

ASTM PHASE I ENVIRONMENTAL ASSESSMENT

AT

SPICKET RIVER RACEWAY
LAWRENCE, MASSACHUSETTS

Prepared for:
The City of Lawrence
225 Essex Street, Third Floor
Lawrence, MA 01840

September 2012

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1 EXECUTIVE SUMMARY

1.1 General Information

Project Information: Phase I Environmental Site Assessment

Site Information: Spicket River Raceway
Lawrence, MA 01840
Lawrence Map ID: Map 67 Lot 5

Site Operated By: Enel North America Inc.

Site Owned By: Essex Co.
C/O Enel North America Inc.
One Tech Drive, Suite 220
Andover, Massachusetts 01810

Site Contact: James Barnes, Community Development Director
Brad Buschur, Project Director for Groundwork Lawrence

Client Information: The City of Lawrence
James Barnes, Community Development Director

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in §312.10 of this part.

I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

The undersigned certifies that all appropriate inquiries were carried out in accordance with the requirements of the final rule (see 40 CFR 312 Standards and Practice for All Appropriate Inquiries).

SAK Environmental, LLC

Prepared By:



Mark P. Grady Jr., EIT
Environmental Engineer

Reviewed By:



Sherry Albert, PE
Senior Environmental Engineer

1.2 Findings Summary

SAK Environmental, LLC (SAK) performed a Phase I Environmental Site Assessment (“ESA”) in conformance with the scope and limitations of American Standard for Testing and Materials (“ASTM”) Standard Practice E1527-05 for the Spicket River Raceway, hereinafter referred to as “Site” or “Subject Site”, located in Lawrence, Massachusetts. Any exceptions to or deletions from the ASTM standard practice are described in Section 2.0 of this report. The following table summarizes the environmental conditions of the Site:

| Summary | |
|--|--|
| Site Reconnaissance | September 24, 2012 |
| Subject Property | Spicket River Raceway at 21 Canal Street, Lawrence, MA |
| Assessment Performed | ASTM Standard E 1527-05 Phase I Environmental Site Assessment for Commercial Real Estate |
| Current Land Use | The Site consists of a raceway located on vacant property historically occupied by various paper mills. All structures have been removed. |
| Historic Land Use | The Site was constructed to convey industrial wastewater from former industries on and abutting the property. The raceway outlet discharged directly to the Spicket River. |
| Petroleum and Hazardous Material | Sediment in the raceway is contaminated with polycyclic biphenyls (PCBs) and oil attributed to historic releases from surrounding properties. The contamination is being addressed under the Massachusetts Contingency Plan (MCP) regulations, 310 CMR 40.0000. The Site and property to the north and south have been tracked by the Massachusetts Department of Environmental Protection (MADEP under Release Tracking Numbers (RTN) 3-0340) since 1987. |
| Significant Environmental Settings | The Site is located in a primarily industrial area; the closest residential properties are approximately 0.19 miles to the east. The Site is not located in a current or potential drinking water resource area. The Spicket River, wetland and open space are located within 500 feet of the Site. The Site is also located within the 100 year flood plain of the Spicket River. |
| Recognized Environmental Conditions (RECs) | The presence of contamination including elevated PCBs in sediment is the only REC at the Site. This REC, however, has been fully characterized. Removal of sediment has been performed to the extent possible from a structural standpoint. The final phase of remediation will be capping. |
| Recommendations | No further assessment is required. Continue to implement proposed MCP response actions (capping and redevelopment) under RTN 3-0340. |
| Pending Data/ Significant Data Gaps | None |

2 INTRODUCTION

2.1 Purpose

The purpose of the Phase I ESA was to identify *Recognized Environmental Conditions (RECs)* associated with past and current use of the Site and to make recommendations regarding further investigation to evaluate the presence or absence of contamination in environmental media, which at this Site consists of surface water and sediment. This report documents the findings, opinions and conclusions of the Phase I ESA.

2.2 Scope of Services

This Phase I ESA was conducted in general accordance with the ASTM guidance document, “*Standard Practice Guidelines for Environmental Site Assessments: Phase I Environmental Site Assessment Process (E 1527-05)*”, consistent with a level of care and skill ordinarily practiced by the environmental consulting profession currently providing similar services under similar circumstances. Significant additions, deletions or exceptions to ASTM Standard Practice E 1527-05 are noted below or in the corresponding sections of this report.

The scope of this assessment included an evaluation of the following:

- ✓ Physical setting characteristics of the Site through a review of referenced sources such as topographic maps and geologic, soils and hydrologic reports.
- ✓ Usage of the Site, adjoining properties and surrounding area through a review of referenced historical sources such as land title records, fire insurance maps, city directories, aerial photographs, prior reports and interviews.
- ✓ Observations and interviews regarding current Site usage and conditions including: the use, treatment, storage, disposal or generation of hazardous substances, petroleum products, hazardous wastes, non-hazardous solid wastes and wastewater.
- ✓ Usage of adjoining and surrounding area properties and the likely impact of known or suspected releases of hazardous substances or petroleum products from those properties on the Property.
- ✓ Information in referenced online environmental agency databases and local environmental records within the specified approximate minimum search distance from the Site.

2.3 Significant Assumptions

There were no significant assumptions affecting the conclusions and recommendations of this report.

2.4 *Limitations and Exceptions*

SAK prepared this Phase I ESA report using reasonable efforts to identify RECs associated with hazardous substances or petroleum products at the Site. Findings contained within this report are based on information collected from observations made on the day(s) of the Site reconnaissance and from reasonably ascertainable information obtained from certain public agencies and other referenced sources. The ASTM Standard Practice E 1527-05 recognizes inherent limitations for Phase I ESAs including but not limited to:

- ✓ *Uncertainty* – A Phase I ESA cannot completely eliminate uncertainty regarding the potential for RECs in connection with any property.
- ✓ *Not Exhaustive* – A Phase I ESA is not exhaustive comprehensive investigation of a property or environmental conditions at such property.
- ✓ *Past Uses of the Property* – Historical reviews under the ASTM E 1527-05 standard are required to cover a minimum of the past 5 years unless there is readily available information beyond this period. Thus, former uses and activities that occurred greater than 5 years ago may not be discovered.

Users of this report may refer to ASTM Standard Practice E 1527-05 for further information regarding these and other limitations. This report is *not definitive* and should not be assumed to be a complete and/or specific definition of all conditions above or below grade. Information in this report is not intended to be used as a construction document and should not be used for demolition, renovation, or other property construction purposes. Any use of this report by any party, beyond the scope and intent of the original parties, shall be at the sole risk and expense of such user.

SAK makes no representation or warranty that the past or current operations at the Site are, or have been, in compliance with all applicable federal, state and local laws, regulations and codes. This report does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type or at a location not investigated. Regardless of the findings stated in this report, SAK is not responsible for consequences or conditions arising from facts not fully disclosed to SAK during the assessment.

An independent data research company provided the government agency database referenced in this report. Information on surrounding area properties was requested for approximate minimum search distances and is assumed to be correct and complete unless obviously contradicted by SAK's observations or other credible referenced sources reviewed during the assessment. SAK shall not be liable for any such database firm's failure to make relevant files or documents properly available, to properly index files, or otherwise to fail to maintain or produce accurate or complete records.

SAK used reasonable efforts to identify evidence of actual or potential sources of contamination during the assessment. “Reasonable efforts” were limited to observation of readily accessible areas, review of referenced public records, reports and interviews.

SAK is not a professional title insurance or land surveyor firm and makes no guarantee, express or implied, that any land title records acquired or reviewed in this report, or any physical descriptions or depictions of the Property in this report, represent a comprehensive definition or precise delineation of Property ownership or boundaries.

The Environmental Professional Statement in Section 1.1 of this report does not “certify” the findings contained in this report and is not a legal opinion of such *Environmental Professional*. The *Environmental Professional* Statement is intended to document SAK’s opinion that an individual meeting the qualifications of an Environmental Professional was involved in the performance of the assessment and that the activities performed by, or under the supervision of, the *Environmental Professional* were performed in conformance with the standards and practices set forth in 40 CFR Part 312 per the methodology in ASTM Standard Practice E 1527-05 and the scope of work for this assessment.

Per ASTM Standard Practice E 1527-05, Section 6, User Responsibilities, the Client of this assessment has specific obligations for performing tasks during this assessment that will help identify the possibility of RECs connection with the Property. Failure by the Client to fully comply with the requirements may impact their ability to use this report to help qualify for *Landowner Liability Protections* (LLPs) under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). SAK makes no representations or warranties regarding a Client’s qualification for protection under any federal, state or local laws, rules or regulations.

In accordance with the ASTM Standard Practice E 1527-05, this report is presumed to be valid for a 6-month period. If the report is older than six months, the following information must be updated in order for the report to be valid: (i) interviews with owners, operators, and occupants; (ii) searches for recorded environmental cleanup liens; (iii) reviews of federal, tribal, state, and local government records; (iv) visual inspections of the property and of adjoining properties; and (v) the declaration by the environmental professional responsible for the assessment or update. Reports older than one year may not meet the ASTM Standard Practice 1527- 05 and therefore, the entire report must be updated.

2.5 User Reliance

The following report was prepared for the sole use of the City of Lawrence. The information used to prepare this report was based solely on the scope of work conducted and the sources for data collection referred to in this report. The information contained in this report was collected and evaluated using current generally accepted industry methods and practices at the time the report was prepared. Findings contained in the report represent the conditions, locations, and materials and data readily available to, and observed by SAK at the time the work was performed. No inferences regarding the findings of other conditions, locations, or materials not observed; or the findings of

conditions, locations, or materials that may be present at a later date or earlier time may be made based on the contents of the report.

SAK Environmental, LLC acknowledges and permits that this report may be conveyed to The City of Lawrence's attorney, title insurer, regulatory agencies and lenders associated with the subject Property. No other warranty, expressed or implied, is made.

3 SITE DESCRIPTION

3.1 Location and Legal Description

The Spicket River Raceway is located on the former Oxford Paper Mill (OPM) property at 21 Canal Street, approximately 400 feet west of the intersection of Canal and Marston Streets in Lawrence, Massachusetts; see **Figure 1** in **Appendix A – Site Location Map**. The geographical coordinates are:

| | |
|--------------------------------------|------------------------------|
| Latitude: | 42° 42' 28" North |
| Longitude: | 71° 08' 56" West |
| Universal Transverse Mercator (UTM): | Zone 19, 323998 E, 4730595 N |

The raceway ("Site") is identified as Map 67, Lot 5 in the City of Lawrence Assessor's database and is a separate parcel from the OPM property which is identified as Map 67, Lot 6.

3.2 Site and Surrounding Area General Characteristics

The Site consists of a 34-foot wide x 330-foot long open channel raceway that is no longer used for its original purpose (see Section 3.3). The Site transects and divides the former OPM property into a northern peninsula and southern parcel. Various paper mill companies had been located on the OPM property and surrounding properties since circa 1880s. All manufacturing operations ceased in 1974. Mill buildings on the north side were demolished in the 1970s; buildings and foundations on the south side were removed and remediated.

The Site and surrounding area are zoned for commercial and industrial use. The Site is abutted by the Spicket River to the east; vacant land (former OPM property) to the north and south; and brownfields site that recently redeveloped as parking lot to the west. The Lawrence General Hospital is located further north and commercial properties are located south of Canal Street (see **Figure 2 – Aerial Map**). Marston Street lies east of the river. The closest residential properties are single family homes located about 0.19 miles to the west on Union Street.

3.3 Historic and Current Use of the Site

The Site was part of the raceway network that included three 13-foot diameter interior raceways, all of which emptied into the open channel (Site), also referred to as the "exterior raceway". The exact year of construction is unknown but the Site was depicted on an 1888 Sanborn Map. The factories and mills discharged industrial process water and stormwater runoff into the raceway system where it ultimately discharged into the Spicket River. The Site was also used to store emergency fire water.

In 2008, the interior raceways were sealed and storm drains that previously discharged to these raceways were plugged. A temporary sediment barrier was installed in the Site outlet to minimize sediment transport to the river during remedial excavation in 2010. Water that currently enters the Site is either groundwater or rainwater and is pumped through a treatment/monitoring system prior to discharge to the river under EPA National Pollutant Elimination Discharge System (NPDES) Permit #MA0003824.

The Site and OPM property are being redeveloped into a public park under the City's revitalization Lawrence Gateway Project. The 3-acre park will be located adjacent to the Lawrence General Hospital and the Spicket River.

3.4 Description of Site Improvements

The Site consists of an open channel constructed of stone block walls. The channel floor was originally thought to be granite blocks, but no floor or barrier was encountered during excavation of sediment in 2010. The Site is located at an elevation of approximately 18 feet above mean sea level, and the depth is approximately 20 feet below surface grade of the OPM property.

3.5 Current Uses of Adjoining Properties

The OPM property which lies north and south of the Site is vacant, unpaved and covered mostly with tall grass and shrubs. The GenCorp brownfield property is located to the west and is currently an 865-space parking lot. The Spicket River lies east of the Site.

3.6 Historic Use of Adjoining Properties

The OPM and other nearby properties have a long history of use by paper mills. According to previous reports, the operations that took place included pulping of wood chips by the "soda and sulphite" chemical process and the possibly kraft pulping process. The former used lime or sodium hydroxide (NaOH) as the base and sulfurous acid (HSO_3). The kraft pulping process used NaOH and sodium sulfide (Na_2S). Buildings identified on historic Sanborn maps (Section 5.5.2) included a "soda pulp mill", "chemical mill and buildings containing "beating engines" and a "rotary bleacher". Bleaching of pulp may have been done using chlorine or hypochlorite. An open coal bin, boiler room, and "black ash room" were also identified on some of the Sanborn maps.

Contaminants associated with former paper mill operations include polycyclic aromatic hydrocarbons (PAHs) from coal, coal ash, and other combustion operations; chlorinated volatile organic compounds (VOCs) formed during pulp bleaching operations and sulfides from chemical pulp residues. Chlorinated VOCs and sulfides wastes were either discharged through air emissions or discharged with process wastewater to the raceways and ultimately the river.

The most significant contamination impacting raceway sediments and walls has been polychlorinated biphenyls (PCBs), specifically Aroclors 1242 and 1260. The source of Aroclor 1260 was transformers formerly located on the OPM property. Aroclor 1242 was a component of heat exchanger fluid used by GenCorp, Inc. from 1966 (after a major fire occurred) until it was replaced

with non-PCB heat transfer oil in the early 1970s. in former GenCorp manufacturing buildings and likely entered the interior raceways through non-aqueous phase liquid (NAPL) transport. PCBs were then adsorbed to sediment which discharged to the Site.

3.7 Status of Regulatory Response Actions for Site and Adjoining Properties

In 1989, the Massachusetts Department of Environmental Protection (MADEP) assigned Release Tracking Number (RTN) 3-0340 to the Site and OPM property due to reported petroleum releases from underground storage tanks (USTs). After remediating the spill, the City identified seven oil storage containers (three 30,000 gallon tanks, one 20,000 gallon tank, one 20,000 gallon tank, two 1,000 gallon tanks). Between 1989 and 2000 all of these tanks were safely removed from the Site.

Two additional RTNs were later assigned to address the north and south parcels abutting the Site separately. The RTN 3-0340 includes the Site and is currently in Phase IV under the Massachusetts Contingency Plan (MCP), 310 CMR 40.0000. The final Site remediation plan includes installation of a sediment cap to prevent potential contact and off-Site migration of contaminants. The MCP response actions and status for the RTNs associated with the Site and OPM property are summarized below.

3.7.1 RTN 3-2691: Area South of the Raceway

Currently all response actions for the area south of the raceway have been completed by Stone & Webster in conjunction with the Massachusetts Department of Transportation (MassDOT), formerly known as the Massachusetts Highway Department (MHD). Response actions included site assessment; building demolition; disposal of contaminated and uncontaminated demolition debris; decontamination of the basements; backfill with structural material in anticipation of bridge construction; removal of PCB-contaminated transformers and soils; and, final grading. All work was performed under a Release Abatement Measure (RAM) Plan.

The Phase II Comprehensive Site Assessment (CSA) and Phase III Remedial Action Plan (RAP) documents for this RTN and raceway were completed and submitted to the MADEP and the EPA on August 31, 2006 and September 7, 2006, respectively. A RAM Completion report was also submitted to both agencies on September 7, 2006. A Conceptual Design was included as part of the Phase III RAP document which outlined the amount of clean fill that will be placed over the Transformer No. 6 / Courtyard area prior to bridge construction. A Phase IV Remedy Implementation Plan (RIP) document was to be submitted to the MADEP in April 2011 and to date has been modified twice. A RAM Completion report was submitted to MADEP in June of 2012.

3.7.2 RTN 3-18655: Area North of the Raceway

The North Area response actions included the placement of three (3) feet of clean fill along with a geotextile membrane throughout the area. The response action for the excavation and stockpiling of wedge area (area north of the raceway) soils was initiated on November 28, 2005 and completed on May 12, 2006. A total of 5,096.53 tons of low level polychlorinated biphenyls (PCBs) contaminated soil was transported off-site to Waste Management facilities in both Rochester, NH and Norridgewok, ME. All soils managed to area north of the raceway RAM Plan have been removed

from the site. The Phase II CSA and Phase III RAP documents for the area north of the raceway were completed and submitted to the DEP and EPA on August 31, 2006. A RAM Completion report for the area north of the raceway was also submitted to both agencies on October 24, 2006. A revised Phase III was submitted in January 2009 showing areas where ACM would be reused and discussing the use of ACM from the north side on the south side. As previously stated, MADEP subsequently agreed to reuse of material from the north side on the north side but rejected reuse on the south side. A Phase IV RIP document for the area north of the raceway was submitted to the DEP in April 2011. An AUL is anticipated to be complete by June 2012 and Class A-4 RAO.

3.7.3 RTN 3-0340: Exterior Raceway (Site)

In accordance with the original Phase IV RIP (Stone and Webster, January 2009) hydraulic dredging in the interior and exterior raceways began in August 2009 to remove PCB-impacted sediments. This operation was shut down after one week because too much construction debris was found in the sediment which hindered movement of the hydraulic dredge. Sediment excavation continued by mechanical dredging but this was shutdown when it appeared that the actual sediment volume was much higher than expected. Original estimates indicated there would be 6 to 12 inches of sediment overlying a stone base floor. Instead, 6 to 8 feet of sediment/debris were encountered and there was no apparent stone bottom. PCB concentrations in residual sediment at the Site exceeded MCP upper concentration limits (UCLs).

PCB residue on the walls of the exterior raceway was removed with high-pressure water spray and post-cleaning wipe sample results were below EPA's target PCB cleanup goal of 10 $\mu\text{g} / 100 \text{ cm}^2$ for unrestricted use. During mechanical dredging of an interior raceway, a wall collapsed into the exterior raceway. All work was then discontinued in the interior and exterior raceways due to significant structural concerns.

A revised Phase IV RIP was submitted to MADEP on August 28, 2012 which describes the final cleanup response actions for the Site. A cap will be placed on top of the existing contaminated sediment to eliminate potential contact and physical mobilization of PCB impacted-sediment. The cap will consist of (from bottom to top):

- Three feet or more of ¾-inch crushed stone placed immediately above the bottom of the raceway.
- Geosynthetic clay liner (specifically made for subaqueous conditions)
- Six inches of clean sand
- Non-woven filter fabric to filter fines and orange plastic fencing
- 6-inch thick layer of crushed stone or rip rap

Following capping, the Site and OPM property will be redeveloped as a "historic" park (Oxford Park) by the Merrimack Valley Regional Transit Authority (MVRTA). It is anticipated that this work will be substantially complete by the summer of 2013.

4 USER-PROVIDED INFORMATION

4.1 Title Records

Title records were not provided to SAK for this investigation. A title search was not part of the scope of services by SAK.

4.2 Environmental Liens or Activity and Use Limitations (AULs)

There are no current environmental liens or Activity and Use Limitations (AULs) associated with the Site, but the client has indicated an AUL will be placed on the Site in conjunction with capping of sediment and abutting parcel. The AUL will be implemented with a Class A-4 Response Action Outcome (RAO) to close out RTN 3-0340 under the MCP.

4.3 Specialized Knowledge

The User of this report provided contact with Groundwork Lawrence project director and access to many reports associated with the Site and OPM property being managed under RTNs 3-0340. The Site and OPM property have been subject to extensive environmental investigations and remediation associated with past releases of oil and/or hazardous materials. The environmental conditions associated with this Site are well-documented and most of information presented in this Phase I ESA report is based on review of MCP submittals and other documents prepared for the City of Lawrence in association with the Lawrence Gateway Project. These documents are referenced in Section 8.

Although not part of remedial actions covered under the MCP after capping is completed two concrete box culverts, each 14 ft x 14 ft, will be installed in the Site to provide additional flood storage capacity. The culverts will be overlain with fill and brought to surface grade with the OPM property to construct an overlying “historic” park and green space. The eastern third of the Site, approximately 125 feet in length, will remain as an open channel to preserve the historic look of the raceways.

4.4 Commonly Known or Reasonably Ascertainable Information

The User of this report was aware of commonly known or *reasonably ascertainable* information within the local community about the Property that is material to RECs in connection with the Property. Included in this knowledge was an understanding of the releases in the area and current plans to cover the raceway.

4.5 Valuation Reduction for Environmental Issues

The User of this report was not provided information regarding a significant valuation reduction for environmental issues associated with the Property and adjoining Properties.

4.6 Owner, Property Manager and Occupant Information

The current Site owner is Essex Hydro Associates, a subsidiary of Enel North America headquartered in Andover, MA. Cleanup activities in the raceway are being managed by GenCorp, the Potentially Responsible Party for RTN 3-0340.

4.7 Reason for Performing Phase I ESA

The Phase I ESA is being performed as an environmental due diligence assessment for the City of Lawrence who will take title of the Site in the fall of 2012 (anticipated). The City will redevelop the Site and former OPM property, which is also owned by the City of Lawrence, to create a park area for public use. Site capping technologies have been designed and are planned to be implemented once the City takes ownership. Construction drawings are included in **Appendix I**.

4.8 Other (User Provided Documents)

Several reports were provided by the User for SAK's review and are included in Section 8 of this report. Other documents were obtained from MADEP's Searchable Waste Sites List/Sites Files on-line database at URL: <http://www.mass.gov/dep/cleanup/>.

5 RECORDS REVIEW

5.1 Standard Environmental Records

A Standard Environmental Records search was conducted by Environmental Data Resources (EDR) as a subcontractor of SAK. The search was performed in accordance with the search radii required under the ASTM Standard. The EDR report is included in **Appendix D**. Results are summarized below.

5.2 Federal Agency Database Findings

5.2.1 Federal Database Findings

The subject Site is not listed in any of the federal databases which include:

- National Priority List (NPL)
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)
- Resource Conservation and Recovery Act (RCRA) Generators List
- RCRA non-CORRACTS Treatment, Storage and Disposal (TSD) facilities
- Emergency Response Notification System (ERNS)
- US Engineering Controls Site List
- US Institutional Controls

The GenCorp property is listed on the CERCLIS database. Properties that are not associated with RTNs for the Site and/or OPM property were identified on the following databases:

CERCLIS: The former Lawrence Gas Manufacturing Plant located 0.38 miles east (across river)
CORRACTS: Clean Harbors Andover, LLC located 0.58 miles west/southwest. CORRACTS sites are RCRA generator, treatment and/or storage facilities that have been issued correction actions by the EPA.

RCRA: Lawrence General Hospital located 0.095 miles north/northeast was listed as a small quantity generator.

5.2.2 State and Tribal Database Findings

A total of 85 releases of oil and/or hazardous materials have been reported to MADEP within a 1-mile radius of the Site. Eleven of the release sites were also on the leaking underground storage tank (LUST) database, and one was identified as a leaking aboveground storage tank (LAST) database. The nearest registered AST is located approximately 0.18 miles northeast on 85 High Street. Additionally, a Utility Release Abatement Measure (URAM) is being conducted in the area of the Property which is associated with current bridge reconstruction work. No sites within a 1-mile radius of the Subject property have recorded AULs.

5.3 *Additional Environmental Records Sources*

Additional environmental record sources reviewed in this investigation included the following municipal department – Fire Prevention, Conservation Commission, Assessor’s Office.

5.4 *Physical Setting Sources*

5.4.1 Topography

The topography of the area surrounding the Site is generally flat with an average elevation of 30 feet above the National Geodetic Vertical Datum of 1987.

5.4.2 Subsurface Geology

Soil below this layer is assumed to be a gravelly fine sandy loam material. According to the 1983 Bedrock Geologic Map of Massachusetts prepared by the USGS, the site is underlain by Andover Granite, which is a light to medium gray foliated medium to coarse grained muscovite biotite granite.

5.4.3 Hydrology

Regional and local groundwater flow is presumed to flow east/south east towards the confluence of the Spicket and Merrimack River’s.

5.5 *Historical Records Sources*

5.5.1 Aerial Photographs

Aerial photographs of the areas were available from 1966, 1978, 1986, 1998, 2006 and 2008. Brief descriptions are below:

| Date | Aerial Photo Description |
|------------------|---|
| 1966 | Buildings are located on the north and south side of the raceway. |
| 1978, 1986, 1998 | Buildings are located on the south side of the raceway. North of the raceway is vacant. |
| 2006 | North and south of the raceway are vacant. |
| 2008 | North and south of the raceway are vacant, but covered in grass. |

5.5.2 Sanborn Fire Insurance Maps

Sanborn fire insurance maps were available from 1888, 1895, 1911, 1949, 1956, 1968 and 1972. Brief descriptions are below:

| Date | Fire Insurance Map Description |
|------------------------|---|
| 1888 | Building descriptions surrounding raceway are not legible. “Drainers” located in the raceway. Two bridges pass over the raceway. |
| 1895 | OPM property is owned by Russell Paper Co. Buildings to north of raceway include: chemical room, black ash room, boiler room, mill tanks and a soda mill. Buildings to the south include: beating engines, drainers, 40,000-gallon aboveground storage tank and a rotary bleacher building. “Drainers” were located in the raceway as well. |
| 1895 –1911 | Same buildings as 1895, but listed property listed as Champion International. An engine and pen stock is located in the raceway. |
| 1949, 1956, 1968, 1972 | Champion International, North of the raceway was a chemical mill building, tank room, black ash room, open coal pit and the boiler room. South of the raceway was a water wheel and mixing station. A wooden bridge passed over the raceway. No drainers were shown. |

5.5.3 Property Tax Files

Property information included the appraised value is provided in the City of Lawrence Assessor’s record cards in **Appendix B**.

5.5.4 Recorded Land Title Records

A title search was not performed as part of this investigation.

5.5.5 Historical USGS Topographic Quadrangles

Historical USGS topographic quadrangles were reviewed but the Site is not visible on multiple maps dating from 1888 to 1987.

5.5.6 City Directories

City directories were used to determine past ownership of the Site. The available City Directories for the subject Property address and surrounding addresses are included in **Appendix F**.

5.5.7 Zoning/Land Use Records

The Site is listed by the City of Lawrence as Zone “I2” for industrial.

5.5.8 Fire Department Records

The Fire Department had no records of the Site. Records for the OPM property were available.

5.6 Prior Reports

Prior reports for the Site are listed in Section 8 – References.

6 SITE RECONNAISSANCE

A site reconnaissance was conducted on September 24, 2012 by Mark Grady, Environmental Engineer of SAK Environmental. Mr. Brad Buschur of Groundwork Lawrence accompanied SAK during the site reconnaissance. A representative from the GenCorp property also accompanied Mr. Buschur on the walk. Photographs taken during the property inspection are included in **Appendix G**.

Exterior Observations: The Property was surrounded by construction at the time of the inspection. No work was being conducted on the Property. The raceway contained a minimal amount of water. The west end of the raceway was plugged to prevent water (groundwater or other) from entering the raceway from the west end. The areas north and south of the raceway slope towards the raceway. Surface water during storm events flows towards the raceway as well.

6.1 Methodology and Limiting Conditions

The method of inspection was limited to visual observations during a walkthrough of the raceway. Exterior observations were generally unobstructed. Sections 6.2 through 6.15 presented below apply to most Phase I ESAs. However, because the entire Site is an open channel structure and not a parcel of land much of the information required under ASTM E 1527-05 is not applicable to the Site.

6.2 Hazardous Substance Use, Storage, and Disposal

Not applicable.

6.3 Underground Storage Tanks (USTs)

Not applicable.

6.4 Aboveground Storage Tanks (ASTs)

Not applicable.

6.5 Other Petroleum Products

Not applicable.

6.6 Polychlorinated Biphenyls (PCBs)

Residual PCB-contaminated sediment exists on the bottom of the raceway but additional excavation is not being performed because it could undermine the structure. Therefore, the sediment will be capped as part of the City's redevelopment plan and MCP regulatory closure.

6.7 Unidentified Substance Containers

Not applicable.

6.8 *Non-hazardous Liquid/Solid Waste*

Not applicable.

6.9 *Wastewater*

All inlets interior raceways, which supply the Site, have been plugged.

6.10 *Waste Pits, Ponds and Lagoons*

Not applicable.

6.11 *Sumps and Drains*

A drain is located above the floor elevation of the raceway for treatment of surface water during a 100-year storm event.

6.12 *Septic Systems*

Not applicable.

6.13 *Storm Water Management System*

The outlet to the river has been dammed since 2010. Surface water entering the Site is pumped out to a treatment system on the OPM property and discharged to the Spicket River. See Section 3.3.

6.14 *Wells*

Not applicable.

6.15 *Other*

Not applicable.

7 INTERVIEWS

During site reconnaissance SAK was provided with some historical information about the subject Property.

7.1 *Other Environmental Conditions*

Other environmental conditions, such as evaluations for Asbestos-Containing Material (ACM), Radon, Lead in Drinking Water, Lead-Based Paint (LBP), and Mold Screening were not performed as part of this ESA and are beyond the scope of SAK's contract. Asbestos has been detected in soil surrounding the subject Property.

7.2 *Findings and Conclusions*

The Site has been the subject of environmental investigations and remediation since 1989 and is considered part of a disposal site under the MCP (RTN 3-0340). The Site is also targeted by the City of Lawrence as part of the Lawrence Gateway Project and is scheduled for remediation and redevelopment within the next 1 to 2 years. The results of the Phase I ESA have not provided any

additional information beyond what has been obtained during MCP response actions, and there are no further recommendations for the Site at this time.

8 REFERENCES

Brown and Coldwell, April 2012. “Revised Remedy Implementation Plan – RTN 3-0340. Raceway Remediation, GenCorp, Inc. – Lawrence Location.”

De Maximis, Inc., revised April 2009. “Remedy Implementation Plan - Massachusetts Contingency Plan, 310 CMR 40.0874, Raceway Remediation”

GenCorp, Inc., August 1993. “Site Background, Lawrence Site, Lawrence, Massachusetts (“Old Bolta Plan”)”.

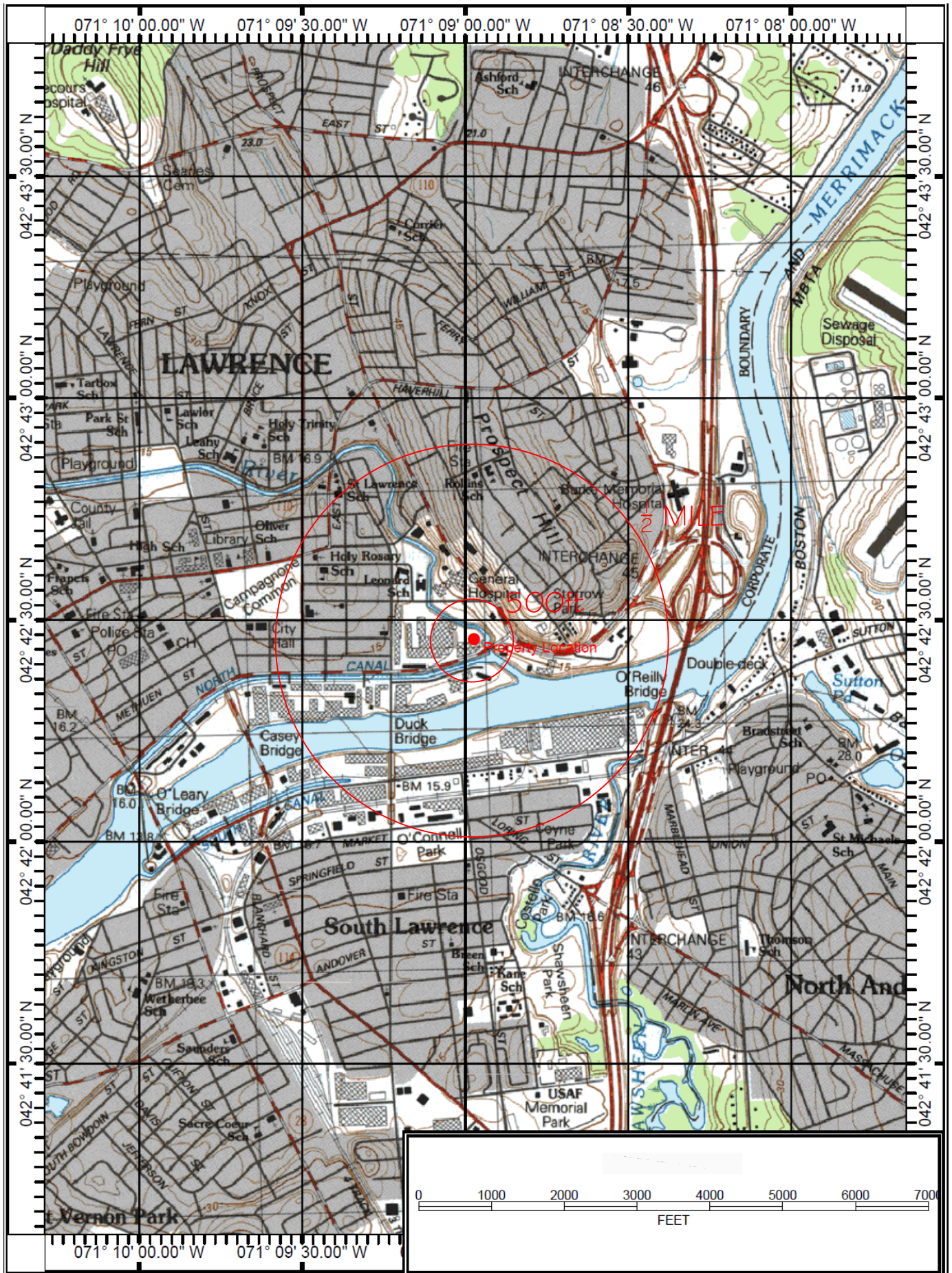
McCabe, Art, 2012. “Community Relations Plan, Merrimack Valley Regional Planning Commission, Brownfield Revolving Loan Fund: (BF-96109001), Oxford Paper Property”.

Stone & Webster, January 2009. “Revised Phase III – Remedial Action Plan for Areas North Of The Raceway.”

9 APPENDICES

| | |
|------------|--|
| APPENDIX A | FIGURES |
| APPENDIX B | ASSESSOR’S RECORDS |
| APPENDIX C | ASTM PHASE I INQUIRY CHECK LIST |
| APPENDIX D | REGULATORY DATABASE REPORT BY EDR |
| APPENDIX E | AERIAL PHOTOGRAPHS |
| APPENDIX F | SANBORN FIRE INSURANCE MAP STATEMENT |
| APPENDIX G | CITY DIRECTORIES |
| APPENDIX H | SITE PHOTOGRAPHS |
| APPENDIX I | |
| APPENDIX J | QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONAL |

APPENDIX A



231 SUTTON STREET SUITE 2G
 NORTH ANDOVER, MA 01845
 TELEPHONE: (978) 688 - 7804
 FAX: (978) 688 - 7801
 www.SAKEnvironmental.com

SPICKET RIVER RACEWAY
 CANAL STREET
 LAWRENCE, MASSACHUSETTS 01843

CLIENT:
 THE CITY OF LAWRENCE
 SCALE:
 SEE SCALE ON MAP

DRAWN BY:
 SJD
 CHECKED BY:
 SAS



SAK Environmental

FIGURE 2 - AERIAL VIEW

PROJECT NO. 12.29.00

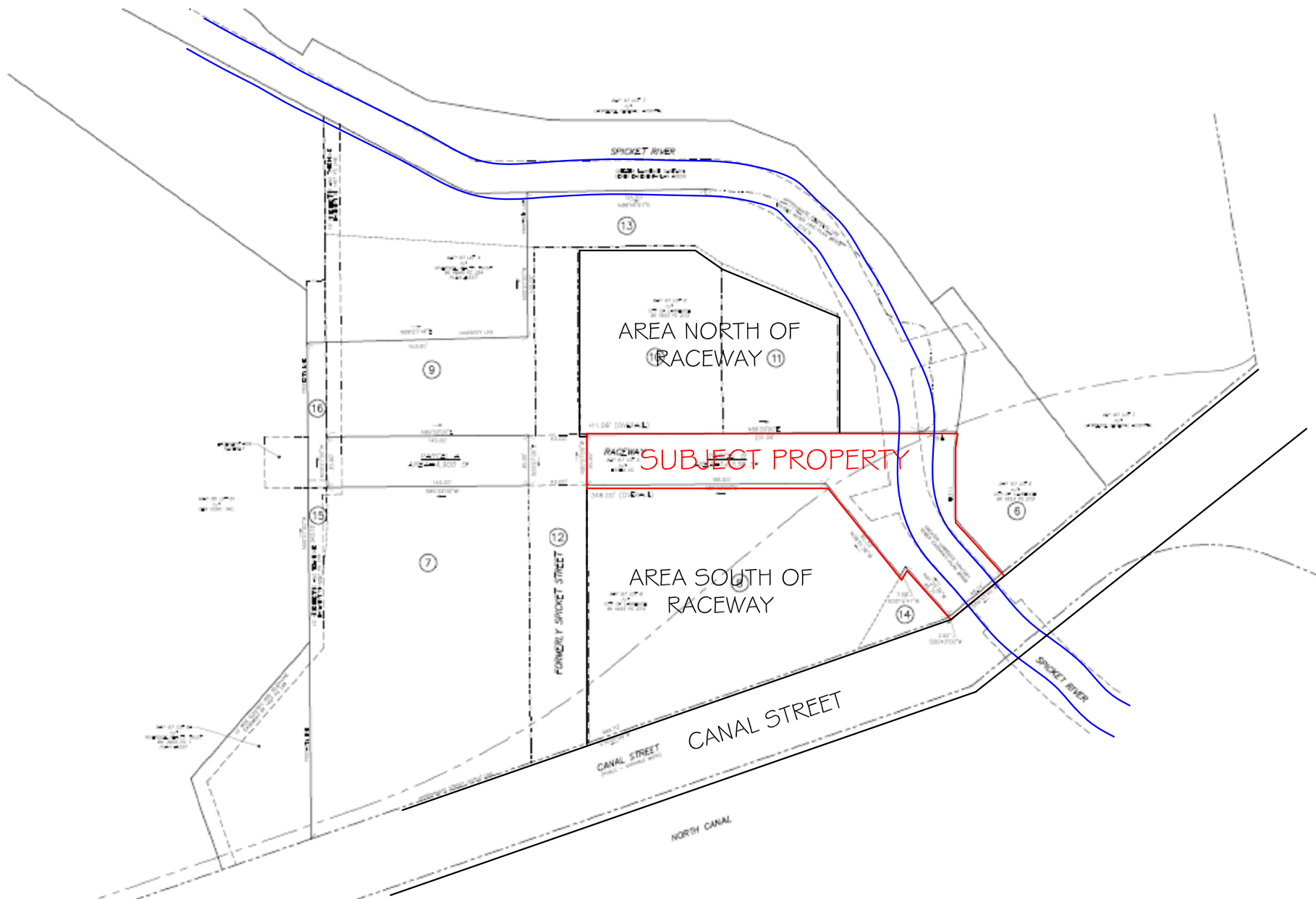
DATE: SEPTEMBER 27, 2012

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CLIENT:
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 APPROXIMATE SCALE:
 NOT TO SCALE

DRAWN BY:
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sak Environmental

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FIGURE 2 - SITE PLAN

SPICKET RIVER RACEWAY
 CANAL STREET
 LAWRENCE, MASSACHUSETTS
 01843

PROJECT NO. 12.29.00

CLIENT:
 THE CITY OF LAWRENCE

APPROXIMATE SCALE:
 NOT TO SCALE

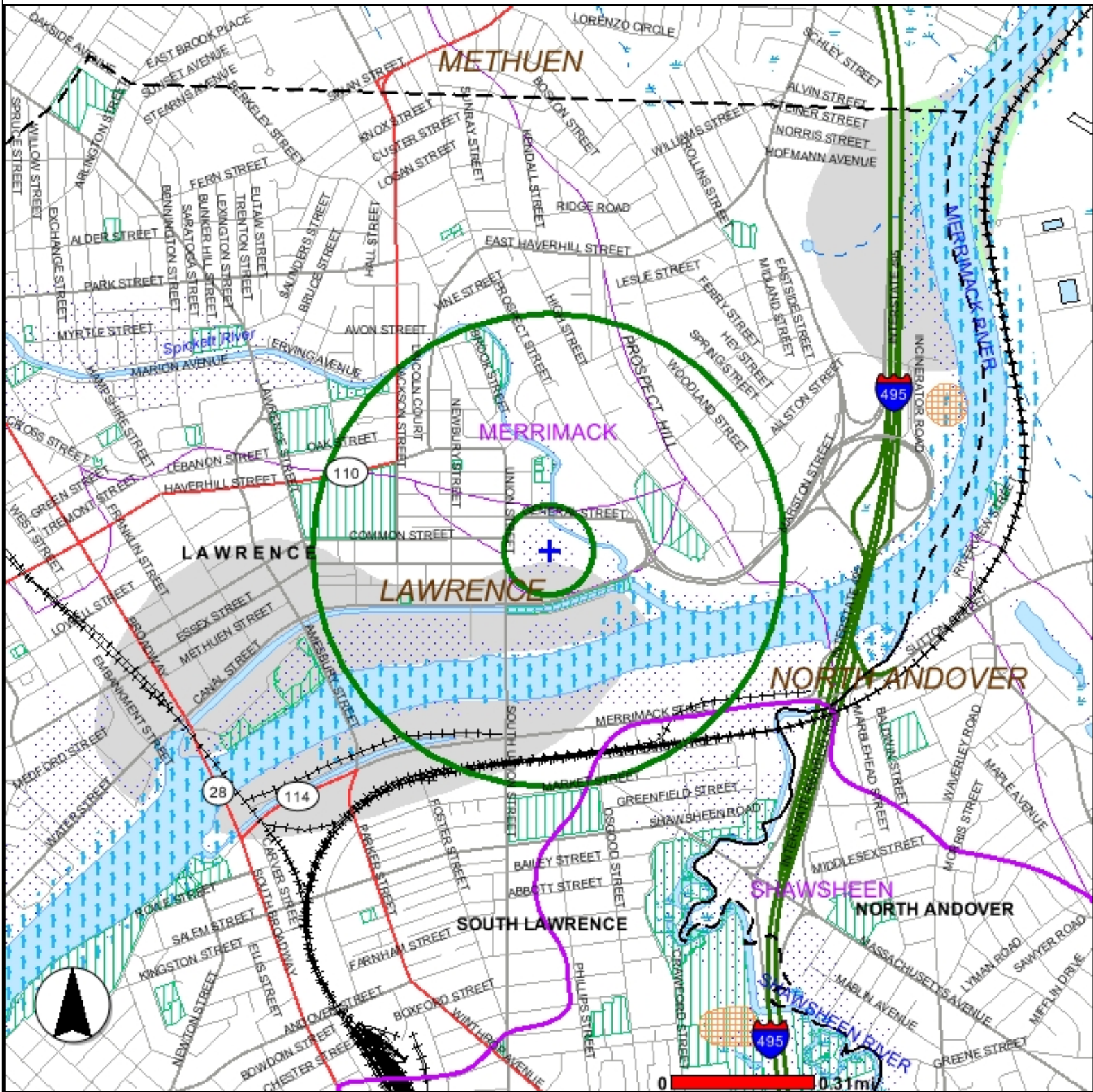
DATE: SEPTEMBER 27, 2012

DRAWN BY:
 SJD

CHECKED BY:
 SAS

LEGEND

- PROPERTY LOCATION
- ~ SPICKET RIVER
- ADJACENT PROPERTIES



Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail
 Boundaries: Town, County, DEP Region; Train, Powerline, Pipeline; Aqueduct
 Basins: Major, Sub; Streams: Perennial, Intermittent, Man Made Shore, Dam
 Aquifers: Medium Yield, High Yield, EPA Sole Source
 Non Potential Drinking Water Source Area: Medium, High (Yield)

PWS Protection Areas: Zone II, IWPA, Zone A
 Hydrography: Open Water, PWS Reservoir, Tidal Flat
 Wetlands: Freshwater, Saltwater, Cranberry Bog
 FEMA 100yr Floodplain; Protected Open Space; ACEC
 NHESP: Est Rare Wetland Habitat, Certified Vernal Pool
 DEP Permitted Solid Waste Landfill

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FIGURE 4 - MADEP PRIORITY RESOURCE MAP
 SPICKET RIVER RACEWAY
 CANAL STREET
 LAWRENCE, MASSACHUSETTS 01843

PROJECT NO. 12.29.00
 CLIENT:
 THE CITY OF LAWRENCE
 SCALE:
 SEE SCALE ON MAP

DATE: SEPTEMBER 27, 2012
 DRAWN BY:
 SJD
 CHECKED BY:
 SAS