DRAFT Analysis of Brownfields Cleanup Alternatives
Former Chapman Valve Manufacturing Company
ES Pinevale Street
Springfield, Massachusetts

I. Introduction & Background

This Analysis of Brownfields Cleanup Alternatives (ABCA) has been prepared to evaluate cleanup alternatives for the former Chapman Valve property located at ES Pinevale Street in the Indian Orchard neighborhood of Springfield, Massachusetts (the Site). The ABCA is a condition of the City of Springfield's application for a United States Environmental Protection Agency (EPA) Brownfields Cleanup Grant.

1. Site Location

The Site encompasses a 15.93-acre parcel of land located on Pinevale Street in Springfield, Massachusetts, where Chapman Valve formerly operated. Currently, the Site is heavily vegetated with tall grasses and trees. Concrete slabs from the foundations of the original factory buildings remain across the Site, several of which are covered below a layer of soil and vegetation. Evidence of historical uses are present at the Site and include wood block flooring within concrete slab foundations, an exposed subsurface vault in the northwestern corner, historical railroad tracks, and various debris piles associated. Debris piles consist of mainly concrete with some brick and metal rebar, and several stockpiled debris piles appear to be covered in vegetation. A chain link fence is present along the entire perimeter of the Site, with a locked access gate located at the middle of the western section of the fence on Pinevale Street.

2. Previous Site Use(s) and Any Previous Cleanup / Remediation

The Site was historically operated as the former Chapman Valve Manufacturing Company for approximately 85 years between at least 1874 and 1959. Chapman Valve primarily manufactured valves for the Navy, but also worked under contract with the Atomic Energy Commission (AEC) to manufacture uranium metal for Manhattan Engineering District (MED) projects. In 1959, Crane Company acquired Chapman Valve and continued to manufacture valves at the Site until the 1980s. Crane Co. demolished the original 12 factory buildings located at the Site between the 1980s and 1996, leaving the slabs and foundations in place. The Site went through various property transfers between 2003 and 2013 before the City of Springfield acquired the property through a municipal tax taking in May 2013.

Since taking ownership as a Municipality with Exempt Status, as defined by Massachusetts General Law (MGL) Chapter 21E, Section 2, the City has not conducted response actions at the Site due to a lack of funding. In 2023, the City, through a Brownfields Assessment Grant from MassDEP, engaged Weston & Samson to conduct a Phase II Environmental Site Assessment (ESA) at the Site, which included an evaluation of the release history and an updated Method 3 Risk Characterization. Weston & Sampson completed the Phase II ESA in October of 2023.

3. Site Assessment Findings

The following subsections include summaries of response actions conducted at the Site since 1986. Tables and figures for the response actions summarized below are presented in Weston & Sampson's 2023 Phase II ESA, and most are available via the EEA Data Portal for Waste Sites & reportable Release (https://eeaonline.eea.state.ma.us/portal#!/wastesite/1-0000170).

i. Phase I ESA - 1986

ERT, Inc. of Laurel, Maryland (ERT), conducted a Phase I ESA in October 1986 at the Site, on behalf of Crane Co. At the time, the Site consisted of a 16-acre fenced property containing 13 buildings. A 20-acre landfill, which was part of the larger Chapman Valve/Crane facility, existed south of the Site. During this investigation, asbestos-containing materials (ACM), lead paint, silica sand and blasting dust (free silica), fuel oil, solvents, probable polychlorinated biphenyl (PCB) oil, and various unknown substances were noted throughout the Site. Based on the findings of the Phase I ESA, ERT recommended the following:

- Assessment and removal/repair of asbestos insulation by a licensed asbestos contractor.
- Filling or sealing the pipe tunnel located on the Site, or leaving as is.
- Underground storage tank (UST) inventory and removal.
- Assessment of possible PCB oil containing transformers for off-site disposal.
- Assessment and disposal of unknown substances located throughout the Site.

ii. Underground Storage Tank Removal - 1987

In February 1987, Clean Harbors Environmental Services of Kingston, Massachusetts (CHES), was contracted by Crane Co. to empty, clean, excavate, remove, and dispose of the USTs identified in the 1986 Phase I ESA by ERT. Nineteen (19) USTs of various capacities and containing various products were removed from the Site. A summary table of the UST characteristics are summarized below:

Tank #	Location	Total Capacity (gal)	Amount of product (in)	Product Type
1	Old Power House	25,000	47	#4 Oil
2	Old Power House	25,000	91	#4 Oil
3	Old Power House	25,000	13	#6 Oil
4	Old Power House	25,000	65	Waster/Sludge
5	Pattern Storage	100	Unknown	Alcohol
6	Brass Foundry No. 1	3,000	46	#2 Oil
7	Brass Foundry No. 2	3,000	76	#2 Oil
8	Lot Essex & Pinevale	650	8	Gasoline
9	Department 40	8,000	Unknown	#2 Oil
10	New Power House No. 1	20,000	13	#4 Oil
11	New Power House No. 2	20,000	11	Water/Sludge
12	Department 7 Hill No. 1	20,000	94	#2 Oil
13	Department 7 Hill No. 2	20,000	6	Water/Oil
14	Department 7 Hill No. 3	20,000	6	Water/Oil
15	Department 7 Hill No. 4	20,000	60	Water/#6 Oil Sludge
16	Department 7 Hill No. 5	20,000	6	#6 Oil Sludge
17	Department 7 Hill No. 6	20,000	6	#6 Oil Sludge
18	Department 7 Shipment	3,000	0	Not Recorded
19	Department 40	8,000	Unknown	#2 Oil

During UST removal activities, free product, oily soil, and/or oily groundwater were observed in multiple excavation areas, including Tanks 1 – 4, Tanks 6 – 7, and Tanks 10 – 11. ERT proposed to perform limited subsurface investigation activities to determine the most cost and environmentally effective way to remediate these areas of contamination, including soil borings, monitoring well installations, the collection of soil boring samples, excavation/stockpile samples, and groundwater samples, and assessing/sampling a cistern located to the west of Tanks 1 – 4.

iii. Remedial Investigations - 1987

In April 1987, ERT prepared a scope of work on behalf of Crane Co. following a Notice of Responsibility (NOR) by Massachusetts DEQE (Department of Environmental Quality Engineering – now the Department of Environmental Protection) to perform remedial investigations at the Site. The remedial investigations were implemented and presented in an October 1987 ERT report titled "Remedial Investigations for Indian Orchard Facility." The following actions were taken at the Site:

- A subsurface exploration program, including the advancement of 25 soil borings and installation of 25 monitoring wells at each boring location. Several borings were located along the railroad tracks and adjacent to UST excavations (Tanks 1-4 and Tanks 10-11) and the Building 48 yard. Soil samples were collected and analyzed for petroleum hydrocarbons and PCBs. Groundwater samples (and surface water samples from within the Tank 1-4 excavation) were collected and analyzed for petroleum hydrocarbons, volatile organic compounds (VOCs), and PCBs.
- Samples of water within a cistern adjacent to the Tank 1-4 excavation area were collected and analyzed. A temporary discharge permit was approved and all the water within the cistern was pumped into the municipal sewer system.
- Inspections of potential past spill areas across the Site

Based on the findings of these remedial investigations, ERT recommended the following:

- Identify locations of oily soil for removal and disposal by a clean-up contractor.
- Assess the Tank 1-4 excavation areas and design a long-term oil removal system.
- Removal of soils within the excavations of Tanks 1-4, 6-7, and 10-11 with elevated concentrations of petroleum hydrocarbons.
- Removal of surficial soils at the Dept #7 yard with elevated concentrations of petroleum hydrocarbons.

iv. Phase II ESA - 1991

Con-Test, Inc. of East Longmeadow, Massachusetts (Con-Test), on behalf of Crane Co., conducted a Phase II ESA investigation between October and December 1990 at the Site. Investigation activities included a wood block subfloor investigation, oily surface verification, site security analysis, and monitoring well installation, sampling, and analysis. The findings of the Phase II ESA are summarized below:

- Total Petroleum Hydrocarbons (TPH) were detected in soil samples collected from beneath portions of concrete subfloors associated with Buildings 23, 25, and 48. TPH concentrations

range from not detected (ND) to 3,000 milligrams per kilogram (mg/kg) at Building 23, ND to 730 mg/kg at Building 25, and ND to 100 mg/kg at Building 48. Semi-volatile Organic Compounds (SVOCs) were detected at low concentrations in some soil samples collected beneath Buildings 23, 25, and 48. Fluorene was detected at 6 mg/kg at the eastern end of Building 23. VOCs were not detected in soil samples collected at beneath these buildings.

- VOCs were detected in groundwater at low concentrations in MW-1, MW-19, CMW-30, and the December 6, 1990, trip blank. SVOCs were detected in groundwater at low concentrations in MW-1, MW-7, MW-12, MW-14, MW-19, CMW-31S and the November 30, 1990, trip blank. TPH was detected in groundwater at 1.2 mg/L at CMW-30.
- The presence of oil under Building 23 may be attributable to a spill of #4 oil from Tanks 10 and 11.
- TPH, TCLP barium, and TCLP lead were detected at concentrations of 140 to 3100 mg/kg, 0.65 mg/L, and 0.56 mg/L, respectively, in various composite samples collected from Oily Soil Area #2. Trace concentrations of VOCs and SVOCs were detected.
- TPH, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, fluoranthene, phenanthrene, 1,2,4-trichlorobenzene, TCLP barium, and TCLP lead were detected at concentrations of 110 to 780 mg/kg, 6 mg/kg, 8 mg/kg, 8 mg/kg, 23 mg/kg, 18 mg/kg, 15 mg/kg, 0.40 mg/L, and 0.09 mg/L, respectively, in various composite samples collected from Oily Soil Area #3.
- Bedrock was identified at depths ranging from 2 to 20 feet below ground surface (bgs) in three (3) monitoring wells (CMW-30, CMW-31S, and CMW-31D) and three (3) subfloor borings beneath Building 23. Two (2) bedrock cores were collected and identified as the Portland Formation.
- A radiological survey of the Site was requested by MassDEP due to the disposal of uranium metallic dust and/or waste or plant equipment contaminated with uranium or uranium oxides in shallow burials. The contamination is associated with work conducted in Building 23 for the Manhattan Project in the 1940s by Chapman Valve. The survey was to be completed by the U.S. Department of Energy (DOE) in 1995 (see below).

v. Post-Remedial Action Report - 1996

Bechtel National, Inc of Reston, Virgina (BNI), on behalf of the DOE, assisted in the planning and implementation of remedial activities for radioactive contamination at the Site from July to September 1995. Residual uranium contamination was present in the western third of Building 23 from operations conducted for the AEC in 1948.

Remedial activities included the decontamination of a bridge crane, overhead trusses, horizontal wall surfaces, wooden block and concrete floor pads, underlying soils, and a drain line. A portion of the decontaminated material were left onsite, including concrete monoliths, wooden decking from the crane, wooden blocks, and concrete pads. Post-remediation surveys performed in the area indicated levels of radioactivity below the applicable DOE cleanup guidelines.

vi. Phase II ESA Addendum - 1998

In May 1998, ATC Associates, Inc. of Woburn, Massachusetts (ATC), on behalf of Crane Co., completed an addendum to the Phase II ESA performed by Con-Test in 1991. Supplemental assessment and investigation activities included soil boring and monitoring well installation, additional analytical

characterization, product recovery testing of culvert wells, disposal of on-Site transformers and switches, transformer pad confirmation sampling, disposal of PCB contaminated woodblocks, interim measures (i.e., gauging and bailing, test pitting, oily soil excavation and removal, NAPL extraction and dewatering activities), and risk characterization. The findings of the supplemental investigation included:

- The investigations and monitoring indicated minimal impact to soil and groundwater from historical Site operations.
- Interim measure activities listed above have addressed UST releases to subsurface and surficial soils Site-wide.
- Residual petroleum-impacted soils surrounding the tank grave associated with Tanks 1-4 are located beneath substantial, permanent, concrete structures and are considered inaccessible, apparently limited in quantity, and isolated. Petroleum-impacts are associated with #4 and #6 oil. The permanent concrete structures are proposed to be left in place and limit the potential migration of residual petroleum impacts.
- Constituents of concern included VOCs, PCBs, and ten (10) metals in groundwater, SVOCs and selenium in soil only, and TPH and PCBs in both soil and groundwater.

A Method 3 Risk Characterization was performed to evaluate the potential for site-specific risk to employees of Crane Co., trespassers, potential construction or utility workers, and future residential populations. Based on the results of the Method 3 Risk Characterization and the Interim Measures performed at the Site, a condition of No Significant Risk (NSR) was achieved in association with the documented release conditions.

vii. Post-Audit Completion Statement and Risk Characterization - 2003

Between September and October 2003, ATC, on behalf of Crane Co., conducted supplement field assessment activities in response to a Notice of Audit Findings/Notice of Non-Compliance (NOAF/NON) issued by MassDEP on July 1, 2003. In the NOAF/NON, MassDEP asserted that the 1998 Phase II ESA Addendum did not establish the horizontal and vertical extent of metals and petroleum impacts in soil and groundwater. MassDEP required additional assessment and an updated Method 3 Risk Characterization.

Assessment activities included a metals assessment program, “black-stained soil” assessment, indoor air sampling, and a surficial oil staining assessment. The findings of the supplemental field assessment are summarized below:

- Soil samples were collected in the vicinity of former monitoring well locations and in areas of the former Iron Machine Shop and Brass Foundry. Laboratory analytical results indicated that antimony, beryllium, lead, copper, and zinc were detected at elevated concentrations. Arsenic, barium, cadmium, chromium, mercury, nickel, and silver were also detected.
- “Black-stained soil” was identified near a manhole cover west of the Tank 1-4 excavation during a Site inspection conducted by MassDEP on June 11, 2003. The “black-stained soil” had a mild organic odor and was presumed to have been stained from regular foundry activities. Petroflag™ kits were used to screen two near-surface soil samples for TPH; TPH readings were recorded as 163 mg/kg and 320 mg/kg. Additional soil samples (S-1 and S-2) were collected by ATC on

September 11, 2003, and analyzed for volatile petroleum hydrocarbons (VPH), extractable petroleum hydrocarbons (EPH), and PAHs. Laboratory analytical results showed various EPH and PAH compounds above laboratory detection limits. Additionally, polarized light microscopy (PLM) and scanning electron microscope (SEM)/energy dispersive x-ray (EDX) examination was performed on the samples and a moderate amount of anthracite coal and coal ash were identified in the samples. The "black-stained soil" was determined by ATC to be exempt from the MCP and was therefore left out of the risk characterization conducted for the Site.

- During groundwater sampling conducted in 1987 and 1988 by ERT, two (2) groundwater monitoring wells MW-8 and MW-27 were found to have TPH at concentrations high enough to pose a risk of vapor intrusion to the occupied buildings. Six (6) vapors points were installed between August and September 2003 and soil gas was screened using a photoionization detector (PID) with results ranging from ND to 28.9 ppmv. On September 12, 2003, four soil vapor samples were collected for air-phase petroleum hydrocarbons (APH) and sent to Con-Test Analytical Laboratories (Con-Test Analytical) for analysis. Laboratory analytical results indicated various compounds above laboratory detection limits. Petroleum hydrocarbon vapors were found to not have the potential to significantly impact indoor air in the occupied buildings down gradient of the impacted wells.
- Surficial oil staining was identified near the eastern end of former Building 10 and several locations in the footprint of Building 23 during a Site inspection conducted by MassDEP on June 11, 2003. The stained materials generally consisted of a sand, gravel, brick, and wood fragment mixture that was likely used to cut material associated with oil spills from former equipment operations. Additionally, a concrete containment bin located in the area was observed to have an oily sheen after sediments within the containment bin were disturbed. Clean up activities were conducted by ATC within the identified areas. Oily water and materials, such as soil, debris, and wooden blocks, were generated and disposed of off Site at appropriate facilities.

Risk characterization results were amended with the additional metal results and did not significantly impact the risk characterization results reported in the 1992 Phase II ESA Addendum submitted in May 1998.

viii. Release Abatement Measure (RAM) Plan - 2007

On January 4, 2007, WjF GeoConsultants, Inc. (WjF), on behalf of Goodwin Realty, LLC, submitted a Release Abatement Measure (RAM) Plan for the discovery of contamination during environmental assessment activities performed by O'Reilly, Talbot & Okun (OTO), on behalf of Western Area Development Corporation. The environmental assessment performed by OTO was completed as a due diligence investigation for a potential purchaser. The objective of the RAM plan was to reduce the concentrations of EPH and PCBs below risk-based standards in the area of the former machine shop (Building 10). Additional contaminates identified above MassDEP Reportable Concentrations S-1 (RCS-1) standards during OTO's assessment were VPH, SVOCs, arsenic, and lead detected in samples collected from beneath the former brass foundry (Building 5) and former iron foundry (Building 16).

ix. RAM Completion Report - 2009

In December 2006, WjF conducted a soil boring program to delineate the EPH and PCB impacts at the Site. Delineation of EPH impacted soil was only partially successful as former foundations and utility

tunnels provided excavation limits to the east and south but soil samples at the north and west extents of the excavation detected EPH concentrations above the Method 1 S-1 GW-2/GW-3 standards. During the June and October 2007 soil excavation program, the north and west extents of EPH impacted soil were delineated. Contaminated soils and concrete foundations in the former machine shop building were excavated and stockpiled on Site. Contaminated soils were sampled for disposal characterization parameters. In June 2008, approximately 160 tons of contaminated soil and concrete rubble was disposed of at Ondrick Construction Company.

x. Asbestos Assessment - 2010

In 2010, OTO completed an asbestos assessment on behalf of Springfield Redevelopment Authority. The purpose of the assessment was to identify ACM that may have remained on site or were left in place when the former foundry buildings were demolished, and to identify areas of asbestos in soil. The asbestos assessment primarily focused on surface level construction debris piles and soil piles, but subgrade exploration was performed at the boiler room and the main north/south utility tunnel. Representative bulk samples of suspected ACM were collected from the ground surface and from limited subsurface structures. ACM, such as transite pipe, transite panels, black building construction paper, black pipe insulation, various roofing materials, resilient floor tiles, and adhesive mastic, were identified in construction debris and soil piles as well as the boiler room and utility tunnel. An approximate 1,850 cubic yards of ACM construction debris and 31,625 cubic yards of ACM soil was estimated to be present at the Site.

xi. Environmental Site Assessment - 2010

In April 2012, OTO completed an ESA at the Site on behalf of Springfield Redevelopment Authority. The purpose of the ESA was to assess the nature and extent of OHM materials in soil and groundwater at the Site. During assessment activities, OTO identified thirteen (13) locations that require additional response actions summarized in the table below. OTO estimated response actions would cost up to $105,000 to address the 13 areas and to conduct one (1) Method 3 Risk Assessment and a Response Action Outcome (RAO) Report.

Area	Associated Samples	Constituents > RCS-1 in Soil	Constituents > RCGW-2 in GW	Proposed Response Actions
RC-1	BT-E, DP-1	Petroleum	N/A	Delineate extent of impacted soil, localized soil excavation (assume 100 cubic yards), Method 3 Risk Assessment, RAO
RC-2	CM-22	Petroleum	None	Delineate extent of impacted soil, Method 3 Risk Assessment, RAO
RC-3	CM-38	Petroleum	Petroleum, Lead	Consider petroleum in groundwater consistent with waiver completion, resample groundwater for total and dissolved lead, assume that condition will not be reportable and document with MassDEP
RC-4	CM-39	Lead	None	Delineate extent of impacted soil, localized soil excavation (assume 100 cubic yards), Method 3 Risk Assessment, RAO
RC-5	CM-40, CM-53, CM-54	Barium, Cadmium, Lead	N/A	Delineate extent of impacted soil, localized soil excavation (assume 50 cubic yards), Method 3 Risk Assessment, RAO

RC-6	CM-43	Petroleum	Petroleum, Lead	Resample groundwater for total and dissolved metals, assume that condition will not be reportable
RC-7	CM-45	None	Lead	Resample groundwater for total and dissolved metals, assume that condition will not be reportable
RC-8	CM-52	Cadmium	None	Delineate extent of impacted soil, localized soil excavation (assume 50 cubic yards), Method 3 Risk Assessment, RAO
RC-9	DP-2	Polycyclic Aromatic Hydrocarbons	N/A	Perform microscopic analysis on soil, assume that condition will not be reportable due to coal/ash
RC-10	MW-205	None	Cadmium	Resample groundwater for total and dissolved metals, assume that condition will not be reportable
RC-11	OTP-4	Polycyclic Aromatic Hydrocarbons	N/A	Perform microscopic analysis on soil, assume that condition will not be reportable due to coal/ash
RC-12	OTP-6	Polycyclic Aromatic Hydrocarbons	N/A	Perform microscopic analysis on soil, assume that condition will not be reportable due to coal/ash
RC-13	OTP-8	Polycyclic Aromatic Hydrocarbons	N/A	Perform microscopic analysis on soil, assume that condition will not be reportable due to coal/ash

xii. Preliminary Geotechnical Findings - 2010

In April 2010, a preliminary geotechnical assessment was completed by OTO in April 2010, on behalf of Springfield Redevelopment Authority, to assess the geotechnical suitability of on-Site soils for future redevelopment into a business/office park. The investigation found that two (2) main issues were present on-Site that would result in premium costs for construction of single story or two to three story buildings. One issue involves the presence of non-engineered fill consisting of ash and building debris and organic soils throughout portions of the Site that would need to be removed and replaced with engineered fill. The other issue involves the presence of concrete floor slabs, foundations, and buried debris that would need to be removed prior to development. Additionally void, basements, tunnels, and improperly abandoned utilities were found to be present in some portions of the Site and would need to be removed from any proposed building footprint and replaced with engineered fill prior to building construction.

xiii. Pollution Report No. 1 - 2015

In March 2011, an investigation to determine the extent of asbestos contamination in on-Site soil and debris piles was requested by MassDEP Western Regional Office (WERO) with assistance from the USEPA Region I Emergency Planning and Response Branch (EPRB). On August 17, 2015, USEPA, Superfund Technical Assessment Team (START), and Emergency Rapid Response Service (ERRS) mobilized to the Site and established work zones, developed a staging area, and prepared for Site excavation at three (3) piles, five (5) surface areas, and four (4) surface soil grids. Excavation activities commenced on August 24, 2015, and were completed on September 2, 2015. Site excavations and analytical results were reviewed with MassDEP WERO and confirmed that excavation activities were complete. Approximately 2,500 tons of soil and debris were excavated and stockpiled on Site pending transportation and disposal. USEPA demobilized from the Site on September 2, 2015.

xiv. Removal Program After Action Report - 2015

The Removal Program After Action Report summarized the activities recorded in Pollution Report No. 1 by the USEPA. ACM impacted soil from the primary stockpile staged on-Site created during the August and September 2015 excavation activities was loaded for disposal at the Seneca Meadow, Inc. Disposal Facility in Waterloo, New York. Between October 26 and 30, 2015, 21 trucks were loaded with ACM soil and between November 2 and 3, 2015, an additional 9 trucks were loaded with ACM soil. The final Site Walk was completed on November 2, 2015, with USEPA, START, and MassDEP and all activities were completed on November 4, 2015. Six (6) of 18 confirmatory soil samples collected post-excavation showed detectable asbestos in soil. No additional soil removal was conducted.

xv. Phase II ESA - 2023

Weston & Sampson performed a Phase II subsurface investigation at the Site in May and August 2023. Subsurface investigation activities included the advancement of 34 soil borings; the collection of soil samples from each soil boring location; the installation of four (4) groundwater monitoring wells; and the collection of groundwater samples from the four (4) newly installed wells and three (3) existing wells. Soil analytical results for samples collected by Weston & Sampson for the 2023 Phase II ESA indicated SVOCs and EPH were present in multiple locations at concentrations exceeding the Method Cleanup Standards. Low-level metals and VPH concentrations were also detected in multiple locations. Groundwater analytical results showed no concentrations of metals VOCs, or SVOCs exceeding the applicable Method 1 GW-3 Cleanup Standards.

The Method 3 Risk Characterization conducted by Weston & Sampson indicated a condition of NSR does not exist at the Site for current and future use due to elevated concentrations of lead and PAHs in soils at discrete locations, as well as ACM in shallow soil in the central portion of the Site.

Weston & Sampson concluded that Regulatory closure can be achieved at the Site if the source of impacts (lead, PAHs, and asbestos) is eliminated or controlled. This may include a combination of soil remediation (removal and off-site disposal of impacted soil), construction and installation of a cover system to prevent access to residual soil impacts, and/or the implementation of an Activity and Use Limitation (AUL). The 2023 Phase II ESA recommended an analysis of remedial alternatives, including conceptual costs, be conducted for the Site.

4. Project Goal

The goals of the project are to protect human health and the environment and to redevelop an underutilized property for commercial reuse. The objective is to remove or contain targeted impacted soils that pose a potential exposure risk to future users of the Site. Once complete, a Permanent Solution Statement with Conditions (PSC) will be filed to close response actions under the Massachusetts Contingency Plan (MCP; 310 CMR 40.0000).

5. Regional and Site Vulnerabilities

The northeastern United States, including the Springfield area, experiences warm and often humid summers and cold winters. Rainfall can be severe with summer thunderstorms common and severe weather resulting from regional nor'easter anticyclone storms and/or hurricanes. Winter conditions can also be severe with ice storms and heavy snow common.

According to the US Global Change Research Program (USGCRP), the northeastern United States can expect increased temperatures and temperature variability and extreme precipitation events (see Attachment A). USGCRP notes that "heat waves, coastal flooding, and river flooding will pose a growing challenge to the region's environmental, social, and economic systems. This will increase the vulnerability of the region's residents, especially its most disadvantaged populations." Increased precipitation will increase stormwater runoff, which is applicable to the cleanup and redevelopment of the Site for residential reuse and open space. Cleanup of the Site will reduce the impervious surface area by breaking up and/or removing former building slabs. Additionally, once developed, the Site is expected to include improved stormwater infrastructure which will account for increasing precipitation.

According to FEMA Flood Zone Maps 25013C0217E, 25013C0236E, 25013C0219E, and 25013C0240E the Site is not located within a Special Flood Hazard Area or Other Areas of Flood Hazard (see Attachment B). Based on the location of the Site and its proposed reuse, other factors related to climate change, such as changing temperature, rising sea levels, wildfires, changing dates of ground thaw/freezing, changing ecological zone, etc.). are unlikely to impact the Site in a significant way.

II. Applicable Regulations and Cleanup Standards

1. Cleanup Oversight Responsibility

The cleanup will be overseen by a Commonwealth of Massachusetts Licensed Site Professional (LSP) in accordance with Massachusetts General Law Chapter 21E and the MCP. In addition, required regulatory documents prepared for this Site will be submitted to the Massachusetts Department of Environmental Protection (MassDEP) electronically and tracked under the Release Tracking Number (RTN) issued for the Site by MassDEP (RTN 1-170). All documents will be in the public record.

2. Cleanup Standards

MassDEP is the state authority that regulates cleanup of sites in the Commonwealth of Massachusetts. The MCP, 310 CMR 40.0000, includes risk-based cleanup standards for use in screening-level and semi-site-specific risk characterizations (Method 1 and Method 2 Risk Characterizations) to evaluate risk to human health and the environment. The MCP also outlines a Method 3 Risk Characterization, in which site-specific cleanup standards and characteristics and/or limitations on use and activity are used to evaluate risk. Under the MCP, regardless of the approach or type of risk characterization, a condition of No Significant Risk (NSR) to human health and the environment must be documented for the site to achieve regulatory closure.

3. Laws and Regulations

Laws and regulations that are applicable to this cleanup include the Federal Small Business Liability Relief and Brownfields Revitalization Act, the Federal Davis-Bacon Act, the MCP, and City of Springfield by-laws. Federal, state, and local laws regarding procurement of contractors to conduct the cleanup will be followed. As described all cleanup will be in accordance with the MCP; 310 CMR 40.0000. All applicable permits and documentation (e.g., Building Permit, Dig Safe, soil transport/disposal manifests) will be obtained prior to the work commencing, and all work will be conducted in accordance with the conditions for approval.

III. Evaluation of Cleanup Alternatives

1. Cleanup Alternatives Considered

EPA requires that this ABCA includes the evaluation of four (4) remedial alternatives. To address the remediation of impacted soil at the Site, the following four (4) alternatives were considered, including:

- Alternative #1 – No Action
- Alternative #2 – Impacted soil removal to an average of 15 feet bgs, complete foundation and subsurface utility corridor demolition
- Alternative #3 – Impacted soil removal to an average of 3 feet bgs, complete foundation removal, partial subsurface utility corridor demolition and implementation of Activity and Use Limitation (AUL).
- Alternative #4 – 18-inch Soil Cap with Geotextile Barrier and implementation of AUL

2. Cost Estimate of Cleanup Alternatives

To satisfy EPA requirements, the effectiveness, implementability, and cost of each alternative must be considered prior to selecting a recommended cleanup alternative.

<u>Effectiveness – Including Vulnerability/Resiliency Considerations</u>

- Alternative #1: No Action is not effective in controlling or preventing exposure of receptors to soil impacts.

- Alternative #2: Extensive soil removal, transport, and off-site disposal of all impacted soil up to 15 ft. bgs with complete removal of former building foundations and subsurface utility corridors is an effective way to eliminate risk at the Site, since most/all contamination will be removed and the exposure pathways will no longer exist.

- Alternative #3: Under this alternative, targeted removal of 71,300 cubic yards of asbestos-impacted soils, up to 3 ft. bgs, that pose the greatest potential exposure risk to future users of the Site will be completed. Impacted soils will be disposed of at licensed facilities in accordance with local, state, and federal laws. Prior to soil removal activities, surficial debris, former building foundations, and portions of the subsurface utility corridors will be required to be removed to access contamination. This material will be transported off-Site for disposal in accordance with state and federal regulations. Confirmatory sampling will be required to evaluate remaining soil conditions and associated risk. A Method 3 Risk Characterization will be conducted using post-remediation data. Remaining Site-wide contaminant concentrations will not removed to below the threshold for unrestricted use; therefore institutional controls in the form of a deed restriction known as an AUL will be required to mitigate exposure to remaining impacted soils and maintain a condition of NSR under the MCP, the state of Massachusetts' voluntary cleanup program (VCP).

- Alternative #4: Under this alternative, the top 18-inches of impacted soils would be regraded, a geotextile demarcation would be installed, and 18 inches of clean-soil cover would be placed on top of the geotextile demarcation barrier. Surficial debris will be removed from the Site. Former

building foundations will be left in place, but will be broken up, and subsurface utility corridors will be backfilled. A Method 3 Risk Characterization will be conducted to evaluate Site closure. Remaining Site-wide contaminant concentrations will not be removed to below the threshold for unrestricted use; therefore, institutional controls in the form of a deed restriction known as AUL will be required to mitigate exposure to remaining impacted soils and maintain a condition of NSR under the MCP.

Implementability

- Alternative #1: No Action is easy to implement since no actions will be conducted.

- Alternative #2: Extensive soil removal with off-site disposal and complete removal of the former building foundations and utility corridors is moderately to highly difficult to implement. Although this alternative will not require ongoing maintenance and monitoring, greater coordination (e.g., dust suppression and monitoring) during cleanup activities and disturbance to the community (e.g., trucks transporting contaminated soils and backfill) are anticipated. Additionally, this alternative is less in line with EPA's Greener Cleanup goals and objectives.

- Alternative #3: Removal of asbestos-impacted, up to 3 ft. bgs, with off-site disposal and complete removal of former building foundations and partial removal of utility corridors is easy to moderately difficult to implement. This alternative would require ongoing maintenance and monitoring of the soil cover system, greater coordination to maintain environmental controls (e.g., dust suppression and monitoring) during remediation, and disturbance to the community (e.g., trucks transporting contaminated soils and backfill). In addition, this alternative may require the implementation of an AUL on the property; however, this is moderately easy to implement.

- Alternative #4: Regrading of the top 18-inches of impacted soil, installing a geotextile barrier, and capping with 18-inches of loam is moderately easy to implement. This alternative would require ongoing maintenance and monitoring of the cover system, greater coordination to maintain environmental controls (e.g., dust suppression and monitoring) during remediation, and disturbance to the community (e.g., trucks transporting backfill). In addition, this alternative will require the implementation of an AUL on the property; however, this is moderately easy to implement.

Cost

- Alternative #1: There are no costs associated with No Action.
- Alternative #2: The removal of most/all impacted soil and removal of the former building foundations and utility corridors is expected to cost approximately $212,565,000.
- Alternative #3: The removal of 71,300 cubic yards of impacted soil, removal of the former building foundations, and partial removal of subsurface utility corridors, and implementation of an AUL is expected to cost approximately $45,850,000.
- Alternative #4: The regrading, installation of a geotextile demarcation barrier, loam cover, and implementation of an AUL is expected to cost approximately $4,940,000.

3. Recommended Cleanup Alternative

Alternative #1: No Action cannot be recommended because it does not address site risk and doesn't allow for the Site to be used in a beneficial way to the City or the surrounding community. Alternative #2: Extensive Removal, Transport, and Off-Site Disposal of Impacted Soil, while effective at eliminating the exposure pathways at the Site, the cost to implement such a remedy could approximately be 5-42 times or more than the cost of controlling the exposure risks in Alternatives #3 and #4. Additionally, Alternative #2 will require many more trucks, will increase impacts to the neighborhood, will take up more space in landfills, and will take more time to implement.

Alternative #3: Target Removal, Transport and Off-Disposal of Impacted soil, would be more cost effective and control exposure risks; however, to implement this remedy could cost approximately 10 times or more than the cost of Alternative #4. Additionally, Alternative #3 will require many more truck, will increase impacts to the neighborhood, will take up more space in landfills, and will take more time to implement. Alternative #4 is a more sustainable approach in line with EPA's Clean and Green Cleanup guidelines.

Therefore, Alternative #4, while more expensive than no action, allows for the reuse and redevelopment of the site and is capable of reducing risk while having the smallest impact on the surrounding community and the environment. For these reasons, the recommended cleanup alternative is Alternative #4: 18-inch Soil Cap with Geotextile Barrier and AUL.

Green and Sustainable Remediation Measures for Selected Alternative

The selected alternative is the most sustainable alternative and requires less trucking and no disposal of impacted soil. The City of Springfield will refer to ASTM Standard E-2893: Standard Guide for Greener Cleanups, EPA's Principles for Greener Cleanups, and MassDEP's Greener Cleanup Guidance (WSC #14-150) to incorporate practices and procedures that reduce carbon emissions, burning of fossil fuels, and the impact on the environment. This will include standard specifications prohibiting equipment idling, encouraging the selection of disposal facilities that are not at excessive distance, and requiring reuse/recycling/treatment over disposal when available.