City of Providence

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

CHAPTER 2000-5

No. 135 **AN ORDINANCE** AMENDING *PROVIDENCE 2000: THE COMPREHENSIVE PLAN*, CHAPTER 1994-52, No. 798, ADOPTED ON DECEMBER 27, 1994, AS AMENDED.

Approved March 23, 2000

Be it ordained by the City of Providence:

That Chapter 1994-52, No. 798, approved December 27, 1994, also known as *Providence 2000: The Comprehensive Plan*, (hereinafter referred to as "Plan") is hereby amended, pursuant to Rhode Island General Laws Section 45-22.2-12. The following sections shall be considered to be a single action to amend to the Plan.

Section 1 - To adopt the plan entitled **"Strategy for Reducing Risks from Natural Hazards in Providence, Rhode Island, 1999"** as Plan Number 5 of the Comprehensive Plan Series of *Providence 2000: The Comprehensive Plan,* attached and made part of this Ordinance.

Section 2 - This Ordinance shall take effect upon passage.

IN CITY COUNCIL
MAR 3 2000
FIRST READING
READ AND PASSED
Richard R. Clement CLERK

IN CITY COUNCIL
MAR 16 2000
FINAL READING
READ AND PASSED
PRESIDENT
Richard R. Clement CLERK

APPROVED

MAR 23 2000
Vincent A. Cianci Jr.
MAYOR

No.

CHAPTER

AN ORDINANCE

IN CITY COUNCIL
OCT 7 1999
FIRST READING
REFERRED TO COMMITTEE ON
~~ORDINANCES~~ Urban Redevelopment, Renewal and Planning
Michael L. Clement CLERK

THE COMMITTEE ON
U.R.R.P. Set up P.H.
Recommends
Barbara A. Gavin
10/18/99 Clerk
11/29/99 P.H. held

THE COMMITTEE ON
URBAN REDEVELOPMENT
RENEWAL & PLANNING
Approves Passage of
The Within Ordinance
Claire E. Bestwick
Feb. 23 2000 Clerk

Council President Lombardi (By Request)

MEMO

DATE: 09/30/99

TO: MICHAEL R. CLEMENT, JR., CITY CLERK

FROM: THOMAS E. DELLER, AICP, DEPUTY DIRECTOR

RE: PLAN NUMBER 5 OF THE COMPREHENSIVE PLAN SERIES

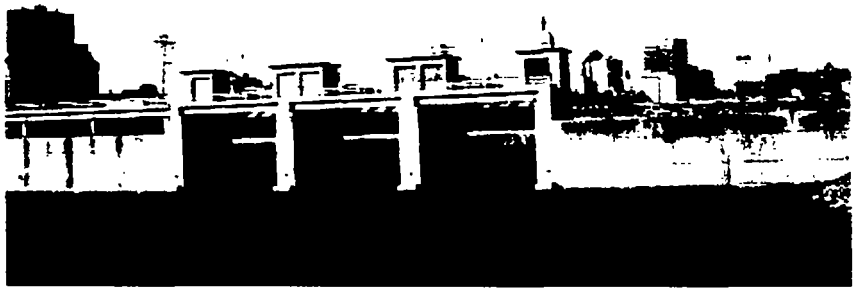
Attached is an original city ordinance that amends *Providence 2000: The Comprehensive Plan* of the Comprehensive Plan Series. This amendment will adopt Plan Number 5 called "Strategy for Reducing Risks from Natural Hazards in Providence, Rhode Island, 1999".

Council President John J. Lombardi, Ward 13 is sponsoring the Ordinance.

DP

Attachments

Strategy for Reducing Risks from Natural Hazards in Providence, Rhode Island



Vincent A. Cianci, Jr., Mayor

Providence Emergency Management Agency

With Assistance From:

The Rhode Island Emergency Management Agency

And

The University of Rhode Island's Coastal Resources Center/

Rhode Island Sea Grant

1999

Acknowledgments

VINCENT A. CIANCI, JR., MAYOR OF PROVIDENCE

PROVIDENCE EMERGENCY MANAGEMENT AGENCY

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Peter Marinucci, Director

Providence City Council

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Ronald Allen, Ward 8
Luis Aponte, Ward 10
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Robert Clarkin, Ward 1
Joseph DeLuca, Ward 6
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Patricia Nolan, Ward 9
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Balbina Young, Ward 11
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James Leach
Miguel Luna
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S. Jon Özbek, Planning and Development
Edgar Paxson, Inspections and Standards
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Samuel J. Shamoon, Planning and Development

Report Principal Author: Samuel J. Shamoon, Associate Director of Planning

With assistance from:

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Joseph Almeida, Jr., Rhode Island Emergency Management Agency
Roland Duhaime, University of Rhode Island Environmental Data Center: Geographic Information System (GIS) Maps

Cover Photo: Peter Marinucci - Report Photos: Tina S. Bingham

The Providence Emergency Management Agency would also like to thank the community of Providence, especially city staff and those active community members who participated in the planning process.

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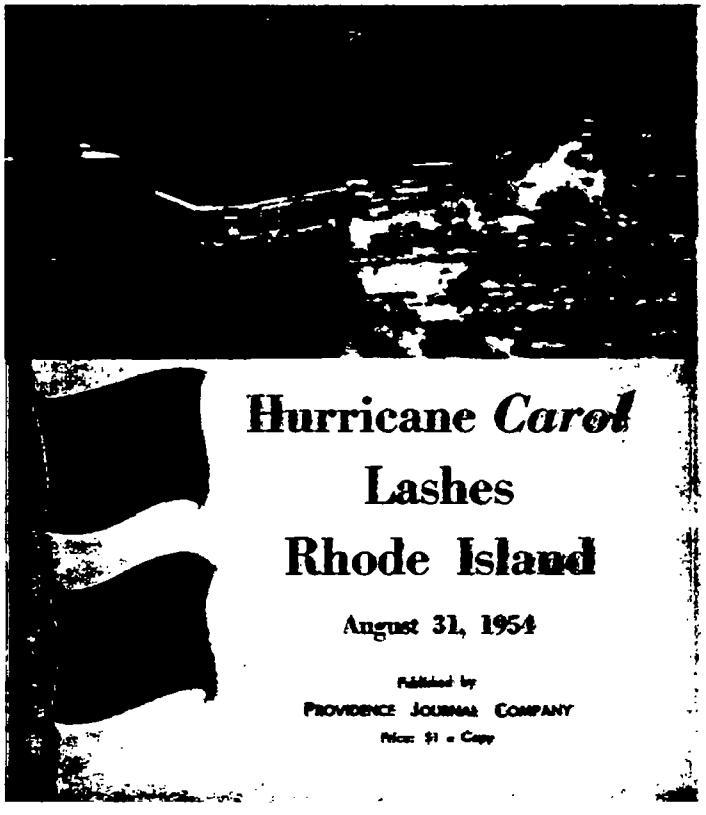
Supervisor of Examinations
Rhode Island Banking Commission

Table of Contents

Section 1.0 – Introduction

The purpose of this report is to establish a plan to mitigate natural hazards in the City of Providence. Ideally located along the eastern seaboard of the United States, Providence prospered from its location and development as a transportation center, offering access to both water and overland routes. In 1940, the City enjoyed its highest population ever (253,504), as industries and businesses continued to migrate to Providence's active harbor and commercial areas.

The climate of Providence is typical of the North Temperate Zone, with a mean annual temperature of approximately 50 degrees Fahrenheit. The mean annual precipitation is 39.4 inches, including an average snowfall approximating 40 inches, though snowfall can occur in appreciably larger amounts. The topography is variable, consisting of hills, lowlands, and swamps. Relief ranges from a high of 250 feet at Neutaconkanut Hill Park along the western corporate limits to a low of sea level at the eastern corporate limits.



The City also has a history of natural disasters, primarily caused by severe flooding and high winds from major storms and hurricanes dating back to the 1600s. On September 22-23, 1815 Providence experienced its first recorded major hurricane. There is little information from that time, but the damages included thirty-five ships that were tossed into buildings and into each other. About 500 homes and small buildings were destroyed, but amazingly there were only two recorded fatalities, both at India Point. In Market Square, the water rose to almost twelve feet above the mean high water mark. The storm was dubbed the Great Gale.[1]

In this century, two major hurricanes, as well as a few minor ones, have struck Providence. The most devastating floods of this century were the result of hurricane tidal surges and accompanying rainfall. On September 21, 1938, a hurricane struck the Connecticut-Rhode Island coastline just hours before the expected high tide in Providence. Peak winds of over 120 miles an hour blowing up Narragansett Bay created a tidal surge that inundated the downtown commercial area of Providence with over 10 feet of water.

1 Conley, Patrick T., Campbell, Paul, *Providence, A Pictorial History*, The Donning Company, 1982.

In August 1954, Hurricane Carol also caused a severe tidal surge (References 2 and 3). The 1938 and 1954 storms had recurrence intervals of 100 and 50 years, respectively. The picture above illustrates the devastation that occurred in the downtown, before the Fox Point Hurricane Barrier was built.

Riverine flooding also occurs in Providence. In March 1968, the riverine flow of record occurred on both the Woonasquatucket and Moshassuck Rivers. Extensive flooding occurred on the Woonasquatucket River near Erickson Place, Valley Street, Amherst Street, and Eagle Street. The recurrence interval for this flood on the Woonasquatucket River at the U.S. Geological Survey (USGS) gauging station in Centerdale was estimated to be 35 years. Flooding on the Moshassuck River occurred near Canal and Mill Streets below the USGS gauge and along Interstate 95. Gauge records showed this flood to be a 38-year event on the Moshassuck River. Flooding resulting from this storm was also extensive on the West River. Areas adjacent to Charles Street were extensively flooded.[2]

1.1 Past Flood Protection Measures

Subsequent to the floods of 1938 and 1954, a hurricane barrier was constructed at Fox Point where the Providence River empties into Narragansett Bay. This structure is equipped with large gates to prevent the inflow of hurricane tides and pumps to discharge the riverine flows south of the barrier. Appurtenant structures include gates at certain road underpasses, dikes, and the embankment of Interstate 95. These measures effectively eliminate the downtown area from hurricane related flood hazards.

The Moshassuck River along Interstate 95 has improved riprap channel in many areas. Construction of State Route 146 adjacent to the West River has resulted in an improved channel through this area. The resulting channel clearing on the West River near Charles Street aids in flood hazard reduction.

During floods (from storm events having a magnitude greater than 10-year occurrence), the West River overflows its banks in the vicinity of Charles Street and main line Amtrak railroad. This flow is channelized into the railroad right-of-way, where it flows south to below Smith Street. A culvert has been installed just below Smith Street to divert this flow from the tracks to Moshassuck River. The culvert is a drop inlet structure consisting of grating across the tracks which drops into a 19 foot-by-16-foot box culvert. The diverted flow then enters the Moshassuck River. The culvert is designed to act against the 100-year flood on the river. A crib wall on the western side of the tracks diverts flow onto the tracks and into the culvert rather than into the capital area.[3]

1.2 Hurricane Barrier Protection

Since the building of the Fox Point Hurricane Barrier, the city has seen much growth in its downtown area. Major improvements in Kennedy Plaza in 1983 and new plans slated for 1999 have transformed the plaza into a transit mall, a highly successful skating rink and beautiful parks. In addition, the City's banks built major buildings in the period from the 1970's to the present, including the Bank Boston Tower, (formerly Hospital

[2] Flood Insurance Study, Federal Emergency Management Agency, for Providence, March 11, 1985, p. 2.
[3] Ibid. p. 6.

Trust Tower), Fleet Center, and Citizens Plaza. In addition the City and State undertook a major renewal effort in the 1980s to relocate the mainline Amtrak railroad tracks, including a new train station and some 65 acres of new development that became the Capital Center District. In 1999, the newest addition will open; a 1.2 million square foot retail establishment known as the Providence Place Mall, that will have as its anchors the nationally renowned Nordstrom, Lord & Taylor and Filenes department stores.

This plan is intended to address multi-hazards and suggest both short-term and long-term mitigation actions to protect the citizens of Providence. Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to people and their property from the effects of natural hazards, such as wind, fire, floods, hurricanes, earthquakes, and the like.

2.0 Goals and Objectives

It is the goal of this plan to preserve and enhance the quality of life, property and resources for the citizens of Providence by:

a) Identifying areas at risk from natural hazards, and

b) Implementing priority hazard mitigation actions in order to protect the City's built environment, people, historic, cultural, economic and natural resources.

An important benefit of hazard mitigation is that money spent today on preventive measures can significantly reduce the cost of post-disaster cleanup tomorrow. Pre-disaster planning can reduce the cost of disasters because it helps to safeguard areas. By planning ahead, Providence will minimize the economic and social disruption that can result from floods, blizzards, or hurricanes (destruction of property, loss or interruption of jobs, and the loss of businesses).

2.1 Benefits of Completing a Hazard Mitigation Strategy

Municipal officials in Providence assessed the risks to the City and developed mitigation actions that address a mix of structural and non-structural initiatives (e.g., educational programs, preventing construction in high-hazard areas, enforcing regulations) to minimize the effects of future hazards (e.g. building code enforcement, retrofitting existing structures, and removal of vulnerable structures). By creating this strategy, Providence has established an ongoing process that will make hazard mitigation a routine part of municipal government.

Formal adoption and implementation of this hazard mitigation strategy will help Providence gain credit points under the Federal Emergency Management Agency's (FEMA) Community Rating System (CRS) program, which provides discounts on the National Flood Insurance Program (NFIP) flood insurance premiums for residents of communities that voluntarily participate in this program. In that regard, the City intends to become a CRS member. As a result of adopting this Plan, the City will be eligible for credit under the Community Rating System (CRS). Up to 210 points are provided if this plan conforms to the guidelines for a floodplain management plan (FMP). In addition, the adoption of this

mitigation strategy increases Providence's eligibility for federal grants for hazard mitigation which include FEMA's pre-disaster Flood Mitigation Assistance (FMA) program and FEMA's post-disaster Hazard Mitigation Grant Program (HMGP) (See Appendix B). The thought and planning that went into this strategy and its implementation will help protect and safeguard the City in the long run. The preventative measures, if carried out, will also save money because there will be less damage in the future.

2.2 Comprehensive Planning

In 1993, the City Council adopted *Providence 2000, The Comprehensive Plan*, which reflects the overall vision for Providence. The plan outlines goals, policies, issues, and actions to be taken by the community to fulfill that vision. The potential impact of natural hazard events could be integrated into many elements of the plan. The City recognized that inclusion of mitigation initiatives -- both pre-disaster and post-disaster -- would not only benefit the community by reducing human suffering, damages, and the costs of recovery, but it will also help build and maintain the sustainability and economic health of the community over the long run. The implementation actions enhance the ongoing activities within the community and provide a framework for current decisions and for those faced in the future. This will help to insure that the vision identified in the Comprehensive Plan can continue to be realized despite the disaster event and can be used to make appropriate decisions to restore the sense of community lost to a natural disaster.

In 2000, *Providence 2000 - The Comprehensive Plan* will be amended. At that time the Local Hazard Mitigation Committee will request that the City Plan Commission amend Section 4.6.1 "Community Services and Facilities Goals and Policies" to specifically include the recommended mitigation actions described below in this Plan.

The Comprehensive Plan outlines goals, policies, issues, and actions to provide a framework for everyday operations within the city. The City recognized that inclusion of mitigation initiatives, both pre-disaster and post-disaster, would not only benefit the community by reducing human suffering, damages, and the costs of recovery, but would also help build and maintain the sustainability and economic health of the community over the long run. These proposed amendments recognize the impact of natural hazard events and provide guidance on what can be done to protect life, property, natural resources and the economic health of the City throughout various departments within the local government.

Providence must continue in its pro-active economic development efforts in order to achieve substantial new employment. Improved infrastructure is another important requirement for continued economic expansion. (Roadway improvements, sewer and water system improvements and port improvements). About forty percent (40%) of the City is in residential use. Commercial uses are generally located along the major arterial streets in the City as well as in the downtown area. Industrial uses are scattered throughout the City, Allens Avenue, including the Port of Providence.

3.0 Process Description - How To Go About It

3.1 Process

The first step in determining hazards in the City is to identify specific areas at risk from natural hazards (flood, wind, snow, ice, fire and earthquakes). The Local Hazard Mitigation Committee with technical assistance from the University of Rhode Island's Coastal Resources Center/ Rhode Island Sea Grant (URI/CRC) and the Rhode Island Emergency Management Agency (RIEMA), used a Risk Assessment Matrix to identify risks. (See Figure 1 - Risk Assessment Matrix). Mitigation actions were then developed for each major risk area to articulate the community's concerns. After identifying the general areas at risk, facts about population, property and resources at risk were gathered.

Resources consulted include planning, engineering and property data and documents from the Department of Planning & Development, Fire and Police Departments, Public Works Department, Emergency Management Director, City Tax Assessor, the US Army Corps of Engineers, the Federal Emergency Management Agency, and state reports.

3.2 Risk Assessment

This section focuses on assessing the community's risk and vulnerability to natural hazards. It identifies what is at risk, how vulnerable those "at risk" areas are (e.g., structures, population, natural resources) and what the impacts will be (loss of life, environmental damage, inconvenience to residence). The Risk Assessment Matrix summarizes the major risks to Providence. Map 1, Risks in Providence, (attached in the pocket of this report) also depicts the risk areas that are listed on the risk matrix.

Figure 1

City of Providence - Natural Hazard Mitigation Strategy
Risk Matrix
(Listed in Order of Priority)

	RISK/TYPES OF PROJECTS	LOCATION BY ADDRESS OR PLAT & LOT	OWNERSHIP	NATURAL HAZARD	PRIMARY PROBLEM/ EFFECT	MITIGATION BENEFITS	RISK – DAMAGED ISTORICALLY (H) OR POTENTIAL (P)
1	Hurricane Barrier	Fox Point	Public	Possible earthquake damage	Public safety will be compromised; significant flooding of the downtown and adjacent areas. Maintenance of pumps is required	Protection of life and property	P
2	A-V Zone Properties (Includes historic properties)	City wide as shown on flood maps	Public & Private	Flooding & wind damage	Structures not meeting current code requirements	Protection of life & property	H
3	Other Fields Point sites: a) Port of Providence b) Johnson & Wales University c) Other	Fields Point	Private contract with City agency	Flooding, storm surge, and wind	Threat to shipping and port operations, business and properties	Uninterrupted port operations have economic benefits to the City	H
4	Local & Interstate Highway Bridges	see Action Plan	Public	Flooding, storm surge, wind damage, earthquake damage	Loss of access, disruption of evacuation routes	Safe evacuation, if needed	H 1938 and 1954 City was flooded
5	City Hall / Other Public Properties	City Hall - 25 Dorrance Street DPW & Traffic Engineering Allens Ave and Ernest Street	Public	Flooding, ice damage, possible earthquake, storm surge	Water damage to City records, data, land evidence records, vital statistics, computer operation and the like	Protection of essential public services	H

Figure 1

City of Providence - Natural Hazard Mitigation Strategy
Risk Matrix
(Listed in Order of Priority)

	RISK/TYPES OF PROJECTS	LOCATION BY ADDRESS OR PLAT & LOT	OWNERSHIP	NATURAL HAZARD	PRIMARY PROBLEM/ EFFECT	MITIGATION BENEFITS	RISK – DAMAGED ISTORICALLY (H) OR POTENTIAL (P)
6	Tree Trimming and Debris Management Program	City wide	Public & Private	Wind	Flying debris, blockage of roads, disruption of essential services, hazard to people and property; potential loss of life, downing of power lines	Protection of property	H
7	Buildings having archaic structural systems	City-wide: ▪ High Rise (laterally structured) ▪ Low Rise (weight supported) ▪ Public safety buildings	Public & Private	Flooding, storm surge	Hazard to people and property; potential loss of life, disruption of essential public services and financial institutions	Protection of life and property, maintenance of essential commercial activity	P
8	Public Safety Buildings	Neighborhood fire stations, communications building – citywide	Public	Flooding, storm surge	High risk to public safety and law enforcement	Public safety and law enforcement preserved	P
9	Narragansett Bay Commission (NBC) Sewage Treatment Plant	Fields Point	NBC	Flooding, fire, storm surge, earthquake damage to structures and systems	Severe public health hazard resulting from disruption of sewage treatment plant including pollution of upper Narragansett Bay	Protection of public health and decrease risk to interruption of essential services. Uninterrupted power supply.	P

A. Riverine Flooding and Storm Surge

The City's topography and location along three rivers at the head of Narragansett Bay makes it vulnerable to storms and flooding. Floodplain areas are shown on Maps 1 and 2. These areas are subject to riverine flooding and the accumulation of water in depressed areas due to sustained heavy rainfall and/or melting snow.

While the Woonasquatucket and Moshassuck Rivers are prone to flooding, the properties most affected are within the 100-year flood boundary as depicted in the FEMA Floodway and Flood Boundary Maps, dated April 15, 1986 (Community Panel Number 445406 0004). These maps are available to the public at the office of the Department of Planning and Development, 400 Westminster Street, Providence, RI 02903.

The Flood Insurance Rate Maps (FIRM), published by the Federal Emergency Management Agency (FEMA) in 1985, delineate four general flood zones. In 1999, FEMA submitted an updated version of the FIRM maps to the City. Eventually, the 1999 version will replace the 1985 maps. These maps, on file in the office of the Providence Department of Planning and Development include GIS maps that show A- and V-Zones. The Floodplain Management Guidelines (43 FR 6030) establish specific requirements of compliance with Executive Order 11988 by all federal agencies. Before any development may commence, floodplain impacts must be determined.

B. Property at Risk from Flood and Wind Events

Most of the existing structures in the flood zone are older buildings, which have not been brought up to current floodplain standards.

The 100-year flood (also referred to as a base flood) is an event that has a 1% chance of happening in any given year and is the storm event used to determine the flood zones, which have specific zoning and building requirements throughout the city and state. The risk of experiencing a flood of this magnitude increases with the length of time considered.

Due to the City's low mean sea level elevation of +6.20 feet and with an average of the Providence River mean sea level of +3.50 feet, Providence had been vulnerable to extensive flood damage. As noted earlier, the City suffered extensive damage from the hurricanes of 1938 and 1954 when, in each instance, water depths of up to eight feet were experienced in the City's commercial area. Damage from the 1938 hurricane amounted to $16.3 million approximately $225 million in today's dollars. Damage from Hurricane Carol amounted to $25.1 million about $134 million in today's dollars. In July 1961 construction began on the Fox Point Hurricane Barrier and was completed in January 1966 at a cost of $16 million. Since the barrier was completed, it has prevented flood damages estimated at $2.4 million. The Fox Point Hurricane Barrier is located immediately south of the New England Power Company Plant, about 0.2 miles north of Fox Point and one mile south of downtown Providence. The barrier provides protection against tidal flooding from hurricanes and other coastal storms to about 280 acres of downtown Providence. The City of Providence operates and maintains the barrier, which is tested four times a

year and is not likely to fail for mechanical reasons. The protected area includes the commercial and industrial center, transportation facilities, public utilities, and many homes.

The area affected by historical hurricane flooding in Providence, now protected by the hurricane barrier, includes census tracts 37, 36, 31, 8 and 7. These census tracts have a total resident population of 11,109 based on the 1990 census. The total estimated employment in the protected area is estimated at 40,000. Since 1980 over 4.7 million square feet of new construction or major renovation valued at over 592.8 million dollars has been completed or started in the protected area.

Considering that there are only 241 flood insurance policies, (including those outside the floodplain) out of the more than 45,000 properties in the city, measures must be put in place to safeguard local property from flood damage. The reason for the difference in a total of 241 flood insurance policies and only 74 policies in the A and V Zone is because condominiums and apartments are included in the total and there are people who have flood insurance, but don't live in a floodplain.

Flood insurance policy holders in Providence have suffered 65 repetitive losses within 17 properties, the third highest in the State.[4] A repetitive flood loss is significant damage to an insured structure which has sustained a minimum of two events since 1978 that NFIP has paid greater than or equal to $1,000. The repetitive loss areas are marked on the GIS map. These areas include Branch Avenue (most were industrial properties), Charles Street (industrial properties and one residential apartment), Governor Street (commercial property), India Street (industrial property), Melrose Street (industrial property near Roger Williams Park), Manton Avenue and Valley Street.

Providence has a good rate of compliance with flood insurance policies, which makes a disaster less costly. The state floodplain manager is planning a community assistance visit some time this year to confirm the City's compliance. As seen in Table 2, below the Federal Emergency Management Agency estimated that there was over $36 million worth of property in Providence insured by the National Flood Insurance Program as of July 1997.

[4] As of 12/19/98. Per Victor Parmentier, Statewide Planning

Table 2

Summary of National Flood Insurance Program Activity in Providence

Total # Policies	Total Premium	Value of Property Covered	Policies in V-Zone*	Policies in A-Zone*	# Claims since 1978	Value of Claims since 1978	Repetitive Flood Losses
241	$162,002	$36,771,100	2	72	200	$3,620,740	65

* V-zone refers to the Velocity zone, where waves greater than 2.9 feet are feasible during the 100-year flood. A-zones are the other areas within the 100-year flood zone with less than 2.9-foot waves. (FEMA, April 1999).

C. Shelters

Providence has identified several emergency shelters throughout the city. The American Red Cross (ARC) requires 40 square feet of usable space per person in each shelter. Ten shelters have the American Red Cross's agreement to operate the facility as a Mass Care Facility. These are:

1. Roger Williams Middle School,
2. Hope High School,
3. Classical High School,
4. Mount Pleasant High School,
5. Central High School,
6. Nathaniel Green Middle School,
7. Gilbert Stuart Elementary School,
8. George J. West Elementary School,
9. Nathan Bishop Middle School and
10. Oliver Hazard Perry Middle School.

The shelters are free of flood risk and the total shelter capacity is 1,750 persons, which is sufficient for some hurricanes. The ARC recommends at least 10% (about 16,000 persons) be sheltered. To accommodate that population, all city fire stations are available, as well as all public buildings.

D. Wind

In addition to flooding, the City residents and property owners experience damage from high winds. The following pictures from recent storms illustrate how wind can cause broken tree limbs and damage to properties.

Wind Damage from Hurricane Gloria

E. Snow and Ice

Winter storms often spawn other natural hazards, such as extreme winds and coastal flooding which can lead to erosion. One such occurrence was the Blizzard of 1978, when heavy snowfall paralyzed the interstate roads and made movement through the City almost impossible, except for emergency vehicles. The weight of accumulated snow or ice can damage infrastructure and possibly cause buildings to collapse. Heavy accumulation of snow and ice and strong winds can also damage utility and power lines. Flat roofed houses face a more serious structural risk from heavy snow. Ice jam formation depends on weather and physical conditions in river channels. Conditions similar to a flash flood occur when there is a rapid rise of water at the jam and this extends upstream or when usually warm weather follows a heavy snowstorm. Ice jams are most likely to occur where the channel's slope naturally decreases, where culverts freeze solid and at natural channel constrictions such as bends and bridges, and along shallow river reaches where channels may freeze solid. Snow melting has caused road flooding in the low lying areas that were mentioned under the flood risk section. FEMA's experience has shown that no area can fully prepare for severe winter storms. However, recorded snow level (depth) data can give insight to probability and frequency of occurrence of severe winter storms.

F. Earthquakes

Earthquake risk in Providence is considered minimal. Throughout this region, there have been a total of 15 earthquakes since 1928, with one in June 1951 registering 4.6 on the Richter Scale. The City enforces the state building code which has been in existence since 1977 and has standards for new construction and major re-construction of buildings so that they are built to withstand an earthquake that registers a 3.0 on the Richter Scale. In general, buildings that are most at risk from earthquakes are old masonry buildings and large structures that were built on filled land.

Severe Wind Damage

FEMA has recently developed a software package called HAZUS that is used to help assess the risk from earthquakes. Information in this database includes building materials, design levels, economic value, population and bridges. This software allows the user to input a scenario of, for example, a 5.0 on the Richter Scale and the model comes up with what damages can be expected based on the intensity and location inputted. The state is now working on compiling more state-specific datasets for use with this software program that would supplement the generic Northeast states information that is currently used. Without data specific on such things as transportation, utility systems inventory, hazardous materials, demographics, vehicles inventory, building stock and essential facilities, it is impossible to do an accurate risk assessment using this software.

G. Potential Losses to the Local Economy

Since property taxes account for over half of the city's revenues, it is imperative that the community and its residents take precautions to protect their investment. According to the city's Finance Department, the average budget for the city is over $350 million per

year and the local Tax Assessor reports that approximately $134 million comes from real estate taxes.

4.0 Identifying Mitigation Actions

Based on Providence's risks and vulnerability, the city has set goals and measurable objectives in order to mitigate damage from natural disasters. These local goals are specific to the City of Providence and are compatible with state hazard mitigation goals.

The LHMC (Local Hazard Mitigation Committee) has worked to set goals and objectives that are bounded by a time frame and are compatible and consistent with state hazard mitigation goals. The State Hazard Mitigation Committee (SHMC) will review and approve these goals and objectives in order to insure consistency with the statewide goals and objectives. The following time frames indicate initiation of the respective actions:

Short Term = 0-2 years
Medium Term = 2-6 years
Long Term = more then 6 years

For all recommended mitigation actions, the lead department or agency responsible for that action is listed first and is followed by other relevant departments and agencies.

4.1 Mitigation Actions for Vulnerable Areas Identified on Risk Assessment Matrix

After developing a clear picture of the areas at risk and an understanding of what is actually vulnerable to natural hazard events, the City has a number of options to reduce its vulnerability to natural hazard losses. The City first focused on how to strengthen its existing plans, programs and procedures, and incorporate mitigation as part of the ongoing process of city government, in order to avoid duplication of efforts, save time and money, and achieve multiple objectives. Mitigation actions will be incorporated into local plans, such as the Emergency Operations Plan and *Providence 2000 - The Comprehensive Plan* and other pertinent planning and implementation tools.

1) Hurricane Barrier

Goals

- To protect downtown Providence and adjacent vulnerable areas from flooding and storm surges
- To keep the hurricane barrier at a state of readiness for hurricane emergencies

Action

On August 6, 1998, the Department of Public Works submitted a request to the Providence Public Building Authority for several capital and maintenance costs related to the Hurricane Barrier. The City allocated $900,000 towards the improvement of Pumps 2 and 3. Among the routine maintenance items, the following is requested of the US Army Corps of Engineers:

- 5-Year Pump Overhaul (5 pumps)
- Routine Electrical and Mechanical Maintenance
- Cleaning, Painting & Sealing
- Dike Maintenance

Due to the high cost of reconstruction, it will not be financially feasible to earthquake proof the hurricane barrier, nor would the costs be outweighed by the benefits.

Responsible Party - Department of Public Works	*Financing Options* - Bond financing, City Budget, FEMA Hazard Mitigation, 404 Grant & NESEC*
Cost - $900,000	*Timeframe* - Short Term

* Northeast States Emergency Consortium

2) A-V Zone Properties

Goals

- To encourage owners of older buildings within A- and V-zones, who are undertaking rehabilitation activities, to bring such buildings up to current flood plain standards.
- To notify property owners within the A- and V-Zones when they come in for building permits and consider a public outreach program of notification.
- To educate the public on retrofitting homes.
- To apply for the Community Rating System (CRS) to enable property owners to receive a discount on flood insurance premiums.

Action

1. As substantial rehabilitation to existing structures occur, the Department of Inspections and Standards will ensure compliance with flood plain standards.
2. The Department of Inspections and Standards will notify owners of property within A- and V-Zones of the requirements to meet new standards.
3. Methods of retrofitting homes can be accomplished by the non-profit housing corporations in the city.
4. CRS coordinator to be named.

Responsible Party - Inspections and Standards	*Financing Options* - FEMA - Flood Mitigation Assistance Program
Cost - Variable	*Timeframe* - Short Term

3) Fields Point, Port of Providence and Adjacent sites

Goals

- To protect the Port of Providence from floods and storm surges
- To ensure that new development will meet flood-proofing standards
- To mitigate against flooding, storm surges and high wind damage

Action

1. The Port of Providence was sold to a private entity. Improvements will be required to retrofit the facility to resist earthquakes.
2. Johnson & Wales, a private educational institution, has campus facilities on this site. All new structures will be required to meet flood standards.
3. The City is viewing the Fields Point area as a place for expanded development opportunity within the next few years. All new development will have to comply with flood proofing and appropriate elevations to avoid damage from storms and hurricanes.
4. Maintain some open space for flood control as part of any site plan within the area.
5. Perform study of the area with Corps of Engineers (COE) flood grant.

Responsible Party - ProvPort and City	*Financing Options* - FEMA, FMAP, Corps of Engineers (COE) flood grant
Cost - Variable, depending on the COE study	*Timeframe* - Short Term

4) Local & Interstate Highway Bridges

Goals

- To determine the condition of existing bridges, particularly those located in the floodplain.
- To take corrective action to repair and/or replace bridges that are below the standards established by the NBIS (National Bridge Inspection Standards).

Action

1. The following bridges are located in the floodplain. Efforts by City and state agencies will investigate retrofitting bridges. These bridges are at about the same elevation and are vulnerable to flooding. Valley Street Bridge was under water during both the 1938 and 1956 hurricanes.

City #	Location	State #	Sufficiency Rating *	Scour Rating *	Owner
4	Valley St.	051101	93.8	---	City
5	Delaine St.	040201	78.4	Low Risk	City/State
6	Tar Bridge (Manton Ave.)	051031	52.6	Low Risk	City
14	Atwells Ave. (River)	097501	79	Low Risk	City
16	Eagle St.	097201	85.1	Low Risk	City

City #	Location	State #	Sufficiency Rating *	Scour Rating *	Owner
17	Acorn St.	070501	90	Low Risk	City
19	Smith St. (River)	097801	97.6	Critical - Severe	State
26	Hawkins St. (River)	079601	49.1	Critical-Moderate	City
29	Douglas Ave.(Geneva)	097701	48.7	Stable	City
30	Manton Ave. (City line)	007801	22	Critical-Mild	State
31	Mill St. (River)	097901	65.8	Low Risk	City
50	Point St. (River) rebuilt 1998	098001	100	-----	City
51	Park St. (River)	070401	82.6	-----	City
52	Dean St.	077601	58.6	-----	State
53	Pl. Valley Pkwy.	077701	63.2	Low Risk	State
54	Stevens St.	088101	75.6	-----	City
55	Randall St. (River)	097401	48.7	Critical - Severe	City
57	Charles St. (W. River)	097301	98.6	Critical - Severe	City
58	West River St. (River)	088301	84.7	-----	City
59	Branch Ave. (River)	097601	44.9	Low Risk	City
60	Veazie St. (River)	089001	67.0	Critical-Moderate	City
63	Smithfield Ave (River)	093201	81.1	-----	City
65	Exchange St.	087401	99.3	-----	City
66	Steeple St.	086701	97.5	-----	City
67	Washington St.	086801	83.3	-----	City
68	Park Row East	086601	97.3	-----	City
69	Waterplace West (Ped.)	086302		-----	City
70	Waterplace East (Ped.)	087502		-----	City
71	College St.	087001	94.2	-----	City
72	College St. North (Ped.)	086902		-----	City
73	College St. South (Ped.)	087102		-----	City
74	Crawford St. (Bridge)	087001	95.1	-----	City
75	Crawford St. (Ped.)	087302		-----	City
77	Memorial Blvd. (North)	098101	79.2	-----	City
79	Bath St./East (Ped.)	077801	49.3	Stable	City
80	Bath St./West	077901	87.7	Low Risk	City

* Sufficiency Rating is a factor that takes into consideration the condition of the main bridge deck, the substructure and support elements. A rating of 0 is total failure and 100 is considered perfect. The term Scour Rating refers to conditions underwater that may result in loss of material in the bridge's footings and substructure. Any "critical" rating would require attention.[5]

Note that the Manton Avenue Bridge has the lowest sufficiency rating at 22.0. All the other bridges have a rating of 40 or higher. Those below 50 will need immediate attention. Bridges such as Smith Street, Randall Street, and Charles Street have Scour Ratings of "Critical-Severe," while Hawkins Street and Veazie Street are rated "Critical-Moderate." These bridges will need attention in the near future.

[5] Source: RIDOT, Bridge Inspection, 1998. These standards are derived by the NBIS (National Bridge Inspection Standard).

Responsible Party - Department of Public Works and RIDOT, FHWA	*Financing Options* - FHWA and RIDOT
Cost - Variable	*Timeframe* - Short Term

5) City Hall and Other Public Properties

Goals

- Protect vital documents and data at City Hall from water or other damage.

Action

1. For the most part, the City Hall is protected from serious flooding by the Hurricane Barrier. In the unlikely event that the barrier should fail, the City's Department of Public Property must insure that vital documents are stored in upper stories or in flood-proof cabinets.

Responsible Party - Department of Public Property	*Financing Options* - City budget, FEMA, FMAP
Cost - Unknown	*Timeframe* - Short Term

6) Tree Trimming and Debris Management Program

Goals

- To protect lives and property from falling tree limbs.
- To remove dead and deteriorating trees and shrubs before they pose a problem for city residents.
- To prevent collapse of power lines from falling trees and heavy limbs.
- To form a partnership with Narragansett Electric to implement this program.
- To establish a debris management program.

Actions

1. Parks Department to undertake ongoing tree trimming program and debris management program to reduce loose limbs and remove diseased trees.

Responsible Party - Parks Department	*Financing Options* - Electric Company, City Budget
Cost - About $20,000	*Timeframe* - Long Term and On-going

7) Buildings with Archaic Structural Systems

Goals

- Protect such structures from flood, wind and other natural hazards.

Action

1. Like City Hall, Downtown Providence is protected from serious flooding by the Hurricane Barrier. Moreover, most new buildings are earthquake resistant. Some buildings both in and out of downtown would require some retrofitting.
2. Buildings constructed after the end of the second world war would have been designed according to then accepted structural engineering practice, resembling current code requirements, to withstand hurricane force winds. Some pre-war buildings may not have utilized structural engineering criteria resembling current code requirements. Structural analysis should be provided by property owners to determine which buildings are structurally consistent with current code requirements and currently accepted engineering practice.

Responsible Party - Department of Inspections and Standards	*Financing Options* - City budget for public buildings; private funds for privately-owned buildings
Cost - Unknown	*Timeframe* - Short Term

8) Public Safety Buildings

Goals

- To protect existing public safety buildings from natural hazards
- To ensure that new construction meets current code requirements

Action

1. The City of Providence is in the process of building a new public safety headquarters to replace the current building which doesn't meet the needs of today's law enforcement and fire fighting personnel. In addition, neighborhood fire stations are in need of repair.
2. The City's Fire Engine 14 on Atwells Avenue at Valley Street is in the floodplain. Relocation should be considered in the event of an emergency.

Responsible Party - Public Property & Public Safety	*Financing Options* - City; Sale of existing Public Safety Headquarter site for new hotel
Cost - Estimated $12 Million	*Timeframe* - Short term

9) Narragansett Bay Commission Sewage Treatment Plant

Goals

- To protect the City's and State's investment in the regional sewer system.

Action

1. The Narragansett Bay Commission prepared its own emergency operations plan in 1988. The plan is currently under review and will be updated by NBC's consultants.[6] The plan includes emergency procedures resulting from power failure, flood, hurricane, windstorm and earthquake, including fires and explosions resulting from such disasters. (Copies of the plan are available at the NBC office at 2 Ernest Street, Providence, RI 02905 and from the City's Emergency Operations Department).

Responsible Party - NBC	*Financing Options* - NBC
Cost - Unknown	*Timeframe* - Short Term

Industrial and residential flood plain development has occurred extensively throughout Providence. South of Glenbridge Avenue to the Providence River, the Woonasquatucket River flood plain is heavily developed with a mixture of industrial and residential development. North of Glenbridge Avenue, development on the Woonasquatucket River is generally confined to residential housing. The Moshassuck River flood plain is heavily developed with industries and residential land from below the North Burial Ground to the confluence with the Woonasquatucket River. The areas surrounding the West River flood plain and the Upper Canada Pond Brook are generally in residential land use. The portion of the flood plain in Providence affected by the Pocasset River consists generally of industrial development. The coastline along the Providence River is heavily developed with industrial facilities, as is the lower portion of the Seekonk River.

The Woonasquatucket River rises in North Smithfield and enters Providence from the west through the Town of Johnston. Along its course, it passes through many reservoirs and old mill ponds.

The Moshassuck River rises in Lincoln and continues south into Providence where it joins with the Woonasquatucket River to form the Providence River. Adjacent to the North Burial Ground and Interstate 95, the Moshassuck River enters a 0.5 mile long culvert which terminates just north of the confluence of the West River. The West River enters the city form the northwest and is also characterized by several old mill ponds with heavy industrial development. Upper Canada Pond Brook enters Providence in the north from its headwaters in North Providence. The portion of this stream within Providence is

[6] Information supplied by Paul A. Desrosiers, Assistant Treatment Manager for the Narragansett Bay Commission (October 22, 1998)

dominated by Upper Canada Pond. The Pocasset River flows from Johnston through the southwestern corner of Providence at the Johnston-Cranston corporate limits.

Providence Harbor and the Providence River form the northern end of Narragansett Bay, ending at the Fox Point Hurricane Barrier. The Seekonk River branches from the Providence River and is tidally affected throughout its length in Providence.

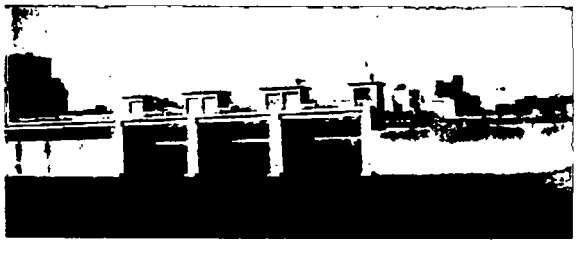
4.2 Capability Assessment

The community has initiated many studies and activities over the years that have laid the foundation for the development of its mitigation strategy. The city implements and enforces the state building code, and participates in the National Flood Insurance Program, as do all of the communities in Rhode Island. The city's Emergency Operation Plan for Hazard Mitigation recommended pre- and post-disaster strategies and measures to reduce loss of life and destruction of property. A variety of hazard mitigation strategies were developed following a Federal Disaster Declaration for Hurricane Gloria in 1986.

In 1993 the City Council adopted *Providence 2000, The Comprehensive Plan*, which reflects the overall vision for Providence. The plan outlines goals, policies, issues, and actions to be taken by the community to fulfill that vision. It was determined that the potential impact of natural hazard events could be integrated into many elements of the plan, which would help carry out and implement the suggested mitigation actions in this plan. The city recognized that inclusion of mitigation initiatives – both pre-disaster and post-disaster – would not only benefit the community by reducing human suffering, damages, and the costs of recovery, but it will also help build and maintain the sustainability and economic health of the community over the long run.

The implementation actions enhance the ongoing activities within the community and provide a framework for current decisions and for those faced in the future. A hazard mitigation component, identifying both pre-disaster and post-disaster actions, should be an extension of the Comprehensive Plan. This will help to insure that the vision identified in the Comprehensive Plan can continue to be realized despite the disaster event and can be used to make appropriate decisions to restore the sense of community lost to a natural disaster.

A. The Fox Point Hurricane Barrier - A Major Mitigation Action



The barrier itself is a 700-foot-long concrete structure, 25 feet high, that extends westerly across the Providence River from Tockwotton Street, near Fox Point to Globe Street, near the power plant. The facility's five pumps are capable of pumping 3,150,000 gallons of water per minute. The structure contains three transfer gate openings that, when closed, prevent the entry of floor waters from the bay. It permits the passage of small vessels when open. Each gate is 40 feet high and 40 feet wide. Two 10 to 15 foot high earthfill dikes, each with stone

slope protection, flank each side of the barrier. The eastern dike is 780 feet long and the western dike is 1,400 feet long.

A pumping station and cooling water canal are integral parts of the project. During a tidal/flood situation, the pumping station's five large pumps can discharge the floodwaters of the Providence River through the barrier into the bay. Two gated openings in the pumping station, each 10 feet high and 15 feet wide, admit water into the cooling water canal used by the New England Power Company located immediately behind the barrier. There are three vehicular gates, located at Allens Avenue, South Main Street, and the New England Power Company and five sewer gates that prevent high tides from backing up through the sewer lines. (See map). With continued funding for pending maintenance projects, the Barrier will continue to hold its ground as it provides safety against flood for the City of Providence.

5.0 Emergency Operations Plan

The city revised its Emergency Operations Plan in 1997. The plan addresses the response to extraordinary emergency situations associated with natural disasters. Developed in conjunction with the Rhode Island Emergency Management Agency, the plan predetermines, to the maximum extent possible, actions taken by the community to prevent or minimize disasters.

The plan primarily addresses response and recovery operations associated with catastrophic incidents. The state is actively working with communities to incorporate into their plans an Annex K - Municipal Administration Plan for Hazard Mitigation. At this time, the focus of this annex is the administration of hazard mitigation grants which may be awarded subsequent to a federal Declared Disaster.

Once the city's Multi-Hazard Mitigation Strategy is completed, the city should incorporate specific actions and initiatives to the Annex K within the Emergency Operations Plan. This will help insure that activities during the response and recovery phase of the natural disaster will address mitigation, thereby reducing potential losses in the future. At a minimum, the city should develop a list of Funding Priorities for incorporation into the plan, as a reference of ideas for potential mitigation grants. If the city chooses to develop a post-disaster redevelopment plan, the plan should be consistent with the Emergency Operations Plan (and the Local Comprehensive Plan), so that actions taken in short-term recovery are compatible and compliment the long-term vision of the community.

5.1 Strategy Adoption

The City of Providence Emergency Management Plan and Hazard Mitigation Strategy was approved for adoption by the LHMC on April 6, 1999. The next step is to gain the approval of the State Hazard Mitigation Committee (SHMC), the executive director of the Rhode Island Emergency Management Agency (RIEMA) and the Federal Emergency Management Agency Region I. The members of the LHMC, along with the City Plan Commission, will recommend that these actions become amendments to *Providence 2000*

- *The Comprehensive Plan.* These actions will need City Council approval as amendments to the Comprehensive Plan.

Appendix A

Proposal to amend *Providence 2000 - The Comprehensive Plan*

Plan Amendment

4.6.1 COMMUNITY SERVICES AND FACILITIES GOALS AND POLICIES

Add a new CS11
Emergency Management/Hazard Mitigation

The general scope of City-provided services and facilities includes Public Safety, Fire, Ambulance Rescue, Police, Emergency Management (pre-and post-disaster), and Animal Control.

The function of Emergency Management for the City of Providence is shared among a number of City departments and state counterparts that are involved in hazard mitigation and emergency relief and response. Depending on the nature and severity of the emergency, staff from public works, police, fire and engineering will act in accordance with the City's Emergency Management Operations Plan, revised in September, 1997. Copies of the Plan are available in the Providence Emergency Management Agency, 200 Chad Brown Street, Providence; the Department of Public Works, Providence Police Department, and Department of Inspections and Standards.

This plan establishes the Mayor as the director for Emergency Response and the main point of contact for all emergency management issues. Headquarters are located at City Hall, 25 Dorrance Street, Providence, RI. The back-up site if the City Hall is not available, is the Providence Emergency Management Agency, 200 Chad Brown Street, Providence.

Due to the unpredictability and many potential sources of man-made disasters, Providence's principal focus is concentrated on responses to the threat of natural disasters, such as floods, hurricanes, northeasters, and blizzards. In addition, the City, in accordance with title III Emergency Planning and Right to Know (Public Law 99-499) has emergency plans for each City facility. The Providence Fire Department has a hazardous materials response plan in effect, and the Narragansett Bay Commission has emergency rules and procedures relating to wastewater and sewage treatment plant protection. All plans are up-dated and kept on file with the appropriate partner agencies, Rhode Island Emergency Management Agency (RIEMA), Rhode Island Department of Labor, and the Rhode Island League of Cities and City Inter-Local Risk Management Trust.

Natural Hazard Mitigation

The Rhode Island Emergency Management Agency and The University of Rhode Island's Coastal Resources Center/Rhode Island Sea Grant assisted the

City in developing a specific Natural Hazard Mitigation Strategy. Mitigation planning combines technical analysis and community participation to make wise choices among alternative strategies to achieve long-term sustainability. This strategy will provide the framework for the City to conduct pro-active planning and education to prevent damage to property, life, and resources, and to preserve and enhance the quality of life, property and resources for residents and visitors of Providence by the following:

- Incorporating hazard mitigation into project review,
- Developing and implementing public outreach and incentive programs, and
- Determining post-disaster mitigation opportunities

Natural hazards that affect Providence are floods, severe winds and snow/ice. The mitigation strategy assesses what is at risk and recommends detailed mitigation actions, please refer to the local hazard mitigation strategy that is updated yearly.

GOAL

To conduct pro-active planning and education to prevent damage to property, life, and resources and to preserve and enhance the quality of life, property, and resources for residents and visitors of Providence by identifying and promoting educational opportunities to introduce residents and visitors to various appropriate hazard mitigation management strategies; and implementing a variety of technical and/or educational mechanisms for effective resource management programs, and to implement priority hazard mitigation programs in order to protect Providence's cultural, historical, structural and natural environment, and to protect the individuals residing in Providence.

POLICIES

A. The City must do its utmost to secure public safety and prevent loss of property and life in the event of a natural or man-made emergency.

B. Provide for well-planned and effective emergency response through coordination with the Rhode Island Emergency Management Agency, Federal Emergency Agency (FEMA), and adjacent cities, in developing an Emergency Operating Plan.

C. Continued participation in the FEMA National Flood Insurance Program Community Rating System (CRS).

D. Continued improvement of special emergency response plans for City facilities.

E. Maintaining and up-dating Hazardous Materials Response Plans and associated training.

F. Improvement of the City's radios communications system and utility telemetry system.

Appendix B - Technical and Financial Assistance for Mitigation

State Resources

Rhode Island Emergency Management Agency
645 New London Avenue
Cranston, RI 02920
Phone: (401) 946-9996

Coastal Resources Center
University of Rhode Island
Narragansett Bay Campus
Narragansett, RI 02882
Phone: (401) 874-6224

Coastal Resources Management Council
Stedman Government Center
4808 Tower Hill Road
Wakefield, RI 02879
Phone: (401) 222-2476

Rhode Island Geological Survey
8 Ranger Road, Suite 2
University of Rhode Island
Kingstown, RI 02881
Phone: (401) 874-2265

Department of Administration/Division of Planning
One Capitol Hill
Providence, RI 02908
Phone: (401) 222-6478

State of Rhode Island Building Committee Office
Building Commissioneris Office
One Capitol Hill
Providence, RI 02903
Phone: (401)222-3529

Rhode Island Builders Association
The Terry Lane Corporation
Terry Lane
Gloucester, RI 02814
Phone: (401) 568-8006

Department of Transportation-Design Section/Bridges
2 Capitol Hill, Room 231D
Providence, RI 02903
Phone: (401) 222-2053

Rhode Island Department of Business Regulations
233 Richmond Street
Providence, RI 02903
Phone: (401) 222-2246

State Fire Marshal's Office
24 Conway Avenue
North Kingstown, RI 02852
Phone: (401) 222-2335

Rhode Island Banking Commission/Associate Director
233 Richmond Street
Providence, RI 02903
Phone: (401) 222-2405

Public Utilities Commission
100 Orange Street
Providence, RI 02903
Phone: (401) 277-3500 Ext. 153

Department of Environmental Management
Division of Parks and Recreation
2321 Hartford Avenue
Johnston, RI 02919
Phone: (401) 222-2635

Federal Resources

Federal Emergency Management Agency
Mitigation Division
Region I Office
J.W. McCormack POCH, Room 462
Boston, MA 02109
(617) 223-9561

U.S. Army Corps of Engineers
New England District
424 Trapelo Road
Waltham, MA 02254
(617) 647-8505

Department of Agriculture
Natural Resources Conservation Service
(formerly Soil Conservation Service)
451 West Street
Amherst, MA 01002
(413) 253-4362

Department of Commerce
National Weather Service
Forecast Office
445 Myles Standish Boulevard
Taunton, MA 02780
(508) 823-2262

Economic Development Administration
143 North Main Street, Suite 209
Concord, NH 03301
(603) 225-1624

Department of the Interior
National Park Service
Rivers and Trails Conservation Program
Regional Office
15 State Street
Boston, MA 02109
(617) 223-5203

U.S. Fish and Wildlife Service
New England Field Office
22 Bridge Street, Unit #1
Concord, NH 03301-4986

Department of Housing and Urban Development
Community Development Block Grants
Region I - O'Neill Federal Building
10 Causeway Street
Boston, MA 02222
(617) 565-5354

Small Business Administration
360 Rainbow Boulevard South, 3rd Floor
Niagara Falls, NY 14303
(716) 282-4612 or (800) 659-2955

Environmental Protection Agency
Region I - JFK Federal Building
Government Center
Boston, MA 02203
(617) 565 3400

Other Resources

The Association of State Floodplain Managers (ASFM)
Professional association with a membership of almost 1,000 state employees that assist communities with the NFIP. ASFPM has developed a series of technical and topical research papers and a series of proceedings from their annual conferences. Many mitigation "success stories" have been documented through these resources and provide a good starting point for planning.

Floodplain Management Resources Center
Free library and referral service of the ASFPM for floodplain management publications. Co-located with the Natural Hazards Center at the University of Colorado in Boulder, staff can use keywords to identify useful publications from the more than 900 flood-related documents in the library.

Institute for Business and Home Safety (IBHS)
(formally Insurance Institute for Property Loss Reduction)
An insurance industry-sponsored, nonprofit organization dedicated to reducing losses—deaths, injuries, and property damage—resulting from natural hazards. IBHS efforts are directed at five specific hazards: flood, windstorm, hail, earthquake, and wildfire. Through its public education efforts and information center, IBHS communicates the results of its research and statistical gathering, as well as mitigation information, to a broad audience.

Volunteer Organizations
Organizations, such as the American Red Cross, the Salvation Army, Habitat for Humanity, Interfaith, and the Mennonite Disaster Service, are often available to help after disasters. Service organizations, such as the Lions, Elks, and VFW are also available. These organizations have helped others with food, shelter, clothing, money, etc. Habitat for Humanity and the Mennonite Disaster Service provide skilled labor to help rebuild damaged buildings incorporating mitigation or floodproofing concepts. The offices of individual organizations can be contacted directly, or the FEMA Regional Office may be able to assist.

Flood Relief Funds
After a disaster, local businesses, residents, and out-of-town groups often donate money to local relief funds. They may be managed by the local government, one or more local churches, or an ad hoc committee. No government disaster declaration is needed. Local officials should recommend that the funds be held until an applicant exhausts all sources of public disaster assistance. Doing so allows the funds to be used for mitigation and other projects that cannot be funded elsewhere.

New England States Emergency Consortium (NESEC)
Lakeside Office Park
NESEC conducts public awareness and education programs on natural disaster and emergency management activities throughout New England. Brochures and videotapes are available on such topics as earthquake preparedness, mitigation, and hurricane safety tips. NE-

SEC maintains a WWW homepage that is accessible at http://www.serve.com/NESEC.

The New England Floodplain and Stormwater Managers Association (NEFSMA)
Professional organization for New England floodplain and stormwater managers. Provides workshops, conferences, and a newsletter to membership and interested individuals and companies. Contact: Nicholas Winter, chairman, at (617) 727-0488 or NEFSMA's homepage on the Web at http://www.seacoast.com/~nefsma.

APPENDIX C: FINANCING OPTIONS

FEDERAL EMERGENCY MANAGEMENT AGENCY

National Flood Insurance Program (NFIP)

All of Rhode Island's 39 municipalities participate in the NFIP. Flood insurance is made available to residents in exchange for community compliance with minimum floodplain management regulations. Communities participating in the NFIP must:

- Adopt the Flood Insurance Rate Maps as an overlay regulatory district
- Require that all new construction or substantial improvement to existing structures in the flood hazard area be elevated or (if nonresidential) floodproofed to the identified flood level on the maps
- Require design techniques to minimize flood damage for structures being built in high hazard areas.

Coverage for land subsidence, sewer backup and water seepage is also available subject to the conditions outlined in the NFIP standard policy. Since homeowners' insurance does not cover flooding, a community's participation in the NFIP is vital to protecting property in the floodplain as well as being essential to ensure that federally backed mortgages and loans can be used to finance floodprone property.

If a community participating in NFIP's Community Rating System (CRS) program performs activities that include maintaining records for floodplain development, publicizing the flood hazard, improving flood data and floodplain management planning, then the flood insurance premiums paid by policy holders in the community will be reduced by 5 to 45 percent. Developing a flood mitigation plan or a multi-hazard mitigation plan will help communities gain additional credit under the CRS.

For further information contact the State of Rhode Island Flood Plain Manager (401) 222-6478 or FEMA Region I (617) 223-9561.

Flood Mitigation Assistance Program (FMAP)

Two programs that have been authorized under the National Flood Insurance Reform Act of 1994 include the Flood Mitigation Assistance (FMA) program and a provision for increased cost of compliance (ICC) coverage. FMA makes grants available on a pre-disaster basis for flood mitigation planning and activities, including acquisition, relocation and retrofitting of structures. FMA grants for mitigation projects will be available only to those communities with approved hazard mitigation plans. ICC coverage has recently been implemented for all new NFIP policies and renewals and is

intended to be "mitigation insurance" to allow homeowners whose structures have been repeatedly or substantially damaged to cover the cost of elevation and design requirements for rebuilding with their flood insurance claim up to a maximum of $15,000. Each state has the discretion to award funds to communities or to state government agencies. The program may fund up to 75 percent of the total cost of the proposed project, with a minimum of 25 percent of the cost coming from the community. A minimum of half the community share must be cash or "hard match." There are limits on the frequency of grants and the amount of funding that can be allocated to a state or community in any 5-year period.

The Rhode Island Emergency Management Agency (RIEMA) receives about $110,000 to award as grants from the Federal Emergency Management Agency (FEMA) every April plus $12,000 for planning and $12,600 for technical assistance. In order to be eligible for these grants, communities must have a flood mitigation plan or a multi-hazard mitigation strategy. Communities that are suspended or on probation from NFIP are not eligible. In 1998, Charlestown, RI received over $108,000 to help implement the mitigation activities as indicated in the proposed Comprehensive Plan amendments. In 1999, Pawtucket, RI received $100,000 to floodproof city hall, which is located along the Blackstone River (the lowest elevation in the city).

For further information contact the State of Rhode Hazard Mitigation Officer (401) 946-9996 or FEMA Region I (617) 223-9540.

Hazard Mitigation Grant Program (HMGP):

Also known as the 404 Program or HMGP, this program is available only after a federally declared disaster occurs, so the amount available varies with each disaster. It represents an additional 15 percent of all the infrastructure and individual assistance funds that are provided to states to repair damages and recover from losses, and is administered by the state in partnership with FEMA. Having a plan or completed mitigation action matrix prior to a disaster event is extremely helpful in meeting the state's deadlines for applications and ensuring the project is eligible and technically feasible. It provides 75/25 matching grants on a competitive basis to state, local and tribal governments, as well as certain nonprofit organizations that can be matched by either cash or in-kind services. The grants are specifically directed toward reducing future hazard losses and can be used for projects protecting property and resources against the damaging effects of floods, earthquakes, wind, and other hazards. Specific activities encouraged under the HMGP include acquiring damaged structures and turning the land over to the community for open space or recreational use, relocating damaged or damage-prone structures out of the hazard area and retrofitting properties to resist the damaging effects of disasters. Retrofitting can include wet- or dry-floodproofing, elevation of the structure above flood level, elevation of utilities or proper anchoring of the structure.

For further information contact the State of Rhode Island Hazard Mitigation Officer (401) 946-9996 or FEMA Region I (617) 223-9540.

Project Impact

This is a new initiative of FEMA's which is to help create "disaster resistant" communities. RIEMA and the State Hazard Mitigation Committee select and nominate municipalities that are either high-risk or have demonstrated pro-active efforts to help safeguard their community. The city of Warwick was nominated as Rhode Island's first Project Impact city and it will serve as a model to other municipalities. In 1999, Warwick received $300,000 for implementation of preventative measures, which will be taken to help safeguard the city. FEMA expects Congress to approve this funding each year.

For further information contact the RIEMA's Project Impact Program Coordinator (401) 946-9996 or FEMA Region I (617) 223-4175.

NATIONAL WEATHER SERVICE (NWS)

The Taunton, Massachusetts NWS office has developed a partnership with RIEMA and donates staff time and tide gauges to help RIEMA gain more lead time before a storm hits.

For further information contact NWS (508) 823-2262.

AMERICAN RED CROSS (ARC)

The American Red Cross chapter of Rhode Island has supplied public education materials and they have also volunteered to conduct training programs and hold seminars.

For further information contact ARC (401) 831-7700.

U.S. ARMY CORPS OF ENGINEERS

Beneficial Uses of Dredged Material - Section 204, Water Resources Development Act of 1992, as amended, authorizes projects for the protection, restoration, and creation of aquatic and ecologically related habitats, including wetlands, in connection with dredging an authorized federal navigation project. Non-federal sponsors are responsible for 25 percent of the project cost and 100 percent of the cost of operation, maintenance, replacement and rehabilitation. There is an annual appropriations limit of $15 million. For projects with an estimated federal cost of less than $5 million, divisions have approval authority.

1948 Flood Control Act, as amended – Section 205 (Small Flood Damage Reduction Projects) aids in the development and construction of small flood damage reduction projects for eligible non-federal sponsors. The *1960 Flood Control Act, as amended* provides 100 percent funding for technical and planning guidance to state and local governments and federally recognized Native American tribes to help develop and interpret flood and floodplain data such as flood hazard mapping, and for assessment for structural and non-structural flood damage reduction measures.

Under *Flood Control Act of 1946 – Section 14, as amended* projects are eligible for construction only after an analysis demonstrates the engineering and environmental feasibility and economic justification of the improvement. The local sponsor must be a municipality or public agency. Funding may also be available for flood damage reduction measures if the community writes a request letter to the U.S. Army Corps of Engineers. The non-federal cost share is 35 percent of the analysis and implementation and the initial $40,000 of the analysis is 100 percent federally funded.

The 1974 Water Resources Development Act, as amended – Section 22 (Planning Assistance to States Program) provides technical assistance for flood control and erosion projects, for example. This program uses cost-shared studies with a non-federal sponsor. The non-federal share of the cost is 50 percent and in-kind services are not authorized. Federal limits for each state is $500,000 annually.

For further information, contact US ACE (978) 318-8087 or (978) 318-8647.

Website at http://www.usace.army.mil.

STATE OF RHODE ISLAND

The State Capital budget is approved on a 5-year basis and is proposed by the governor. If there is any surplus available in the emergency fund, this could be a possible source of financing for mitigation projects.

RI Department of Environmental Management
In the 1980s, four major open space bond issues were approved that resulted in an investment of more than $100 million for recreational and open space land acquisition. Each application is reviewed by a committee to assure consistency with local plans and habitat values. The state participates in funding either through a matching grant or a revolving loan. For state-owned recreational areas, improvements could be made by coordinating with ongoing Rhode Island Department of Environmental Management (RI DEM) efforts on various projects. Funds may be available through the RI DEM Parks and Recreation Division for tree trimming, dune restoration and bulkhead repair. In addition, the state has several funding programs (amount varies for each program) for the acquisition of land or purchase of development rights to protect open spaces. For instance, two Rhode Island municipalities use a real estate transfer tax for land preservation. Rhode Island has several incorporated land trusts who work to preserve

land and natural resources. Land owners can participate in the Farm, Forest and Open Space Program. Under this program, land may qualify for a reduced property tax assessment if it meets specific criteria as farmland, forest lands or open space.

For current funding availability contact the Open Space and Recreational Bond Fund Land Acquisition Program or RI DEM (401) 222-2776.

RI Department of Transportation

The State Planning Council designates which enhancement projects from the Transportation Improvements Plan the state will work on. Applications for the Federal Wooden Bridge Replacement Program can be made through RI DOT. RI DOT has a debris management program that activates during a storm event.

For further information contact RI DOT (401) 277-2481.

North East States Emergency Consortium (NESEC)

Since 1998, RIEMA has been given funds for preventive measures and maintenance. Providence and Woonsocket both received $5,000 grants from NESEC for mitigation activities that were addressed in their local hazard mitigation strategies.

For further information contact NESEC (781) 224-9876.