

**HAZARD MITIGATION PLAN  
ANNEX  
FOR  
LEDYARD, 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 Ledyard, is 40.5 square miles in area, and is located in the central portion of New London County approximately 7 miles southeast of Norwich, Connecticut, and 42 miles southwest of Providence, Rhode Island. It is bordered by the Town of Preston to the north, the Town of North Stonington to the east, the Naval Submarine Base and the Town of Groton to the south, and the Thames River to the west.

Ledyard is a suburban community with a 2000 U.S. Census population of 14,687. More than 50% of the land in Ledyard is undeveloped with areas of developed land known as Gales Ferry, including the U.S. Naval Submarine Base which is near the Thames River; Ledyard Center and Highlands Area, near the center of town; and the Mashantucket Pequot Indian Reservation, which is located near the eastern corporate boundary.

Ledyard has developed considerably since the expansion of the Pfizer Pharmaceutical Company in Groton and the construction of Foxwoods Resort Casino on the Mashantucket Pequot Reservation. Foxwoods Resort Casino and the Mohegan Sun Casino in Montville are two of the largest employers in New London County. Many tourists come to Ledyard to visit the Foxwoods Resort Casino as well as the Mashantucket Pequot Museum.

Major roads in Ledyard include Routes 2, 12, 117, and 214. Numerous important buildings are situated along these roads including the Town of Ledyard Post Office, Town Hall, Ledyard Fire Station and Police Station which are located on or near Route 117. Backus Health Center, a medical center located in Gales Ferry, the Gales Ferry Post Office, Gales Ferry Fire Station, and three of the town's six schools are located on or near Route 12. In addition, the Dow Chemical Company Allyn's Point Plant is also on Route 12. The Providence/Worcester Rail line runs along the eastern edge of the Thames River.

Residents of Ledyard have several recreational areas that include Stoddard Hill State Park located near the Thames River, the Rose Hill Wildlife Management area along the northern corporate boundary, and Colonel Ledyard Park in the center of the town. Notable bodies of water, in addition to the Thames River, include Ledyard Reservoir, Rosemond Lake, Smith Pond, and Long Pond.

## **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 Ledyard. 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 officials from the Town of Ledyard on August 31, 2003 to develop the 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 Ledyard is flooding.

The Thames River, which flows south and forms the western boundary of the town, is one of the principal rivers in Connecticut. Although the Thames River is only 15 miles long, the basin extends approximately 75 miles north, with the Shetucket and Quinnebaug Rivers being the main tributaries to the Thames River. The drainage area of the Thames River basin is approximately 1,500 square miles.

The Town of Ledyard has a significant area of undeveloped woodland, open space, public and agricultural land. Floodplain development is residential and the majority of the commercial and industrial development is along Route 12 and Route 117.

The history of flooding in the region indicates that flooding can occur in any season of the year. The most severe floods have occurred during the summer and fall as a result of tropical storms. Flooding has also occurred in early spring when the ground is frozen. There have been a number of major floods on the Thames River this century. The two most notable floods were the result of the hurricane of September 21, 1938 and the hurricane of August 31, 1954. The 1938 hurricane resulted in the greatest disaster in Connecticut's history up to that time, because of the combined effects of flooding, gale winds, and storm surge. The tide was high when the storm surge struck and resulted in a maximum tidal elevation of 9.7 feet above mean sea level. The hurricane of 1954 moved up the Atlantic coast and entered Connecticut in the New London area causing a maximum tidal elevation of 8.9 feet NGVD.

There are no flood protection structures in the Town of Ledyard at this time and none have been proposed.

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.

The Town of Ledyard 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 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 Town of Ledyard's Flood Insurance Rate Maps and topographic maps, residential structures that are subject to flooding during significant flood events are located along the Thames River.

There are several sections of Ledyard that flood in residential developments. These roads are Stony Brook Road, Mill Cove Road, and Homestead Road. Homestead Road is near the eastern corporate limits of Ledyard near Long Pond. Access to Mill Cove Road and Homestead Road are in the flood zone.

Along the shoreline of the Thames River there are structures located in the flood zone. There are flood prone structures on Poquetanuck Cove at Green Point Street and Royal Oaks. Another area of potential flooding is near Clark Cove in the Gales Ferry section of Ledyard. Several structures are located in the flood hazard area along the Thames River on Hurlbutt Road and Riverside Place.

## **B. Commercial/Industrial**

Foxwoods Resort Casino is the largest commercial development in Ledyard. The impact of the casino and its success has led to an increase in commercial structures in Ledyard. The Foxwoods Resort Casino along with other commercial and industrial development areas mainly along Route 117 in the center of Ledyard and in the Gales Ferry section are not located in flood hazard areas.

## **C. Critical Facilities**

A review of the critical public facilities in the Town of Ledyard indicates that the majority of the critical facilities are not located in flood hazard areas. These facilities are free from flooding and are generally protected from other potential hazards.

## **D. Transportation Corridors**

Ledyard has several transportation routes including Route 12, Route 2, Route 117, and Route 214. In addition, several local roads are potentially subject to flooding. Any roadway flooding could result in problems related to emergency response.

As Route 12 travels over the Thames River at Poquetanuck Cove it is in the flood zone. One of the quickest routes to Backus Hospital in Norwich is Route 12 north over Poquetanuck Cove. In the event of flooding, a slower and less efficient way must be traveled to reach the hospital on back roads for vehicles that would travel north on Route 12. Route 12 is also in the flood zone near the intersection of Christy Hill Road and then again near the intersection of Long Cove Road.

Based on a review of the Flood Insurance Rate Map of Ledyard, several secondary roads are located in the 100-year floodplain. These roads include Avery Hill Road, which connects the large development at Poquetanuck Cove and the residences on the road to the center of Ledyard. A portion of the road floods where Billings Avery Brook crosses the road. Christy Hill Road is in a flood zone at the intersection of Pine Swamp Brook. The Military Highway is in the flood zone from Mill Cove to Long Cove. Shewville Road floods at the intersection of Shewville Brook, north of the intersection of Silas Deane Road, at Williams Brook near Whitford Road, and at the intersection of Gallup Hill Road. Lambtown Road floods at the intersection of Haley's Brook.



Iron Street floods between the intersection of Spicer Hill Road and Gallup Hill Road. Town Farm Road is also in the flood zone at the intersection of Williams Brook near Shewville Road. Lantern Hill Road is in a flood zone near Long Pond Road South and also near Whitford Pond.

Several of Ledyard's smaller roads that connect to main roads may flood during storms and create impassable roadways. These roads include Thomas Road where Rose Brook crosses over, Baldwin Hill Road, Long Cove Road (in two areas), and Lambtown Road Extension at the intersection of Ed Lamb Brook. Woodland Drive near Mill Cove is also in a flood zone.

Town officials have also expressed concern with increased thru-traffic in Ledyard. 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 Ledyard.

#### **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 Ledyard has planning and zoning tools in place that incorporate floodplain management. The town's planning and zoning regulations, inland wetlands and watercourses 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 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.

6. Erosion and Sediment Control Regulation

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.

## **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 of the Regional Hazard Mitigation Plan.

## **C. Emergency Services**

Emergency communication is a critical aspect of the hazard response programs currently in place in Ledyard. 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 Connecticut Light and Power Company 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

The Town of Ledyard employs four full time fire fighters and two full time EMTs. In order for the emergency dispatch to communicate, phone lines are required. These phone lines run along Route 117. If the phone lines were damaged, it could shut down Ledyard's entire emergency communication system. The police station does not have emergency backup power, however, the dispatch center does have emergency power. If Ledyard's Emergency Communications Center were to lose phone lines, 9-1-1 calls would be forwarded to Groton. Town officials have expressed interest in studying a radio frequency system for backup use. A radio frequency link would eliminate the need for phone lines to dispatch police, fire, and ambulances.

During fire emergencies there is a mutual aid agreement with several towns surrounding Ledyard. This agreement allows the towns to use low band radio frequencies for town to town communication. This has created good communication with the surrounding towns which include Preston, North Stonington, Groton, Montville, and the U.S. Naval Submarine Base.

#### **D. Structural Projects**

Structural projects include utilization of the flood control strategies that have been and continue to be used throughout Connecticut. The potential environmental impacts of structural projects are often a concern. Structural projects that can be included in hazard mitigation planning include the following:

1. Levees/Floodwalls
2. Bridge & 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 of 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 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 Ledyard.

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 potential hazard mitigation projects recommended to reduce Ledyard'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 Ledyard Hazard Mitigation Projects**

<b>Hazard</b>	<b>Vulnerable Location</b>	<b>Mitigation Project</b>	<b>Priority</b>
All Hazards	Town Wide	Provide a Back up of Communications Between all Critical Facilities	High
Flooding	Town Wide	Develop a Flood Audit Program	High
All Hazards	Town Wide	Evaluate the Hazard Resistant Nature of All Critical Facilities	High
Flooding	Thames River	Evaluate Structural Project or Property Acquisition	Medium

**The Town of Ledyard Hazard Mitigation Projects**

All Hazards	Town Wide	Review of Town Transportation 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
<b>Hazard</b>	<b>Vulnerable Location</b>	<b>Mitigation Project</b>	<b>Priority</b>
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

**The Town of Ledyard Hazard Mitigation Projects**

All Hazards	Town Wide	Evaluate Emergency Shelters, Update Supplies and Check Communication Equipment	Low
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
<b>Hazard</b>	<b>Vulnerable Location</b>	<b>Mitigation Project</b>	<b>Priority</b>

**The Town of Ledyard 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 to Assess Vulnerabilities and Capabilities for Fire Protection  Dry Hydrants should be Considered as a means for Emergency Equipment	Low