



WHITE PAPER

Road to Resilience: Town Highway Disaster Reserve Benchmarks

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Introduction

Vermont local governments operate with constrained resources and limited capacity in an increasingly complex political, social, and environmental context. From 2023 to the present, the last of these factors was felt acutely throughout Vermont due to the impact of extreme weather and related flooding. Information on how to plan for reducing and avoiding [this risk is relatively widespread](#); however, guidance on how to withstand the financial impact of extreme weather events is sparse.

The Bond Bank's [Town Highway Disaster Reserve Benchmarks](#) (Reserve Benchmarks) are a first step in filling this gap with transparent data on the average annual amount towns would have needed to set aside to cover flood losses from 2009 to 2024. Local governments can use this tool to build disaster reserves and better manage the fiscal risks of future extreme weather.

As a statewide lender to local governments, the Bond Bank has a vested interest in the financial sustainability of every village, town, and city. The Reserve Benchmarks contribute to this mission by advancing the use of [financial benchmarking](#), which is the best practice for sound financial management and builds on the Bond Bank's annual [portfolio median release](#).

This first iteration of the Bond Bank's analysis is focused on public infrastructure—specifically the transportation network—where significant fiscal liability exists. This does not diminish other financial impacts felt by businesses, nonprofits, and households due to flooding but does start the conversation around the asset that literally connects communities.

As the data within this paper show, small achievable annual contributions by Vermont local governments can make large differences in reducing disaster cost liabilities. Combining Bond Bank data and historic disaster costs indicates that the median Vermont community requires an annual contribution of less than 1% of its budget to meet the Bond Bank's recommended annual reserve contribution, and even in the hardest-hit communities, this amount rises to just over 3%.

The Reserve Benchmarks are the first of what will be ongoing Bond Bank guidance on planning for the financial consequences of extreme weather. Future guidance will include expanded benchmarks and programmatic guidelines for accessing additional financial incentives through the Municipal Climate Recovery Fund (MCRF).

The following sections of this white paper describe:

- a framework for Vermont municipalities to address the financial impacts of extreme weather risks;
- the significance of local transportation networks in this framework;
- a review of statewide municipal financial preparedness; and,
- the methodology used to develop this first release of the Reserve Benchmarks.

Annual Contribution

The recommended amount — Low, Medium, or High — that a municipality sets aside each year toward its disaster reserve, calculated as a percentage of its average annual flood-related loss.

Disaster Reserve Target

The total reserve balance a municipality should build toward: 15% of the average of its three highest loss years over the 15-year analysis period, covering risk retention in a major event.

Extreme Weather Risk Framework

Risk management frameworks are based on two complementary ideas: risk identification followed by treatment of the related risk. Risk treatments include:

- Risk reduction
- Risk avoidance
- Risk transfer
- Risk retention

Exposure to flooding is well understood in Vermont. Guidance on risk reduction and risk avoidance is widespread and includes many activities supported by pre-event and post-event programs such as FEMA Hazard Mitigation Grants and the on-again-off-again Building Resilient Infrastructure and Communities (BRIC) grants.

The City of Barre provides helpful examples of both risk reduction and risk avoidance.

- *Risk Reduction* – underground infrastructure for a new housing development on Seminary Street will be sealed for flood resistance and the related building will have no residences on the first floor.
- *Risk Avoidance* – moving the public works garage out of the floodplain to higher ground in the Town of Barre.

Risk transfer refers to insurance policies and other contracts to transfer financial risk to a third party. This includes post-event federal assistance, including FEMA Public Assistance (FEMA PA) and the Federal Highway Administration Emergency Relief Program. The lack of insurance premiums to access federal

assistance makes this an attractive option, but as local governments know, it does not cover all expenses, and the management burden is significant.

The last risk management tool, **risk retention**, is less well understood. Because the cost of reducing or avoiding all flood risk is beyond the reach of most communities, Vermont local governments inevitably retain some financial risk, whether they recognize it explicitly or not. Risk retention is also required for federal risk transfer programs.

Despite the reliance on this risk management tool, it is almost universally an unfunded liability. This liability will potentially increase if [proposed reductions in FEMA assistance](#) are enacted.

In Vermont, risk retention can be partially reduced through participation in the Emergency Relief Assistance Fund (ERAF), which limits a local government's risk retention in a federally declared disaster to either 7.50% or 12.50% of the 25% match required of FEMA PA.

Understandably, the volatility and unpredictability of extreme weather make it challenging to identify an appropriate reserve amount. Additionally, towns face many competing demands on their municipal budgets.

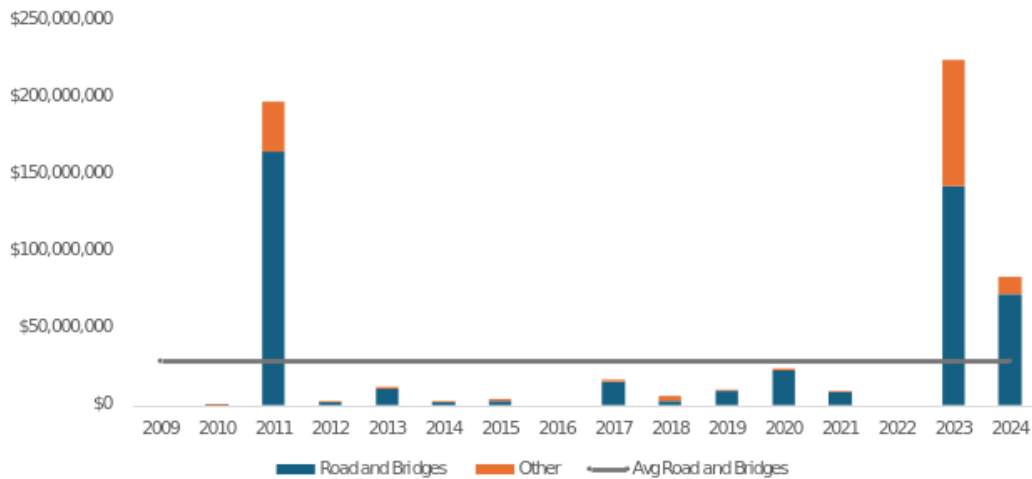
Long-term planning for risk retention, however, can reduce costs over time and enable local governments to respond more quickly while increasing financial sustainability. More importantly, recognizing the true cost of risk retention can support a more informed analysis of the trade-offs between reserve funding and adaptation projects.

The Reserve Benchmarks can be used in the annual budgeting process to identify the amount to set aside so that the municipality is not financially overwhelmed when large disaster losses occur. Cumulative contributions and interest earnings in related reserves can be compared against the Disaster Reserve Target within the benchmarks to evaluate whether a municipality is sufficiently funded in the event of a flood-related loss.

Why Road and Bridge Exposure is Essential to Understanding Flood Risk

Over the last 16 years, inclusive of all years from 2009 to 2024, FEMA Public Assistance obligations for local road and bridge projects accounted for approximately 77% of all local-government FEMA Public Assistance obligations in Vermont as of July 9, 2026. This concentration reflects both the vulnerability of transportation assets and the limited availability of other insurance or risk-transfer mechanisms for these assets.

INFLATION ADJUSTED FEMA PROJECT COSTS FOR VT LOCAL GOVERNMENT - 2009 TO 2024



The Bond Bank’s current disaster reserve benchmark release is focused on transportation because of the significance of this asset in driving historic disaster costs. Additionally, Vermont Agency of Transportation’s (VTrans’) [Transportation Resilience Planning Tool](#) is a best-in-class model to understand risk to transportation assets. Combined, the two data sets can help local governments compare financial exposure with the vulnerability and importance of their transportation assets.

Vermont Municipal Financial Preparedness

The Bond Bank’s database of municipal financial statements allowed comparison of the Reserve Benchmarks to existing financial conditions for towns that experienced damage over the analysis period. A total of 110 municipalities (of 293 in the database) had both disaster losses and recent financial data¹. Notably, this analysis only includes road and bridge damage, and the potential capacity of existing financial resources should be evaluated narrowly.

Encouragingly, the analysis indicates that funding disaster reserves is within reach for many Vermont local governments. The median budget share needed to contribute to the Medium Annual Contribution represents only 0.38% of the annual budget and a maximum amount of just under 5%. Additionally, only 22% of the local governments reviewed had Disaster Reserve Targets that were higher than their available general fund balance.

This statewide finding masks substantial variation among Vermont communities. The 10 most exposed communities accounted for 30% of total losses during the analysis period. In those communities, the median required contribution rises to more than 3%, and 70% have less available general fund balance than their Disaster Reserve Target.

¹The Bond Bank only reviews financial data for municipalities that have loans with the Bond Bank

The picture changes significantly when disaster costs are concentrated in a single event. At the mid-range state contribution level of 12.50%, the largest flooding event experienced by each town would require a median local budget contribution of 34%. Among the 10 most vulnerable communities, the median contribution would increase to 47%. More than 66% of towns would need to contribute 20% or more of their annual budget to meet this match.

The analysis above assumes a FEMA PA system that contributes at historic levels, which is now in doubt given policy changes proposed by the [FEMA Review Council](#). Without FEMA PA assistance, the picture is stark for Vermont's villages, towns, and cities.

Over 50% of local governments have Disaster Reserve Targets in excess of their general fund balance, and the median budget share needed to keep pace with the Reserve Benchmark increases to 4%. In the top 10 most vulnerable towns, the median contribution needed for the Reserve Benchmark would be 32% — annually. Over 40% of towns would need to use 50% or more of their budget to cover the largest event in the 15-year review period.

The data above indicates that Vermont communities are making rational risk-treatment decisions under current conditions. The median Annual Contribution would support about \$119,000 in debt if used for debt service, which would finance only a small portion of transportation-network improvements.

This seemingly rational approach only works if dollars are set aside between events and the cost of risk retention does not skyrocket for an event that diverges from the 15-year average. Both the potential for overlapping events and federal uncertainty underscore the need to use Reserve Benchmarks to avoid future resource scarcity.

Methodology

The Bond Bank approached this analysis by focusing on what is known: historical damages reflected in inflation-adjusted FEMA PA obligations. The analysis used [FEMA's Public Assistance Funded Projects Details](#) (FEMA PA) and the Vermont Agency of Transportation's [Transportation Resilience Planning Tool](#) (TRPT).

The time range was limited by disaster declaration dates between 2009 and the currently available 2024 data. The date of the data pull for the FEMA PA dataset was July 9, 2026. The TRPT was released on September 30, 2022.

Local Loss Data

FEMA PA data was used to generate the dollar amount of local government projects receiving FEMA assistance following declared disasters related to severe storm, hurricane, and flooding incident types. The analysis includes only projects in Category C – Roads and Bridges. The dataset only includes project costs that resulted in FEMA obligations.

These amounts were then adjusted for inflation using the [Consumer Price Index for the urban northeast](#). The year of the disaster was the base from which to apply the inflation cost adjustment, given that FEMA PA is largely a reimbursement-based program and the date of the reimbursement may not reflect the original cost scoping of the project.

Notably, the dataset is limited by relying on FEMA-related costs, and actual experienced losses may be higher than cost totals shown in the database. Further, the slow nature of FEMA obligations means that the full scope of 2023 and 2024 costs is not yet included in the database.

Departments of local governments that applied separately were included in the applicable local government summary. Units of government within towns, such as villages, are shown separately in the database. Not all FEMA project identification numbers could be matched to municipalities and it is possible losses within Category C are not shown in the database.

Annual Contribution Benchmark Levels

The benchmark levels were established based on the expectation of continued FEMA PA assistance and the assumption that Vermont local governments will take advantage of limiting their risk retention to 7.50% of FEMA-eligible project costs. Average annual losses were calculated using the annual average of inflation adjusted project costs over the 15 year time period.

Annual recommended contribution levels are based on the following:

Contribution Level	Annual Amount	Rationale
Low Annual Contribution	7.50% of average annual loss	Based on lowest local risk retention in a federally declared disaster under current policies
Medium Annual Contribution	10.00% of average annual loss	Incorporates additional flexibility for non-declared events and costs that may not be eligible for reimbursement
High Annual Contribution	15.00% of average annual loss	Based on lowest local risk retention following the potential implementation of FEMA Review Council recommendations. This framework would decrease standard federal contributions from 75% to 50% (7.5%/25% × 50% local match). Assumes state continues to provide relative level of assistance under ERAF.

Disaster Reserve Target

Annual contribution amounts are based on averages of the last 16 years of local damages. The averages are influenced by the major events in 2011, 2023, and 2024 when high losses occurred. Annual contributions to the reserve, alongside interest earnings, will need to build to a level sufficient to cover risk retention in the largest years. Over the long run, annual contributions in the amount of the annual benchmark will produce amounts sufficient to fund the reserve but will be influenced by other risk treatment strategies, project cost inflation, and the changing climate.

The Disaster Reserve Target represents the terminal amount of Annual Contributions plus interest earnings. The difference between total annual contributions plus interest earnings and the Disaster Reserve Target represents an estimate of the transportation disaster cost liability of the local government.

The Disaster Reserve Target is based on 15% of the average of the three highest loss years over the 16-year period of analysis. The higher percentage is used to account for the many unknowns of the future and the unaccounted-for costs in recovery.

Transportation Data

TRPT data was screened by limiting the analysis to all classes of town highways within the dataset. Each line segment within the database includes this designation along with the corresponding town, vulnerability, and criticality scores. The line segment also includes a VTrans attribute indicating the miles of the segment that was summarized to calculate ratios in the Reserve Benchmarks Database.

The vulnerability rating was based on a score of six (6) or above in an event with a 100-year return period. This score corresponds to likely damage in the TRPT user guide, as shown in the table below.

Table 6 Summary of Vulnerability Scoring

Vulnerability Score	Vulnerability Rank	Likely Failure Mode	Transportation Influence	Distance (miles)	Vulnerability Type
0	Low	None	Road far from river such that vulnerability is unlikely	N/A	N/A
1, 2, 3	Low	Partial Closure	Single-lane closure, reduced capacity with some allowable travel, <24 hours	<0.25	Temporary inundation, minor erosion or deposition
4, 5	Medium	Full Closure	Multilane closure, detour required, 24 hours to several days	0.25 – 1	Large-scale inundation, localized erosion, localized deposition
6, 7, 8	Medium	Temporary Failure	Partial destruction of facility, several days to 1 week for recovery	0.25 – 1	Severe inundation, erosion, deposition
9, 10	High	Complete Failure	Complete destruction of facility, 1 week to months for recovery	Varies	Severe erosion or deposition

Source: User Guide for the Vermont Transportation Resilience Planning Tool (TRPT), p. 10

Critical road segments were based on a score of five (5) or above, which indicates that a failure of the link could lead to many failed trips or long delays, that access to critical facilities could be reduced, and

that a local detour route may be cut off. Both vulnerable roads and critical vulnerable roads were shown, as historically FEMA PA assistance was not limited to critical roads.

The GIS data included intersections with Vermont towns but not villages. Future releases of the Reserve Benchmarks will include village-level data.

Local Government Financial Data

The Bond Bank annually monitors its portfolio of loans and maintains a database that includes key data points for annual financial audits and/or reports. Annually, the Bond Bank produces and publicly [shares portfolio medians related to this data](#).

Not all local governments within the state are monitored by the Bond Bank. Local government entities with financial statements in the Bond Bank's database for the 2023 and 2024 fiscal and/or calendar years were matched with entries in the database. For simplicity, available general fund balances were used alongside aggregate budget amounts reported in audits. The analysis does not consider resources within enterprise funds or restricted reserves for post-disaster recovery.

Conclusion

The Reserve Benchmarks are intended to be a first step in a comprehensive framework for Vermont's municipalities to consider the financial trade-offs of flood risk and exposure to losses in the transportation network. This initial review gives reason for encouragement, as the financial resources needed to begin preparing are modest. The Bond Bank recognizes, however, that this potential financial planning is occurring alongside a cascade of competing costs and escalating municipal capacity challenges.

The release of this dataset is an attempt to begin the conversation with a focus on financial preparedness. Future Bond Bank work through the MCRF is intended to address other risk treatments, including reduction and adaptation through low-cost and flexible planning loans. These resources will be structured to better align the relatively low financial cost (but high human cost) of risk retention and the high financial cost (but lower human cost) of risk reduction and adaptation. All potential Bond Bank incentives will start with sound financial planning and use of the Reserve Benchmarks in the budgeting process.