January 12, 2016  
GZA File No: 03.0033930.00  

Commonwealth of Massachusetts  
Department of Environmental Protection  
Northeast Regional Office  
205B Lowell Street  
Wilmington, Massachusetts 01887  

Re: Utility-Related Abatement Measure Status Report No. 6  
UMASS Boston Campus UCRR Project  
Boston, Massachusetts  
RTN 3-31002  

To Whom It May Concern:  

On behalf of the University of Massachusetts Boston (UMASS Boston the “Site”), GZA GeoEnvironmental, Inc. (GZA) has prepared this Utility-Related Abatement Measure (URAM) Status Report No. 6 to address the handling and management of contaminated soil that will be encountered during work associated with the installation of pile caps and other utilities in the area to the north of the Calf Pasture Pump Station of the Utility Corridor and Roadway Relocation (UCRR) Project at the Site. This URAM Status Report was requested by the Massachusetts Department of Environmental Protection (MassDEP) in an e-mail of December 28, 2015, subsequent to a meeting held on December 18, 2015 with representatives of UMASS Boston, GZA and the UCRR design team at the UCRR Project Site. A Site Locus Map is presented as Figure 1, and the area that will be subject to the provisions of this URAM Status Report are delineated on Figure 2. The URAM will be performed in compliance with the applicable requirements contained in Section 40.0460 of the Massachusetts Contingency Plan (MCP).

This Status Report was necessitated by the detection of asbestos fibers in soil samples collected from landfill excavate stockpiled at the Site, and in-situ samples of landfill material taken from areas to be excavated as part of the UCRR Project. This modification addresses the short-term construction activities which will be conducted to the north of the Calf Pasture Pumping Station shown on Figure 2. A subsequent Status Report (No. 7) will be submitted to the MassDEP to discuss provisions to be taken relative to the presence or potential presence of asbestos in soil for Site-wide, long-term construction activities for the UCRR project which are anticipated to be completed in the fall of 2017.

The provisions for management and handling of potentially contaminated material are described in this Status report and Attachment 1, the Revised Excavated Material Management Plan (EMMP) of the same date. The provisions for air monitoring/sampling for asbestos are described in the appended Perimeter Asbestos Air Monitoring Plan.
BACKGROUND

The project Site is approximately 95-acres in area and is occupied by a college campus, consisting of multi-story buildings, a central former parking garage that forms a central plaza level, a running track, a softball field, parking lots, and roadways. The UMASS Boston campus is located on the Columbia Point peninsula which is the site of a former municipal solid waste landfill used by the City of Boston. The Columbia Point peninsula has a history of filling over the past 130 years. Originally, the Site was a tidal marshland and approximately 60 acres of the southern and eastern campus area was originally submerged or tidal marsh. The UMass Boston Campus is constructed on filled marsh deposits, and the fill material used was largely municipal solid waste mixed with granular soil.

The first known Site development was a drainage sewer pumping station and discharge tunnels constructed in the late 1870s and early 1880s, called the Calf Pasture Pumping Station. The pumping station structure and discharge tunnels are still present at the Site. A manufactured gas plant (MGP) was constructed in the area that is now the western portion of the campus and was in operation from the late 1880s to the 1930s. Beginning in the 1920s, the Site was used as a municipal landfill which consisted of dumping and burning refuse, which more than doubled the size of the previously filled land that is now occupied by the Campus. The landfill was closed in the early 1960’s and the UMASS Boston campus was constructed in the early 1970’s. During construction of the Campus, imported sand and gravel fill (non-urban fill) was used to fill the area of Bianculli Boulevard and portions of University Drive South. In addition, loam was imported to the site for landscaping purposes.

The UMASS Boston campus was granted a Special Project Designation (SPD) under the Massachusetts Contingency Plan (MCP) by the MassDEP in 2012. The master release tracking number (RTN) for the UMB campus is 3-31000. Under the terms of the SPD, each construction project site on campus at which MCP-regulated contaminated or landfill materials will be encountered, excavated, disturbed, or relocated will be assigned a unique “daughter” RTN. The UCRR project is being conducted under RTN 3-31002 and the work is overseen by the MassDEP Bureau of Waste Site Cleanup.

UTILITY CORRIDOR AND ROADWAY RELOCATION (UCRR) PROJECT

The UCRR project consists of the reconfiguration of roadways and construction of new utilities in accordance with the campus master plan. The utilities that will be constructed include natural gas lines, domestic and fire protection waterlines, sanitary and storm sewers, electric power, data telecom, and thermal (chilled and hot water) lines. Unlike individual building projects on the campus which have a well-defined footprint, the UCRR project is “linear” and extends over a large areas of the campus, therefore the extent of excavations for installation of utilities include much of the campus area (refer to Figure 3 for extents). It is estimated that over 300,000 cubic yards of soil and landfill material will be handled (excavated, processed, stockpiled or reused as utility trench backfill and permanent landforms) during the entire project.
During the scope of work which falls under this URAM Status Report (work associated with the installation of pile caps and other utilities in the area to the north of the Calf Pasture Pump Station), it is estimated that approximately 16,000 cubic yards of material will be excavated and stockpiled.

As noted above, a subsequent Status Report will be submitted to the MassDEP to discuss provisions relative to the presence or potential presence of asbestos in soil for site-wide, remaining construction activities for the UCRR project. These provisions will demonstrate the project goals of reducing significant off-Site disposal quantities and costs, and processing/reusing excavated soil and landfill material onsite.

Construction activities at the Site have followed the provisions detailed in the URAM Plan of June 24, 2013 and the EMMP.

**PRACTICES FOR MATERIALS MANAGEMENT PRIOR TO THE DETECTION OF ASBESTOS**

Excavated landfill materials have been physically screened to remove oversized materials and landfill debris (e.g. wood, leather, fabric, concrete, brick, metal, cobblestones, granite curbing and vegetation). The material passing through the screen consists of a soil matrix and is used as utility trench backfill. The material is used as backfill in the area above the envelope of clean soil that surrounds the pipes and below 2 feet below grade. The material that is retained on the screen undergoes mechanized crushing of inorganic and oversized materials (e.g. brick, concrete, granite and glass), with the intent of reuse on-Site below grade. Organic materials or other materials that are unable to be crushed or are unsuitable for reuse as trench backfill are culled from the material prior to crushing and are termed solid waste or tailings. The screening has taken place at Site S (South Lot) and in the former track area. The majority of the crushing operation has taken place in the former track area shown on Figure 3. Screened landfill material which cannot be used as backfill (e.g. metal, large pieces of concrete, granite and organic materials or materials that cannot be crushed as described above) are termed solid waste or tailings, and are stored in the former track area shown on Figure 4. The solid waste/tailings that cannot be used as backfill will be disposed of off-Site. The screened and crushed materials are subsequently used as on-Site fill and backfill in the utility trenches and the construction of landforms. The final surface of the processed/reused screened and crushed landfill material will be covered with clean cover in maintained landscape areas and at least 1 foot of clean cover material in hardscape areas (asphalt roadways). In excavated areas that will not be covered by pavement or buildings, the backfilled landfill material will be covered with a marker barrier and clean backfill. An Activity and Use Limitation (AUL) will be filed for the Site to support a Permanent Solution Statement (PSS) under the MCP when the UCRR project is completed and the closure documents will be maintained in UMass Boston’s Centralized Environmental Information Center.

As described in the EMMP, stockpiles (including unscreened, screened and crushed landfill material, as well as other materials excavated such as sand and gravel or topsoil) are kept covered either with polyethylene sheeting or GeoMatrix SS
permeable fiber mat to prevent erosion and generation of airborne dust. Roadways over which construction equipment travels, have been continuously watered to suppress dust. The screening and crushing operations are misted with water to prevent generation of dust. Furthermore, as described in the EMMP, the contractor is required to decontaminate construction equipment by washing with water before it leaves the work area and is required to monitor for dust in each work area and worker breathing zone. In addition, monitoring for total dust and PM10 dust has been conducted each work day at the active excavation areas, within the workers’ breathing zone, at the stockpile areas, at roadways, adjacent to areas where the public has access, and along the perimeter of the construction site by GZA.

SOIL SAMPLES COLLECTED PRIOR TO NOTIFICATION TO MASSDEP

In early November, 2015 to facilitate disposal of the solid waste/tailings resulting from screening and crushing processes, the Contractor, JDC, collected a sample of the material and had the sample analyzed for PCBs, TCLP Lead and asbestos, as requested by the potential receiving facility. Results were received on November 10, 2015. The PCB and TCLP Lead analyses were below the acceptance limits for the potential receiving facility however, analyses indicated the “presence” (unquantified) of asbestos. Further, quantification of the sample indicated 2.1 percent asbestos (see first solid waste/tailings sample on Table 1, sample ID 15062-01). The procedures used to collect the sample were not observed by a member of the design team and an additional sample was collected on November 13, 2015 (Sample ID 15065-01 as shown on Figure 4). On the same date, JDC collected samples 15065-02 through 15065-05 from stockpiles of unprocessed landfill excavate and of landfill excavate that had undergone screening to separate the larger pieces, as described above, and is intended to be crushed. These stockpiles are located in the former track and South Lot areas shown on Figure 4. The stockpiled material originated from material excavated from University Drive South and University Drive East as shown on Figure 3. The second sample of the solid waste/tailings pile did not contain asbestos. The four samples from the stockpiles which originated from excavations of landfill material, contained asbestos ranging from 1.2 to 3.8 percent (see Table 1). These samples that originated from landfill excavate (Sample ID 15065-02 through 15065-05) were collected by JDC. JDC provided a portion of the samples to GZA which GZA later had analyzed for asbestos. GZA observed that JDC did not decontaminate their sampling equipment between obtaining each sample.

Upon receipt of the analyses on November 17, 2015, excavation of landfill excavate was terminated, stockpiles were secured, perimeter air samples were collected for asbestos analyses, and the MassDEP was made aware of the findings.
RESULTS OF PERIMETER AIR SAMPLES

Air samples for asbestos analyses were collected from the perimeter of the UCRR project and interior areas of the campus (outside the Plaza area) by Environmental Health and Engineering Inc. (EH&E) on November 24, 2015. Results which are detailed Attachment 2 indicate that samples from all locations were below workplace exposure standard and guidelines as well as the clearance criteria for re-occupancy of spaces following asbestos abatement. The results did not indicate any evidence of elevated emissions of asbestos from the project under the conditions the samples were collected.

SOIL SAMPLES COLLECTED SUBSEQUENT TO NOTIFICATION TO MASSDEP

Additional samples of in-situ landfill material and soil stockpiles for asbestos analyses, were collected by JDC and GZA between November 30 and December 3, 2015, after MassDEP was notified of the detection of asbestos in the landfill-originated stockpile samples 15065-02 through 15065-05.

As indicated previously, 1.2 to 3.8 percent asbestos was detected in samples collected by JDC in four stockpiles initially sampled. During the initial sampling by JDC, they provided a portion of their samples to GZA (i.e. split samples). The splits of these samples, were analyzed by GZA and detected trace (<1 percent) to 4.0 percent asbestos. Although these results are suspect relative to which stockpile contained asbestos since sampling equipment was not decontaminated between stockpile sampling locations, the results indicate that asbestos is present in at least one of the stockpiles.

JDC collected four samples (15153-01 through 15153-04) from test pit excavations at the GAB area shown on Figure 4 to determine if asbestos was not present, so that work could possibly resume in this area. Results ranged from 1.3 to 2.1 percent asbestos. This area was not sampled by GZA. These results are also suspect since the sampling equipment was not decontaminated between obtaining each sample; however the results indicate that asbestos is present in at least one of the samples. Based on the results, work was not resumed in the area.

JDC collected seven samples from the Track, South Lot, to the west of the EMKI, at the former Utility Plant ramp, and Lot A areas (samples 15158-01 through 15158-07). GZA was present during some of the sampling, and JDC did not properly decontaminate the sampling equipment and did not employ proper sampling techniques. The origin and location of sample 15158-05 was not provided to GZA. JDC’s results ranged from not detected (ND) to 2.3 percent asbestos. It is noted that asbestos was detected in samples collected by JDC from stockpiles of on-site excavated clean gravel (sample 15158-01), loam (sample 15158-03) and reclaimed asphalt (sample 15158-06). GZA resampled these three stockpiles and did not detect asbestos. We believe that the samples collected by JDC may have been cross contaminated due to improper sampling techniques.
Finally, JDC collected four soil samples from the pile cap area north of the Calf Pasture Pumping Station (CPPS; samples 15190-01 through 15190-04). The results showed that asbestos was not present in the samples. Splits of these samples (SMH4(D), S7W(D), HWCHWS7(D), and HWCHS7(D)) were provided to GZA; two of the results indicated that asbestos was not present and two of the results indicated trace (<1 percent) asbestos.

Although the data generated by JDC and GZA vary somewhat, and the results generated by JDC are suspect due to inappropriate sampling techniques, the analyses indicate the presence of low levels of asbestos in some of the landfill material excavated from University Drive South, University Drive East, and the GAB area.

Excavations to the north of the Calf Pasture Pumping Station Area (pile cap area) encountered material that was indicative of urban fill rather than the landfill material encountered in other areas of the UCRR project and showed non-detect to trace levels of asbestos. This is the area where work will be resumed following the provision in this URAM Status Report No. 6 and the Revised EMMP.

PRACTICES FOR MATERIAL MANAGEMENT FOR WORK IN THE AREA COVERED UNDER THIS URAM STATUS REPORT 6

Sampling of the pile cap area to the north of the CPPS, shown on Figure 2, has shown non-detect (ND) to trace levels of asbestos. Due to the apparent variability of asbestos in the landfill material, pre-characterization of the soil in the Pile Cap Area will not be performed and the material excavated from this area will be managed as if it contains asbestos. The excavate from this area will be managed as outlined in the Revised EMMP. As with the metals and PAHs which are known to be present in the landfill material, the potential route of exposure to asbestos would be through inhalation or ingestion. Therefore, dust will be suppressed by ensuring that the landfill material is damp when excavated and handled. If necessary, the areas to be excavated and the excavated material will be wetted with water or will be misted.

Workers contacting soil will wear gloves and will wash their hands before eating, drinking, smoking, and before leaving the work area. Provisions for preventing inhalation and ingestion of contaminated soils are outlined in the Revised EMMP and the Health and Safety Plan that JDC has been following for the work completed to date at the UCRR project. Some highlighted materials management provisions of the Revised EMMP include, but are not limited to the following. Refer to the Revised EMMP for details.

1. Wetting and misting of soil while excavating, culling oversized particles, transporting, stockpiling, and backfilling.
2. Covering stockpiles (daily) with GeoMatrix or poly to minimize the potential for dust and erosion.
3. Decontamination of all equipment that has, or is suspected to have, come into contact with contaminated material, prior to being moved out of a work zone.
4. Covering truck loads to minimize the potential for dust.
5. Watering roadways to minimize the potential for dust.
6. Sampling/monitoring for air-borne asbestos/dust and maintaining air-borne asbestos/dust levels below permissible limits.

It is anticipated that 16,000 cubic yards of soil will be handled during the short-term project in the Pile Cap Area to the north of the CPPS. The excavations will extend up to about 15 feet deep. The proposed work zone (work area) subject to the provisions of this URAM Status Report 6 is shown on Figure 2. The proposed utilities and the areas proposed for excavation and stockpiling/filling needs is depicted on Figure 3. Soils from the excavation will be stockpiled directly to the north of the excavation area (see Figure 3) and covered daily with polyethylene sheeting (poly) or GeoMatrix SS permeable fiber mat. Trucks transporting potentially contaminated material from one work zone to another will be covered with truck tarps.

Unsuitable materials including large debris excavated from the utility trenches, such as stumps, logs, tires, granite blocks, rocks and other oversized material will be culled with an excavator bucket. The culling procedure will take place with the soil being kept damp by adding water if necessary. The oversized or unsuitable material will be separated from the soil stream and the two resulting products will be segregated and stockpiled separately to the north of the excavation area.

Although the attached EMMP describes the screening, crushing, processing, and onsite reuse of excavated landfill material, this activity will not take place during the scope of work covered under this URAM Status Report 6 (i.e. short-term work in the Pile Cap Area to the north of the CPPS). Details of the proposed screening, crushing, backfilling, and material reuse process for the entire remaining UCRR project, will be provided in URAM Status Report No.7.

Equipment decontamination (decon) facilities will be constructed in the locations adjacent to work area(s) utilizing two (2) layers of 0.45 rubber roof membrane sufficient in length and width to accommodate cleaning of all heavy equipment, trailers, dumpsters prior to exiting the work area(s). The rubber membrane shall be formed over hay bales and secured to the ground to form a damming barrier so that all the wash water can be effectively pumped into a frac tank to be processed through a 5 micron in-line filtering system and reused as a wetting agent. As work proceeds, the decon station may be relocated to accommodate construction access.

Wash-load out facilities will be constructed contiguous with the work area(s) that may be used for cleaning nonporous materials for disposal. The equipment decontamination facility, will be used unless sequencing requires an additional facility, which will be constructed in the same manner as the equipment decontamination facility with processing through a frac tank and a 5 micron in-line filtering system. All water utilized to clean components shall be collected and filtered through 5 micron in-line filtering system prior to reuse as wetting agent. Cleaning nonporous material for on Site reuse will be cleaned in the excavations and washer water will be recharged on-Site.
All equipment, including personnel trucks, coming in contact with potentially contaminated soil in the work area, will be washed before traversing on University and public streets and before being moved off site.

For backfilling the utility trenches to the north of the CPPS, which is covered under this URAM Status report, the following practices will be employed:

1. For the utility bedding material (material surrounding the pipe) clean imported granular material will be placed.

2. For trench backfill above the utility bedding material, clean granular material will imported to the Project, or backfilling will be postponed pending submittal, review, and approval of the subsequent URAM Status Report No. 7, as described below.

3. The excavated material is not proposed for reuse as trench backfill in this area. Following culling of oversized and deleterious materials, portions of the excavate will be stockpiled, as discussed above, and portions will be placed in compacted lifts as fill to the north of the excavation and stockpile areas, as shown on Figure 3 (also termed Tri-Gen site). The material placed as fill in this area will eventually be used as permanent fill for a landform.

**PRACTICES FOR MATERIAL MANAGEMENT FOR REMAINING WORK IN THE UCRR PROJECT**

This Status Report 6 has described only the practices for work in a well-defined area, to the north of the CPPS. The remaining work for the entire UCRR project includes the handling (excavation, transportation, screening, crushing, blending, processing, stockpiling, filling, backfilling, and onsite reuse) of approximately 105,000 cubic yards of material. The practices for material management during the remaining construction activities (following the scope covered under Status Report 6) will be addressed in subsequent URAM Status Report No. 7.

**AIR MONITORING FOR DUST AND ASBESTOS**

For the work described in this URAM Status Report No. 6 taking place north of the Calf Pasture Pumping Station, including stockpiling of excavate in the Tri-Gen area to the north of the excavation area, air monitoring for asbestos will take place for the duration of this portion of the project that is covered under URAM Status Report 6. It is anticipated that the work may be completed in approximately one month. The areas to be monitored and details of the air monitoring program are provided in EH&E’s Perimeter Asbestos Air Monitoring Plan provided in Attachment 3. This Plan addresses comments by MassDEP that were provided during the December 18\(^{th}\), 2015 site meeting and in the DEP’s e-mail of December 28, 2015, on the original air monitoring plan provided in the URAM Plan Modification No. 1 of December 15, 2015.
During excavations, loading, stockpiling, and other earth moving activities, GZA will monitor for dust along the perimeter of the work limits and within GZA’s “breathing zone”, using a Thermo Scientific MIE pDR-1000 DataRam Dust Monitor (total dust meter) and a Thermo Scientific MIE pDR-1500 (PM10 dust meter). The dust readings will be compared to the action levels, as indicated in GZA’s HASP for the “breathing zone” and in the Excavated Materials Management Plan. If dust levels exceed the action levels, GZA will notify the contractor and the contractor will modify his dust-suppression techniques as required to maintain a permissible level of dust.

Please contact the undersigned at 781-278-3700 if you have any questions regarding this URAM Status Report No. 6.

Very truly yours,

GZA, INC.

Jason Ressler, P.E.
Project Manager

Randy Meuse
Consultant/Reviewer

William R. Norman, LSP
Principal

Figures:

- Figure 1: Locus Map
- Figure 2: Sketch Showing the Area Subject to the Provisions of URAM Status Report 6
- Figure 3: Segment # 7 – Stockpile and Fill Plan, Showing Excavation Areas, Widths, and Utilities
- Figure 4: Sketch Showing Stockpile Locations and Asbestos Soil Sampling Locations

Tables:

- Table 1: Summary of Asbestos Laboratory Results in Soil

Attachments:

- Attachment 1: Revised Excavated Materials Management Plan
- Attachment 2: Initial Perimeter Asbestos Air Sampling Results
- Attachment 3: Perimeter Asbestos Air Monitoring Plan
FIGURE 2: SKETCH SHOWING THE AREA SUBJECT TO THE PROVISIONS OF URAM STATUS REPORT 6
FIGURE 3 UMASS BOSTON UCRR
SEGMENT #7 - STOCKPILE & FILL PLAN
Screened Landfill Stockpile

Stockpile of Sand and Gravel Excavated from Bianculli Blvd. and U. Drive South, Sample IDs 15158-01 and CGT (D)

Uncrushed Landfill Tailings Stockpile, Intended to be Crushed. Sample IDs 15065-03 and 15065-03(D)

Imported Aggregate Stockpiles

UTILITY CORRIDOR AND ROADWAY
UMASS – BOSTON
Boston, Massachusetts

Figure 4: Sketch Showing Stockpile Locations and Asbestos Soil Sampling Locations
GZA Project No. 03.0033930.00/01
### TABLE 1
UMASS Boston
Summary of Asbestos Laboratory Results in Soil

<table>
<thead>
<tr>
<th>Location</th>
<th>Material(1)</th>
<th>Sample ID</th>
<th>Description/Location(1)</th>
<th>Percent Asbestos in Soil Sample(2)</th>
<th>Sample ID</th>
<th>Description/Location(1)</th>
<th>Percent Asbestos in Soil Sample(2)</th>
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<tr>
<td>Track</td>
<td>Solid Waste/Tailings(1)</td>
<td>Not Sampled by GZA</td>
<td>Soil - Track to be Screened - Duplicate of 15065-02</td>
<td>2.1(1)</td>
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<td>Solid Waste Stockpile</td>
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<td>Track</td>
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<td>15065-2 (D)</td>
<td>Soil - Track to be Screened - Duplicate of 15065-02</td>
<td>2.1(1)</td>
<td>15065-02</td>
<td>Track to be Screened</td>
<td>1.6(1)</td>
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<td>Track</td>
<td>Stockpile of Landfill Material Retained on Screen</td>
<td>15065-03 (D)</td>
<td>Soil - Track to be Crushed - Duplicate of 15065-03</td>
<td>0(1)</td>
<td>15065-03</td>
<td>Track to be Crushed</td>
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<td>South Lot</td>
<td>Stockpile of Unscreened Landfill Material</td>
<td>15065-4 (D)</td>
<td>Soil - South Lot to be Screened - Duplicate of 15065-04</td>
<td>3.8(1)</td>
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<td>South Lot to be Screened</td>
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<td>South Lot</td>
<td>Stockpile of Landfill Material Retained on Screen</td>
<td>15065-5 (D)</td>
<td>Soil - South Lot to be Crushed - Duplicate of 15065-05</td>
<td>3.8(1)</td>
<td>15065-05</td>
<td>South Lot to be Crushed</td>
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<td>Not Sampled by GZA</td>
<td>GAB #01 - East</td>
<td>2.1(1)</td>
<td>15153-01</td>
<td>GAB #01 - East</td>
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<td>GAB</td>
<td>Excavated Landfill Material South East of GAB</td>
<td>Not Sampled by GZA</td>
<td>GAB #02 - South East</td>
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<td>15153-02</td>
<td>GAB #02 - South East</td>
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<td>GAB</td>
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<td>GAB #03 - South West</td>
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<td>Track</td>
<td>Stockpile of Onsite Excavated Sand and Gravel</td>
<td>CGT (D)</td>
<td>Soil - Clean Gravel Track - Duplicate of 15158-01</td>
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<td>Clean Gravel at Track</td>
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<td>Clean Gravel at South Lot</td>
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<td>Lot A</td>
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<td>LOAM LA (D)</td>
<td>Soil - Loam Lot A - Duplicate of 15158-03</td>
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<td>Loam at Lot A</td>
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<td>West of EMKI</td>
<td>Stockpile of Onsite Excavated Loam</td>
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<td>15158-04</td>
<td>EMK - 1 Loam</td>
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<td>EMK - 1 Loam</td>
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<tr>
<td>Unknown</td>
<td>Unknown</td>
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<td>Misc</td>
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<td>Misc</td>
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<td>RCLM (D)</td>
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<td>1.3(1)</td>
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<td>Under UP Ramp</td>
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<td>Not Sampled by GZA</td>
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<td>SMH4 (D)</td>
<td>Soil - SMH4 Run (2) - Duplicate of Derenzo</td>
<td>0</td>
<td>15190-02</td>
<td>SMH 4 Run</td>
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<td>STW (D)</td>
<td>Soil - Excavated at Segment 7 West - Duplicate of Derenzo</td>
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<td>15190-01</td>
<td>HWCHW Seg 7 West</td>
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<td>North of CPPS</td>
<td>Excavated Landfill Material North of CPPS</td>
<td>HWCHWS7 (D)</td>
<td>Soil - Excavated at Hot and Chilled Water Run at Segment 7 Duplicate of Derenzo</td>
<td>TR</td>
<td>15190-03</td>
<td>HWCHW Seg 7</td>
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<td>North of CPPS</td>
<td>Excavated Landfill Material North of CPPS</td>
<td>HWCHW7 (D)</td>
<td>Soil - Excavated from Hot and Chilled Water Run at Sewer Segment 7 - Duplicate of Derenzo</td>
<td>TR</td>
<td>15190-04</td>
<td>HWCHW @ Sewer Seg 7</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes:
1. The landfill processing procedure consists of screening the excavated material through a 3 to 4 inch screen. This results in the separation of particles that are less than and greater than 3 to 4 inches. “To be crushed” indicates material that has been retaining on the screen and is intended to be crushed to yield re-useable material. “To be screened” indicates landfill material that has not yet been screened to remove overize particles.
2. TR indicates less than one percent.
3. Soil samples were collected by Derenzo. Derenzo provided a portion of the samples to GZA. Derenzo did not decontaminate sampling equipment between each sample.
4. From the screening and crushing operations, solid waste or tailings materials are generated. Solid waste consists of organic matter, large pieces or metal or concrete, material that cannot be crushed, or material that is unsuitable for reuse onsite. GZA was not consulted regarding sampling method for the first sample obtained. GZA was present to observe sampling procedures for the second sample.
PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. This Revised Excavated Materials Management Specification was necessitated by the detection of asbestos fibers in soil samples collected from landfill excavate stockpiled at the Site, and in-situ samples of landfill material taken from areas to be excavated as part of the UCRR Project. This Excavated Materials Management Specification has been revised as discussed in the Utility-Related Abatement Measure (URAM) Status Report Number 006 to address the handling and management of contaminated soil that will be encountered during work associated with the installation of pile caps and other utilities located to the north of the Calf Pasture Pump Station (CPPS) of the Utility Corridor and Roadway Relocation (UCRR) Project at the Site. This revision does not apply to the entire UCRR work zone. The work areas that are subject to this revised Specification are delineated in the URAM Status Report Number 006, of the same date, on Figure 2. Figure 3 of the Status Report also delineates that approximate work zone, excavation, backfilling, and stockpiling areas that are subject to the provisions of this revised Specification. Rather than sampling, testing, and precharacterization of soils in the work area, the excavated materials will be viewed as potentially containing asbestos fibers, and will be managed as described herein. A second revised Specification will be submitted as an attachment to URAM Status Report Number 007, to address provisions to be instituted Site-wide, for the remaining duration of the project.

B. Although this revised Excavated Materials Management Plan describes the screening, crushing, and processing of excavated landfill material, these activities will not take place during the scope of work covered under URAM Status Report 6 (i.e. area to the north of the CPPS). For the scope of work covered under URAM Status Report 6, the excavated materials will be stockpiled, culled of oversized debris using and excavator bucket, and stockpiles will be maintained as described herein. Following excavations to required depths, utilities and associated clean imported pipe bedding (envelope) material shall be installed. Imported clean granular material will be used as trench backfill.

C. Attention is directed to the AGREEMENT AND GENERAL CONDITIONS and Exhibits and all Sections within DIVISION 1 - GENERAL REQUIREMENTS, which are hereby made a part of this section of the specifications.

D. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section.

E. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.
1.2 BACKGROUND

A. Based on the past use of the Project Site (UMass Boston campus) as a landfill, recent observations made during subsurface explorations, and recent analyses, various contaminants and debris are present beneath the ground surface at various locations on the Project Site. Specific assessments of subsurface conditions at select locations within the Project Site have been undertaken by GZA GeoEnvironmental Inc. (GZA) of Norwood, Massachusetts. These assessments have been conducted to characterize the general nature of subsurface materials and the types of contaminants that may be encountered during construction activities. The supplemental information to the Contract Documents includes the geotechnical and environmental reports prepared for this project which contain logs of the field explorations, a plan showing the exploration locations, and results of environmental analyses performed for the project.

B. The Project Site is regulated under the Massachusetts Contingency Plan under Release Tracking Number 3-1430. The subsurface work at the Project Site will be performed under a Utility Related Abatement Measure (URAM) Status Report No. 6, which will be prepared by the project’s Licensed Site Professional (LSP) and submitted to and approved by the Mass DEP. Copies of the URAM Status Report No. 6 will be provided prior to execution of the work.

C. Prior to submitting a bid, the Contractor shall review and understand the information and requirements/conditions contained in the referenced Appendices and all Contract Documents. The subsurface investigation logs and chemical summary tables are made available to the Contractor for information on factual data only and shall not be interpreted as a warranty of subsurface conditions, whether interpreted from written text, boring logs, or other data. The Contractor should be aware that because the Project Site contains historical solid waste debris placed in an uncontrolled manner, subsurface conditions are likely to be highly variable both laterally and vertically.

D. The Contractor and all subcontractors that are expected to come in contact with site materials, groundwater, or soil vapors, shall, at all times, be solely responsible for exercising reasonable and required precautions to protect the health, safety, and public welfare, of all on-site personnel, the public, and the environment during performance of the Work described herein. The Contractor and each subcontractor shall comply with all applicable provisions of federal, state, and local health and safety and occupational health and safety statutes and codes.

E. It is the intent of this Section that excavated materials will be reused on site following screening and processing to the maximum extent possible. On-site re-use of excavated materials shall be in accordance with requirements of this Section and other applicable Sections and governing regulations. Provisions for off-site disposal are also included in this Section for excess excavated materials that are not reused on site.

1.3 DESCRIPTION OF WORK

A. Work Included: The purpose of this Section is to outline procedures associated with the excavation, temporary stockpiling, screening, segregation, management, reuse and/or off-site disposal of excavated materials as designated by the GZA’s LSP. The location of the limits of excavation and Limits of Work are shown on the Drawings. The work of this Section, in general, includes all labor, materials and equipment necessary to complete
the work of this Section, including but not limited to the following:

1. Review and understanding of existing information.
2. Excavation, initial handling, screening, segregation, and management of excavated materials, including spoils associated with installation of utilities, support structures, and ground improvement.
3. Collection, management, characterization, and off-site disposal of drilling fluids and resulting slurries.
4. Temporary stockpiling and storage of all excavated materials at designated on-site locations.
5. Maintenance of excavated material stockpiles, soil management areas, screening and segregation equipment, and associated environmental controls.
6. Decommissioning of stockpile areas including removal of all potentially contaminated materials remaining from stockpiles and segregation activities, cleanup and restoration of the areas to their original condition.
7. Characterization, loading, transport and off-site disposal of designated material.
8. Reuse procedures, including backfilling requirements of excavated material shall be performed in accordance with Section 312000 (EARTH MOVING).
9. Furnishing, operating, and maintaining decontamination equipment for equipment, vehicles, and personnel.

B. Alternates: Not Applicable.

C. Items To Be Installed Only: Not Applicable.

D. Items To Be Furnished Only: Not Applicable.

E. Related Work: The following related items of work are not included in this Section, but will be performed under the designated Section:

1. Section 312000 — EARTH MOVING for soil materials, excavating, backfilling, and site grading and removal of site utilities.
2. Section 312005 — SEDIMENTATION AND EROSION CONTROLS for the control measures to prevent erosion, siltation, and sedimentation of wetlands, waterways, construction areas, and other areas.
3. Section 312319 — DEWATERING for lowering of groundwater to facilitate construction and management of dewatering effluent.
4. Section 315000 – EXCAVATION SUPPORT AND UNDERPINNING PROTECTION
5. Section 316340 — DRILLED MICROPILES.

F. Allowances: Contractor to provide an allowance price for fifteen (15) test pits up to fifteen (15) feet deep in locations and as directed by the Geotechnical Engineer. Once test pits are complete the contractor is to backfill with existing material and compact to levels indicated by the Geotechnical Engineer.

1.4 DEFINITIONS

A. UMBA: The term UMBA shall refer to the University of Massachusetts Building Authority.

B. User Agency: The term User Agency shall refer to the University of Massachusetts
Boston (UMass Boston).

C. **Designer:** BVH Integrated Services, 50 Griffin Road, South Bloomfield, CT 06002 and its subconsultants.

D. **Project LSP:** William Norman, LSP GZA GeoEnvironmental, Inc. One Edgewater Drive Norwood, MA 02062.

E. Geotechnical Engineer – GZA GeoEnvironmental, Inc.

F. **Construction Manager:** Bond Brothers 145 Spring Street Everett, MA 02149.

G. **Contractor:** Collectively, the General Contractor and subcontractors (Trade Contractors) to the General Contractor.

H. **MassDEP:** Massachusetts Department of Environmental Protection.

I. **USEPA:** U.S. Environmental Protection Agency.

J. **MCP:** Massachusetts Contingency Plan, 310 CMR 40.0000.

K. **LSP:** Licensed Site Professional (LSP) as defined in 310 CMR40.0000.

L. **Solid Waste Management Facility Regulations:** 310 CMR 19.00.

M. **HASP:** Health and Safety Plan.

N. **BOL:** Bill of Lading.

O. **OSHA:** Occupational Safety and Health Administration.

P. **CFR:** Code of Federal Regulations.

Q. **CMR:** Commonwealth of Massachusetts Regulations.

R. **Group I Material:** Existing topsoil free of solid waste debris. Group I soils do not include asphalt and gravel sub-base materials that will be reclaimed.

S. **Group II Materials:** Existing granular fill soils, free of solid waste debris, that currently serve as cover material over the landfill.

T. **Group III Materials:** Existing granular fill soils with minor amounts of inorganic waste/debris (glass, ash, brick, metal, concrete, etc.).

U. **Group IV:** Reclaimed asphalt, granular sub-base materials, and construction debris that is exempt from solid waste disposal requirements if processed and reused in an appropriate manner, as specified in 310 CMR 16.05 and in accordance with Section 312000 — EARTH MOVING.

V. **Group V Materials:** Solid waste, debris or granular fill with significant amounts of organic or inorganic debris.
W. **Group VI:** Drilling liquids and resulting slurries associated with pile installation activities.

X. **Group VII:** Excavated materials exhibiting gross or overt contamination.

Y. **Excavated Material:** Any material removed for the purpose of Utility Installation or other site improvements as part of the Work of this Contract.

Z. **Debris:** Common household wastes including but not limited to: glass, lumber, roofing shingles, paper, leather, ceramics, wood, plastic, metal, cloth as defined in 310 CMR 19.00 and excludes oil or hazardous materials relative to MGL Chapter 21E and the MCP. Debris may also include variable amounts of soil, cinders and ash that may have been introduced and intermixed during landfilling.

AA. **Construction Debris:** Construction Debris includes waste building materials and rubble resulting from the construction or demolition of buildings, pavements, roads or other structures, that is exempt from solid waste disposal requirements if processed and reused in an appropriate manner, as specified in 310 CMR 16.05. These materials include, but not limited to: concrete, brick, masonry, paving materials, granite block, and excludes oil or hazardous materials relative to MGL Chapter 21E and the MCP.

BB. **Contaminated Debris:** Any debris that is contaminated by a release of oil and/or hazardous material as specified in 310 CMR 40.1600.

CC. **Contaminated Media:** means any air, soil, sediment, groundwater, or surface water that is contaminated by a release of oil and/or hazardous material as specified in 310 CMR 40.0000.

DD. **Drilling Liquids and Resulting Slurries:** Potable water that has been augmented with physical, chemical or biological additives including, but not limited to, bentonite-based drilling mud and/or the resulting slurry that occurs during drilling or installing piles using casing. If drilling or pile installations extend below the groundwater table, groundwater will be a component of the resulting slurry.

EE. **VOCs:** Total volatile organic compounds; commonly associated with but not limited to chlorinated solvents and gasoline constituents.

FF. **SVOCs:** Semi-volatile organic compounds, also known as acid and base/neutral extractable compounds. Includes polycyclic aromatic hydrocarbons (PAHs).

GG. **PCBs:** Polychlorinated biphenyls, commonly associated with oils used for cooling or temperature control such as in electrical transformers or manufacturing processes.

HH. **TPH:** Total Petroleum Hydrocarbons. TPH concentrations shall be considered evaluated in the laboratory by gas chromatography detection analysis (GC) in accordance with USEPA Method 8100.

II. **TCLP:** Toxicity Characteristic Leaching Procedure.

JJ. **Urban Fill:** Soils excavated in urbanized areas containing low to moderate concentrations of petroleum hydrocarbons and other common industrial contaminants that cannot be directly attributed to a point-source release (such as leaking tanks) or defined spills. Contamination of this nature is considered to be primarily due to past site...
utilization (years of small spills/drips), the presence of fills of unknown origins, and historical area wide deposition of automobile/smokestack emissions.

**KK. Remediation:** Activities associated with identifying, excavating, stockpiling, testing, classifying, recycling, treating, and off-site disposal of Contaminated Debris or Contaminated Media or other materials which may be encountered in the Work.

**LL. Characterization:** Chemical analytical test results of representative samples of a material that indicate the contaminant concentrations and other constituents present in the material, and the sampling protocol and frequency, and testing frequency and methods are considered appropriate such that the results of the testing may be relied upon to identify appropriate disposal requirements and facilities.

**MM. Naturally-Deposited Uncontaminated Soils:** Soils encountered during construction which are previously undisturbed and in their natural state.

### 1.5 APPLICABLE REGULATIONS

**A.** Work covered by this Section is subject to applicable regulations and policies including, but not limited to, the most recent version of the following:

1. 29 CFR 1926: Safety and Health Regulations for Construction.
3. 29 CFR 1910.1000: Air Contaminants
4. 29 CFR 1910: Safety and Health Regulations for General Industry,
5. 29 CFR 1910.120: Hazardous Waste Operations and Emergency Response
6. 40 CFR 117: Determination of Reportable Quantities for Hazardous Substances
7. 40 CFR 172: Hazardous Waste Transportation
8. 40 CFR 261: Standards Applicable to Generators of Hazardous Waste
9. 40 CFR 263: Standards Applicable to Transporters of Hazardous Waste
10. 40 CFR 268: Land Disposal Restrictions
11. 40 CFR 300: National Oil and Hazardous Substances Pollution Contingency Plan
12. 40 CFR 302: Designation, Reportable Quantities, and Notification
13. 310 CMR 6.00: Ambient Air Quality Standards
14. 310 CMR 16.000: Site Assignment Regulations for Solid Waste Facilities
15. 310 CMR 19.00: Solid Waste Management Facility Regulations.
16. 310 CMR 30.00: Hazardous Waste Regulations.
17. 310 CMR 40.0000: Massachusetts Contingency Plan.
18. 454 CMR 10: Construction Industry Rules and Regulations

**B.** Conduct the work in compliance with the above regulations and policies as well as any changes or addenda to the same as set forth prior to the awarding of the Contract.

**C.** Comply with all rules, regulations, laws and ordinances of the Commonwealth of Massachusetts, OSHA and of all other authorities having jurisdiction. All labor, materials,
equipment and services necessary to make the work comply with such requirements shall be provided without additional cost to the Project. UMass Boston, UMBA, and BVH will not be responsible at any time for the Contractor's violation of any applicable local, state, or federal regulations, or endangerment of laborers or others.

1.6 REQUIREMENTS OF THE WORK:

A. General Requirements:

1. Excavations for pile installations, ground improvement, and utility installation activities, shall be limited to only those extents necessary for completion of the construction as required.

2. Excavate materials by methods that will permit observation by GZA's LSP for purposes of identifying segregation and stockpiling requirements, and to eliminate the potential for mixing contaminated media and debris with uncontaminated media. GZA's LSP will classify excavated materials in the field as the work proceeds, based on, but not limited to, visual observations of strata, material composition, and moisture content, and it shall be the Contractor's responsibility to subsequently manage, segregate, and stockpile these excavated materials.

3. Excavation and dewatering shall be performed in a local and controlled manner, and the excavation shall be limited in depth and area, as outlined in the Contract Drawings, such that these activities do not result in cross-contamination of uncontaminated materials. Excavation and dewatering shall also be performed so as not to induce migration of contaminants.

4. Construction workers, surrounding human population and environmental receptors shall be protected from exposure to oil or hazardous material during construction activities.

5. All excavated materials shall be managed in compliance with the provisions of 310 CMR 16.00, 310 CMR 19.00, 310 CMR 40.0000, 310 CMR 30.00, and all applicable Federal, State, and Local laws.

6. Earthwork activities and reuse of excavated materials on site shall be performed in accordance with the requirements of this Section, Section 312000 — EARTH MOVING, or as otherwise directed by the GZA's LSP.

7. If conditions are encountered during excavation, which in accordance with 310 CMR 40.0311 through 40.0314, requires MassDEP notification within 2 hours or 72 hours, the GZA's LSP shall suspend construction in the affected area and immediately notify the UMass Boston. The Contractor shall coordinate and cooperate with the UMass Boston and GZA's LSP to implement appropriate response actions in accordance with 310 CMR 40.0000.

8. Maintain management areas, stockpiles, excavations and backfill areas in a neat and controlled manner to the satisfaction of the UMass Boston. Stockpiles shall not contaminate stockpile areas. Control dust, vapors, odors, and wind-blown trash in accordance with local and state regulations and to the satisfaction of the UMass Boston.

B. Performance Requirements:

1. This Section provides procedures and requirements for excavation, handling, screening, segregation, on-site reuse, and on-site recharge of contaminated water and soils/debris encountered during construction operations. In addition, this Section also provides procedures and requirements for characterizing, management,
transport, and off-site disposal of designated materials.

2. The Contractor shall provide all facilities, labor, materials, tools, equipment, transportation, supervision, and related work necessary to complete the Work specified in this Section, and shown on the Drawings.

3. Based on the limited exploration, sampling, and testing program performed by GZA, contamination above MCP reportable concentrations (RCS-1) exists within the Limits of Work and will likely be encountered during construction. Based on recent testing during construction, portions of the Site may contain soil mixed with landfill material that contains low percentages of asbestos fibers. To the extent possible, all materials (debris and media) excavated during the Work will remain on site; however, any excess or otherwise unusable materials requiring off-site disposal shall be managed in accordance with 310 CMR 40.0000, as appropriate.

4. The Contractor shall manage contaminated materials encountered within the Limits of Work and in the excavation in a manner that ensures the protection of health, safety, public welfare, and the environment. The handling and storage of contaminated excavated soil and debris materials shall be in designated, on-site stockpile, storage or management areas. These areas shall be operated and maintained by the Contractor, according to the procedures presented herein and as directed by the Designer and coordinated with the GZA’s LSP. Stockpiling of excavated materials shall only be allowed in designated areas within the project work limits.

5. The Contractor shall excavate, manage, handle, screen, segregate, stockpile, store, load, treat, recycle, reuse, transport, discharge, and/or dispose of contaminated materials in compliance with the provisions of 310 CMR 19.00, 310 CMR 40.0000, 310 CMR 16.00, and all other applicable Federal, State, and Local laws and regulations and bylaws, and the criteria of this Section.

6. The Contractor shall manage contaminated groundwater and surface water that is collected, treated, recycled, or discharged at the Project Site as part of construction in compliance with all applicable provisions of Federal, State, and Local laws, regulations, and bylaws. No discharge shall occur into a storm drain or sanitary sewer unless applicable permits exist or have been obtained by the Contractor for this work. Refer to Section 312319 —DEWATERING for additional construction dewatering requirements.

7. Excavated material stockpiles shall be covered and secured as required in this Section, to minimize airborne transport of material, runoff, and saturation and seepage from precipitation.

8. The Contractor shall maintain, handle and re-handle stockpiled materials in a manner that allows construction to proceed on schedule.

1.7 SUBMITTALS

A. The Contractor shall submit each item in this Section according to the conditions and requirements of the Contract and Section 013300 SUBMITTAL REQUIREMENTS.

B. General: Review and/or Approvals by BVH or the GZA’s LSP of Contractor submittals shall not relieve the Contractor of the responsibility to perform the work in accordance with the Contract Documents. Submittals will be to BVH and reviewed to assess whether the Contractor’s intended means, methods, and sequence of work are generally consistent with the intent of the Contract Documents and other regulations or conditions governing the work. Submittals deviating from these requirements will be indicated and returned and shall be modified and resubmitted by the Contractor. The Contractor shall submit the following to BVH and GZA for review at least 21 calendar days prior to the intended start of earthwork or
extraction, unless otherwise noted.

C. Site Activity Work Plan

1. A written detailed description and plan indicating the proposed sequence of work to clear and strip the site, segregate and maintain topsoil for reuse, reclaim or otherwise remove asphalt, excavate to required grades, prepare the utility corridors including placing any intermediate cover materials, install foundation piles, install utilities, temporarily stockpile, process, and manage excavated materials, place backfill, and other required earthwork. The intent of the plan is to clearly present the anticipated sequence of work including transporting, stockpiling and processing of excavated material, characterization and off-site disposal of spoils, and placement of fills to optimize material reuse while also minimizing stockpile duration and material re-handling.

2. A plan indicating the Contractor’s proposed stockpiling, screening, excavated material processing, and roll-off container storage area locations; material processing methods and equipment; and methods to cover the stockpiles and otherwise protect excavated materials from the environment in accordance with this Section. The Contractor shall revise the stockpile locations and separation methods as required by BVH.

3. A written description of the Contractor’s proposed methods to control dust, odors, windblown trash, and other nuisance factors associated with soil processing and management operations.

4. A written description of the Contractor’s proposed plan and methods for controlling storm water, dewatering and on-site recharge or discharge of collected groundwater and storm water. Construction areas requiring dewatering and management of groundwater and proposed on-site recharge locations shall be indicated on a plan and submitted. Coordinate with submittals required in Section 312319—DEWATERING.

5. A written description of the Contractor’s proposed plan and methods for excavating, handling, transporting, and dewatering of soil excavated from below the water table, including proposed location and design details for wet soil drainage bed construction and operation and conveyance of collected water to on-site treatment system. Coordinate with submittals required in Section 312319—DEWATERING.

6. Design and operating plan for decontamination procedures.

D. Waste Management Plan: The Contractor shall submit the Waste Management Plan as specified in Section 013300—SUBMITTAL REQUIREMENTS. The Contractor shall provide a written plan that details his means, methods, and control procedures for loading, transportation, and disposal of designated wastes generated during the Project. The Plan shall include, but not be limited to, the requirements of Section 013300—SUBMITTAL REQUIREMENTS and the following:

1. The Contractor shall select landfills that are established, fully operational, and in full compliance with all applicable Federal, State and local regulations.

2. The Contractor shall designate one landfill as the primary facility and one as an alternate facility should project conditions require the use of a backup facility. UMBA will not incur any additional costs if an alternate facility is utilized or if the primary facility is rejected by UMBA.

3. The Contractor shall submit information for each landfill selected, within 21 calendar days of issuance of the Notice to Proceed as part of its Waste Management Plan. The facility information shall include the following:

   a) General Information:
EXCAVATED MATERIALS MANAGEMENT

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1) Facility Name
2) Facility Address
3) Name of Contact Person
4) Title of Contact Person
5) Telephone Number of Contact Person
6) Permit Number
7) A statement that the facility is not subject to any pending or ongoing local, state, or federal enforcement actions due to violations of permits or management practices,

b) A complete list of the disposal facility's permitted allowable contaminant levels and physical characteristic requirements for accepted material, and list any required regulatory approvals for individual waste streams.

c) The landfills shall provide written confirmation that they are permitted to accept and will accept the classified waste of the general quality and quantity described by these Specifications. The landfill(s) shall specify the volume of material that can be accepted from the site on a weekly and a total basis. The Contractor shall submit initial approvals or letters of intent and facility information for the recycling and disposal facilities selected, within 21 calendar days of issuance of the Notice to Proceed.

d) The landfills shall provide a listing of all current and valid permits, licenses, letters of approval, and other authorizations to operate that they hold, pertaining to the receipt and management of the soils or materials specified in this Section. The Plan shall also include identification of the proposed waste hauler with copies of all applicable licenses, registrations and approvals.

E. Health & Safety Plan

1. Contractor shall submit a site-specific Health and Safety Plan (HASP) prepared by a Certified Industrial Hygienist that addresses site activities related to soil and groundwater management and ensures the safety of the Contractor's employees, visitors and the general public during the performance of the work. The HASP shall also address safe working conditions relative to the chemical constituents in soil, groundwater, and air. The HASP shall be prepared in accordance with 29 CFR 1910.120 and shall include, but not be limited to, action levels, monitoring requirements, institutional controls, contingency procedures, required training and medical monitoring, and required personal protection equipment including respiratory protection. Training will not be provided by UMBA, the UMass Boston or the GZA’s LSP. Action levels shall be selected by the Contractor's CIH and shall be selected based on the work activity and published permissible limits (e.g., 310 CMR 6.00 for dust, 5% of the Lower Explosive Limit for combustible gases, and 29 CFR 1910.1000 for volatile organic compound vapors. The Contractor’s HASP shall address hazards, mitigation measures, and air monitoring as described in Paragraph 1.8 E and 3.2 of this Specification.

2. The Contractor shall provide Bond Brothers and BVH with written notice of the existence of said HASP and of his/her communication of the HASP to all relevant workers. No work shall be performed until the Designer receives the written notice.

3. The Contractor's HASP shall be provided to UMBA, the UMass Boston, the Bond Brothers, and BVH for informational purposes only within 21 calendar days of receiving Notice to Proceed.

4. The HASP must be completed for discussion at the health and safety coordination meeting scheduled by the Contractor and held at least three (3) days prior to
commencement of work The Contractor shall provide written notice of the Health and Safety Coordination meeting to all interested parties, including but not limited to, UMBA, BVH, the UMass Boston, the GZA’s LSP and representatives of each subcontractor.

5. The Contractor shall maintain a log indicating that each worker who may potentially be exposed to contaminated materials (debris and media) has been briefed of the site conditions and has reviewed the HASP. This log shall be subject to inspection by BVH, UMBA, the UMass Boston, the GZA’s LSP, or the Bond Brothers upon request. All subcontractors shall be subject to the same requirements and shall maintain a similar log book. If required, each subcontractor shall prepare an independent HASP for specific exposures of their employees. Specifics of subcontractor's HASP's shall be incorporated into the HASP prepared by the Contractor's Certified Industrial Hygienist.

6. Workers who will handle, directly contact, or be in close proximity to excavated materials and groundwater shall be trained in Health and Safety procedures according to OSHA requirements, including 29 CFR 1910.120 and be current in their OSHA HAZWOPER 8-hour refresher course.

7. Opinions of the GZA's LSP and/or BVH regarding expected site conditions do not relieve the Contractor or subcontractor of their responsibility to protect the health and safety of their employees, all sub-contractor employees, the public welfare, and the environment.

8. The Contractor shall submit the name and summary of qualifications of the full-time, qualified person to be retained by the Contractor to perform personnel and ambient air monitoring (as described in Paragraph 1.8 E and 3.2 of this Section) during construction as described herein.

F. Waste Disposal Work Closeout Submittals:

1. Disposal Site Receipts: Within fourteen (14) calendar days after transport off-site of any material, the Contractor shall submit copies of all documentation to BVH and the GZA’s LSP related to off-site soil and water disposal, including but not limited to: certified disposal facility weight and/or truck slips, Bills of Lading, and/or Materials Shipping Records, or other documentation required to document the ultimate disposal location of materials removed from the Project Site.

G. Quality Control Submittals:

1. Certificates:
   a) The MassDEP certification of the chemical testing laboratory the Contractor proposes to use for any required chemical testing.

2. Test Reports:
   a) The Contractor shall provide at least 2 days’ notice to BVH and GZA, of their intent to collect samples of waste or other materials on the Project, and allow BVH and GZA to oversee the collection of samples.
   b) Waste Characterization data: The Contractor shall submit a copy of all analyses of waste materials proposed for off-site disposal to BVH and GZA within 2 days of receipt of the laboratory report. This submittal shall also include the location of the sample, a record of the sampling event indicating on-going construction activities at the time the sample was taken, and the
chain-of-custody for the samples.

c) Analytical data shall be kept confidential, distributed only to the GZA’s LSP and BVH and the disposal facilities.

d) Seven calendar days shall be allowed for BVH and GZA to review all test results.

1.8 QUALITY ASSURANCE

A. The Designer and/or the GZA’s LSP will monitor the Contractor's activities associated with the work under this Section. These duties do not include supervision or direction of the actual work by the Contractor, his employees or agents. Neither the presence of BVH and/or the GZA’s LSP nor any observation and testing by BVH and/or the GZA’s LSP shall excuse the Contractor from defects discovered in the Contractor's Work. BVH and/or the GZA's LSP will provide on-site monitoring of excavation and material processing operations to assess compliance with:

1. Requirements for stockpile segregation and handling;
2. Reuse of excavated materials as described herein and consistent with other referenced requirements for this Project,
3. Proper covering of exposed waste material,
4. Proper management of impacted and non-impacted groundwater, and
5. Control of dust, odors, nuisance and volatile vapors, windblown trash and general site cleanliness.

B. The UMass Boston will be the generator and will sign all waste profile applications or questionnaires, Material Shipping Records, and Bills of Lading.

C. The Contractor shall be responsible for any cross-contamination and/or mixing of materials which requires additional segregation, stockpiling, material re-handling, testing, on-site treatment, off-site disposal, or other costs to the Project. The Contractor shall perform activities to remediate or remedy the cross-contamination, to the satisfaction of the GZA’s LSP, without cost or delay to the project.

D. Soil Quality Monitoring During Excavation:

1. The Contractor shall coordinate all work with BVH and the GZA’s LSP.
2. Soil will be initially classified by the GZA’s LSP in accordance with this Section and based on field observations and data from previous subsurface explorations in the immediate vicinity of the excavation. Excavated material shall be designated either as (1) acceptable for reuse as backfill, or (2) requiring processing to segregated oversize or unacceptable material, or (3) unacceptable for reuse or processing and requiring secure storage and off-site disposal in accordance with the requirements of this Section and as judged acceptable by the GZA’s LSP.

E. Ambient Air Monitoring:

1. The GZA’s LSP will monitor air quality in the "breathing zone" according to the procedures outlined in the LSP's HASP for his employees only. The information obtained from this monitoring will be made available to the Contractor upon request for general knowledge only. The Contractor shall not rely on this data and shall perform additional monitoring in accordance with the Contractor's HASP. It is
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important to note that due to their more intensive work, the Contractor's employees may be subject to higher contaminant exposures than those measured by the LSP.

2. **Personal air monitoring, sample collection and analysis shall be the responsibility of the contractor.** During general earthwork construction, below-grade utility installations, and foundation installation, the Contractor shall employ a qualified person to perform routine monitoring of environmental conditions within the work zone. Specific monitoring to be performed and comparison action levels shall be determined by the Certified Industrial Hygienist that prepares the Contractor’s HASP and will be performed throughout each work day. At a minimum, on-site monitoring within the work zone shall include dust and asbestos concentrations in ambient air, VOCs in the workers’ breathing zone, and combustible gas during activities that disturb soils and/or fill located within the Work Area and at material processing operations and stockpile locations. The contractor shall ensure that employee exposures are maintained below 0.1 f/cc as an 8-hour time-weighted average, the OSHA permissible exposure limit (PEL) for airborne asbestos. If at any time concentrations exceed 50 percent of the PEL (0.05 f/cc), the contractor will notify the owner and work activities will be evaluated for appropriate dust/fiber control methods. Corrective action shall be immediately performed by the Contractor upon immediate notification of any exceedance of this level, and exceedances shall be brought to the attention of Bond Brothers and BVH immediately upon the Contractor’s knowledge of any exceedance. Results of air monitoring for dust and asbestos shall be provided to BVH within 2 days of the Contractor obtaining the results. All activities that require workers to enter trenches and excavations that are deeper than three feet must have oxygen monitoring equipment active throughout the time the workers are in the trench and/or excavations. The Contractor shall make the results of this monitoring available to all on-site personnel and shall use this monitoring data to identify action levels to upgrade personal protection equipment in accordance with the Contractor's HASP.

3. Each subcontractor shall perform additional air quality monitoring using instruments in accordance with the procedures outlined in the subcontractor’s individual HASP. Each subcontractor maintains the responsibility to monitor environmental conditions for the purposes of health and safety of their on-site workers.

4. The GZA’s LSP will monitor for dust, VOCs, and combustible gas along the perimeter of the Limits of Work. Results of this monitoring that indicate exceedances of air quality criteria stated in Section 3.2 will be brought to the attention of the Contractor. The Contractor shall immediately address site conditions, including suspending construction and/or backfilling of work in progress if necessary, to remedy the site conditions to the satisfaction of BVH and GZA’s LSP.

5. A CIH or representative of a CIH (not employed by the Contractor) will monitor/sample for air-borne asbestos along the perimeter of the Limits of Work. Ambient air sampling locations will be determined based on daily planned work activities. Air samples will be collected in a manner targeting individual work areas where potentially asbestos-contaminated soils are being excavated, handled, or stockpiled. Air samples will be collected in at least 4 locations around the perimeter of relevant work areas. Results that indicate exceedances of air quality criteria stated in Section 3.2D will be brought to the attention of the Contractor. The Contractor shall immediately address site conditions and take corrective actions to address exceedances of air quality criteria, to the satisfaction of BVH and the CIH performing the sampling. The areas to be monitored and details of the air monitoring program shall be provided as indicated in EH&E’s Perimeter Asbestos Air Monitoring Plan.
PART 2 - PRODUCTS

2.1 GENERAL

A. Provide all employees of the Contractor and the Subcontractor(s) with personal protective equipment and protective clothing consistent with the levels of protection required for this Work as indicated in the Contractor's HASP.

2.2 MATERIALS

A. Polyethylene plastic: 20-mil minimum thickness.

B. High Density Polyethylene (HDPE) sheet liner 20-mil minimum as manufactured by PolyFlex mc, Solmax International, Inc., or an approved equal.

C. Concrete Jersey Barriers to segregate the work areas and stockpile perimeters.

D. Straw Bales may be used to segregate the work areas and stockpile perimeters in designated non-traffic areas. The straw bales shall be made of straw with forty pounds minimum weight and one hundred and twenty pounds maximum weight. They should be either wire or nylon bound. Wood stakes shall be a minimum of 2 inch by 2-inch nominal size by a minimum of 3 feet long. As an alternate, No. 4 size steel reinforcing bars may be used with rubber safety tops.

E. Roll-Off Containers, watertight with covers, with storage capacities of 20 to 30 cubic yards.

F. Stockpile Covering Foam

1. Long Duration Foam, as manufactured by Rusmar Incorporated (West Chester, PA, 610-436-4314), Product No. AC-645, or equivalent, for use to control dust, vapors and odors during active excavation and handling of materials, and as daily cover as required.

2. Extra Long Duration Foam, as manufactured by Rusmar Incorporated (West Chester, PA 610-436-4314), Product No. AC-91 12, or equivalent, for use to control dust, vapors and odors from stockpiles that will remain inactive for longer periods of time. AC-91 2 foam may also be used in lieu of soil cover as intermediate cover (for periods generally longer than 3 days) over Group III soils that have been placed as permanent fills. Herein, this foam will be referred to as "Extra Long Duration Foam."

3. The Contractor shall apply long duration foam in accordance with the equipment and procedures recommended by the manufacturer and as acceptable to GZS's LSP.

G. Decontamination Equipment

1. Provide decontamination materials and equipment:
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a. **Decontamination:** When required under Paragraph 3.8, provide a temporary, low pressure water system for decontamination of tools and equipment including clean water supply tank, water, hoses, and brushes, which the Contractor shall use to decontaminate tools and equipment. Connection to potable water supply is acceptable with written permission of the connection’s owner/operator. Decontamination water from low-pressure system shall be recharged on-site in the location of the excavation for Oil or Hazardous Material- (OHM-) impacted materials, or otherwise collected and legally disposed of in accordance with Section 312319 — DEWATERING.

b. **Wheel Wash:** If a wheel wash is required by BVH under Paragraph 3.9, construct and operate a wheel wash station of a minimum length to fit one 18-wheel dump trailer. Water generated from the wheel wash station shall be recharged on-site in the location of the excavation for OHM-impacted materials, or otherwise collected and legally disposed of in accordance with Section 312319 — DEWATERING.

c. **Equipment decontamination (decon) facilities** will be constructed in the locations adjacent to work area(s) utilizing two (2) layers of 0.45 rubber roof membrane sufficient in length and width to accommodate cleaning of all heavy equipment, trailers, dumpsters prior to exiting the work area(s). The rubber membrane shall be formed over hay bales and secured to the ground to form a damming barrier so that all the wash water can be effectively pumped into a frac tank to be processed through a 5 micron in-line filtering system and reused as a wetting agent. As work proceeds, the decon station may be relocated to accommodate construction access.

d. **Wash-load out facilities** will be constructed contiguous with the work area(s) that may be used for cleaning nonporous materials for disposal. The equipment decontamination facility, will be used unless sequencing requires an additional facility, which will be constructed in the same manner as the equipment decontamination facility with processing through a frac tank and a 5 micron in-line filtering system. All water utilized to clean components shall be collected and filtered through 5 micron in-line filtering system prior to reuse as wetting agent. Cleaning nonporous material for on Site reuse will be cleaned in the excavations and washer water will be recharged on Site.

e. All equipment, including personnel trucks, coming in contact with potentially contaminated soil in the work area, will be washed before traversing on University and public streets and before being moved off site.
PART 3 - EXECUTION

3.1 GENERAL

A. Perform this Work in accordance with these Specifications and the Contractor’s HASP.

B. Maintain all required field controls throughout the performance of the Work.

C. Immediately notify the GZA’s LSP of visible stains or unnatural odor of any excavated material, or if suspected oil or potentially hazardous material is observed.

D. Implement control measures as required by the Specifications to prevent discharge of excavated or stockpiled material to storm drains and sewers. Control measures may include, but are not limited to temporary berms, straw bales, and temporary covers. Remove control measures upon completion of the Work.

E. Reuse excavated or processed materials as identified by BVH as backfill in accordance with Section 312000 — EARTH MOVING. Unless otherwise directed by GZA’s LSP, reuse or process for reuse all excavated material within the project area consistent with the Contract Drawings and Sections of the Specifications.

F. Transport excavated material and contained liquids to Material Management Area(s), except those identified by GZA’s LSP as appropriate for direct loading, transporting, and off-site disposal. During transport of the material by truck, the loads will be covered with truck tarps.

3.2 HEALTH AND SAFETY

A. The Contractor and each subcontractor are required to notify all of their workers of the site history and contaminants and debris that may be present, and to be alert for evidence of contaminated soils, groundwater, and fugitive soil gas from landfill debris. The UMass Boston and the GZA’s LSP should be immediately notified of the presence of potentially hazardous conditions, if encountered.

B. The Contractor shall maintain air quality with respect to dust, airborne asbestos, oxygen, combustible gases and volatile organic compound vapors in Work Zone. If maximum total VOC concentrations, dust, oxygen, and combustible gas at the perimeter of the Limits of Work, (as monitored by GZA’s LSP and communicated to the Contractor) or if the concentration of airborne asbestos at the perimeter of the Limits of Work (as monitored by a CIH or his/her representative and communicated to the Contractor) exceed the action levels specified in the Contractor’s HASP, this Specification, or exceed the action levels for asbestos described in Paragraph 1.8 E (50 percent of the PEL), the Contractor shall immediately implement controls to mitigate environmental conditions that exceed the levels specified or otherwise referenced.
C. The GZA’s LSP will monitor, at the perimeter of the Limits of Work, dust, combustible gas, and VOC levels using the threshold concentrations specified herein.

1. Dust: dust concentrations in accordance with 310 CMR 6.00.
2. Combustible Gas: Maintain combustible gas concentrations below 5% of the lower Explosive Limit
3. VOC concentrations: OSHA: Part 29 CFR 1910.1000 for volatile organic compound vapors. At no time shall maximum total VOC concentrations at the perimeter of the Limits of Work exceed 1 ppm above background for a sustained period greater than 15 minutes.

D. A CIH or representative of a CIH (not employed by the Contractor) will sample for air-borne asbestos along the perimeter of the Limits of Work, using a threshold based on the Commonwealth of Massachusetts Department of Labor, Division of Occupational Safety (MADOS), clearance criteria of 0.01 fibers/cubic centimeter.

E. In the event, these action levels are exceeded, GZA’s LSP will immediately notify the Contractor and Bond Brothers. The Contractor shall cease work and employ engineering measures (e.g. covering, watering, misting) necessary to reduce concentrations to below the action levels, prior to being permitted to resume work.

3.3 EXCAVATION

A. The potential exists for encountering debris and contaminated material during excavation activities. The Contractor shall excavate material by methods which will permit observation of the exposed subsurface to reduce the potential for mixing visually contaminated materials with visually uncontaminated soils.

B. The Contractor shall maintain all required field controls throughout the performance of the work.

C. No over-excavation beyond the limits required to perform the work will be allowed without specific authorization of BVH or GZA’s LSP.

D. Excavation shall proceed in accordance with standard engineering procedures and methods shall be employed to isolate contaminated fill from non-contaminated soils.

E. BVH may direct the Contractor to excavate additional soil and/or fill from areas beyond the designated excavation limits that contain soil and/or fill as required to meet acceptable conditions for the construction of foundations and utilities.

F. Soils excavated from below the groundwater table should be anticipated to contain free water. These saturated materials will require dewatering/draining prior to stockpiling and processing. All transport of excavated saturated zone soils shall only be conducted in watertight, sealed tailgate, trucks. Water drained from excavated soils shall be managed in accordance with Specification Section 312319, Dewatering. Contractor shall construct a wet soil dewatering station, containing a bed of sand, or similarly porous material, on which the wet soil will be placed to drain and equipped with an underdrain system to allow the collection of the drained water and conveyance to the on-site treatment system. Collected water will be managed in accordance with Specification Section 312319, DEWATERING. The materials of construction, size, and operation of the
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Drainage bed shall be determined based on the specific earthwork sequence and management plan proposed by the Contractor and approved by GZA's LSP.

G. The Contractor shall maintain, within the Contractor's Work Zone, dust, airborne asbestos, combustible gas, and VOC levels below the threshold concentrations determined by the Contractor's HASP. The Contractor shall also maintain noise levels at the Limits of Work below City of Boston Noise Regulations.

H. The Contractor shall place Long Duration Foam or use other acceptable measures, as approved by the GZA's LSP, to control dust, airborne asbestos, combustible gas, or vapors and odors in accordance with the Contractor's HASP and the specified threshold concentrations at the perimeter of the Contractor's Work Zone.

3.4 EXCAVATED MATERIAL CLASSIFICATION FOR STOCKPILING AND ON-SITE REUSE, PROCESSING, OR OFF-SITE DISPOSAL

A. Excavated materials will be classified by the GZA’s LSP in the field during the work.

B. Excavated material will be classified into seven main groups for purposes of on-site reuse, temporary, separate stockpiling, processing, or off-site disposal. The excavated materials and corresponding stockpiles will be designated as:

1. Group I: Existing topsoil free of solid waste debris. Group I soils do not include asphalt and gravel sub-base materials that will be reclaimed. Group I material will be stockpiled and covered for reuse as topsoil when restoring landscape areas.

2. Group II: Existing granular fill soils, free of solid waste debris, that currently serve as capping material over the landfill. Group II materials may be encountered to varying depths below the existing cover (Group I) soils. Group II material will be stockpiled and covered for reuse as backfill following installation of utilities.

3. Group III: Existing granular fill soils with minor amounts of inorganic waste/debris (glass, ash, brick, metal, concrete, etc.). Group III materials will likely be encountered to varying depths below the existing cover (Group I and II) soils. Group III and Group V materials will be transferred to the materials management area, stockpiled and secured. These materials will be processed to segregate oversize and unacceptable materials and to yield material for reuse as backfill.

4. Group IV: Reclaimed asphalt, granular sub-base materials, and construction debris that is exempt from solid waste disposal requirements if processed and reused in an appropriate manner, as specified in 310 CMR 16.05 and processed in accordance with Section 312000 — EARTH MOVING. Asphalt that is not reclaimed for subsequent reuse on site shall be stockpiled separately for off-site disposal by the Contractor. The intent of this category is that all existing on-site asphalt and sub-base soils will be reclaimed for reuse as specified in the Contract Documents. Prior to excavating Group IV materials, the Contractor shall inform BVH and GZA's LSP so that appropriate observations can be made to document conditions.

5. Group V: Solid waste, debris or granular fill with significant amounts of organic or inorganic debris. Group V fill may be encountered directly below existing cover materials (Group I and II) or below Group III soils underlying the cover materials. Prior to excavating Group V materials, the Contractor shall inform BVH and GZA’s LSP so that appropriate observations can be made to document conditions. Group III and Group V material materials will be transferred to the materials management area, stockpiled and secured. These materials will be processed to segregate oversize and...
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unacceptable materials and to yield material for reuse as backfill.

6. Group VI: Drilling liquids and resulting slurries associated with pile installation activities. Group VI material shall be containerized for off-site disposal.

7. Group VII: Excavated materials exhibiting gross or overt contamination shall be placed directly into sealed roll-off containers for potential characterization and off-site disposal. Prior to excavating Group VII materials, the Contractor shall inform BVH and GZA’s LSP so that appropriate in situ observations can be made to document conditions. Group VII materials shall be placed directly into roll-off containers and under no circumstances shall be temporarily stockpiled.

C. The transfer of excavated materials from the excavation to the material management area stockpiles or to roll-offs, shall be conducted so as to prevent the uncontrolled deposition of materials to areas that are not suitable for such materials.

3.5 MATERIAL STOCKPILING

A. Designated separate stockpiles and/or roll-off container storage areas shall be created by the Contractor for Group I through Group VII materials. The required stockpile areas and durations shall be determined based on the specific earthwork sequence and management plan proposed by the Contractor and approved by GZA’s LSP. Each stockpile area shall be protected from storm water runoff and run-on and wind erosion by daily covering at the end of each work day with polyethylene sheeting (poly) or by the application and maintaining/re-application of GeoMatrix SS permeable fiber mat. Prior to stockpiling materials, the Contractor shall construct a Jersey barrier, straw bale berm or other approved means of containment around each stockpile area. The berm shall be a minimum of 18 inches high and function to provide reliable containment. To prevent accumulation of stormwater runoff within the bermed area, polyethylene sheeting or other required cover shall be extended over the berm such that runoff is diverted beyond the containment/stockpile area. The Contractor shall re-grade the ground surface as appropriate to divert stormwater run-on and runoff away from the stockpiled material. The Contractor shall be responsible for protecting each stockpile from precipitation and other forms of moisture to enable material processing or direct on-site reuse and to minimize potential off-site disposal costs due to additional weight or handling efforts.

B. The Contractor shall track all materials from excavation to final disposition. The Contractor shall provide to BVH, on a daily basis, copies of field records documenting the approximate quantities, types, and locations of stockpiled material from that day. Records will also be provided of quantities, processed and yields of reusable and disposable materials.

C. The clearing and preparing of stockpile areas and the grading, barriers, polyethylene sheets, jersey barriers, straw bales and all other materials, equipment, and labor required for the protection of the excavated material shall be considered incidental to the work and will not be separately measured for payment nor will separate payment be made.

D. Stockpiles of Groups I, II and IV materials shall be placed on an impervious surface and covered with two complete layers of polyethylene plastic sheeting with an overlap of not less than 18 inches of adjacent sheets. Plastic sheeting covering the piles shall be sufficiently anchored or restrained to secure the plastic over the pile to prevent it from blowing off or tearing due to wind and weather.

E. Group III and Group V may be combined and temporarily stockpiled together to await
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Revised January 12, 2016

processing. Stockpile requirements are the same as in D above, with the additional requirement that the top (cover) section of HDPE shall have either welded joints or sufficient overlap of abutting sheets such that the resulting cover can adequately control odors from the stockpile, provides a watertight enclosure, and will not blow off or become dislodged during high winds. Yellow plastic CAUTION tape, or some other appropriate labeling system acceptable to the UMass Boston and GZA’s LSP, shall be placed around Group V stockpiles to inform on-site personnel of the potential for contaminated contents. It is intended that, weather permitting, material processing be conducted on a continuous basis to prepare material for reuse as backfill and have adequate stockpiles of processed material available as required to allow backfilling to proceed at a rate commensurate with utility installation. Processed material stockpiles will be maintained to the same requirements as in D, above.

F. Containers for Class VI and Class VII materials shall be stored in designated areas accessible to trucks to permit picking up and removing filled containers for off-site disposal, if required. Roll-off containers shall be watertight and covered to prevent leakage or infiltration of precipitation. If necessary to control odors, dust, or VOC vapors from materials within the roll-off containers, the Contractor shall apply Extra Long Duration Foam over the surface of the materials within the containers.

G. Provide BVH and/or GZA’s LSP access to perform headspace analyses, field testing, or other testing. Provide personnel and equipment to assist with soil sampling, if requested.

H. Disposal of material that is OHM-impacted as a result of careless handling or use of unauthorized procedures shall be at the Contractor's expense. This includes mixing soil from separate stockpiles with different reuse or disposal requirements. Delays of Work resulting from temporary storage of excavated material shall be at no additional cost to the Owner.

I. Do not remove excavated material until the materials have been designated for reuse or off-site disposal by BVH and/or GZA’s LSP.

J. At the completion of the Work, dismantle and properly dispose of the materials used in constructing the stockpiles.

3.7 REUSE OF EXCAVATED MATERIALS

A. Stockpiled materials shall be reused on site in accordance with Section 312000 — EARTH MOVING and as indicated below.

1. Group I: Reuse as topsoil in landscaped areas and as cover material, subject to requirements as defined in Section 312000 — EARTH MOVING.

2. Group II: Reuse as cover material and general Common Fill, subject to geotechnical requirements as defined in Section 312000 — EARTH MOVING.

3. Group III and Group V materials will be processed to yield reusable material and spoils material requiring off-site disposal (see Section 3.8 below). Segregated unacceptable or non-processable material including, but not limited to, wood, plastic and putrescent waste, shall be designated as Group VII material and managed accordingly. Material that, through the screening and crushing operations, achieves a 2-inch minus particle size will be reused as common fill at depths of and greater than 2-feet below finished grade in designated landscaped areas and below pavement.
subject to Section 312000 - EARTH MOVING

4. Group IV: Reuse as compacted sub-base material, provided the final gradation of the reclaimed asphalt meets the gradation specified in Section 312000 — EARTH MOVING. Asphalt that is not reclaimed for subsequent reuse on site shall be stockpiled separately for off-site disposal by the Contractor at no additional cost to the Project.

B. Materials, designated as Group VI and VII by the LSP may not be reused on site. Group VI and VII material shall be loaded into containers provided by the Contractor. The Contractor shall be responsible for covering the material at the end of each work day with tarps. The Contractor shall be responsible for securing the tarps and properly maintaining the security of the roll-offs.

3.8 MATERIAL PROCESSING

A. Material processing is to be conducted on Group III and Group V materials. Processing shall consist of the separation of materials by particle size into less than or greater than 2-inches, using vibrating screen or alternate methods, as proposed by Contractor and accepted by Bond Brothers and GZA’s LSP. Oversize materials shall be further processed by the removal of visible organic materials (e.g. wood, leather, fabric, paper, and vegetation), plastic, putrescent material, and metal; and the crushing of brick, concrete, glass, and rock to 2-inch minus. The screened material and the crushed material will then be combined and blended to yield a reusable backfill material.

B. Oversize, organic, or otherwise unacceptable non-reusable materials from the processing operation will be designated as Group VII material, and handled accordingly.

C. For the work performed under the provisions and within the area of URAM Status Report 006, material screening, crushing, and processing as described in items A and B above will not be performed. For the area subject to the provisions of URAM Status Report 006, unsuitable materials including large debris excavated from the utility trenches, such as stumps, logs, tires, granite blocks, rocks and other oversized material will be culled from the excavated soil matrix with an excavator bucket. The culling procedure will take place with the soil being kept damp by adding water if necessary. The oversized or unsuitable material will be separated from the soil stream and the two resulting products will be segregated and stockpiled separately.

3.9 DECONTAMINATION OF CONSTRUCTION EQUIPMENT

A. All trucks and excavation equipment that have come in contact with or are suspected to have come in contact with contaminated on-site material or debris shall be cleaned of soil and debris using brushes, in an area designated exclusively for equipment decontamination by the Contractor. The location of such areas shall be indicated on shop drawing submitted to BVH for review. This operation shall be performed each time a piece of equipment or truck leaves the each work area or the site. The Contractor shall collect the resulting soil and debris and place this material into the Group III stockpile.

B. Include a truck wheel wash, as specified in Paragraph 2.2G.

C. Decontaminate by hosing down tools, equipment, and machinery using the low-pressure water system and brushes specified in Paragraph 2.2G of this Section to remove material.
D. Direct decontamination water in accordance with Section 312319 — DEWATERING.

3.10 DUST CONTROL

A. Dust (including air-borne asbestos) control shall be performed by the Contractor during excavation, stockpiling, processing, and all other earthwork operations, and daily construction traffic activities at the Project Site. The Contractor shall provide all required measures to control generation of dust and air-borne asbestos on site and to prevent off-site migration.

B. Dust (including air-borne asbestos fibers) suppression techniques such as wetting, misting, soil covering, ensuring the material is damp when excavated and handled, strategic placement of wind barriers and/or application of Long and Extra Long Duration Foam shall be employed as necessary to reduce dust and air-borne asbestos levels. Wetting techniques shall not increase moisture contents unnecessarily such that the proper on-site reuse (placement and compaction) of material from the stockpiles is prohibited. Similarly, wetting agents shall not result in causing runoff. The addition of other chemicals to reduce dust needs to be approved by LSP prior to use.

C. Dust suppression techniques shall be modified or enhanced if on-site dust monitoring indicates exceedances of maximum dust levels in accordance with 310 CMR 6.00.

D. Air-borne asbestos suppression techniques shall be modified or enhanced if on-site sampling and analysis of samples indicated exceedances as described in Paragraphs 1.8 and 3.2.

3.11 SAMPLING OF MATERIALS FOR OFF-SITE DISPOSAL

A. The intent of the Project is that, to the greatest extent possible, excavated materials will be reused on site in accordance with this Section. However, excavated materials classified as Group VII based on field observations or laboratory chemical testing performed by GZA’s LSP, shall be disposed off-site by the Contractor, as described herein. Group VI materials shall be disposed off-site. In addition, there may be additional excess materials that require off-site disposal.

B. If off-site disposal of excess materials and/or Group VII materials is required, the Contractor shall undertake a chemical characterization testing program to determine the acceptability of the materials at the Contractor’s proposed landfill. Sampling and analyses shall be conducted at the frequency and for the parameters required by the proposed receiving facility. The cost associated with these analyses shall be incorporated in the Contractor’s bid. No additional compensation will be provided for the sampling, analyses, and management of the required samples.

C. The Contractor shall take samples in such a manner as not to cause any cross-contamination. All sampling equipment shall be decontaminated between collections of samples from each stockpile.

D. Representative sampling of material to be disposed off-site shall be done at sufficient and adequately distributed locations so that the concentrations of the chemical
constituents of concern which may be present are adequately characterized for the purpose of minimizing total sampling and disposal costs. **Contractor shall notify GZA's LSP 2 days in advance of sampling of waste or other materials on the Project so that GZA’s LSP or his designee may observe sample collection.**

E. The disposal facility required analysis shall be performed by a laboratory certified for such analyses by the Commonwealth of Massachusetts as specified in 310 CMR 42.

F. The Contractor shall submit a copy of all analyses to BVH within 2 days of receipt of the laboratory report. Analytical data shall be kept confidential, distributed only to GZA's LSP and BVH and the disposal facilities. 21 calendar days shall be allowed for BVH’s review of test results.

G. Based on the results of the characterization, GZA’s LSP will inform the Contractor of the documentation requirements (Bill of Lading, Material Shipping Record), and the Contractor shall become responsible for the legal transport and disposal of the excess materials at an appropriate facility selected by the Contractor and approved in writing by the UMass Boston. No excavated materials of any type shall be removed from the site without prior written approval from the UMass Boston.

H. If additional chemical testing is required by the disposal facility selected by the Contractor, the Contractor shall be responsible for the providing the required chemical test data in a timely manner to allow off-site disposal of the materials.

### 3.12 TRANSPORTATION AND DISPOSAL OF EXCAVATED MATERIAL

A. All material removed from the Site shall be disposed off-site only in licensed landfill facilities approved by GZA’s LSP and the UMass Boston.

B. The Contractor shall be responsible for off-site disposal of all excess excavated material from the construction of the Work. The Contractor shall transport excess and Group V materials in accordance with all United States Department of Transportation, MassDEP, and local regulations.

C. The hauler(s) shall be licensed as applicable in all states affected by transport.

D. The Contractor shall ensure that all loads are properly covered during transport and that transportation vehicles contain placards as applicable.

E. The Contractor shall not transport material requiring off-site disposal until all disposal and/or recycling documentation has been received, reviewed, and accepted by BVH.

F. The Contractor shall drain all materials of free liquid prior to transport.

G. All materials transported off site shall be loaded by the Contractor into properly licensed and permitted vehicles and transported directly to BVH-approved destination facility.

H. Materials removed for disposal shall be loaded within the limits of the temporary stockpile area. A tarpaulin shall cover all trucks leaving the Site. Each truck shall be thoroughly cleaned of spilled debris and soil that might fall from the truck during transport. Soil material shall be removed from truck tires within a designated
decontamination area prior to leaving the temporary stockpile area. The Contractor shall take all steps necessary to prevent debris or any fluid from being spilled from trucks or tracked from the Site onto other portions of the Campus or local streets. Each workday the Contractor shall clean the local vicinity of the Campus roadways and local streets, as necessary, of any spillage, soil, and debris.

3.13 WASTE PROFILES AND BILLS OF LADING

A. The Contractor shall be responsible for preparing and submitting to BVH for review all waste profile applications and questionnaires, and coordination with disposal facilities and all Federal and State Environmental Agencies.

B. The UMass Boston and GZA’s LSP will also be responsible for MassDEP regulatory notification and interaction as necessary.

C. For all materials subject to management under 310 CMR 40.0035 of the Massachusetts Contingency Plan (i.e., materials having contaminant concentrations in excess of applicable RCS-1 Reportable Concentrations), the Contractor shall be responsible for preparing all 21E Bills of Lading (MassDEP Forms BWSC112, 112A, and 112B) with all applicable analytical backup, notification, and control forms. The Contractor shall submit BOLs to the Designer for review at least 21 calendar days before planned transport. The Designer will obtain the LSP signature on the BOLs. The Contractor shall submit signed (including signatures of disposal facility’s representative) BOLs to BVH prior to receiving progress payment.

D. For all materials not subject to management under 310 CMR 40.0035 of the Massachusetts Contingency Plan (i.e., materials having contaminant concentrations below applicable RCS-1 Reportable Concentrations), the Contractor shall be responsible for preparing all MassDEP Material Shipping Record and Logs (MSRLs) with all applicable support documentation. Contractor shall submit MSRLs to BVH for review at least seven calendar days before planned transport. GZA’s LSP and UMBA will provide signature on the MSRLs. The Contractor shall submit signed (including signatures of disposal facility’s representative) original MSRLs to BVH prior to receiving progress payment.

E. The Contractor shall provide certified tare and gross weight slips for each load received at the designated facility which shall be attached to each returned BOL/MSRL. All documentation for each load shall be tracked by the original BOL/MSRL document number that was assigned.

F. The UMass Boston will be designated as generator and will sign all waste profile application/questionnaire, BOLs and/or MSRLs.

G. The appropriate completed shipping/disposal documentation shall be provided for each load from the site to the disposal facility.

H. The Contractor shall submit to the UMass Boston and BVH, prior to receiving progress payment, documentation for each load from the Site certifying that all materials were transported to, accepted, and disposed of, at the selected disposal facility.
3.14 ENVIRONMENTAL FIELD MONITORING

A. During construction, the Contractor shall conduct continuous environmental air monitoring in accordance with Paragraph 1.8 immediately around the areas where construction activities involve the excavation, stockpiling and loading of contaminated soil. The environmental field monitoring shall be performed in accordance with the Contractor's HASP.

B. The Contractor shall immediately stop work and notify LSP, UMass Boston, and BVH when air monitoring results indicate that a potentially unsafe condition exists, combustible gas is encountered at a level greater than 5% of the lower explosive limit of methane and at any time when volatile organic measurements require upgrades in the level of personal protection. Within 24 hours of the notification, the Contractor shall provide a plan to GZA’s LSP and BVH for safely continuing the work.

3.15 ACCIDENT REPORTING REQUIREMENTS

A. The Contractor shall comply with the following accident and or incident reporting requirements:

1. Should any unforeseen safety-related factor, hazard, or condition become evident during the performance of the Work, the Contractor must immediately take prudent action to establish, maintain, and secure the site and working conditions. This shall be followed by immediate notice to BVH and GZA’s LSP.

2. If serious injury to a person or damage to property, environment, or natural resources results from an incident, the Contractor shall immediately report the incident to BVH, UMBA and the UMass Boston. The report shall be followed by a written document describing the incident, what hazards were created by it, and detailed statements of what actions were taken to correct the problem. The Contractor will also include a description of why the actions taken were prudent.

3.16 CONTINGENCIES

A. If during the work, the presence of unexpected hazardous materials or conditions is evident, work in the area shall be suspended. These conditions include, but are not limited to, encountering buried containers, isolated asbestos containing materials (excluding asbestos in soil), drums, or tanks.

1. The area will be secured to prevent the existence of a health risk or release into the environment. The sources of the event causing the material to be considered suspect will be evaluated by GZA's LSP.

2. The Contractor shall immediately notify UMBA, the UMass Boston, BVH, and GZA’s LSP.

3. The impact on the work should be evaluated and, if necessary, the Contractor's Health and Safety Program implemented at the Site (and that of the subcontractors) should be revised in response to the unforeseen conditions.
3.17  CLEANING

A.  Temporary Storage and Stockpile Areas:

1. After using the approved temporary stockpile, soil management, and processing areas, the Contractor shall thoroughly clean the areas including scraping and sweeping any remaining loose soils such that no residues of stockpiled materials remain.

END OF SECTION
December 14, 2015

Ms. Zehra Schneider Graham, CHMM, REM
Deputy Director of Environmental Health and Safety
University of Massachusetts Boston
100 Morrissey Boulevard
Boston, MA 02125-3393

RE: Initial Perimeter Asbestos Air Sampling Results – Utility Corridor and Roadway Relocation Project, University of Massachusetts Boston (EH&E 20529)

Dear Ms. Zehra Schneider Graham:

Environmental Health & Engineering, Inc. (EH&E) provides this report documenting the results of initial area air sampling for asbestos around the perimeter of Utility Corridor and Roadway Relocation Project (the Project) work areas on the University of Massachusetts Boston (UMB) campus in Boston, Massachusetts. This sampling occurred on November 24, 2015, following the discovery of asbestos-contaminated soils on the Project and after excavation, handling, and processing of all soils had temporarily ceased due to this finding.

The objective of EH&E’s sampling was to provide an initial assessment of potential fiber emissions from the Project under current (non-active) conditions so that corrective actions, if needed, could be implemented immediately. This assessment focused on locations where potentially asbestos-contaminated soils were stockpiled or exposed at the time of the discovery. EH&E’s air sampling results for total fibers (including but not specific to asbestos) surrounding the Project were all low (below the laboratory reporting limit) and well below workplace exposure guidelines as well as the clearance criteria for re-occupancy of spaces following asbestos abatement. These results did not indicate any evidence of elevated asbestos emissions from the Project work areas. The sampling methods and results, which were previously communicated to UMB, are detailed in the following sections.¹ Please note that this report is subject to the limitations in Appendix A.

¹ Email communication from William Wade of EH&E to Zehra Schneider Graham of UMB on November 25, 2015.
SAMPLING STRATEGY AND METHODS

On November 24, 2015, EH&E collected area samples to measure total airborne fibers, including but not specific to asbestos, in 11 outdoor locations surrounding areas where potentially asbestos-contaminated soils were stockpiled or exposed on the Project. Sampling was performed by a U.S. Environmental Protection Agency (EPA)-accredited and Commonwealth of Massachusetts-certified asbestos project monitor from EH&E (Yalissa L. Francis; #AM900474). Air sample locations were selected based on nearby receptors, including near occupied buildings and pedestrian walkways, and were sited at locations upwind and downwind along the perimeter of Project work areas. Air sampling locations are shown in Figure B.1 of Appendix B. Samples were collected during typical construction hours on the Project (samples were collected from approximately 8:30 a.m. to 5:00 p.m.).

Air samples were collected and analyzed for total airborne fibers using phase contrast microscopy (PCM) in accordance with National Institute for Occupational Safety and Health (NIOSH) Method 7400. Samples were collected at breathing height (approximately 4 – 6 feet above the ground) using sampling pumps to draw air through open-faced air sampling cassettes (25-millimeter diameter cassettes equipped with conductive extension cowls and 0.8-micron pore size, mixed cellulose ester filters). Air was drawn through the filters at a nominal flow rate of 3.5 liters per minute for approximately 6 to 6.5 hours. Pump flows were verified using a primary standard flow meter (Drycal®) at the start and end of the sampling period. Flow rates measured at the start and end of sampling were averaged in order to calculate the total volume of air sampled. In addition to the primary samples, two duplicates and four blanks were collected and analyzed for quality control purposes.

After sampling, the filter cassettes were sealed and transported under chain of custody to ProScience Analytical Services, Inc. (ProScience), Woburn, Massachusetts, for analysis using PCM in accordance with NIOSH Method 7400. ProScience is certified by the Massachusetts Departments of Labor, Division of Occupational Safety (#AA043428) and accredited by the American Industrial Hygiene Association.

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2 Wind directions were determined based on prevailing directions reported by the National Weather Service at Logan Airport (ranging from west-southwest to west-northwest) as well as on-site observations.

SAMPLING RESULTS

Concentrations of total airborne fibers at all sampling locations surrounding the Project on November 24, 2015, were below the laboratory reporting limit (0.002 fibers per cubic centimeter [f/cc]). Results are tabulated in Table C.1 of Appendix C and Appendix D includes the laboratory report. Reporting limits from all locations were well below health-based occupational exposure limits including the U.S. Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) of 0.1 f/cc. All results were also well below the 0.010 f/cc clearance criteria for re-occupancy of spaces following asbestos abatement. These results did not indicate evidence of elevated emissions from the Project work areas under inactive conditions.

If you have any comments or questions regarding this report, please contact either of us at 1-800-TALK EHE (1-800-825-5343).

Sincerely,

William S. Wade, C.I.H.
Senior Scientist/Project Manager

Cynthia D. Campisano, M.S., P.G.
Senior Scientist/Project Executive

Appendix A Limitations
Appendix B Air Sampling Locations
Appendix C Air Results
Appendix D Laboratory Report

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1. Environmental Health & Engineering, Inc.’s (EH&E) indoor environmental quality assessment described in the attached report number 20529, *Initial Perimeter Asbestos Air Sampling Results – Utility Corridor and Roadway Relocation Project, University of Massachusetts Boston* (hereafter "the Report"), was performed in accordance with generally accepted practices employed by other consultants undertaking similar studies at the same time and in the same geographical area; and EH&E observed that degree of care and skill generally exercised by such other consultants under similar circumstances and conditions. The observations described in the Report were made under the conditions stated therein. The conclusions presented in the Report were based solely upon the services described therein, and not on scientific tasks or procedures beyond the scope of described services.

2. Observations were made of the site as indicated within the Report. Where access to portions of the site was unavailable or limited, EH&E renders no opinion as to the condition of that portion of the site.

3. The observations and recommendations contained in the Report are based on limited environmental sampling and visual observation and were arrived at in accordance with generally accepted standards of industrial hygiene practice. The sampling and observations conducted at the site were limited in scope and, therefore, cannot be considered representative of areas not sampled or observed.

4. When an outside laboratory conducted sample analyses, EH&E relied upon the data provided and did not conduct an independent evaluation of the reliability of these data.

5. The purpose of the Report was to assess the characteristics of the subject site as stated within the Report. No specific attempt was made to verify compliance by any party with all federal, state, or local laws and regulations.
APPENDIX B
AIR SAMPLING LOCATIONS
### APPENDIX C

#### AIR SAMPLING RESULTS

<table>
<thead>
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<th>Sample ID</th>
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<th>Type</th>
<th>Total Fiber Concentration (f/cc)</th>
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<tr>
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<td>Plaza, near Wheatley Hall</td>
<td>Upwind</td>
<td>ND (&lt;0.0021)</td>
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<tr>
<td>162858</td>
<td>Corner of Lot S, near Harbor Walk</td>
<td>Downwind</td>
<td>ND (&lt;0.0021)</td>
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<td>162859</td>
<td>Adjacent to Lot C</td>
<td>Upwind</td>
<td>ND (&lt;0.0021)</td>
</tr>
<tr>
<td>162860</td>
<td>Adjacent to EMKI</td>
<td>Downwind</td>
<td>ND (&lt;0.0021)</td>
</tr>
<tr>
<td>162861</td>
<td>Near Clark, adjacent to former track area</td>
<td>Upwind</td>
<td>ND (&lt;0.0020)</td>
</tr>
<tr>
<td>162862</td>
<td>Near GAB1, adjacent to former track area</td>
<td>Downwind</td>
<td>ND (&lt;0.0020)</td>
</tr>
<tr>
<td>162863</td>
<td>Near GAB1, adjacent to former track area (duplicate)</td>
<td>Downwind</td>
<td>ND (&lt;0.0022)</td>
</tr>
<tr>
<td>162864</td>
<td>Roadway north of former track area</td>
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<td>Near former Pumping Station</td>
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</tr>
<tr>
<td>162866</td>
<td>Across roadway from baseball left field</td>
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<td>ND (&lt;0.0020)</td>
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<td>Across roadway from baseball left field (duplicate)</td>
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**f/cc** fibers per cubic centimeter  
**ND** not detected above the laboratory reporting limit (reporting limit shown in parentheses)  
**<** less than  
**EMKI** Edward M. Kennedy Institute  
**GAB1** General Academic Building 1

Samples analyzed for total fibers by ProScience Analytical Services, Inc. (ProScience), Woburn, Massachusetts, using Phase Contrast Microscopy in accordance with National Institute for Occupational Safety and Health Method 7400. ProScience is certified by the Massachusetts Departments of Labor, Division of Occupational Safety (#AA043428) for this analysis.
Will Wade
Environmental Health & Engineering, Inc.
117 Fourth Ave.
Needham, MA 02494

November 25, 2015

Dear Will Wade,

The enclosed analytical results have been obtained using Phase Contrast Microscopy in accordance with the "NIOSH-7400" method. The detection limit of this method is 5.5 fibers per 100 fields. ProScience Analytical Services Inc., assumes no responsibility for inaccurate analytical results caused by improper sample collection techniques, improper use of the field equipment, insufficient number of samples collected or erroneous data provided by the client.

The Quality Control data related to the samples analyzed is available for review upon the client's written request. ProScience Analytical Services, Inc., makes no representation or statement related to the clearance of the area where the samples have been collected. Results are adjusted for blank counts.

All Laboratory records are retained for at least three years unless otherwise directed in writing by the client. The sample cassettes are retained for a period of two months, while the mounted slides will be retained for five years. All analytical results and records are considered strictly confidential and will not be released under any circumstances to anyone except the actual client. The analytical results included in this report apply only to the items tested.

If you have any questions please contact the Laboratory Manager or the Laboratory Director.

Sincerely,

Patricia Weakley, Optical Manager
Aimee Cormier, Laboratory Director

Enclosure:
LAB BATCH ID: A 98917   CLIENT PROJECT ID: 20373
Client Ref: N/A
AIHA ID# 102754; CT ID# PH-0209; MA ID# AA000156; ME ID# LB-055; ME ID# LA-056; RI ID # AAL-093; VT ID# AL016876
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Note: To create a unique lab sample ID, use the Batch # and the Sample ID (example: [Batch #] - [Sample ID]).

Analyst: Mark Derosier
MEMORANDUM

TO: Zehra Schneider Graham, CHMM, REM, Deputy Director of Environmental Health and Safety, University of Massachusetts Boston

FROM: William S. Wade, C.I.H., Senior Scientist/Project Manager
Cynthia D. Campisano, M.S., P.G., Senior Scientist/Project Executive

DATE: January 7, 2016

RE: Perimeter Asbestos Air Monitoring Plan – Installation of Pile Caps North of the Calf Pasture Pump Station, Utility Corridor and Roadway Relocation Project, University of Massachusetts Boston (EH&E 20529)

cc: William Norman, LSP, Principal, GZA GeoEnvironmental, Inc.
Jason Ressler, Assistant Project Manager, GZA GeoEnvironmental, Inc.

Environmental Health & Engineering, Inc. (EH&E) provides this plan outlining the perimeter asbestos air monitoring program during installation of pile caps north of the Calf Pasture Pump Station (the Phase) for the Utility Corridor and Roadway Relocation Project (the UCRR Project) on the University of Massachusetts Boston (UMB) campus in Boston, Massachusetts. Work areas associated with this Phase, which is subject to the provisions of UCRR Project Utility-Related Abatement Measure (URAM) Status Report 6, are shown in Figure 1 attached.

The objective of the perimeter air monitoring program is to assess the adequacy of Phase-related dust control measures at minimizing potential airborne asbestos fiber impacts in adjacent publicly accessible locations, and to ensure that if deviations are detected, corrective actions can be implemented in a timely manner to effectively control potential sources. The following sections outline the monitoring strategy, site-specific evaluation criteria, and sample collection and analysis methods for the Phase, which were designed in coordination with Project stakeholders and input from the Massachusetts Department of Environmental Protection (MassDEP). Any modifications to this plan will be submitted to and approved by MassDEP prior to implementation.
SAMPLING STRATEGY, EVALUATION CRITERIA, AND NOTIFICATION

EH&E will collect area air samples to measure total airborne fibers continuously at fixed sites along the perimeter of active Phase work zones. Ambient air sampling locations will be determined based on daily planned work activities. Air samples will be collected in a manner targeting individual work areas where potentially asbestos-contaminated soils are being excavated, handled, or stockpiled. Air samples will be collected in at least four locations around the perimeter of relevant work areas. Daily sampling locations will also be selected based on prevailing wind directions reported at Logan Airport as well as on-site observations.

Air samples will be collected throughout every day of the Phase when potentially asbestos-contaminated soils are being disturbed and when potential emissions of asbestos dust may occur. During typical (approximately 8-hour) workdays, two sets of samples will be collected at each active perimeter air sampling location. At each site, one sample will be collected for approximately half of the workday and then a second sample will be collected for the remainder of the workday.

Perimeter air samples will be analyzed for total airborne fibers, including but not specific to asbestos, using Phase Contrast Microscopy (PCM) on an immediate turn-around time basis to ensure prompt response to any detected exceedances. Results from the first set of PCM samples will be available such that corrective actions, if warranted, can be implemented the same workday. Results from the second set of samples will be available such that corrective actions, if warranted, can be implemented the morning of the next workday.

Daily results from each sampling location will be considered individually as well as composited (as time-weighted average concentrations) to assess temporal trends over the course of the Phase. Any individual perimeter air sampling result that meets or exceeds 0.010 fibers per cubic centimeter (f/cc) potentially related to Phase work will result in the temporary stoppage of activities and re-evaluation and improvement of work practices, engineering controls, and/or dust/fiber suppression methods. Although PCM results will be used to determine the need for immediate site corrective actions, samples with total fiber concentrations meeting or exceeding 0.010 f/cc may also be analyzed for asbestos fibers by transmission electron microscopy (TEM).

Air sampling analytical results collected under this plan will be provided on a daily basis to the MassDEP Northeast Regional Office Asbestos Program (or upon an alternative schedule if requested). Notification will also be provided immediately (within 2 hours) to the MassDEP Northeast Regional Office Asbestos Program upon receipt of total fiber analytical results meeting or exceeding 0.010 f/cc.

1 The Commonwealth of Massachusetts Departments of Labor, Division of Occupational Safety clearance criteria for asbestos response actions.
SAMPLE COLLECTION AND ANALYSIS METHODS

Area air samples will be collected and analyzed using PCM in accordance with National Institute for Occupational Safety and Health (NIOSH) Method 7400.\(^2\) Samples will be collected at breathing height (between 4 – 6 feet above the ground) using stationary, calibrated air sampling pumps to draw air through open-faced air sampling cassettes. Cassettes will be 25-millimeter in diameter and equipped with conductive extension cowls and 0.8-micron pore size, mixed cellulose ester filters. Air sampling pumps capable of operating at flow rates of approximately 10 – 12 liters per minute will be used and a minimum volume of air will be collected to achieve detection limits well below 0.010 f/cc. Target detection limits will be approximately 0.001 f/cc for 4-hour samples (0.0005 f/cc for full day composite samples). Flow rates and durations will be adjusted to achieve target detection limits as possible based on site activities. Pump air flow rates will be measured before and after each use by means of a primary standard or by a secondary standard (e.g., rotameter) that has been calibrated against a primary standard within the last 180 days. Air flows at the start and end of the sampling period will be averaged to calculate the total volume of air sampled. A minimum of two blanks and one duplicate will be submitted for analysis with each sample set, or 10 percent of total primary samples, whichever is greater.

All air samples collected under this plan will be handled under strict chain-of-custody procedures and analysis will be performed by qualified personnel/laboratories. General information and observations about work activities, site conditions, and weather deemed potentially relevant to data quality and results will also be noted during sampling. Deviations from this plan, if any, will also be recorded. PCM samples will be analyzed in accordance with NIOSH Method 7400 (A-Counting Rules). If warranted, based on the evaluation procedures outlined above, samples may be analyzed for asbestos fibers by TEM in accordance with NIOSH Method 7402.\(^3\)

Air samples will be collected by professional sampling technicians under the supervision and direction of a Certified Industrial Hygienist (CIH). All samples will be analyzed by a laboratory certified by the Massachusetts Departments of Labor, Division of Occupational Safety and accrediting the American Industrial Hygiene Association.

We appreciate the opportunity to support you and the team. Please contact us if you have any questions regarding this information.

Attachment: Figure 1

