

# Community Flood Study Town of Windsor, Vermont

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Final Draft May 9, 2014

This report was developed in 2014 for the Town of Windsor assistance from the Southern Windsor County Regional Planning Commission, Ascutney, VT.

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# 1 INTRODUCTION

## 1.1 Purpose

This Community Flood Study for the Town of Windsor is intended to identify flood and erosion hazard areas, clarify the local flood permit process, and help to implement Town Plan recommendations by explaining complex flood rules for residents.

In 2007, the updated FEMA special flood hazard area maps became effective as regulated under the *Town of Windsor Zoning Regulations*. The new maps significantly extended the regulatory floodway and floodway fringe areas in Windsor, most notably within the downtown area. This greatly impacted the previously established "Rails-to-Riverfront" redevelopment district.

Currently there are 245 buildings within the special flood hazard area in Town, 73 of those buildings are located within the regulatory floodway. Seventeen percent (17%) of all structures in Windsor are located within the special flood hazard area – this is the highest proportion of all Vermont towns. Furthermore, Windsor has the second highest number of structures within the floodway – second only to Barre City. This complicates re-vitalization and in-fill development efforts. Applicants and town officials alike are not always clear which buildings are within these flood zones or, as a result, what standards apply. Applications for improvements to these existing buildings are very common, but many residents remain unclear about the flood prevention standards currently in effect. This study seeks to clarify these questions and provide a concise document to summarize this situation and guide re-development efforts. This study process will also involve outreach to help educate town officials and residents.

## 1.2 Document Organization

Requirements of flood hazard regulations and the National Flood Insurance Program are complex. This study attempts to provide guidance on these issues in a very concise document. Throughout this document are references to relevant parts of the local zoning standards or links to other resources that provide detailed guidance. This study is not comprehensive nor does it fully address all requirements of Windsor's flood hazard regulations. Please contact Windsor's Zoning Office for copies of the pertinent regulations, application forms, and personalized guidance for a project.

The main body of this document is intended for the general public. In addition to this introductory section, it includes the following sections:

1. **Introduction** – This section describes the purpose and organization of this document.
2. **Inventory of Hazard Zones** – Hazard areas are identified and explained, including floodway, floodplain and other considerations. Appendix A1 includes maps and Appendix A2 includes a matrix of effected properties, both of which correspond to this inventory;
3. **How Existing Flood Regulations May Impact Affected Properties** – Aspects of the Flood Hazard Regulations are explained in order to help property owners understand what development activities are possible and what permits are required.
4. **Resources** – This section lists applicable rules and regulations, technical references that help guide the

LAND DEVELOPMENT: the division of a parcel into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or other structure, or of any mining, excavation or landfill, and any change in the use of any building or other structure or land, or extension of use of land." [§4303]

implementation of these regulations, and financial opportunities.

5. **Appendices** – The Appendices contain more detailed information, including Appendices A1 and A2 discussed above. Appendix A3 includes additional information primarily intended for town officials that involve related sections of the Town Plan, local All-Hazard Mitigation Plan, and existing regulations.

### 1.3 Rules and Regulations

Vermont is a “Dillon’s Rule” state, which means that municipalities only have the authority granted to it by the state government. Local land use regulations are subject to Title 24 of the Vermont Statutes Annotated (notably [Chapter 59](#) regarding ordinances and [Chapter 117](#) regarding land use regulations) as well as Windsor’s Municipal Charter under Title 24 Appendix [Chapter 157](#). Generally speaking all “land development” in Windsor requires a permit under the zoning or subdivision bylaws, as most recently adopted.

A local flood permit is required for **all development**, including interior and exterior construction, reconstruction, renovation, conversion or structural alteration for all buildings and lots located within these Special Flood Hazard Areas.

Windsor’s Flood Hazard Overlay District (see Table 2.10 and Section 5.6 of the 2007 *Zoning Regulations of the Town of Windsor, VT* or as most recently amended) requires a flood permit for **all development** located within the regulatory floodway and floodplain as depicted as “Special Flood Hazard Areas” per the most current flood insurance studies and maps published by the Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA), and National Flood Insurance Program (NFIP), as provided by the Secretary of the Agency of Natural Resources pursuant to 10 V.S.A. §753. (See FEMA’s [Map Service Center](#) for the current maps.)

Buildings and lots located within these Special Flood Hazard Areas require a flood permit for all development, including interior and exterior construction, reconstruction, renovation, conversion or structural alteration. Locations outside of the Special Flood Hazard Areas do not need a local permit for interior renovations or exterior maintenance of a building. However, State building codes also apply to non-residential structures. In addition, such projects may require additional local or state permits. The best course of action is to call Windsor’s Zoning Administrator and the State Permit Specialist who will advise if permits are required (see the contact information below).

<b>Town of Windsor Zoning Office</b> (802) 674-1018 <a href="mailto:zoning@windsorvt.org">zoning@windsorvt.org</a>	<b>State Permit Specialist</b> Dept. of Environmental Conservation (802) 885-8850 <a href="mailto:jackie.carr@state.vt.us">jackie.carr@state.vt.us</a>
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The purpose of Windsor’s Flood Hazard Overlay District is to promote public health, safety and welfare by:

- a) Minimizing and preventing the loss of life and property, the disruption of commerce, the impairment of the tax base, and the extraordinary public expenditures and demands on public services that result from flooding and other flood related hazards;
- b) Ensuring that the design and construction of development in flood and other hazard areas are accomplished in a manner that minimizes or eliminates the potential for flood and loss or damage to life and property;
- c) Managing all flood hazard areas designated pursuant to 10 V.S.A. § 753; and
- d) Making the state, municipalities, and individuals eligible for federal flood insurance and other federal disaster recovery and hazard mitigation funds as may be available.

Since Windsor has adopted these flood regulations and is enrolled in the National Flood Insurance Program, all residents are eligible for flood insurance, whether located within or outside of the Special Flood Hazard Areas. In order to meet statutory requirements and to maintain eligibility for flood insurance, Windsor must administer these flood regulations adequately and fairly.

See Section 3 for more information about how these regulations will impact your property.

## 2 INVENTORY OF HAZARD ZONES

As noted above, Windsor’s Flood Hazard Overlay District regulates the flood hazard areas as determined by FEMA (see the discussion of the Special Flood Hazard Areas on page 2). This does not mean that properties located outside of these FEMA-mapped areas will never experience flood damage. Flooding can happen in many different locations, such as along the shore of a pond, shore areas adjacent to streams and brooks, other low-lying areas, and locations with poorly draining soils.

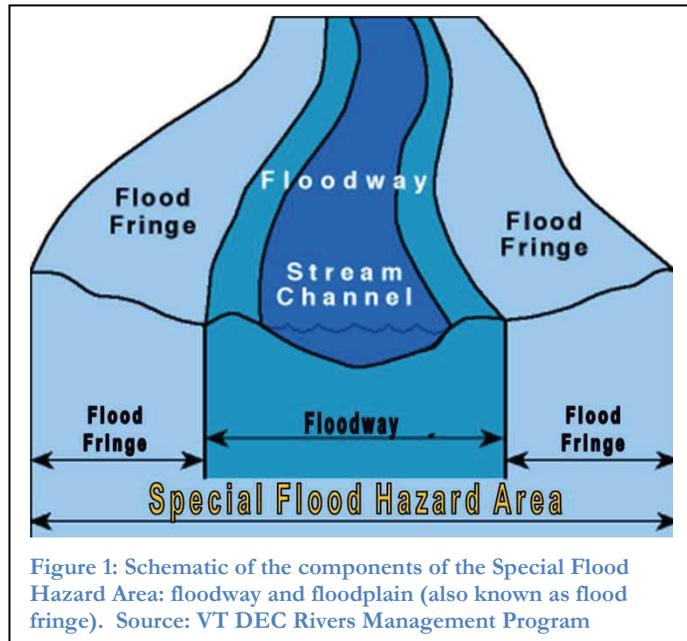
Special Flood Hazard Areas represent areas mapped by FEMA that have a 1% chance each year to be under water. It is often referred to as the “100-year floodplain”. However, that term gives people the wrong idea. Such a flood does *not* happen only every 100 years.

Much of the local damage resulting from the flooding events of 2011 and 2013 were outside of these Special Flood Hazard Areas. These damages involved flash flooding or stream erosion. At present, areas at risk of this type of damage are not mapped.

### 2.1 Regulatory Floodway

Windsor’s flood regulations have stricter standards for development within the floodway. Mapped floodway areas in Windsor are generally located in the large agricultural fields along the Connecticut River, the Jarvis Street area and a portion of the Bridge Street neighborhood. There are also floodway areas along the Mill Brook roughly from Sunset Lane to where it meets the Connecticut River. (See Appendix A1)

The official definition of a floodway is indicated in the sidebar. In general, the floodway is the where the river or stream carries the deeper, faster moving water during a flood event (see the Special Flood Hazard Area schematic above). Floodways are areas where new fill or other development is likely to divert



#### Definitions

**SPECIAL FLOOD HAZARD AREAS (SFHA):** Land in the floodplain within a community subject to a 1 percent or greater chance of flooding in any given year.

**CHANNEL:** Area that contains continuously or periodic flowing water that is confined by banks and a streambed.

**FLOODWAY:** Channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot at any point.

**FLOODWAY FRINGE:** The remaining portion of special flood hazard areas after exclusion of the floodway (i.e. floodplain).

**ZONE A:** Portions of the SFHAs where no Base Flood Elevations (BFEs) or flood depths are shown because detailed hydraulic analyses have not been performed.

**ZONE AE:** Portions of the SFHAs where Base Flood Elevations (BFEs) are shown.

**ZONE X:** Areas of 2 percent annual chance of flood (i.e. often called the 500-year floodplain). This area is not regulated by Windsor’s current flood regulations.

**BASE FLOOD ELEVATION (BFE):** The height of the base flood (1% annual chance) usually measured in feet of elevation.

flow and contribute to increased water depths elsewhere during a flood. Floodways may also be subject to high velocities, which can cause severe damage to structures and high risks for occupants and emergency responders. Ideally, floodways should be maintained as undeveloped areas that can accommodate flood flows, thereby minimizing flood risks. Any new development in the floodway impacts other properties up- or down-stream of them. Therefore, any new development or building expansion generally requires an engineering analysis of the impact on flood hazards. (*Floodplain Facts #12*, Southern Tier Central Regional Planning and Development Board)

## 2.2 Floodway Fringe (i.e. Floodplain)

In Windsor, the floodway fringe has two sub-categories: Zone A and Zone AE. The AE zone refers to the area where FEMA has determined the elevation of the “base flood”. Windsor’s regulations require all applicable construction to be raised one-foot above the base flood elevation. The A zone includes all other portions of the floodway fringe, but the base flood elevation is unknown.

The AE zone is generally located along the Connecticut River, around the Lake Runnemedede area, and encompasses a significant portion of downtown Windsor. The AE zone is also located along the Mill Brook, notably covering the school recreational fields.

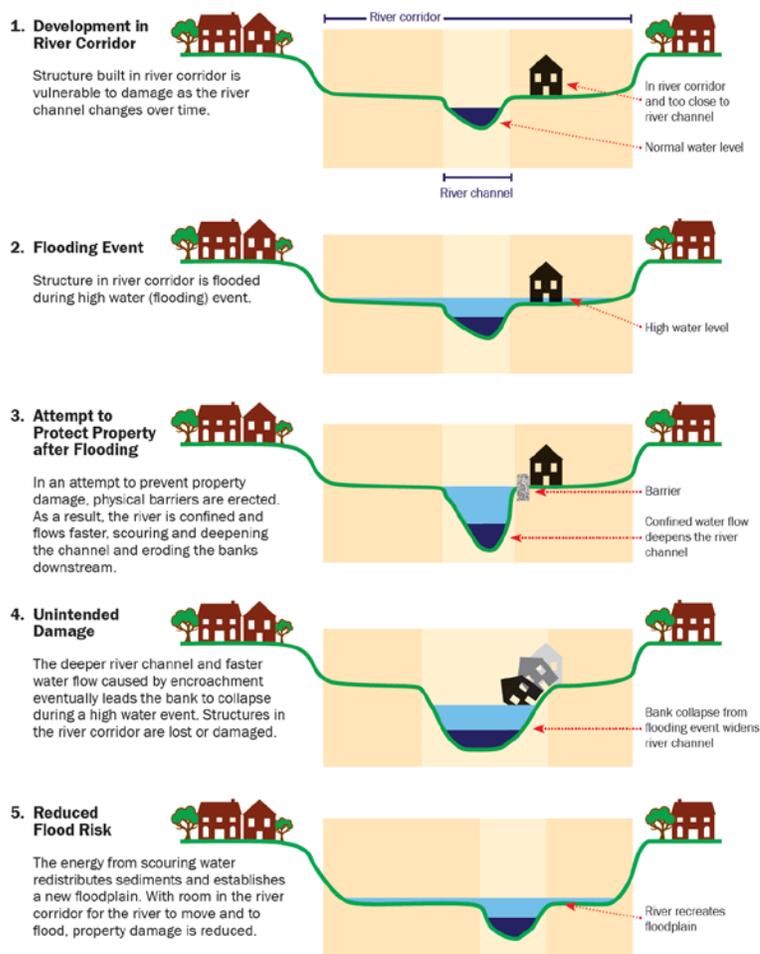
There are two small areas designated as A zone, including a portion along the Mill Brook between Estey Lane and Sunset Lane, and an area around a tributary located north of the Simon Pierce facility.

## 2.3 River Corridors

River corridors are sometimes referred to as “fluvial erosion hazard zones”. Rivers and streams are dynamic. Erosion or scouring of riverbeds or banks may occur during high flow conditions. River corridor areas are those land areas where this erosion is more likely to occur. During Tropical Storm Irene in 2011, most of the damages sustained in Windsor were a result of fluvial erosion along the Mill Brook.

At this time, these hazard areas are not available on a map. However, a scientific study is underway in 2014 that will help to determine where these river corridor protection areas are located along the Mill Brook.

Figure 2 shows what may happen to development that locates too close to a river that is subject to erosion. If you are building a new house, locating outside of that area will reduce your risk.



**Why Protect River Corridors?** VERMONT AGENCY OF COMMERCE & COMMUNITY DEVELOPMENT AGENCY OF NATURAL RESOURCES  
Figure 2: River Corridor Protections. Source: ACCD & ANR

## 2.4 Other Considerations

Primarily the larger rivers and streams have flood hazard areas mapped by FEMA. However, all streams, brooks and ponds are subject to periodic flooding. Section 4.11 of Windsor's current zoning regulations requires 50 foot minimum vegetated buffers along all wetlands, rivers and streams, and all public ponds. These buffer provisions are intended to prevent sedimentation and erosion of surface waters. While it is not a stated purpose of this provision, stream buffers can help to lessen flood risk to some extent. However, a 50 foot buffer may not be sufficiently wide enough in some places to adequately protect properties from flood damages.

There are a number of other factors that relate to community flood risk including, but not limited to, municipal storm drainage systems, road and driveway culverts, and stormwater controls. A number of municipal regulations help to lessen these risks, including *Town of Windsor Road and Bridge Standards*, local access permits, and subdivision stormwater provisions.

## 3 HOW EXISTING FLOOD HAZARD REGULATIONS MAY IMPACT YOU

In general, it is important to know if your property is located within any of the hazard areas discussed in the previous section. If you are planning any development for your site, reducing flood risks should be one of your considerations. The following section is intended to provide guidance on how Windsor's flood hazard regulations impact you and your property. The following is provided as general guidance. Since each application is unique, it will need to be evaluated by the Zoning Administrator (ZA) or Development Review Board (DRB), and the relevant standards will be applied as appropriate.

### Local Permits Required

A permit is required for all development within FEMA special flood hazard areas. This not only includes new construction, building additions and similar projects, but smaller interior projects as well. Any such projects within a special flood hazard area will need a permit and must meet certain standards. Projects that will **need a local flood permit** include, but are not limited to:

- New or replaced building systems (e.g. heating, plumbing, electrical and other systems);
- Interior renovations, expansions or additions;
- Garages and other accessory structures;

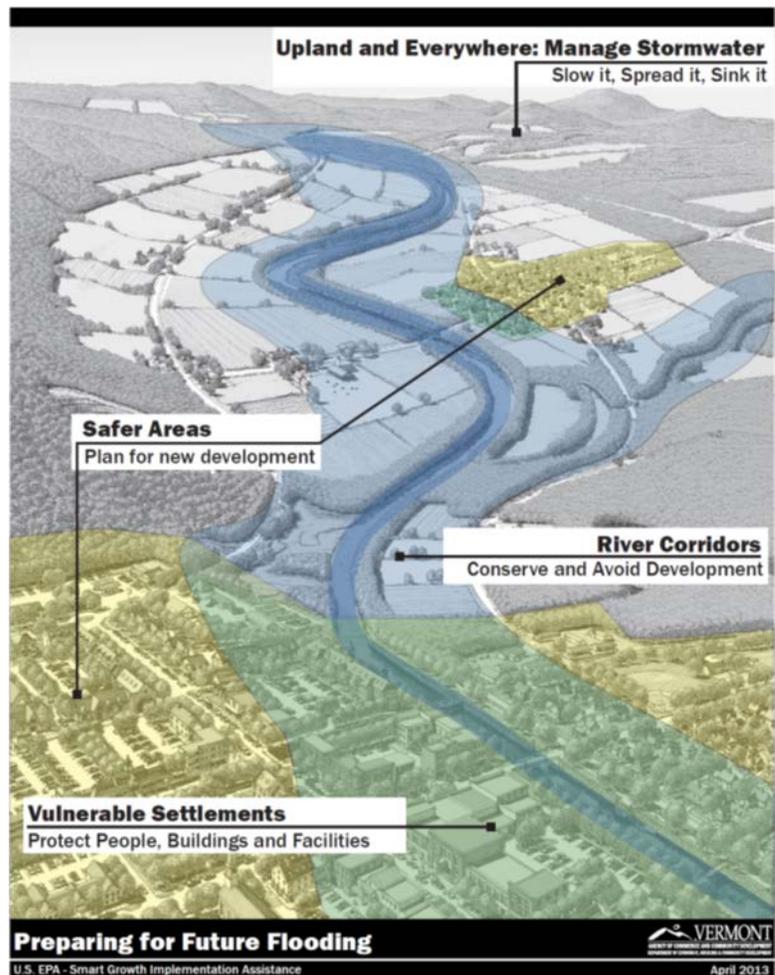


Figure 3: Strategies to achieve flood resilience. Source: ACCD & ANR

- Site work / excavation;
- Construction or reconstruction of roads, driveways, parking lots and retaining walls;
- New or replacement fuel storage tanks;
- Recreational vehicles placed on the site for more than 180 days.

The uses listed below are **exempt from local permits**, but require a state flood permit issued by the State of Vermont starting July 1, 2014 in accordance with [Act 138](#) (2012). *Vermont Floodplain Rules* are currently being created for this state permitting process, and are anticipated to be adopted during spring 2014.

- Farming activities and farm structures in accordance with the Vermont Department of Agriculture’s Accepted Agricultural Practices (AAP);
- Forestry operations conducted in accordance with the Vermont Department of Forests and Parks Acceptable Management Practices;
- Public utility power generating plants and transmission facilities regulated under 30 V.S.A. § 248 (24 V.S.A. § 4413(b));
- Telecommunications facilities regulated under 30 V.S.A. § 248a (30 V.S.A. § 248a(h));
- Development over which a municipality has limited regulatory authority that is not sufficient to comply with NFIP requirements. Such development includes those uses listed under 24 V.S.A. § 4413(a), including state-owned and operated institutions and facilities.

The following are **exempt from all flood permits**:

- Open space;
- Removal of a building;
- Routine maintenance (e.g. roads, driveways and storm water drainage systems).

### National Flood Insurance Program (NFIP) Purpose

The purpose of the NFIP is to reduce future flood damage through community floodplain management ordinances, and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for the protection (*FEMA F-084*, March 2011). The standards described in this section are intended to achieve those purposes. However, this document is not intended to replace or to be as comprehensive as local zoning provisions. The FEMA guidance documents listed in Section 4 provide more detailed guidance on how to meet the flood standards and procedures.

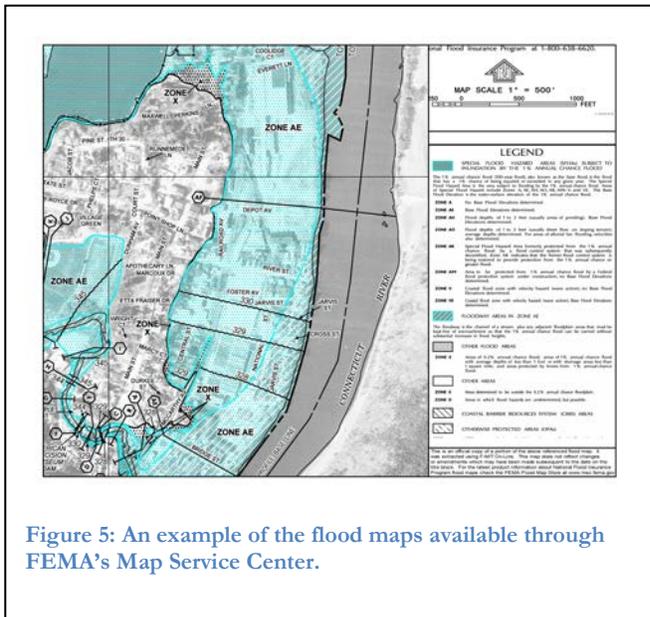


Figure 5: An example of the flood maps available through FEMA’s Map Service Center.

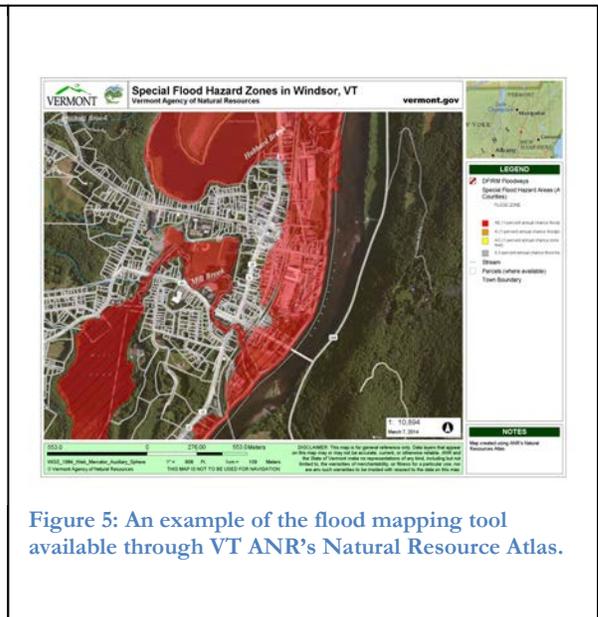


Figure 5: An example of the flood mapping tool available through VT ANR’s Natural Resource Atlas.

## Is My Property in the Special Flood Hazard Zone?

Check the official flood maps issued by FEMA. Hard copies of these maps are available in the Town of Windsor Zoning Office as well as on FEMA's [Map Service Center](#) website (see Figure 5). While these are the official maps as regulated by the Town, it is not always easy to locate your property on them. FEMA's Flood Insurance Study for Windsor is very technical, but it can also be a good reference. They are also available through the Map Service Center. Vermont's Agency of Natural Resources maintains the [Natural Resource Atlas](#), an online mapping tool, which is much easier to use and can help to interpret the official FEMA maps (see Figure 5).

Appendix A1 includes a set of maps and Appendix A2 includes a matrix of affected properties. Those two appendices are intended to help identify which flood zones apply to which parcels and areas of town. However, the Zoning Administrator will help individual property owners identify if a flood permit is required for any particular project and which set of rules apply. Even if only a small corner of your building is within the flood zone, these flood hazard provisions apply.

## New Construction or Fill in Floodways

Junkyards and hazardous material storage facilities are prohibited within the floodway.

Any development within the floodway requires conditional use review by Windsor's Development Review Board. New development is only allowed in the floodway if the applicant provides adequate information to prove that it will not cause a rise in water levels during a base flood, which is usually difficult to achieve.

## Existing Homes within Floodways

Legally existing development within floodways are grandfathered. In other words, they are allowed to continue, but any alterations to structures will require a permit and must meet all applicable standards. (See the discussion below regarding "substantial improvements and non-substantial improvements to existing structures.")

## New Construction and Substantial Improvements in Floodway Fringe Areas

Within the floodway fringe areas (i.e. floodplain) any new buildings, substantial damage or substantial improvements to existing buildings, or variance requests require conditional use review by the Development Review Board. The construction of new buildings, substantial improvements, and rebuilding after substantial damage occurs must meet all standards in the zoning regulations, including raising the lowest floor or flood-proofing. (See the discussion below regarding "substantial improvements and non-substantial improvements to existing structures.")

## All Other Development in Floodway Fringe Areas

All other development within this zone requires a permit issued by the Zoning Administrator, including, but not limited to, non-substantial improvements, accessory structures, decks, fences, and site work. Certain standards apply to these developments (i.e. the so-called "all development" standards), including:

- Development shall be reasonably safe from flooding;
- Anchored to prevent floatation or collapse;
- Constructed with flood-resistant materials;
- Use construction methods and practices that minimize flood damage;
- Building utilities and services (e.g. heating, electrical, etc.) located to prevent flood water from entering or accumulating within components.

Other standards may apply per the Zoning requirements. For

### Substantial Improvement Definition

Any reconstruction, rehabilitation, addition or other improvement, the cost of which exceeds 50% of the market value of the structure

This does **not** include:

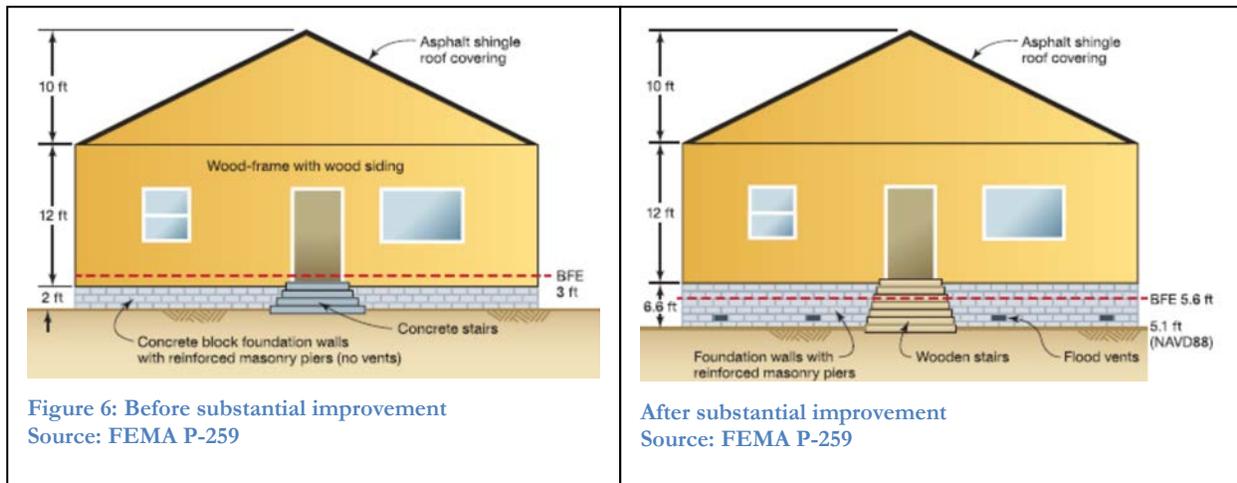
- Corrections to address violations of health, safety or sanitary codes;
- Alterations of "historic structures" that will not preclude continued designation as a historic structure.

example, new fuel storage tanks need to be elevated and tied-down. [See Section 5.6(H)(1) and (3) in *Windsor's Zoning Regulations*.]

### Substantial Improvements to Existing Buildings

All improvements to existing buildings within special flood hazard areas are required to obtain a permit from the Town. Details about the proposed improvements need to include cost estimates in order for the Town to determine if the project is a “substantial improvement” or not. If the initial estimate exceeds 40% of the structure’s market value, very detailed cost estimates will be required. A detailed cost estimate worksheet is required as part of a complete application for applicable projects. Market value is determined based on the most current municipal property assessment; contact the [Lister’s Office](#) (674-5414) for more information. An applicant may provide an alternate market value prepared by a professional assessor for the Town’s consideration. The Zoning Administrator and Development Review Board will consult with the Lister’s Office in order to determine if the alternative market value assessment is acceptable.

For substantial improvement projects, the entire structure must be retrofitted to meet all applicable standards in the flood hazard regulations. For residential structures, that includes raising the lowest floor – ***including the basement*** – to be one-foot above the base flood elevation (see Figure 6).



Non-residential structures will either need to be raised to one-foot above the base flood elevation, or modified to make the structure watertight and able to withstand the pressure of flood waters during a base flood event. (See Figure 7 that lists flood-proofing options for general structure types.)

GENERAL STRUCTURE TYPE		FLOODPROOFING OPTION			
		ELEVATE ON COLUMNS OR FILL 2	FLOODWALL ON LEVEE	FLOOD SHIELDS & CLOSURES 3	
WITH BASEMENT	PROPOSED STRUCTURE	WOOD OR METAL SIDING	X	O	X
	EXISTING STRUCTURE	MASONRY (CONCRETE BLOCK OR BRICK VENEER)	X	O	O
		CONCRETE (CAST-IN-PLACE OR PRE-CAST)	X	O	O
		WOOD OR METAL SIDING	O	O	X
	EXISTING STRUCTURE	MASONRY (CONCRETE BLOCK OR BRICK VENEER)	X	O	O
		CONCRETE (CAST-IN-PLACE OR PRE-CAST)	X	O	O
WOOD OR METAL SIDING		O	O	X	
WITHOUT BASEMENT	PROPOSED STRUCTURE	WOOD OR METAL SIDING	O	O	X
	EXISTING STRUCTURE	MASONRY (CONCRETE BLOCK OR BRICK VENEER)	O	O	O
		CONCRETE (CAST-IN-PLACE OR PRE-CAST)	O	O	O
		WOOD OR METAL SIDING (WITH UNIFIED FLOOR SYSTEM)	O	O	X
	EXISTING STRUCTURE	WOOD OR METAL SIDING (SLAB ON GRADE)	O	O	X
		MASONRY (CONCRETE BLOCK OR BRICK VENEER)	X	O	O
CONCRETE (CAST-IN-PLACE OR BRICK VENEER)		X	O	O	

O-MAY BE APPLICABLE X-GENERALLY NOT APPLICABLE

Figure 7 List of flood-proofing options. Source: FEMA Publication 102

(See [FEMA Publication 758](#) regarding substantial improvements to existing buildings. See also [FEMA Publication 102](#) or [Technical Bulletin 3](#) on dry flood-proofing non-residential structures.)

## Substantial Damage

“Substantial damage” involves damages sustained by any cause, not just by flooding, where the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. Similar to substantial improvements, restoration will require the structure to comply with all flood hazard regulations. In such instances, the property owner *should consider* additional options to reduce risks, such as:

- Relocating the structure to a different part of the lot in order to avoid being in or minimize the portion of the building within special flood hazard areas; or,
- Talking with Town staff about a potential buy-out of the property, especially if it has sustained damage in more than one flooding event.

## Non-Substantial Improvements

The entire existing structure does not need to be brought into compliance (i.e. raised or flood-proofed) for improvements that cost less than 50% of the structure’s market value. However, the non-substantial improvement itself does need to meet the appropriate standards [see Section 5.6(H)(1)]. For example, any interior renovations located below the base flood elevation will need to use flood resistant materials, be adequately anchored, and use other methods to minimize flood damage.

Windsor’s current regulations do not assign a timeframe for substantial improvements. (Some other towns include a requirement that all improvements completed within a 3 or 5 year period of time combined may trigger the substantial improvement threshold.) However, it is not acceptable to attempt to avoid the additional standards for substantial improvements by applying for smaller, phased improvements over the course of a few months.

Additions to a building will need to meet all of the flood standards. For non-substantial improvements, the existing building will not need to be raised or flood-proofed, but the addition will need to be elevated and meet all other applicable standards.

## Cleanup of Contaminated Soils

Remediating contamination at Brownfield sites is subject to flood permits. A summary of the general standards for Brownfield-related site work are listed below, but – since each project is unique – a property owner should talk to the Windsor Zoning Office before proceeding on such a project:

- Any Brownfield site work (e.g. capping contaminated soils) in a floodway is subject to the “no rise” and other applicable standards.
- Within the floodway fringe (i.e. floodplain), Brownfield-related work must meet the “all development” standards (i.e. anchored, flood resistant materials, minimize flood damage, etc.) per Section 5.6(H)(1).

Remediation of contamination found in existing buildings would contribute toward the “substantial improvement” calculation. If the cost of remediation and any other proposed building improvements are above the 50% substantial improvement or damage threshold, the entire building would need to be brought into compliance with all other standards (i.e. elevate it to be one-foot above the base flood elevation or dry flood-proofing). If such work is below the 50% threshold, it is subject to the “all development” standards [see Section 5.6(H)(1)].

## No Basements

Under the NFIP, a basement is not the same as a building’s foundation. Basements are considered to be living space and, therefore, must be elevated one foot above the base flood elevation. The foundation or crawlspace area is considered by FEMA as an “enclosed area below the base flood elevation”. Existing basements are allowed to remain. The following standards must be met for the “enclosed area” in all new construction, reconstruction, substantial improvement as well as for the replacement of substantially damaged structures:

- The space cannot be used as living space;
- It can be used only for parking vehicles, storage or building access;
- Construction materials need to be resistant to flood damage and properly anchored;
- The foundation must withstand the force of flood waters by allowing floodwaters to enter and exit (i.e. adequately sized and located flood openings);
- The floor of the foundation or “enclosed area” must not be below grade (see Figure 8).

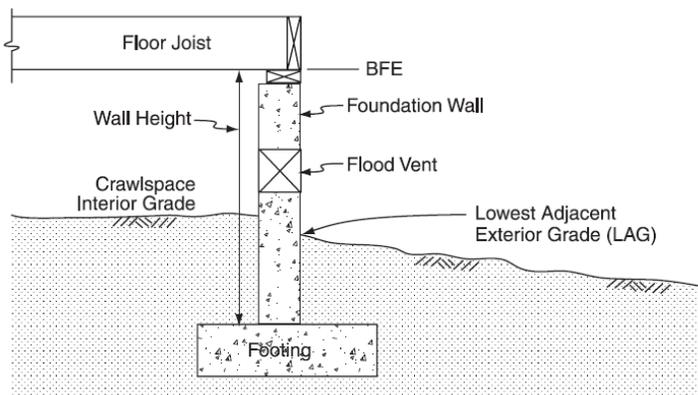


Figure 8: Interior grade of the enclosed area (i.e. crawlspace) is above the exterior grade in order to avoid flood waters from accumulating inside of the building. Source: FEMA Technical Bulletin 11 (2001)

## Flood Resistant Building Materials

All building materials below the lowest floor (i.e. one foot above the base flood elevation) must be resistant to flood damage. FEMA's [Technical Bulletin #2](#) describes acceptable flood resistant materials in detail. Figure 9 shows examples of flood-resistant building techniques and materials. The applicant will need to provide sufficient levels of information in order to determine that the materials comply with this requirement.

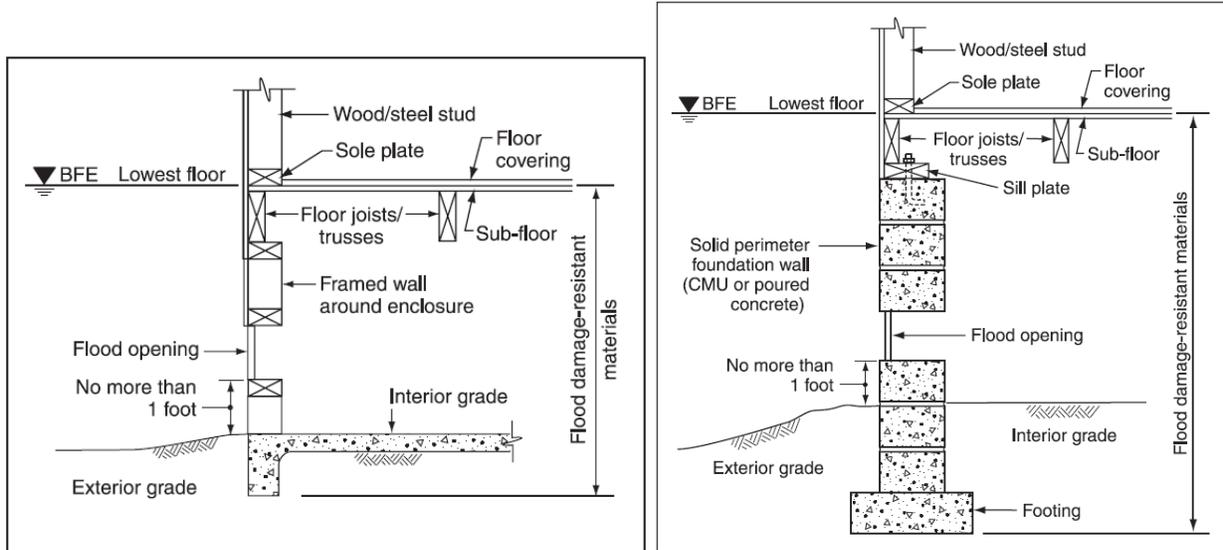


Figure 9: NFIP compliant construction techniques. Notice the flood resistant construction materials, flood openings, and interior grade is at or above the exterior grade. Source: FEMA Technical Bulletin 2 (2008).

## Raising My House

There may be options to raise the lowest floor of your house in order to meet these standards, if needed. (See [FEMA Publication 347](#) Above the Flood: Elevating your Floodprone House for more information.) The following images<sup>1</sup> depict ways to raise the lowest floor of existing buildings above the base flood elevation (see Figures 10-13).

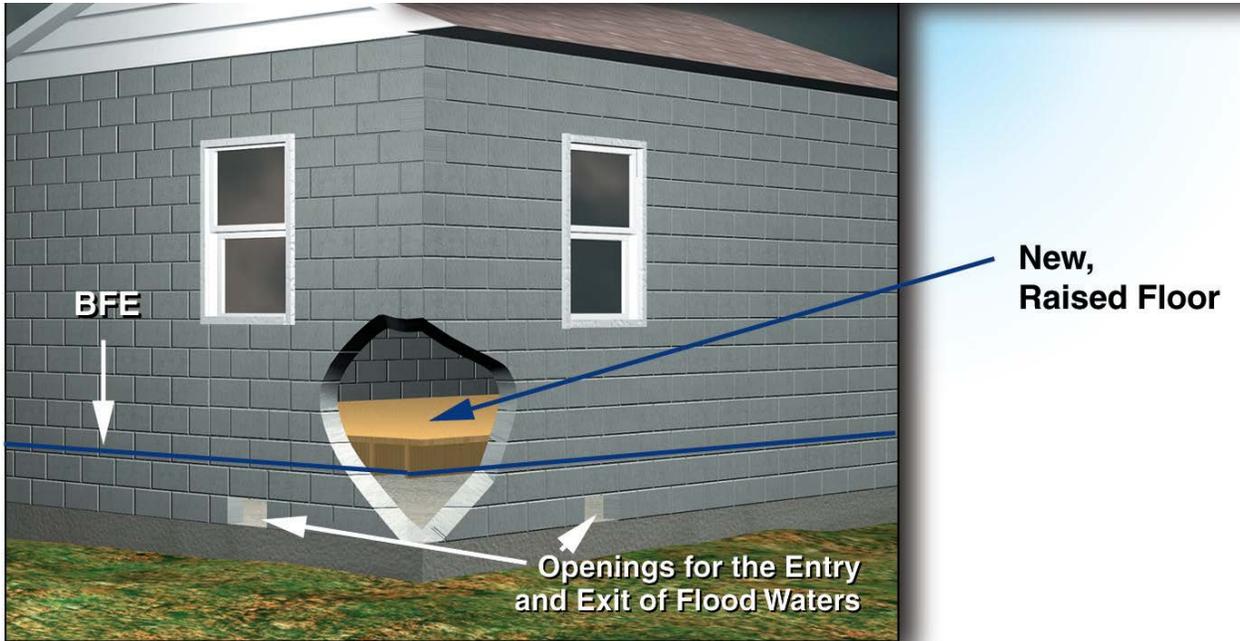


Figure 10: Interior of the building is retrofitted by raising the lowest to be one foot above base flood elevation

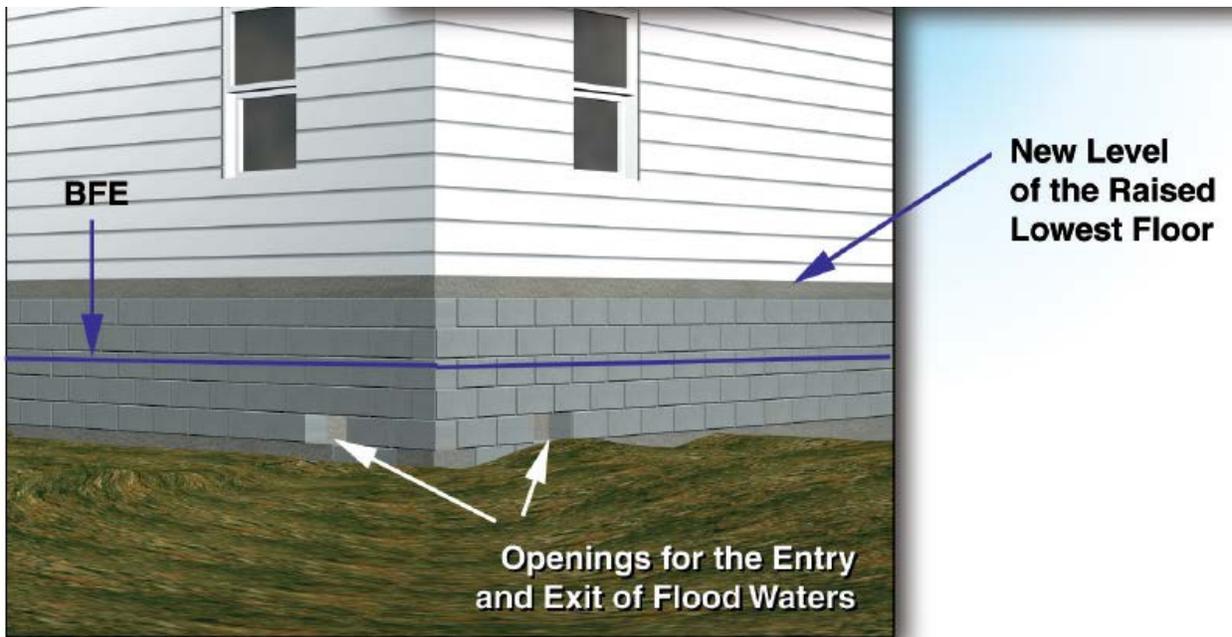


Figure 11: Building foundation is modified to raise the house to be one foot above the base flood elevation.

<sup>1</sup> FEMA P-347 *Above the Flood: Elevating your Floodprone House* (2000)

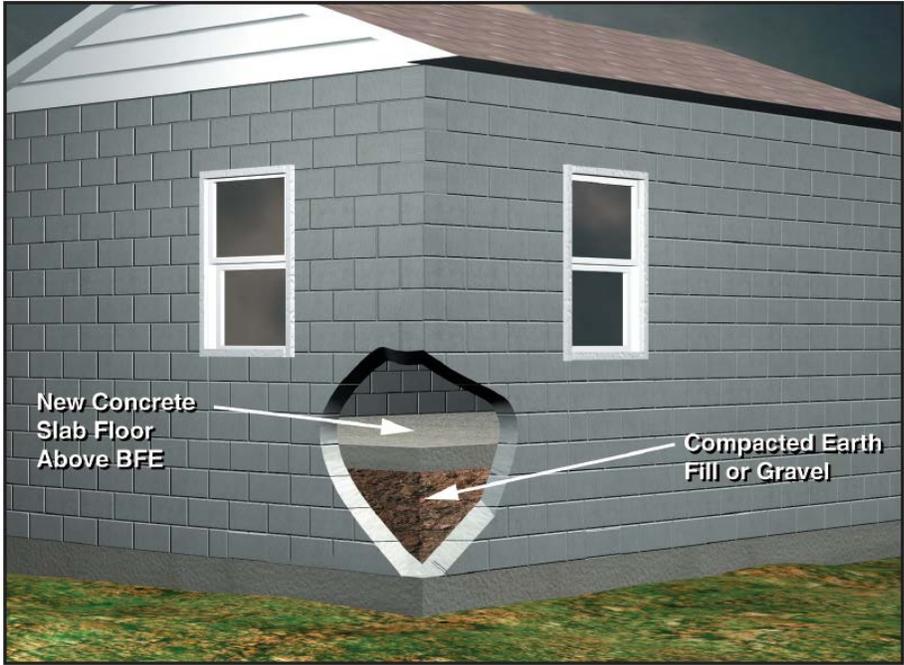


Figure 12: Basement was filled and compacted to build a new concrete floor to be one foot above the base flood elevation

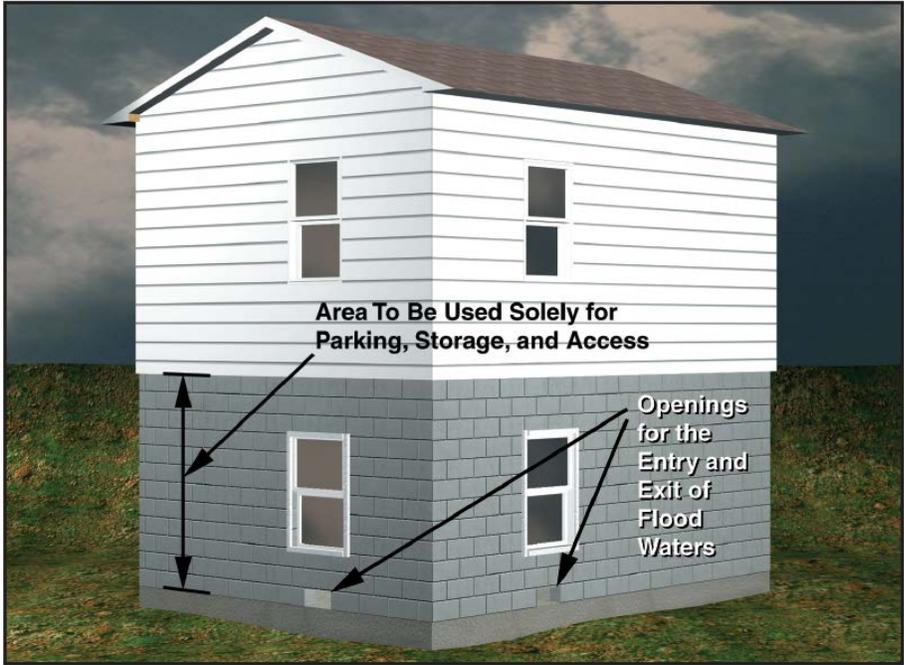


Figure 13: Building was raised and foundation constructed to provide an enclosed area that can be used only for parking, storage and building access

## Historic Structures

NFIP rules allow two options to modify flood standards in order to maintain the historic integrity of designated historic structures. The definition of historic structures is shown in the sidebar below. Windsor's Zoning Regulations include both options for historic structures:

- Any alteration of an existing building that meets the historic structure definition is exempt from standards that apply to “substantial improvements” *as long as these improvements do not preclude continued historic designation.* (See the definition of “substantial improvement” in Section 7.1.) This means that such buildings may not need to elevate or dry flood-proof the structure, if such an improvement would undermine the historic character. However, such projects would still need to meet the “all development” standards under Section 5.6(H)(1).
- Variances from the “all development” standards may be applied for if needed in order to maintain the continued designation as a historic structure. Variances granted are to be the minimum necessary in order to maintain the historic designation.

An applicant will need to provide sufficient levels of information to justify these historic structure provisions. That type of information, at a minimum, will include plans or other information from a qualified architect, professional engineer or historic preservationist with an indication of the level of reduction in standards necessary in order to maintain designation as a historic structure. A variance will affect your flood insurance rates (see the Flood Insurance section on the next page).

**Historic Structure:** Any structure that is:

- (a) Listed in the National Register of Historic Places (Department of the Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
- (b) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
- (c) Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior; or
- (d) Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:
  - (i) By an approved state program as determined by the Secretary of the Interior or
  - (ii) Directly by the Secretary of the Interior in states without approved programs.

In order to determine if your building meets the historic structure definition, please note the following:

- Seven buildings, the Windsor-Cornish Covered Bridge and the Mt. Ascutney State Park are individually listed on the National Register (see Appendix A2).
- There are currently two historic districts listed on the National Register: Ascutney Mill Dam Historic District and Windsor Village Historic District. Structures that contribute to those districts are listed in the maps (see Appendix A2).
- Twenty-one buildings and one bridge are individually listed on the Vermont State Register (see Appendix A2).
- Four historic districts are also listed on the Vermont State Register: Ascutney Mill Dam Historic District, Court Square Historic District, Main Street Historic District, and Upper Main Street Historic District. District maps and a list of contributing structures for each district are included in Appendix A2.
- There is no certified local inventory of historic places at this time.

Non-contributing structures and vacant lands within Historic Districts do not meet the “historic structure” definition. Therefore, they must meet all applicable flood hazard provisions.

For more information on historic listings, including how to list a property, see the websites for the [National Register of Historic Places](#) Program and the [Vermont Historic Resources](#) information. [FEMA Publication 467-2](#) provides guidance on historic structures located in flood hazard areas.

## Flood Insurance

Flood insurance is generally required for any new federally-backed mortgage for structures within the FEMA-determined Special Flood Hazard Areas. People who acquire a home through inheritance or by cash purchase may not be aware of the flood risks on the property or of the benefit of a flood insurance policy. Flood insurance is a good idea for any building that is at risk of flooding, whether within or outside of the FEMA Special Flood Hazard Areas.

Be aware however that flood insurance rates will be increasing due to recent federal laws (i.e. Biggert-Waters Act and the more recent Homeowner's Flood Insurance Affordability Act). FEMA's Flood Insurance Reform [website](#) has some more information on these changes. FEMA's Flood Smart [website](#) is a good reference to get more information about flood insurance.

If a variance to the flood standards is issued, your flood insurance rates are likely to increase substantially.

There may be a few options to reduce your flood insurance rates. Please talk to your insurance agent to help consider your best options.

- Bring your building into compliance with the flood standards. It may ultimately be cheaper to elevate it, than to insure a high-risk structure. Options to meet the standards may vary depending upon the building, but generally may include:
  - Replacing a basement with a flood-vented crawlspace.
  - Elevating the lowest floor to be one-foot or more above the base flood elevation. The higher the elevation in whole-foot increments the less costly the insurance.
  - Relocating the structure to be outside of the hazard area, if possible.
- Increasing your deductible may reduce your insurance premiums, but it may have negative consequences.
- The Town may consider improving Windsor's Community Rating System (CRS) rating. By adopting regulations that exceed the minimum NFIP standards, a community may be able to reduce flood insurance premium rates for residents. However, CRS is difficult to administer. At the present time, only three communities are in this voluntary program. See the following [website](#) for more information.

## 4 RESOURCES

### 4.1 Technical References

The [Town of Windsor Zoning Office](#) should be your first point of contact for any questions regarding Windsor's flood hazard permit requirements or questions. Staff at either the VT Department of Environmental Conservation [Flood Hazard Management Section](#) or the [Southern Windsor County Regional Planning Commission](#) may also be able to answer questions.

There are numerous documents that provide additional information or guidance on the National Flood Insurance Program and the interpretation of standards for flood hazard permits. Some, but not all, of these reference documents are listed below:

#### Regulatory References

- Table 2.10 on page 14, Section 5.6 starting on page 56 of the [Zoning Regulations](#) for the Town of Windsor, VT
- [Title 44](#) of the Code of Federal Regulations, National Flood Insurance Program Parts 59-80

## Flood Insurance

- FEMA [Flood Smart](#) website
- Visit [this section](#) of the Flood Smart website for information on how to buy flood insurance, finding an insurance agent, and to estimate premiums
- *NFIP Flood Insurance Claims Handbook*, [FEMA F-687](#) (2009)

## Flood Hazard Maps

- Find the official Special Flood Hazard Map at the [FEMA Map Service Center](#)
- Use ANR's [Natural Resource Atlas](#) to find your property and available natural resource mapping data, including D-FIRM flood hazard maps
- How to change your flood zone designation see FEMA's [Letter of Map Amendment website](#)

## Guidance for Flood Hazard Regulations

- [Above the Flood: Elevating Your Floodprone House](#), FEMA 347
- [After a Flood: The First Steps](#), FEMA L-198 / ARC 4476
- [Answers to Questions About Substantially Damaged Buildings](#), FEMA 213
- [Answers to Questions About the National Flood Insurance Program](#), F-084
- [Below-Grade Parking Requirements](#), FIA-TB-6
- [Crawlspace Construction for Buildings Located in Special Flood Hazard Areas](#), FIA-TB-11
- [Design Guidelines for Flood Damage Reduction](#), FEMA 15
- [Elevated Residential Structures](#), FEMA 54
- [Elevation Certificate, FEMA 467-1](#)
- [Elevator Installation](#), FIA-TB-4
- [Engineering Principles and Practices of Retrofitting Floodprone Residential Structures](#), FEMA 259
- [Ensuring that Structures Built on Fill In or Near Special Flood Hazard Areas are Reasonably Safe From Flooding](#), FIA-TB-10
- [Historic Structures, FEMA 467-2](#)
- [Homeowners Guide to Retrofitting](#), FEMA 312
- [Floodproofing Non-Residential Structures \(Full Document\)](#), FEMA 102
- [Floodproofing Non-Residential Structures \(Technical Bulletin\)](#), FIA-TB-3
- [Flood Damage-Resistant Materials Requirements](#), (Technical Bulletin 2) (2008)
- [Free-of-Obstruction Requirements](#), (Technical Bulletin 5) (2008)
- [Managing Floodplain Development in Approximate Zone A Areas](#), FEMA 265
- [Openings in Foundation Walls and Walls of Enclosures](#), (Technical Bulletin 1) (2008)
- [Protecting Building Utilities from Flood Damage](#), FEMA 348
- [Protecting Manufactured Homes from Floods and Other Hazards](#), FEMA 85
- [Reducing Damage from Localized Flooding](#), FEMA 511
- [Reducing Losses in High Risk Flood Hazard Areas: A Guidebook for Local Officials](#), FEMA 116
- [Selecting Appropriate Mitigation Measures for Floodprone Structures](#), FEMA 551
- [Substantial Improvement/Substantial Damage Desk Reference](#), FEMA P-758
- [Wet Floodproofing Requirements](#), FIA-TB-7

## Other Resource Documents

- [Biggert-Waters Reform Act](#) provisions require the NFIP to raise insurance rates for some older properties in high-risk areas to reflect true flood risk. See the link for more information.
- [Homeowner's Flood Insurance Affordability Act](#) was signed by the President on March 21, 2014, making changes to reduce the insurance rate increases for primary residences so that do not exceed 18% a year. See the link for more information.

## Financial Assistance

There may be a variety of funding assistance depending upon the situation. The following list provides links to find more information on each of these possible funding sources:

- Purchase [flood insurance](#) for your property
- [Increased Cost of Compliance](#)
- [FEMA Public Assistance](#)
- [FHWA Emergency Relief for Federal-Aid Highways](#)
- [VT Disaster Relief Fund](#)
- VTTrans Town Highway Emergency Fund (see Section 6 in the [Orange Book](#) from VTTrans)
- [Hazard Mitigation Grant Program](#)
- [Pre-Disaster Mitigation \(C\) Program](#)
- [Flood Mitigation Assistance \(FMA\) Program](#)
- [Emergency Watershed Protection Program](#), Natural Resources Conservation Service (NRCS), U. S. Department of Agriculture

Additional funding opportunities may be available after severe disasters, such as Tropical Storm Irene. See the Vermont Community Foundation [website](#) or the Vermont Strong [website](#) for more information.

## **5 Appendices:**

**A1: Flood Hazard Area Maps**

**A2: Flood Hazard Area Inventories**

**A3: Local Flood Resilience Strategies**

**A4: Town Plan Flood Resilience Checklist**

**A5: Flood Permit Review Procedures**

**A6: Flood Permit Review Template**

**A7: Flood Variance Review Template**