

**TOWN OF PROSPECT
NATURAL HAZARD PRE-DISASTER MITIGATION PLAN**

**CENTRAL NAUGATUCK VALLEY
REGIONAL PLANNING AREA**

FEMA REVIEW DRAFT

JANUARY 2008

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Prepared For:



**Council of Governments
Central Naugatuck Valley**

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Prospect Pre-Disaster Natural Hazard Mitigation Plan

Executive Summary

1. The Disaster Mitigation Act of 2000 (DMA) requires local communities to have a Federal Emergency Management Agency (FEMA)-approved mitigation plan in order to be eligible to receive post-disaster Hazard Mitigation Grant Program (HMGP) grants and Pre-Disaster Mitigation (PDM) program project grant funds.
2. The primary purpose of a pre-disaster hazard mitigation plan (HMP) is to identify natural hazards and risks, existing capabilities, and activities that can be undertaken by a community or group of communities to prevent loss of life and reduce property damages associated with the identified hazards. These include the loss of or damage to life, property, infrastructure, and natural, cultural and economic resources from natural disasters.
3. Two meetings with town officials, field inspections, and a public information meeting were held in Prospect as of August 31, 2007 to collect information, to provide background for evaluation, and to perform outreach. The draft plan will be reviewed by municipal officials prior to sending the draft to FEMA for comments. Finally, a public hearing will be held in Prospect prior to local adoption of the plan. When adopted, the final plan will be sent again to FEMA for its approval.
4. Prospect's hilly terrain makes it particularly vulnerable to an array of natural disasters and which limit development in much of the town. Slopes and water features limit development at the northern and eastern ends of the town. In the southern half of the town, the undeveloped land is largely owned by three water supply utilities for conservation purposes, posing a strict limitation to further development in this area.
5. Two major faults exist in Town: an unnamed fault and the Western Border Fault which stretches from Milford into Massachusetts. Both are inactive.

6. Approximately 60% of the Town falls within the Canton and Charlton soils' categories which consist of very deep, well-drained soils formed in a loamy mantle.
7. The Town of Prospect drains to seven major watersheds: Ten Mile River (33% of town), Willow Brook (9%), West River (0.5%), the Naugatuck River (0.1%), Beaver Pond Brook (12%), Fulling Mill Brook (0.16%), and Beacon Hill Brook (29%). It is in the headwaters of all but the Naugatuck and West Rivers.
8. Prospect has been extremely proactive in its hazard mitigation efforts since 1983 and has been successful in convincing landowners and developers to make improvements in an effort to mitigate damage from natural hazards such as oversized pipes and box culvert for drainage and underground utilities for new developments.
9. There are no major waterways or widespread floodplains associated with waterways in Prospect. The principal flood hazard zones tend to be associated with wetlands and water bodies at headwater locations. Inland flooding affects only a few areas of Prospect: in the floodplains adjacent to rivers and along tributaries. These generally occur when snow melt coincides with spring rains and with storms of tropical origin in the late summer move to the northeast.
10. Measures for flood damage prevention, property protection, construction, public education and awareness, natural resource protection and emergency services are listed including pursuing open space acquisition, and increasing culverts sizes where appropriate.
11. The Town should perform a Master Drainage Study, including an introduction of a comprehensive catch basin maintenance program and join the community rating system to lower insurance rates for residents, and continue to keep its Emergency Operations Plan up to date.

12. A major hurricane mitigation measure is increased public awareness of evacuation routes and available shelters.
13. In the winter, icing is a serious problem along Route 69 from the town center to the Bethany town line, along Route 68 near the Department of Public Works, and along Terry Road.
14. There is the potential for catastrophic loss of life and property with the failure of the two Class C Dams (Cheshire Reservoir Dam and Waterbury Reservoir Dam #2). Failure of Waterbury Reservoir Dam #2 would have a higher impact on the residents and infrastructure of the Town of Prospect and both would significantly impact downstream areas in adjacent communities.
15. Prospect is at a low risk for wildfires. Areas at largest risk include undeveloped protected watershed lands owned by water companies which have limited access.

1.0 INTRODUCTION

1.1 *Background and Purpose*

The term hazard refers to an extreme natural event that poses a risk to people, infrastructure, or resources. In the context of natural disasters, pre-disaster hazard mitigation is commonly defined as any sustained action that permanently reduces or eliminates long-term risk to people, property, and resources from natural hazards and their effects.

The primary purpose of a pre-disaster hazard mitigation plan (HMP) is to identify natural hazards and risks, existing capabilities, and activities that can be undertaken by a community or group of communities to prevent loss of life and reduce property damages associated with the identified hazards. This HMP is prepared specifically to identify hazards in the Town of Prospect, Connecticut ("Prospect" or "Town"). The HMP is relevant not only in emergency management situations, but also should be used within the Town of Prospect's land use, environmental, and capital improvement frameworks.

The Disaster Mitigation Act of 2000 (DMA), commonly known as the 2000 Stafford Act amendments, was approved by Congress and signed into law in October 2000, creating Public Law 106-390. The purposes of the DMA are to establish a national program for pre-disaster mitigation and streamline administration of disaster relief.

The DMA requires local communities to have a Federal Emergency Management Agency (FEMA)-approved mitigation plan in order to be eligible to receive post-disaster Hazard Mitigation Grant Program (HMGP) grants and Pre-Disaster Mitigation (PDM) program project grant funds. Once a community has a FEMA-approved hazard mitigation plan, the community is then eligible to apply for PDM project funds for mitigation activities.

The subject pre-disaster hazard mitigation plan was developed to be consistent with the requirements of the HMGP, PDM, and Flood Management Assistance (FMA) programs. These programs are briefly described below.

Pre-Disaster Mitigation (PDM) Program

The Pre-Disaster Mitigation program was authorized by Part 203 of the Robert T. Stafford Disaster Assistance and Emergency Relief Act (Stafford Act), 42 U.S.C. 5133. The PDM program provides funds to states, territories, tribal governments, communities, and universities for hazard mitigation planning and implementation of mitigation projects prior to disasters, providing an opportunity to reduce the nation's disaster losses through pre-disaster mitigation planning and the implementation of feasible, effective, and cost-efficient mitigation measures. Funding of pre-disaster plans and projects is meant to reduce overall risks to populations and facilities. PDM funds should be used primarily to support mitigation activities that address natural hazards. In addition to providing a vehicle for funding, the PDM program provides an opportunity to raise risk awareness within communities.

Hazard Mitigation Grant Program (HMGP)

The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. The HMGP provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. A key purpose of the HMGP is to ensure that any opportunities to take critical mitigation measures to protect life and property from future disasters are not "lost" during the recovery and reconstruction process following a disaster.

Flood Mitigation Assistance (FMA) Program

The FMA program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FEMA provides FMA funds to assist States and communities with implementing measures that reduce or eliminate the long-term risk of flood damage to buildings, homes, and other structures insurable under the NFIP. The long-term goal of FMA is to reduce or eliminate claims under the NFIP through mitigation activities. Three types of grants are available under FMA. These are Planning, Project, and Technical Assistance grants.

1.2 Hazard Mitigation Goals

The primary goal of this hazard mitigation plan is to ***reduce the loss of or damage to life, property, infrastructure, and natural, cultural and economic resources from natural disasters***. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

Developing, adopting, and implementing this hazard mitigation plan is expected to:

- ❑ ***Increase access to and awareness of funding sources for hazard mitigation projects.*** Certain funding sources, such as the Pre-Disaster Mitigation Competitive Grant Program and the Hazard Mitigation Grant Program, will be available if the hazard mitigation plan is in place and approved.

- ❑ ***Identify mitigation initiatives to be implemented if and when funding becomes available.*** This HMP will identify a number of mitigation recommendations, which can then be prioritized and acted upon as funding allows.

- ❑ ***Connect hazard mitigation planning to other community planning efforts.*** This HMP can be used to guide Prospect's development through inter-departmental and inter-municipal coordination.

- ❑ ***Improve the mechanisms for pre- and post-disaster decision making efforts.*** This plan emphasizes actions that can be taken now to reduce or prevent future disaster damages. If the actions identified in this plan are implemented, damage from future hazard events can be minimized, thereby easing recovery and reducing the cost of repairs and reconstruction.

- ❑ ***Improve the ability to implement post-disaster recovery projects*** through development of a list of mitigation alternatives ready to be implemented.

- ❑ ***Enhance and preserve natural resource systems.*** Natural resources, such as wetlands and floodplains, provide protection against disasters such as floods and hurricanes. Proper planning and protection of natural resources can provide hazard mitigation at substantially reduced costs.

- ❑ ***Educate residents and policy makers about natural hazard risk and vulnerability.*** Education is an important tool to ensure that people make informed decisions that complement the Town's ability to implement and maintain mitigation strategies.

- ❑ ***Complement future Community Rating System efforts.*** Implementation of certain mitigation measures may increase a community's rating, and thus the benefits that it derives from FEMA. The Town of Prospect has never participated in the Community Rating System.

1.3 Identification of Hazards and Document Overview

As stated in Section 1.1, the term *hazard* refers to an extreme natural event that poses a risk to people, infrastructure, or resources. Based on a review of the Connecticut Natural Hazard Mitigation Plan and correspondence with local officials, the following have been identified as natural hazards that are most likely to affect the Town of Prospect:

- Inland Flooding
- Hurricanes and Tropical Storms
- Summer Storms (including lightning, hail, and heavy winds) and Tornadoes
- Winter Storms
- Earthquakes
- Dam Failure
- Wildfires

This document has been prepared with the understanding that a single *hazard effect* may be caused by multiple *hazard events*. For example, flooding may occur as a result of frequent heavy rains, a hurricane, or a winter storm. Thus, Appended Tables 1 and 2 provide summaries of the hazard events and hazard effects that impact the Town of Prospect, and include criteria for characterizing the locations impacted by the hazard, the frequency of occurrence of the hazards, and the magnitude or severity of the hazards.

Despite the causes, the effects of several hazards are persistent and demand high expenditures from the Town. In order to better identify current vulnerabilities and potential mitigation strategies associated with other hazards, each hazard has been individually discussed in a separate chapter.

This document begins with a general discussion of Prospect's community profile, including the physical setting, demographics, development trends, governmental structure, and sheltering capacity. Next, each chapter of this Plan is broken down into six

or seven different parts. These are *Setting*; *Hazard Assessment*; *Historic Record*; *Existing Programs, Policies, and Mitigation Measures*; *Vulnerabilities and Risk Assessment*; and *Potential Mitigation Measures, Strategies, and Alternatives*, and if necessary, a *Summary of Recommendations*. These are described below.

- ❑ *Setting* addresses the general areas that are at risk from the hazard. General land uses are identified.
- ❑ *Hazard Assessment* describes the specifics of a given hazard, including general characteristics, and associated effects. Also defined are associated return intervals, probability and risk, and relative magnitude.
- ❑ *Historic Record* is a discussion of past occurrences of the hazard, and associated damages when available.
- ❑ *Existing Programs, Policies, and Mitigation Measures* gives an overview of the measures that the Town of Prospect is currently undertaking to mitigate the given hazard. These may take the form of ordinances and codes, structural measures such as dams, or public outreach initiatives.
- ❑ *Vulnerabilities and Risk Assessment* focuses on the specific areas at risk to the hazard. Specific land uses in the given areas are identified. Critical buildings and infrastructure that would be affected by the hazard are identified.
- ❑ *Potential Mitigation Measures, Strategies, and Alternatives* identifies mitigation alternatives, including those that may be the least cost effective or inappropriate for Prospect.

- *Summary of Recommended Mitigation Measures, Strategies, and Alternatives* provides a summary of the recommended courses of action for Prospect that are included in the STAPLEE analysis described below.

This document concludes with a strategy for implementation of the Hazard Management Plan, including a schedule, a program for monitoring and updating the plan, and a discussion of technical and financial resources.

1.4 Discussion of STAPLEE Ranking Method

To prioritize recommended mitigation measures, it is necessary to determine how effective each measure will be in reducing or preventing damage. A set of criteria commonly used by public administration officials and planners was applied to each proposed strategy. The method, called STAPLEE, stands for the "Social, Technical, Administrative, Political, Legal, Economic and Environmental" criteria for making planning decisions. The following questions were asked about the proposed mitigation strategies:

- **Social:** Is the proposed strategy socially acceptable to Prospect? Is there any equity issues involved that would mean that one segment of Prospect could be treated unfairly?
- **Technical:** Will the proposed strategy work? Will it create more problems than it will solve?
- **Administrative:** Can Prospect implement the strategy? Is there someone to coordinate and lead the effort?
- **Political:** Is the strategy politically acceptable? Is there public support both to implement and maintain the project?
- **Legal:** Is Prospect authorized to implement the proposed strategy? Is there a clear legal basis or precedent for this activity?

- ❑ **Economic:** What are the costs and benefits of this strategy? Does the cost seem reasonable for the size of the problem and the likely benefits?
- ❑ **Environmental:** How will the strategy impact the environment? Will the strategy need environmental regulatory approvals?

Each proposed mitigation strategy presented in this plan was evaluated and assigned a score (Good = 3, Average = 2, Poor = 1) based on the above criteria. An evaluation matrix with the total scores from each strategy can be found in Appendix A. After each strategy is evaluated using the STAPLEE method, it is possible to prioritize the strategies according to the final score. The highest scoring is determined to be of more importance, economically, socially, environmentally and politically and, hence, prioritized over those with lower scoring.

1.5 Documentation of the Planning Process

The Town of Prospect is a member of the Council of Governments of the Central Naugatuck Valley (COGCNV), the responsible regional planning body for Prospect and twelve other member municipalities: Beacon Falls, Bethlehem, Cheshire, Middlebury, Naugatuck, Oxford, Southbury, Thomaston, Waterbury, Watertown, Wolcott, and Woodbury. Oxford, Waterbury, Watertown, and Woodbury have existing mitigation plans, and hazard mitigation plans are being concurrently developed for the municipalities of Cheshire and Wolcott.

Ms. Virginia Mason of the COGCNV coordinated the development of this Hazard Mitigation Plan. The COGCNV applied for the grant from FEMA through the Connecticut Department of Environmental Protection (DEP). The adoption of this plan in the Town of Prospect will also be coordinated by the COGCNV.

The following individuals from the Town of Prospect provided information, data, studies, reports, and observations; and were involved in the development of the Plan:

- ❑ Robert J. Chatfield, Mayor
- ❑ William Donovan, Land Use Inspector
- ❑ Nelson Abarzua, Prospect Resident State Trooper
- ❑ Richard Mortenson, Prospect Local Emergency Planning Commission

An extensive data collection, evaluation, and outreach program was undertaken to compile information about existing hazards and mitigation in the Town, as well as to identify areas that should be prioritized for hazard mitigation. The following is a list of meetings that were held to develop this Hazard Mitigation Plan:

- ❑ *A project initiation meeting was held June 26, 2006.* This meeting addressed the scope of services necessary to develop this HMP. Initial input was provided by the project team.
- ❑ *Field inspections were performed on June 28, 2006.* Observations were made of problem areas called out by Town officials during the project initiation meeting.
- ❑ *A project meeting with Town officials was held July 25, 2006.* Necessary documentation was collected, and problem areas within the Town were discussed.
- ❑ *A public information meeting was held November 20, 2006 at 7:30 P.M.* Preliminary findings were presented and public comments solicited.

While residents were invited to the public information meeting via newspaper, few attended. Residents were also encouraged to contact the COG with comments via newspaper articles.

As another direct gauge of public interest, a thorough review of complaint files stored by the Office of the Mayor was undertaken to document problems of public concern.

Finally, the Connecticut DEP was routinely briefed and consulted throughout the development process.

It is important to note that COGCNV manages the Central Naugatuck Valley Emergency Planning Committee. This committee has begun coordinating emergency services in the region. Fire, Police, EMS, Red Cross, emergency management directors, and other departments participate in these efforts. In June 2004, over 120 responders participated in the region's first tabletop exercise on biological terrorism. Area health directors, hospitals, and other health care professionals also meet monthly with the Health and Medical Subcommittee to share information, protocols, and training. Thus, local knowledge and experience gained through the Emergency Planning Committee activities has been transferred by the COGCNV to the pre-disaster mitigation planning process.

Additional opportunities for the public to review the Plan will be implemented in advance of the public hearing to adopt this plan, tentatively scheduled for spring 2008, contingent on receiving conditional approval from FEMA. The draft that is sent for FEMA review will be posted on the Town website and the COGCNV website to provide opportunities for public review and comment. Such comments will be incorporated into the final draft when applicable. Upon receiving conditional approval from FEMA, the public hearing will be scheduled, at which time any remaining comments can be addressed. Notification of the opportunity to review the Plan on the websites and the public information meeting will be placed on the websites and placed in local newspapers.

If any final plan modifications result from the comment period leading up to and including the public hearing to adopt the plan, these will be submitted to FEMA as page revisions with a cover letter explaining the changes. It is not anticipated that any major modifications will occur at this phase of the project.

Appendix B contains copies of meeting minutes, field notes and observations, the public information meeting presentation, and other records that document the development of this Pre-Disaster Hazard Mitigation Plan, to date.

2.0 COMMUNITY PROFILE

2.1 Physical Setting

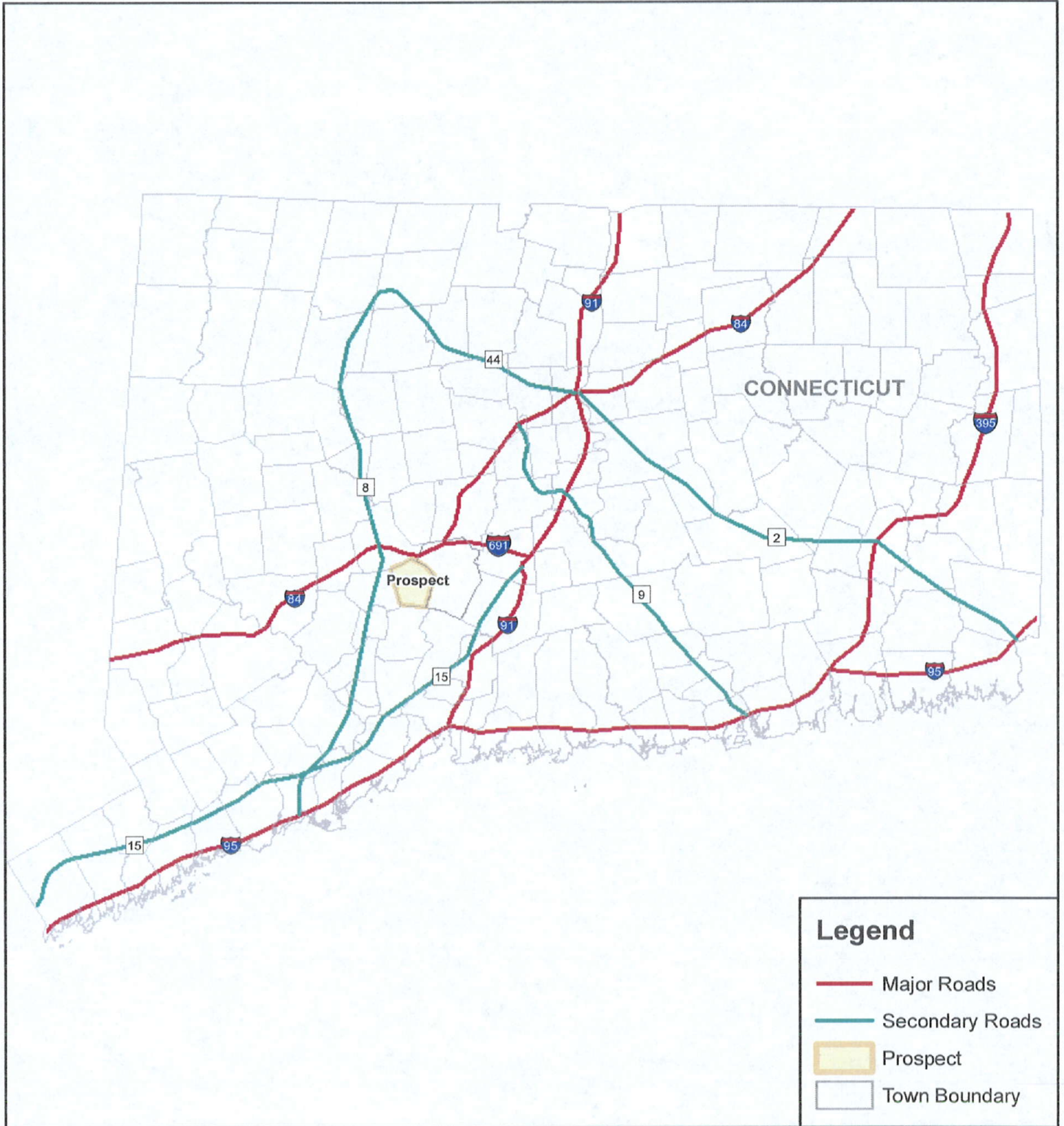
The Town of Prospect is located in New Haven County. It is bordered by Naugatuck to the west, Waterbury to the north, Cheshire to the east, and Bethany to the south. Refer to Figure 2-1 for a location schematic, Figure 2-2 for a location map. Of the thirteen communities in the Central Naugatuck Valley Region, Prospect is ranked 7th in terms of population density.

Prospect is located within the eastern part of the crystalline uplands, or Western Highlands, of western Connecticut. This geologic feature consists of three belts of metamorphic rocks bounded to the west by the sediments and low-rank metamorphic rocks of the Hudson River valley and on the east by the Triassic sediments of the Connecticut River valley. The topography of the Town ranges from gently rolling terrain in the river valleys to steep hilly terrain in several upland areas. Elevations ranging from 240 feet in the northeastern part of Town to 910 feet above sea level on top of Turkey Hill in the northwestern part of Town, based on the National Geodetic Vertical Datum of 1929. The hilly terrain of Prospect makes it particularly vulnerable to an array of natural hazards.

2.2 Existing Land Use

Prospect is characterized by its hills and steep slopes which limit development in much of the town. Municipal facilities are concentrated in the center of the town at the intersection of Routes 68 and 69. Commercial activity is principally located along Route 69 from the town center north. The commercial areas are surrounded by low-density residential districts interspersed with agricultural operations. Slopes and water features limit development at the northern and eastern ends of the town. In the southern half

Figure 2-1: Prospect Location Map



Source: "Roads", GDT
"Town Boundary", DEP
For general planning purposes only. Delineations may not be exact.
January 2007



0 10 20 Miles



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of the town, the undeveloped land is largely owned by one of three water supply operations for conservation purposes, posing a strict limitation to further development in this area. The largest concentration of industrial land uses is located about a mile west of the town center on Route 69.

In total, Prospect encompasses 14.43 square miles. Table 2-1 provides a summary of land use in Prospect by area. In addition, refer to Figure 2-3 for a map of generalized land use in the Central Naugatuck Valley Planning Region.

Table 2-1
Land Use by Area

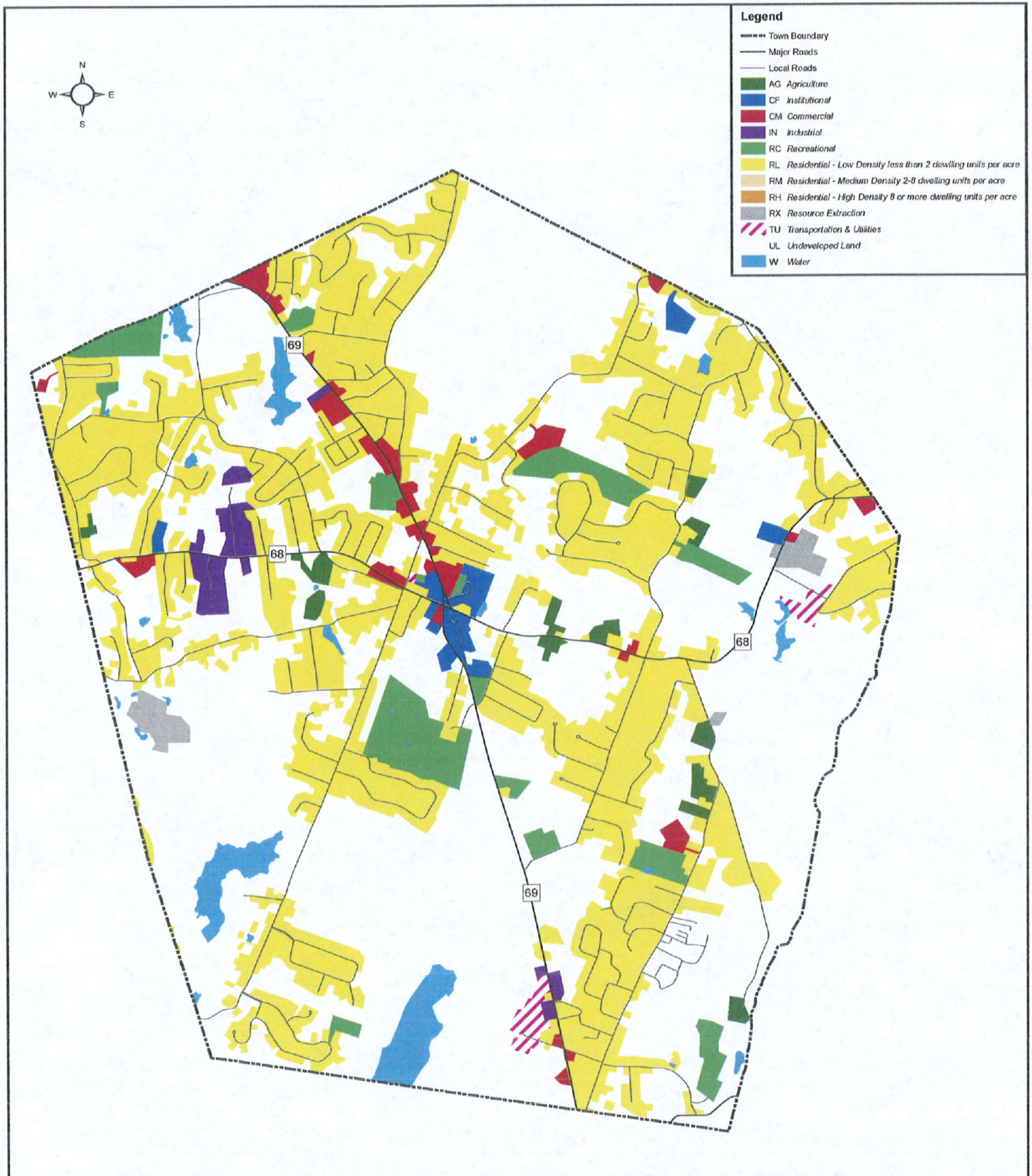
Land Use	Area (acres)	Pct.
Vacant	4875	52.8%
Residential - Low Density	3489	37.8%
Water	173	1.9%
Recreational	144	1.6%
Mining	137	1.5%
Agricultural	107	1.2%
Industrial	100	1.1%
Residential - High Density	71	0.8%
Commercial	50	0.5%
Institutional	41	0.4%
Utilities/Transportation	38	0.4%
Residential - Medium Density	15	0.2%

Source: Council of Governments Central Naugatuck Valley, 2000

2.3 Geology

Geology is important to the occurrence and relative effects of natural hazards such as earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Prospect. The following discussion highlights Prospect's geology at several regional scales.

Figure 2-3: Prospect Generalized Land Use



Source: "Roads", GDT
 "Town Boundary", DEP
 "Land Use", COGCNV

For general planning purposes only. Delineations may not be exact.
 January 2007

0 0.5 1 Miles



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In terms of North American bedrock geology, the Town of Prospect is located in the northeastern part of the Appalachian Orogenic Belt, also known as the Appalachian Highlands. The Appalachian Highlands extend from Maine south into Mississippi and Alabama and were formed during the orogeny that occurred when the super-continent Pangea assembled during the late Paleozoic era. The region is generally characterized by deformed sedimentary rocks cut through by numerous thrust faults.

Regionally, in terms of New England bedrock geology the Town of Prospect lies within the Eugeosyncline Sequence. Bedrock belonging to the Eugeosyncline Sequence are typically deformed, metamorphosed, and intruded by small to large igneous plutons.

Connecticut bedrock geology is comprised of several "terranes." Terranes are geologic regions that reflect the role of plate tectonics in Connecticut's natural history. The bedrock beneath the Town of Prospect is part of the Iapetos Terrane, comprised of remnants of the Iapetos Ocean that existed before Pangaea was formed. This terrane formed when Pangaea was consolidated and its boundaries are coincident with the Eugeosyncline Sequence geologic province described above.

The Town of Prospect's bedrock consists of three general lithologies: volcanic and intrusive igneous silicate gneisses, metamorphic granofels, and metasedimentary and metaigneous schists. The bedrock alignment trends northeast-southwest through the Town. Refer to Figure 2-4 for a depiction of the bedrock geology in the Town of Prospect.

The five primary bedrock formations in the Town (from west to east) are Waterbury Gneiss, Taine Mountain & Collinsville Formation, The Straits Schist, Trap Falls Formation, and Beardsley Member of Harrison Gneiss. Waterbury Gneiss is a gray- to dark-gray, fine- to medium-grained schist and gneiss. Taine Mountain & Collinsville Formation is comprised of well-layered, gray granofels. The Straits Schist is a silvery to gray, coarse grained schist. The Trap Falls formation consists of gray to silvery, partly

rusty-weathering, medium-grained schist, and Beardsley Member of Harrison Gneiss is gray to dark-gray, medium-grained, lineated gneiss. In addition, a small area of light-colored, foliated granitic gneiss believed to be from the Ordovician period exists in the southeastern portion of Town., and a small area of igneous buttress dolerite (basalt) exists in the northern portion of Town.

Two major faults exist in the Town: An unnamed fault and the Western Border Fault. The Western Border Fault is a large fault extending along the eastern edge of the Western Highlands and stretches from Milford northwards into Massachusetts. The unnamed fault divides Prospect from southwest to northeast. Both of these faults trace to the Jurassic period. Neither of these faults is active. Bedrock outcrops are difficult to find in Prospect due to the forested nature of the Town, although outcrops can be found at higher elevations and on hilltops. Figure 2-4 also depicts the location of known fault lines in the Town of Prospect.

At least twice in the late Pleistocene, continental ice sheets moved across Connecticut. As a result, surficial geology of the Town is characteristic of the depositional environments that occurred during glacial and postglacial periods. Refer to Figure 2-5 for a depiction of surficial geology.

A vast area of the Town is covered by glacial till. Tills contain an unsorted mixture of clay, silt, sand, gravel, and boulders deposited by glaciers as a ground moraine. This area includes nearly all of the northern, central, and southern portions of Prospect and most of the remaining area of the Town. Stratified sand and gravel ("stratified drift") areas are also associated with the major rivers and brooks throughout the Town. These deposits accumulated by glacial meltwater streams during the outwash period following the latest glacial recession.