33.8 | Yes to ROD Cleanup Goals | Open Space[4] | Open Space | Lot 2 under Grant |
| 4 | L<br>(Subareas L1, L2, L3, L4) | Surface Soil 16SS-1<br>Surface Soil 16SS-2 | Chlordane<br>Chromium<br>Nickel<br>Zinc<br>DDE<br>DDT<br>Aroclor 1260 | 1.4<br>26.8<br>33.8<br>157<br>0.14<br>0.17<br>1 | Yes- L1, L2, L3 were cleaned up ROD clean up goalsArea L4 was to Construction worker risk based cleanup goals and ROD cleanup goals to 1' bgs | Open Space with deed restrictions[5] | Open Space with deed restrictions, L4 is partially under paving and landscape area | Lot 2 under Grant |
| 2 | T<br>(Subareas T1, T2) | Surface Soil 14SS-1<br>12SUB01 | Chlordane<br>DDT<br>Nickel<br>Zinc | Ecological Risk Reduction greater than 25% | Yes to ROD Cleanup Goals | Open Space[4] | Open Space | Lot 1 under Grant |
| 5 | M | | Benzo(a)anthracene<br>Benzo(a)pyrene<br>Benzo(b)fluoranthene<br>Benzo(k)fluoranthene<br>Chrysene<br>Dieldrin<br>Lead | 8.5<br>2<br>7.9<br>6.2<br>11.1<br>0.35<br>1,000 | Yes to ROD Cleanup Goals, Construction Worker values applied at depths >2' bgs | Open Space | Open Space/ Yacht Club | Remediation field work is complete. Closeout report and implementation of Institutional Control pending. |
| 5 | N | | Chlordane<br>DDT | 1.4<br>0.17 | Yes to ROD Cleanup Goals | Open Space | Open Space | Remediation field work is complete. Closeout report and implementation of Institutional Control pending. |
| 5 | O | | Benzo(a)anthracene<br>Benzo(a)pyrene<br>Benzo(b)fluoranthene<br>Benzo(k)fluoranthene<br>Chrysene<br>Dibenz(a,h)anthracene<br>Indeno(1,2,3-cd)pyrene | 8.5<br>2<br>7.9<br>6.2<br>11.1<br>0.27<br>3 | Yes to ROD Cleanup Goals | Open Space | Open Space | Remediation field work is complete. Closeout report and implementation of Institutional Control pending. |

Click here to go to Section 6.7

**Table 6-1**
**MTL Pre-Excavation Areas and Current Status Table**
**Materials Technology Laboratory**
**Watertown, Massachusetts**

| Zone | Site Area | Samples | Contaminants | Clean up Goals (mg/kg) | Clean up Goals Achieved | Land Reuse Expectation | Land Reuse, Current | Notes |
|---|---|---|---|---|---|---|---|---|
| 5 | P | | Benzo(a)pyrene<br>Indeno(1,2,3-cd)pyrene | 2<br>3 | Yes to ROD Cleanup Goals, Construction Worker values applied at depths >2' bgs | Open Space | Open Space | Remediation field work is complete. Closeout report and implementation of Institutional Control pending. |
| 5 | Q | | Benzo(a)pyrene<br>Indeno(1,2,3-cd)pyrene<br>DDE<br>DDT | 2<br>3<br>0.14<br>0.17 | Yes to ROD Cleanup Goals, Construction Worker values applied at depths >2' bgs | Open Space | Open Space | Remediation field work is complete Closeout report and implementation of Institutional Control pending. |

[1] See Table 1-1 for current tenant status.

[2] Commercial Reuse restrictions for Lot 1 as stated in the Grant Section 2 Paragraph A (i) (a) states prevent use as residential, daycare, school (for children under eighteen years of age) hotel, motel, community center (for children under eighteen years of age) and/or recreational uses or activities. After Grant Amendments there remains Grant restrictions for Buildings 60, 97, 311, 312, "Center Wing of Building 313 Area" and "Portion of Southerly Area of Building 313 Area"and 652 that state these areas are prevented for use as a residential, daycare, school (for children under eighteen years of age) hotel, motel, community center (for children under eighteen years of age) and/or recreational uses or activities, excavation, drilling or otherwise disturbing the soil underlying building foundations and slabs, and disturbance of the building foundations and slabs which would compromise their integrity in a manner that would or would be likely to result in human contact with underlying soils

[3] Excavation Area "B", "E", and "G" as stated in the Grant Section 2 Paragraph A (iii) (a), (b) and (c) prevent use as residential, daycare, school (for children under eighteen years of age) hotel, motel, community center (for children under eighteen years of age) and/or recreational uses or activities, prevent a reduction in grade below the surface grade, as defined in subparagraph 2.C. and movement of soils, located at a depth of one foot or more below the surface grade, above the depth defined in subparagraph 2.C. unless disposed of off-site in compliance with the Soil Management protocol set forth in Paragraph 4 "Obligations and Conditions" of the Grant.

[4] Lot 2 restrictions as stated in the Grant Section 2 Paragraph B (i) states prevent use as residential, daycare or school (for children under eighteen years of age) uses or activities. Building Areas 111, 142, 244, and 245 are restricted for use as residential, daycare or school (for children under eighteen years of age) hotel, motel, community center (for children under eighteen years of age) and/or recreational uses or activities excavation, drilling or otherwise disturbing the soil underlying building foundations and slabs, and disturbance of the building foundations and slabs which would compromise their integrity in a manner that would or would be likely to result in human contact with underlying soils.

[5] Excavation Area "L4" as stated in the Grant Section 2 Paragraph B (iii) prevent use as residential, daycare or school (for children under eighteen years of age) uses or activities, prevent a reduction in grade below the surface grade, as defined in subparagraph 2.C. and movement of soils, located at a depth of one foot or more below the surface grade, above the depth defined in subparagraph 2.C. unless disposed of off-site in compliance with the Soil Management protocol set forth in Paragraph 4 "Obligations and Conditions" of the Grant.

[6] Information taken from the 1996 ROD

Information gathered from ROD dated September 1996, the two ESDs, and the Grant.