Cover Certification Report

Boston Edison Company
Tax Map 9-2-8 – New Boston Street;
Tax Map 9-7-3 – Merrimac Street;
Tax Map 9-1-5 – Merrimac Street; and,
Tax Map 15-1-11 – Commerce Way
Woburn, Massachusetts 01801

September 4, 2008

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1.0 INTRODUCTION

The Industri-Plex Site Remedial Trust (Remedial Trust) is required by the Consent Decree entered on April 24, 1989 by the United States District Court for the District of Massachusetts in the matter styled *United States v. Stauffer Chemical Company et al.*, Civil Action No. 89-0195-MC, and *Commonwealth of Massachusetts v. Stauffer Chemical Company et al.*, Civil Action No. 89-0196-MC, and recorded at the Middlesex South Registry of Deeds in Book 19837, Page 476 (Consent Decree) to fund and administer the obligations of the Consent Decree. At the request of the Remedial Trust, Roux Associates, Inc. (Roux Associates) has prepared this property-specific Final Cover Certification Report (Cover Certification Report) in compliance with the Consent Decree requirements. This Cover Certification Report documents completion of a portion of the Remedial Action for soil, sediments, and air at the Industri-Plex Superfund Site (Industri-Plex Site), Woburn, Massachusetts. Site wide completion of the Remedial Action for soil, sediments, and air is documented in the Master Cover Certification Report for the Industri-Plex Site. The specific properties addressed in this report are owned by the Boston Edison Company (Tax Maps 9-2-8, 9-7-3, 9-1-5, and 15-1-11) and are located along New Boston Street, Merrimac Street, and Commerce Way in Woburn, Massachusetts. These properties together form a portion of the Boston Edison Company Right-of-Way (ROW) No. 9. Within the report text herein, these properties are collectively referred to as the BECO Property. Construction of the Remedial Action for soil, sediment, and air was completed on June 28, 1996. Changes to the cover at this property may have been made since that date. Approved changes to the cover are documented in the Administrative Record for the Industri-Plex Site.

In accordance with the Consent Decree and the Contract Documents for the Remedial Action, a certification report must be prepared by a registered professional engineer certifying that all remedial activities have been completed in full satisfaction of the requirements of the Consent Decree. As defined by the United States Environmental Protection Agency (EPA), (Federal Register, July 26, 1982) certification does not constitute a guarantee or warranty, but a "rendering of a professional opinion concerning compliance with a requirement of the regulations by a qualified professional in the field."

1.1 Site Description and History

The Industri-Plex Site is a 245 (+/-) acre area, located about 10 miles northwest of Boston, Massachusetts in the north part of Woburn, within the Aberjona River Valley. The Site is bounded on the east side by Interstate 93, and Interstate 95/State Route 128 is located about one half mile south of the Site. The Boston Edison Power Company ROW No. 9 is the southwest boundary of the Site. The Massachusetts Bay Transportation Authority (MBTA) railway transects roughly the western third of the Site in a northwest-southeast direction. The Industri-Plex Site was surveyed by SAIC Engineering, Inc. and Liu Aerial Surveys in 1990 and 1991.

Since the mid-1800s, the Industri-Plex Site has been used primarily by companies producing chemicals for textile, leather, and paper. Chemical manufacturing operations occurred at the Site from 1853 to 1931, producing sulfuric acid and related chemicals, arsenic insecticides, acetic acid, dry colors, phenol, benzene, picric acid, toluene and trinitrotoluene (TNT). By 1929, the Merrimac Chemical Company, which occupied the Industri-Plex Site, had become one of the leading producers of insecticides and other chemicals in the United States. The Merrimac Chemical Company plant included 90 buildings on 417 acres, many of which were within the current Industri-Plex Site. Early operations included disposal of wastes in pits or low-lying wetlands. Liquid wastes were discharged into streams and later sewers. As a result, heavy metal wastes from the chemical operations contaminated Site soils and wetland sediments.

From 1934 to 1969, the property was used by several companies to manufacture glues and gelatins from animal hides. Raw, salted or limed hides, hide fleshings, or chrome tanned leather scraps from cattle, hogs, sheep or other animals were used to manufacture glue by extracting a protein called collagen from animal tissues or bones. Animal hide waste products from the rendering process were disposed of in mounds or hide piles on-Site. A developer purchased the plant property in the early 1970s intending to build a complex of industrial buildings (hence Industri-Plex) and began grading operations. During hide pile excavation, noxious gases and odors, attributable to the decomposing hide wastes, were released. The distinctive odor became known as the "Woburn odor." Complaints from local residents and encroachment on wetland areas stopped further development of the Site.

In 1981, the EPA proposed the Industri-Plex Site for the National Priorities List (NPL), also known as Superfund. The Industri-Plex Site was finalized on the NPL in 1983. In May 1982, EPA and the Massachusetts Department of Environmental Quality Engineering [DEQE – currently known as the Massachusetts Department of Environmental Protection (MassDEP)] entered into a Consent Order with Stauffer Chemical Company to undertake a Remedial Investigation/Feasibility Study (RI/FS). In April 1985, Phase II of the RI/FS was completed. The Remedial Investigation identified arsenic, lead, and chromium in Site soils and wetland sediments as well as impacts to the ground water and odors due to hydrogen sulfide and methyl mercaptans emitted from the hide piles. Abandoned buildings and waste lagoons were also present on the Site. Based on the RI/FS, EPA, along with MassDEP, established a Record of Decision (ROD) in 1986 for the first phase of the cleanup at the Industri-Plex Site (known as Operable Unit 1, OU-1), which included protective covers over more than 100 acres of soil contaminated with heavy metals and animal wastes, a gas collection and treatment system, institutional controls, an interim groundwater remedy, as well as further investigations of Site related contamination at and downstream of the Site to support a future second phase (known as Operable Unit 2, OU-2). The location of the protective covers are illustrated in **Attachment 1**, which includes an impermeable cover for the gas collection and treatment system situated at what is known as the East Hide Pile.

Further details of the Industri-Plex Site history can be found in the 1986 Record of Decision.

In a 1989 Consent Decree between EPA, MassDEP and the current and former property owners, two Trusts were established which set in motion the remediation and reuse of the Industri-Plex Site. The Remedial Trust was formed to prepare and implement the remedy according to the ROD. The Industri-Plex Site Custodial Trust (Custodial Trust) was formed to hold, manage, and sell a portion of the Site.

Golder Associates, Inc. (Golder) was selected in 1989 by the Remedial Trust to design the remediation for the Industri-Plex Site. The remedial design included pre-design investigations of the soils, wetlands, air, and groundwater.

The pre-design investigations included sampling analysis and studies to determine the extent of contamination and, in accordance with the Consent Decree, to evaluate cover types. Designs were needed to prepare the ground surface for cover. The remedial design included:

1. Plans for the demolition or decommissioning of abandoned buildings, railroad tracks, underground utilities, a personnel tunnel, and over 120 existing observation wells and piezometers used during the preliminary investigation.
2. Plans for controlling odors, fugitive dusts, and surface water runoff during construction to prevent off-Site impacts.
3. Evaluation of, and considerations for the future stability of, the hide pile slopes.
4. Plans for collecting and treating waste gases in a Thermal Oxidation Unit.
5. Plans for dredging, remediating, and revitalizing streams and wetlands.

The remedial design for contaminated soils and air included both permeable (soil and geotextile) and impermeable (soil and geomembrane) covers. A permeable cover system was designed for 60 acres of upland soils and three hide piles (known as the West, East-Central and South Hide Piles) contaminated with high concentrations of heavy metals and decomposing organic wastes. The permeable cover included a geotextile base to maintain separation between contaminated soils and clean cover material, a clean grading fill, and topsoil with vegetation. An impermeable cover was designed for a fourth hide pile (known as the East Hide Pile) which was approximately four acres and an active odor source. The impermeable cover included a high permeability gas collection layer, geomembrane, cover grading fill, topsoil, and vegetation. An active gas collection system was designed to collect gases trapped by the impermeable cover and convey the gases to a thermal oxidation unit for treatment. The permeable cover system for the Site was further divided into two categories: “Engineered Cover”; and “Equivalent Cover”. The Engineered Cover was designed and constructed by the Industri-Plex Site Remedial Trust as part of the response activities at the Site to prevent exposure to contaminated soil, and may be comprised of one or more of the following materials: geotextile, geomembrane, soil, gravel, bituminous concrete and/or asphalt. The Equivalent Cover represents existing structures serving as an adequate permeable cover. Equivalent Cover, although not designed as part of the Engineered Cover, functions to prevent exposure to contaminated soil, and may be comprised of one or more of the following ground covering structures or features, or portions of such structures or features: buildings; foundations; slabs; paved driveways, walkways, parking lots

and/or roads; or other such ground covering structures or features. The location of Engineered and Equivalent Covers are illustrated in the Record Drawings.

Site remediation also required capping approximately five acres of contaminated streams and wetland sediment. Approximately seven acres of wetland enhancement, restoration, and creation were designed to compensate for wetland losses. Normandeau Associates, Inc. of Bedford, New Hampshire, was a key designer of the wetland mitigation plans.

A revised final (100%) Design Report was issued on May 8, 1992. Approval for the 100% Design Report was issued by EPA in consultation with the MassDEP on May 18, 1992. A Remedial Action Work Plan for Soil, Sediment and Air Remedy was issued on June 22, 1994, and approved by EPA, in consultation with MassDEP, on July 11, 1994.

1.2 Scope of the Remedial Action

The Remedial Action (RA) implemented the Remedial Design prepared by Golder and distributed for bidding in April 1992. The RA included covering metal-contaminated soils encountered over an approximately 100-acre portion of the 245-acre Site, portions of which this property represents are shown on Sheets A-46, A-54, A-59, and A-101 of **Attachment 1**. This certification addresses the remedial action performed on the BECO Property (Tax Maps 9-2-8, 9-7-3, 9-1-5, and 15-1-11). The remedial actions on this property included a designed permeable cover of clean soil or gravel overlying a geotextile layer that was placed directly on prepared existing ground and fill soil.

Work conducted between 1992 and December 1997 is addressed in this report.

This report includes the following information as it pertains to the remedial action performed on the BECO Property (Tax Maps 9-2-8, 9-7-3, 9-1-5, and 15-1-11):

- Relevant portions of the Final 100% Design Report (**Appendix A**);
- The submittal log (**Appendix B**);
- Modifications of specifications and plans (**Appendix C**);
- Results of Site air and surface water monitoring (**Appendix D**);

- Decommissioning of wells, piezometers, gas vents, and unidentified wells (UIDs) (**Appendix E**);
- Results of soil conformance and in-place material testing during the Remedial Action (**Appendix F, G**);
- Results of geosynthetics conformance material testing (**Appendix H**);
- Observations of subgrade preparation and geosynthetic installation (**Appendix I**);
- Review of lines and grade control.

1.3 Report Format

This property-specific Cover Certification Report was derived from the Master Cover Certification Report documenting the completion of the soil, sediment and air remedies at the Site [excluding MassPort Authority property documented in the April 1998 Regional Transportation Center (RTC) Cover Certification Report]. Other property-specific Cover Certification Reports will be produced for the remaining properties at the Site. This property-specific Cover Certification Report presents a generic description of all work performed to complete the soil, sediment, and air remedies, some of which are applicable to this property. For those portions/sections which are not relevant to this property-specific Cover Certification Report, those sections have be identified as "[Not Applicable to This Property]". The Master Cover Certification Report contains property-specific details and record drawings for 31 Tax Map lots at the Site including additional general and Woburn Roads/Right of Way information. Please reference the Master Cover Certification Report for this additional Site-wide information.

2.0 PROJECT PARTICIPANTS

2.1 Overview

In July of 1989 Golder was retained by the Remedial Trust to prepare the Remedial Design for the Site. The Consent Decree included the Remedial Design/Remedial Action Plan (RDAP). The RDAP required the preparation of Pre-Design Investigations and a Remedial Design. The design was executed in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as amended and re-authorized. From 1990 to 1992 Golder prepared Preliminary, Intermediate, Pre-Final and Final Design Reports in conformance with the RDAP.

The Remedial Trust entered into an agreement with Chemical Waste Management, Inc. Remediation Services Group of Princeton, New Jersey, (CWM, also Contractor) to perform the Remedial Action in accordance with the RDAP and the Remedial Design plans and specifications. The name of the Contractor changed January 1, 1993 when CWM was acquired by Rust Remedial Services Inc. (Rust), then again in May of 1995 when OHM acquired Rust. The name Chemical Waste Management was retained as the legal name of the Contractor throughout the period covered by this report.

Several subcontractors assisted the Contractor with specific tasks during the remedial work. A list of the subcontractors and the services they provided is presented below:

- Rust Environment and Infrastructure, formerly SEC Donohue Inc., of Burlington, Massachusetts provided engineering support;
- Earth Tech Inc. (Earth Tech), formerly HMM Associates Inc., of Concord, Massachusetts provided surveying services from 1992 to 1993 and Meridian Land Services Inc. (Meridian) of Milford, New Hampshire provided surveying services from 1993 to 2001. Both surveying companies collected field documentation that would be used to establish the as-built drawings for this report;
- Eastmont Environmental Inc. of Walpole, Massachusetts conducted perimeter air monitoring;
- Beattie Enterprises of Lancaster, New Hampshire assisted with clearing and grubbing the Site;

- Midway Paving of Chelmsford, MA or its subcontractors performed paving work for the Site during 1992-1995;
- HMM Associates, Inc. (HMM) of Concord, MA performed surface water monitoring services;
- Toxikon Laboratories, of Woburn, Massachusetts, and 21st Century Environmental Inc. of Bridgeport, New Jersey, assisted the Contractor with water and soil analytical testing; and,
- Reliable Fence Company of Woburn, Massachusetts installed chain link fence on the Site.

In accordance with the Consent Decree, EPA contracted with Halliburton NUS (HNUS) of Wilmington, Massachusetts to provide technical oversight. Representatives of EPA and the MassDEP met with the Remedial Trust monthly (approximately) throughout the Remedial Action to oversee the performance of the work. Minutes of the meetings were recorded but are not included in this report.

Golder provided engineering quality assurance (QA) for the Remedial Action from September 1992 through December 1995. QA included examining and testing materials and procedures to verify and assure the Remedial Trust that the construction conformed to the specifications and drawings. The Remedial Trust directed Golder to perform a geophysical investigation during May 1993. Golder Construction Services Inc. (Golder Construction) provided on-Site construction management services for the Remedial Trust from March 1995 through December 1995.

The Remedial Trust contracted with Professional Service Industries, Inc. (PSI) of Canton, Massachusetts to perform soil moisture/density testing of compacted soils, soil laboratory testing, and asphalt testing. PSI also performed on-Site QA testing from August 1993 through December 1995.

During 1995, the Remedial Trust contracted with *de maximis, inc.* to be the Site manager for the Remedial Trust and to coordinate the work conducted by Golder, CWM, and other contractors. In 1998, the Site manager role was assumed by Maverick Construction Management Services, Inc. (Maverick). Following remedial construction activities, the Remedial Trust contracted directly with Maverick to coordinate the documentation of as-built cover conditions, to manage construction activities necessary to bring the cover into compliance with the 100% Design and to prepare a Draft Cover Certification Report. In 2007, the Remedial Trust contracted with Roux Associates to complete the certification of the cover, including the completion of the draft and final Cover Certification Report.

3.0 CONSTRUCTION DOCUMENTS

RD/RA work performed for the Remedial Trust was completed according to the documents, plans, and specifications described in Sections 3.1 through 3.4.

3.1 Consent Decree

The Consent Decree (EPA, 1989) entered into between the Plaintiffs [*i.e.*, EPA and the MassDEP (Agencies)] and the Settlers defined the work that was to be undertaken at the Site. This definition is within the Consent Decree as well as the RDAP. The Consent Decree was based on the Record of Decision (ROD) for the Site (EPA, 1986). While the Consent Decree, the RDAP, and the ROD were consulted for the specific definition of the remedies to be implemented at the Site, the RDAP generalized the remedy and formed the basis for Golder's preparation of the Remedial Design Work Plan and ultimately the Final 100% Design Report. This certification applies to the Consent Decree but the primary component is the RDAP.

3.2 100% Design Report and Addenda

Golder developed the design and specifications and produced the "Final 100% Design Report, Part I" for the Industri-Plex Site (**Appendix A**), which was submitted to EPA and MassDEP in December 1991. This report applied to the remedy for soil, sediments, and air for the Site. Other Consent Decree requirements were deferred in accordance with the Agencies' instructions. The Agencies provided comments on the 100% Design Report, and responses to those comments were submitted April 3, 1992. A revised final 100% Design Report was issued April 3, 1992. The 100% Design was issued for bid April 25, 1992. The 100% Design Report was approved on May 18, 1992.

Subsequent addenda were issued for the 100% Design Report including the following:

- Addendum 1 issued May 1992 (EPA/MassDEP Approval March 11, 1993)
- Addendum 2 issued June 1992 (EPA/MassDEP Approval March 11, 1993)
- Addendum 3 issued May 14, 1993 (EPA/MassDEP Approval May 27, 1993)
- Addendum 3 revision 1 August 27, 1993 (EPA/MassDEP Approval September 10, 1993)
- Addendum 3 revision 2 October 18, 1993 (EPA/MassDEP Approval November 2, 1993)

On October 1, 1996, EPA approved an alternative permeable cover design for the RTC entitled RTC Alternate Cover Design (Golder, 1996). Details of the construction and certification of the RTC Alternative Cover Design are presented in the RTC Cover Certification Report (Golder, 1998), which was approved by EPA on April 28, 1998.

3.3 Remedial Action Work Plan

According to the Consent Decree, the Remedial Action Work Plan (RAWP) was to be submitted to the Agencies within sixty (60) days after EPA and the Commonwealth received notification of the selected Remedial Action Contractor. The RAWP was prepared by the Remedial Action Contractor for the Remedial Trust to implement the Site remedy consistent with the approved design for each Site area. The Consent Decree required that the RAWP contain:

(1) A description of all the activities necessary to implement the Remedial Actions; and

(2) A timetable for the completion of all these activities, which shall also identify major and minor milestone events in the Remedial Action process. The schedule of significant events shall be consistent with Attachment D, [Project Schedule and Remedial Design/Action Milestones].

On August 18, 1992, prior to EPA's receipt, review, and acceptance of the RAWP, the Remedial Trust requested EPA and MassDEP approval of a preparatory, non-intrusive work plan for work that would begin in September. Submittal of this work plan allowed the Contractor to maximize the construction work season while awaiting final approval of the RAWP. An addendum to the August request was submitted to EPA and MassDEP on October 9, 1992 expanding the earlier request to include debris removal and non-intrusive work and above ground structure demolition. Both the August 18 and October 9 requests were tacitly approved by EPA in consultation with MassDEP. As required, the Remedial Trust submitted a RAWP to EPA on October 5, 1992 (Consent Decree Attachment, Section B, Subsection 3B).

An interim RAWP was submitted to EPA on October 22, 1992 with a request to begin work west of the MBTA railroad tracks. EPA in consultation with MassDEP provided comments on the interim RAWP on November 25, 1992 and a revised interim work plan was submitted to EPA in December 1992. With EPA and MassDEP concurrence, the Remedial Trust authorized the Contractor to begin remediation of the Site on December 2, 1992.

EPA's review of the original RAWP, in consultation with MassDEP, continued through the first half of 1993. EPA, in consultation with MassDEP, provided a conditional approval of the RAWP on March 11, 1993. The Agencies had two main concerns, 1) "the effect of the proposed groundwater treatment changes on the 'Created Wetlands' (CW); and 2) the maintenance of air and stream water quality (ARARs) during the construction of the Remedy." EPA, after consultation with MassDEP, requested the following: 1) a revised CW design with a buffer and separation from the groundwater; and 2) implementation of a program for surface water sampling for contaminants.

Following the Remedial Trust's responses, EPA after consultation with MassDEP, presented an approval of the RAWP on May 19, 1993, contingent upon: 1) sampling of surface water to measure water quality; 2) resolution of water treatment design questions; 3) provision of a copy of the Contractor drilling and blasting plan and 4) a requirement to cover all frequently used roads with a minimum of 4 inches of crushed stone. On July 2, 1993, EPA, after consultation with MassDEP and the Remedial Trust, reached an agreement on procedures for testing surface water and revisions to the CW.

Erosion and sediment control issues prompted further revisions to the RAWP. On March 1, 1994, a major revision to the RAWP was submitted to EPA. EPA, after consultation with MassDEP, approved the revision on July 11, 1994. Subsequent revisions were submitted and the latest version of the RAWP at the preparation of this report is August 21, 1995.

3.4 Health and Safety Plan

A Health and Safety Plan (HASP), prepared by CWM and dated August 1992, for the remediation of the Site was transmitted to EPA, after consultation with MassDEP, on September 2, 1992. The submission was made in fulfillment of the requirements to the Consent Decree Appendix I, Section F. The Remedial Trust was informed at the March 22, 1993 meeting that EPA, after consultation with MassDEP, would not approve the HASP but would provide comments. The HASP was revised on March 16, 1994; December 20, 1994; May 5, 1995; and June 29, 1995 largely to address changes to the Emergency Response Plan. In accordance with the Agencies' policy, the HASP was reviewed but not approved. The latest version of the HASP as of this report is June 29, 1995.

4.0 REMEDIAL DESIGN/ACTIONS

4.1 Soil Remedy

The soil remedy for the Site involved covering on-Site soils containing lead, arsenic, or chromium at or above the action levels established by the Consent Decree with permeable soil cover. An impermeable cover was designed for a four-acre hide pile (East Hide Pile) on Site, which was an active odor source. The BECO Property (Tax Maps 9-2-8, 9-7-3, 9-1-5, and 15-1-11), however, does not include the East Hide Pile and therefore required only permeable soil or gravel.

4.1.1 Soil Remedy - Consent Decree Requirements

The RDAP is included as Appendix I of the Consent Decree. Throughout the RDAP, the remedy for the Site is referred to as the "cap". However, the 100% Design refers to the Site remedy as the "cover". The term "cover" has been retained for the text of this report, excluding the RDAP.

Page 1 of the RDAP states the following:

"The remedial action for soils, sediments, and sludges contaminated with Hazardous Substances, other than those emitting odors (the East Hide Pile), shall include site grading, capping with a permeable soil cover, excavation, dredging, and/or consolidation for all areas containing Hazardous Substances at concentrations above established action levels (arsenic = 300 ppm, lead = 600 ppm, chromium = 1,000 ppm)...."

Furthermore the RDAP states, "Settlers shall design and implement remedial action for soils contaminated with Hazardous Substances above the action level for metals that shall consist of site grading and capping together with Institutional Controls. Areas already covered adequately by buildings, roadways, parking lots, or other ground covering features, would not receive cover material, instead allowing the structures themselves to act as the protective cap.

For small areas on-Site, such as the landscaped areas between buildings and parking lots, Settlers may propose location-specific alternatives to capping consisting of excavation of contaminated soil and consolidation on-site with similarly contaminated soils, or placement of a protective layer such as asphalt to cap the contaminated soils.

Settlers shall design and implement the remedial actions for contaminated soils in accordance with the following requirements:

(1) cap design and construction activities shall be in accordance with regulations and/or guidance on cap design for permeable covers as summarized in [RDAP] Attachment A ... provided that an alternative permeable cap design including a permeable synthetic fabric and a soil layer less than 30 inches in depth, may be used in all areas of the Site where Settlers demonstrate to EPA and the Commonwealth that the alternative cap design will perform as well as or better than the permeable cap design summarized in Attachment A."

Attachment A to the RDAP states that:

"Permeable covers shall be designed and constructed to include at a minimum the following:

A. A vegetated top layer which shall be:

    1. of a minimum thickness of six (6) inches;

    2. capable of supporting vegetation that minimizes erosion and minimizes continued maintenance;

    3. planted with a persistent species with roots that will not penetrate into the contaminated soils;

    4. designed and constructed with a top slope of between 3 percent and 5 percent after settling and subsidence or, if designed and constructed with less than 3 percent, a drainage plan to ensure that the ponding of surface water does not occur or, if designed and constructed with a slope of greater than 5 percent, an expected soil loss of less than 2 tons/acre/year using the USDA universal soil loss equation; and,

    5. designed and constructed with a surface drainage system capable of conducting effective run-off across the cap.

B. A base layer that shall be:

    1. of a minimum thickness of twenty-four (24) inches of appropriate fill material; and,

    2. designed and constructed to prevent clogging."

Two alternative permeable covers were designed as part of the remedy under the Consent Decree. The first alternative permeable cover design concept utilizing a 16-inch thick borrow cover overlaying a geotextile was developed in the Alternative Cover Design Report (Golder, 1989). This design was subsequently approved by the EPA and MassDEP in a letter dated September 11, 1989. The second alternative permeable cover design was the design to accommodate the RTC Alternative Cover (VHB/Golder, 1996). The EPA, in consultation with the MassDEP, approved the RTC Alternate Cover design in a letter dated October 1, 1996. The RTC Alternative Cover was properly constructed and documented in the RTC Cover Certification Report (Golder, 1998), approved by EPA on April 28, 1998.

4.2 Sediment Remedy

The sediment remedy for the Site consisted of three remedies. Streams and wetlands containing lead, arsenic, and/or chromium at or above the action levels established by the Consent Decree, in the absence of hide residues where dredged then capping them with permeable cover. Streams and wetlands containing lead, arsenic, and/or chromium at or above the action levels established by the Consent Decree and containing hide residues were capped with permeable cover with no or minimal dredging. Where topography or infrastructure prevented other options, streams were culverted and wetlands were filled and capped.

4.2.1 Sediment Remedy - Consent Decree Requirements

The RDAP is included as Appendix I of the Consent Decree. Throughout the RDAP, the remedy for the Site is referred to as the "cap". However, the 100% Design refers to the Site remedy as the "cover". The term "cover" has been retained for the text of this report, excluding the RDAP.

Page 5 of the RDAP states the following:

For areas where Hazardous Substances above action levels are in direct contact with wetlands or surface water bodies or abutting such wetlands or surface water bodies, Settlers shall use the appropriate action listed below to eliminate the actual or potential adverse impact resulting from the contact of Hazardous Substances with such wetlands or surface water bodies.

First, for all wetlands (including the Chromium Lagoons, the general location of which is shown on Attachment F), drainage streams, ditches, and ponds where there are no odor-emitting Hazardous Substances (e.g. hide wastes), Settlers shall dredge the Hazardous Substances or remove them by another method shown to be environmentally protective and approved by EPA in consultation with the Commonwealth under this Consent Decree. Hazardous Substances removed from such areas shall be consolidated in other areas of the Site which contain such Hazardous Substances and which will be covered as part of the approved remedial action. Settlers shall design the protective cover abutting wetlands, streams, ditches and ponds, and shall use excavation/consolidation only as necessary, to maintain the existing contours of the water body and to accommodate the increased erosion potential in such areas. For man-made drainage swales, Settlers may propose culverting to cover the sediment as an alternative to removal of the sediment. Settlers shall demonstrate the acceptability of such an alternative during Remedial Design.

Second, for wetland areas or surface water sediments containing hide materials that have the potential for odor release, Settlers shall cover the deposits in-situ, minimizing to the extent practicable the impact on the wetlands. The general locations of hide materials, as far as is currently known, are shown on Attachment F.

The following additional requirements shall apply to the remedial actions for contaminated sediments and sludges:

1. Bulkheading and capping activities associated with odor emitting Hazardous Substances (e.g. hide wastes) in direct contact with surface waters and wetlands including, but not limited to, such portions of the East and West Hide Piles, shall be consistent with the technical requirements of subparts B.2.(l-8) above.

2. Excavation (dredging) and on-site consolidation and capping of other Hazardous Substances (e.g. metals) in direct contact with surface waters and wetlands including, but not limited to, areas of the pond between the East and West Hide Piles, the discharge stream for that pond, the

3. drainage ditch paralleling New Boston Street and the drainage swale adjacent to the Chromium Lagoons, shall be consistent with subparts B.2.(l-8) above and the following requirements:

   (a) National Ambient Water Quality Criteria and the Massachusetts Water Quality Standards for the Hazardous Substances present at the Site;

(b) NPDES technical requirements as codified in 40 CFR Part 122, relative to dewatering, treatment and discharge of pond and surface drainage waters from controlled (e.g. bulkheaded) work areas and sediment dewatering activities; and

(c) restoration of the wetlands consistent with 40 CFR Part 6, Appendix A, § 6(a)(5).

4.3 Air Remedy [Not Applicable To This Property]

5.0 SITE CONTROLS AND DOCUMENTATION

5.1 Survey Control

The Contractor utilized Meridian and Earth Tech to provide record survey documentation of the extent of cover, configuration of grading and general as-built conditions of the cover and any buried or concealed construction. The results of these record surveys are provided in **Attachment 1** (Sheets A-46 through A-63 and A-101 through A-108). The record drawings are based on the survey control provided in the 100% Design Report plans.

5.2 Construction Control

During the RA work, the Contractor was required by the project specifications to provide controls to maintain a safe work environment and protect the public health and safety. Such controls included air monitoring and surface water monitoring (**Appendix D**).

Air Monitoring

The objective of the ambient air monitoring program was to monitor total reduced sulfur (TRS) compounds and total suspended particulate (TSP) and inhalable particulate (PM10) as well as heavy metals (arsenic, lead and chromium) in TSP at fenceline locations during remediation efforts.

Specification section 01562 - Dust Control of the 100% Design Report required the contractor to employ construction methods and means that would keep airborne particulates below the following action levels:

- PM10 particulates were to be limited to an annual average of less than 150 micrograms per cubic meter ($\mu g/m^3$) at Site monitoring points; and
- Respirable dust concentrations were limited to 90 $\mu g/m^3$ at Site monitoring points and 5,000 $\mu g/m^3$ in the worker's breathing zone.

Data gathered by dust monitoring devices was used to monitor metals in the particulates to ensure that they were below the following threshold limit values (TLVs) outlined in the American Council of Governmental and Industrial Hygienists:

Arsenic	Chromium	Lead
0.02 $\mu g/m^3$ (of air)	1.36 $\mu g/m^3$ (of air)	1.36 $\mu g/m^3$ (of air)

Appendix B to Volume 6 of the 100% Design Report provides a detailed Odor Control Plan which specifies that TRS compounds in air at the perimeter of the Site may not exceed 47 parts per billion (ppb).

Eastmount Environmental Inc. conducted ambient air quality testing, beginning in September 1992. The particulates and heavy metals were sampled at four perimeter monitoring locations. TRS sampling was conducted at seven perimeter monitoring locations. See **Appendix D.1** for a map indicating sampling points.

TSP and PM10 Sampling

TSP and PM10 samples were collected using Hi-Volume samplers. Each Hi-Volume sampler was programmed to sample at each of the four sample locations from midnight to midnight on six day intervals. In addition to the four sample locations, a duplicate TSP sampler was stationed at Location 4 and a duplicate PM10 sampler was stationed at Location 2. The duplicate TSP sample was also analyzed for metals (arsenic, chromium, and lead).

Eastmount Environmental prepared Hi-Volume Sampling Summary reports. The Summary of Hi-Volume Results tables from those reports issued for periods during performance of work on the RA are included in **Appendix D.1**. Analytical results showed levels of TSP, PM10, and metals below the action levels.

TRS Sampling

The ambient TRS sampling was conducted using a Photovac 10S Plus portable gas chromatograph capable of measuring odorous sulfur compounds in the low part per billion range. Ambient TRS sampling was conducted twice a week from the beginning of the sampling program up until December 1992. After that, the sampling frequency was reduced to once every six days.

Eastmount Environmental prepared Ambient Air Sampling Summary reports. The Summary of Ambient TRS Results tables from those reports issued for periods during performance of work on the RA are included in **Appendix D.1**. The majority of TRS results were non-detects. Hydrogen sulfide was detected on a few occasions; however, there were no exceedances of the 47 ppb action level.

Surface Water Monitoring

CWM was also required to monitor surface water during remedial activities. According to the Site Surface Water Monitoring Plan (RAWP, Section 5.2), the following Ambient Water Quality Control (AWQC) concentrations were used as the response action levels for the Industri-Plex Site:

- AWQC chronic concentration for arsenic = 0.190 milligrams per liter (mg/L)
- AWQC chronic concentration for chromium = 0.210 mg/L
- AWQC acute concentration for lead = 0.082 mg/L

The above-tabulated AWQC limits correspond to a hardness of 100 parts per million (ppm). Water hardness values on-Site indicated moderately hard to very hard conditions (EPA, 1986). Historical background surface water data collected from surface water drainways periodically contained lead concentrations of 0.025 mg/L. Since these background levels routinely exceeded the threshold value of the AWQC chronic concentration for lead, the AWQC acute concentration was approved on June 8, 1994 as the response action level by MassDEP and EPA.

Surface water sampling was conducted to meet the project specifications and the RAWP requirements. The surface water controls established by EPA and included in the Contractor's RAWP required the following procedures:

- Each work day, field measurements were conducted at various stations (whenever there was flow) for turbidity, dissolved oxygen, temperature, specific conductivity, and pH. The sample from each station with the highest turbidity during the week was submitted for laboratory analyses of total and dissolved arsenic, lead, and chromium, total suspended solids (TSS), and hardness. Any sample with a turbidity greater than or equal to 85 nephelometric turbidity units (NTU) was also submitted for the same laboratory analyses.

- Additional sampling was conducted if a storm and/or a construction event caused the turbidity to rise above 85 NTU at the monitoring stations. The samples were analyzed for total and dissolved metals (arsenic, chromium, and lead), TSS, and hardness. Field measurements for turbidity, dissolved oxygen, temperature, specific conductivity, and pH were conducted at the time of sampling.

HMM conducted surface water quality sampling as a subcontractor to CWM. Test results indicate that the surface water quality remained below the response action thresholds with the exception of exceedances as listed in **Appendix D.2**. Specific reasons and mitigating actions for each exceedance are described in the Quarterly Reports of 1993-1995. Generally, the Agencies were notified and the mitigating actions were performed to the satisfaction of the Agencies.

5.3 Decontamination

CWM was required to decontaminate all equipment that came in contact with contaminated soils, sediments, and sludges during the work. Water used during the pressure washing was collected and treated at the on-Site storage areas. The decontamination was performed in accordance with the specifications and the project work plans. Water generated from decontamination activities was stored in a Modu-tank on the east side (across the MBTA rail lines) of the Site. The water was treated and properly disposed of on-Site as approved by the Agencies.

Personnel entering work areas (exclusion zones) during the RA, wore protective equipment as specified by CWM's Health and Safety Plan (HASP). The HASP also specified personal decontamination procedures. All personnel leaving work areas were required to properly clean or dispose of all protective equipment, small tools and instruments.

5.4 Facility Documentation for Off-Site Disposal

Prior to disposing of any materials off-Site during the RA, EPA was to determine if the proposed facilities were of "acceptable status" and could receive materials from the Site. Only non-hazardous vegetation (cleared/cut above ground surface) was disposed off-Site during the RA. During the work, as previously discussed, wastewater from decontamination activities was stored on the east side of the Site and treated prior to disposal.

All grubbed vegetation (containing soil), and contaminated soil, sediments, and sludge excavated from the Site were consolidated in other areas of the Site in accordance with the RDAP. All contaminated materials excavated from the Site were placed on the hide piles that were covered as part of the approved RA. However, prior to placement on the hide piles, saturated sediments and sludge were dried over large areas east of the MBTA rail lines on the Site within the remedial cover area.

6.0 SOURCE AND CONFORMANCE TESTING

Testing performed for the Remedial Trust, such as testing of soil and soil products and geosynthetics, is described in Sections 6.1 and 6.2, respectively. The testing methods according to the specifications are summarized in **Table 2** [*i.e.*, Golder's Quality Assurance Procedure Plan (QAPP) Table 1-1]. Abbreviations used in the supporting documentation found in the appendices are summarized in **Table 3**.

6.1 Soil and Soil Products

6.1.1 Compacted Fill

The majority of compacted fill materials were derived from on-Site grubbing and dredging operations. Compacted fills were used as stabilizing fill to flatten hide pile slopes and re-grade low relief areas to promote drainage. A portion of rock and concrete demolition debris generated by crushing and screening operations was also used to a limited degree as compacted fill material. The remaining compacted fill was imported from off-Site borrow areas. Most of the off-Site fill was composed of silty sand from a quarry in Hubbardston, Massachusetts and glacial till from a borrow pit on Deer Island, Boston Harbor, Massachusetts. Compacted fill tests included grain size distribution and primarily Standard Proctor tests with some Modified Proctor tests as needed.

6.1.2 Cover Soil

All cover soil used on-Site was from off-Site sources. Cover soil placed on slopes flatter than 8 horizontal to 1 vertical (8H:1V) was typically a granular silt from a glacial till deposit on Deer Island. Cover soil placed on slopes steeper than 8H:1V and some slopes flatter than 8H:1V was a silty sand from a quarry in Hubbardston. Cover soil tests included grain size distribution, Standard and Modified proctor densities, interface friction, and Atterburg Limits. Results of the testing are provided in **Appendix F**. Analytical testing was performed on Deer Island cover soil materials to verify the levels of potential contaminants. All soil materials tested and placed on-Site met the clean soil thresholds set up by EPA, after consultation with MassDEP, or were otherwise approved by a variance in accordance with EPA in consultation with MassDEP criteria. EPA in consultation with MassDEP clean soil threshold criteria for cover soil used at the Site are summarized in **Table 1**. Analytical test results are provided in **Appendix F.1**.

6.1.3 Topsoil

According to the Consent Decree, topsoil must be capable of supporting vegetation that minimizes both erosion and continued maintenance. Topsoil used for the cover in upland areas and as a wetland vegetative cover soil came from several off-Site sources. Such source locations were from the following Massachusetts towns: Andover, Reading, Salem, and Tewksbury. Other topsoils were sourced from the following New Hampshire towns: Nashua, New Boston, and Manchester. Each source was tested for grain size distributions, organic content, and soil fertility or Baker Soil test. Results of testing are provided in **Appendix F.2.3**. Where the topsoil did not meet some criteria, but would be capable of meeting the Consent Decree requirement for being capable of supporting vegetation, a variance was requested and received from EPA, after consultation with MassDEP.

6.1.4 Subangular Stone

There were several varieties of subangular stone required by the 100% Design Report. Each of the subangular stone materials was a product of off-Site crusher/screener operations from PJ Keating Company of Lunenburg, Massachusetts or Bardon Trimount Inc. of Burlington, Massachusetts. The products required for the Remedial Action included American Associates of State Highway and Transportation Officials (AASHTO) No. 8, the stone used in the gas collection layer material; AASHTO No. 57, a variety of stone used for bedding and armoring purposes; and both AASHTO 2 and 67, stone materials used in sediment filter construction. Testing of these stone materials consisted of the following: grain size, permeability, and carbonate content. Testing was performed on a per source basis unless the Remedial Trust requested additional testing. Test results are provided in **Appendix F.2.2.**

6.1.5 Stone Riprap

Two average sizes of stone riprap (d_{50} = 6-inch and d_{50} = 3-inch by weight) were required by the 100% Design Report. Each of the riprap stone materials was produced at off-Site crusher/screener operations owned by PJ Keating Company of Lunenburg, Massachusetts or Bardon Trimount Inc. of Burlington, Massachusetts. Both types of stone riprap were used as gravel/cobble lining for remediated drainways and hide pile toe drain construction. The 6-inch riprap was also used in permanent erosion control features and as gabion backfill material. Testing of the riprap included a test for abrasion, freeze-thaw susceptibility, and specific gravity. Gradation tests were also reviewed. Stone riprap materials were tested once per source area

unless the Remedial Trust requested additional testing. The stone riprap test results are presented in **Appendix F.2.2**.

6.1.6 Subbase

Road Structural Fill as specified in Section 02223 was used as subbase in the Remedial Action. Tests for the subbase material included gradation and compaction. All subbase materials were supplied by an off-Site quarry. Test results are provided in **Appendix F.2.1**.

6.2 Geosynthetics

6.2.1 Geotextile

6.2.1.1 Materials

Geotextile materials were supplied by the following three manufacturers: Nicolon/Mirafi, Polyfelt Americas Inc., and Synthetic Industries. Nicolon/Mirafi provided 6-ounce (oz), 10-oz and 16-oz geotextile, Polyfelt Americas Inc. provided 6-oz and 16-oz geotextile and Synthetic Industries provided 16-oz geotextile. All fabrics are permeable, non-woven, needle-punched monofilament and allow percolation. The geotextile was used in the cover to primarily separate the contaminated soil from the clean cover soil (Golder, 1989). The geotextile also precludes upward migration of contaminated material by frost heave effects; provides a drainage capillary break layer at the base of the cover on slopes to prevent sloughing during thaws; and provides further means of reducing the chance of incidental contact through land use.

6.2.1.2 Quality Control Testing

The manufacturers of the geotextile material provided Quality Control certificates for the installed 6-, 10-, and 16-oz materials. Copies of the Quality Control Certificates are presented in **Appendix H.1.2**. As material was delivered to the Site, Golder reviewed the Quality Control Certificates for conformance with the 100% Design through the submittal process.

6.2.1.3 Quality Assurance Testing

Rolls of 6-, 10-, and 16-oz geotextile were tested for conformance to the 100% Design Report specifications. Conformance testing was performed by Golder Construction Service's Geosynthetic Laboratory (Golder Construction's Geosynthetic Laboratory) located in Atlanta,

Georgia. Test results are provided in **Appendix H.1.3**. Before individual rolls of geotextile were deployed on-Site, Golder reviewed the test results for conformance with the project specifications.

6.2.2 Geomembrane [Not Applicable To This Property]

6.2.3 Geocomposite [Not Applicable To This Property]

6.2.4 Geogrid [Not Applicable To This Property]

6.2.5 Interface Friction [Not Applicable To This Property]

6.3 Asphalt Cover Materials [Not Applicable To This Property]

7.0 REMEDY CONSTRUCTION

7.1 Construction Sequence

7.1.1 Decommissioning

7.1.1.1 Decommissioning Wells

Various existing wells and piezometers were identified in the 100% Design Report requiring decommissioning or abandonment prior to construction of the cover on the Site. The 100% Design Report identified wells and piezometers to be decommissioned. The Contractor with a subcontractor (Maher) proposed and submitted for review decommissioning methods for each well in accordance with the 100% Design Report specifications. Maher used several drilling rigs during the decommissioning work, including all-terrain vehicles for remote locations, and a Barber dual rotary drill for over drilling wells. A Smeal pump hoist was used to perforate Poly-vinyl chloride (PVC) pipe left in place. All cuttings were retained in water tight roll-offs and later deposited on the west side of the East Central Hide Pile. PVC pipe removed during decommissioning was disposed of off-Site after decontamination. From December 1992 until April 1993, the majority of the wells were decommissioned or abandoned in accordance with the 100% Design Report specifications. The 12 piezometers or wells (P-1, P-2-D, P-2-I, P-2-S, P-7, UID-53, OW-23, OW-42, OW-49, OW-49A, OW-50, and OW-50A) located on the BECO Properties (Tax Maps 9-1-5, 9-7-3, 9-2-8, and 15-1-11) were decommissioned or abandoned in accordance with the 100% Design Report. The exact locations of P-7 and UID-53 could not be determined and as a result were not included on the Record Drawings.

After reviewing the contractor's well decommissioning reports, Roux Associates confirmed that well decommissioning on the Site was substantially compliant with the 100% Design Report and the procedures outlined in Section 4.6 of the January 2001 *Standard Reference for Monitoring Wells* set forth by MassDEP. Wells were over drilled, pulled, or grouted in place with a grouting mixture of 95% cement and 5% bentonite. Wells were grouted to appropriate depths and plugged with concrete after the time requirement set forth by the standard. Copies of the driller's decommissioning logs are provided in **Appendix E**.

7.1.1.2 Decommissioning Utilities and Structures

The 100% Design Report identified features that required decommissioning or abandonment prior to construction of the cover for the RA. Other abandoned below grade features that were discovered during construction of the cover were either removed to a depth 2 feet below the placement of the permeable cover or cleaned and backfilled with clean concrete. Additionally, a below grade concrete tank located 1 foot below the permeable cover was not decommissioned, per CAR-083. These features were left in place without any demolition or decommissioning if they did not otherwise impair the long-term effectiveness of the remedy. The general majority of the structure decommissioning occurred during construction of the RTC. A more detailed illustration of this decommissioning can be found in the "Final Report on RTC Cover Certification" dated April 1998 and prepared by Golder.

7.1.2 Soil Remedy

7.1.2.1 Subgrade and Drainage

Existing vegetation was cleared and root matter grubbed to a minimum depth of one foot prior to placement of the permeable cover. No herbicides were employed to control re-establishment of vegetative growth. Tree roots were grubbed to a depth of 2 feet. Woody material from above ground, roots and other vegetation were chipped and stockpiled for later placement as fill under the permeable cover. Rocks and concrete debris grubbed from the surface were crushed on-Site in order to comply with the fill material specifications. Reinforcing steel was removed from the concrete during the crushing operations and stockpiled for off-Site disposal.

The cover area in the vicinity of bedrock outcrops or exposed concrete structures was grubbed of vegetation and cleaned in accordance with recommendations of the Site Health and Safety Officer and documented by the Contractor. The surrounding soil cover was extended up to the outcrop or structure.

Existing subgrade soils were proof rolled prior to placing the cover and fill materials were compacted and tested. The final prepared grade was rolled with a 10-ton smooth wheel compactor or in small areas compacted with a hand operated plate vibratory compactor. Where positive drainage was called for in the 100% Design Report plans, such drainage was achieved in the finish grade of the cover. Throughout construction, erosion and sedimentation measures

were generally utilized and maintained in accordance with the 100% Design Report specifications to control soil loss. Any deficiencies in the erosion and sedimentation measures were corrected in accordance with EPA in consultation with MassDEP guidelines.

7.1.2.2 Geosynthetics

After proof rolling, the prepared subgrade was inspected and any protruding debris or roots greater than ½-inch in diameter were manually removed prior to placing geosynthetics. After geosynthetics were placed, filling was performed to reach final elevations.

A 6-oz per square yard non-woven geotextile was used in the permeable cover on the subject property. The geotextile materials were sewn together using white nylon thread for dark fabric and black thread for white fabric.

The geotextile seam was initially placed with a minimum slack along the seam to protect it and allow for movement in the geotextile during placement of cover soil. This procedure was primarily practiced in the developed areas of the Site with little topographic relief. Subsequent reviews of the procedure and the 100% Design Report concluded the extra slack was unnecessary and the procedure was discontinued for the remainder of the Remedial Action (**Appendix C, DSCR-030-R2**).

7.1.2.3 Cover Soil

Cover soils placed over the geotextile on slopes greater than 8H:1V were granular materials from off-Site sources that had an inherently low potential to clog the geotextile. For slopes flatter than 8H:1V, the cover soil from off-Site sources could contain more than 12 percent by weight passing the #200 sieve. In all areas where the remediated slope was steeper than 33 percent, a geogrid reinforcement layer was included at the base of the cover soil immediately above the geosynthetic layer. The cover soil was placed in a manner that minimized imposed stresses on the underlying geosynthetics by using low ground pressure earth moving equipment and maintaining a minimum thickness of 12 inches of soil between the rubber tire equipment and the geosynthetic. Cover soil placed in unpaved areas with permeable cover was nominally compacted by the action of the placing equipment only.

Other cover sections used in limited areas or for access roads were comprised of various combinations of cover soil and dense graded aggregate subbase or riprap. Each modified section of cover is designed to be a minimum of 16 inches in accordance with the specifications of the 100% Design Report. The types and locations of these modified sections are included in the record drawing documentation, **Attachment 1**.

Minimum thicknesses of cover soil are detailed in Section 02242 of the 100% Design Report. Generally, the permeable cover consists of 12 inches of select soil fill and 4 inches of topsoil, while the gravel permeable cover consists of 13 inches of cover soil and 3 inches of gravel surface. The tolerance, in thickness is -0.0 feet and +0.3 feet. Based upon survey data collected both at the time of construction, as well as post construction data collected, the vast majority of the Site met the design thickness within the tolerances.

Any isolated areas identified by multiple post construction survey data points to be below the acceptable tolerances, were corrected by the placement of additional cover fill to meet the required thickness. This repair of cover fill was performed during the summer of 1999 by Maverick.

Based on analysis of the of the relevant survey data points located on the Boston Edison Company Property (Tax Maps 9-2-8, 9-7-3, 9-1-5, 15-1-11), the minimum thickness of cover soil specified in Section 02242 of the 100% Design Report was met at all locations surveyed throughout the subject parcels.

7.1.2.4 Topsoil and Vegetation

Topsoil was placed over the cover soil in 4-, 6- or 8-inch thicknesses as specified by the 100% Design Report. After placing the top soil, lime and fertilizer were applied to the topsoil by a York rake in larger areas and by a walk-behind drop-spreader for small areas. Seed was broadcast by the hydroseed method in all other areas using fertilizer mulch and seed according to the 100% Design Report, or approved variances.

7.1.2.5 Revegetation

The vegetation on the upland soil covers of the Site has been restored to an herbaceous meadow to protect the underlying geotextile from penetration of large, woody roots of trees and shrubs. Drainways adjacent to upland covers have been revegetated with shallow-rooted overhanging vegetation which will eventually provide cooling shade and organic input in the form of leaves. Criteria for selecting the revegetation plants and seeds in the 100% Design Report included:

- Endemic to Central Massachusetts;
- Tolerant of full sun and water levels;
- Easily established, with fibrous root systems rather than tap roots; and
- Perennials, or prolific annuals.

7.1.3 Sediment Remedy

Wetlands Remedy

The sediment remedy included the remediation of wetlands throughout the Site. The 100% Design Report indicated two remedy solutions for the remediation of wetlands. In sediment remedy areas where Arsenic, Lead and/or Chromium exceeded the established Consent Decree action levels and hide residues were found, a 16-inch thick permeable cap consisting of a 16 ounce nonwoven geotextile placed on the sediments, followed by a 12-inch soil cover with a 4-inch thick topsoil layer was placed over the sediments. In sediment remedy areas where Arsenic, Lead and/or Chromium exceeded the established Consent Decree action levels in absence of hide residues, the sediments were dredged to a depth of 16-inches and a 16-inch thick permeable cap consisting of 16-ounce nonwoven geotextile followed by 8-inches of gravel and 8-inches of topsoil were placed over the sediments. For Wetland 8, located on the BECO property, the permeable cap consists of a 16 ounce nonwoven geotextile placed on the sediments, followed by a 12-inch soil cover with a 4-inch thick topsoil layer. The prevention of animal burrows in Wetland 8 was not a remediation goal because the shallow wetland was completely eliminated by the covering required by the Consent Decree.

Stream Remedy

The sediment remedy also included the remediation of streams throughout the Site. The 100% Design Report states that the streams on Site serve several functions as part of the remedy. These functions include the collection of stormwater from surrounding drainage areas, the conveyance of stormwater form upstream, and the storage of backwaters during a storm. The remedy for stream sediments was designed to satisfactorily perform all of the aforementioned functions. Additionally the following criteria were considered in the selection of the remedy:

- Ability to perform in accordance with their design objectives for a minimum of 30 years;
- Satisfactory performance under varying groundwater conditions and to prevent sediment transport via groundwater seepage toward the stream;
- Prevention of surface water from contacting sediments and, possibly, transporting sediments downstream;
- Minimization of storage capacity losses;
- Satisfactory performance under variable weather conditions;
- Maintenance of discharge capacity so that peak discharges can be conveyed without increasing flood potential;
- Minimization of excavation of hide residues, and;
- Continued ability to collect runoff from the surrounding drainage areas.

The 100% Design Report offered three remedy choices for application in stream sediment scenarios. The first stream sediment remedy, for streams containing Arsenic, Lead and/or Chromium at or above Consent Decree action levels, in the absence of hide residues, consisted of a gravel/cobble cap to be placed after dredging the sediments. A minimum of 16 inches of sediments was dredged followed by the placement of a 16 ounce nonwoven geotextile and a 16 inch gravel/cobble with a d_{50} of 3-inches. The second stream sediment remedy, for streams containing Arsenic, Lead and/or Chromium at or above Consent Decree action levels and hide residues, utilized the same cover with the minimum amount of dredging consistent with maintaining storm flow capacity. A third stream sediment remedy consisted of culvertization. The culvertization was selected only for the portion of the Western Branch of the Aberjona River adjacent to the East Central Hide Pile, where regarding the slope of the hide pile, for stabilization purposes, does not allow other solutions.

Based on the presence of hide residues on the BECO property, the second stream remedy was applied to the portion New Boston Street Drainway where it flows into Wetland 8. 16-ounce non-woven geotextile was laid in the stream bed following minimal dredging of the sediments. A 16-inch thick layer of gravel/cobble overlies the geotextile. Slopes of the gravel/cobble lined channel have a minimum base width of 4-feet and side slopes of one to one or flatter.

Drainage Swales

The main Remedial Actions for the drainage swales consisted of dredging and capping with an impermeable cover. Where dredging and capping was not part of the design, the alternative of culvertization was implemented. Cleaning of existing culverts was also part of the sediment remedy.

7.1.3.1 Dredging and Subgrade

The 400-foot reach of the Atlantic Avenue drainway south of Atlantic Avenue was dredged to a depth of 16 inches or more by a Gradall and dozer. Dredged sediments were segregated to control runoff and dewatered in a dewatering facility as described in the RAWP.

Prior to dredging, the Contractor installed pump-around systems to maintain flow along the drainway. The pump-around system included temporary drains or inflatable rubber bladders placed in existing culverts to block the flow in the drainway. Water upstream of the work was pumped through flexible or solid conduit to a downstream discharge point. Sediment filters composed of granular materials were constructed downstream of the discharge to minimize sediment transport away from the Site in accordance with the 100% Design Report.

Existing culverts connecting drainways were cleaned in accordance with the Contractor's RAWP and certified clean by the Site Health and Safety Officer. Existing culverts cleaned and left in-place included a triple barrel 48-inch culvert beneath Atlantic Avenue.

7.1.3.2 Stormwater Structures

To supplement the stormwater management of on-Site wetlands and drainways for the sediment remedy, sedimentation and outlet control structures were constructed.

7.1.3.3 Revegetation

The vegetation on the upland soil covers of the Site has been restored to an herbaceous meadow to protect the underlying geotextile from penetration of large, woody roots of trees and shrubs. Drainways adjacent to upland covers have been revegetated with shallow-rooted overhanging vegetation which will eventually provide cooling shade and organic input in the form of leaves.

Criteria for selecting the revegetation plants and seeds in the 100% Design Report included:

- endemic to Central Massachusetts;
- tolerant of full sun and water levels;
- easily established, with fibrous root systems rather than tap roots; and,
- perennials, or prolific annuals.

7.1.4 Air Remedy [Not Applicable To This Property]

8.0 DESIGN CHANGES

Section 8.0 describes design changes associated with the Alternative Cover Design Report (Golder, 1989), approved by EPA on September 11, 1989, and the RTC Cover Certification Report (VHB/Golder, 1996), approved by EPA on October 1, 1996.

8.1 Change Management

During the Remedial Action from 1992 to 1994 for the Site, changes were managed through the Remedial Trust. At the start of 1995, the Remedial Trust and Contractor agreed to a new scope and cost contract for the remaining remedial work. The Construction Management contractor, Golder Construction, performed change management during 1995 as an agent for the Remedial Trust.

Managing changes for the Remedial Action primarily included changing the agreed upon scope of work or technical details of the 100% Design Report. Requirements identified in the Consent Decree were not changed unless approved by EPA, after consultation with MassDEP. Changes could be initiated from any of the following: EPA or MassDEP, the Contractor, the Remedial Trust or Golder as the designer, and later, Golder Construction in the role of Construction Managers.

Changes were divided into two categories, design specification changes and administrative, cost and schedule changes. Design specification changes were usually technical in nature and involved specific changes to the details of the specifications and plans presented in the 100% Design Report. Generally these changes were minor and EPA, after consultation with MassDEP, initially wanted only to review significant changes. Design changes were originally documented as design/specification change requests (DSCR). Impacts to cost and schedule were handled by another system administered by the Remedial Trust.

Early in 1994, the Contractor made several management revisions including a new method for managing changes. The Contractor introduced a change management system that included Variance Requests (VRs), Change Request Authorizations (CRAs), Corrective Action Requests (CARs), and Requests for Information (RFIs), procedures that subsequently were accepted by the Remedial Trust. The DSCR system was phased out by mid 1994 with the introduction of this

change management system. Copies of all the associated forms pertaining to this Cover Certification Report are included in **Appendix C**.

8.2 Site Wide Design Changes

A series of DSCRs and CARs were adopted for Site wide application.

The Site wide design changes listed below were approved by the resident design engineer, project manager, EPA and/or MassDEP. The design changes generally related to grubbing, geotextile selection, geotextile installation, fill materials selection, fill materials sampling, and materials selection and placement. Several design changes applied to design details that required revision to match the 100% Design Report. The approved design changes included:

- DSCR-001
- DSCR-002
- DSCR-003
- DSCR-023
- DSCR-027
- DSCR-030
- DSCR-056
- DSCR-069
- VR-064
- VR-090

Additional Site wide design changes were identified as requiring further review in order to verify compliance with the 100% Design Specifications. These design changes include:

- CAR-053 involved a request for resampling of Deer Island Stockpile materials due to incorrect initial sampling procedures. The stockpile was resampled on March 30, 1994 and approved by the Agencies on April 28, 1994. The CAR was not signed completely by the design engineer, which appears to be an administrative discrepancy that does not affect the integrity of the cover.

- CAR-071 involved a request for resampling of soil Stockpiles 5 and 6. Hold times for volatiles in the soils were exceeded. The Remedial Trust decided to accept data for Stockpile 5, but requested Stockpile 6 be resampled. Stockpile 6 was resampled on March 30, 1994, and test results were approved by the Agencies on April 28, 1994. The CAR was not signed completely by the design engineer, which appears to be an administrative discrepancy that does not affect the integrity of the cover.

Additional details and documentation of Site wide design changes are located in **Appendix C**.

8.3 Property-Specific Design Changes

A series of DSCRs, CARs, VRs and CRAs were adopted for application on the subject property.

The property-specific design changes listed below were approved by the resident design engineer, project manager, EPA and/or MassDEP. The design changes generally related to fill materials selection and surface grading transitions. The approved design changes included:

- DSCR-019
- DSCR-073
- VR-001
- VR-009
- VR-011
- VR-011R
- VR-015
- VR-016
- VR-018
- VR-020
- VR-042
- VR-065

Additional property-specific design changes were identified as requiring further review in order to verify compliance with the 100% Design Specifications. These design changes include:

- DSCR-075 was a Remedial Trust-initiated change request. According to available records BECO wanted to install the same stone on the roads as used on the rest of the ROW, effectively deleting the road from the site. The DSCR form could not be located; however the available records indicated that the Remedial Trust approved the change. The integrity of the cover would not be affected by altering the surface materials from asphalt to gravel.

- CAR-019 indicated that the limits of grubbing on the BECO property were extended beyond the limits of the BECO property. The CAR indicated that the design change would be accepted as is. However, the CAR form was not signed completely by the design engineer, which appears to be an administrative discrepancy that does not affect the integrity of the cover.

- CAR-020 indicated that wet soils excavated from the BECO property were sent directly to the East-Central Hide Pile for disposal without being properly processed through the dewatering facility. The CAR stated that the dewatering system was insufficient and operators were not provided direction on where to place loads of dredged or wet materials. The CAR indicated that the wet soils were to be removed from the East-Central Hide Pile; however, the CAR also indicated that the wet soils remained on the East-Central Hide Pile throughout the winter season of 1993 and 1994. The wet soils will be discussed in further detail in the East-Central Hide Pile Cover Certification Report.

The placement of wet soils on the East-Central Hide Pile does not affect the integrity of the cover on the BECO property. The CAR form was not signed completely by the design engineer, which appears to be an administrative discrepancy that does not affect the integrity of the cover.

- CAR-021, CAR-024, and CAR-025 indicated that the geotexile panel placement did not conform to the designed panel layout. According to the CAR, the contractor made a constructability decision to lay the geotextile panels in a different orientation that the designed panel layout. The CAR indicated that the change would be accepted as is. However, the CAR form was not signed completely by the design engineer, which appears to be an administrative discrepancy that does not affect the integrity of the cover.

- CAR-022 indicated that the design of the Type 2 Transition called for in the 100% Design Report for the BECO Property would induce ponding of surface water. The CAR indicated that the area would need to be reworked and/or repaired. The corrective action performed was a reduction in surface slope to less than 5 percent to facilitate drainage rather than ponding. However, the CAR form was not signed completely by the design engineer, which appears to be an administrative discrepancy that does not affect the integrity of the cover.

- CAR-027 indicated that the Contractor made a constructability decision to reverse the direction of the Type 6 transition. After grubbing operations were complete, the subgrade was identified to be lower in elevation than anticipated. The CAR form indicated that the request was accepted as is. However, the form was not signed completely by the design engineer, which appears to be an administrative discrepancy that does not affect the integrity of the cover.

- CAR-061 indicated that the cover on the BECO property was constructed before the layout of the transition to the adjacent property was complete. The CAR indicated that the corrective work constructing the transition began on December 9, 1993 However, the CAR form was not signed completely by the design engineer, which appears to be an administrative discrepancy that does not affect the integrity of the cover.

- CAR-069 indicated that, due to frozen ground conditions, 280 feet of geotextile was laid out over ungrubbed ground. The ISRT determined that the absence of grubbing in the frozen conditions was acceptable and approved the change in a letter dated March 9, 1994. However, the CAR form was not signed completely by the design engineer, which appears to be an administrative discrepancy that does not affect the integrity of the cover.

- CAR-070 indicated that geotextile was overlapped rather than sewn as stipulated in the specifications for the interior groundwater remediation facilities. The CAR indicated that no corrective action was necessary since the initial groundwater remedy will be covered over with new geotextile during the soil remedy implementation. However, the CAR form was not signed completely by the design engineer, which appears to be an administrative discrepancy that does not affect the integrity of the cover.

- CAR-083 was unable to be located. The CAR Record Log indicated that CAR-083 was related to decommissioning of a concrete structure on the subject property on June 18, 1994, however CAR-083 could not to be located in the project files. The engineer's field records from that day indicate that the 10' x 20' subsurface concrete structure was not

demolished because it would satisfy minimum depth requirements at the conclusion of cover construction. The design engineer's field notes for the day also indicate that this decision was reviewed and approved. The concrete structure was otherwise covered in accordance with the 100% Design report. The loss of CAR-083 is, therefore an administrative discrepancy that does not affect the integrity of the cover.

- VR-031 indicates that RUST Remedial Services Inc. requested a variation of DSCR-030-R1 to change the method of placement of riprap over 16-ounce geotextile. The riprap placement was to be performed in accordance with Section 02271-3.01(b) of the 100% Design Report specifications. The Remedial Trust and Design Engineers reviewed this variance request and modified the request, but did not approve it. Their modification required testing of the procedures to be conducted prior to approval of the variance request. Based on Roux Associates' research of available records, including Design Engineer Field Books and Quality Assurance Documents, no evidence was identified that the required testing was conducted or that this design modification was implemented on the Site. Therefore, the tasks discussed in this variance request do not affect the integrity of the cover.

- CRA-001 indicated that the drainage plan for the BECO property required modifications to accommodate the existing air sparging system and proposed cover. Details of the air sparging system and associated cover required the design and installation of a culvert. Roux evaluated the design and implementation of the culvert in an effort to determine if the estimated runoff would be effectively discharged through the culvert. Roux determined that the 24-inch culvert would adequately channel the estimated runoff from a 100-year stormwater event. However, the CAR form was not signed completely by the Remedial Trust. Based on additional research, the incomplete signatures appear to be an administrative discrepancy that does not affect the integrity of the cover.

Additional details and documentation of these property-specific design changes are located in **Appendix C**.

9.0 QUALITY ASSURANCE OBSERVATION AND TESTING

Construction documentation includes daily field reports and weekly reports to the Remedial Trust. Inspection field diaries were also prepared, and photographs were taken on a regular basis throughout construction. The Golder reports and diaries are not included in this document, but are available for review at Golder's Manchester, New Hampshire office.

9.1 Decommissioning

Wells and piezometer abandonment operations were conducted under intermittent field observation by Golder as a representative of the Remedial Trust. The well decommissioning observations included:

- Verifying the submitted method and equipment to seal the well;
- Verifying the well depth and depth drilled;
- Verifying the diameter of overdrill;
- Verifying the grout mix and volume used; and
- Verifying the final concrete cover.

A report of well decommissioning for each well on the property (P-1, P-2-D, P-2-I, P-2-S, P-7, UID-53, OW-23, OW-42, OW-49, OW-49A, OW-50, and OW-50A) was prepared by Maher. The individual decommission logs are presented in **Appendix E**. Roux Associates reviewed the reports for conformance with the decommissioning procedures. Based on the well decommissioning records prepared by Maher, the wells were decommissioned in conformance with the 100% Design Report specifications. The exact locations of P-7 and UID-53 could not be determined and as a result were not included on the Record Drawings.

9.2 Compacted Fill

Field moisture-density tests were generally performed at least once per 5,000 square feet per lift using a Troxler Model 3440 Nuclear Density gauge. Golder periodically monitored the soil testing operations performed by PSI. Failing tests were retested. During 1993 to 1994 the Contractor performed soil moisture density tests as quality control testing. The QC testing was performed by Express Geotesting, Concord, Massachusetts. A summary of field moisture density tests is located in **Appendix F.3**.

9.3 Subgrade Preparation

Subgrade preparation was inspected by Golder or PSI and the Contractor prior to geotextile deployment. A subgrade inspection form was prepared by Golder, PSI, or the Contractor for areas in which deployment would take place. Subgrade inspection forms are provided in **Appendix I.1**.

9.4 Permeable Cover

Geotextile was deployed over the prepared subgrade and seamed. The seams were inspected by Golder or PSI and the Contractor to verify the connection. A geotextile seam inspection form was prepared by Golder, PSI, or the Contractor. Geotextile seam inspection forms are provided in **Appendix I.2**.

Cover soil was placed as permeable cover over the geotextile in accordance with the 100% Design Report, and was nominally compacted by the placing equipment. No inspection or testing was required according to the 100% Design Report. Surveyors verified the cover thickness prior to placing topsoil or gravel. Topsoil, soil amendments, and seeds were then added, and the seed germinated with rainfall or water applied from water trucks. The quality of vegetative cover was evaluated. Erosion control matting was utilized in areas where seed did not germinate well.

9.5 Impermeable Liner Installation [Not Applicable To This Property]

9.6 Geocomposite Drainage [Not Applicable To This Property]

9.7 Geogrid Reinforcing [Not Applicable To This Property]

9.8 Manholes and Culverts [Not Applicable To This Property]

9.9 Seeding and Wetland Vegetation

Calculations for soil loss, based on the United States Department of Agriculture (USDA) Soil Loss Equation, verify assumptions of the topsoil type, anticipated rainfall, vegetative cover type, and slope steepness are still valid with a calculated loss of less than 2 tons per acre per year. Erosion control matting was installed as a temporary measure to supplement the vegetated cover when the remaining growing season was too short to establish protective vegetative growth.

10.0 RECORD DRAWINGS

Based on the Survey Control (Section 5.1) established for the Industri-Plex Site, Record Drawings of the as-built conditions were established for the soil, sediment and air remedies constructed at the Site, and certified by a Massachusetts Land Surveyor (Meridian Land Services, Inc.). The Record Drawings for this property at the Site are included in **Attachment 1**. The Record Drawings include an elaborate survey network and extensive details on the horizontal and vertical locations of the various protective covers installed for the soil, sediment and air remedies. These details may aid in the future monitoring and management of the remedy, and Institutional Controls/Grant of Environmental Restrictions for the Site. The Record Drawings also illustrate the Institutional Controls/Grant of Environmental Restrictions boundaries denoted as Class A, B, C and D Lands.

Where located in Class C lands, existing concrete structures such as concrete pads, stairways, ramps, and loading docks remained in-place as an equivalent cover. These structures are similar to cover types 4, paved equivalent cover, and 5, building equivalent cover. However, because they were not specifically identified in the 100% Design Report, they have not been identified as a specific equivalent cover type herein.

The Record Drawings have plan views and points charts. The plan view shows grid points and intermediate point locations. The points chart shows elevation data collected at each point shown on the plan view. The plan views include contour lines for subgrade and finish grade. A summary of the separate sections of the Record Drawings is as follows:

- Sheet A-46: Specific Property Location (Parcel 1);
- Sheet A-47: Boundary Lines, Land Classifications, Easements and As-Built Drainage (Parcel 1);
- Sheet A-48: Boundary Lines, Land Classifications, Easements and As-Built Drainage (Parcel 1);
- Sheet A-49: Record Points, Topography & Limits of Engineer Cover (Parcel 1);
- Sheet A-50: Record Points, Topography & Limits of Engineer Cover (Parcel 1);
- Sheet A-51: Cover Types and Transitions (Parcel 1);
- Sheet A-52: Cover Types and Transitions (Parcel 1);

- Sheet A-53: Details and Transitions (Parcel 1);
- Sheet A-54: Specific Property Location (Parcel 2);
- Sheet A-55: Boundary Lines, Land Classifications, Easements and As-Built Drainage (Parcel 2);
- Sheet A-56: Record Points, Topography & Limits of Engineer Cover (Parcel 2);
- Sheet A-57: Cover Types and Transitions (Parcel 2);
- Sheet A-58: Details and Transitions (Parcel 2);
- Sheet A-59: Specific Property Location (Parcel 3);
- Sheet A-60: Boundary Lines, Land Classifications, Easements and As-Built Drainage (Parcel 3);
- Sheet A-61: Record Points, Topography & Limits of Engineer Cover (Parcel 3);
- Sheet A-62: Cover Types and Transitions (Parcel 3);
- Sheet A-63: Details and Transitions (Parcel 3);
- Sheet A-101: Specific Property Location (Parcel 4);
- Sheet A-102: Boundary Lines, Land Classifications, Easements and As-Built Drainage (Parcel 4);
- Sheet A-103: Boundary Lines, Land Classifications, Easements and As-Built Drainage (Parcel 4);
- Sheet A-104: Record Points, Topography & Limits of Engineer Cover (Parcel 4);
- Sheet A-105: Record Points, Topography & Limits of Engineer Cover (Parcel 4);
- Sheet A-106: Cover Types and Transitions (Parcel 4);
- Sheet A-107: Cover Types and Transitions (Parcel 4); and
- Sheet A-108: Details and Transitions (Parcel 4).

11.0 CERTIFICATION

On behalf of the Remedial Trust, Roux Associates certifies that the BECO properties (Tax Maps 9-1-5, 9-7-3, 9-2-8 and 15-1-11) remedial action was completed in compliance with the approved remedial design and work plans, approved design variances, and the Consent Decree. Any exceptions to the design are noted within this Cover Certification Report. Changes to the cover made following construction completion on June 28, 1996 are not addressed in this report. Approved changes to the cover made since that date are documented in the Administrative Record. The Professional Engineer's certification (below) comprises a declaration of his professional judgment. It does not constitute a warranty or guarantee, expressed or implied, nor does it release any other party of their responsibility to abide by contract documents or applicable codes, standards, regulations, and ordinances. The Professional Engineer's certification is based upon a review of the remedial action documentation. Roux Associates' certification relies upon the accuracy of the as-built survey and record drawings prepared by Meridian and upon the representations made and information provided by the Remedial Trust and its representatives, contractors and consultants involved with the remedial action effort. These contractors and consultants include CWM, Golder, PSI, and Maverick.

Respectfully Submitted,

ROUX ASSOCIATES, INC.

COMMONWEALTH OF MASSACHUSETTS
GLEN P. GORDON
ENVIRONMENTAL
No. 41819
REGISTERED PROFESSIONAL ENGINEER

9-4-08

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Certifying Engineer for Roux Associates, Inc.
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Lawrence McTiernan, LSP
Project Principal

Table 1
ISRT Clean Soil Thresholds
in milligrams per kilogram (mg/kg)

Adapted from Table 02223-1

The following table is presented as the clean soil guideline for the Industri-Plex (I-Plex) Site. Metals which are naturally rock-forming compounds may vary from the guideline values on a case by case basis.

Tests	Proposed Threshold Levels for Clean Soil Used at I-Plex				
Volatile Organic (TCL)	Non-detectable (3)			EPA Method	8240
Acid/Base Neutrals (TCL)	Non-detectable (3)			EPA Method	3550/8270/8270
Pesticides/PCBs (TCL)	Non-detectable			EPA Method	3550/8080
Metals - Target Analyte List (TAL) (4)					
Aluminum	<	100,000	mg/kg	EPA Method	3050/6010
Antimony	<	10	mg/kg	EPA Method	3050/6010
Arsenic	<	25	mg/kg	EPA Method	3050/7060
Barium	<	500	mg/kg	EPA Method	3050/6010
Beryllium	<	1	mg/kg	EPA Method	3050/6010
Cadmium	<	10	mg/kg	EPA Method	3050/6010
Calcium	<	50,000	mg/kg	EPA Method	3050/6010
Chromium	<	23	mg/kg	EPA Method	3050/6010
Cobalt	<	20	mg/kg	EPA Method	3050/6010
Copper	<	50	mg/kg	EPA Method	3050/6010
Iron	<	70,000	mg/kg	EPA Method	3050/7420
Lead	<	87	mg/kg	EPA Method	3050/6010
Magnesium	<	10,000	mg/kg	EPA Method	3050/6010
Manganese	<	1,000	mg/kg	EPA Method	3050/6010
Mercury	<	1	mg/kg	EPA Method	3050/7470
Nickel	<	100	mg/kg	EPA Method	3050/6010
Potassium	<	10,000	mg/kg	EPA Method	3050/6010
Selenium	<	20	mg/kg	EPA Method	3050/7740
Silver	<	20	mg/kg	EPA Method	3050/6010
Sodium	<	4,000	mg/kg	EPA Method	3050/6010
Thallium	<	5	mg/kg	EPA Method	3050/7840
Vanadium	<	150	mg/kg	EPA Method	3050/6010
Zinc	<	200	mg/kg	EPA Method	3050/6010
Cyanide	<	10	mg/kg	EPA Method	9010
TPH (Total Petroleum Hydrocarbon)	<	200	mg/kg	EPA Method	418.1

Notes:

1) At any time the Trust may revise this list to include testing for additional constituents which may pose a health threat.

2) TCL = Target Compound List

3) Excludes common laboratory contaminants given in the EPA Region 1 Contract Laboratory Program Data Validation Functional Guidelines.

4) TAL Metals by Inductively Coupled Plasma (ICP) and Atomic Absorption (AA) Methods, Test 6010, except run the following constituents by the following methods: (As) 7060, (Pb) 7420, (SE) 7740, (Th) 7840, (Hg) 7470. The 7000's are "furnace and cold vapor AA" methods.

Table 2
Testing Methods for Soil and Geosynthetics
adapted from Golder's QAPP Table 1-1

7.2 TESTING METHODS	STANDARD	PRECONSTRUCTION FREQUENCY	CONSTRUCTION FREQUENCY
BACKFILL & FILL (Specification Section 02223)			
Backfill and fill tests will be performed by Professional Service Industries, Inc.			
Compacted Fill			
Gradation Test	ASTM D422	1/Source	1/5,000 CY
Plasticity Index	ASTM D4318	1/Source	1/5,000 CY
Standard Compaction	ASTM D698	1/Source	1/5,000 CY
Modified Compaction	ASTM D1557	1/Source	1/5,000 CY
Field Moisture/Density	ASTM D2922	Not Required	9/Lift or 1/100 LF
In-Place Methods	ASTM D1556 or D2167	Not Required	1/Day
Sand Bedding			
Gradation Test	ASTM D422	1/Source	1/5,000 CY
Carbonate Content	ASTM D3042	1/Source	Not Required
SUBANGULAR STONE (Specification Section 02233)			
Subangular stone tests will be performed by Professional Service Industries, Inc.			
AASHTO No. 2, 57, 67			
Gradation Test	ASTM D422	1/Source	1/1,000 CY
Carbonate Content	ASTM D3042	1/Source	Not Required
AASHTO No. 8			
Gradation Test	ASTM D422	1/Source	1/1,000 CY
Carbonate Content	ASTM D3042	1/Source	Not Required
Permeability Test	USCO EM1110-2-1906	1/Source	Not Required
IMPERMEABLE & PERMEABLE COVER FILL (Specification Section 02242)			
Impermeable and permeable cover fill test will be performed by Professional Service Industries, Inc. unless designated with **			
Cover Soil (Select Cover Fill)			
Gradation Test	ASTM D422	1/Source	1/2,000 CY
Plasticity Index	ASTM D4318	1/Source	1/5,000 CY
Direct Shear Test**	Section 02242	1/Source	1/2,000 CY
** Test to be performed by Golder Associates Ltd.			
Top Soil			
Gradation Test	ASTM D422	1/Source	1/2,000 CY
pH Test	ASTM D4972	1/Source	Not Required
Baker Soil Fertility Test**	Section 02242	1/Source	1/2,000 CY
** Test to be performed by Land Management Decisions, Inc.			
WETLANDS SEDIMENT REMEDIATION COVER SOILS (Specification Section 02243)			
Wetland sediment cover soil tests will be performed by Professional Service Industries, Inc. unless designated with **			
Wetland Gravel (Road Structural Fill: Section 02223)			
Gradation Test	ASTM D422	1/Source	1/5,000 CY
Wetland Topsoil (Topsoil: Section 02937)			
Gradation Test	ASTM D422	1/Source	1/5,000 CY
pH Test	ASTM D4972	1/Source	1/5,000 CY
Organic Matter Content	Section 02937, Tbl 2	1/Source	1/5,000 CY
Soil Fertility Test**	Section 02937, Tbl 2	1/Source	1/5,000 CY
** Test to be performed by Land Management Decisions, Inc.			
STREAM SEDIMENT REMEDIATION COVER (Specification Section 02244)			
Stream sediment cover tests will be performed by Professional Service Industries, Inc.			
Gravel/Cobble (Section 02271)			
Abrasion Test	ASTM C535	Not Required	Not Required
Freeze Thaw Test	AASHTO T103	Not Required	Not Required
Specific Gravity	ASTM C127	Not Required	Not Required
Gradation Test-Aggregate	ASTM C136	1/Source	Not Required

Table 2
Testing Methods for Soil and Geosynthetics
adapted from Golder's QAPP Table 1-1

7.2 TESTING METHODS	STANDARD	PRECONSTRUCTION FREQUENCY	CONSTRUCTION FREQUENCY
STONE RIPRAP (Specification Section 02271)			
Stone riprap tests will be performed by Professional Service Industries, Inc.			
Gravel/Cobble (d_{50}=3 inches) (Section 02271)			
Abrasion Test	ASTM C535	Not Required	Not Required
Freeze Thaw Test	AASHTO T103	Not Required	Not Required
Specific Gravity	ASTM C127	Not Required	Not Required
Gradation Test-Aggregate	ASTM C136	1/Source	Not Required
Streambed Sediment Filter and Gabion Rock (d_{50}=6 inches)			
Abrasion Test	ASTM C535	Not Required	Not Required
Freeze Thaw Test	AASHTO T103	Not Required	Not Required
Specific Gravity	ASTM C127	Not Required	Not Required
Gradation Test-Aggregate	ASTM C136	1/Source	Not Required
SUBBASE AND PAVEMENT (Specification Section 02575)			
Subbase and Pavement tests will be performed by Professional Service Industries, Inc.			
Graded Aggregate Base Course			
Gradation Test	AASHTO T11 & T27	1/Source	1/5,000 SY or 1 Day
Compacted Density	AASHTO T180 Method D	1/Source	1/5,000 SY or 1 Day
Abrasion Test*	AASHTO T96	1/Source	1/5,000 SY or 1 Day
Freeze Thaw Test*	AASHTO T103	1/Source	1/5,000 SY or 1 Day
(* as required by MDPW specifications)			
Binding and Wearing Asphalt Courses			
Extraction Test (Plant)	AASHTO T168	Not Required	1/500 Tons
Gradation Test (Plant)	AASHTO T11 or T27	Not Required	1/500 Tons
Density/Stability (Plant)	AASHTO T209, T245, T246, T247	Not Required	1/500 Tons
Max. Theoretical Density	ASTM D2041	Not Required	1/500 Tons
Max. Density - Marshall	AASHTO T209 or T245	Not Required	2/500 Tons
In place Density	ASTM D2950	Not Required	1/100 LF
In place Density (Core)	AASHTO T166	Not Required	1Core/500 SY
In place Thickness (Core)	AASHTO T166	Not Required	1 Core/500 SY
In place Smoothness Test	Section 02575	Not Required	1/100 LF
GEOTEXTILE (Specification Section 02595)			
Geotextile tests will be performed by Golder Construction Services, Inc.			
Non-woven, 6, 10, and 16 ounces/square yard			
Mass Per Unit Area	ASTM D5261	1/100,000 SF	Not Required
Grab Strength	ASTM D4632	1/100,000 SF	Not Required
Trapezoidal Tear Strength	ASTM D4533	1/100,000 SF	Not Required
Burst Strength	ASTM D3786	1/100,000 SF	Not Required
Puncture Strength	ASTM D4833	1/100,000 SF	Not Required
Thickness	ASTM D5199	1/100,000 SF	Not Required
Apparent Opening Size	ASTM D4751	1/100,000 SF	Not Required
GEOMEMBRANE (Specification Section 02597)			
Geomembrane tests will be performed by Golder Construction Services, Inc.			
Textured HDPE			
Thickness	ASTM D5199	1/100,000 SF	Not Required
Density	ASTM D1505	1/100,000 SF	Not Required
Minimum Tensile Properties:	ASTM D638	1/100,000 SF	Not Required
Tensile Strength, Yield			
Tensile Strength, Break			
Elongation at Yield			
Elongation at Break			
Tear Resistance	ASTM D1004 Die C	Not Required	Not Required
Low Temperature Brittleness	ASTM D746 Proc. B	Not Required	Not Required
Dimensional Stability	ASTM D1204	1/100,000 SF	Not Required
Environmental Stress Crack	ASTM D1693	Not Required	Not Required
Puncture Resistance	FTMS 101C Method 2065	Not Required	Not Required
Carbon Black Content	ASTM D1603	1/100,000 SF	Not Required
Carbon Black Dispersion	ASTM D3015	1/100,000 SF	Not Required
Shear Test	ASTM D4437 NSF Mod.	Not Required	1/500 LF
Peel Adhesion (Hot Wedge Fusion Weld)	ASTM D4437 NSF Mod.	Not Required	1/500 LF
Peel Adhesion (Fillet Extrusion Weld)	ASTM D4437 NSF Mod.	Not Required	1/500 LF

Table 2
Testing Methods for Soil and Geosynthetics
adapted from Golder's QAPP Table 1-1

7.2 TESTING METHODS	STANDARD	PRECONSTRUCTION FREQUENCY	CONSTRUCTION FREQUENCY
GEOCOMPOSITE (Specification Section 02598)			
Geocomposite tests will be performed by Golder Construction Services, Inc.			
Geocomposite (TEX-NET TN3002CN)			
Geocomposite Transmissivity @ 500 psf; Gradient = 1	ASTM D4716	1/100,000 SF	Not Required
Geocomposite Transmissivity @ 20,000 psf; Gradient = 1	ASTM D4716	1/100,000 SF	Not Required
Tensile Strength - Net only (prior to lamination)	ASTM D5035	Not Required	Not Required
Tensile Strength - Geotextile only (prior to lamination)	ASTM D4632	Not Required	Not Required
Geocomposite Peel Strength	ASTM D413	1/100,000 SF	Not Required
Density - Net only (prior to lamination)	ASTM D1505	Not Required	Not Required
Carbon Black Content - Net only (prior to lamination)	ASTM D1603	Not Required	Not Required
Thickness - Net only (prior to lamination)	ASTM D5199	Not Required	Not Required
Thickness - Geotextile only (prior to lamination)	ASTM D5199	Not Required	Not Required
Geotextile Mass/Unit Area	ASTM D5261	1/100,000 SF	Not Required
Apparent Opening Size - Geotextile only (prior to lamination)	ASTM D4751	Not Required	Not Required
GEOGRID (Specification Section 02599)			
Geocomposite tests will be performed by Golder Construction Services, Inc.			
Geocomposite (TEX-NET TN3002CN)			
Open Area	COE CW 02215-89	1/100,000 SF	Not Required
Thickness:	ASTM D5199	1/100,000 SF	Not Required
Ribs			
Junctions			
Long Term Design Load (MD)	ASTM D5262	Not Required	Not Required
Flexural Rigidity	ASTM D1388	1/100,000 SF	Not Required
Geogrid Rib Tensile Strength	GRI GG1	1/100,000 SF	Not Required
Junction Node Strength	GRI GG2	1/100,000 SF	Not Required
Strength			
Efficiency			
Density	ASTM D1248	1/100,000 SF	Not Required
Carbon Black Content	ASTM D1603	1/100,000 SF	Not Required
WETLAND MITIGATION (Specification Section 02937)			
Wetland sediment cover soil tests will be performed by Professional Service Industries, Inc. unless designated with **			
Wetland Cover Soil			
Gradation Test	ASTM D422	1/Source	1/Acre/Lift
Plasticity Index	ASTM D4318	1/Source	1/Acre/Lift
Standard Compaction	ASTM D698	1/Source	1/Source
Flexible Wall Perm Test **	ASTM D5084	1/Source	1/Acre/Lift
Field Moisture/Density	ASTM D2922	Not Required	1/10,000 SF
** Test will be performed by Golder Associates, Inc.			
CAST IN PLACE CONCRETE (Specification Section 03300)			
Cast in place concrete tests will be performed by Professional Service Industries, Inc.			
Compression Test Cylinders	ASTM C39	Not Required	4/Class/100 CY to
Making of Test Cylinders	ASTM C31	Not Required	4/Class/5,000 SF of
Testing of Aggregate	ASTM C33	Not Required	Conrete Place As

Notes:
QAPP = Quality Assurance Project Plan
ASTM = American Society for Testing and Materials
CY = cubic yard
LF = linear feet
AASHTO = American Association of State Highway and Transportation Officials
Tbl = Table
MDPW = Massachusetts Department of Public Works
SF = square foot
PSF = pounds per square foot

Table 3
Summary of Abbreviations
Property-Specific Cover Certification Reports
Industri-Plex Site

Mapping Location:

@	=	at
AAD	=	Atlantic Avenue Drainway
AL	=	Above Geotextile
AP	=	Above Pipe
BECO	=	Boston Edison Company right of way
BLDG	=	Building
BRD	=	Bradford
BSG	=	Below Subgrade
BTOB	=	Below Top of berm
CO	=	Company
COMM	=	Commerce (Way Extension)
DET	=	Detention Basin
E	=	East
EEOS	=	East End of Seam
ECHP	=	East Central Hide Pile
EXT	=	Extension
HUB	=	Hubbardston
MID	=	Middle
N	=	North
PLYM	=	Plymouth
PRES	=	Presidential (Way Extension)
REV	=	Revere
S	=	South
SEOS	=	South End of Seam
SG	=	Subgrade
STK	=	Stock (yard)
UGT	=	Under Ground Tank
UTIL	=	Utility
W	=	West
w/	=	with
WEOS	=	West End of Seam
WIL	=	Wilmington
WOB	=	Woburn

Cover Materials:

GB	=	Gravel Borrow (Subbase)
LL	=	Liquid Limit
MOIST	=	Optimum Moisture Content
NP	=	Non-Plastic
PCF	=	Pounds per Cubic Foot
PL	=	Plastic Limit
PSI	=	Pounds per Square Inch
PROC	=	Processed
SCRND	=	Screened
SD	=	Sand
SS	=	Site Soil
TRI	=	(Bardon) Trimount

INDUSTRI-PLEX SITE
OU-1 COVER CERTIFICATION REPORT
LOCUS OF TAX MAP LOT 9-1-5 (AKA LOT IC-10)
N/F BOSTON EDISON COMPANY (PARCEL 3)
RECORD DRAWINGS
WOBURN, MASSACHUSETTS
AUGUST 8, 2000

REFERENCE PLANS:

1. "REGIONAL TRANSPORTATION CENTER– WOBURN, MASSACHUSETTS" ALTERNATE COVER DESIGN– ISSUED FOR EPA/DEP APPROVAL, DATE ISSUED: MAY 16, 1995 LATEST ISSUE: JULY 26, 1995. BY VANASSE HANGEN BRUSTLIN, INC., WATERTOWN, MA

2. "INDUSTRIAL-PLEX SITE – WOBURN, MASSACHUSETTS 100K DESIGN REPORT, PART I – REMEDIAL WORK FOR SOIL, SEDIMENTS AND AIR– VOLUME 7 OF 8", PREPARED BY GOLDER ASSOCIATES, MT. LAUREL, N.J., APRIL 25, 1992.

3a. "SUBDIVISION PLAN OF LAND IN WOBURN – PERFORMED BY GEORGE W. OLSON, MAY, 1960", SCALE: 1"=240', CERT. OF TITLE NO. 103286 BOOK 646 PAGE 136, RECORDED AS PLAN NO. 7312-B ON MARCH 14, 1962 AT SOUTH REGISTRY DISTRICT OF MIDDLESEX COUNTY.

3b. "SUBDIVISION PLAN OF LAND IN WOBURN – PERFORMED BY DANA F. PERKINS, AUGUST 25,1969", SCALE: 1"=100', CERT. OF TITLE NO. 131682 BOOK 788 PAGE 132, RECORDED AS PLAN NO. 7312-F ON SEPTEMBER 24, 1969 AT SOUTH REGISTRY DISTRICT OF MIDDLESEX COUNTY.

4. "INDEX PLAN OF – LAND COURT SUBDIVISION – IN – WOBURN, MA" PREPARED FOR THE NORTHEAST REGIONAL TRANSPORTATION CENTER BY MASSACHUSETTS PORT AUTHORITY, DATED OCTOBER 21, 1996, SHEETS 1–6. LCC 7312.

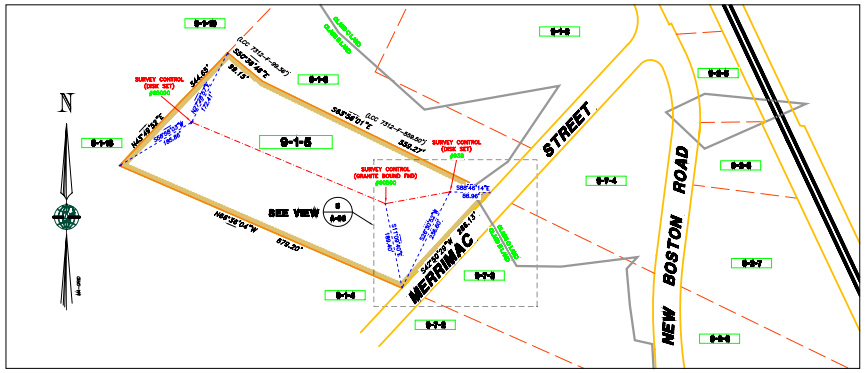
5. "PLAN OF RELOCATION OF A PORTION OF NEW BOSTON STREET, WOBURN, AS ORDERED BY THE COUNTY COMMISSIONERS, 1979, SCALE 1"=40'", SHEETS 4 & 5 OF 5. DOCUMENT NO. 579260.

SURVEY CONTROL NETWORK POINTS

POINT #	NORTHING (FEET)	EASTING (FEET)	ELEVATION (FEET)	DESC.
9	558629.94	696197.41	88.33	PK/C(G)
11	554791.93	696324.79	93.29	MONU(A)
117	554905.71	696605.05	114.44	LPN(F)
118	554977.42	696614.51	126.72	LPN(F)
119	554977.43	696714.50	126.72	LPN(F)
120	556005.46	696713.05	95.27	C.B.(F)
138	555213.88	696740.20	115.51	LPN(F)
139	555276.16	696860.59	117.47	LPN(F)
140	555370.20	696860.55	118.61	C.B.(F)
152	556047.71	696915.95	78.43	LPN(F)
153	556008.80	697126.18	96.01	P.K.(F)
154	556102.46	696256.34	96.55	LPN(F)
155	556142.01	696222.63	90.28	P.K.(F)
157	556902.41	696264.79	90.58	C.B.(F)
216	553575.07	697366.19	72.34	DISK
218	554139.23	696420.64	91.30	LPN(W)
219	554833.75	696456.17	113.01	DISK
220	554921.67	696794.06	73.06	D.H.(F)
221	554963.86	696456.38	36.35	P.K.(F)
246	553901.79	695702.81	70.74	PN/C(G)
301	552991.89	695855.71	67.70	G.B.(F)
302	552963.08	695726.35	68.00	G.B.(F)
303	552924.40	695730.62	69.62	G.B.(F)
761	556314.48	696896.21	58.42	G.B.(F)
762	556286.63	697011.89	57.42	G.B.(F)
764	556266.43	697111.80	57.00	G.B.(F)
765	556195.77	697325.27	54.70	G.B.(F)
766	556150.19	696806.56	56.39	PN/C(G)
828	552986.66	695304.98	72.68	MSPK(S)
831	552171.27	695647.05	92.16	PN/C(G)
832	555622.39	695701.60	86.06	P.K.(A)
833	555464.46	695703.07	76.24	PN/C(G)
834	555360.77	695393.39	96.82	PN/C(G)
850	553156.01	695495.74	65.79	P.K.(F)
857	554268.42	694914.00	73.19	PN/C(G)
868	553407.27	694721.18	73.66	P.K.(G)
871	553005.63	694889.09	75.27	P.K.(A)
872	553156.49	694571.47	74.36	P.K.(A)
873	553263.14	694886.21	73.74	PN/C(G)
874	553152.46	695235.93	72.96	P.K.(A)
887	553569.05	697762.19	74.67	G.B.(A)
888	553762.69	698362.16	75.46	G.B.(F)
889	553966.68	698391.10	74.41	PN/C(G)
890	553542.21	698464.66	72.87	G.B.(G)
891	553879.28	698142.48	69.34	PN/C(G)
892	553874.66	698013.87	69.66	G.B.(G)
893	553576.04	698702.70	69.67	G.B.(G)
894	553302.10	698147.19	69.40	MONU(A)
895	553730.69	697997.70	67.50	MONU(A)
919	554466.09	696730.30	106.02	PN/C(G)
921	553624.01	695975.76	78.40	PN/C(G)
922	553513.87	695975.76	78.40	PN/C(G)
923	553513.88	695433.28	72.72	DISK
924	553420.01	695116.40	72.78	DISK
925	553842.60	697033.21	93.39	DISK
926	553842.60	697009.22	94.98	PN/C(G)
927	553976.01	697011.95	79.00	DISK
928	553812.76	696737.39	107.69	PN/C(G)
929	552961.74	696628.28	95.15	PN/C(G)
930	552760.55	697119.09	71.76	PN/C(G)
931	553178.62	697620.53	69.02	DISK
932	554021.49	694226.27	87.39	D.H.(F)
933	554121.34	694226.27	101.39	G.B.(F)
934	554251.87	694354.50	90.95	PN/C(G)
935	554396.24	694517.95	95.34	PN/C(G)
936	554396.24	694517.95	95.34	PN/C(G)
937	553260.61	694245.09	91.03	PN/C(G)
938	553174.85	694227.08	91.54	PN/C(G)
939	553263.93	694553.72	90.60	DISK
940	553614.66	697307.90	N/A	G.B.(F)
941	554003.77	694525.95	74.68	P.K.(F)
942	552960.73	695376.15	65.62	DISK
943	552343.09	695555.77	63.57	G.B.(A)
944	552436.47	696703.20	71.73	DISK
950	553325.73	696313.53	68.40	G.B.(A)
951	551831.65	697011.14	69.87	DISK
952	551433.89	697330.32	73.66	DISK
953	551433.89	697330.32	73.66	DISK
954	553019.29	695739.73	63.45	DISK
955	553532.44	695410.23	63.71	DISK
956	551961.31	695260.16	65.21	DISK
957	552364.28	695035.18	67.73	G.B.(F)
960	554676.37	695477.26	96.32	G.B.(A)
961	554434.15	695271.84	90.91	G.B.(A)
962	553860.01	695285.87	79.76	G.B.(A)
963	553612.09	695422.70	78.81	DISK
964	553610.44	695553.71	79.47	G.B.(A)
965	553424.46	695196.34	79.67	G.B.(A)
966	553424.46	695196.34	79.67	G.B.(A)
967	553708.65	695855.30	74.82	DISK
968	552760.10	695795.11	73.69	DISK
971	554679.15	696895.61	129.11	LPN(F)
972	555573.02	696922.49	125.79	PN/C(G)
973	556324.98	697196.40	117.15	PN/C(G)
974	556328.29	697345.61	96.63	G.B.(F)
975	556466.38	697935.00	92.45	DISK
976	556840.49	697867.72	72.09	G.B.(A)
977	556411.42	697867.77	95.47	PN/C(G)
978	556238.37	697940.64	70.49	G.B.(G)
979	556715.28	698015.18	87.78	PN/C(G)
980	554628.03	698398.18	80.83	PN/C(G)
981	554628.02	698731.62	81.33	PN/C(G)
982	554630.27	697867.58	76.05	DISK
983	554337.41	697867.58	76.05	PN/C(G)
984	554127.10	697935.66	76.18	PN/C(G)
985	554366.37	697935.66	75.15	PN/C(G)

SURVEY CONTROL NETWORK POINTS

POINT #	NORTHING (FEET)	EASTING (FEET)	ELEVATION (FEET)	DESC.
986	553791.19	697528.87	72.71	G.B.(F)
1141	556436.21	696190.95	90.57	LPN(F)
10874	555130.50	695276.52	69.28	G.B.(F)
10875	555350.98	695361.95	69.88	G.B.(F)
10876	555350.98	695361.95	69.88	G.B.(F)
10881	553529.00	695275.61	67.51	G.B.(F)
60000	552817.04	694811.44	81.42	G.B.(F)
60004	553463.08	694795.69	68.26	G.B.(F)
60005	553431.74	694140.48	72.60	G.B.(F)
60011	552636.22	694800.13	75.34	LPN(F)
60016	552373.96	695413.28	64.34	LPN(F)
60018	551800.54	695023.12	59.14	C.B.(F)
60019	552366.42	695800.12	73.38	LPN(F)
60020	553366.42	696992.42	N/A	G.B.(F)
60049	553944.47	697366.41	72.79	N/A G.B.(F)
60051	550098.62	697563.34	N/A	G.B.(F)
60052	550511.64	697601.08	N/A	G.B.(F)
60057	551335.71	698044.07	N/A	C.B.(F)
60058	551358.23	698034.35	N/A	G.B.(F)
60059	553365.09	694995.50	N/A	LPN(F)
60060	553365.09	694995.50	N/A	LPN(F)
60061	553366.46	694294.18	72.01	LPN(F)
60063	552960.73	694394.68	81.57	DISK
60064	551417.98	694604.57	72.26	G.B.(S)
60065	553606.43	695095.74	70.96	G.B.(S)
60066	553606.43	695095.74	70.96	G.B.(S)
60067	553366.69	695300.88	66.78	G.B.(S)
60068	553366.69	695300.88	66.78	G.B.(S)
60069	552960.73	695300.88	65.25	G.B.(S)
60077	556414.66	697523.06	102.54	G.B.(F)
60078	556277.23	697614.54	90.27	G.B.(F)
60079	556277.23	697779.98	90.97	G.B.(F)
60080	556277.23	697779.98	72.66	G.B.(F)
60081	556277.23	697779.98	72.66	G.B.(F)
60082	553762.94	697866.33	73.66	D.H.(F)
60083	553762.94	697866.33	73.66	D.H.(F)
60084	553762.94	697866.33	73.66	D.H.(F)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CLASS C LAND
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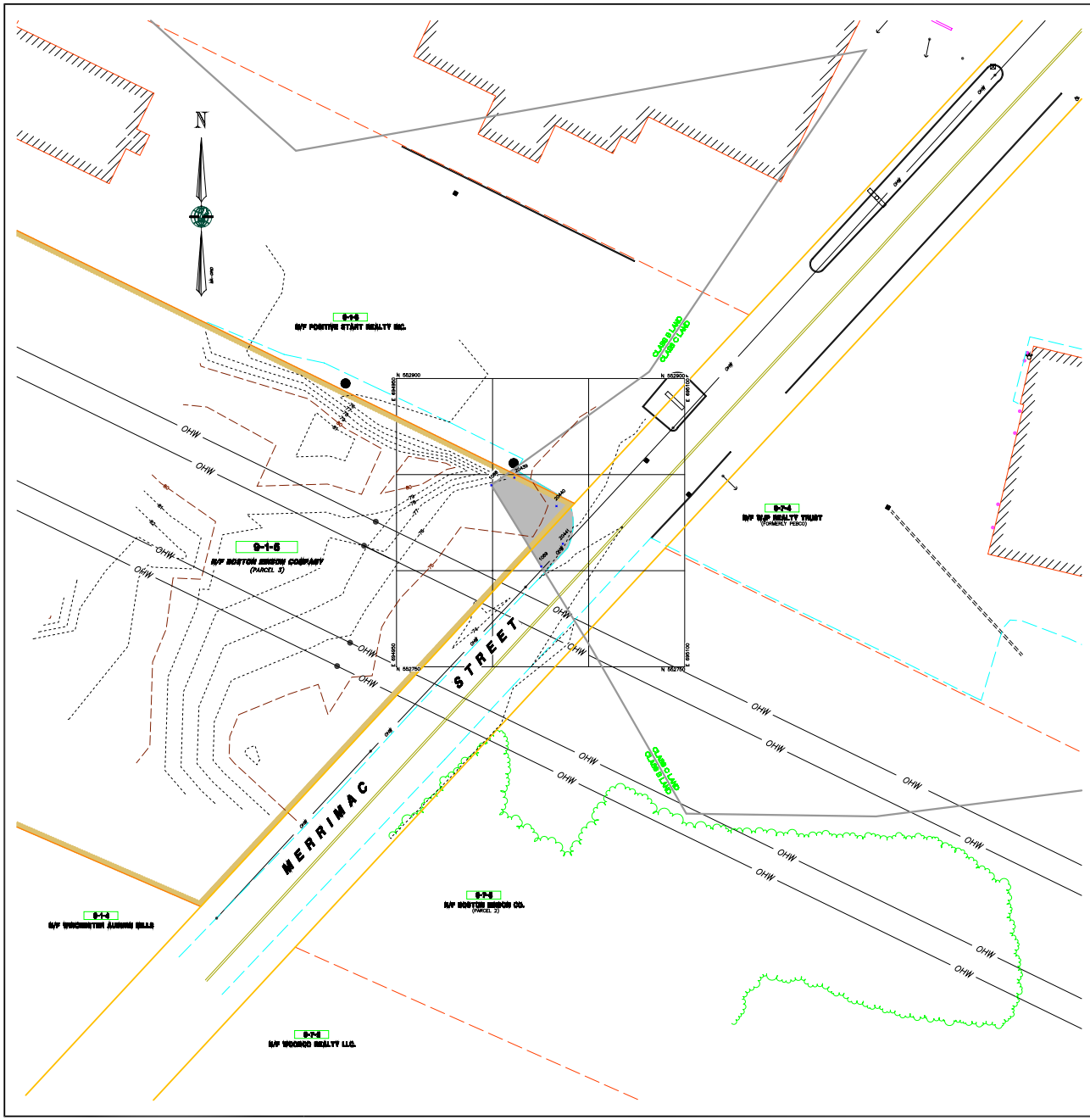
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R/F POINTIN START REALTY INC.
9-1-5
R/F BOSTON BEKON COMPANY
(PARCEL 3)
9-1-4
R/F R/P REALTY TRUST
(FORMERLY PEBCO)
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R/F BOSTON BEKON CO.
(PARCEL 3)
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R/F WINCHESTER ARMORY HILLS
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R/F WACKRO REALTY LLC.
MERRIMAC
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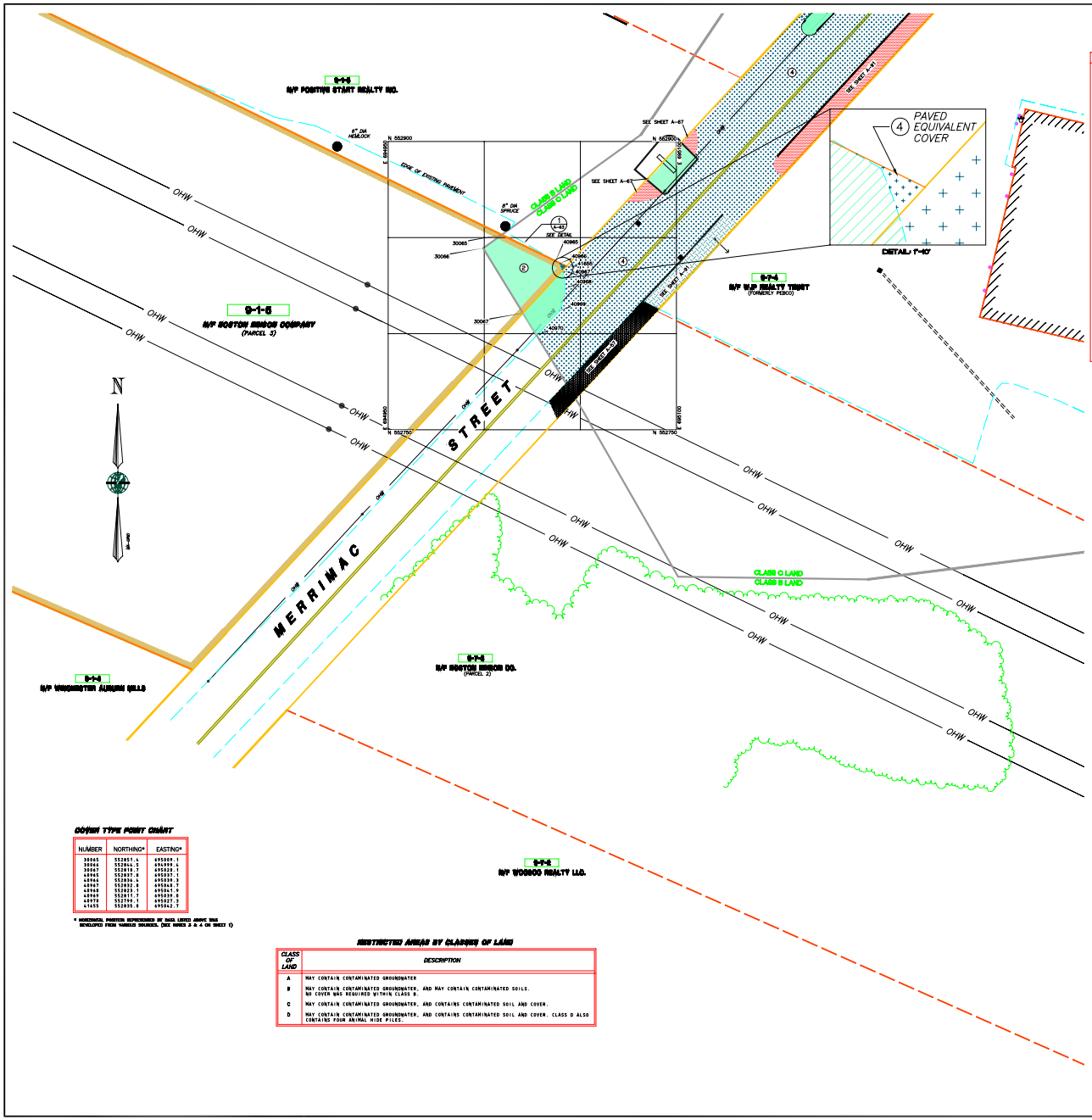

COVER TYPES (NONEQUIVALENT)

AREA	ORIGINAL CONDITION	COVER TYPE
1	VARIES	ABOVE GRADE ENGINEERED PERMEABLE COVER
2	VARIES	AT GRADE ENGINEERED PERMEABLE COVER
3	PLANTER WITH GRASS SHRUBS, SMALL TREES	AT GRADE ENGINEERED PERMEABLE COVER
6	DRAINAGE SWALE	ENGINEERED COVER GRAVEL/COBBLE LINED
7	DRAINAGE SWALE	CONCRETE CULVERT (BENEATH EAST-CENTRAL HIDE PILE REMEDIATED SLOPE)
9	WETLANDS	ABOVE GRADE ENGINEERED PERMEABLE COVER (WETLANDS REMEDIATION)
10	WETLANDS	DREDGE SEDIMENT, PLACE PERMEABLE COVER (WETLANDS REMEDIATION)
11	EAST HIDE PILE	IMPERMEABLE COVER ENGINEERED (EAST HIDE PILE REMEDIATION)
12	VARIES	ABOVE GRADE ENGINEERED PERMEABLE COVER (EXTENT OF SOUTH HIDE PILE REMEDIATION)
13	SOUTH HIDE PILE	ABOVE GRADE ENGINEERED PERMEABLE COVER
14	EAST CENTRAL HIDE PILE	ABOVE GRADE ENGINEERED PERMEABLE COVER
15	DEPRESSION VEGETATION VARIES	AT GRADE ENGINEERED PERMEABLE COVER
16	RAILROAD LINES	ENGINEERED RAILROAD COVER
17	VARIES	PLACE TRENCH DRAIN
18	VARIES	GRAVEL ACCESS ROAD
19	CHROMIUM LAGOONS	FILL, ABOVE GRADE ENGINEERED PERMEABLE COVER

AREA	ORIGINAL CONDITION	COVER TYPE
20	CONCRETE FOUNDATION	CLEAN, CLEAN & PATCH
22	PAVED	REGRADE, ABOVE GRADE ENGINEERED ASPHALT
23	VARIES	PLACE CULVERT
24	CULVERT	EXTEND CULVERT
25	VARIES	SEE NOTE 4 (SHEET 1)-SEE GIN REFERENCE PLAN 2)
26	VARIES	ABOVE GRADE ENGINEERED ASPHALT COVER
27	VARIES	EXCAVATE, STORMWATER STORAGE, PLACE 18" FILL ENGINEERED COVER
28	DRAINAGE CHANNEL	DREDGE 18" SEDIMENT, PLACE GRAVEL/COBBLE LINED ENGINEERED COVER
29	EXISTING MDC SEWER SERVICE	RAISE MANHOLES
31	DRAINAGE SWALE	DREDGE 18", PLACE GRAVEL/COBBLE GROUNDWATER RECHARGE BASIN)
32	VARIES	AT GRADE ENGINEERED COVER (GRAVEL SURFACE)
33	VARIES	ABOVE GRADE ENGINEERED COVER (GRAVEL SURFACE)
34	VARIES	GROUNDWATER TREATMENT PLANT
35	VEGETATION VARIES	AT GRADE ENGINEERED ASPHALT COVER
36	WEST HIDE PILE	ABOVE GRADE ENGINEERED PERMEABLE COVER
37	VARIES	GRAVEL/COBBLE LINED CREATED WETLAND STREAM

② AT GRADE ENGINEERED PERMEABLE COVER

COVER TYPES (EQUIVALENT)

AREA	ORIGINAL CONDITION	EQUIVALENT COVER TYPE
4	PAVED	EQUIVALENT COVER
5	BUILDING	EQUIVALENT COVER
8	BEDROCK DRAINAGE SWALE	BLAST/EXCAVATE CHANNEL EQUIVALENT COVER
21	BEDROCK OUTCROP	GRUB & CLEAN EQUIVALENT COVER
30	STACK	EQUIVALENT COVER

④ PAVED EQUIVALENT COVER

LEGEND

BOUNDARY LINE	ASBUILT COVER TYPE
RIGHT-OF-WAY	TEST PIT
ABUTTING PROPERTY LINES	MONITOR WELL
ASPHALT, CONCRETE, GRANITE CURB	HYDRANT
TRANSITION ZONE	GATE VALVE
LAND CLASS LINE	CATCH BASIN (ROADWAY)
N 684,000 GRID LINE	CATCH BASIN (DRIVEWAY)
EDGE OF EXISTING PAVEMENT	DRAIN MANHOLE
LIMIT OF VEGETATION	SEWER MANHOLE
A.T.&T. FIBER OPTIC CABLE	UTILITY POLE
TOE OF SLOPE	GUY WIRE
TOP OF SLOPE	ASBUILT POINT NO. & LOCATION
LIMIT CHAIN LINK FENCE	GAS METER
EDGE OF ASPHALT GRAVEL ROAD	GAS SHUT OFF
BACK EDGE OF PLANTER	WATER SHUT OFF
EDGE OF PROPOSED PAVEMENT	WATER CONTROL BOX
EXISTING EASEMENT	SIGN
ASBUILT CULVERT	BOLLARD
LIMIT OF TREE LINE	TELEPHONE MANHOLE
EXISTING CONCRETE STRUCTURE	POINT SEARCH (SEE POINTS CHART)
ASBUILT FINISH GRADE CONTOUR 5' INTERVAL 99999	BORING LOCATION
ASBUILT FINISH GRADE CONTOUR 1' INTERVAL	MICRO WELL LOCATION
OHW OVERHEAD WIRES	PIEZOMETER LOCATION
UGD UNDERGROUND GAS LINE	SOIL SAMPLE LOCATION
LIMITS OF EXISTING EASEMENTS	STAFF GAUGE LOCATION
EDGE OF EXISTING BUILDINGS	MONUMENTATION LOCATION
AREA OF LUSAC	LSD LOCATION
	MONITORING WELL LOCATION

DETAIL/CROSS SECTION DESIGNATION
SHEET No. WHERE DETAIL/CROSS SECTION IS PRESENTED

COVER TYPE POINT CHART

NUMBER	NORTHING*	EASTING*
30065	552857.4	695809.1
30066	552864.3	695799.4
30067	552819.7	695820.1
40965	552837.8	695837.1
40966	552832.4	695848.9
40967	552823.6	695854.7
40968	552823.1	695867.9
40969	552811.7	695839.0
40970	552799.1	695827.3
41465	552895.8	695842.7

* HORIZONTAL POSITION REFERENCED BY DATA LISTED ABOVE WAS DEVELOPED FROM VARIOUS SOURCES. (SEE NOTES 2 & 4 ON SHEET 1)

RESTRICTED AREAS BY CLASSES OF LAND

CLASS OF LAND	DESCRIPTION
A	MAY CONTAIN CONTAMINATED GROUNDWATER
B	MAY CONTAIN CONTAMINATED GROUNDWATER, AND MAY CONTAIN CONTAMINATED SOILS. NO COVER WAS REQUIRED WITHIN CLASS B.
C	MAY CONTAIN CONTAMINATED GROUNDWATER, AND CONTAINS CONTAMINATED SOIL AND COVER.
D	MAY CONTAIN CONTAMINATED GROUNDWATER, AND CONTAINS CONTAMINATED SOIL AND COVER. CLASS D ALSO CONTAINS FOUR ANIMAL HIDE PILES.

GRAPHIC SCALE
20' 10' 0 20' 40' 60'

REV.	DATE	DESCRIPTION	DRN.	CK.
A	8/9/00	ISSUE FOR REVIEW	MJP	JGK
B	8/17/01	DEP REVISIONS	MJP	JGK
C	8/16/02	DEP REVISIONS	MJP	JGK
D	8/8/03	FINAL SUBMISSION	MJP	JGK
E	8/17/05	EPA & DEP COMMENTS OF 7/25/05	MJP	JGK
F	8/17/06	EPA & DEP COMMENTS OF 7/12/06	MJP	JGK
G	8/14/07	EPA & DEP COMMENTS OF 8/7/07	MJP	JGK
H	8/8/08	EPA COMMENTS OF 7/25/08	MJP	JGK
I	7/30/09	EPA COMMENTS OF 7/23/09	MJP	JGK

PROFESSIONAL LAND SURVEYOR

PROFESSIONAL ENGINEER

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

MERIDIAN
Land Surveyors, Inc.
Woburn, Massachusetts

Golder Associates
400 Commercial Street
Manchester, NH 03101
603-668-0880 FAX 603-668-1199

PROJECT RECORD (TAX MAP LOT G-1-5)

COVER TYPES AND TRANSITIONS

INDUSTRI-PLEX SITE REMEDIAL TRUST
WOBURN, MASSACHUSETTS

SCALE: 1" = 20'

AUGUST 6, 2009

DESIGNED BY: MJP
DRAFTED BY: MJP
CHECKED BY: JGK
FILE: 29000834.dwg
DO NOT SCALE DRAWING

A-62
SHEET No.
PROJECT: 2900.00
SHEET 4 OF 5

Jul 31, 2009 - 8:33am JGK Land Drawing 2004 - LD14
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LEGEND

X / A-63 — DETAIL/CROSS SECTION DESIGNATION
SHEET No. WHERE DETAIL/CROSS SECTION IS PRESENTED

NOTES

1.) FOR SLOPES FLATTER THAN 25%, A 16oz. NONWOVEN GEOTEXTILE WAS INSTALLED ON HIDE PILES AND A 6oz. NONWOVEN GEOTEXTILE WAS INSTALLED ELSEWHERE.

2.) FOR SLOPES 25% OR STEEPER, A GEOSYNTHETIC DRAIN WAS INSTALLED AS FOLLOWS:

a. ON HIDE PILES, A GEOCOMPOSITE DRAIN WAS EXTENDED FROM THE TOE OF SLOPE A DISTANCE EQUAL TO A 10-FOOT CHANGE IN ELEVATION. A 16oz. NONWOVEN GEOTEXTILE WAS USED ELSEWHERE AND FIELD SEWN TO MATCH THE DRAIN.
b. IN AREAS OTHER THAN HIDE PILES, A 16oz. NONWOVEN GEOTEXTILE WAS USED THROUGHOUT.

3.) SEE SPECIFICATIONS FOR DETAILS AND MATERIALS USED.

COVER TYPE

2 AT GRADE ENGINEERED PERMEABLE COVER

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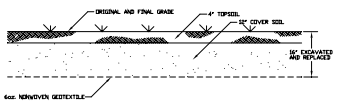

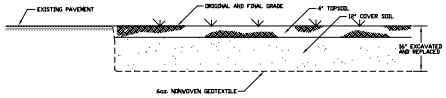

1 / A-63 TYPICAL AT GRADE ENGINEERED COVER AT PAVEMENT TIE IN

NOT TO SCALE

REV.	DATE	DESCRIPTION		
A	8/9/00	ISSUE FOR REVIEW	JF	MJP
B	10/12/01	DEP REVISIONS	JF	MJP
C	8/14/02	DEP REVISIONS	JF	MJP
D	8/17/05	EPA & DEP COMMENTS OF 7/13/05	JF	MJP
E	8/17/06	EPA & DEP COMMENTS OF 7/7/06	JF	MJP
F	8/17/07	EPA & DEP COMMENTS OF 8/3/06	JF	CJC
G	8/9/07	EPA & DEP COMMENTS OF 8/7/07	JF	CJC
H	8/28/08	EPA COMMENTS OF 4/23/08	TC	DRH
I	7/20/09	FINAL SUBMISSION	TC	DRH

PROFESSIONAL LAND SURVEYOR

PROFESSIONAL ENGINEER

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

MERIDIAN Land Surveyors, Inc.
Boundary • Topographic • Construction • Site Surveys

Golder Associates
Manchester, New Hampshire
400 Commercial Street
Manchester, NH 03101
603-668-0880 FAX 603-668-1199

PROJECT RECORD (TAX MAP LOT 9-1-5)

DETAILS & TRANSITIONS

INDUSTRI-PLEX SITE REMEDIAL TRUST
WOBURN, MASSACHUSETTS

SCALE: 1" = NONE — AUGUST 6, 2000

DESIGNED BY: MJP
DRAFTED BY: MJP
CHECKED BY: JGK
FILE: 2900003R.dwg
DO NOT SCALE DRAWING

A-63
SHEET No.
PROJECT: 2900.00
SHEET 5 OF 5

Jul 31, 2008 – 8:47am JGKeen J:\Land Drawing 2004 – L274 H:\Jobs\2900\2900-04-06\2900R\A-63.DWG

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
ONE CONGRESS STREET SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

September 3, 2008

NSTAR Electric Company
[property owner of Tax Map 9-2-8 (New Boston Street) Tax Maps 9-7-3 and 9-1-5 (Merrimac Street) and Tax Map 15-1-11 (Commerce Way) Woburn, MA]
Attention: Jeffrey N. Stevens, Esq.
800 Boylston Street
Boston, MA 02199

NSTAR Electric Company
[property owner of Tax Map 9-2-8 (New Boston Street) Tax Maps 9-7-3 and 9-1-5 (Merrimac Street) and Tax Map 15-1-11 (Commerce Way) Woburn, MA]
Attention: Ms. Kathleen Freeman, Director of Environmental Affairs
One NSTAR Way (NE 250)
Westwood, MA 02090

Re: Industri-plex Superfund Site, Operable Unit 1: Final Property-Specific Cover Certification Report for **Tax Map 9-2-8 (New Boston Street) Tax Maps 9-7-3 and 9-1-5 (Merrimac Street) and Tax Map 15-1-11 (Commerce Way) Woburn, MA**.

Please find attached the property-specific final Cover Certification Report (CCR) for your property located at Tax Map 9-2-8 (New Boston Street) Tax Maps 9-7-3 and 9-1-5 (Merrimac Street) and Tax Map 15-1-11 (Commerce Way) Woburn, MA, formerly owned by Boston Edison Company. This CCR documents the completion of a portion of the Remedial Action for soil, sediments, and air at the Industri-Plex Superfund Site, Operable Unit 1, Woburn, MA, in accordance with approved 100% Design Report, dated April 1992. The Remedial Action implemented on your property was required by the Consent Decree entered on April 24, 1989 by the United States District Court for the District of Massachusetts in the matter styled United States v. Stauffer Chemical Company et al., Civil Action No. 89-0195-MC, and Commonwealth of Massachusetts v. Stauffer Chemical Company et al., Civil Action No. 89-0196-MC.

The CCR contains detailed full-size Record Drawings illustrating the Remedial Action implemented on your property, such as the location of Engineered and/or Equivalent Covers which serve as barriers preventing contact to the underlying Contaminated Soils. The Record Drawings also illustrate the location of various land classifications designated on your property (i.e. Land Class A, B, C and/or D), which represent various conditions and restrictions. The details contained in the CCR, particularly the Record Drawings, will be useful towards ensuring

the long protectiveness of the remedy and compliance with institutional controls (i.e. Grant of Environmental Restriction).

In addition to the CCR, your are also being provided:

1) a set of half-size Record Drawings; and

2) a compact disc containing electronic versions of the CCR, as well as electronic CAD files of the Record Drawings.

The half-size drawings will be useful towards your periodic inspection of the remedial action implemented on your property, as well as any consideration you may have towards implementing future intrusive work on the property that may affect the remedial action. If you elect to alter the remedial action on your property (e.g. Engineered or Equivalent Covers), then you will be required to prepare As Built Records. The As Built Records are engineering drawings and other records depicting the location and details of remedial action alterations, and Clean Corridors, as constructed on the property. EPA expects the As Built Records to include engineering drawings which are similar in detail and quality as the Record Drawings. The electronic CAD files provided in the attached compact disc can be utilized by the owner and/or their designated surveyor to effectively and efficiently alter the Record Drawings and prepare adequate As Built Records.

The next steps in the superfund process for this property will be the inauguration and recording of the Grant of Environmental Restrictions (Grant). A package will be sent to you regarding the inauguration requirements for your property.

If you should have any questions regarding this letter, please contact me at (617) 918-1323.

Sincerely,

Joseph F. LeMay

Joseph F. LeMay, P.E.
Remedial Project Manager
Office Site Remediation and Restoration

cc: Bob Cianciarulo, EPA (letter)
David Peterson, EPA (letter)
Jennifer McWeeney, MassDEP
Andy Cohen, MassDEP (letter)
Tim Cosgrave, ISRT Coordinator (letter)
Carol Dickerson, SMC (letter)
Randy Cooper, Monsanto (letter)
David Youngsman, NSTAR Electric & Gas Company (letter)