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Disaster Relief and Resiliency Fund
Building Back Better: Best Practices for Repairing Damage in a Resilient Manner

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The Disaster Relief and Resiliency Fund (DRRF) was created to provide emergency disaster relief to alleviate the damage, loss, hardship, and suffering caused by a natural or other catastrophic event and to reduce the risk of such harm occurring again in the future. One way to reduce risk is by adding resilience into the design and construction of buildings and other infrastructure. This means designing projects to withstand both current risks and those that could exist in the future. For example, if stormwater running across a property enters a basement, absorbing the water in a rain garden or minimizing impact with a sump pump would improve the resilience of the building.

To help identify ways to build resilience, this document offers recommendations and best practices for repairing, restoring, or rebuilding buildings or infrastructure damaged by a catastrophic event. The goal is to reduce the likelihood of the same damage occurring again in the future. This resource is a complement to the regulations promulgated and guidance issued by the Executive Office for Administration and Finance to administer funds from the Disaster Relief and Resiliency Fund (801 CMR 29).

The document brings together resilience best practices from regulations, standards, and guidance issued by multiple state agencies, federal agencies, and independent experts. The best practices outlined here are relevant to a wide range of projects, from small repairs to full reconstruction of buildings or infrastructure. It is not anticipated that any single project would integrate all the best practices. Please review this list to determine which actions may be applicable to your situation. If you receive funds from the DRRF, you will be asked to confirm that you will take reasonable steps to reduce vulnerability to future disasters; this can include implementing resilience best practices like those outlined in this document.

Some resilience measures, such as ensuring walls and floors are dry before refinishing or replacing them, can be done without professional assistance. For projects that involve a contractor, engineer, electrician, or other professional, this document should be shared with them as early as possible. Doing so can increase the integration of resilience measures that will help protect buildings and infrastructure in the future.

This document does not include every possible measure that can improve resilience. Additional actions may be required as a condition of a permit, license or other source of funding.

For all categories of infrastructure, standards may be updated from time-to-time, including when state agencies issue guidance for incorporating resilience into design standards for culverts, water, and energy infrastructure**.** This resource may also be updated as new information becomes available.

Section 1. Best Practices Recommended for Non-Building Infrastructure

For infrastructure projects, including transportation, drainage, stormwater, water, and wastewater facilities, the following standards and guidance are best practices where applicable.

- Massachusetts Stormwater Handbook and Stormwater Standards (including any updated versions) as well as all relevant MassDEP manuals and guidelines for public water systems, wastewater treatment works, and stormwater.
- For projects with stormwater components, reference EPA Performance Removal Curves.
- For culverts, reference Stream Crossing Standards unless technically infeasible due to site constraints.
- EEA resilient infrastructure standards and guidance (expected by end of 2026).
- Review any municipal vulnerability or hazard mitigation plan to determine if work can be coordinated with identified resilience priorities or projects.

Section 2. Best Practices Recommended for Buildings

For building projects, whether a repair, restoration, or rebuild, the following are best practices for municipalities, businesses, homeowners, and other property owners. Not every action will apply to every building project, but the measures are generally arranged to start with those that are easier to integrate into smaller projects, such as responding to a flooded basement, and end with those that are more relevant to larger projects, such as rebuilding a destroyed building.

A. Recommendations for Roof Damage from Wind, Hurricanes or Tornadoes

- ☐ Seal potential entry points for water.
- ☐ Follow FORTIFIED standards, as defined by the Insurance Institute for Business and Home Safety (IBHS), for roof & window repairs and replacements.
- ☐ If replacing a roof for any reason, consider a cool roof, e.g., white or highly reflective, to reflect solar radiation and lower building temperatures (higher solar reflectance indexes are better).

B. Recommendations for Flood Damage

- ☐ Before beginning any refinishing projects, ensure all walls, floors, and other structural components are dry.
- ☐ Ensure all exposed foundations and flooring is dry before replacing flooring.
- ☐ Maximize use of water & mold resistant materials in areas at or below prior levels of flooding and/or water entry.
- ☐ Use waterproof or highly water-resistant insulation and drywall in areas at or below prior levels of flooding and/or water entry.
- ☐ If a contractor is working on a project, seal entry points to the structure at or below ground level.
- ☐ If an electrician is working on a project, seal entry points to mechanical equipment and electrical systems that are at or below prior levels of flooding and/or water entry (for destroyed buildings, elevate equipment instead).
- ☐ If an electrician is working on a project, raise electrical panels and outlets in accordance with the MA State Building Code 780. Lower elements should comply with the Massachusetts Electrical Code (527 CMR 12.00).
- ☐ Evaluate use of sump pumps for sources of water infiltration (battery or water-power backup recommended in areas at risk of power outages).
- ☐ Evaluate use of floor drain standpipes, check valves or backwater valves.
- ☐ Evaluate use of rain barrels (use stored water within 1-2 weeks, keep barrel in shade and cover openings with fine mesh screen).

- ☐ Evaluate use of landscape features and green infrastructure to improve absorption, *e.g.,* rain gardens, bioswales, native plantings, and permeable pavement. For coastal properties, see CZM fact sheet on planting vegetation to reduce erosion and storm damage.
- ☐ Evaluate use of physical structures to manage surface runoff and reduce hydrostatic pressure on foundations, e.g., drains, flood vents, dry or retaining wells, perimeter flood barriers.
- ☐ Comply with the grading requirements from the MA State Building Code 780 (e.g., section R401.3 for residential code and Section 1804 for base code).
- ☐ Locate/extend downspouts to deposit water away from foundations, siding and doors in accordance with the MA State Building Code 780.
- ☐ Evaluate elevating mechanical equipment and electrical systems out of below-grade areas or higher prior levels of flooding/water entry.
- ☐ For buildings on 1 or more acres, use best practices outlined in the Massachusetts Stormwater Handbook and Stormwater Standards, wetlands regulations and associated guidance. This is required for single family homes only if the building site contains or is adjacent to Critical Areas, as defined in 310 CMR 10.04.
- ☐ Review any municipal vulnerability or hazard mitigation plan to determine if work can be coordinated with identified resilience priorities or projects.
- ☐ No new dwelling units below the base flood elevation in 100- or 500-year flood zones.
- ☐ If raising existing structures or rebuilding a destroyed structure:
    - Use climate effects data in Section 3 to inform elevation and design features.
    - Bottom of lowest horizontal structural member of the lowest floor must be elevated to or above the base flood elevation plus 2 feet as defined in MA State Building Code 780.
- ☐ If a project is subject to the MA State Building Code 780's new construction standards, it should comply with any more stringent requirements in ASCE 24-24 Flood Resistant Design and Construction Standards.
- ☐ Evaluate use of the ASCE 24-24 Flood Resistant Design and Construction standards for projects in all locations.

Section 3: Best Practices Recommended for Projecting Future Risks for all Projects

- ☐ For project components subject to precipitation-based design values, use data from ResilientMass Projected Precipitation Frequency Tables or NOAA Atlas 14, or any updated version. For stormwater management and drainage components of projects use precipitation projects at least 20 years in the future; for building elevation and structural components, use precipitation projections at least 50 years in the future.
- ☐ For coastal projects, use design elevations recommended by the higher of (i) the Massachusetts Coast Flood Risk Model (MC-FRM) level 2 data and (ii) ASCE 24-24 (or the most updated, relevant dataset).