HAZARD MITIGATION PLAN
ANNEX
FOR
WATERFORD, CONNECTICUT

An Annex of the
Southeastern Connecticut
Regional Hazard Mitigation Plan

PREPARED FOR:

Southeastern Connecticut
Council of Governments

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I. INTRODUCTION

A. Setting

The Town of Waterford is approximately 33.4 square miles in area and is located in south-central New London County, on Long Island Sound. It is bordered by the Town of Montville to the north, the City of New London to the east, the Niantic River and the Town of East Lyme to the west and Long Island Sound to the south.

The Town of Waterford has an extensive shoreline which attracts tourists predominantly during the summer months. The Eugene O'Neill Theater Center and summer music at Harkness State Park also attract many visitors as well. The suburban town has a 2000 Census population of 19,152. Major commercial development is located within the Waterford Business Triangle (formed by Route 85 and Interstates 95 and 395), including large retail developments. Industrial development is generally found along Route 85 north of Interstate Route 95, and along Industrial Drive, north of I-395. Two of the largest employers in Waterford are the Millstone Nuclear Power Plant and Sonalysts, a sonar/film-audio studios.

The Town of Waterford has approximately 7.3 miles of shorefront along Long Island Sound. Approximately 1.0 mile of shorefront is publicly owned. The total tidal shoreline, including the east bank of the Niantic River and the west bank of the Thames River, is approximately 22 miles. This distance includes the shores of various coves along the shoreline including Jordan Cove and the western shore of Alewife Cove.

The Town of Waterford contains many freshwater and tidal wetlands. Tidal wetlands can be found along the shorelines of the Niantic River, the Thames River, Long Island Sound, and various coves that drain thereto. The areas surrounding Lake Konomac and Millers Pond, and the low land in the center of the industrial triangle, which feeds Jordan and Stony Brooks, represent some of the larger inland wetlands of the town. Hills and ridges in the northern portion of the town rise to elevations greater than 300 feet. The southern portion of town is fairly flat, except for a steep area on the western banks of Jordan Cove.

B. Purpose of Annex

The purpose of this annex is to provide hazard risk assessment, capability assessment, hazard mitigation measures, and a hazard mitigation project ranking for the Town of Waterford. Hazards such as earthquakes and windstorms which affect the entire region are addressed in the Southeastern Connecticut Council of Governments Regional Hazard Mitigation Plan.

C. Plan Development Process and Public Involvement

The Regional Hazard Mitigation Plan and this annex were developed through a series of meetings and the completion of written questionnaires, personal interviews, and workshops. To provide oversight of the plan development process and maximize local involvement, all member communities in the region and the two tribal affiliate members were invited to appoint a representative to serve on the Hazard Mitigation Steering Committee. Committee members and chief elected officials received notices of all the committee meetings and were encouraged to attend. Meeting notices and agendas were also sent to area media and to town and city clerks for posting in each community. Steering committee meetings were held in public at the Southeastern Connecticut Council of Governments office in Norwich. Three steering committee meetings were held during the development of the hazard mitigation plan. Verbal reports on progress were given to monthly meetings of the Southeastern Connecticut Council of Governments, which are routinely attended and covered by area press in local newspapers. Articles describing the planning process have appeared in the three issues of the SCCOG Quarterly Newsletter since March, 2003. This newsletter is mailed to 285 officials, organizations, and media within the region.

II. HAZARD RISK ASSESSMENT

A meeting was conducted with representatives of the Town of Waterford on August 26, 2003 to develop a risk assessment for the town. Based on the results of this meeting and additional risk assessment research it was determined that a significant hazard in Waterford is flooding.

The most severe flooding in the town occurs during hurricanes or coastal storms. These storms, with their intense winds and rainfall, can create abnormally high tidal surges, wave run-up, and peak runoff. Hurricanes normally occur in the late summer or early fall, but occurrence of coastal storms is not restricted to any particular season. When coastal storms occur in winter and spring, the flooding problem is compounded by runoff of melting snow.

Two of the largest hurricanes that have created significant flooding in the Town of Waterford occurred in 1938 and 1954. Hurricane tidal flood damages for the 1938 and 1954 hurricanes were scattered along the entire shoreline, with principal concentrations at the head of Niantic Bay and in the Ridgewood area on the west bank of Alewife Cove. Much of the loss in 1954 was from damage to boats. Hurricane Gloria hit the town on September 27, 1985. Total damages were a result of one or a combination of the following: previous shoreline instability, wind and wave action during the storm, and the degree of exposure of the shoreline. Rainfall was insignificant compared to other storm effects due to the location of the town east of the eye of the storm. Damages were generally classified as dock damage, structural damage to sea walls, retaining wall and bulkhead damage, and beach erosion.

Buildings located in flood hazard areas are primarily residential but also include some commercial, industrial, and critical facility structures. Most of the structures that are threatened by flooding are located within the 100-year floodplain, but some are also located in the coastal velocity zone. Location in the velocity zone poses an increased threat to structures due to high wind and potential wave damage, as well as inundation by flood waters.

Tidal surges during severe storms cause flooding along both the Niantic and the Thames Rivers and Jordan, Alewife, Goshen, and Keeney Coves.

Waterford has no formalized program currently in place to identify the location or the number of structures that are susceptible to flooding. Such information would be valuable in directing hazard mitigation efforts to locations with the greatest risk. A potential hazard mitigation project would involve the review of all existing available data regarding flood hazards and the preparation of an inventory and assessment of structures at risk in the coastal flood hazard areas.

Such an inventory program would be the first step in completing a Flood Audit, which would provide early flood warning, guidance and technical information regarding flood risks to property owners, as well as prioritize future property protection projects. The completion of a Flood Audit would be an important step in the National Flood Insurance Program Community Rating System by which towns can qualify for a reduction in flood insurance rates.

A. Residential

Based on a review of the Flood Insurance Rate Maps and topographic maps, residential structures that are subject to flooding during significant flood events are located along the shoreline and are impacted by coastal flooding.

The Waterford shoreline is a year-round community which intensifies the risks to those who live in the coastal area. Most of Waterford's velocity zones are located along the immediate shoreline. The beachfront properties in the velocity zone are very susceptible to damage. The damage is not only a result of flooding and wave action but also because the dynamic nature of the beach system results in shoreline erosion in some locations.

Along the shoreline there are many roads and structures in flood zones. Structures in flood zones along the Niantic River include Route 156 (River Street), Fourth Street, Avenue B, Niantic River Road, Beach Street, and structures in the vicinity of First Avenue, Second Avenue, Third Avenue, Oswegatchie Road, Konomoc Avenue, and Oil Mill Road.

Long Island Sound has a potential to flood structures on the coastline of Waterford. Several areas near the coastline are low-lying and are susceptible to flooding. These areas include Windward Way, Jordan Cove Circle, Jordan Cove Road, Shore Road, Reed Avenue, and New Shore Road.

Flooding in Alewife Cove may potentially affect structures along Shore Drive, Peninsular Avenue, Greenfield Street, Niles Hill Road, and sections of Birch Street, Laurel Street, Woodbine Street, and Glenwood Road.

Brooks may also affect structures located in flood zones including Lakes Pond Brook, Jordan Brook, and Hunts Brook. Structures along sections of Oil Mill Road and Way Hill Road near Lakes Pond Brook, sections of Trumbull Road and Route 156 (Rope Ferry Road) near Jordan Brook, and a section of Old Norwich Road near Hunts Brook may be affected by flooding from severe storms.

B. Commercial/Industrial

The majority of the commercial and industrial development in the Town of Waterford is located near Routes 85, I-395, and I-95. Commercial development is also scattered along Route 1 that crosses through Waterford. The industrial section is mainly on Route 85, north of I-95 and Industrial Drive located north of I-395. A review of the Town of Waterford Flood Study and Flood Insurance Rate Maps suggests that these areas should not be affected by flooding.

One potential flood hazard area near commercial and industrial businesses is along Cross Roads near the intersection of Route 85 (the Hartford Turnpike). Jordan Brook may impact Cross Roads and the surrounding structures during severe storms. Potential flooding may also impede travel between Cross Roads and Route 85.

The Millstone Nuclear Power Plant is located in Waterford at Millstone Point. The area surrounding the power plant is above potential flood zones. One of the access roads to the east of the power plant is however, in a flood zone. During severe storms this may impact emergency response or hinder evacuation from the power plant.

C. Critical Facilities

Critical facilities are necessary for providing for safety, health and emergency care, and for maintaining documents and regulations. These facilities include the police department, fire departments, Town Hall, and emergency shelters. A review of the Town of Waterford's critical facilities indicates that these facilities are not in flood hazard areas.

D. Transportation Corridors

Waterford has several major transportation routes which include Interstates 95 and 395, Route 1, Route 156, and the Amtrak Providence/Worcester rail line. A series of crossings of the railroad and the highway have been constructed to allow passage of roadways under and over the highway and railroad.

Several roads throughout Waterford have sections in flood zones. Flooding of these roads may delay emergency response during severe storms. These roads include Route 1 (Boston Post Road), Douglas Lane, and Fog Plain Road near Jordan Brook. Gun Shot Road, Gardiners Wood Road, New Shore Road, and Great Neck Road are potentially flooded by Long Island Sound. A section of Great Neck Road may be impacted by Alewife Cove, and sections of Bloomingdale Road and Old Mill Road by Hunts Brook.

Town officials have also expressed concern with increased thru-traffic in Waterford. Specifically, the town is concerned with the transportation of hazardous materials over their roadways and their ability to respond to a major incident regarding a release of such materials.

III. HAZARD MITIGATION MEASURES

The following sections provide a brief description of the types of hazard mitigation measures and programs that are available to address the natural hazards that exist in Waterford.

A. Prevention

Hazard prevention includes identification of risks and the use of land-use regulatory and other available management tools to prevent future damage. The Town of Waterford has incorporated into its zoning laws, a set of floodplain management regulations to help minimize future flood damages and related hazards. Waterford has planning and zoning tools in place that incorporate floodplain management. The Town's planning and zoning regulations, inland wetlands and watercourses regulations, harbor management regulations, and the building department's enforcement of the Connecticut Basic Building Code are all important existing regulatory mechanisms that address hazard prevention and incorporate floodplain management.

The following are examples of how hazard prevention can be accomplished through existing programs:

1. Planning and Zoning

   Planning and Zoning Regulations can be tailored to be consistent with hazard mitigation planning. Establishment of Flood Prone Conservancy Districts, Coastal Resource Zones, and River Corridor Preservation Zones are all techniques that can potentially be employed to limit additional development in hazardous locations.

2. Open Space Preservation

   Community planning that includes open space acquisition and preservation sections can be established or revised in a manner that is consistent with hazard mitigation planning. Acquisition of floodplain and river corridor properties should be encouraged as a municipal priority.

3. Floodplain Development Regulations

The modification of floodplain management regulations to include more restrictive development standards is consistent with hazard mitigation planning. The National Flood Insurance Program Community Rating System gives credit to communities that exceed the minimum floodplain management requirements of the National Flood Insurance Program. Requirements include elevating structures higher than the lowest floor and 1 foot above the 100-year base flood elevation, which is an example of a more stringent standard.

4. Stormwater Management

Stormwater management regulations that limit any potential increase in the state of discharge of stormwater and that preserve floodplain storage are examples of the use of stormwater management in a manner consistent with hazard mitigation planning.

5. Wetlands Protection

Wetlands areas are generally also critical flood storage areas. By limiting wetlands development not only are important natural resource areas protected but additional floodplain development is also limited. Acquisition in fee or easement should be a municipal priority.

6. Erosion and Sediment Control Regulations

Effective implementation of sediment and erosion controls include utilization of detention basins and use of other Best Management Practices to slow the velocity and limit increase in runoff. Strict adherence to these requirements are effective hazard mitigation tools and should be considered as Waterford develops its stormwater management plan required under NPDES II.

B. Property Protection

Property protection measures can address hazards at a single structure or can include multiple structures.

The following list identifies common property protection measures:

1. Relocation
2. Acquisition
3. Building Elevation
4. Utility Protection
5. Flood Proofing

Additional descriptions of property protection measures are provided in Appendix A in the Regional Hazard Mitigation Plan.

C. Emergency Services

Emergency communication is a critical aspect of the hazard response programs currently in place in Waterford. Emergency Services hazard mitigation measures can be combined with other types of measures to form successful projects, or remain as stand-alone projects.

The major utilities that provide service to the town follow similar procedures. The Northeast Utilities has emergency operation centers which become operational in the event of any emergency that could impact the utilities.

The interagency communication between the town and independent utilities requires continued coordination to assure the critical communications link between the town operations and the utilities is effectively maintained. A need for improved and continued coordination has been identified during this study.

Aspects of emergency services typically addressed in hazard mitigation include the following:

1. Emergency Communication
2. Flood Warning
3. Flood Response
4. Critical Facilities Protection

D. Structural Projects

Structural projects include utilization of the flood control strategies that have been and continue to be applied throughout Connecticut. The potential environmental impacts of structural projects are often a concern. Areas containing coastal resources of special concern should be considered after other less damaging alternatives are pursued.

Structural projects that can be included in hazard mitigation planning include the following:

1. Levees/Floodwalls
2. Bridge and Culvert Replacement
3. Channel Modifications
4. Storm Sewer Improvements
5. Structural Project Maintenance and Repair

Any prospective projects which were identified during the course of assembling this plan are included in the hazard mitigation matrix in Appendix A of this annex report. Additional information on some types of structural projects is provided in Appendix A in the Regional Hazard Mitigation Plan.

E. Public Information

Public information is another type of hazard mitigation measure which, like prevention and resource protection, can be most effectively implemented in conjunction with other hazard mitigation projects.

The Hazard Mitigation Committee has identified the need for a continued and expanded program of public information. Such a program could include providing educational information to the homeowners and business owners in the flood hazard areas. A public education and information component should be included in all hazard mitigation projects undertaken by the Town of Waterford.

The following list includes some common types of public information measures:

1. Map Information

   Development of hazard maps for public distribution or posting in public locations. This type of information is easily understood and assists in raising the public's awareness of the natural hazards that exist in their community.

2. Flood Audits

   For additional information regarding flood audits refer to Appendix F of the Regional Hazard Mitigation Plan.

3. Real Estate Disclosure

   This is a procedure where buyers and sellers of real estate are compelled to provide notice of known hazards affecting the property to be conveyed.

4. Public Library

   Libraries can be an effective location of a hazard information center. Town Halls and other public facilities can also serve as information centers. A wide range of hazard mitigation documentation should be compiled for review.

5. Technical Assistance

Local governments can provide technical assistance to homeowners and contractors regarding hazard resistant construction. An appropriate time for such assistance can be at the time of a building permit application.

6. Environmental Education

Private and public schools and adult education programs can offer environmental education classes that include hazard identification and hazard mitigation components.

IV. HAZARD MITIGATION PROJECT RANKING

Based on the hazard risk assessment analysis, the Hazard Mitigation Committee has developed a matrix of several hazard mitigation projects recommended to reduce Waterford's vulnerability to natural hazards. A matrix depicting potential hazard mitigation projects and a prioritized ranking is included in Appendix A.

Projects identified in the matrix have been prioritized based on the following criteria:

- Safety of the population
- Historical damage
- New development in high risk areas
- Value of property at risk
- Consistency with plan goals and objectives

The projects were also considered on how they relate to potential health risks, structural damage, access/egress for evacuation, and protection of structures that house people with special needs and residential areas housing a large portion of the town's population. For additional information on projects listed in the matrix and for a complete list of criteria used in the prioritization process, please refer to the text and attachments of the Regional Hazard Mitigation Plan.

V. IMPLEMENTATION, MONITORING, AND EVALUATION

The Southeastern Connecticut Council of Governments Regional Hazard Mitigation Plan and this associated community annex report were prepared with the understanding that potential funding sources may not be available within the time frame necessary to implement the recommended actions on a specific schedule. It is therefore necessary to incorporate into the plan a system of monitoring its progress and making necessary adjustments. In addition, the goals and objectives may need to be modified over time in order to meet the demands of a changing community. Accomplished activities will be eliminated, and new ones added.

The staff of the Southeastern Connecticut Council of Governments (SCCOG) serves as coordinator of the Hazard Mitigation Committee that provided oversight of the plan preparations. In accordance with § 201.6 (c)(4)(i) of the Interim Final Rule, it is recommended that the Committee meet on or before the fifth anniversary of the adoption of the plan to review the implementation progress as well as the goals, objectives, and actions outlined in the plan. With input from the Committee, SCCOG staff should prepare a report on the status of plan implementation. The report should include the following: a review of the goals and objectives of the original plan; a review of any disasters or hazards that occurred during the period; a review of each element or objective of the original plan, including what was accomplished the previous year; and recommendations for new projects or revised objectives.

FEMA also recommends that each of the local communities name a person as a local coordinator for the implementation and monitoring of the progress of the plan. This person would act as a contact for the Southeastern Connecticut Council of Governments and the State of Connecticut National Flood Insurance Program Coordinators during the grant application and cost-benefit analysis process.

The Town of Waterford Hazard Mitigation Projects			
Hazard	**Vulnerable Location**	**Mitigation Project**	**Priority**
Flooding	Millstone Station Access Road	Raise and Improve Hydraulics of Secondary Access to Facility	High
All Hazards	Town Wide	Evaluate the Hazard Resistant Nature of All Critical Facilities	High
All Hazards	Town Wide	Comprehensive Evaluation of Emergency Communication Capabilities Throughout Town	High
Flooding	Town Wide	Develop a Flood Audit Program	High

The Town of Waterford Hazard Mitigation Projects			
Flooding	Town Wide	Inventory Evacuation Routes and Repair Areas of Access Impairment	Medium
Hazard	**Vulnerable Location**	**Mitigation Project**	**Priority**
Flooding	Town Wide	Install Signs for Evacuation Routes	Medium
All Hazards	Town Wide	Review of TownTransportation Facilities to Identify Critical Risks	Medium
Hazardous Materials Spills on Roadways	State Roads	Identify Appropriate Improvements to Traffic Infrastructure and Emergency Response Training and Equipment	Medium

The Town of Waterford Hazard Mitigation Projects			
All Hazards	Town Wide	Implement a Reverse 9-1-1 System to Automatically Call Telephones Throughout Town, Relaying Important Information During an Emergency	Low
All Hazards	Town Wide	Distribute or Post Public Information Regarding Hazards in the Town	Low
Hazard	**Vulnerable Location**	**Mitigation Project**	**Priority**
All Hazards	Town Wide	Evaluate Emergency Shelters, Update Supplies and Check Communication Equipment	Low

The Town of Waterford Hazard Mitigation Projects			
All Hazards	Town Wide	Maintain Emergency Personnel Training as well as Maintaining and Updating Emergency Equipment and Response Protocols	Low
Wind Hazards	Town Wide	Evaluate and Consider Burying Power Lines Underground and Away From Possible Tree Damage	Low
Earthquake Hazards	Town Wide	Complete an Earthquake Survey of all Critical Facilities and Infrastructures	Low
Hazard	**Vulnerable Location**	**Mitigation Project**	**Priority**

The Town of Waterford Hazard Mitigation Projects			
Flooding	Town Wide	1)Complete Catch Basin Surveys to Identify Catch Basins in need of Maintenance and/or Replacement 2) Complete Culvert Survey to Determine Priority for Maintenance and/or Replacement Plan	Low
Fire Hazards	Town Wide	Complete a Survey of Fire Hydrants in the Town to Assess Vulnerabilities and Capabilities for Fire Protection Dry Hydrants should be Considered as a means for Emergency Equipment	Low