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2024 MCP Amendments Q&A

November 1, 2024 – This document contains Q&As related to the 2024 amendments to the Massachusetts Contingency Plan (MCP). These questions include questions asked at training sessions for Licensed Site Professionals (LSPs) and Massachusetts Department of Environmental Protection (MassDEP) staff on the amendments. The Bureau of Waste Site Cleanup (BWSC) will be adding additional Questions and Answers to this document and revising the date of the document to indicate updates have been made. Questions on the MCP, including the 2024 MCP amendments, may be submitted to BWSC.Regulations@mass.gov.

Subpart I: RISK CHARACTERIZATION (310 CMR 40.0900)

(added November 1, 2024)

Coal Tar Waste Deposits

Q1: The MCP uses the term "visible coal tar waste deposit". What is meant by this term?

A: "Visible coal tar waste deposits" are a sub-set of coal tar wastes. Coal tar wastes are by-products or residuals from the processing of coal for coal gas. The term "visible coal tar waste deposits" is intended to apply to distinct layers or accumulations of solid and semi-solid coal tar wastes that are clearly (visibly) discernable from the surrounding environmental media. "Visible coal tar waste deposits" exist as a separate phase, distinct from the surrounding soil, sediment, surface water or groundwater. Coal tar wastes that always exist strictly as a liquid (i.e., year-round regardless of ambient temperatures) may be addressed as NAPL under the provisions at 310 CMR 40.1003(7).

The term "visible coal tar waste deposits" is not intended to include sporadic occurrences of limited coal tar wastes that are entirely interspersed in and comprise a small part of the soil matrix. Such limited coal tar wastes: (1) do not occur as distinct layers; (2) do not include layers that are or could be described as "soil mixed in coal tar waste" or a "coal tar waste-rich soil layer"; and (3) can be (*must be*) adequately characterized through analysis of representative soil samples. These occurrences of limited coal tar wastes may be considered

to be part of soil and not a "visible coal tar waste deposit," and accordingly, they can be evaluated as soil in a Risk Characterization.

These limited coal tar wastes may be found on the fringes of a "visible coal tar waste deposit" site or as part of mixed wastes at locations that are not otherwise considered a coal gasification waste site.

Q2: Should DNAPL from coal tar be managed under the NAPL control and removal requirements (310 CMR 40.1003(7)) of the MCP?

A: DNAPL from coal tar or other origin should be treated as "NAPL" ***if*** it flows in a manner consistent with the principles of fluid flow in porous media (i.e., Darcy's Law) as described in the Conceptual Site Model definition at 310 CMR 40.0006. "Solid" material cannot be characterized in that manner. While coal tar wastes can, under certain conditions, exhibit separate phase mobility (i.e., behave as a liquid), coal tar wastes typically exist in a solid state with little or no mobility. Most coal tar wastes in the Commonwealth are likely to be aged/weathered. In short, most coal tar wastes are expected to be solid under ambient conditions and would not be considered DNAPL. Only coal tar wastes that always exist strictly as a liquid (i.e., year-round regardless of ambient temperatures) may be addressed as NAPL under the provisions at 310 CMR 40.1003(7).

Q3: Why does BWSC allow the use of published values to estimate coal tar waste deposit Exposure Point Concentrations, rather than requiring environmental sampling?

A: Coal tar wastes can be highly concentrated and analytically "messy" to the point that it can damage lab equipment, so a typical lab may be unable to analyze environmental coal tar samples. While Exposure Point Concentrations should be based on environmental samples where possible/feasible, there is flexibility to evaluate coal tar waste deposits qualitatively or quantitatively. When the environmental sample is coal tar, this presents potential analytical problems. The MCP Exposure Point Concentration provisions (310 CMR 40.0926(8)(a)3.) therefore indicate that in the case of visible coal tar waste deposits the EPC "shall be based on the OHM concentration known or estimated to be present in the coal tar itself."

Q4: Can risk characterization methods other than Method 3 be used for sites with visible coal tar waste deposits?

A: No. Methods 1 and 2 can only be used to characterize potential risks from oil or hazardous material ***in*** soil or groundwater, and visible coal tar waste deposits are a separate and distinct phase from these media. The MCP describes the options available to characterize the risk from contamination in media other than soil and groundwater at 310 CMR 40.0942(1)(b). As described therein, Method 3 alone or a combined Method1/Method 3 approach may be appropriate.

Q5: For the purposes of characterization risk, is there some *de minimis* amount of coal tar waste deposits that is not subject to the MCP coal tar provisions?

A: No. The MCP does not specify a *de minimis* amount of coal tar waste deposit. With some site-specific exceptions, it is reasonable to expect that relatively small amounts of coal tar waste deposits can, and should, be removed to minimize long-term management of the material on-site. For sites with significant coal tar waste deposits, a site-specific determination is needed to indicate whether it makes sense to manage the coal tar waste deposits on-site or to remove the wastes.

Q6: Soil beneath a building is considered inaccessible or defined as "isolated" under the MCP (310 CMR 40.0933(4)(c)3.). The coal tar provisions appear to consider coal tar waste deposits under buildings "accessible" or "potentially accessible"? What is the reasoning behind this?

A: The soil accessibility descriptions ("accessible", "potentially accessible" and "isolated") inform human health risk characterizations. The new coal tar waste deposit regulations are modeled on the rules for the Method 3 Ceiling Limits (M3CLs), formerly known as the Upper Concentration Limits. Both provisions address the risk of harm to Public Welfare and the Environment related to leaving high concentrations ("gross contamination") on-site as part of a Permanent or Temporary Solution. Neither provision involves a quantitative or qualitative evaluation of exposure as would be found in a human health risk characterization, and thus the soil exposure characteristics described in 310 CMR 40.0933(4) are not applicable.

Q7: Would you need an Activity and Use Limitation if all the remaining visible coal tar waste deposits at a site were limited to a depth greater than 15 feet from the ground surface?

A: Yes. For a Permanent Solution at a site, all remaining visible coal tar waste deposits must be located *either* at a depth greater than 15 feet from the ground surface *or* beneath an Engineered Barrier, and both conditions also require an Activity & Use Limitation (310 CMR 40.0997(3)). Where the visible coal tar waste deposit is located beneath a building that is not constructed to serve as an Engineered Barrier, the "ground surface" begins at the surface of the soil immediately below the building (310 CMR 40.0997(4)).

Q8: Since old asphalt can contain coal tar as can asphalt base materials and sealcoating products, how does this fit with new coal tar waste deposit regulations?

A: Asphalt and seal coating products are not themselves a by-product or residual from the process of producing coal gas from coal but are products that may incorporate some amount of coal tar material. Asphalt and sealcoating are not subject to the MCP coal tar waste deposit provisions.

Q9: The provisions at 310 CMR 40.0997 indicate that an Engineered Barrier is required to achieve a Permanent Solution if visible coal tar waste deposits remain at a site at a depth less than 15 feet. Are there any other remedial alternatives that could be considered a valid means of achieving a Permanent Solution at a site with visible coal tar waste deposits?

A: Currently, the coal tar waste deposit regulations do not explicitly include a provision allowing the waste to be "permanently immobilized or fixated as part of a remedial action." However, MassDEP has considered alternative means to *remediate* coal tar waste deposits if the alternative effectively reduces or eliminates the potential risks posed by the coal tar wastes by permanently transforming the nature of the material to the point where it no longer has the characteristics of the visible coal tar waste deposit. Persons contemplating the use of such alternatives should contact the BWSC Deputy Regional Director for the region where the project site is located to discuss the proposal before proceeding. The treatment alternative must be adequately justified, e.g. documentation of bench scale and QA/QC testing as appropriate in the Phase III RAP, Phase IV RIP and Phase IV FIR. This material would be considered similarly to materials treated to address M3CL exceedances, including the implementation of an Activity and Use Limitation (310 CMR 40.0996(6)).

Exposure Point Concentrations

Q10: Where in the MCP does it indicate the use of a conservative estimate of the Exposure Point Concentration as being the average mean concentration contacted by a receptor at each Exposure Point?

A: 310 CMR 40.0926(5) states "In estimating the Exposure Point Concentration, the objective shall be to identify a conservative estimate of the mean concentration contacted by a receptor at each Exposure Point over the relevant exposure period".

Q11: For surface water and sediment EPCs, is there a comparable 75/10 rule requirement for justifying using the average?

A: No. The MCP Exposure Point Concentration provisions for surface water and sediment, 310 CMR 40.0926(10) and (11), respectively, do not have a comparable rule. The 2024 MCP amendments do not change the performance standard of calculating "a conservative estimate of the mean." This is partly due to surface water and sediment sampling being more complex than soil sampling.

Q12: For soils in categories that span both the 0-3 foot and the 0-15 foot depth interval, are two separate EPC calculations required?

A: Yes. These two depth intervals are considered two Exposure Points because the potential for exposure is different in the short-term (0-3 feet) compared to the longer-term (0-15 feet).

See 310 CMR 40.0924(7)(a) and (b) for applicable soil Exposure Points under Methods 1/2 and Method 3. By calculating a separate EPC for the more surficial soils, you have a more accurate estimate of potential exposure under current conditions.

Systematic Sampling

Q13: What is the recommended/proper spacing between samples when performing systematic grid sampling?

A: The spacing of sampling locations will depend on the size of the target area and the number of samples to be collected. MassDEP generally recommends 25- to 50-foot grid squares. However, for small exposure areas (e.g., a residential yard) spacing of grid samples may need to be closer to collect a representative sample. Justification for the grid spacing used at a given site should be included in the risk characterization.

Q14: How many sample points are needed when performing systematic grid sampling to obtain a representative sample for an EPC estimate?

A: MassDEP generally considers 20-30 systematic discrete samples sufficient to estimate an Exposure Point Concentration using an upper confidence limit. The number of samples required for a representative EPC estimate will depend on the variability of contaminant concentrations as well as the size of the parcel under investigation. When preliminary soil sampling study data are available, statistical calculations such as those used in the U.S. EPA ProUCL "DQOs Based Sample Sizes" tool can be used to estimate the size of the data set needed for a specified level of certainty based on the estimated variability in the preliminary data set.

Q15: The latest version of the U.S. EPA ProUCL software no longer recommends the Chebyshev method. Why is the Chebyshev method specified in the MCP?

A: The technical guide for the ProUCL version 5.2 update cited concerns that the 95th percentile Chebyshev non-parametric upper confidence limit can result in gross overestimates of the mean. MassDEP agrees that the 95th percentile Chebyshev upper confidence limit can be overly conservative, and therefore specifies the use of the 90th percentile Chebyshev non-parametric upper confidence limit in the MCP.

Q16: Can I use ProUCL to calculate and choose alternative upper confidence limits (UCLs)?

A: Yes. With appropriate justification (310 CMR 40.0926(8)(a)2.a.), ProUCL may be used to calculate a number of UCLs including the 90% Chebyshev UCL. However, MassDEP disagrees with USEPA's implementation of ProUCL version 5.2 for selecting a "Suggested UCL to use."

The recommendations from ProUCL version 5.2 alone are therefore not a sufficient technical justification for using an alternative 95% parametric UCL instead of the 90% Chebyshev UCL specified in the MCP. The previous version of ProUCL, version 5.1, does not have these issues with the suggested UCL selection, so it may be used to select an alternative 95% parametric UCL.

Q17: Can I use Excel to calculate the 90th percentile upper confidence limit on the mean rather than ProUCL?

A: Yes. For a given range of data points (DataRange), you can use following formula to calculate the 90% Chebyshev UCL in Excel:

=AVERAGE(DataRange)+(STDEV(DataRange)/SQRT(COUNT(DataRange)))*SQRT((1/0.1)-1)

This formula is only applicable to data sets that do not include non-detect (ND) values.

(Note that the 90th percentile upper confidence limit on the mean is different from the 90th percentile of site data, which uses a different Excel function.)

Q18: How should "non-detect" values be handled in UCL calculations?

A: MassDEP recommends the use of Kaplan-Meier (KM) estimates of the sample mean and standard deviation to incorporate non-detect values in the calculation of the 90th percentile Chebyshev non-parametric upper confidence limit of the mean. ProUCL provides this calculation as the "90% KM Chebyshev UCL" in its output UCL statistics for data sets with non-detects.

Excel is not capable of providing KM estimates without downloading add-ins. A paper that provides SAS code for the calculation is available at https://analytics.ncsu.edu/sesug/2010/SDA09.Beal.pdf.

Alternative statistical software or approaches to address non-detect values in UCL calculations should be adequately documented with appropriate technical justification.

Incremental Sampling

Q19: Does incremental sampling require the use of an upper confidence limit (UCL) for EPC calculations?

A: MassDEP does not require the use of a UCL for Incremental Sampling Methodology (ISM) sample and replicate results. For incremental sampling, the arithmetic mean of the three

results may be used as an estimate of the Exposure Point Concentration because the nature of ISM sampling reduces the uncertainty in the calculated mean.

Judgmental Sampling

Q20: Can data collected using judgmental sampling be used for upper confidence limit (UCL) calculations? This is of particular concern at older sites where all (or most) of the past sampling was judgmental.

A: UCL calculations are generally only appropriate for systematic sampling approaches. Judgmental sampling data collected using either discrete or composite sampling procedures cannot be used in combination with systematic sampling data in a UCL calculation as the different sampling strategies provide different (and incompatible) data sets.

As indicated in 310 CMR 40.0926(8)(a)1.b., if judgmental data do not meet the 75/10 rule, the arithmetic mean can still be used as long as the LSP provides technical justification. While not specifically stated, the calculation of an alternative conservative estimate of the arithmetic mean considering "the size of the data set, density and potential biases of the sampling, and other relevant factors" is also acceptable under this provision, with the corresponding technical justification. It is unlikely that a technical justification can be used to justify a UCL calculation in this case.

The MCP soil Exposure Point Concentration provisions at 310 CMR 40.0926(8)(a)2. provide for the use of an upper confidence limit where systematic sampling has been implemented. Again, an alternative conservative estimate of the arithmetic mean may be used considering "the size of the data set, density and potential biases of the sampling, and other relevant factors" with technical justification, but only after it is demonstrated that the 90th percentile Chebyshev UCL is not suitable. If appropriate and justified, this may not include a UCL calculation.

Thus, when calculating an alternative conservative estimate of the arithmetic mean pursuant to either 310 CMR 40.0926(8)(a)1.b. or 40.0926(8)(a)2., the regulations require consideration of "the size of the data set, density and potential biases of the sampling, and other relevant factors". Presumably the inclusion of mixed data (from both judgmental and systematic sampling) in an exposure point concentration calculation pursuant to either 310 CMR 40.0926(8)(a)1.b. or 40.0926(8)(a)2. would necessarily have to consider the same list of factors, and the technical justification would explicitly address how and why the use of such mixed data results in a "conservative estimate of the mean".

Caps and Engineered Barriers

Q21: What is the distinction between a cap and an Engineered Barrier?

A: The term cap is not specifically defined in the definition section of the MCP, but it is used in several places in 310 CMR 40.0000 to refer to a barrier that reduces or eliminates exposure to media beneath it. A cap may also minimize percolation of water into the subsurface. An Engineered Barrier is a defined MCP term and a specific type of cap/barrier system that meets the requirements in 310 CMR 40.0998.

CLIMATE CHANGE
(added March 29, 2024)

Q1: Why did MassDEP include the consideration of climate change impacts in the 2024 MCP amendments?

A: The MCP requirement to consider climate impacts at 21E sites stems from Executive Order 569 (link here) and the Commonwealth's 2018 State Hazard Mitigation and Climate Adaptation Plan (2018 MA SHMCAP, link here.) The 2018 MA SHMCAP was revised in 2023 and renamed as the 2023 ResilientMass Plan, or 2023 MA SHMCAP (link here.)

Executive Order 569 states "WHEREAS, our state agencies and authorities, as well as our cities and towns, must prepare for the impacts of climate change by assessing vulnerability and adopting strategies to increase the adaptive capacity and resiliency of infrastructure and other assets."

The 2018 MA SHMCAP detailed the requirements for Executive Order 569 and directed all Executive Office of Energy and Environmental Affairs (EOEEA) agencies to "review, evaluate, and implement revisions as needed to environmental and energy policies, regulations, and plans." For MassDEP, this included revising the MCP to address the assessment and mitigation of potential impacts related to climate change at disposal sites.

Q2: What are the MCP requirements related to potential climate change impacts at disposal sites?

A: The MCP climate change-related requirements are found in the definition of Conceptual Site Model (CSM) at 310 CMR 40.0006, in the Response Action Performance Standard (RAPS) provisions at 310 CMR 40.0191, and in the "Defining Foreseeable Period of Time for Purposes of a Permanent Solution" provision at 310 CMR 40.1005(1).

The Conceptual Site Model definition has been revised to reference "current and foreseeable" site characteristics and risk. The change at 310 CMR 40.1005(1) adds to the description of foreseeable period of time for a Permanent Solution, "considering existing site conditions and reasonably foreseeable future changes in site conditions, including anticipated impacts associated with climate change." This foreseeable period of time definition is cross-referenced in RAPS at 310 CMR 40.0191(1).

Other climate change-related changes to RAPS include referencing the Executive Office of Energy and Environmental Affairs (EOEEA) as a source of relevant policies and guidelines to reflect that EOEEA is the appropriate source for information on climate change forecasts. Also added to RAPs is a general requirement that the MCP Response Action Performance Standard include consideration of "response actions that incorporate climate change resilience to the extent practicable and consistent with response action requirements."

Together, these changes are intended to ensure that anticipated climate change impacts are taken into account as part of a Permanent Solution and are otherwise generally incorporated into the overall response action approach at a disposal site.

Q3: When considering a Permanent Solution, what timeframe is appropriate for assessing "reasonably foreseeable future changes in site conditions, including anticipated impacts associated with climate change"?

A: The MCP does not specify a timeframe that applies to all sites. The timeframe will vary based on the nature of the contamination that remains on-site, as well as the vulnerability of the site and the surrounding area. LSPs should exercise professional judgment in identifying an appropriate timeframe considering site-specific information in combination with forecasts of climate change impacts.

Most of the forecasts related to Executive Order 569 and the 2023 ResilientMass Plan use planning ranges between the years 2050 and 2100. Selecting a target date that falls within these years (30, 50 or 80-years out) will allow the assessment of the Permanent Solution against specific climate change scenarios.

Q4: To what extent do the MCP requirements to consider climate change impacts at a disposal site apply to a Temporary Solution or Remedy Operation Status?

A: The climate change related references in the RAPs provisions at 40.0191(2) and (3) and in the Conceptual Site Model (CSM) definition that includes consideration of "current and foreseeable future site characteristics and risk" apply to the overall and long-term response strategy at the site and therefore are relevant to the achievement of Temporary Solutions and Remedy Operation Status. Achieving Temporary Solution and/or Remedy Operation Status requires evaluating the feasibility of achieving a Permanent Solution, which requires considering "existing site conditions and reasonably foreseeable future changes in site conditions, including anticipated impacts associated with climate change."

Q5: How is vulnerability to climate impacts at 21E sites to be assessed?

A: As described in the 2018 MA SHMCAP, vulnerability to climate change is a function of "Exposure," "Sensitivity," and "Adaptive Capacity" relative to four primary climate changes:

- Precipitation (e.g., inland flooding, drought, landslide);
- Sea Level Rise (e.g., coastal flooding, coastal erosion, tsunami);
- Rising Temperature (e.g., average/extreme temperatures, wildfires, invasive species); and
- Extreme Weather (e.g., hurricanes/storms, nor'easters, tornadoes).

"Exposure" to these changes can be determined by using available climate models/forecasts, such as those at ResilientMA.org (link here.)

Site-specific "Sensitivity" factors to consider include:

- Location within exposure area(s) and relative to environmentally sensitive resources;
- Demographics (e.g., population proximity and density, Environmental Justice communities);
- Vulnerability of equipment and structures still in use (e.g., wells, site/remediation equipment);
- Status of the Remedial Action at the disposal site, including whether there are active systems (Active Remedial Systems, Active Exposure Pathway Mitigation Measure), sensitive human or environmental exposures (Imminent Hazard, Critical Exposure Pathway), and/or long-term considerations (NAPL, Activity and Use Limitation); and
- Contaminant nature, concentration, and fate & transport (e.g., degradation rates, remobilization as a bulk material, adsorption/desorption, volatilization and/or dissolution).

"Adaptive Capacity" addresses the potential for modification of operations, policies, or other functions in response to changing natural hazards and climate change impacts.

Consulting applicable professional standards and practices, such as those described in the "MCP Climate Change Toolkit" published by the Licensed Site Professional Association (LSPA) Climate Change Subcommittee (link here), may be helpful in performing this analysis. This Toolkit includes a "Climate Vulnerability Assessment Checklist," flow chart, glossary, list of tools & resources, and case studies.

Q6: Do these climate vulnerability assessment requirements apply to all 21E sites?

A: The requirement to consider potential climate impacts applies to all sites, but the level of effort will depend on the site sensitivity factors. A detailed climate vulnerability assessment would not be necessary, for example, at a disposal site where risk due to these sensitivity factors is shown to be absent and/or the site has been restored to background concentrations of oil and/or hazardous materials (OHM). Conversely, a comprehensive assessment would be appropriate where elevated levels of a toxic contaminant are capped at a location that climate change forecasts predict to be susceptible to future storm surges and coastal flooding.

Q7: How should climate-related impacts to groundwater be assessed?

A: Correlations and estimations of climate impacts on groundwater levels are possible using various methods, but the uncertainty and complexity of these predictions are significant. Because there are and will continue to be climate change-related impacts on groundwater elevations, broader and more direct fate and transport questions that apply are: "What happens to contamination in the vadose zone when inundated with water if groundwater levels rise?" and, conversely, "What happens to contamination if groundwater levels drop?" These questions should be considered as an element of a climate vulnerability assessment regardless of any analytical/statistical groundwater level prediction variabilities.

Q8: What adaptive/resilience measures should be considered?

A: Resilience measures, or best management practices (BMPs), for potential climate change impacts should be considered during the entire MCP process and implemented as part the selected response actions, as appropriate. Some examples of resilience BMPs are included in Section 4 of the Commonwealth's Climate Resilience Design Standards and Guidelines Project by the Resilience Massachusetts Action Team (RMAT, link here,) EPA's Superfund Climate Resilience Webpage (link here,) and in the ITRC Sustainable Resilient Remediation Guidance (ITRC SRR, link here.)

Q9: Does MassDEP plan to re-visit previously closed sites on the basis of climate change?

A: MassDEP does not intend to revisit previously closed sites on the basis of climate change impacts as long as the activities, uses or exposures upon which a Permanent Solution is based do not change in a way that increases potential for human or environmental exposure to OHM and pose significant risk. An example of an impact that could affect a Permanent Solution is the erosion of a cap over contaminated soil as a result of flooding at a closed site where the person liable for maintaining the cap has failed to undertake response actions to repair it.

Q10: Do the MCP climate change related provisions affect Activity and Use Limitations?

A: The climate change MCP provisions do not directly affect AUL requirements and need not affect the manner in which an AUL documents a property owner's ongoing obligations and conditions for maintaining a condition of No Significant Risk. For example, an AUL may say "maintain the integrity of the cap, including repairing as needed. Inspect annually at a minimum." If there are impacts over time, the AUL requires the cap to be repaired over time, regardless of the climate change vulnerability assessment.

Q11: What technical resources and climate forecasts are recommended for performing assessments of potential climate change impacts?

A: Most of the technical information needed to conduct vulnerability assessments is included in ResilientMA.org (link here,) which is a resource:

> "…produced to ensure continued access to information and provide communities with the best science and data on expected climate changes, information on community resiliency, and links to important grant programs and technical assistance. This website also catalogs specific vulnerabilities, risks and strategies concerning agriculture, forestry, local government, education, energy, recreation, and transportation. All of the climate projections included on the website are specific to Massachusetts… includes an interactive map so that users can understand how climate change will affect their specific location and the resources they manage."

ResilientMA.org and its associated contents are reviewed and updated regularly and it is the primary resource for this work. The site includes a map tutorial video (link here) and a data graphing tutorial video (link here.)

In addition, the LSPA's "MCP Climate Change Toolkit" (link here) provides a "Climate Vulnerability Assessment Checklist," flow chart, glossary, list of tools & resources, and case studies.

Other helpful resources to consider include, but are not limited to:

- RMAT Climate Resilience Design Standards and Guidelines Project (link here)

- Massachusetts (MA) Office of Technical Assistance and Technology (OTA) Mapping Toxics in Communities and Assessing Climate Vulnerability (link here)
- MA Coast Flood Risk Model (MC-FRM) (link here)
- ITRC SRR Guidance (link here)
- EPA Superfund Climate Resilience webpage (link here)
- EPA 2021 Climate Adaptation Plan (link here)
- EPA 2021 Climate Smart Brownfields Manual (link here)
- First Street Foundation Defining America's Flood Risk (link here)
- Federal Emergency Management Agency (FEMA) National Risk Index for 18 natural hazards (link here)
- Coastal Zone Management (CZM) Massachusetts Sea Level Affecting Marshes Model (SLAMM) viewer (link here)
- ASTM Standard Guide for Remedial Action Resiliency to Climate Impacts (ASTM E3249-21) (link here)

Q12: What funding sources are available for this work?

A: At this time, there are no funding sources specifically targeted for addressing climate change impacts at MCP sites. However, the Municipal Vulnerability Preparedness (MVP) grant program (link here) provides support for cities and towns across the Commonwealth to identify climate change vulnerabilities, prioritize critical actions, and build community resilience.