

**PHASE II ASSESSMENT REPORT
FORMER REGAL SHOE CISTERN SITE
LOT 1-ABUTTING 401 SOUTH AVENUE
WHITMAN, MASSACHUSETTS
MASSDEP RELEASE TRACKING NO. (RTN) 4-0588**

Prepared for:

Mr. Frank Lynam
Town Manager
Town of Whitman
54 South Avenue
Whitman, Massachusetts 02382

Prepared by:

Ransom Consulting, Inc.
60 Valley Street, Building F, Suite 106
Providence, Rhode Island 02909
(401) 433-2160

Project 151.02051.001
January 4, 2017

EXECUTIVE SUMMARY

On behalf of the Town of Whitman, Massachusetts, Ransom Consulting, Inc. (Ransom) has prepared this Phase II Assessment Report summarizing the results of document review and a Phase II subsurface investigation for the Former Regal Shoe Cistern Site ("Site"). The approximate 19.84-acre Site property is designated by the Town of Whitman Assessor as parcel ID 7-75-1 and owned by H&G Whitman Development Co. c/o Gowdy. A Notice of Responsibility (NOR) was issued to H. and G. Whitman by the Massachusetts Department of Environmental Protection (MassDEP) in August 1998, which assigned Release Tracking Number (RTN) 4-0588 to a release of petroleum hydrocarbons. The Site is classified by MassDEP as "Tier ID". The Site is located within a Zone II public water supply protection area.

A number of shoe factories operated at the Site from the mid-1880s to the 1960s and a variety of businesses leased the Site in the early 1970s. The former Site building was razed in 1973 and the Site has been vacant since that time. Multiple above ground tanks (ASTs) and underground storage tanks (USTS), including a wastewater cistern, were present at the Site during operation of the former shoe manufacturing facilities, all of which were reportedly removed. The United States Environmental Protection Agency (EPA) conducted a Removal Action from 2005 to 2006, which included the excavation and off-Site disposal of approximately 4,000 tons of contaminated soil to depths ranging from 1 to 5 feet below ground surface (bgs) and disposal of 10,000 gallons of sludge/liquids from a former cistern. The cistern was demolished by EPA as part of the Removal Action and the excavated area was backfilled with clean fill. Based on Ransom's review of historic documents and reports, the EPA removal actions included the excavation and off-Site disposal of soil from a portion of a former "landfill" at the southwestern portion of the Site, which was observed to contain leather scraps, bricks, glass, paint cans, tar buckets, metal scraps and rocks, along with installation of a clean soil cap. Based on a review of historic aerial photographs, Ransom estimates the size of the landfill as an approximate 200-foot by 200-foot area. The eastern and southeastern portions of the former landfill are located within a wetland area and do not appear to have been included as part of EPA's Removal Action.

Ransom conducted subsurface investigations in February and June 2016, which included soil, groundwater and surface water sampling. Based on the results of Ransom's investigation, along with a review of historic data, there is evidence of heavy metals impacts to Site soil within the southwestern portion of the Site (landfill area), along with residual lead impact to Site soil at the northwestern portion of the Site. Concentrations of barium, chromium and zinc were detected in Site soil at levels exceeding applicable Massachusetts Contingency Plan (MCP) Reportable Concentrations and represent a MCP 120-Day Reporting condition for the Potentially Responsible Party (PRP), upon obtaining knowledge of the release condition.

There is evidence of a contaminant source of landfilled debris at the southwestern portion of the Site and in localized soil at the northwestern portion of the Site. Although a clean soil cap serves as a measure to mitigate potential exposure to contaminated soils within the western portion of the landfill and wetland vegetation restricts access to the eastern/southern portions of the landfill, remediation and/or implementation of an Activity and Use Limitation (AUL) is necessary to achieve a MCP Condition of No Significant Risk at the Site for future unrestricted use. Based on the evidence of trespassing, there is a potential that erosion of the clean soil cap installed by EPA in 2005-2006 may erode over time and contribute to potential exposure of Site contaminants to receptors.

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
2.0	GENERAL SITE DESCRIPTION AND HISTORY	2
2.1	Site Location	2
2.2	Site Description and Current Use	2
2.3	Site History	2
2.4	Site Owner History	3
2.5	Oil and/or Hazardous Material Use, Waste Management and Storage History	3
4.0	SUMMARY OF ASSESSMENT AND REMOVAL ACTIVITIES	4
4.1	Historic Site Activities- RTN 4-0755	4
4.1.1	MCP Reporting Conditions, Notices of Noncompliance.....	4
4.1.2	Site Investigation Activities: 1990-2005	4
4.2	Recent Site Activities-2016	6
4.2.1	Limited Geophysical Survey	7
4.2.2	Soil Boring Advancement.....	7
4.2.3	Monitoring Well Installation	8
4.2.4	Groundwater Sampling and Well Elevation Survey	8
4.2.5	Sediment and Surface Water Sampling	8
4.3	Sampling Analytical Results.....	9
4.3.1	Soil samples	9
4.3.2	Groundwater samples	9
4.3.3	Surface water samples	9
5.0	SUMMARY OF SITE CONTAMINATION IMPACTS.....	10
6.0	CONCLUSIONS	11
7.0	LIMITATIONS.....	12
8.0	REFERENCES.....	13

TABLES

Table 1:	Summary of Soil Laboratory Analytical Results
Table 2:	Summary of Groundwater Laboratory Analytical Results
Table 3:	Summary of Cistern Sludge Laboratory Analytical Results
Table 4:	Summary of Surface Water Laboratory Analytical Results

FIGURES

Figure 1:	Site Location Map
Figure 2:	Site Plan
Figure 3:	Historic Site Details
Figure 4:	Groundwater Contour Plan

APPENDICES

Appendix A:	MassGIS Priority Resource Map
Appendix B:	Historic Sanborn Maps and Aerial Photographs
Appendix C:	Pertinent Town of Whitman Fire Dept. records
Appendix D:	Pertinent EPA Historic Site Plans and Figures
Appendix E:	Pertinent EPA Reports
Appendix F:	2016 Limited Geophysical Survey Report
Appendix G:	2016 Soil Boring and Monitoring Well Construction Logs
Appendix H:	2016 Groundwater Sampling Logs
Appendix I:	2016 Laboratory Analytical Reports – Soil Samples
Appendix J:	2016 Laboratory Analytical Report – Groundwater Samples

1.0 INTRODUCTION

On behalf of the Town of Whitman, Massachusetts, Ransom Consulting, Inc. (Ransom) has prepared this Phase II Assessment Report to address the results of a document review and subsurface investigation conducted at the Former Regal Shoe Cistern Site ("Site") in 2016. The "Site" as defined herein consists of an approximate 19.84-acre property designated by the Town of Whitman Assessor as parcel ID 7-75-1 and owned by H&G Whitman Development Co. c/o Gowdy. A Notice of Responsibility (NOR) was issued to H. and G. Whitman by the Massachusetts Department of Environmental Protection (MassDEP) in August 1998, which assigned Release Tracking Number (RTN) 4-0588 for a release of petroleum hydrocarbons. The Site is classified by MassDEP as "Tier ID". The Site is located within a Zone II public water supply protection area.

The Town obtained access from the owner to conduct a Phase II investigation at the Site. Site investigations were conducted by Ransom in 2016 within the approximate 300,000 square foot area of the Site, which defines the Massachusetts Contingency Plan (MCP) disposal site boundary.

A Site Location Map, Site Plan Historic Site Details and Groundwater Contour Plan are provided as Figures 1 through 4.

2.0 GENERAL SITE DESCRIPTION AND HISTORY

2.1 Site Location

The approximate 19.84-acre Site is designated by the Town of Whitman Assessor as Parcel ID 7-75-1 and owned by H&G Whitman Development Co. c/o Gowdy. The Site is abutted to the north by South Ave., beyond which is a multi-family residential building; to the east by Beech Hill Brook (tributary of Shumatuscant River), beyond which is an auto body facility; to the northwest by a mixed commercial/residential building (401 South Ave.); to the west by an active Massachusetts Bay Transportation Authority (MBTA) railroad and commuter rail station, beyond which is the Shumatuscant River and, to the south by wetlands. Referring to Appendix A, MassGIS Priority Resource Map, the Site is located within a Zone II public water supply protection area. Figure 1 is a Site Location Map.

2.2 Site Description and Current Use

The Site is currently undeveloped and vacant and portions of the Site are heavily vegetated, including areas of wetlands along the southern portion of the Site and wooded areas along the eastern portion of the Site. Access to the Site is via South Avenue (east of 401 South Avenue) and along (sandy) roads and paths throughout the Site which have been created by trespassers (suspect all-terrain vehicle [ATV] use). Dog walkers were observed on the dates of Ransom's Site investigation. Other than the western portion of the Site, there is no fenced enclosure to restrict Site access. The MCP Disposal Site boundary measures an approximate 600-foot by 500-foot area at the western portion of the Site and depicted on Figure 2.

2.3 Site History

According to historic reports and documents, a number of shoe factories operated at the Site from the mid-1880s to the 1960s and a variety of businesses leased the Site in the early 1970s. The former Site building was razed in 1973 and the Site has been vacant since that time.

Referring to historic Sanborn Fire Insurance Maps (Appendix B), the former manufacturing facility buildings occupied the Site and the northwesterly abutting 401 South Ave. property.

1. Smith, Stoughton & Payne B. & S. Mfry" is depicted on the 1885 and 1891 Sanborn maps as a T-shaped building.
2. On the 1896 map, the building footprint has increased and is occupied by "Smith & Stoughton Boot & Shoe Mfy". Additional buildings include coal sheds and a freight house. In 1900, the Site is occupied by "L.C. Bliss & Co. She Mfy".
3. Sanborn maps from 1905, 1911, 1919, 1939, 1950 and 1959 reference "Regal Shoe Co.", showing changes to the building footprint within this time span. Shoe manufacturing building operations depicted in the Sanborn maps include office space, sole leather dept., finishing, stitching, lasting, dressing, blacking, packaging, bottoming, cutting, fitting, shipping, receiving leather storage and coal storage, freight house, paint storage and "IR dust separator". Coal and leather were used for fuel in the 1800's and early 1900's.

2.4 Site Owner History

According to historic reports, multiple shoe manufacturing companies owned the Site property. The William L. Reed Company established ownership of the Site property circa 1866. In 1879, the property was transferred to Reed and Closson and the factory burned down in 1883. A new factory was constructed on the Site in 1892 by Smith and Stoughton and building burned down on 1896. The Site property was owned by Regal Shoe Company from circa 1924, which constructed a new building and operated its facility at the Site. The property was transferred to Regal Shoe Manufacturing in 1954 and to Edward and Carl Kane, Regal Industrial Building and Trust on 1960. Shoe manufacturing reportedly ceased at the Site in 1960. Subsequent to 1960, the Site was owned and operated by various businesses, including a cardboard manufacturing company until circa 1973. Reportedly, a number of “commercial land development companies” owned the property from the early to mid-1980s. The Site property was purchased by H and G Whitman Development Company, Inc. in 1987. The property is currently in tax arrears.

2.5 Oil and/or Hazardous Material Use, Waste Management and Storage History

The following summary is based on a review of pertinent historic reports, documents and aerial photographs and Sanborn insurance maps (Appendix B). Pertinent Site records obtained from the Whitman Fire Dept. are included as Appendix C.

1. A former cistern (comprised of three interconnected underground vaults), one 15,000-gallon No. 6 fuel oil and one 1,000-gallon (suspect petroleum) underground storage tanks (USTs) were formerly located at the Site. The USTs were removed in 1989 and the cistern was demolished in 2006.
2. A Plan titled “Regal Shoe Co. and dated August 14, 1908, depicts a gasoline UST at the southeastern portion of the site and designated as “not used” and a proposed 15,000 “below grade” oil storage tank at the western portion of the Site. A 10,000-gallon tank (20-foot elevation) is show at the western portion of the Site building.
3. 1911 and 1919 Sanborn maps depict a 3,000-gallon “buried gasoline” tank at the northern portion of the Site and a 10,000-gallon tank (referenced as 75 feet above ground) is shown within the western portion of the building complex. A 20,000-gallon tank (contents unknown and referenced as 75 feet above ground) is shown to the east of the building and connects to the Site building via two 6-inch diameter pipes. A cement storage building is shown to the southeast, which appears to connect to the Site building via a pipe-like structure and appears to be the former cistern.
4. According to a letter issued on August 29, 1989 to Hills and Gowdy Development Company by the Town of Whitman Fire Department, a 1,000-gallon above-ground storage tank (AST) was located on the southwest corner of the Site.
5. A 1970 aerial photograph for the Site area shows a large swath of suspect waste materials resembling leather hides along the southwestern portion of the Site and suggests that this is the area referenced in reports as the “landfill area” and is depicted in Figure 2-Site Plan. It is noted that historic Sanborn maps show a leather storage building at the southwestern portion of the Site and within the immediate vicinity of the landfill area.

4.0 SUMMARY OF ASSESSMENT AND REMOVAL ACTIVITIES

Ransom conducted a Site investigation on behalf of the Town from February to June 2016. Historic Site activities were conducted by various consultants, including those on behalf of the former owners, MassDEP and USEPA, from 1988 to 2006. EPA conducted a removal action in 2005 and 2006, which included the removal of a former cistern, excavation and off-Site disposal of cistern sludge and liquids and contaminated soil, and installation of a clean soil cap at portions of the Site. Soil, groundwater, cistern sludge, and surface water results are summarized in Tables 1 through 4. Pertinent Site details are depicted in Figures 1 through 4.

4.1 Historic Site Activities- RTN 4-0755

The following is a summary of historic Site activities conducted at the Site from 1988 to 2006, based on a review of available reports on file at MassDEP (eDEP) and an EPA file review conducted by Ransom in 2016.

4.1.1 MCP Reporting Conditions, Notices of Noncompliance

On July 19, 1988, MassDEP was notified of a release of petroleum hydrocarbons associated with gasoline-impacted fill materials. Approximately 700 cubic yards (CY) of petroleum hydrocarbon impacted soils were excavated and disposed off-Site. During Site grading activities, an approximate 15,000-gallon UST was discovered, which contained approximately 14,000 gallons of No. 6 fuel oil, along with evidence of two broken feed lines. MassDEP assigned release tracking number (RTN) 4-0588 to the petroleum release. Approximately 600 CY of soil was excavated and the tank was removed and disposed off-Site in August 1998. A Notice of Responsibility (NOR) was issued to H&G Whitman Development Company. On May 5, 2005, MassDEP issued a Notice of Noncompliance (NON) to H&G Whitman Company for RTN 4-0588, due to non-submittal of MCP reports within the required regulatory timelines.

4.1.2 Site Investigation Activities: 1990-2005

Rizzo Investigations (1990-1991)

Rizzo Associates, Inc. (Rizzo) oversaw the advancement of six soil borings (RIZ-01 through RIZ-05 and RIZ 3A) in July 1990. The borings were advanced to approximate depths ranging from 5 to 16 feet below ground surface (bgs). Soil samples were collected and field-screened using a photoionization detector (PID) and no soil samples were submitted for laboratory analysis. Rizzo collected soil samples from Site stockpiles in July 1990, which were submitted for laboratory analysis of total petroleum hydrocarbons (TPH) and heavy metals (select samples). Groundwater samples were submitted for laboratory analysis of TPH and Volatile Organic Compounds (VOCs).

In February 1991, Rizzo conducted soil, groundwater and cistern sludge sampling. Referring to Figure 2, eight test pits (TP-1 through TP-8) were excavated throughout the Site at depths ranging from 1 to 4 feet below ground surface (bgs). At the southwestern portion of the Site, the area was described as "raised into a flat-topped terrace about three feet higher than the rest of the Site". During excavation activities, leather scraps, bricks, glass, paint cans, tar buckets, metal scraps and rocks were encountered. A soil sample was collected from test pit TP-7 and submitted for laboratory analysis of TPH, 13 Priority Pollutant metals (PPM), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCBs), pesticides and VOCs. Rizzo collected a

sample from the cistern for laboratory analysis of the aforementioned analytes, with the exception of pesticides.

Rizzo prepared a Hazardous Materials Preliminary Site Assessment/Phase I-Subsurface Investigation report, dated May 20, 1991 for South Shore Bank (on file at eDEP). At the time of Rizzo's activities, the Site was described as an "empty lot". Rizzo noted the following pertinent Site features:

1. The northern portion of the Site was described as an open graveled area.
2. Five piles of soil were present at the Site prior to February 2001 (SP-1" through "SP-5"). The sizes of the stockpiles was not documented.
3. A "set of three cisterns" was buried in an area at the southeastern portion of the Site, which was comprised of three 11-foot diameter brick-lined cylindrical vaults interconnected by conduits and containing standing water.

ES&M/MassDEP Investigations (2004 to 2005)

On behalf of MassDEP, Environmental Strategies & Management, Inc. (ES&M) conducted Site investigations in 2004 and 2005. A geophysical survey revealed the presence of the former cistern, along with evidence of potential underground utilities. In December 2004, ES&M advanced six borings (ESM-1 through ESM-5 and SB-1) to approximate depths ranging from 8 to 12 feet bgs. Soil samples were collected from depths ranging from 0 to 8 feet bgs and submitted for laboratory analysis of Volatile Petroleum Hydrocarbons (VPH) and target analytes, Extractable Petroleum Hydrocarbons (EPH) and PAH target analytes, RCRA 8 metals, VOCs and PCBs. Groundwater samples were collected from existing Rizzo wells and the new ES&M wells in January 2005 and submitted for analysis of VPH, EPH, RCRA 8 metals and PCBs. Refer to Figure 2 for sample locations.

Weston/EPA Investigations (2005-2006)

On behalf of USEPA, Weston Solutions, Inc. (Weston) conducted Site investigation activities from 2005 to 2006. Soil samples were collected from the five existing stockpiles and in areas throughout the Site. In April 2005, Weston collected 13 surface soil samples (SS-1 through SS-13); 13 subsurface samples (SD-1 through SD-13); 5 cistern sludge samples (T-01 through T-04) and 7 surface water samples (SW-1 through SW-7) from the abutting brook. Media were submitted for analysis of VOCs, Semivolatile Organic Compounds (SVOCs), pesticides, PCBs and metals. No groundwater samples were collected. Sample locations are depicted in historic figures (Appendix D) and Figure 2.

Weston conducted an "extent-of-contamination sampling survey" in March and April 2006. Over 40 surface soil samples were collected throughout the Site in a grid-pattern (Appendix D) and submitted for laboratory analysis of SVOCs and select RCRA 8 metals. Six sediment samples were collected from the easterly abutting brook and submitted for laboratory analysis of RCRA 8 metals and mercury.

In May 2006, EPA excavated 12 test pits (TP-1 through TP-12) in the landfill area, based on visual evidence of "brick, wood, metal and leather debris". The test pits were excavated to an approximate depth of 3 feet bgs and collected a surface soil sample and a sample at the 3-foot

depth. The samples were submitted for laboratory analysis of SVOCs and RCRA 8 metals. Test pit locations are depicted in Figure 2.

EPA Removal Activities-2005 to 2006

EPA designated 4 excavation areas (“Area 2” through “Area 5”) and described as follows and depicted on Figure 2. (“Area 1” was not documented in available EPA report figures):

1. Area 2 (Corridor at northeastern portion of the Site): EPA conducted soil excavation activities in May 2006. Soil was excavated to an approximate depth of 1 foot bgs and one soil sample was collected at the base of the excavation on May 30, 2006 and submitted for laboratory analysis of SVOCs and RCRA 8 metals.
2. Area 3: (Corridor at western portion of the Site): EPA conducted soil excavation activities in April 2006. The excavation depth was not documented. Four post-excavation soil samples (SS-12, SS-13, SS-16 and SS-18/19/20) were collected on April 28, 2006 and submitted for laboratory analysis of SVOCs and RCRA 8 metals. Referring to Table 1, a concentration of lead was detected in one sample (SS-18/19/20) at a level exceeding the current MCP RCS-1 and Method 1 Soil Standard. EPA conducted the excavation of an additional 6 inch depth of soil in May 2006
3. Area 4: (Cistern area, located at southeastern portion of the Site): In April 2006, EPA pumped approximately 10,000 gallons of sludge and liquid from the cisterns, and conducted the excavation and removal of the three separate concrete and brick cisterns and associated piping. The cisterns were constructed above-ground and underground. The depth of the cisterns and excavation were not documented. Three post-excavation sidewall soil samples were collected submitted for laboratory analysis of SVOCs and metals. Based on a review of post-excavation results, EPA conducted additional excavation activities. No additional post-excavation sampling was documented.
4. Area 5: (Western portion of landfill, located at the southwestern portion of the Site): In June 2005, EPA excavated soils in Area 5 to approximate depths ranging from 3 to 3.5 feet bgs. One June 6, 2006, EPA collected six post-excavation soil samples and submitted for laboratory analysis of SVOCs and metals.

Prior to backfilling, EPA lined the post-excavation areas with geotextile fabric and backfilled the areas with clean fill. “Due to the close proximity to ground water at the Site, all excavations were terminated at a maximum of 5 ft bgs (1-2 ft above the groundwater table)”. A total of approximately 4,000 tons of contaminated soil was disposed off-Site (including stockpiled soil) and approximately 2,000 tons of clean fill was used as backfill. Copies of available pertinent EPA reports are included as Appendix E.

4.2 Recent Site Activities-2016

Ransom conducted Site activities from February to June 2016, which included a limited geophysical survey, and sampling of soil, groundwater and surface water.

4.2.1 Limited Geophysical Survey

On February 26, 2016, prior to the commencement of drilling activities, TPI Environmental (TPI) of Boston, Massachusetts confirmed the locations of on-Site utilities and underground anomalies via a geophysical survey. The geophysical survey included an electromagnetic metal detector survey, a ground penetrating radar (GPR) survey, and a radio frequency line location survey. According to the report issued by TPI, a copy of which is provided in Appendix F, a suspect pipe was detected at the southeastern portion of the Site. The pipe appears to have been associated with the former cistern.

4.2.2 Soil Boring Advancement

On February 29, 2016 and June 22, 2016, Ransom oversaw the advancement of 14 soil borings, identified as SB101 through SB108 and SB201 through SB206, using direct-push drilling methods (i.e. Geoprobe drilling methods). Technical Drilling Services, Inc. (TDS) conducted drilling activities. Borings were advanced to an approximate depth of 15 feet bgs. The borings were placed within the areas of former USTs, building footprint, cistern and landfill area. Boring locations are depicted in Figure 2.

Ransom encountered wet surface conditions within the former landfill area during the February 2016 sampling events. The June 2016 soil sampling event was conducted to assess the extent of contaminant impacts within accessible areas of the former landfill area, based on the results of the February sampling event. Access to the eastern/southeastern portion of the former landfill area was restricted, due to heavy vegetative growth (phragmites). Site surface conditions in the landfill area in July were dry, which may have been attributed to drought and/or seasonal conditions.

Soil samples collected during the advancement of the soil borings were visually classified in the field by Ransom in general accordance with the Burmister Soil Classification System. Sample intervals, sample recovery, and organic vapor and total petroleum hydrocarbon concentrations (as determined by field screening noted below) are included on the soil boring logs, provided in Appendix G. Soil samples collected during the advancement of the soil borings were observed for visual and olfactory evidence of contamination and were screened in the field for the presence of organic vapors using a photionization detector (PID)-equipped instrument with a 10.6 electron volt lamp and calibrated to an isobutylene standard. PID readings were 0 parts per million (ppm) or non-detect (ND).

Soil samples were selected for laboratory analysis based on the results of qualitative field screening and visual and olfactory observations. Continuous soil sampling was conducted and samples were collected from 5-foot acetate sleeves. Soil samples were collected directly from the sampling equipment and transferred into laboratory-prepared glassware. The samples were preserved in the field in accordance with applicable protocols and delivered on ice under chain-of-custody to ConTest Laboratory of Westfield, Massachusetts for analysis of Volatile Petroleum Hydrocarbons (VPH) and target analytes, Extractable Petroleum Hydrocarbons (EPH) and target Polycyclic Aromatic Hydrocarbon (PAH) analytes, RCRA 8 metals, TCLP chromium and PCBs. Based the visual observations of green soil, a sample was collected from boring SB106 for laboratory analysis of cyanide. A composite soil sample was collected on June 22, 2016 for laboratory analysis of disposal characteristics (TPH, SVOCs, VOCs, RCRA 8 metals, PCBs, corrosivity and reactivity).

4.2.3 Monitoring Well Installation

The SB100-series soil borings were completed as 2-inch diameter flush-mount groundwater monitoring wells, constructed of Schedule-40 PVC casing and 10-slot screen. The annulus surrounding the screen was filled with an appropriate sandpack sized to the well screen slot size and was extended a minimum of two feet above the top of screen. An approximate two-foot thick bentonite seal was installed above the sandpack and the remainder of the borehole annulus was filled with sand. The wells were developed by the driller.

4.2.4 Groundwater Sampling and Well Elevation Survey

From March 8-10, 2016, Ransom collected groundwater samples from monitoring wells MW101 through MW108. Groundwater levels were gauged using a Solinst® Model 122 electronic oil-water interface probe (1 millimeter accuracy). No light non-aqueous phase liquid (LNAPL) was encountered in any of the sampled wells. Purging rates were maintained at approximately 100 milliliters per minute (ml/min). Discharge water was monitored for stabilization of field indicator parameters (i.e., pH, temperature, specific conductance, dissolved oxygen, oxidation/reduction potential [ORP], and turbidity) using a Yellow Springs Instruments (YSI) multi-parameter sonde flow-through cell and a Geotech Model II peristaltic pump. Dedicated polyethylene tubing with the inlet located approximately at the mid-point of the water column was used to collect samples from each well. During purging, groundwater was monitored for pH, specific conductance, temperature, dissolved oxygen, turbidity, and ORP at 3 to 5-minute intervals until the following stabilization criteria were met for three consecutive readings. It is noted that turbidity levels were not achieved for groundwater sampled from well MW103. Depth to groundwater ranged from 4.4 to 7.5 feet bgs.

The data were recorded on low flow sample data sheets, which are included in Appendix H. When purging was completed, the discharge line from the pump was disconnected from the YSI flow cell and samples were collected directly from the peristaltic pump discharge tube into pre-preserved containers provided by Con-Test. Following collection, samples were subsequently placed on ice in a cooler, logged on a chain-of-custody form, and transported by courier. Groundwater samples were submitted for laboratory analysis of VPH and target analytes, EPH and target analytes, dissolved RCRA 8 metals (field-filtered) and PCBs.

Ransom conducted an elevation survey of the new Site wells, using a Topcon optical survey system. Referring to Figure 3, Site groundwater was determined to flow to the east, towards the abutting brook.

4.2.5 Sediment and Surface Water Sampling

On March 9, 2016, Ransom collected one surface water sample (SW101) at the northeastern portion of the abutting stream, which was collected from the sidewalk on South Ave. The samples were submitted to ConTest for analysis of VPH and target analytes, EPH and target analytes and total RCRA 8 metals. Access to the brook from the Site was restricted, due to heavy vegetative cover. Therefore, the proposed sediment sampling and additional surface water sampling was not accomplished.

4.3 Sampling Analytical Results

4.3.1 Soil samples

Referring to Table 1, Summary of Soil Laboratory Analytical Results, soil concentrations were compared to applicable Massachusetts Contingency Plan (MCP) Reportable Concentrations for Soil Category S-1 (RCS-1) and Method 1 Soil Standards. Concentrations of barium, chromium and zinc were detected in soil (SB106, SB201) at levels exceeding applicable MCP RCS-1 and Method 1 Soil Standards. The soil samples were collected within the former landfill area at approximate depths ranging from 2 to 4 feet bgs. The laboratory analytical reports are included as Appendix I.

4.3.2 Groundwater samples

Referring to Table 2, Summary of Groundwater Laboratory Analytical Results, none of the analyzed constituents were detected at levels exceeding their respective MCP RCGW-1 or Method 1 Groundwater Standards. The laboratory analytical report is included as Appendix J.

4.3.3 Surface water samples

Referring to Table 4, Summary of Surface Water Laboratory Analytical Results, concentrations of analyzed constituents were compared to EPA National Recommended Water Quality Criteria (WQC) for Freshwater. All analyzed constituents were non-detect or detected at low levels below EPA WQC.

5.0 SUMMARY OF SITE CONTAMINATION IMPACTS

1. The removal action conducted by EPA appears to have removed contaminant impacts associated with the former cistern.
2. Based on the removal of former ASTS and USTs, along with excavation of petroleum contaminated soils, the results of recent soil and groundwater sampling indicate that prior removal and cleanup activities were successful in remediating petroleum hydrocarbon impacts.
3. Concentrations of heavy metals (arsenic, barium, lead, chromium, zinc) are present in soil at the southwestern portion of the Site and within the eastern portion of the former landfill. It is likely that the eastern footprint of the landfill was not addressed under EPA's removal action, due to the presence of wetlands. The EPA removal action appears to have removed soils and debris at the western portion of the landfill to approximate depths ranging from 3.0 to 3.5 bgs and installed a clean cap. Based on the results of post-excavation sampling conducted by EPA in 2006, there is evidence of contaminant impacts at depths greater than 3.5 feet bgs within the footprint of the landfill. Based on the results of historic and recent sampling, there is a potential that at least 30% of the landfill footprint contains waste materials that serve as a contaminant source. However, the results of recent groundwater sampling suggest that metals contaminants detected in Site soil have not migrated to groundwater.
4. A localized area of lead-impacted soil is present at the northwestern portion of the Site, based on post-excavation soil sample results collected in 2006.
5. Based on the results of historic and recent sampling conducted at the Site, there is no evidence of contaminant impacts to Site groundwater.
6. Potential impacts to sediment and surface water at the abutting brook are unclear and require additional assessment.

6.0 CONCLUSIONS

Based on the information presented in this Phase II Assessment Report, Ransom makes the following conclusions:

1. There is evidence of a contaminant source of landfilled debris at the southwestern portion of the Site and in localized soil at the northwestern portion of the Site. Although a clean soil cap serves as a measure to mitigate potential exposure to contaminated soils and that the presence of wetland vegetation restricts access to the eastern/southern portions of the landfill, remediation or implementation of an Activity and Use Limitation (AUL) is necessary to achieve a MCP Condition of No Significant Risk at the Site.
2. There is no evidence that Site groundwater or air serve as an exposure pathway to Site contaminants.
3. Additional assessment is required to assess potential Site contaminant impacts to the easterly abutting brook.
4. No conditions warranting an Immediate Response Action (IRA) have been identified at the Site;
5. Based on the evidence of trespassing, there is a potential that erosion of the clean soil caps installed by EPA in 2005-2006 may erode over time and contribute to potential exposure of Site contaminants to receptors.



August 11, 2017

Consulting
Engineers
and Scientists

Proposal 151.02051.002

Frank Lynam, Town Administrator
Town of Whitman
54 South Avenue
Whitman, MA 02382

Re: Scope of Work for Licensed Site Professional (LSP) & Massachusetts Contingency Plan (MCP) Services
MassDevelopment Brownfields Assessment Funding
Former Regal Shoe Cistern Site
Lots 1 & 2-Abutting 401 South Avenue
Whitman, Massachusetts
Release Tracking Number (RTN) 4-0588

Dear Mr. Lynam:

Ransom Consulting, Inc. (Ransom) is pleased to provide this Scope of Work (SOW) to the Town of Whitman (the "Town") for the Former Regal Shoe Cistern Site (the "Site"). The SOW addresses activities to conduct follow up Phase II assessment activities, along with report preparation. Ransom understands that the Town is in the process of acquiring the Site through a tax taking, but does not currently own the Site property. We further understand that the Town will obtain access to the Site to allow Ransom to complete the field tasks described in this SOW.

BACKGROUND

The approximate 19.84-acre Site is comprised of two parcels, designated as Lots 1 and 2 (Town Assessor Maps 6 and 7, Block 75), and located to the east and south of 401 South Avenue. The Site is currently undeveloped and vacant and portions of the Site are heavily vegetated. Access to the Site is via South Avenue (east of 401 South Avenue) and along (sandy) roads and paths throughout the Site. It is Ransom's understanding that these roads/paths have been created by trespassers (suspect all-terrain vehicle use). The Site is abutted to the west by an active Massachusetts Bay Transportation Authority (MBTA) railroad and commuter rail station, beyond which is the Shumatuscant River and to the east by Beech Hill Brook, which serves as a tributary to the aforementioned river.

1. A number of shoe factories operated at the Site from the mid 1880's to the 1960's and a variety of businesses leased the Site in the early 1970's. The former Site building was razed in 1973 and the Site has been vacant since that time.
2. A Notice of Responsibility (NOR) was issued to H. and G. Whitman by MADEP in August 1998, which assigned RTN 4-0588 to the release of petroleum hydrocarbons. The Site is classified as "Tier ID".

60 Valley Street, Building F, Suite 106, Providence, Rhode Island 02909, Tel (401) 433-2160, Fax (401) 433-2176
12 Kent Way, Suite 100, Byfield, Massachusetts 01922-1221, Tel (978) 465-1822
Pease International Tradeport, 112 Corporate Drive, Portsmouth, New Hampshire 03801, Tel (603) 436-1490
400 Commercial Street, Suite 404, Portland, Maine 04101, Tel (207) 772-2891
2127 Hamilton Avenue, Hamilton, New Jersey 08619, Tel (609) 584-0090

www.ransomenv.com

3. A former cistern, comprised of three interconnected underground vaults, one (15,000-gallon No. 6 fuel oil) and one (1,000-gallon, unknown contents) underground storage tanks (USTs) were formerly located at the Site. The USTs were removed in 1989 and the cistern was demolished in 2006.
4. Based on the results of Site investigations conducted from the early 1990s to 2005, concentrations of petroleum hydrocarbons, metals, polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs) were detected in sludge samples collected from former cistern and in Site soil. Groundwater sampling results indicate concentrations of petroleum, metals, and volatile organic compounds (VOCs). Surface water samples were collected from Beech Hill Brook, which indicated the presence of metals.
5. U.S. EPA conducted a Removal Action in 2006, which included the excavation and off-Site disposal of 4,000 tons of contaminated soil to an approximate depth of 5 feet below ground surface (bgs) and 10,000 gallons of sludge/liquids from the former cisterns. The cistern was demolished and the excavated area was backfilled with clean fill. According to the U.S. EPA Pollution Report dated July 6, 2006, "A soil cap was placed over remaining contamination in soils at and below this depth."
6. Based on Ransom's review of historic documents and reports, the 2006 EPA removal actions included the excavation and off-Site disposal of soil from a portion of a former "landfill" at the southwestern portion of the Site, which was observed to contain leather scraps, bricks, glass, paint cans, tar buckets, metal scraps and rocks, along with installation of a clean soil cap. Based on a review of historic aerial photographs, Ransom estimates the size of the landfill as an approximate 200-foot by 200-foot area. The eastern and southeastern portions of the former landfill are located within a wetland area and do not appear to have been included as part of EPA's Removal Action.
7. Ransom conducted subsurface investigations in February and June 2016, which included soil, groundwater and limited surface water sampling. Based on the results of Ransom's investigation, along with a review of historic data, there is evidence of heavy metals impacts to Site soil within the southwestern portion of the Site (landfill area), along with residual lead impact to Site soil at the northwestern portion of the Site. Concentrations of barium, chromium and zinc were detected in Site soil at levels exceeding applicable Massachusetts Contingency Plan (MCP) Reportable Concentrations and represent a MCP 120-Day Reporting condition for the Potentially Responsible Party (PRP), upon obtaining knowledge of the release condition. Ransom prepared a Phase II Assessment Report (dated January 4, 2017), which was submitted to the Town.
8. The Town recently conducted a survey of the Site in May 2017, which included a wetlands survey and the extent of the landfill area. The survey is anticipated to support a future Activity and Use Limitation (AUL) for the landfill area.
9. Additional investigations are required to assess the extent of contaminant impacts to soil and groundwater along the southeastern portion of the Site; potential impacts to surface water and sediment; and, assessment of potential risk to human health and ecological receptors.

Mr. Frank Lynam
Town of Whitman

Figure 1 is a Locus Map, which shows the location of the Site and surrounding area. Figure 2 is a Site Plan, depicting pertinent Site features.

PROPOSED SCOPE OF WORK

Ransom has developed the following SOW to assess the extent of Site contaminant impact and fill the following data gaps:

1. Additional limited soil and groundwater sampling is required to assess contaminant impacts along the southeastern portion of the Site.
2. Comprehensive sediment and surface water sampling is required to assess potential contaminant impacts and to support a Stage II Ecological Risk Characterization, to assess potential Site contaminant impacts to ecological receptors.
3. A human health risk assessment is required to assess potential contaminant impacts to future Site occupants and receptors.

Task 1: Phase II Field Investigation

Ransom proposes the following investigations at the Site to assess the extent of contamination to Site soil, groundwater, sediment and surface water and fill data gaps. Proposed sampling locations are depicted in Figure 2, Site Plan.

1. Prior to initiating field investigations, Ransom will update its existing Site-specific Health and Safety Plan (HASP).
2. Ransom will subcontract a licensed Massachusetts driller.
3. Ransom will subcontract EcoTec, Inc. to assist in sediment and surface water sampling and to conduct an ecological risk assessment.
4. Ransom will assign coordinates to the new sampling locations, using global positioning system (GPS) equipment.

Soil Boring and Monitoring Well Installation

1. Up to 2 soil borings will be advanced by Ransom's subcontractor driller, using a tracked Geoprobe drill rig. The borings will be advanced to a maximum depth of 15 feet bgs and completed as 2-inch diameter flush-mount groundwater monitoring wells, constructed of 40-schedule polyvinyl chloride (PVC) casing and 10-slot screen and screened across the groundwater table.
2. Soil will be field-screened for total VOCs (TVOCs) using a photoionization detector (PID).
3. Up to 2 soil samples will be submitted for laboratory analysis of volatile petroleum hydrocarbons (VPH) and target analytes; extractable petroleum hydrocarbons (EPH) and

Mr. Frank Lynam
Town of Whitman

target PAH analytes; of Resource Conservation and Recovery Act (RCRA) 8 metals, zinc and nickel; and polychlorinated biphenyls (PCBs). Samples will be submitted to ConTest Laboratory on a standard (7-day) turnaround time.

4. Up to 6 sediment samples will be collected and submitted to ConTest for laboratory analysis of PAH SIM analysis; RCRA 8 metals, zinc and nickel, and total organic carbon (TOC).
5. Up to 3 surface water samples will be collected and submitted for analysis of PAH, RCRA 8 metals, zinc and nickel, oxidation reduction potential (ORP), hardness and pH.
6. Soil boring and well construction logs will be prepared. Ransom will prepare a figure to depict sampling locations.

Groundwater Sampling

Ransom will conduct one groundwater sampling event and collected samples from the 2 new Site wells. The wells will be sampled using U.S. EPA low stress/low flow methods.

1. Depth to groundwater and the presence of light non-aqueous phase liquid (LNAPL) will be evaluated using an oil-water interface probe.
2. Up to 2 groundwater samples will be submitted for laboratory analysis of VPH/EPH and target analytes, dissolved RCRA 8 metals, zinc and nickel and PCBs. Dissolved metals samples will be field filtered. Samples will be submitted to ConTest Laboratory on a standard turnaround time
3. Ransom will conduct an elevation survey of the new wells to determine groundwater flow direction.

Investigation-Derived Waste

Ransom has assumed that investigation-derived waste (IDW) generated during drilling, soil, sediment, surface water and groundwater sampling will be managed on-Site. The proposed fee does not include provisions for special handling or off-Site disposal of IDW.

Task 2: State II Ecological Risk Characterization

Ransom's subcontractor, EcoTec, Inc. will conduct a Stage II ecological risk characterization (ERC), based on the results of sediment and surface water sampling. Multiple lines of evidence in assessing risk to the environment will include:

1. Qualitative visual assessment of the aquatic habitats;
2. Chronic toxicity testing of a sediment dwelling invertebrate, which measures the survival, growth, and reproduction of animals grown on samples of Site sediment;

Mr. Frank Lynam
Town of Whitman

3. Comparison of Site concentrations of contaminants of concern (“CoCs”) to existing screening benchmarks and site-specific benchmarks (for petroleum constituents) based upon the Battelle (2007) methodology; Macroinvertebrate community analysis will be conducted evaluate this community living in the abutting stream.
4. EcoTec will contract with EnviroSystems Inc. of Hampton NH (“ESI”) for proposed sediment toxicity testing. Contract with EnviroSystems Inc. (ESI) of Hampton, NH for sediment toxicity testing, consisting of 42-day acute and chronic toxicity to the amphipod *Hyaletella Azteca*.
5. A Semi-Quantitative Benthic Macroinvertebrate Community Analysis will be conducted and benthic macroinvertebrates will be sampled within impacted and non-impacted zones. Organisms collected will generally be taxonomically identified to the family level, and results tabulated. Based upon comparisons within substrate type of the species and community composition of samples from impacted and non-impacted areas, conclusions will then be drawn relative to the presence or absence of evidence that indicates or suggests impacts to the benthic macroinvertebrate community in the impacted areas.
6. EcoTec will prepare a summary report to support a MassDEP Stage II ERC.

Task 3: Reports

Ransom will prepare a Phase II Summary Report on behalf of the Town and will submit the report to MassDEP as a courtesy. Since the Town does not own the Site, the Town will not submit the report as a Responsible Party or as a “MCP” report. However, the report will be prepared in a “MCP Phase II” format. The report will also address potential new MCP Reporting Conditions.

Data Tabulation and Site Map

Ransom will tabulate all available soil and groundwater data in an electronic (MS Excel) format and will prepare CAD or Geographic Information System (GIS) -based figures to depict historic sampling locations and pertinent Site details. Soil boring and well construction logs will be prepared. Ransom will prepare a GIS-based figure to depict sampling locations.

Phase II Summary Report

Ransom will prepare a MCP Phase II Summary Report, which will include the following:

1. Disposal Property Name, Location and Locus Map, Detailed Disposal Site Map(s), Disposal Site History;
2. Site Hydrogeological Characteristics;
3. Environmental Fate and Transport of Oil and/or Hazardous Material;
4. Nature and Extent of Contamination;
5. Exposure Assessment; and

Mr. Frank Lynam
Town of Whitman

6. Method 3 Risk Characterization: Ransom's risk assessor will prepare a Method 3 Risk Characterization.
7. Stage II ERC: (refer to Task 2)

Remedial Cost Estimate

Ransom will prepare a remedial cost estimate, which will identify, evaluate and select the feasible Remedial Action Alternative (RAA) for the Site. The evaluation will include initial screening of likely remedial action alternatives. A feasibility evaluation will be conducted, which will include technological feasibility and a benefit-cost analysis. The results of the evaluation will be provided in a remedial cost estimate that will support the selection of the remedial action alternative by providing information of sufficient detail on the process by which the recommended RAA was developed and evaluated.

PROJECT COSTS

The estimated cost to complete the tasks presented above is **\$63,900**. The cost will be invoiced on a time-and-materials basis and invoiced in accordance with Ransom's *Fee Schedule*, a copy of which is provided as Attachment B. Costs for each of the tasks of the proposed work are provided below.

Task	Description	Ransom Fees	Subcontractor Fees	Laboratory Fees
Task 1	Phase II Field Investigation	\$ 6,000	\$2,400	\$6,000
Task 2	Stage II Ecological Risk Characterization	--	\$36,000	--
Task 3	Reports	\$13,500	--	--
	<i>Subtotals</i>	\$19,500	\$38,400	\$6,000
	TOTAL ESTIMATED COST	\$63,900		

Our price is based on our current understanding of the project requirements and judgment of the time necessary to complete the scope of work as set forth above. Successful completion of the project can be influenced by change in the scope of services as dictated by your needs, as well as unforeseen conditions. We will keep you informed as to the budget starts as the work progresses. Changes that may require adjusting the scope of work and budget will be reviewed with you.

ASSUMPTIONS

1. This cost estimate assumes the work will be completed over the durations noted above. The cost for Ransom to conduct additional sampling oversight and/or field professional services beyond the time detailed above is approximately \$1,700 per day.
2. The Town will provide access to the Site.
3. Proposed sampling locations may be changed in the field, based on accessibility and field conditions.

Mr. Frank Lynam
Town of Whitman

4. The proposed sampling plan will be adequate to investigate the horizontal and vertical extent of contamination to support the Phase II report.
5. No MCP Imminent Hazard or Substantial Hazard conditions are identified during the investigations.
6. No new MCP release conditions are identified at the Site.
7. A ground penetrating radar (GPR) survey is not required to assess the potential presence of abandoned USTs.
8. Limited IDW will be generated and will be managed on-Site and not disposed off-Site.
9. No vegetation clearing will be conducted.

LIMITATIONS

In addition to the assumptions identified above, the following limitations were made regarding this cost estimate:

1. This SOW does not include MCP annual compliance fees, submittal fees or fines.
2. This SOW excludes additional LSP/MCP services beyond those outlined herein.
3. This SOW is based on information available at the time this document was prepared and the need to perform additional activities may be identified as additional information regarding the nature of the conditions at the Site becomes available.

PROJECT SCHEDULE

Ransom anticipates that Task 1 will be commenced within 3 weeks of authorization, pending subcontractor availability. Task 2 is anticipated to be completed within 10 to 12 weeks subsequent to the completion of Task 1 activities. Task 3 is anticipated to be completed within 2 weeks subsequent to the completion of Task 2.

ORGANIZATION

Tracey A. Costa will serve as Project Manager and LSP for this project and will be your primary contact at Ransom. Should Tracey be unavailable, please feel free to contact Steve Ransom at sransom@ransomenv.com.

Mr. Frank Lynam
Town of Whitman

BILLING AND PAYMENT OPTIONS

Ransom will send invoices electronically to the email address you provide. If you prefer to receive paper invoices by mail, please check the "Opt Out" option below.

Send invoices to the following email address(es): _____

☐ I wish to opt out of electronic invoicing. Please mail invoices to this address:

Street/P.O. Box: _____

City/State/Zip: _____

For billing questions, please provide a telephone number to contact you: () _____

You may also choose to pay invoices via Discover, Visa, MasterCard, or American Express. To do so, please provide the following information.

CREDIT CARD PAYMENT OPTION: (Check one) ☐ Visa ☐ MasterCard ☐ AmEx ☐ Discover

Card Number: _____ Expiration Date: _____ CVV Code _____

Print Name as it appears on card:

3-digit code on back: M/C, Visa,
Discover
4-digit code on front of Amex

Billing Address:

Street City/State Zip

Cardholder's Signature _____

NOTE: If the credit card payment option is selected, the retainer amount will be charged to card upon receipt of signed agreement. Balance owing will be charged either: (a) monthly, if time-and-materials billing applies; or (b) at project completion, if lump-sum fee applies.

Mr. Frank Lynam
Town of Whitman


AUTHORIZATION

Ransom's *Fee Schedule* and *Terms and Conditions* are attached to this scope of work as Attachment B and C, respectively, and are hereby incorporated by reference as if fully restated herein. Prior to initiation of project work, we will need to receive an executed copy of this proposal which will serve as authorization to proceed. If you are in agreement with the terms of this proposal, please indicate your acceptance by signing in the space provided below and return the executed copy back to Ransom.

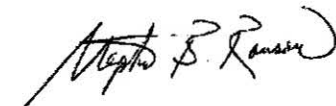
We would like to thank you again for the opportunity to submit this scope of work and cost estimate. If you have any questions regarding this proposal, please contact Tracey Costa at (978) 998-2503 or tracey.costa@ransomenv.com.

Sincerely,

RANSOM CONSULTING, INC.

 Tracey A. Costa
2017.08.11
10:04:13 -04'00'

Tracey A. Costa, LSP, CHMM, TURP, ENV-SP, LEED Green Associate
Senior Project Manager/Senior Scientist


Stephen B. Ransom
President/CEO

TAC/ SBR: mes
Attachments

ACCEPTED AND APPROVED BY TOWN OF WHITMAN:

Signature: _____

Name (print or type): _____

Title: _____ Date: _____

Pleasant Street

County Bound Found
N60°57'30"E
238.95'
N28°17'03"W
0.35'

Avenue

Lot Area = 18.6 Acres
Upland 3.4 Acres

South

MASS BAY TRANSPORTATION AUTHORITY

NOTES:

1. PROPERTY LINE INFORMATION TAKEN FROM LAND COURT PLAN 199528 AND COUNTY LAYOUT OF SOUTH AVE.
2. WETLAND DELINEATION PERFORMED BY PINEBROOK CONSULTING ON APRIL 28, 2017.
3. ACTIVITY AND USE LIMITATION AREA OUTLINED MARKED BY RANSOM CONSULTING, INC.

Wetland Delineation & Use Limitation Area
in
WHITMAN, MASS.

prepared for
Town of Whitman
Scale: 1 in. = 40 ft. May 30, 2017
C. W. GARVEY CO., INC.
SURVEYORS AND ENGINEERS
38 WEST STREET
WHITMAN, MASS.

