

## 9.28 BATH BOROUGH

This section presents the jurisdictional annex for Bath Borough.

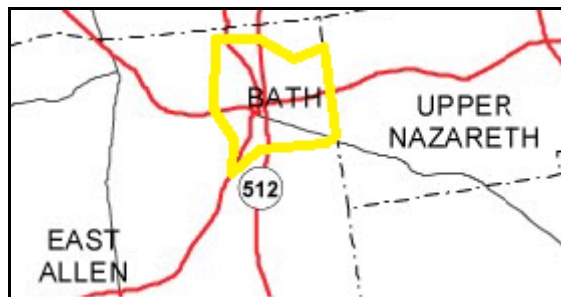
### A. HAZARD MITIGATION PLAN POINT OF CONTACT

| Primary Point of Contact |  | Alternate Point of Contact |  |
|--------------------------|--|----------------------------|--|
| <u>Name</u>              | Thomas R. Petrucci   | <u>Name</u>                |  |
| <u>Title/</u>            | Borough Manager  | <u>Title/</u>              |  |
| <u>Department</u>        | 215 E. Main Street, Suite 1  | <u>Department</u>          |  |
| <u>Address</u>           | Bath, PA 18014   | <u>Address</u>             |  |
| <u>Telephone</u>         | (610) 837-6525   | <u>Telephone</u>           |  |
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### B. MUNICIPAL PROFILE

Bath Borough is located in the western part of Northampton County. It encompasses an area of approximately 0.9 square miles, and has a population of 2,693 (2010 Census). As shown in Figure 1, the borough is bordered by Upper Nazareth Township to the east and East Allen Township to the north, west, and south.

**Figure 1**



(Source: <http://www.lvpc.org/pdf/maps/baseMap-LehighNorthamptonCounties.pdf>)

The Monocacy Creek flows southward from the northwest corner of the borough south into East Allen Township. Another small stream flows into the borough from the west, just south of PA Route 248. A small pond runs parallel to PA Routes 329/987 to the southwest of the borough; its northern tip enters the borough's border. Penn-Dixie Pond also enters the borough from the east, south of PA Route 248.

Bath Borough is a hub of several major roadways. PA Route 248 (Main Street/Northampton Street) crosses through the center of the borough east-west. PA Route 512 (Walnut Street) crosses through the middle of the borough north-south. PA Routes 329 and 987 share the designation of Race Street until it meets PA Route 248, when PA Route 329 ends. PA Route 987 follows Main Street to the southeast to South Chestnut Street, where it turns north and shares South Chestnut Street with PA Route 248 until that road turns east on Northampton Street. PA Route 987 continues north as Chestnut Street.



**D. NATURAL HAZARD RISK/VULNERABILITY RISK RANKING**

The following relative ranking of natural and non-natural hazard risks in this municipality was developed using PEMA's Risk Factor methodology described in Section 4, "Risk Assessment"

| HAZARD RISK | NATURAL HAZARDS        | RISK ASSESSMENT CATEGORY |        |                |              |          | RISK FACTOR (RF) |
|-------------|------------------------|--------------------------|--------|----------------|--------------|----------|------------------|
|             |                        | PROBABILITY              | IMPACT | SPATIAL EXTENT | WARNING TIME | DURATION |                  |
| HIGH        | Winter Storm           | 3                        | 2      | 4              | 1            | 3        | 2.7              |
|             | Flood                  | 3                        | 2      | 2              | 3            | 3        | 2.5              |
| MODERATE    | Radon Exposure         | 4                        | 1      | 2              | 1            | 4        | 2.4              |
|             | Extreme Temperatures   | 4                        | 1      | 2              | 1            | 3        | 2.3              |
|             | Drought                | 2                        | 1      | 4              | 1            | 4        | 2.2              |
|             | Wildfire               | 3                        | 1      | 2              | 3            | 3        | 2.2              |
|             | Hailstorm              | 3                        | 1      | 3              | 2            | 1        | 2.1              |
|             | Wind, incl. Tornado    | 1                        | 3      | 2              | 4            | 1        | 2.1              |
|             | Lightning              | 4                        | 1      | 1              | 2            | 1        | 2                |
| LOW         | Earthquake             | 1                        | 1      | 4              | 4            | 1        | 1.9              |
|             | Subsidence / Sinkholes | 2                        | 1      | 1              | 2            | 1        | 1.4              |
|             | Landslide              | 1                        | 1      | 1              | 4            | 1        | 1.3              |

| HAZARD RISK | MAN-MADE HAZARDS                     | RISK ASSESSMENT CATEGORY |        |                |              |          | RISK FACTOR (RF) |
|-------------|--------------------------------------|--------------------------|--------|----------------|--------------|----------|------------------|
|             |                                      | PROBABILITY              | IMPACT | SPATIAL EXTENT | WARNING TIME | DURATION |                  |
| HIGH        | Fire (Urban / Structural)            | 4                        | 2      | 1              | 4            | 2        | 2.6              |
|             | Env. Hazard and Explosion            | 3                        | 2      | 2              | 4            | 3        | 2.6              |
|             | Utility Interruption                 | 3                        | 1      | 3              | 4            | 3        | 2.5              |
| MOD-ERATE   | Transportation Accident              | 4                        | 1      | 1              | 4            | 1        | 2.2              |
|             | Mass Gathering and Civil Disturbance | 3                        | 1      | 1              | 4            | 2        | 2                |
| LOW         | Terrorism                            | 1                        | 3      | 1              | 4            | 1        | 1.9              |
|             | Building Collapse                    | 1                        | 3      | 1              | 4            | 1        | 1.9              |
|             | Dam Failure                          | 1                        | 2      | 2              | 4            | 2        | 1.9              |
|             | Nuclear Incident                     | 1                        | 1      | 1              | 4            | 2        | 1.4              |
|             | Levee Failure                        | 0                        | 0      | 0              | 0            | 0        | 0                |

### **E. CAPABILITY ASSESSMENT**

This section identifies the following capabilities of the local jurisdiction:

- Planning and Regulatory capability
- Administrative and Technical capability
- Fiscal capability
- Community classifications

## E.1 Planning and Regulatory Capability

| Tool / Program   | Status   |                         |                   | Dept./Agency Responsible                         | Effect on Loss Reduction:<br>+ Support<br>O Neutral<br>- Hinder | Change Since Last Plan:<br>+ Positive<br>- Negative | Comments                              |
|--|----------|-------------------------|-------------------|--|---|---|---------------------------------------|
|  | In Place | Date Adopted or Updated | Under Development |  |   |   |                                       |
| Hazard Mitigation Plan   | x        | 2006                    |                   | Northampton County EMS                           | +   | +   |                                       |
| Emergency Operations Plan  | X        | 2011                    |                   | Borough of Bath Emergency Management Coordinator | +   | +   | Revised in 2011                       |
| Disaster Recovery Plan   | X        | 2011                    |                   | Borough of Bath Emergency Management Coordinator | +   | +   | Revised in 2011                       |
| Evacuation Plan  | X        | 2011                    |                   | Borough of Bath Emergency Management Coordinator | +   | +   | Revised in 2011                       |
| Continuity of Operations Plan  |          |                         |                   |  |   |   |                                       |
| NFIP - Floodplain Regulations (spec. NFIP Flood Damage Prevention Ordinance) | X        | 2012                    | X                 | FEMA   | 0   | +   | In process of being updated/approved. |
| NFIP – Community Rating System   |          |                         |                   |  |   |   |                                       |
| Floodplain Management Plan   |          |                         |                   |  |   |   |                                       |
| Zoning Regulations   | X        | May 1st, 1978           |                   | Borough of Bath Council; Zoning Hearing Board    | 0   |   |                                       |
| Subdivision Regulations  | X        | 1956                    |                   | Borough of Bath Council                          | 0   |   |                                       |
| Comprehensive Land Use Plan (or General, Master or Growth Mgt. Plan)         | X        | 1969                    |                   | Borough of Bath Planning Commission; LVPC        | 0   |   |                                       |
| Open Space Management Plan (or Parks/Rec or Greenways Plan)                  |          |                         |                   |  |   |   |                                       |
| Stormwater Management Plan / Ordinance                                       | x        | 1990                    |                   | Borough of Bath Council                          | 0   |   |                                       |
| Natural Resource Protection  |          |                         |                   |  |   |   |                                       |

| Tool / Program             | Status   |                         |                   | Dept./Agency Responsible  | Effect on Loss Reduction:<br>+ Support<br>O Neutral<br>- Hinder | Change Since Last Plan:<br>+ Positive<br>- Negative | Comments |
|----------------------------|----------|-------------------------|-------------------|---|---|---|----------|
|                            | In Place | Date Adopted or Updated | Under Development |   |   |   |          |
| Plan                       |          |                         |                   |   |   |   |          |
| Capital Improvement Plan   |          |                         |                   |   |   |   |          |
| Economic Development Plan  |          |                         |                   |   |   |   |          |
| Historic Preservation Plan | X        | 1998                    |                   | Borough of Bath Historical Architectural Review Board (HARB); Historic District | 0   |   |          |
| Farmland Preservation      |          |                         |                   |   |   |   |          |
| Building Code              | x        | 1988                    |                   | Borough of Bath Council   |   |   |          |
| Fire Code                  | X        | 1995                    |                   | Borough of Bath   |   |   |          |
| Other                      |          |                         |                   |   |   |   |          |

## E.2 Administrative and Technical Capability

| Staff/Personnel Resources  | Yes | No | Department/Agency                                | Comments |
|--|-----|----|--|----------|
| Planners (with land use / land development knowledge)  | x   |    | Keystone Consulting Engineers                    |          |
| Planners or engineers (with natural and/or human caused hazards knowledge)   | X   |    | Keystone Consulting Engineers                    |          |
| Engineers or professionals trained in building and/or infrastructure construction practices (includes building inspectors) | X   |    | Keystone Consulting Engineers                    |          |
| Emergency Manager  | X   |    | Mark Saginario, Emergency Management Coordinator |          |
| NFIP Floodplain Administrator  | X   |    | Borough Manager                                  |          |
| Land Surveyors   | X   |    | Keystone Consulting Engineers                    |          |
| Scientists or staff familiar with the hazards of the community   |     | X  |  |          |
| Personnel skilled in Geographic Information Systems (GIS) and/or FEMA's HAZUS program                                      | x   |    | Borough Manager                                  |          |
| Grant writers or fiscal staff to handle large/complex grants   | x   |    | Borough Manager                                  |          |
| Staff with expertise or training in Benefit-Cost Analysis  | x   |    | Borough Manager                                  |          |
| Other  |     |    |  |          |

**E.3 Fiscal Capability**

| Financial Resources                                     | Yes | No | Department/Agency       | Comments  |
|---|-----|----|-------------------------|---|
| Capital Improvement Programming                         |     | X  |                         |   |
| Community Development Block Grants (CDBG)               | X   |    | Northampton County      |   |
| Special Purpose Taxes                                   |     | X  |                         |   |
| Gas / Electric Utility Fees                             |     | X  |                         |   |
| Water / Sewer Fees                                      |     | X  | Bath Borough Authority  | This is a separate entity from the Borough of Bath. |
| Stormwater Utility Fees                                 | X   |    | Borough of Bath Council |   |
| Development Impact Fees                                 |     | X  |                         |   |
| General Obligation, Revenue, and/or Special Tax Bonds   |     | X  |                         |   |
| Partnering Arrangements or Intergovernmental Agreements |     | X  |                         |   |
| Other   |     |    |                         |   |



## E.4 Community Classifications

| Program  | Classification | Date Classified |
|--|----------------|-----------------|
| Community Rating System (CRS)                        | NP             | N/A             |
| Building Code Effectiveness Grading Schedule (BCEGS) | TBD            | TBD             |
| Public Protection                                    | TBD            | TBD             |
| Storm Ready  | NP             | N/A             |
| Firewise   | NP             | N/A             |

N/A = Not applicable. NP = Not participating. TBD = To Be Determined.

The classifications listed above relate to the community's effectiveness in providing services that may impact its vulnerability to the natural hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The CRS class applies to flood insurance while the BCEGS and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class one (1) being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1000 feet of a creditable fire hydrant and is within 5 road miles of a recognized Fire Station. StormReady communities are better prepared to save lives from the onslaught of severe weather through advance planning, education and awareness.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

## F. MITIGATION STRATEGY

### F.1 Past Mitigation Activities/Efforts

The following table summarizes progress on the mitigation strategy identified by the Borough in the 2006 plan.

| 2006 Initiative                   |  | Status    | Review Comments                                  |
|-----------------------------------|--|-----------|--|
| Description                       | Location                                 |           |  |
| Remove home and restrict land use | 224 West Main Street (at Monocacy Creek) | Completed | Completed under Monocacy Creek- Phase II Project |
| Remove home and restrict land use | 226 West Main Street (at Monocacy Creek) | Completed | Completed under Monocacy Creek- Phase II Project |

| 2006 Initiative                   |  | Status    | Review Comments                                  |
|-----------------------------------|--|-----------|--|
| Description                       | Location                                 |           |  |
| Remove home and restrict land use | 214 West Main Street (at Monocacy Creek) | Completed | Completed under Monocacy Creek- Phase II Project |

Further details on mitigation activities completed in the Borough include:

- Drainage Improvement – Keystone Park Pavilion – exploring and planning the option of opening up a culvert adjacent to the pavilion to mitigate future flooding episodes that result in significant damage.

## F.2 Hazard Vulnerabilities Identified

It is estimated that in Bath Borough, 23 residents live within the 1% annual chance flood area (NFIP Special Flood Hazard Area). Of the municipality's total land area, 2.2% is located within the 1% annual chance flood area. \$8,352,303 (1.8%) of the municipality's general building stock replacement cost value (structure and contents) is located within the 1% annual chance flood area.

There are 8 NFIP policies in the community. While there are 9 structures located within the 1% annual chance flood area, there are no policies issued to property owners in the 1% annual chance flood area. No Repetitive Loss (RL) properties have been identified in the municipality.

HAZUS-MH estimates that for a 1% annual chance flood, \$244,958 (0.1%) of the municipality's general building stock replacement cost value (structure and contents) will be damaged, 160 people may be displaced, 114 people may seek short-term sheltering, and an estimated 40 tons of debris could be generated.

HAZUS-MH estimates the following damage and loss of use to critical facilities in the community as a result of a 1% annual chance flood event:

Critical Facilities Located in the DFIRM 1% and 0.2% Flood Boundaries and Estimated Potential Damage from the 1% Flood Event

| Name             | Type | Exposure |            | Potential Loss from 1% Flood Event |                 |                                |
|------------------|------|----------|------------|------------------------------------|-----------------|--------------------------------|
|                  |      | 1% Event | 0.2% Event | Structure Damage                   | Content Damages | Days to 100-Percent Functional |
| Bath Sewer Plant | WWTF | X        | X          | -                                  | -               | -                              |

Source: FEMA, 2004; FEMA, 2011; HAZUS-MH 2.1

Notes:

X = indicates the facility location as provided by Lehigh Valley is located in the DFIRM flood zone.

NA = HAZUS-MH 2.1 does not estimate the days to 100-percent functional for user-defined facilities.

- = There is no damage estimate either because the 0.2% annual chance flood event potential loss estimates were not run in HAZUS or HAZUS did not calculate potential loss estimates for some facilities located in the DFIRM flood hazard zone. This is because even though these facilities are located within the boundary of the flood depth grid generated by HAZUS the depth of flooding does not amount to any damages to the structure or contents according to the depth damage function used in HAZUS.

The following vulnerabilities have been identified by the community, within the risk assessment, or in other plan, reports and documents (e.g. FEMA Flood Insurance Studies, Act 167 Stormwater Management Plans):

- Keystone Park Pavilion – Structure was washed out due to flooding (TS Lee), resulting in over \$100K damages.
- W. Northampton Street – Commercial property flooding (TS Lee) significantly after overflow of water came from creek.

Please refer to the Hazard Profiles in the Risk Assessment section for additional vulnerability information relevant to this jurisdiction.

### F.3 Hazard Mitigation Strategy

Note some of the identified mitigation initiatives in Table F are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

| Action No. | Action   | Mitigation Technique Category               | Hazard(s) Addressed             | Priority (H/M/L) | Estimated Cost | Potential Funding Sources  | Lead Agency / Department   | Implementation Schedule | Applies to New and/or Existing Structures* |
|------------|--|---|---------------------------------|------------------|----------------|--|--|-------------------------|--|
| 1          | Keystone Park Pavilion Drainage Improvements – Expand/widen the pipe/culvert which drains directly into the Keystone Park Pavilion parking lot. The Pavilion was significantly damaged by the lack of drainage capacity of the pipe in its current configuration, during both Irene and Lee storm events.  |   |                                 |                  |                |  |  |                         |  |
|            | See above.   | Structural Projects;<br>Property Protection | Flood                           | High             | Medium         | Federal Grant funding with local cost share  | Borough of Bath  | Short Term DOF          | Existing                                   |
| 2          | <p>Retrofit structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority.</p> <p>Specifically identified are the following:</p> <ul style="list-style-type: none"> <li>- Retrofit 224 W. Main St. (Borough-owned property) to withstand flooding.</li> <li>- Keystone Pavilion will be reconstructed in 2013. The new facility will have an upgraded retaining wall.</li> <li>- 226 W. Main St.</li> </ul> <p>Phase 1: Identify appropriate candidates for retrofitting based on cost-effectiveness versus relocation.</p> <p>Phase 2: Where retrofitting is determined to be a viable option, work with property</p> | Property Protection                         | Flood, Severe Storm, Earthquake | High             | High           | FEMA Mitigation Grant Programs and local budget (or property owner) for cost share | Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from PEMA, FEMA | Long-term DOF           | Existing                                   |

| Action No. | Action  | Mitigation Technique Category | Hazard(s) Addressed  | Priority (H/M/L) | Estimated Cost | Potential Funding Sources  | Lead Agency / Department   | Implementation Schedule | Applies to New and/or Existing Structures* |
|------------|---|-------------------------------|----------------------|------------------|----------------|--|--|-------------------------|--|
|            | owners toward implementation of that action based on available funding from FEMA and local match availability.  |                               |                      |                  |                |  |  |                         |  |
| 3          | <p>Purchase, or relocate structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority.</p> <p>Specifically identified are the following:<br/>- 226 W. Main St., Bath, PA</p> <p>Phase 1: Identify appropriate candidates for relocation based on cost-effectiveness versus retrofitting.</p> <p>Phase 2: Where relocation is determined to be a viable option, work with property owners toward implementation of that action based on available funding from FEMA and local match availability.</p> | Property Protection           | Flood                | High             | High           | FEMA Mitigation Grant Programs and local budget (or property owner) for cost share | Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from PEMA, FEMA     | Long Term DOF           | Existing                                   |
| 4          | Maintain compliance with and good-standing in the NFIP including adoption and enforcement of floodplain management requirements (e.g. regulating all new and substantially improved construction in Special Hazard Flood Areas),  | Property Protection           | Flood, Severe Storms | High             | Low - Medium   | Municipal Budget   | Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from PEMA, ISO FEMA | On-going                | New & Existing                             |

| Action No. | Action  | Mitigation Technique Category   | Hazard(s) Addressed           | Priority (H/M/L) | Estimated Cost | Potential Funding Sources | Lead Agency / Department   | Implementation Schedule | Applies to New and/or Existing Structures* |
|------------|---|---------------------------------|-------------------------------|------------------|----------------|---------------------------|--|-------------------------|--|
|            | floodplain identification and mapping, and flood insurance outreach to the community.<br><br>Further, continue to meet and/or exceed the minimum NFIP standards and criteria through the following NFIP-related continued compliance actions identified below.  |                                 |                               |                  |                |                           |  |                         |  |
| 5          | Conduct and facilitate community and public education and outreach for residents and businesses to include, but not be limited to, the following to promote and effect natural hazard risk reduction:<br>Provide and maintain links to the HMP website, and regularly post notices on the County/municipal homepage(s) referencing the HMP webpages.<br>Prepare and distribute informational letters to flood vulnerable property owners and neighborhood associations, explaining the availability of mitigation grant funding to mitigate their properties, and instructing them on how they can learn more and implement mitigation.<br>Use email notification systems and newsletters to better educate the public on flood insurance, the availability of mitigation grant funding, and personal natural hazard risk reduction measures.<br>Work with neighborhood associations, civic and business groups to disseminate information on flood insurance and the availability of mitigation grant funding. |                                 |                               |                  |                |                           |  |                         |  |
|            | See above.  | Public Education and Awareness  | All Hazards                   | High             | Low-Medium     | Municipal Budget          | Municipality with support from Planning Partners, PEMA, FEMA                                     | Short Term              | N/A  |
| 6          | Begin the process to adopt higher regulatory standards to manage flood risk (i.e. increased freeboard, cumulative substantial damage/improvements) and sinkhole risk (e.g. carbonate bedrock standards).  | Prevention                      | Flood; Subsidence / Sinkholes | High             | Low            | Municipal Budget          | Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from PEMA, FEMA | Short Term              | New & Existing                             |
| 7          | Determine if a Community Assistance Visit (CAV) or Community Assistance Contact (CAC) is needed, and schedule if needed.  | Prevention, Property Protection | Flood, Severe Storms          | Medium           | Low            | Municipal Budget          | NFIP Floodplain Administrator with support from PADEP, PEMA, FEMA                                | Short Term              | N/A  |
| 8          | Have designated NFIP  | Public                          | Flood,                        | High             | Low            | Municipal                 | NFIP   | Short Term              | N/A  |

| Action No. | Action   | Mitigation Technique Category                                   | Hazard(s) Addressed  | Priority (H/M/L) | Estimated Cost                 | Potential Funding Sources  | Lead Agency / Department   | Implementation Schedule | Applies to New and/or Existing Structures* |
|------------|--|---|----------------------|------------------|--------------------------------|--|--|-------------------------|--|
|            | Floodplain Administrator (FPA) become a Certified Floodplain Manager through the ASFPM, and pursue relevant continuing education training such as FEMA Benefit-Cost Analysis.  | Education and Awareness   | Severe Storms        |                  |                                | Budget   | Floodplain Administrator   | DOF                     |  |
| 9          | Participate in the Community Rating System (CRS) to further manage flood risk and reduce flood insurance premiums for NFIP policyholders. This shall start with the submission to FEMA-DHS of a Letter of Intent to join CRS, followed by the completion and submission of an application to the program once the community's current compliance with the NFIP is established. | Prevention, Property Protection, Public Education and Awareness | Flood, Severe Storms | Medium           | Low                            | Municipal Budget   | NFIP Floodplain Administrator with support from PADEP, PEMA, FEMA  | Short Term              | N/A  |
| 10         | Archive elevation certificates   | Public Education and Awareness                                  | Flood, Severe Storm  | High             | Low                            | Municipal Budget   | NFIP Floodplain Administrator  | On-going                | N/A  |
| 11         | Continue to support the implementation, monitoring, maintenance, and updating of this Plan, as defined in Section 7.0  | All Categories  | All Hazards          | High             | Low – High (for 5-year update) | Municipal Budget, possibly FEMA Mitigation Grant Funding for 5-year update | Municipality (via mitigation planning point of contacts) with support from Planning Partners (through their Points of Contact), PEMA | On-going                | New & Existing                             |
| 12         | Complete the ongoing updates of the  | Emergency Services  | All Hazards          | High             | Low                            | Municipal Budget   | Municipality with support  | On-going                | New & Existing                             |

| Action No. | Action  | Mitigation Technique Category                      | Hazard(s) Addressed | Priority (H/M/L) | Estimated Cost | Potential Funding Sources                         | Lead Agency / Department   | Implementation Schedule | Applies to New and/or Existing Structures* |
|------------|---|--|---------------------|------------------|----------------|---|--|-------------------------|--|
|            | Comprehensive Emergency Management Plans  |  |                     |                  |                |   | from PEMA  |                         |  |
| 13         | Create/enhance/ maintain mutual aid agreements with neighboring communities for continuity of operations.   | Emergency Services                                 | All Hazards         | High             | Low            | Municipal Budget                                  | Municipality with support from Surrounding municipalities and County | On-going                | New & Existing                             |
| 14         | Identify and develop agreements with entities that can provide support with FEMA/PEMA paperwork after disasters; qualified damage assessment personnel – Improve post-disaster capabilities – damage assessment; FEMA/PEMA paperwork compilation, submissions, record-keeping | Public Education and Awareness, Emergency Services | All Hazards         | Medium           | Medium         | Municipal Budget                                  | Municipality with support from County, PEMA, FEMA                    | Short Term              | N/A  |
| 15         | Work with regional agencies (i.e. County and PEMA) to help develop damage assessment capabilities at the local level through such things as training programs, certification of qualified individuals (e.g. code officials, floodplain managers, engineers).                  | Public Education and Awareness, Emergency Services | All Hazards         | Medium           | Medium         | Municipal Budget, FEMA HMA and HLS grant programs | Municipality with support from County, PEMA                          | Short/Long Term DOF     | N/A  |

Notes:

\*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.

**Costs:**

Where actual project costs cannot reasonably be established at this time:

Low = < \$10,000

Medium = \$10,000 to \$100,000

High = > \$100,000





**Potential FEMA HMA Funding Sources:**

PDM = Pre-Disaster Mitigation Grant Program

FMA = Flood Mitigation Assistance Grant Program

RFC = Repetitive Flood Claims Grant Program

SRL = Severe Repetitive Loss Grant Program

HMGP = Hazard Mitigation Grant Program

**Timeline:**

Short = 1 to 5 years. Long Term = 5 years or greater. OG = On-going program.

DOF = Depending on funding.

## G. ANALYSIS OF MITIGATION ACTIONS

Municipal mitigation actions were evaluated and prioritized primarily using the PA STEEL methodology discussed in Section 6 of this plan. Per the cost-benefit weighted PA STEEL methodology, those actions receiving 20 or more favorable ratings were generally considered high-priority actions. However, other factors beyond the PA STEEL numeric ranking may have been considered by the municipality during project prioritization. For example, a project might be assigned a medium priority because of the uncertainty of a funding source, and could be changed to high once a funding source has been identified such as a grant.

| Mitigation Action |  | PA STEEL CRITERIA CONSIDERATIONS |          |                    |                          |                      |                                 |                      |                    |                   |                        |                       |                               |                          |                        |                              |                               |   |                            |                 |                          | Results                   |                              |   |                        |
|-------------------|--|----------------------------------|----------|--------------------|--------------------------|----------------------|---------------------------------|----------------------|--------------------|-------------------|------------------------|-----------------------|-------------------------------|--------------------------|------------------------|------------------------------|-------------------------------|---|----------------------------|-----------------|--------------------------|---------------------------|------------------------------|---|------------------------|
|                   |  | (+)<br>Favorable                 |          |                    |                          |                      | (-)<br>Less favorable           |                      |                    |                   |                        | (N)<br>Not Applicable |                               |                          |                        |                              |                               |   |                            |                 |                          |                           |                              |   |                        |
|                   |  | P<br>Political                   |          |                    | A<br>Administrative      |                      |                                 | S<br>Social          |                    | T<br>Technical    |                        |                       | E<br>Economic                 |                          |                        | E<br>Environmental           |                               |   |                            | L<br>Legal      |                          |                           | SUMMARY<br>(EQUAL WEIGHTING) | SUMMARY (BENEFITS<br>& COSTS PRIORITIZED) |                        |
| Political Support | Local Champion                               | Public Support                   | Staffing | Funding Allocation | Maintenance / Operations | Community Acceptance | Effect on Segment of Population | Technically Feasible | Long-Term Solution | Secondary Impacts | Benefit of Action (x3) | Cost of Action (x3)   | Contributes to Economic Goals | Outside Funding Required | Effect on Land / Water | Effect on Endangered Species | Effect on HAZMAT / Waste Site | Consistent w/ Community Environmental Goals | Consistent w/ Federal Laws | State Authority | Existing Local Authority | Potential Legal Challenge |                              |   |                        |
| 1                 | Keystone Park Pavilion Drainage Improvements | +                                | +        | +                  | N                        | +                    | +                               | +                    | +                  | +                 | -                      | +                     | +                             | +                        | +                      | N                            | N                             | N   | N                          | N               | N                        | +                         | -                            | 14 / 2 / 7                                | 18 / 2 / 7             |
| 2                 | Retrofit Vulnerable Properties               | +                                | +        | +                  | -                        | -                    | +                               | +                    | +                  | +                 | +                      | +                     | +                             | +                        | -                      | +                            | +                             | +   | N                          | +               | N                        | +                         | +                            | 18 (+) / 3 (-) / 2 (N)                    | 22 (+) / 3 (-) / 2 (N) |
| 3                 | Acquire Vulnerable Properties                | +                                | +        | +                  | -                        | -                    | -                               | +                    | -                  | +                 | +                      | +                     | +                             | +                        | -                      | +                            | +                             | +   | +                          | +               | N                        | +                         | +                            | 17 (+) / 5 (-) / 1 (N)                    | 21 (+) / 5 (-) / 1 (N) |
| 4                 | Maintain NFIP compliance                     | +                                | +        | +                  | +                        | +                    | -                               | +                    | +                  | +                 | +                      | +                     | +                             | +                        | +                      | +                            | +                             | N   | +                          | +               | N                        | +                         | -                            | 19 (+) / 2 (-) / 2 (N)                    | 23 (+) / 2 (-) / 2 (-) |

|    |  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                          |                          |                          |
|----|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------------|--------------------------|--------------------------|
|    |  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |                          | 2 (N)                    |                          |
| 5  | Public Education and Outreach                  | + | + | + | + | + | + | + | + | + | + | + | + | + | + | N | N | N | N | N | N | + | + | 17 (+)<br>0 (-)<br>6 (N) | 21 (+)<br>0 (-)<br>6 (N) |                          |
| 6  | Higher Regulatory Standards                    | + | + | - | + | + | - | - | - | + | + | + | + | + | + | + | N | N | + | + | + | + | - | 16 (+)<br>5 (-)<br>2 (N) | 20 (+)<br>5 (-)<br>2 (N) |                          |
| 7  | Community Assistance Visit                     | + | + | + | + | + | - | + | + | + | N | N | + | + | + | N | N | N | N | + | N | + | - | 14 (+)<br>2 (-)<br>7 (N) | 18 (+)<br>2 (-)<br>7 (N) |                          |
| 8  | NFIP FPA become a Certified Floodplain Manager | + | + | + | + | - | + | + | + | + | N | + | + | + | + | N | N | N | N | N | N | + | + | 15 (+)<br>1 (-)<br>7 (N) | 19 (+)<br>1 (-)<br>7 (N) |                          |
| 9  | Join Community Rating System                   | + | + | + | + | - | - | + | + | + | + | + | + | + | + | + | + | N | + | + | N | + | + | 19 (+)<br>2 (-)<br>2 (N) | 23 (+)<br>2 (-)<br>2 (N) |                          |
| 10 | Archive Elevation Certificates                 | + | + | + | + | + | + | + | + | + | N | + | + | + | N | + | N | N | N | N | + | N | + | +                        | 16 (+)<br>0 (-)<br>7 (N) | 20 (+)<br>0 (-)<br>7 (N) |
| 11 | Support Plan Maintenance and Update            | + | + | + | + | + | + | + | + | + | + | + | + | + | + | N | N | N | N | + | + | + | + | 19 (+)<br>0 (-)<br>4 (N) | 23 (+)<br>0 (-)<br>4 (N) |                          |
| 12 | Update CEMP                                    | + | + | + | + | + | + | + | + | + | + | + | + | + | + | N | N | + | N | + | + | + | + | 20 (+)<br>0 (-)<br>3 (N) | 24 (+)<br>0 (-)<br>3 (N) |                          |
| 13 | Enhance Mutual Aid Agreements                  | + | + | + | + | + | + | + | + | + | + | + | + | + | + | N | N | + | N | + | N | + | + | 19 (+)<br>0 (-)<br>3 (N) | 23 (+)<br>0 (-)<br>3 (N) |                          |
| 14 | Identify Post-Disaster Capabilities            | + | + | + | + | - | + | + | + | + | + | + | + | + | + | + | N | N | N | + | N | + | + | 18 (+)<br>1 (-)<br>4 (N) | 22 (+)<br>4 (-)<br>4 (N) |                          |
| 15 | Develop Post-                                  | + | + | + | - | - | + | + | + | + | + | + | + | - | + | - | + | N | N | N | + | N | + | +                        | 15 (+)                   | 17                       |

|  |                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                |                       |
|--|-----------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|----------------|-----------------------|
|  | Disaster Capabilities |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 4 (-)<br>4 (N) | (+)<br>6 (-)<br>4 (N) |
|--|-----------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|----------------|-----------------------|

## H. FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

A more detailed flood loss analysis could be conducted on a structural level (versus the Census block analysis conducted for the HMP). The location of each building, details regarding the building (see additional data needed below) and the assessed or fair market value could be included in HAZUS-MH. The FEMA DFIRM boundaries, FEMA Flood Insurance Study detailed studies, base flood elevations and available Light Detection and Ranging (LiDAR) data or digital elevation models (DEM) could be used to generate a more accurate flood depth grid and then integrated into the HAZUS model. The flood depth-damage functions could be updated using the U.S. Army Corps of Engineer damage functions for residential building stock to better correlate HAZUS-MH results with FEMA benefit-cost analysis models. HAZUS-MH would then estimate more accurate potential losses per structure.

Additional data needed to perform the analysis described above:

- Specific building information – first-floor elevation (elevation certificates), number of stories, foundation type, basement, square footage, occupancy type, year built, type of construction etc.
- Assessed or fair market value of structure
- LiDAR or high resolution DEM

## I. HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for Bath Borough to illustrate the probable areas impacted within Bath Borough. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which Bath Borough has significant exposure. Regional risk maps are provided in the hazard profiles.

## J. ADDITIONAL COMMENTS

No additional comments at this time.

