Regulating Land Use in Flood Hazard Areas – Model 4.0

Floodplains are natural landforms that prevent flood damage by detaining water, debris, ice, and sediment; and reduce flow velocity, and erosion. Floodplains provide many social, economic, and ecological benefits to communities such as reducing water pollution, enhancing soil quality, and protecting natural communities. Floodplains are also places of known and avoidable hazard. Many towns have older structures, roads, bridges, and sometimes critical facilities built in the flood hazard area. Few communities have adequate resources to provide for public safety during and after the base flood. Your municipal flood hazard bylaw will largely determine the human consequences of floods for years to come.

Flooding is inevitable, but human injury, misery, and damage due to flooding can be avoided through good planning. Flood damages in Vermont currently cost more than $16 million each year.

By managing flood hazards so as to meet or exceed the requirements of the National Flood Insurance Program your municipality can enable all residents to secure flood insurance, enable the municipality to receive disaster relief for damaged infrastructure, and be eligible for grant programs to prepare for the next flood event.

When development encroaches into floodplains, streams can become unstable, flood depths increase, erosion increases, and flow can be diverted toward and onto other properties and existing buildings. Damage to public and private infrastructure often requires expensive and unsustainable channel alterations. These alterations further destabilize the situation leading to a greater risk to public safety in an unsustainable vicious cycle.

FEMA has mapped the inundation hazard associated with the base flood. The base flood has a one percent chance of being equaled or exceeded in a given year. Over the term of a 30 year mortgage a structure in the Special Flood Hazard Area has a 26% chance of being damaged by a flood as compared to a 9% chance of damage from fire.

Inundation is not the only form of damage from flooding. Erosion from flash flooding is the most expensive form of flood damage in the state. Over time, streams meander laterally, and fill or degrade vertically as they adjust to their water levels, sediments, and slope. Stream channels may change suddenly and catastrophically. The area of active stream channel movement is called the Fluvial Erosion Hazard Zone. Vermont DEC is studying rivers across the state to identify areas where stream channels are actively adjusting and there is risk of catastrophic erosion damage from flooding.

Vermont DEC can provide a Fluvial Erosion Hazard Zone Map for your community. FEH Zones are currently used to review and regulate development under Act 250 proceedings. VT DEC emphasizes the importance of avoiding hazards and expensive interventions, and allowing streams and rivers the opportunity to come to a natural equilibrium wherever possible.

Vermont communities received their first Flood Hazard Boundary Maps and Flood Insurance Rate Maps in the 1970s. Prior to those maps, early settlement patterns allowed structures to be built in unsafe locations. These settlement patterns have left some communities with an extraordinary level of risk.

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Please consult with your Fire Chief and emergency responders to understand their capacities to protect the public during the next flood. Your community's regulations should reduce the hazards as identified in your municipal plan and your hazard mitigation plan. The community's efforts to regulate development in known hazard areas may strengthen applications to the Hazard Mitigation Grant Program, the Pre-Disaster Mitigation Fund, and the FEMA Flood Mitigation Assistance grant program. Communities that allow inappropriate development in areas with known hazards may be exposed to legal liabilities. [1]

Your community can start from several different model bylaws to develop and update your flood hazard regulations. The table below outlines four models of flood hazard bylaws. To participate in the National Flood Insurance Program (NFIP) your community will need to adopt and administer regulations that meet or exceed the NFIP requirements.

The Vermont DEC River Management Program recommends models 2.0, 3.0, and 4.0. Models 2.0 and 4.0 prohibit new residential and non-residential structures in the mapped hazard zones. Model 3.0 allows for accessible elevated structures outside the Fluvial Erosion Hazard Zone. Please feel free to call the VT DEC River Management Program to discuss the models that might be appropriate for your municipality.

	Primary Focus	**NFIP Compliant?**	**Use**	**Address Erosion Hazards?**	**Cumulative Benefits / Cost for Town**	**VT DEC Recommended**
1.0	NFIP Minimum	Yes		No	Low	No
2.0	Inundation Hazard	Yes	Stand Alone	No	High	Yes
3.0	Inundation and Erosion Hazard	Yes	Zoning Attachment	Yes	Moderate	Highly
4.0	**Flood Hazard**	**Yes**	Zoning Attachment	**Yes**	**High**	**Highly**

This Model Flood Hazard Regulation (4.0) assumes that the community has pre-existing zoning bylaws. Administrative language is only included to the extent that the established process may need to be amended. Endnotes have been provided to help identify some of the situations where communities can legally choose different regulatory standards. Please let us know if you have questions.

When your Planning Commission has a draft text prepared, please send it to the NFIP Coordinator at Vermont DEC for review. The review may need up to 30 days. The final text, as adopted by the community, must be reviewed by VT DEC and determined to meet or exceed the minimum requirements of the National Flood Insurance Program. VT DEC will also need a clerk's certificate confirming legal adoption of the regulations.

Thank you,

VT DEC River Management Program

VT DEC River Management Program
Agency of Natural Resources
103 South Main Street, Building 10 North
Waterbury, Vermont 05671-0408
802.241.3759, ANR.floodplains@state.vt.us

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TOWN/ CITY/ VILLAGE OF _____ [2]
FLOOD HAZARD REGULATIONS

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I. Statutory Authorization and Effect

In accordance with 10 V.S.A. Chapter 32, and V.S.A. Chapter 117 §4424, §4411 and §4414, there is hereby established a bylaw for areas at risk of flood damage in the Town/City/Village of _____, Vermont.

II. Statement of Purpose

It is the purpose of this bylaw to:

A. Implement the goals, policies, and recommendations in the current municipal plan;
B. Avoid and minimize 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 related inundation and erosion;
C. Ensure that the selection, design, creation, and use of development in hazard areas is reasonably safe and accomplished in a manner that is consistent with public wellbeing, does not impair stream equilibrium, flood plain services, or the stream corridor,
D. Manage all flood hazard areas designated pursuant to 10 V.S.A. Chapter 32 § 753, the municipal hazard mitigation plan; and make the Town/City/Village of _____, its citizens, and businesses eligible for federal flood insurance, federal disaster recovery funds, and hazard mitigation funds as may be available.

III. Other Provisions

A. Precedence of Bylaw

The provisions of these flood hazard bylaws shall not in any way impair or remove the necessity of compliance with any other local, state, or federal laws or regulations. Where this flood hazard regulation imposes a greater restriction the provisions here shall take precedence.

B. Validity and Severability

If any portion of this bylaw is held unconstitutional or invalid by a competent court, the remainder of this bylaw shall not be affected.

C. Warning of Disclaimer of Liability

This bylaw does not imply that land outside of the areas covered by this bylaw will be free from flood or erosion damages. This regulation shall not create liability on the part of the Town/City/Village of _____, or any municipal official or employee thereof, for any flood or erosion damages that result from reliance on this regulation, or any administrative decision lawfully made hereunder.

IV. Lands to Which these Regulations Apply

A. Regulated Flood Hazard Areas

These regulations shall apply to the Fluvial Erosion Hazard Areas and Special Flood Hazard Areas (hereafter called "hazard areas") in the Town/City/Village of _____, Vermont as described below. These hazard areas overlay [3] any other existing zoning districts and the regulations herein are the minimum standards that must be met before meeting the additional standards applicable in the underlying district. These hazard areas include:

1. The Fluvial Erosion Hazard Zone as determined on the most current Fluvial Erosion Hazard Zone Map published by the Vermont Agency of Natural Resources which are hereby adopted by reference and declared to be part of these regulations, [4] and

2. The Special Flood Hazard Area in and on the most current flood insurance studies and maps published by the Department of Homeland Security, Federal Emergency Management Agency, National Flood Insurance Program, as provided by the Secretary of the Agency of Natural Resources pursuant to 10 V.S.A. Chapter 32 § 753, which are hereby adopted by reference and declared to be part of these regulations.

B. Base Flood Elevations and Floodway Limits in Special Flood Hazard Areas

Where available, base flood elevations and floodway limits provided by the National Flood Insurance Program and in the Flood Insurance Study and accompanying maps shall be used to administer and enforce these regulations. In Special Flood Hazard Areas where base flood elevations and/or floodway limits *have not* been provided by the National Flood Insurance Program in the Flood Insurance Study and accompanying maps, it is the applicant's responsibility to develop the necessary data. Where available, the applicant shall use data provided by FEMA, or State, or Federal agencies.

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C. Interpretation

The information presented on any maps, or contained in any studies, adopted by reference, is presumed accurate.

1. If uncertainty exists with respect to the boundaries of the Special Flood Hazard Area or the floodway, the location of the boundary shall be determined by the Administrative Officer (AO). If the applicant disagrees with the determination made by the AO, a Letter of Map Amendment from FEMA shall constitute proof.

2. If uncertainty exists with respect to the boundaries of the Fluvial Erosion Hazard Zone, the location of the boundary shall be determined by the AO. If the applicant disagrees with the determination made by the AO, a letter of determination from the Vermont Agency of Natural Resources shall constitute proof.

V. Summary Table: Development Review in Hazard Areas

The hazard areas are not appropriate sites for new structures nor for development that increases the elevation of the base flood or obstructs the ability of streams to establish and maintain geomorphic equilibrium.

#	Activity	Hazard Zone		
	P Permitted **C** Conditional Use Review **X** Prohibited **A** Exempted	**Special Flood Hazard Area**	**Floodway**	**FEH Zone**
1	New Structures	X	X	X
2	Storage	X	X	X
3	Improvements to Existing Structures	P, C	C	C
4	Small Accessory Structures	P	X	C
5	At Grade Parking	P	C	C
6	Replacement water supply or septic systems	C	C	C
8	Fill as needed to elevate existing structures	C	C	C
9	Fill	X	X	X
12	Grading	C	C	C
13	Road maintenance	A	A	A
14	Road improvements	C	C	C
15	Bridges and culverts	C	C	C
16	Channel management	C	C	C
17	Recreational vehicles	P	P	P
18	Open space, recreation	A	A	A
19	Forestry	A	A	A
20	Agriculture	A	A	A

VI. Development Review in Hazard Areas

A. Permit

A permit is required from the Administrative Officer for all development in all areas defined in Section IV. Development that requires conditional use approval, non-conforming use approval, or a variance from the Appropriate Municipal Panel (AMP) under these flood hazard regulations, must have such approvals prior to the issuance of a permit by the AO. Any development subject to municipal jurisdiction in the designated hazard areas shall meet the criteria in Section VI and VII. Any permit issued will require that all other necessary permits from State or Federal Agencies have been received before work may begin. [5]

B. Permitted Development

For the purposes of review under these regulations, the following development activities in the Special Flood Hazard area where outside of the floodway and outside of the Fluvial Erosion Hazard Zone, and meeting the Development Standards in Section VII, require only an administrative permit from the AO:

1. Non-substantial improvements;
2. Accessory structures;
3. Building utilities;
4. At-grade parking for existing buildings; and,
5. Recreational vehicles.

C. Prohibited Development in Special Flood Hazard Area and Fluvial Erosion Hazard Zone

1. New residential or non-residential structures (including the placement of manufactured homes and critical facilities);
2. Storage or junk yards;
3. New fill except as necessary to elevate structures above the base flood elevation;
4. Accessory structures in the floodway; and,
5. All development not exempted, permitted, or conditionally permitted.

D. Conditional Use Review

Conditional use review and approval by the AMP, is required prior to the issuance of a permit by the AO for proposed development within the following:

1. Substantial improvement, elevation, relocation, or flood proofing of existing structures;
2. New or replacement storage tanks for existing structures;
3. Improvements to existing structures in the floodway;
4. Grading, excavation; or the creation of a pond;
5. Improvements to existing roads;

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6. Bridges, culverts, channel management activities, or public projects which are functionally dependent on stream access or stream crossing;
7. Public utilities;
8. Improvements to existing primary structures in the Fluvial Erosion Hazard Zone that do not expand the footprint of the existing structure more than 500 square feet;
9. Accessory structures in the Fluvial Erosion Hazard Zone, of 500 square feet or less, that represent a minimal investment
10. Building utilities in the Fluvial Erosion Hazard Zone; and,
11. At-grade parking for existing buildings in the Fluvial Erosion Hazard Zone.

E. Exempted Activities

The following are exempt from regulation under this bylaw:

1. The removal of a building or other structure in whole or in part;
2. Maintenance of existing roads and storm water drainage;
3. Silvicultural (forestry) activities conducted in accordance with the Vermont Department of Forests and Parks Acceptable Management Practices; and,
4. Agricultural activities conducted in accordance with the Vermont Department of Agriculture's Accepted Agricultural Practices (AAP). Prior to the construction of farm structures the farmer must notify the AO in writing of the proposed activity. The notice must contain a sketch of the proposed structure including setbacks.

F. Variances

Variances may be granted in writing by the AMP only in accordance with all the criteria in 24 V.S.A. § 4469, § 4424 (E), and 44 CFR Section 60.6 [6], after a public hearing noticed as described in Section VIII.

1. A variance for development within the Fluvial Erosion Hazard Zone may be allowed if, based on a review by VT ANR, it is determined that the proposed development will not obstruct the establishment and maintenance of fluvial geomorphic equilibrium for the watercourse.
2. Any variance issued in the Special Flood Hazard Area will not increase flood heights, and will inform the applicant in writing over the signature of a community official that the issuance of a variance to construct a structure below the base flood elevation increases risk to life and property and will result in increased flood insurance premiums up to amounts as high as $25 for $100 of coverage. Such notification shall be maintained with a record of all variance actions. [7]
3. A copy of such a variance shall be affixed to the deed of the property on file in the municipal clerk's office.

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G. Nonconforming Structures and Uses

The AMP may, after public notice and hearing, approve the repair, relocation, replacement, or enlargement of a nonconforming structure within a flood hazard area provided that:

1. The proposed development is in compliance with all the Development Standards in Section VII of this bylaw;
2. A nonconforming structure that is substantially damaged or destroyed may be reconstructed only in circumstances when the structure cannot be relocated to a less hazardous location on the parcel. The lowest floor of the reconstructed structure must be rebuilt to one foot or more above the base flood elevation, and the structure must otherwise comply with all requirements of the National Flood Insurance Program;
3. Nonconforming structures or uses shall be considered abandoned where such structures or uses are discontinued for more than 12 months; and
4. An individual manufactured home lot in an existing manufactured home park that is vacated shall not be considered a discontinuance or abandonment of nonconformity. Replacement manufactured homes must be placed so as to meet the development standards in this bylaw.

VII. Development Standards – The criteria below are the minimum standards for development in the flood hazard areas. Where more than one zone or area is involved, the most restrictive standard shall take precedence.

A. Special Flood Hazard Area

1. *All development* shall be:

    a. Reasonably safe from flooding;
    b. Designed, operated, maintained, modified, and adequately anchored to prevent flotation, collapse, release, or lateral movement of the structure;
    c. Constructed with materials resistant to flood damage;
    d. Constructed by methods and practices that minimize flood damage;
    e. Constructed with electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding;
    f. Adequately drained to reduce exposure to flood hazards;
    g. Located so as to minimize conflict with changes in channel location over time and the need to intervene with such changes; and,
    h. Required to locate any fuel storage tanks (as needed to serve an existing building in the Special Flood Hazard Zone) a minimum of one foot above the base flood elevation and be securely anchored to prevent flotation; or storage tanks may be placed underground, if securely anchored as certified by a qualified professional.

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2. In Zones AE, AH, and A1 – A30 *where base flood elevations and/or floodway limits have not been determined*, development shall not be permitted unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated encroachment, will not increase the base flood elevation more than 1.00 foot [8] at any point within the community. The demonstration must be supported by technical data that conforms to standard hydraulic engineering principles and certified by a registered professional engineer.

3. *Structures to be substantially improved* in Zones A, A1-30, AE, and AH shall be located such that the lowest floor is at least one foot [9] above base flood elevation, this must be documented, in as-built condition, with a FEMA Elevation Certificate;

4. New *subdivision developments,* planned unit developments, or manufactured home parks of more than 5 acres or 50 lots, whichever is less, shall:

    a. Include base flood elevation data; [10]
    b. Minimize flood damage within the flood-prone area;
    c. Provide adequate drainage to reduce exposure to flood hazards; and
    d. Locate and construct utilities and facilities, such as sewer, gas, electrical, and water systems, so as to minimize or eliminate flood damage.

5. *Manufactured homes to be replaced or substantially improved* that are:

    a. Located in a new manufactured home park or subdivision, outside of a manufactured home park or subdivision, in an expansion to an existing manufactured home park or subdivision, or in a manufactured home park or subdivision which has incurred substantial damage from a flood shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to at least one foot [11] above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement during the occurrence of the base flood.
    b. Located in an existing manufactured home park (created before the FIRM), where elevating a replacement home to or above base flood elevation is *not possible*, the lowest floor shall be supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than 48 inches [12] in height above grade and be securely anchored to resist flotation, collapse, and lateral movement.

5. *Non-residential structures to be substantially improved* shall:

    a. Meet the standards in VII A 3, or as an alternative to VII A 3, such structures may:
    b. Have the lowest floor, including basement, together with attendant utility and sanitary facilities be designed so that two feet [13] above the base flood elevation the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; A permit for flood proofing

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shall not be issued until a registered professional engineer or architect has reviewed the structural design, specifications and plans, and has certified that the design and proposed methods of construction are in accordance with accepted standards of practice for meeting the provisions of this subsection.

7. *Fully enclosed areas below the lowest floor*, in buildings being substantially improved, shall:
    a. Be solely used for parking of vehicles, storage, or building access, and such a condition shall clearly be stated on any permits; and,
    b. Be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Such designs must be certified by a registered professional engineer or architect, or meet or exceed the following minimum criteria: A minimum of two openings on two walls having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

8. *Recreational vehicles* on sites within special flood hazard areas shall be:

    a. On the site for fewer than 180 consecutive days and be fully licensed and ready for highway use; [14] or
    b. Permitted in accordance with the elevation and anchoring requirements for "manufactured homes" in Section VII A 5.

9 A *small accessory* structure of 500 square feet or less [15] that represents a minimal investment need not be elevated to the base flood elevation in this area, provided the structure:

    a. Shall be used only for parking or storage of non-hazardous material;
    b. Shall be designed to have low flood damage potential;
    c. Shall be constructed and placed on the building site so as to offer the minimum resistance to the flow of floodwaters;
    d. Shall provide a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters;
    e. Shall be firmly anchored to prevent flotation; and,
    f. Shall have service facilities such as electrical and heating equipment, elevated or flood proofed to at least one foot above base flood elevation.

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10. *Replacement water supply systems* shall be designed to minimize or eliminate infiltration of flood waters into the systems. [16]

11. *Replacement sanitary sewage systems* shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters.

12. *Replacement on-site waste disposal systems* shall be located to avoid impairment to them or contamination from them during flooding.

13. *The flood carrying and sediment transport capacity* [17] within the altered or relocated portion of any watercourse shall be maintained, and any alteration or relocation shall not result in any decrease of stream stability;

14. *Bridges and culverts*, which by their nature must be placed in or over the stream, must have a stream alteration permit from the Agency of Natural Resources.

15. *Existing buildings to be substantially improved in Zone AO* shall have the lowest floor, including basement, elevated above the highest adjacent grade, at least as high as the depth number specified on the community's FIRM, or at least two feet if no depth number is specified. [18]

16. Structures to be substantially improved *must be accessible by dry land* access outside the special flood hazard area.

<u>B. Floodway Areas</u> [19]

1. Encroachments or development above grade and below the elevation of the floodway are prohibited unless hydrologic and hydraulic analyses are performed in accordance with standard engineering practice, by a registered professional engineer, certifying that the proposed development will:

   a) Not result in any increase in flood levels (0.00 feet) during the occurrence of the base flood;
   b) Not increase any risk to surrounding properties, facilities, or structures from erosion or flooding.

2. Public utilities may be placed underground, and the analyses may be waived, where a registered professional engineer certifies that there will be no change in grade and the utilities will be adequately protected from scour.

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C. Fluvial Erosion Hazard Zone [20]

1. Improvements to existing structures, and any associated fill as needed to comply with elevation requirements in the Special Flood Hazard Area shall not decrease the distance between the existing primary building and the top of bank;
2. Accessory structures may be located within 50 feet of the existing primary building provided that the location does not decrease the distance between the existing primary structure and the top of bank.
3. Development shall not increase the susceptibility of that or other properties to fluvial erosion damage;
4. Development shall not increase the potential of materials being swept onto other lands or into the stream and causing damage to other properties from fluvial erosion;
5. Development shall not cause an undue burden on public services and facilities including roads, bridges, culverts, and emergency service providers during and after fluvial erosion events.
6. Bridge and culvert projects must have a Stream Alteration Permit; and
7. Channel management activities must be authorized by the Agency of Natural Resources.

VIII. Administration

A. Application Submission Requirements

Applications for development follow municipal procedures of the Town/City/Village of _____, under Chapter 117 and include:

1. Where applicable, a site plan that depicts the proposed development, all water bodies, Special Flood Hazard Areas, floodways, Fluvial Erosion Hazard Zone, the shortest horizontal distance from the proposed development to the top of bank of any stream, any existing and proposed drainage, any proposed fill, and pre and post development grades, and the elevation of the proposed lowest floor, as referenced to the same vertical datum as the elevation on the current Flood Insurance Rate Maps;
2. A Vermont Agency of Natural Resources Project Review Sheet for the proposal. The Project Review Sheet shall identify all State and Federal agencies from which permit approval is required for the proposal, and shall be filed as a required attachment to the municipal permit application. The identified permits, or letters indicating that such permits are not required, shall be submitted to the AO and attached to the permit before work can begin; [21]

B. Referrals

Upon receipt of a complete application for a substantial improvement or new construction the AO shall submit a copy of the application and supporting information to the State National Flood Insurance Program (NFIP) Coordinator at the Vermont Agency of Natural Resources, in accordance with 24 V.S.A. § 4424 [22]. A permit may be issued only following receipt of

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comments from the Agency, or the expiration of 30 days from the date the application was mailed to the Agency, whichever is sooner. [23]

If the applicant is seeking a permit for the alteration or relocation of a watercourse, copies of the application shall also be submitted to the adjacent communities, the Stream Alteration Engineer at the Vermont Agency of Natural Resources, and the Army Corps of Engineers. Copies of such notice shall be provided to the State National Flood Insurance Program (NFIP) Coordinator at the Vermont Agency of Natural Resources, Department of Environmental Conservation. A permit may be issued only following receipt of comments from the Vermont Agency of Natural Resources, or the expiration of 30 days from the date the application was mailed to the Vermont Agency of Natural Resources, whichever is sooner.

D. Decisions

The AMP shall consider comments from the NFIP Coordinator at ANR. The AMP may recess the proceedings on any application pending submission of additional information.

E. Records

The Administrative Officer shall properly file and maintain a record of: [24]

a) All permits issued in areas covered by this bylaw;
b) An Elevation Certificate with the as-built elevation (consistent with the datum of the elevation on the current Flood Insurance Rate Maps for the community) of the lowest floor, including basement, of all new, substantially improved, or flood proofed buildings (not including accessory buildings) in the Special Flood Hazard Area;
c) All flood proofing and other certifications required under this regulation; and,
d) All decisions of the AMP (including variances and violations) and all supporting findings of fact, conclusions and conditions.

IX Certificate of Occupancy [25]

In accordance with Chapter 117 §4449, it shall be unlawful to use or occupy, or permit the use or occupancy of any land or structure, or part thereof, created, erected, changed, converted, or wholly or partly altered or enlarged in its use or structure within Special Flood Hazard Area or Fluvial Erosion Hazard Zone until a certificate of occupancy is issued therefore by the Administrative Officer, stating that the proposed use of the structure or land conforms to the requirements of these bylaws. A certificate of occupancy is not required for structures that were built in compliance with the bylaws at the time of construction and have not been improved since the adoption of this bylaw. Within 14 days of the receipt of the application for a certificate of occupancy, the AO shall inspect the premises to ensure that all permits identified on the Project Review Sheet have been acquired and all that all work has been completed in conformance with the zoning permit and associated approvals. If the AO fails to grant or deny the certificate of occupancy within 14 days of the submission of the application, the certificate shall be deemed issued on the 15th day.

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X. Enforcement and Penalties

A. It shall be the duty of the Administrative Officer to enforce the provisions of this bylaw under 10 VSA §1974a, 24 VSA §4451 and §4452 in accordance with the municipal zoning bylaws of the Town/City/Village of _____, A copy of the notice of violation will be mailed to the State NFIP Coordinator.

B. If the violation remains after all appeals have been resolved, the AO shall submit a declaration to the Administrator of the National Flood Insurance Program requesting a denial of flood insurance for the property pursuant to Section 1316 of the National Flood Insurance Act of 1968, as amended.

C. Violations of the Accepted Agricultural Practices shall be enforced as violations of the municipal bylaw. Such violations shall also be immediately reported to the Secretary of Agriculture for enforcement under 6 V.S.A. Section 4812.

XI. Definitions

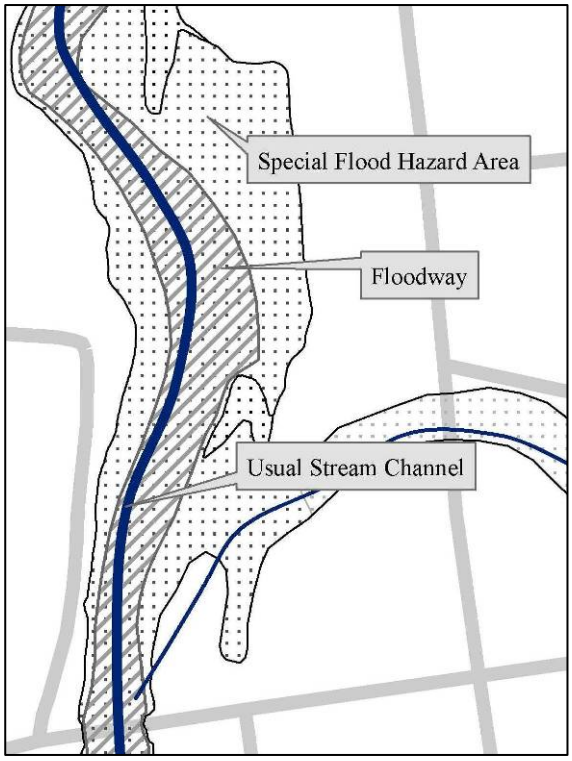
"Accessory Structure" means a structure which is: 1) detached from and clearly incidental and subordinate to the principal use of or structure on a lot, 2) located on the same lot as the principal structure or use, and 3) clearly and customarily related to the principal structure or use. For residential uses these include, but may not be limited to garages, garden and tool sheds, and playhouses.

"Appropriate Municipal Panel" (AMP) means a planning commission performing development review, a board of adjustment, a development review board, or a legislative body performing development review.

"Area of Special Flood Hazard" is synonymous in meaning with the phrase "special flood hazard area" for the purposes of these regulations.

"Base Flood" means the flood having a one percent chance of being equaled or exceeded in any given year (commonly referred to as the "100-year flood").

"Base Flood Elevation" (BFE) is the elevation of the water surface elevation resulting from a flood that has a 1 percent chance of equaling or exceeding that level in any given year. On the



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Flood Insurance Rate Map the elevation is usually in feet, in relation to the National Geodetic Vertical Datum of 1929, the North American Vertical Datum of 1988, or other datum referenced in the Flood Insurance Study report, or the average depth of the base flood, usually in feet, above the ground surface.

"Basement" means any area of the building having its floor elevation below ground level on all sides.

"BFE" see Base Flood Elevation

"Channel" means an area that contains continuously or periodic flowing water that is confined by banks and a streambed.

"Channel width" (or bankfull width) is the width of a stream channel when flowing at a bankfull discharge. The bankfull discharge is the flow of water that first overtops the natural banks. This flow occurs, on average, about once every 1 to 2 years.

"Common plan of development" is where a structure will be refurbished over a period of time. Such work might be planned unit by unit.

"Critical facilities" - include police stations, fire and rescue facilities, hospitals, shelters, schools, nursing homes, water supply and waste treatment facilities, and other structures the community identifies as essential to the health and welfare of the population and that are especially important following a disaster. For example, the type and location of a business may raise its status to a Critical Facility, such as a grocery or gas station that survive a flood and now are the only sources for food and gas.

"Development" means any human-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials.

"Existing manufactured home park or subdivision" means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is *completed before the effective date of the initial floodplain management regulations* adopted by a community.

"Expansion to an existing manufactured home park or subdivision" means the preparation of additional sites by the construction of facilities for servicing the lots on which the manufacturing homes are to be affixed (including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads).

"Fill" means any placed material that changes the natural grade, increases the elevation, or diminishes the flood storage capacity at the site.

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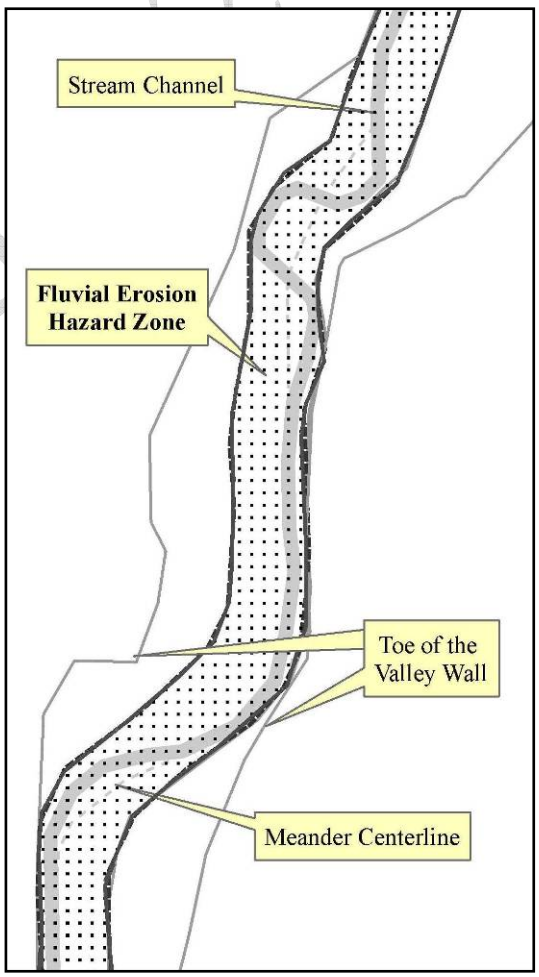
"FIRM" see Flood Insurance Rate Map

"Flood" means (a) a general and temporary condition of partial or complete inundation of normally dry land areas from: the overflow of inland or tidal waters; the unusual and rapid accumulation or runoff of surface waters from any source; and mudslides which are proximately caused by flooding and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current. (b) The collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as flash flood or abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding.

"Flood Insurance Rate Map" (FIRM) means an official map of a community, on which the Federal Insurance Administrator has delineated both the special flood hazard areas and the risk premium zones applicable to the community. In some communities the hazard boundaries are available in paper, pdf, or Geographic Information System formats as a Digital Flood Insurance Rate Map (DFIRM).



"Flood Insurance Study" means an examination, evaluation and determination of flood hazards and, if appropriate, the corresponding water surface elevations or an examination, evaluation and determination of mudslide (i.e., mudflow) and /or flood related erosion hazards.

"Floodplain or flood-prone area" means any land area susceptible to being inundated by water from any source (see definition of "flood").

"Flood proofing" means any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

"Floodway" means the 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. Please note that Special Flood Hazard Areas and floodways may be shown on a separate map panels.

"Floodway, Regulatory in Town/City/Village of _____" means the 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. [26]

"Fluvial Erosion" is erosion caused by streams and rivers. Fluvial erosion can be catastrophic when a flood event causes a rapid adjustment of the stream channel size and/or location.

"Fluvial Erosion Hazard Zone" includes the stream and adjacent lands necessary to accommodate the slope and plan form requirements of a geomorphically stable channel, and is subject to fluvial erosion as defined by the Vermont Agency of Natural Resources and delineated on the current Fluvial Erosion Hazard Zone Map.

"Functionally dependent use" means a use which cannot perform its intended purpose unless it is located or carried out in close proximity to water.

"Historic structure" means any structure that is: (a) listed individually in the National Register of Historic Places (a listing maintained by the 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.

"Letter of Map Amendment (LOMA)" is a letter issued by the Federal Emergency Management Agency officially removing a structure or lot from the flood hazard zone based on information provided by a certified engineer or surveyor. This is used where structures or lots are located above the base flood elevation and have been inadvertently included in the mapped special flood hazard area.

"Lowest floor" means the lowest floor of the lowest enclosed area, including basement, except an unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of 44 CFR 60.3.

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"Manufactured home (or Mobile home)" means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term "manufactured home" does not include a "recreational vehicle".

"Manufactured home park or subdivision" means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

"New construction" for regulation under this bylaw, means structures for which the *start of construction* commenced on or after the effective date of the floodplain management regulation adopted by the community and includes any subsequent improvements to such structures.

"New manufactured home park or subdivision" means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is *completed on or after the effective date of the floodplain management regulations* adopted by a community.

"Nonconforming structure" means a structure or part of a structure that does not conform to the present bylaws but was in conformance with all applicable laws, ordinances, and regulations prior to the enactment of the present bylaws, including a structure improperly authorized as a result of error by the administrative officer. Structures that were in violation of the flood hazard regulations at the time of their creation, and remain so, remain violations and are not nonconforming structures.

"Nonconforming use" means use of land that does not conform to the present bylaws but did conform to all applicable laws, ordinances, and regulations prior to the enactment of the present bylaws, including a use improperly authorized as a result of error by the administrative officer.

"Nonconformity" means a nonconforming use, structure, lot, or parcel.

"Non-residential" includes, but is not limited to: small business concerns, churches, schools, nursing homes, farm buildings (including grain bins and silos), pool houses, clubhouses, recreational buildings, government buildings, mercantile structures, agricultural and industrial structures, and warehouses.

"Recreational vehicle" means a vehicle which is: (a) Built on a single chassis; (b) 400 square feet or less when measured at the largest horizontal projection; (c) Designed to be self-propelled or permanently towable by a light duty truck; and (d) Designed primarily not for use as a permanent dwelling but as a temporary living quarters for recreational, camping, travel, or seasonal use.

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"Special Flood Hazard Area" is the floodplain within a community subject to a 1 percent or greater chance of flooding in any given year. For purposes of these regulations, the term "area of special flood hazard" is synonymous in meaning with the phrase "special flood hazard area". This area is usually labeled Zone A, AO, AH, AE, or A1-30 in the most current flood insurance studies and on the maps published by the Federal Emergency Management Agency. Maps of this area are available for viewing in the municipal office or online from the FEMA Map Service Center: msc.fema.gov Base flood elevations have not been determined in Zone A where the flood risk has been mapped by approximate methods. Base flood elevations are shown at selected intervals on maps of Special Flood Hazard Areas that are determined by detailed methods. Please note, where floodways have been determined they may be shown on separate map panels from the Flood Insurance Rate Maps.

"Start of construction" for purposes of floodplain management, determines the effective map or bylaw that regulated development in the Special Flood Hazard Area. The "start of construction" includes substantial improvement, and means the date the building permit was issued provided the actual start of construction, repair, reconstruction, rehabilitation, addition placement, or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footing, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, regardless whether that alteration affects the external dimensions of the building.

"Structure" means, for regulatory purposes under this bylaw, a walled and roofed building, as well as a manufactured home, and any related built systems, including gas or liquid storage tanks.

"Substantial damage" means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged conditions would equal or exceed 50 percent of the market value of the structure before the damage occurred.

"Substantial improvement" means any reconstruction, rehabilitation, addition, or other improvement of a structure after the date of adoption of this bylaw, the cost of which, over three years, or over a the period of a common plan of development,[27] cumulatively equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage", regardless of the actual repair work performed. The term does not, however, include either: (a) Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specification which have been identified by the local code

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enforcement official and which are the minimum necessary to assure safe living conditions or (b) Any alteration of a "historic structure", provided that the alteration will not preclude the structure's continued designation as a "historic structure".

"Top of Bank" means that vertical point along a stream bank where an abrupt change in slope is evident. For streams in wider valleys it is the point where the stream is generally able to overflow the banks and enter the floodplain. For steep and narrow valleys, it will generally be the same as the top of slope.

"Violation" means the failure of a structure or other development to be fully compliant with this bylaw. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in 44 CFR 60.3 is presumed to be in violation until such time as that documentation is provided.

"Walkout-on-grade basement" means a basement whose floor is at ground level on at least one side of the house, usually with a door on that side. This is considered the lowest floor as defined by these regulations.

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Endnotes

[1] Kusler, Jon A., *Legal Questions: Government Liability and No Adverse Impact Floodplain Management*, Association of State Floodplain Managers, May 2004
[2] Please search for and replace "Town/City/Village of _____" with the name of your municipality in all locations in this document.
[3] In some communities the flood hazard areas are considered "underlying" districts. Please use the term appropriate for your community.
[4] VT DEC and the NFIP strongly recommend these standards. 44 CFR 60.1 (c)(d) Structures in the Fluvial Erosion Hazard Zone are at risk of damage through predictable river channel adjustments. Efforts to protect such structures, such as through the armoring of banks, impinge on the area needed to maintain long term stream channel equilibrium and may increase the risk of flood and erosion damage to existing properties and public infrastructure. Damage caused by flood-caused erosion is the single most expensive type of disaster in Vermont for the state and municipalities. VT DEC has identified Fluvial Erosion Hazard Zones for many Vermont rivers and strongly recommends these regulations.
[5] To participate in the National Flood Insurance Program (NFIP), the Code of Federal Regulations requires that communities assure that all other permits have been secured. 44 CFR 60.3 (a) (2)
[6] Required for NFIP, 44 CFR Section 60.6
[7] Required for NFIP, 44 CFR Section 60.6 (a) (5)
[8] The "one foot" standard here should be the same as the standard that the community adopts in the definition of "Floodway, Regulatory in Town/City/Village of ____".
[9] Where base flood elevations are available, structures are required to be at or above the base flood elevation, 44 CFR 60.3 (c)(2)(3). Flood insurance rates are substantially reduced for structures one foot or more above base flood elevation. Over time the elevation of the base flood may increase as the stream changes position, as the floodplain is encroached upon, as development increases in the watershed, and as the climate changes. VT DEC strongly recommends that existing structures in all flood hazard areas be at least one foot above the base flood elevation.
[10] Required for NFIP, 44 CFR 60.3 (a)(4)
[11] See endnote 20 on elevation.
[12] The NFIP requires 36 inches of elevation or more, 44 CFR 60.3 (c) 12 (ii). This standard addresses situations where improved or replaced manufactured homes on sites in existing (pre-FIRM) manufactured home parks in the hazard area can not be elevated above the base flood elevation. VT DEC recommends elevating such structures at least 48 inches. Such elevation would only protect the structure from floods smaller and more frequent than the base flood.
[13] Flood proofing to two feet above BFE secures the same protection recognized by insurance ratings as elevating to one foot above BFE.
http://www.fema.gov/plan/prevent/floodplain/nfipkeywords/floodproofing_certificate.shtm
[14] The NFIP requires 180 days or less, 44 CFR 60.3 (c)(14)
[15] The community can define a low cost structure by setting a limit such as 500 ft^2 or less. The community can also choose to not allow such accessory structures. Flood insurance is not available for such structures.

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[16] The NFIP requires the standards in VII A 10, 11, and 12, 44 CFR 60.3 (a) (5)(6). Under Vermont state law, permits for such activity are handled by VT DEC and are not subject to local control unless the community has been delegated authority. The NFIP requirements are met through the state permit process. If there are additional requirements regarding development (in general) in the hazard zone then any application for development must meet those standards during local review.

[17] The NFIP requires that any altered watercourse maintain its capacity to carry floodwaters, 44 CFR 60.3 (b) 7. VT DEC recommends that any altered watercourse also maintain its ability to transport its sediment load and not decrease stream geomorphic stability.

[18] Communities that do not have AO Zones mapped on their FIRM do not need to adopt this regulation.

[19] These standards are recommended by VT DEC and/or required by the NFIP. The floodway is an area reserved to convey floodwaters during the base flood. Encroachments in the floodway are prohibited if they cause any increase in the elevation of the base flood. Actual floodwater movement during the base flood may have considerable destructive velocity and power.

[20] Please see endnote 6.

[21] The NFIP requires assurance that all other permits have been secured. The Project Review Sheet provides an efficient way to meet that requirement.

[22] Required by Title 24 VSA Chapter 117 §4424.

[23] Required by Title 24 VSA Chapter 117 §4424.

[24] The NFIP requires the community to keep records of permits, variances, elevations, flood proofing, and certifications. CFR 60.3 (b) (5)

[25] A Certificate of Occupancy is recommended by the VT DEC as a low cost method to support the enforcement of these regulations.

[26] If the FIRM includes information on base flood elevations, the NFIP requires that the community adopt a regulatory floodway standard. CFR 60.3 (d) (2). This standard should allow a surcharge of one foot or less. In effect, this allows the base flood elevation to increase up to one foot, thereby increasing the risk of damage to existing properties in or near the Special Flood Hazard Area. Section VI C 3 prohibits new fill, except where necessary to safely elevate structures, as a way to minimize increases in the elevation of the base flood.

[27] The community has several options here. "Substantial Development" sets the threshold by which a structure in harm's way is compelled to be prepared for the base flood. Typically the preparation is to elevate the addition or the structure. The minimum NFIP standard is to define "substantial" as an investment of 50% of the existing value of the structure, or any investment subsequent to "substantial damage" to the structure. This high (50%) threshold may not get the structure or community prepared in time for the next flood, and many improvements are phased over several years. The NFIP encourages communities to adopt stricter standards such as by defining "substantial improvement" as cumulative over a defined period of time (such as three or five years), or by way of a common plan of development. The definition here uses three years. 44 CFR 59.1.

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