

## 5.0 Town of Berlin Annex

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### 5.1 Introduction

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The former Central Connecticut Region, which includes Berlin, is updating its Natural Hazard Mitigation Plan (the Plan). The goal of the Plan for the Town of Berlin is to reduce losses of life and property, and minimize economic consequences of natural hazards. The Town of Berlin has developed a series of objectives to meet this goal as discussed in Section 5.3, and specific strategies are identified under appropriate objectives with the goal of enacting these strategies by 2021.

The Plan contains two parts. The first four chapters comprise a regional section that considers risks from various natural hazards, and lays out a series of broad goals and objectives. The final seven chapters is a collection of municipal plans referred to as “annexes”. These municipal annexes serve three functions. The first is to gather, in one place, information from various municipal departments about how the Town currently prepares for, and responds to, natural hazards. The second is to gather the projects and priorities that the community will pursue to improve its natural hazard preparedness and strengthen its disaster response efforts. The final purpose is to make the community eligible for funding from the Federal Emergency Management Agency (FEMA). To be eligible for many of FEMA’s grant and assistance programs, a municipality must have a current FEMA-approved Natural Hazard Mitigation Plan that is adopted by the local governing body by resolution.

Chapter 5 presents the updated municipal annex of the Plan for the Town of Berlin. It presents a brief overview of the town, its challenges, its vulnerabilities, and its goals, objectives, and strategies for the next five years.

#### 5.1.1 Background

The Town of Berlin is located in the southeastern corner of the former CCRPA region, with Southington situated on its western border, and New Britain to its north. Other neighboring communities include Newington and Rocky Hill to the northeast, Cromwell to the east, Middletown to the southeast, and Meriden to the south.

Berlin encompasses 26.3 square miles of land area and is home to 19,866 residents as of the 2010 census. Berlin has a population density of 755 persons per square mile, which is above the state average (644 persons per square mile), but below the Hartford County average (1,190 persons per square mile). The median age (as of 2012) was 44.6 years of age and 82.8% of households in the Town of Berlin are single-family residences.

Elevation in Berlin ranges from approximately 15 to 767 feet. Nearly all of the land area in Berlin drains to Mattabeset River, a tributary to the Connecticut River. A small portion of land in southern Berlin drains to the Sodom Brook, a tributary to the Quinnipiac River in Meriden. Aside from the Mattabeset River, other major streams in Berlin include Belcher Brook, Willow Brook, and Webster Brook.

Berlin is primarily a suburban community, with some portions of the town considered to be rural areas. The town features mainly decentralized development, with a large retail strip located along the State Route 5/15 corridor and three distinct village centers (Berlin, East Berlin, and Kensington). In addition to the State Route 5/15 corridor, other major transportation routes through Berlin include State Routes 9,

71, 71A, 72, 160, 364, and 372. An Amtrak commuter rail line passes through Berlin and makes stops in the Kensington area on the west side of town.

Berlin's major businesses and industries include construction, manufacturing, retail trade, and health care and social assistance. According to the 2011 Comprehensive Annual Financial Report, the top employer in the town is Eversource Energy (formerly Northeast Utilities) with over 1,700 employees. Eversource is the largest utility provider in Connecticut.

The Town of Berlin is professionally managed by a full-time Town Manager. The Town Hall serves as the Emergency Operations Center with the Police Department serving as back-up. The Police Department is comprised of 41 full-time police officers, nine civilian emergency dispatch personnel, and additional support staff. Fire protection is provided by three volunteer fire stations with one in each village.

The Town of Berlin's draft 2013 Plan of Conservation and Development (POCD) has reemphasized the town's commitment to preserving the natural and cultural character of the community through preservation of ridgelines, open meadows and fields, inland wetlands and watercourses, woodlands and forests, and rehabilitation of flood hazard areas. The POCD emphasizes strategic and smart growth principles that revisit established service and zoning boundaries of the town, beyond which water, sewer, and other municipal services are not extended.

The POCD incorporates elements of the initial hazard mitigation plan for the region, including a discussion of climate change on flooding impacts, and the potential impacts of dam failure. In reference to natural hazard mitigation, the POCD recognizes that the 1% and the 0.2% annual chance floodplains and floodways should be protected regardless of whether these areas coincide with other open space values, that development should be focused on areas that have previously been developed, and that new development does not exacerbate flooding potential or degrade existing land uses.

The Town of Berlin commissioned a buildout analysis in 2010 as described in the 2013 POCD. The analysis indicates that there is the potential for an additional 1,660 residential development lots in the Town in addition to the 452 units that had been approved but not yet built in 2010. This could raise the population of Berlin by nearly 5,700 from the 2010 census population. Recent development includes more than 100,000 square feet of industrial space, and several hundreds of thousands of square feet of commercial redevelopment. As the population of the community, building square footage, and associated infrastructure increases, so does the risk of damage from natural hazards as discussed in the next section.

## 5.2 Challenges

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The top three natural hazards that present a high risk to Berlin include flooding, winter storms, and tropical storms/hurricanes. According to information from the Town and the FEMA Public Assistance Funded Projects Summary (Open Government Initiative), there were 10 federally declared disasters or emergencies since 1999 that resulted in reimbursement requests to FEMA. These expenses included debris and snow removal, emergency protective measures, and repairs to damaged infrastructure and buildings experienced by private citizens and businesses. A summary is presented in Table 5-1. The types of events in this table are consistent with the top three natural hazards listed above.

Event	Name	Declaration Date	Town of Berlin Reimbursement	Other Local Agency <sup>1</sup> Reimbursement	Total Cost <sup>2</sup>
DR-1302	Tropical Storm Floyd	9/23/1999	\$4,408.92	\$0	\$5,878.56
EM-3176	Snow (February)	3/11/2003	\$39,895.83	\$0	\$53,194.44
EM-3192	Snow (December)	1/15/2004	\$42,643.60	\$0	\$56,858.13
EM-3200	Snow (January)	2/17/2005	\$51,964.35	\$0	\$69,285.80
DR-1619	Severe Storms and Flooding (October)	12/16/2005	\$15,331.76	\$0	\$20,442.35
EM-3266	Snow (February)	5/2/2006	\$53,545.54	\$0	\$71,394.05
DR-1958	Severe Winter Storm	3/3/2011	\$47,045.00	\$5,797.50	\$62,726.67
DR-4023	Tropical Storm Irene	9/2/2011	\$572,546.48	\$0	\$763,395.31
DR-4046	Severe Storm Alfred	11/17/2011	\$604,829.16	\$0	\$806,438.88
DR-4106	Severe Winter Storm	3/21/2013	\$181,420.78	\$6,645.00	\$250,754.37

Table 5-1 Recent Disasters Where Berlin Applied for Public Assistance.

1. Other Agencies = Fire Districts, Schools, Housing Authorities, Private and Non-Profit Agencies
2. Assuming that federal reimbursement was 75% of damages.

Source: FEMA

Other natural hazards present a moderate or low risk. A general discussion of the Town of Berlin's emergency response capabilities and a discussion of the vulnerability of the community to each hazard is discussed in more detail in the sections below.

### 5.2.1 All Hazards

The Town of Berlin has a variety of emergency operation procedures in place to respond to the effects of natural hazards. In addition to maintaining an Emergency Operations Plan (updated annually) and an Emergency Operations Center, the Town maintains shelters, has identified warming/charging stations, and has identified a variety of resources to assist with response to natural hazard events. The Town also maintains a training program for its emergency personnel.

The Everbridge emergency notification system was recently initiated town-wide. This emergency notification system provides additional coverage above the statewide CT Alerts system. Previous systems used in Berlin only covered schools and municipal employees. The Town wishes to determine an efficient, inexpensive method to encourage sign ups, such as using local newspapers, social media, and encouraging sign-ups through the Town website.

Local schools are currently used as shelters. The Town currently relies on portable generators to provide power to the shelters. The Town of Berlin has an agreement with the local school system to utilize food stored in the cafeteria when the shelters are active. The Town reimburses for the supplies used following the event. Berlin acquires shelter supplies whenever possible.

The Town of Berlin is currently renovating the high school, which has a 135-kW generator. The renovated building has space reserved for an 800-kW generator. The replacement generator would be sufficient to power the portions of the building necessary to allow the high school to function as the primary shelter for the community, as well as providing sufficient power supply to allow redundancy for Town departments. For example, the Physical Services Complex is at risk of flooding but could relocate some functions to the high school. The Town has applied for generator grants but has not been successful to date, and will continue to pursue funding to purchase the generator. If the high school generator is funded, the existing generator will be refurbished onto a flatbed truck for use as a portable generator.

Several additional facilities are equipped with backup power, although additional generators are needed. The Town Hall has full backup power from a generator. The Senior Center is owned by the Housing Authority and this entity is pursuing grants for a generator. If a generator is obtained, this building could be used as a backup shelter. The Town would like one more portable generator to provide additional redundancy to the existing backup power supplies.

A total of 12 sewer pumping stations are in active use for operation of the municipal sewer system. None have permanent generators. The Water Control Department moves a portable generator from station to station during outages to ensure that the wet wells at each station do not overflow. The National Guard need to bring in approximately five generators to the town following Irene and Alfred which were used to keep stations up and running during the five-day outages. The Water Control Department has identified the need for an additional portable generator in order to properly keep water and sewer infrastructure functioning during extended power outages.

The Worthington Fire District does not have any generators for its water system. The Kensington Fire District is known to have a couple of generators for its water system.

While the above assets are necessary to keep the town up and running, emergency planners also pay close attention to their most vulnerable citizens. Populations that may be particularly vulnerable include: people living under the poverty line, people with limited or no English proficiency, minorities, and people who are dependent on transit. These issues are considered regionally in Section 2 of this document.

### **5.2.2 Flooding**

During the past decade, Berlin has experienced recurrent flooding throughout the town, with regular, localized flooding at known locations 4-5 times per year. Core capitalized areas, such as the downtown, various business parks, and shopping centers are in proximity to streams and the Mattabesset River. In particular, the Town has identified areas of elevated flooding risk along Farmington Avenue, and portions of Park Drive have been washed away in the past as a result of heavy rains causing the dam in Meriden to overflow. During larger events, floodwaters divided the town into sections, separating population centers (such as Kensington and East Berlin) from the remainder of Berlin. This can complicate both evacuation and sheltering during emergencies.

#### **Location**

Figure 5-1 below shows the locations of critical facilities in Berlin, as well as the relationship between them, flood zones, and the most populated areas of town. As shown in the map, a large portion of Berlin is located within the 1% annual flood zone; fortunately, most of the critical facilities in town are outside the flood zone. The sole exception is a school and an ambulance facility. Most of the most densely populated areas of town are close to a flood zone, but not in one. The central business district is in the 1% annual chance flood zone associated with the Mattabesset River and its tributaries.

Areas at risk of flooding are generally unchanged since the initial Plan. These include sections of Farmington Avenue, residences on Lower Lane, properties on Norton Road between the two schools, portions of Massirio Drive, and the east side of New Britain Road.

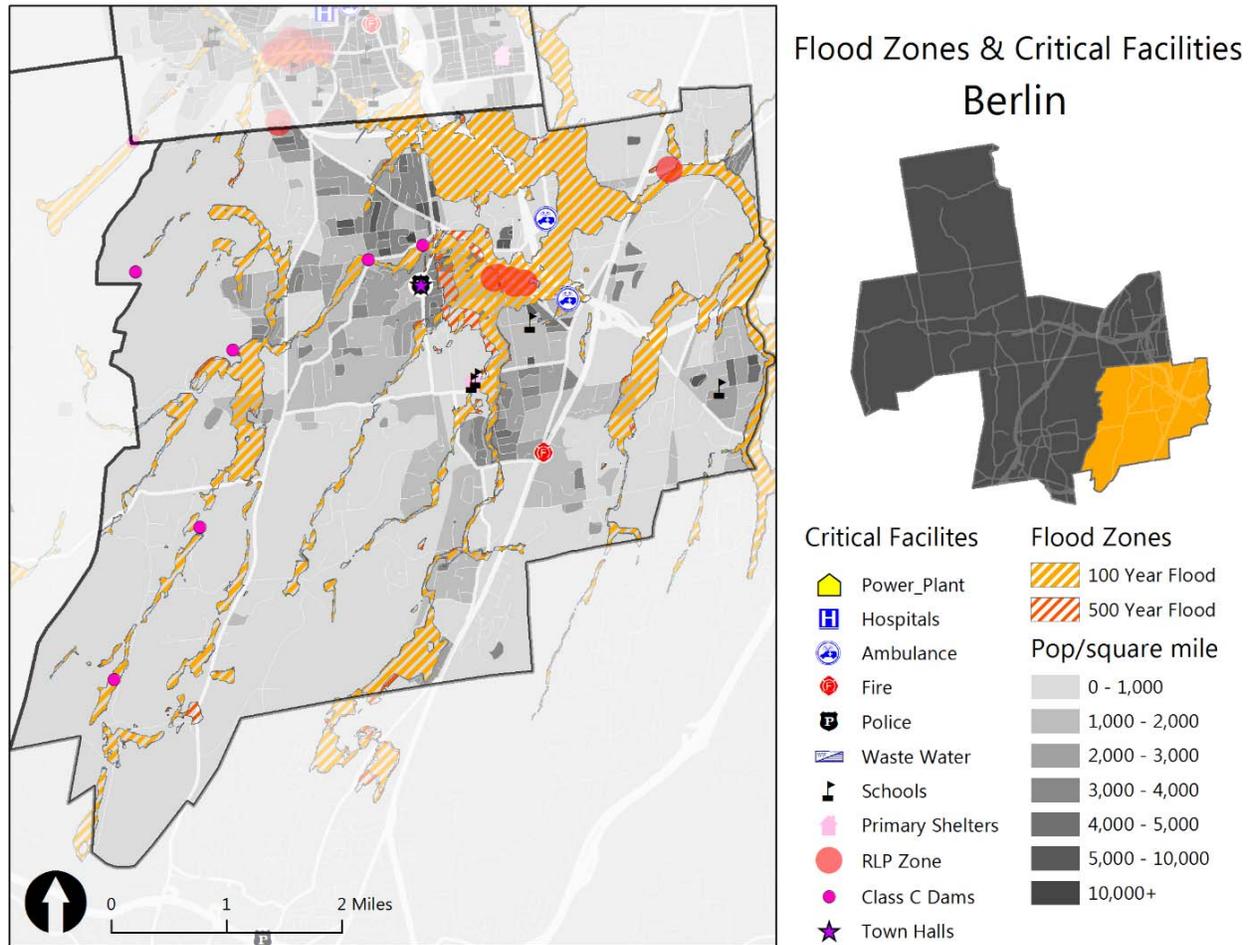


Figure 5-1. Flood Zones, Critical Facilities, and Population Density in Berlin.

### Existing Capabilities

The Town of Berlin has in place codes and ordinances to reduce the risks to public health and property posed by flooding. These regulations primarily limit any activities on floodplains that would increase flood heights and velocities, or reduce or alter naturally occurring floodplains and water catchment areas, but also stipulate the use of flood-resistant materials, floodproofing, and requirements for the elevation of the lowest floor and on-site water storage. The Town defines floodplains, hereafter special flood hazard areas, off of the Federal Flood Insurance Rate Maps identified in FEMA’s Flood Insurance Study. Table 5-2 includes a brief description of how the Town of Berlin is addressing flood risk in its most important planning documents.

Planning Documentation	Year Established or Last Updated	Lead Department(s)	Recommendation for Natural Hazard Mitigation
Plan of Conservation & Development (POCD)	2013	Planning and Zoning Commission	<ul style="list-style-type: none"> <li>The Plan identifies preserving “lands...intrinsic to public health and safety” among its open space policies.</li> <li>The Plan also directly identifies areas that see regular flooding and potential infrastructural changes that could help alleviate flooding.</li> <li>Finally the plan recognizes a need to ensure zoning and subdivision regulations are written to promote limited impact development and to discourage new development that would exacerbate flood risk.</li> </ul>
An Ordinance Establishing Floodplain Management Regulations for Special Flood Hazard Areas in the Town of Berlin, Connecticut	2008	Inland Wetlands and Water Courses Commission	<ul style="list-style-type: none"> <li>These regulations fulfill the requirement for participation in the National Flood Insurance Program (NFIP).</li> <li>The regulations apply to all special flood hazard areas (SFHA) identified by the Federal Emergency Management Agency (FEMA) in its Flood Insurance Study (FIS).</li> <li>The Flood Insurance Rate Maps (FIRM) identify the SFHAs and is considered to provide the “degree of flood protection required... [and] is considered reasonable for regulatory purposes and is based on scientific and engineering considerations.”</li> <li>The regulations require freeboard of one foot for floodproofing of nonresidential structures</li> </ul>
Subdivision Ordinance	2003	Planning and Zoning Commission	<ul style="list-style-type: none"> <li>This ordinance stipulates that subdivisions address the need to avoid damage related to flooding by ensuring: all utilities and facilities are located to minimize impact, adequate drainage is provided all subdivisions greater than 50 lots or 5 acres include elevations in their application.</li> <li>Under the Storm Sewer Design section of the ordinance, the municipality mandates that drainage estimates should be based upon “anticipated runoff for a 25-year storm and ultimate land use”. Additionally the section addresses flood risk by stipulating that “cross culverts and basins shall be sized to accommodate runoff from a 100-year (1%) design storm.”</li> </ul>
Inland Wetlands and Watercourses Commission Regulations	2012	Inland Wetlands and Water Courses Commission	<ul style="list-style-type: none"> <li>Under Connecticut General Statutes all municipalities shall regulate activities on those wetlands and watercourses that lie within municipal borders. While these regulations are primarily for the protection of environmental and ecological assets, they do address impacts to safety and public health.</li> <li>Additionally, the Inland Wetlands and Water Courses Commission reviews all development applications for projects within the special flood hazard areas, giving it a central role in mitigating flood hazard risk.</li> </ul>

Planning Documentation	Year Established or Last Updated	Lead Department(s)	Recommendation for Natural Hazard Mitigation
Stormwater Annual Report	2014	Public Works	<ul style="list-style-type: none"> <li>Report identifies Best Management Practices (BMP's) and development of future BMPs for implementation with regard to Stormwater Management.</li> <li>Report includes efforts toward stakeholder education, public involvement and participation, and enforcement of regulations to reduce impact of development on stormwater storage and drainage.</li> </ul>
Capital Improvement Plan (CIP)	2015	All Departments	<ul style="list-style-type: none"> <li>Identifies the municipal plans associated with equipment and infrastructure improvement.</li> <li>Specifically, Berlin will seek funding to develop a Disaster Recovery Plan, POCD Implementation Studies, Public Safety Equipment, and Public Works Projects to fund Bridge Rehabilitation and Town-wide Drainage Improvements and Flood Control.</li> </ul>
Municipal Building Code	2012	Engineering Department Town Building Inspector	<ul style="list-style-type: none"> <li>Establishes the authority of the Town Building Inspector, (assisted by the Town Engineer) to review all building permit applications to determine whether proposed building sites will be reasonably safe from flooding, and that proper materials and building methods are used in construction or substantial infrastructure improvements if placed in identified floodplains.</li> </ul>
National Flood Insurance Program (NFIP)	1980	Town Manager	<ul style="list-style-type: none"> <li>Town of Berlin is a participating community in FEMA's NFIP since 1980 and intends to continue participation in the NFIP for the foreseeable future.</li> <li>The NFIP has paid 48 property damage claims in Berlin totaling \$365,993.40 to date.</li> <li>The NFIP has paid 19 repetitive loss property damage claims in Berlin on 6 properties. These claims have totaled \$251,540.07.</li> </ul>
Local Emergency Operations Plan	2014-2015	Fire Marshall/ Emergency Management	<ul style="list-style-type: none"> <li>These plans are meant to be applied during an emergency to maximize survival, give direction, integrate departments and expertise, define roles to departments and community leaders, and provide a basis for continued preparation.</li> <li>Specifically the plans identify town personnel and assign responsibilities to each department and its personnel during disasters and emergencies. As part of the plan, instructions are also outlined for activation of the emergency operations center.</li> </ul>

Table 5-2. Town of Berlin Planning Documents

Town staff believe that existing ordinances do a good job of discouraging development in and near wetlands and in floodplains. Enforcement and outreach regarding floodplain activities is performed by Planning Department and Public Works, with outreach typically occurring on a case-by-case basis. The subdivision and zoning codes have not been updated to offer incentives for low-impact development, although low-impact development is encouraged for new developments. There was not sufficient time

and resources to complete this task. The Town is still interested in codifying such incentives in the next few years.

The Town has an annual inspection and maintenance (if needed) schedule for its bridges and culverts. Drainage and flooding complaints are routed to either the Fire Department or Public Works, depending on if it is an emergency. Usually Public Works will be involved in resolving any complaint. The Town regularly sandbags certain properties at risk of flooding in order to mitigate flood damage when advance warning is available. The Town recently purchased a sandbag loader to lower the response time. The Town also evacuates flooding areas when necessary.

The Town owns 37 bridges. The Department of Public Works has been undertaking bridge replacement projects throughout the town, with prioritization taking into account whether or not a bridge is undersized based on the most recent NRCC rainfall return periods. The current budget allows approximately \$750,000 per year over the next 10 years for bridge replacements. All new construction is designed using the most recent NRCC rainfall return periods in accordance with December 2014 CT DOT guidance. The Town has not evaluated other culverts in the community based on the new rainfall return periods. Several bridges have been replaced recently or are in the process of being replaced:

- Funding made available following Tropical Storm Irene was utilized to upgrade a culvert on Park Drive to a three-sided box with a 10-foot span. The cost share was 75%/25% local.
- A bridge on Spruce Brook Road is being replaced with funding by the CT DOT Local Bridge Program. The existing bridge will be replaced with a three-sided concrete arch with a 22-foot span.
- Other bridge replacement projects that are in process include the Farmington Avenue Bridge (paid for through funding that provides an 80% federal, 10% state, and 10% local share), and the Burnham Street and High Road bridges over the Mattabasset River (both funded through the CT DOT Local Bridge Program).

One strategy from the initial Plan was to target wetland and floodplain properties for open space acquisition. This has been completed as a list is now available. The repetitive loss property at 79 Massario Drive was acquired and converted to open space prior to the 2011 plan. A property on Lower Lane was also purchased. The Town seeks conservation easements for all new developments, and acquires properties (when funding allows) that provide ecosystem services (which is often concurrent with mitigation potential).

The Community Rating System program was discussed with Town staff as part of the planning process. Town staff do not believe that this program would be cost effective and are not interested in pursuing entry into the Community Rating System at this time.

The Town's capability to mitigate flooding damage is considered to be effective at preventing damage to new development and substantial improvements. In general, the level of capability of the Town of Berlin relative to all facets of flood mitigation has slightly increased since the 2011 Plan. The bridge replacement projects have reduced the town's overall vulnerability to flooding, an open space acquisition list has been generated, and a sandbag loader has been purchased. The Town's participation in the MapMod program several years ago also resulted in digital FIRMs for the community which make it easier to demonstrate floodplain boundaries to property owners.

### Impacts and Loss Estimates

Flood losses reported under the NFIP to properties in Berlin are listed in Table 5-2. Several historical events were noted by Town personnel. The 1982 and 1992 floods were reportedly 50-year storms that divided East Berlin from the rest of the town. Many east-west streets were impassible, and access was only available through New Britain. In addition, a 1986 dam failure in Meriden caused minor flooding along the Mattabesset corridor.

During flood events, a home on Becker Avenue is flooded with water running through the living room of the building. The Town would like to purchase or elevate the building, but a grant would be needed to do so. The Town attempted to secure a grant previously but was unsuccessful. Exacerbating the flooding was the fact that nearby culverts are undersized and were often clogged. A program has been instituted to increase the frequency of maintenance at this particular culvert and the flooding frequency of the home has declined. The Town also routinely delivers sandbags to this house, and believes that a buyout proposal has a high probability of being accepted by the property owner.

The Town's Physical Services (Public Works) Complex at 19 Town Farm Lane is in the floodplain. The Town is considering creating some duplicate facilities at the high school for when this facility is unable to be used. During heavy rain events, the staff remove low file draws and place them on top of tables if flooding is anticipated. The Town would like to relocate the facility. If funding was available, staff indicated that relocating the Physical Services Building out of the floodplain would be the top project. Other actions would involve culvert resizing and maintenance projects.

The primary industry area in Berlin is located on Farmington Avenue between Main Street and Route 9. Most businesses have had minor impacts from recent storms, primarily water in the basements that required pump outs. Flooding of arterial roadways can isolate businesses and render them inoperable. Propane tanks and other debris and materials can also get lifted up in floodwaters and cause impacts downstream.

At the public information meeting in May 2015, business owners on Farmington Avenue between Bruce Avenue and Washington Avenue claimed that flooding has increased at their properties due to recent sewer line improvements which may have altered hydraulics along the Mattabesset River. The 2013 POCD also identifies that flooding in Berlin along the Mattabesset River is exacerbated by the undersized culvert under Route 9. While expansion of the culvert would reduce the extent of the flood zone in the vicinity of Farmington Avenue, the project would be very expensive and potentially increase flooding impacts downstream in Berlin, Cromwell, and Middletown. The Town of Berlin is considering a study of this area to fully analyze the impacts and develop recommendations.

CCRPA used FEMA's HAZUS-MH model to analyze potential risks that the Town of Berlin might face from a major flooding event. A Level 1 HAZUS-MH Analysis was prepared by CCRPA. Such analyses are known to generally skew high in part based on the limited data entered by the user. Thus, while the numbers below are likely higher than would actually be experienced under a 1% annual chance flood event, they are nonetheless useful for planning purposes. The model estimates that the total economic losses in the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring in any given year (the 100-year flood) would be \$108,350,000. Key impact areas of such a flooding event are summarized in Table 5-3.

Impact of Flooding	Estimated Damage from 1% Annual Chance Flood Event
Households Displaced	667
People Needing Shelter	1,297
Buildings at Least Moderately Damaged	61
Total Estimated Economic Losses	\$108,350,000
Total Residential Building & Content Losses	\$22,720,000
Total Commercial, Industrial, & Other Building & Content Losses	\$85,250,000
Total Business Interruption Losses	\$390,000

Table 5-3. HAZUS-MH 1% Annual Chance Flood Losses for Berlin  
Source: HAZUS-MH

Based on the public assistance reimbursements in Table 5-1, the Town of Berlin has incurred \$26,320.91 since 1999 for impacts due to flooding. Based on the information for the NFIP in Table 5-2, a total of \$365,993.40 has been paid out to NFIP-insured properties since 1980 (34 years). The annualized loss due to flooding based on this information is \$11,538.66. The annualized loss estimate based on the county-wide damages presented in the 2014 *Connecticut Natural Hazards Mitigation Plan Update* (CT NHMP) described in Section 3.2 is similar at \$11,558. The greater figure is utilized herein as an estimate of annualized loss for the community.

### 5.2.3 Winter Storms

Berlin faces challenges during winter storms as ice and snow make roads impassable and knock down tree limbs which in turn disrupts utility service. The combined effect can leave people stranded in their homes, potentially without heat or power.

#### Location

All areas of Berlin are susceptible to winter storms. Higher elevations may be at a greater risk because the frequency of winter storm events is typically greater in such areas. Areas in floodplains are at increased risk of winter storm damage due to any flooding that may accompany a winter storm.

#### Existing Capabilities

The Town has 110 miles of local roads and approximately 25 miles of state roads. Removal of the ice and snow for Berlin's town-owned roads is handled by a combination of town workers and contractors; the town also handles debris removal.

The majority of roofs on Town-owned buildings are flat, including the schools. The Town has an informal program to review snow accumulation on town-owned roofs each winter, with clearing occurring when depths are sufficiently deep or wet. During the successive heavy snows of the winter of 2010 to 2011, several roofs were damaged in Berlin during the winter which lead to the creation of the informal program. The Town does not believe that it needs a formal snow load evaluation and removal program at this time.

The Town subdivision regulations require that utilities in new developments are installed underground. The underground installation of utilities is encouraged for all new development.

The Town’s capabilities are considered to be effective in regards to response to winter storms, although the Town’s capability to mitigate severe winter storm damage is limited to Town facilities. In general, the level of capability of the Town of Berlin relative to all facets of winter storm mitigation has slightly increased since the 2011 Plan with the introduction of the informal snow load evaluation procedures and the initiation of the Everbridge emergency notification system.

**Impacts and Loss Estimates**

Table 5-4 below considers the impact of Severe Winter Storms on the Town of Berlin based on Winter Storm Alfred in late October 2011. Debris removal was the biggest impact, costing \$615,000.

Impact of Severe Winter Storm	Estimated Losses from a Severe Winter Storm Comparable to Winter Storm Alfred (October 2011)
Number of Electrical Customers Served (2013)	9,622
Maximum Outages During Severe Winter Storm (2011)	6,868
Maximum Outages Percentage of Customers (2011)	71.38%
Number of Businesses Experiencing Outages	9
Total Lost Wages (Daily)	\$1,872.08
Average Lost Wages (Weekly)	\$55,514.00
Miles of Local Roads Plowed by Town of Berlin	103.72
Municipal Cost (Plowing, Road Treatment)	\$806,438.88

*Table 5-4. October 2011 Severe Winter Storm Losses for Berlin.  
Sources: Eversource, CCRPA Internal Analysis*

The January 2013 blizzard produced a lot of snow in Berlin and contractors were needed to remove it. Snow removal was the primary financial impact.

Town staff reported that during the winter of 2014-2015, one private company had a partial roof collapse. As such, the potential for roof damage is likely present in Berlin each year even if record snowfalls are not occurring.

Based on the public assistance reimbursements in Table 5-1, the Town of Berlin has incurred \$1,378,382.34 since 1999 (15 years) for impacts due to winter storms. The annualized loss due to winter storms based on this information is \$91,892.16. The annualized loss estimate based on the county-wide damages presented in the 2014 CT NHMP as described in Section 3.2 is much lower at \$21,171. The greater figure is utilized herein as an estimate of annualized loss for the community.

**5.2.4 Tropical Cyclones and Hurricanes**

Berlin faces a number of challenges due to tropical storms and hurricanes. The primary problem is dealing with the impact of downed trees which can interrupt power supply for many days and hinder egress through neighborhoods. Secondary impacts are generally caused by heavy rainfall accompanying the storm.

**Location**

All areas of Berlin are susceptible to tropical storms and hurricanes. Higher elevations may be at a greater risk because the speed of the wind may be greater. Areas in floodplains are at increased risk of tropical storm and hurricane damage due to any flooding that may accompany such an event.

### Existing Capabilities

The Town of Berlin uses a variety of preparedness and response procedures to deal with the impacts of tropical storms and hurricanes. Town departments have purchased sufficient supplies over the past few years to be prepared for the next major storm event. Several chainsaws and a wood chipper are available to assist with cleanup activities. The Town has a chipping and trimming contractor on call for when assistance is needed.

Much of the tree trimming in Berlin near power lines is conducted by Eversource Energy. A significant amount of trimming occurred in Berlin following the 2011 storms, and six to eight crews were actively working in Berlin in April 2015.

The Town's capabilities are considered to be effective with regard to mitigating hurricane damage. In general, the level of capability of the Town of Berlin relative to all facets of tropical storm and hurricane mitigation has slightly increased since the 2011 Plan, with the implementation of the Everbridge system and the recent trimming by Eversource reducing the overall vulnerability of the town.

### Impacts and Loss Estimates

Following Tropical Storm Irene in 2011, power was lost for approximately five days in Berlin, and approximately three days in downtown areas. Some residents lost power for up to six days. A maximum of 6,134 customers were without power.

CCRPA used FEMA's HAZUS-MH model to analyze the risks that the Town of Berlin might face from a hurricane as powerful as the 1938 Hurricane. The model estimates the economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be approximately \$11.7 million. The impacts of such a storm are summarized below in Table 5-5.

Impact of Simulated 1938 Hurricane Today	Estimated Losses from 1938 Hurricane Event
Households Displaced	6
People Needing Short-Term Shelter	1
Buildings at Least Moderately Damaged	681
Building Completely Damaged	2
Total Estimated Economic Losses	\$11,692,790
Total Residential Building Losses	\$10,321,900
Total Commercial, Industrial, & Other Building Losses	\$1,027,950
Total Business Interruption Losses	\$342,940
Total Debris Generated (in tons)	271,695 tons
Truckloads (at 25 tons/truck) of building debris	10,868 truckloads

Table 5-5. HAZUS-MH 1938 Hurricane Simulated Losses for Berlin.

Source: HAZUS-MH

Based on the public assistance reimbursements in Table 5-1, the Town of Berlin has incurred \$763,395.31 in damages since 1999 (15 years) for impacts due to tropical storms and hurricanes. The annualized loss due to tropical storms and hurricanes based on this information is \$50,893.02. The annualized loss estimate based on the county-wide damages presented in the 2014 CT NHMP as

estimated by HAZUS-MH is much higher at \$1,245,371. The greater figure is utilized herein as an estimate of annualized loss for the community.

### **5.2.5 Tornadoes and Thunderstorms**

Berlin faces regular challenges due to tornadoes and thunderstorms, although these events are typically less damaging than tropical storms or hurricanes. The primary problem is dealing with the impact of downed trees which can interrupt power supply and hinder egress through neighborhoods. Secondary impacts are generally caused by heavy rainfall accompanying the storm, and direct wind damage or lightning and hail damage to structures and vehicles.

#### **Location**

All areas of Berlin are susceptible to tornadoes and thunderstorms. Higher elevations may be at a greater risk because the speed of the wind may be greater. Areas in floodplains are at increased risk of thunderstorm damage due to any flooding that may accompany such an event.

#### **Existing Capabilities**

The strategies used to mitigate tornado and thunderstorm damage are similar to those used to mitigate damage from tropical storms and hurricanes. The Town has a limited budget for tree maintenance (~\$15,000) which is considered sufficient at this time. This is only for Town properties and right-of-ways. The Town will only cut a privately-owned tree if it could damage town property. Cleanup expenses come from another line item.

The Town's capability to mitigate thunderstorm damage is similar to that for tropical storms and hurricanes, but the Town's ability to mitigate tornado damage is relatively limited. In general, the level of capability of the Town of Berlin relative to all facets of thunderstorm and tornado mitigation has slightly increased since the 2011 Plan with the introduction of the Everbridge emergency notification system and the recent tree trimming conducted by Eversource.

#### **Impacts and Loss Estimates**

According to Town staff, there are no areas of the Town that are specifically prone to wind damage. The annualized loss estimate for thunderstorms based on the county-wide damages presented in the 2014 CT NHMP as described in Section 3.2 is \$2,638. The annualized loss estimate for tornadoes based on the county-wide damages presented in the 2014 CT NHMP as described in Section 3.2 is \$291,471.

### **5.2.6 Wildfires**

Berlin experiences small wildfires each year, particularly in the more rural areas of town. Most are accidentally set, although some have been ignited by lightning or undetermined sources.

#### **Location**

Less developed areas in Town are at the highest risk for a wildfire. These include the rural south end of town where public water service is not available, and the Ragged Mountain preserve on the western side of town.

#### **Existing Capabilities**

The Town maintains mutual aid agreements with all surrounding communities for fire protection. The town has three dry hydrants and three cisterns throughout the community. The cisterns are typically 10,000 gallons. The dry hydrant in Paper Goods Pond needs maintenance or replacement. There is no specific requirement to include dry hydrants or cisterns although the Fire Department can require it as

part of their review of a development. The Town has three Open Burning Officials certified through the Connecticut DEEP's Open Burning Program.

The Town's capabilities are considered to be effective in regards to wildfire response. In general, the level of capability of the Town of Berlin relative to all facets of wildfire mitigation is unchanged since the 2011 Plan.

### Impacts and Loss Estimates

The greatest areas of concern are the areas of town that do not have public water service. These areas are located on the Metacomet side and the Southington side of Berlin.

The Town anticipates a major burn will occur in the Ragged Mountain Preserve in the coming years because this area has not had a fire in five to seven years. A significant amount of deadfall has accumulated, much of it from the 2011 storms. Hikers are common in this area which increases potential risk for an accidental fire. A major burn in 1984 continued for a week and a half in this area.

On occasion, a brush fire ignites due to sparks coming off the Amtrak rail line. Private property owners have also caused fires; a homeowner in south Kensington recently sparked a 2 acre brush fire when he was conducting burning without a permit.

The annualized loss estimate for wildfires based on the county-wide damages presented in the 2014 CT NHMP as described in Section 3.2 and the population density of Berlin is \$3,269.

### 5.2.7 Drought

Only severe droughts would have the potential to cause damages in Berlin. The short-duration and moderate droughts that generally occur every few years are not a concern to Town staff.

#### Location

All areas of Berlin are susceptible to drought. Property owners with private wells may have an increased risk of damage due to drought as lower groundwater levels could impact water supply wells.

#### Existing Capabilities

The Town primarily relies on regional and statewide measures for mitigating the impacts of drought such as the Connecticut Drought Management Plan. The three municipal water department and the two fire district water departments each maintain an Emergency Contingency Plan that outlines the necessary response procedures when drought is impacting their sources of supply. The Town Water Control Department webpage includes tips for consumers on how to conserve water year round including during droughts. The Town Water Department is a member of the Water Utility Coordinating Committee that will be reconvening in 2016 and will discuss regional water supply issues and needs including ensuring that supply is available during periods of drought.

The Town does not perform any other mitigation activities for drought and its capability to mitigate drought is relatively limited. In general, the level of capability of the Town of Berlin relative to all facets of drought mitigation is unchanged since the 2011 Plan.

### Impacts and Loss Estimates

Town staff could not recall any specific damages due to drought. The Sunny Borders Nursery is the largest agricultural land use in town, but the business has not complained to the Town about drought in recent memory.

Town staff did not recall any well deepening permits or new drilling permits being issued recently due to private wells going dry during a drought. Public water is available in most parts of the community.

Based on the information above, it is likely that the annualized loss due to drought has been minimal over the past 20 years. An annualized loss figure of \$0 has been used for this Plan update. This is likely lower than the actual annualized loss due to drought, but is believed acceptable at this time and can be revised if needed in future updates of this Plan.

### **5.2.8 Earthquakes**

Although low intensity earthquakes regularly occur in Connecticut, these earthquakes are not damaging and are generally imperceptible to residents. Stronger earthquakes have historically occurred in Connecticut which have the potential to cause critical levels of damage.

#### **Location**

All areas of Berlin are susceptible to earthquakes. Property owners with structures that pre-date current building codes (particularly pre-1990 structures) are considered to be at increased risk of suffering earthquake damages, as well as structures built on sandy soils that could be prone to liquefaction (see Section 3.2.8).

#### **Existing Capabilities**

Due to the very infrequent nature of damaging earthquakes, and the fact that earthquakes generally cannot be predicted, local land use policies in Berlin do not directly address earthquake damage. In the event that significant earthquake damage occurred, the Town of Berlin would activate its Emergency Operations Plan and respond as appropriate.

The Town's capability to mitigate earthquake damage is limited. In general, the level of capability of the Town of Berlin relative to all facets of earthquake mitigation is unchanged since the 2011 Plan.

#### **Impacts and Loss Estimates**

Town staff could not recall any damages occurring due to earthquakes. The annualized loss estimate for earthquakes based on the county-wide damages presented in the 2014 CT NHMP as described in Section 3.2 is \$1,245. The low figure is consistent with the lack of earthquake damage in the recent historical record.

### **5.2.9 Dam Failure**

A total of twenty-three dams could affect the Town of Berlin with their failure, and six Class C (high hazard) dams lie within the Town boundaries. The rupture of the Kenmere Dam in 1987 which forced 80 million gallons of water into town alerted Berlin to the potential risks it faces from the dams in town. Because of the dam's location, most of this water inundated a golf course. Had the downstream area been developed differently, the outcome could have been far worse.

#### **Location**

Only areas of Berlin that lie immediately downstream of dams, or near watercourses that are downstream of dams, are susceptible dam failure. In many cases a breach could flood a similar area to the 1% annual chance or 0.2% annual chance flood; in some cases (particularly for high hazard dams) the impacted area could be much wider. Table 5-6 summarizes the high and significant hazard dams that could affect Berlin based on files maintained by the Connecticut DEEP. Only one dam was listed to be in poor condition on the 2013 list.

Dam Name	Hazard Class	Dam Use	Dam Condition	Owner	Downstream Watercourse
Hallmere Reservoir Dam	C	Water Supply	Fair	City of Meriden	John Hall Brook
Kenmere Reservoir Dam	C	Water Supply	Good	City of Meriden	Unnamed Stream
Kensington Dam	C	Recreation	Fair	Town of Berlin	Mattabesset River
Lower Hart Ponds Dam	C	Water Supply	Fair	City of New Britain	Mattabesset River
Merimere Reservoir Dam	B	Water Supply	Poor	City of Meriden	Unnamed Stream
Paper Goods Pond Dam	B	Recreation	Fair	Town of Berlin	Mattabesset River
Shuttle Meadow Reservoir	C	Water Supply	Satisfactory	City of New Britain	Willow Brook
Silver Lake Dam	B	Recreation	Not Rated	Connecticut DEEP	Belcher Brook
Swede Pond Dam	B	Recreation	Not Rated	Private	Crooked Brook
Upper Hart Pond Dam	C	Water Supply	Not Rated	City of New Britain	Mattabesset River
Wasel Reservoir Dam	C	Water Supply	Satisfactory	City of New Britain	Trib. to Willow Brook

*Table 5-6. Summary of Dams Whose Failure Could Significantly Impact Berlin.*

*Source: Connecticut DEEP*

### Existing Capabilities

The Town of Berlin owns one Class C (high hazard) and one Class B (significant hazard) dam. The Town recently hired a consultant to perform dam inspections on a two-year / 5-year basis for its two dams for the next few years based on the inspection requirements of Connecticut DEEP.

The Public Works and Emergency Management staff have been working on a “Dam Breakage Plan” for several years and Town staff estimate the plan to be 75% complete. The plan is evaluating the potential downstream inundation area for the two Town-owned dams if either were to fail. The information for this plan has been utilized by the Town’s consultant to prepare formal Emergency Action Plans (EAPs) in accordance with recent DEEP guidance. Once complete, the Town hopes to encourage residents at properties in the potentially affected areas to submit contact information into the Everbridge emergency notification system database. The Town has copies of EAPs prepared for other dams whose failure could affect Berlin; this information is maintained by the Emergency Management Director.

The Town’s ability to mitigate dam failure is considered to be good for Town-owned dams but limited for privately-owned dams and dams owned by other municipalities (in these cases, preparation for emergency response is the primary goal). In general, the level of capability of the Town of Berlin relative to all facets of dam failure mitigation has slightly increased since the 2011 Plan with the Town’s ongoing analysis of the potential impacts of dam failure and the recent dam safety law revisions that have occurred statewide.

### Impacts and Loss Estimates

Potential losses downstream of Class C (high hazard) dams could be catastrophic, while potential losses downstream of Class B (significant hazard) dams could be significant. The total property damage related to the 1987 Kenmere Reservoir dam failure was \$187,000. The annualized loss in Berlin due to dam failure over the last 27 years is therefore \$6,925.93.

### 5.3 Goals, Objectives, and Strategies

The goal and five objectives from the 2011 Plan were upheld. No additional objectives were identified, although Objective #5 was re-written to “Mitigate impacts to properties in the National Flood Insurance Program” because the Town of Berlin intends to continue participation in the NFIP.

#### 5.3.1 Status of Previous Strategies and Actions

Table 5-7 presents the status of the strategies and actions originally developed in the initial 2011 Plan.

Objective	Task	Priority	Responsible Department	Comment	Status
1. Update Town Policies and Plans to Encourage Sound Practices	Target wetland or floodplain properties for open space acquisition	High	Planning, Conservation Commission	A list has been prepared.	Completed
	Complete the Dam Breakage Emergency Plan	High	Planning	This was started and analysis is currently ongoing	Carry Forward
	Revise Subdivision/zoning code to offer incentives for low-impact development	Medium	Planning	This has not been performed due to lack of resources	Carry Forward
	Conduct comprehensive study of stormwater issues across town; examine benefits (if any) of developing a strategic (rather than piecemeal) stormwater management plan	Medium	Planning, Public Works	Town staff no longer believe that the study would sufficiently mitigate issues to be worth the cost	Delisted
2. Ensure Access to Critical Facilities	Relocate physical services building complex to higher ground	Medium	Public Works	Has not occurred due to lack of funding	Carry Forward
3. Improve Capacity to Deal with Hazards by Investing in Necessary Equipment & Training	Acquire generators and shelter supplies to equip multiple shelters	High	Emergency Management	Berlin acquires supplies whenever possible. This is a capability. Generators are still needed	Revised
	Improve coordination and efficiency by periodically exercising and evaluating response plans	High	Emergency Management	This is regularly performed and is a capability	Delisted
	Take advantage of regional WebEOC training as necessary	High	Emergency Management	This is regularly performed and is a capability	Delisted
	Invest in a sandbag loader, sandbags, and sand to help manage recurrent flooding	Medium	Public Works	This was purchased.	Completed
	Purchase chainsaws and a wood chipper to expedite removal of downed trees and other debris	Medium	Public Works	These were purchased.	Completed

Objective	Task	Priority	Responsible Department	Comment	Status
4. Enable Residents to Better Help Themselves Through Preparedness Education	Develop and distribute a pamphlet about household preparedness for natural hazards; post pdf of pamphlet on town website	High	Emergency Management, Staff	This is performed whenever supplies are available. This is a capability.	Delisted
	Public evacuation plan on town website	High	Emergency Management	Evacuation plans are developed on a case-by-case basis	Delisted
	Encourage preparedness workshops in schools	High	Emergency Management	This is regularly performed and is a capability	Delisted
5. Continue Participation in the National Flood Insurance Program	Continue enforcement of floodplain management ordinances by regulating all new and substantially improved construction in flood zones	High	Planning	This is regularly performed and is a capability	Delisted
	Work with FEMA to update FIRMs as necessary	High	Planning, Public Works	The MapMod program was completed several years ago	Completed
	Continue to distribute information about the NFIP to homeowners	High	Planning	This is performed on request and is a capability	Delisted
	Continue to assist homeowners with amendments to NFIP maps as necessary	High	Planning	This is performed on request and is a capability	Delisted

Table 5-7. Status of Previous Strategies and Actions for Berlin.

### 5.3.2 Current Strategies and Actions

This section includes both new strategies and actions as well as updates on objectives and mitigation strategies that were carried forward from the 2011-2016 Plan.

**Goal: Reduce losses of life and property, and minimize economic consequences of natural hazards**

#### Objective 1: Update Town policies and plans to encourage sound practices

##### Strategies and Actions:

##### 1.1 Complete the Dam Breakage Emergency Plan

Action Description: This plan evaluates the impact of dam failure of two Town-owned dams and includes failure inundation mapping. Once this is complete, the Town will prepare formal EAPs for the two dams.

Lead: Planning

Priority: Medium

Status: In Progress (Carried Forward from Initial Plan)

Estimated Cost: Moderate

Potential Funding Source(s): Municipal Operating Budget

Timeframe: 7/2016 to 6/2017

**1.2 Revise the subdivision/zoning code to offer incentives for low-impact development**

Action Description: Low-impact development techniques are anticipated to reduce the amount of stormwater runoff from new developments which could reduce the amount of flooding experienced over time.

Lead: Planning

Priority: Medium

Status: Not Started (Carried Forward from Initial Plan)

Estimated Cost: Moderate

Potential Funding Source(s): Municipal Operating Budget

Timeframe: 7/2016 to 6/2021

**1.3 Incorporate updated hazard mitigation information into community plan updates**

Action Description: Hazard mitigation information will be incorporated into future plan updates such as the POCD

Lead: Planning

Priority: High

Status: Not Started

Estimated Cost: Low

Potential Funding Source(s): Municipal Operating Budget

Timeframe: 7/2016 to 6/2021

**1.4 Participate in the statewide Water Utility Coordinating Committee process**

Action Description: The Connecticut DPH is preparing a Coordinated Water Supply Plan for the entire state beginning in 2016. The Town Water Department will participate to address drought-related public water supply needs throughout the community.

Lead: Water Department

Priority: Medium

Status: Not Started

Estimated Cost: Low

Potential Funding Source(s): Municipal Operating Budget

Timeframe: 7/2016 to 6/2018

**1.5 Ensure local officials have most updated version of the Connecticut Drought Management Plan**

Action Description: The Connecticut Drought Management Plan is periodically updated. Local officials, land use commissions, health departments, fire departments, and local water utilities should all be made aware of updates to this plan.

Lead: Planning

Priority: Medium

Status: Not Started

Estimated Cost: Minimal

Potential Funding Source(s): Municipal Operating Budget

Timeframe: 7/2016 to 6/2021

**Objective 2: Ensure access to critical facilities****Strategies and Actions:****2.1 Relocate Physical Services Complex to higher ground**

**Action Description:** The Physical Services Complex is located in the floodplain and is at risk of flooding which can render it inoperable during flood events. A grant is necessary to relocate the facility.

**Lead:** Public Works

**Priority:** Medium

**Status:** Not Started (Carried Forward from Initial Plan, Grant Dependent)

**Estimated Cost:** High

**Potential Funding Source(s):** Municipal Capital Budget, STEAP, HMGP, PDM, FMA, EOC

**Timeframe:** 7/2016 to 6/2021

**2.2 Create duplicate facilities for the Physical Services Complex at the High School**

**Action Description:** The Physical Services Complex is located in the floodplain and is at risk of flooding which can render it inoperable during flood events. The High School has facilities (offices, computers, auto shop) that could allow it to act as a backup facility.

**Lead:** Public Works

**Priority:** Low

**Status:** Not Started (Dependent upon Action 3.1, Grant Dependent)

**Estimated Cost:** High

**Potential Funding Source(s):** Municipal Capital Budget, STEAP

**Timeframe:** 7/2016 to 6/2021. If the Physical Services Complex is relocated (Action 2.1), this action will not be needed.

**Objective 3: Improve capacity to deal with hazards by investing in necessary equipment & training****Strategies and Actions:****3.1 Acquire generators for shelters and other critical facilities**

**Action Description:** The need for three generators has been identified to ensure that backup power is available for critical town functions. These include the purchase of an 800 kW generator for the High School so this facility can be converted to the primary shelter (and potentially backup Public Works use), an additional portable for the Town for general use, and an additional portable generator for the Water Control Department to ensure that sewer pumping stations can be maintained during outages. If the 800 kW generator is acquired, the existing 135 kW generator at the High School will be refurbished and installed onto a flatbed truck for portable use.

**Lead:** Emergency Management

**Priority:** Medium

**Status:** In Progress (Revised from Initial Plan, Grant Dependent)

**Estimated Cost:** High

**Potential Funding Source(s):** Municipal Capital Budget, STEAP, HMGP

**Timeframe:** 7/2016 to 6/2021

**3.2 Refurbish or replace the dry hydrant in Paper Goods Pond**

Action Description:	The dry hydrant is in a deteriorated condition and needs repair or replacement to function properly.
Lead:	Emergency Management
Priority:	High
Status:	Not Started
Estimated Cost:	Low
Potential Funding Source(s):	Municipal Capital Budget, STEAP
Timeframe:	7/2016 to 6/2019

**3.3 Encourage the City of Meriden to perform repairs to Merimere Reservoir Dam**

Action Description:	Merimere Reservoir Dam was listed as being in “Poor” condition on the 2013 Connecticut DEEP dam summary list. Town officials will contact the City and Connecticut DEEP to encourage repairs to reduce the likelihood of failure.
Lead:	Emergency Management, Town Manager
Priority:	Low
Status:	Not Started
Estimated Cost:	Minimal
Potential Funding Source(s):	Municipal Operating Budget
Timeframe:	7/2016 to 6/2021

**Objective 4: Enable residents to better help themselves through preparedness education****Strategies and Actions:****4.1 Encourage sign-ups for the Everbridge emergency notification system**

Action Description:	The Town recently contracted with Everbridge to provide a town-wide emergency notification system. The Town wishes to use an efficient, inexpensive method to encourage sign-ups for this system beyond the current announcement on the Town website. Targeted mailings may be used to encourage signups in particularly vulnerable areas, such as special flood hazard areas and dam failure inundation areas.
Lead:	Emergency Management
Priority:	High
Status:	In Progress
Estimated Cost:	Low
Potential Funding Source(s):	Municipal Operating Budget
Timeframe:	7/2016 to 6/2018.

**Objective 5: Mitigate impacts to properties in National Flood Insurance Program****Strategies and Actions:****5.1 Acquire or elevate the property at risk of flooding on Becker Avenue**

**Action Description:** A home on Becker Avenue is routinely flooded. The Town routinely sandbags the property, and has instituted an enhanced culvert maintenance program nearby to reduce the frequency of flooding. However, the building continues to be at risk of flooding. The town would like to elevate or acquire and demolish the structure, but needs a grant to do so.

**Lead:** Emergency Management

**Priority:** High

**Status:** Not Started (Grant Dependent)

**Estimated Cost:** High

**Potential Funding Source(s):** Municipal Capital Budget, HMGP, PDM, FMA, STEAP

**Timeframe:** 7/2016 to 6/2021

**5.2 Study the Mattabeset River culvert at Route 9 for potential mitigation options**

**Action Description:** The culvert conveying the river under Route 9 is considered undersized, but modifications will be expensive and could have downstream impacts. A study is needed to analyze alternatives and their potential impacts. The Town should work with CT DOT to study this area.

**Lead:** Public Works

**Priority:** Low

**Status:** Not Started (Funding Dependent)

**Estimated Cost:** High

**Potential Funding Source(s):** Municipal Operating Budget, CT DOT

**Timeframe:** 7/2016 to 6/2021

**5.3 Work with RLP owners to mitigate RLPs upon property owner request**

**Action Description:** Repetitive loss properties in Berlin are typically only damaged during severe flood events. Six repetitive loss properties are located in Berlin that have experienced 19 flood losses. Mitigation could include acquisition/demolition, elevation, floodproofing, or other techniques.

**Lead:** Public Works

**Priority:** Medium

**Status:** Not Started (Property Owner and Grant Dependent)

**Estimated Cost:** High

**Potential Funding Source(s):** Municipal Capital Budget, HMGP, PDM, FMA

**Timeframe:** 7/2016 to 6/2021

**5.4 Update the local floodplain management ordinance to meet current model ordinance requirements**

**Action Description:** The Town of Berlin last updated this ordinance in 2008. Since that time, FEMA and the Connecticut DEEP have revised the model ordinance including recommending the increase of the freeboard requirement to two feet for new buildings and substantial improvements.

**Lead:** Planning

**Priority:** High

**Status:** Not Started

**Estimated Cost:** Moderate

**Potential Funding Source(s):** Municipal Operating Budget

**Timeframe:** 7/2016 to 6/2018

**5.4 Contributors to Plan Update**

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