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Association

405 Concord Avenue #352, Belmont, MA 02478

617-977-4304

info@lspa.org

www.lspa.org

MCP Climate Change Toolkit

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1 Introduction

This toolkit was developed by the LSP Association (LSPA) Climate Change Subcommittee to assist waste site cleanup practitioners as they consider the potential effects of climate change on site assessment and the selection and implementation of cleanup response actions as required by the 2023 amendments to the Massachusetts Contingency Plan (MCP); 310 CMR 40.0000. The tools in this document are available for use in all phases of the remediation process under the MCP and can be customized to meet the needs of individual sites. The tools are intended to support consideration of climate change with respect to MCP response actions but should not be considered policy and are not a replacement for application of professional judgment on the part of the Licensed Site Professional (LSP)-of-record for an MCP Site. Parties using this toolkit should be aware that there may be other acceptable alternatives for considering and documenting impacts associated with climate change. This toolkit was developed and is maintained by the LSPA, which retains primary authorship. It is meant to work in concert with MassDEP's Q&A document on Climate Change.

The tools are reflective of the framework defined in the 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan (the SHMCAP), as well as the updated September 2023 SHMCAP ([2023 ResilientMass Plan | Mass.gov](#)). The SHMCAP accounts for projected changes in precipitation and temperature, sea level rise, and extreme weather events, and aims to reduce the risks associated with natural hazards and the effects of climate change. The SHMCAP and related resources can be found at the [MA Climate Change Clearinghouse \(mass.gov\)](#).

1.1 MCP Revisions/Regulatory Setting

On September 16, 2016, Governor Charlie Baker issued Executive Order 569, establishing an Integrated Climate Change Strategy for the Commonwealth. The Executive Order included, in part, requirements for development of the SHMCAP and supporting frameworks that state agencies, cities, and towns can use to assess and adapt to climate change. The MCP Amendments incorporate language to apply the goals of Executive Order 569 to the waste site cleanup process. The MCP language directs persons conducting cleanups to identify and assess foreseeable climate impacts that may affect the permanency and protectiveness of the cleanup at vulnerable sites and take reasonable measures to reduce vulnerabilities.

The climate change-related revisions to the MCP are reflected by the **blue** text in the following sections:

- The definition of Conceptual Site Model (CSM) in 310 CMR 40.0006 is revised as follows:
“Conceptual Site Model or CSM means a site-specific description of how contaminants entered the environment, how contaminants have been and may be transported within the environment, and routes of exposure to human and environmental receptors that provides a dynamic framework for assessing **current and foreseeable future** site characteristics and risk, identifying and addressing data gaps and managing uncertainty, eliminating or controlling

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contaminant sources, developing and conducting response action strategies, and evaluating whether those strategies have been effective in achieving desired endpoints. At sites at which NAPL is or may be present, this includes the body of fundamental scientific principles describing the behavior of fluid flow in porous media necessary to assess NAPL in subsurface strata.”

- The Response Action Performance Standard (RAPS) in 310 CMR 40.0191 is revised as follows:
 - “(1) The Response Action Performance Standard (RAPS) is the level of diligence reasonably necessary to obtain the quantity and quality of information adequate to assess a site and evaluate remedial action alternatives, and to design and implement specific remedial actions at a disposal site to achieve a level of No Significant Risk for any foreseeable period of time, **as defined at 310 CMR 40.1005**, and, where feasible, to reduce to the extent possible the level of oil and/or hazardous materials in the environment to background levels.
 - (2) RAPS shall be employed during the performance of all response actions conducted pursuant to 310 CMR 40.0000, and shall include, without limitation, the following:
 - (a) consideration of relevant policies and guidelines issued by the Department, **EOEEA** and EPA;
 - (b) use of accurate and up-to-date methods, **models**, standards and practices, equipment and technologies which are appropriate, available and generally accepted by the professional and trade communities conducting response actions in accordance with M.G.L. c. 21E and 310 CMR 40.0000 under similar circumstances; and
 - (c) investigative practices which are scientifically defensible, and of a level of precision and accuracy commensurate with the intended use of the results of such investigations.
 - (3) The application of RAPS shall be protective of health, safety, public welfare and the environment and shall include, without limitation, in the context of meeting the requirements of this Contingency Plan, consideration of the following:
 - (a) technologies which reuse, recycle, destroy, detoxify or treat oil and/or hazardous materials, where feasible, to minimize the need for long-term management of contamination at or from a disposal site;
 - (b) containment measures as feasible Permanent Solutions only where reuse, recycling, destruction, detoxification and treatment are not feasible;
 - (c) remedial actions to reduce the overall mass and volume of oil and/or hazardous material at a disposal site to the extent feasible, regardless of whether it is feasible to achieve one or more Temporary Solutions and/or Permanent Solutions or whether it is feasible to achieve background for the entire disposal site and not include the dilution of contaminated media with uncontaminated media;
 - (d) response actions to restore groundwater, where feasible, to the applicable standards of quality within a reasonable period of time to protect the existing and potential uses of such resources;
 - (e) eliminating or reducing, to the extent practicable and consistent with response action requirements and objectives, total energy use, air pollutant emissions, greenhouse gases, water use, materials consumption, and ecosystem and water resources impacts, resulting from the performance of response actions through energy efficiency, renewable energy use, materials management, waste reduction, land management, and ecosystem protection; **and**

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(f) response actions that incorporate climate change resilience to the extent practicable and consistent with response action requirements."

- The "Foreseeable Period of Time" for a Permanent Solution at 301 CMR 40.1005 is further defined as follows: "(1) A Permanent Solution shall ensure a level of control of each identified substance of concern at a site or in the surrounding environment such that no such substance of concern shall present a significant risk of harm to health, safety, public welfare or the environment during any foreseeable period of time, **considering existing site conditions and reasonably foreseeable future changes in site conditions, including anticipated impacts associated with climate change.**"

Collectively, the above revisions provide a framework to consider, based on models and resources developed through Executive Office of Energy and Environmental Affairs (EEA) and other government resources, the vulnerability of the release site to climate change and the need for adaptation to address such vulnerability.

1.2 Toolkit Applicability

The tools and references are applicable to MCP cleanup sites regardless of the site setting, location, or type of oil and/or hazardous materials (OHM) released to the environment. The tools can support the development of the CSM and evaluation of response actions at any stage of the MCP process but will be most helpful when applied during development of the CSM and throughout the selection and design of comprehensive response actions. Where short term response actions such as Release Abatement Measures (RAMs) and Immediate Response Actions (IRAs) are typically implemented within a timeframe much less than the timeframes for sustained climate change effects, it is nevertheless applicable in some circumstances to incorporate climate change considerations when the outcome of the RAM or IRA will become all or part of a Permanent Solution.

The climate change toolkit is an on-line resource for waste site cleanup practitioners and is meant to work in concert with the models, data and references available online at [MA Climate Change Clearinghouse \(mass.gov\)](#), which provides the best available resource on expected climate changes in the Commonwealth as identified by EEA and is the primary resource for this work.

Whenever possible, this toolkit includes live links to these resources, which provide a living, regularly updated means to support and inform consideration of climate change. Note that the resources accessible through [MA Climate Change Clearinghouse \(mass.gov\)](#) are not specific to MCP response actions; rather they are utilized by a broad range of stakeholders, including municipalities, cities and towns assessing community vulnerability and state departments and agencies engaged in development and infrastructure projects in the Commonwealth. Consequently, the use of professional judgement on the part of the LSP is needed when developing and applying the [2023 ResilientMass Plan](#) outputs.

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2 Toolkit Components

This toolkit includes the following tools to support the consideration of climate change in the MCP process:

- MassDEP's Climate Change Q&A
- MCP Climate Change Evaluation Flowchart
- Vulnerability Assessment Checklist
- Case Studies
- MCP Climate Change Glossary of Terms and Technical Resources

The following sections provide a summary of each of these tools.

2.1 Climate Change Q&A

MassDEP's Climate Change Q&A, incorporated here by reference, should be considered by LSPs as the primary guideline for approaching climate change at MCP sites. It provides a set of frequently asked questions about climate considerations in the MCP process. The Q&A was compiled by MassDEP Bureau of Waste Site Cleanup (BWSC) from a set of questions submitted by LSPs, waste site cleanup practitioners and other interested parties, and the responses were developed by MassDEP BWSC. The goal of the Q&A is to clarify when and how climate change considerations are to be incorporated into MCP deliverables, the application of reasonably foreseeable future site attributes in the context of climate change, and the potential climate-driven changes to MCP decision making.

2.2 MCP Climate Change Evaluation Flowchart

Attachment 1 is a flow chart for evaluating MCP sites to help determine whether or not a more detailed vulnerability assessment may be necessary. The flowchart illustrates how the site setting, contaminant type, and fate and transport factor into the level of detail required in a vulnerability assessment.

2.3 Vulnerability Assessment Checklist

The vulnerability assessment checklist (**Attachment 2**) provides a series of questions to consider in the process of assessing the vulnerability of an MCP site to climate change. The checklist provides a broad range of considerations structured to prompt the LSP to look at each of the four primary exposure parameters in the SHMCAP (precipitation, sea level rise, extreme weather, and temperature change) for the site, along with the potential effects of climate change on groundwater. Not all sections of the checklist will necessarily apply to each cleanup site. The checklist includes links to predictive model outputs and location-specific databases available through the [ResilientMass Climate Hub \(arcgis.com\)](https://www.arcgis.com) which can inform and support responses to the checklist questions.

The intent is to allow the LSP to consider the information in checklist sections A through E to form an opinion on the potential for climate change to impact the CSM and the resilience of the remedial action to projected climate change impacts. An LSP may choose to complete and incorporate the checklist into one or more MCP deliverables for a given site, envisioned as an appendix or attachment, and then use the checklist findings to prepare and support the climate change discussions in the CSM. The goal of the checklist is to support the LSP's opinion regarding a site's vulnerability. The LSP may consider applying all or part of the checklist or incorporating the checklist into deliverables.

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2.4 Case Studies

Attachment 3 includes case studies that walk the reader through the climate change consideration process using the flowchart and checklist tools as a guide. The case studies are fictitious sites based on a real-world setting, contaminant fate and transport mechanisms, site sensitivity and one or more climate exposure parameters. The case studies illustrate MCP sites in a coastal and inland settings, but the same process can be followed regardless of the site location and setting. The case studies are intended to illustrate use of the toolkit and exercising professional judgement by the LSP.

2.5 MCP Climate Change Glossary of Terms and Technical Resources

Throughout the toolkit, specific climate change terminology is used. Where a climate change term is first included in any of the tools, a live link to the glossary is provided so that the practitioner can readily reference the meaning of that term specifically in the context of MCP sites. The glossary definitions are derived from the SHMCAP as the primary reference, but the glossary also pulls in terms and standards from more widely distributed global, federal, and state references. Each term in the glossary includes a link to the underlying supporting reference(s). However, it should be noted that the glossary definitions have been customized and narrowed to be more directly applicable to the MCP process and the pending climate change revisions to the MCP.

There are many technical resources that may be helpful to LSPs considering climate change during the MCP process. **As noted above, the primary technical resource in considering climate change using this toolkit is the [MA Climate Change Clearinghouse \(mass.gov\)](#) website.** This website and its associated content are reviewed and updated regularly, and it is the primary resource for this work. To assist users of the [2023 ResilientMass Plan and the ResilientMass Climate Hub \(arcgis.com\)](#), a current map tutorial video can be found [here](#) and a data graphing tutorial can be found [here](#). Other technical resources that may also be helpful to LSPs include state resources, federal and United States Environmental Protection Agency (EPA) resources, and resources published by national organizations such as the Interstate Technology and Regulatory Council (ITRC) and the American Society for Testing and Materials (ASTM).

Attachment 4 includes the climate change Glossary of Terms, the glossary references, and links to [MA Climate Change Clearinghouse \(mass.gov\)](#) and other suggested technical resources available as of the date of publication of this toolkit. The references and resources linked in **Attachment 5** are routinely updated as advances are made.

3 Acknowledgements

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